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BURLINGTON DEVELOPMENT REVIEW BOARD
Tuesday, July 18, 2023, 5:00 PM
PUBLIC HEARING NOTICE

Hybrid & In Person (at 645 Pine Street) Meeting

Zoom: https://us02web.zoom.us/j/83225696227?pwd=SGQ0bTdnS000Wkc3c2J4WWw1dzMxUT09
Webinar ID: 832 2569 6227
Passcode: 969186
Telephone: US +1 929 205 6099 or +1 301 715 8592 or +1 312 626 6799 or +1 669 900 6833 or +1 253 215 8782 or +1 346 248 7799

1. **ZP-23-253; 453 Pine Street (E-LM, Ward 5S) Derrick Davis / Kelley DesRoches**
   Construction of 30,000 square foot health club (spa/bathhouse) and 12,400 square foot retail/commercial buildings with associated site improvements.

2. **ZP-23-222; 10-12 Oak Street (RM, Ward 2C) Harold & Juliet Moran / Anna Thelemarck**
   Establish dwelling unit within the garage and reconfigure driveway. PUD for 2nd detached dwelling unit.

3. **Joint Institutional Parking Management Plan**
   Continued review of proposed 2023-2028 Plan.

Plans may be viewed upon request by contacting the Department of Permitting & Inspections between the hours of 8:00 a.m. and 4:30 p.m. Participation in the DRB proceeding is a prerequisite to the right to take any subsequent appeal. Please note that ANYTHING submitted to the Zoning office is considered public and cannot be kept confidential. This may not be the final order in which items will be heard. Please view final Agenda, at www.burlingtonvt.gov/dpi/drb/agendas or the office notice board, one week before the hearing for the order in which items will be heard.

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CHAMPLAIN COLLEGE

The University of Vermont

THE University of Vermont MEDICAL CENTER

Joint Institutional Parking Management Plan

2023-2028

Prepared For: Development Review Board
Date: July 18th, 2023

vhb

CATMA
We'll help you get there

Acknowledgements

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Table of Contents

Executive Summary ..... **ix**

Introduction **13**

Purpose & Content 13
CATMA 15
Transportation Management Associations (TMA) 15
Transportation Demand Management (TDM) 16

Collective Institutional Summary **17**

Peak Parking Demand 17
Trends & Patterns 19
Policy Shift 19
COVID-19 Pandemic 20
Survey Trends on Travel Behavior 21
On-Street Parking Adjacent to Institutions 24
Collective Highlights & Strategies 25
Transportation Demand Management 25
Campus Shuttles and Transit 26
Bike Share 27
CarShare 27
Climate Initiatives 28
Multimodal Connections 29

Champlain College **37**

Existing & Anticipated Infrastructure and Development 38
Existing & Anticipated Community Population 39
Existing & Anticipated Parking Demand 40
Fleet 43
Highlighted Strategies 44
Parking Restrictions and Permits 44
Telework 44
Transportation Demand Management 44
CarShare Vermont 44
Shuttles 45
Monitoring, Compliance, and Enforcement 45

University of Vermont 46

Existing & Anticipated Infrastructure and Development 47
Existing & Anticipated Community Population 51
Existing & Anticipated Parking Demand 51
Fleet 55
Highlighted Strategies 55
Parking Restrictions and Permits 55
Telework 56
Transportation Demand Management 56
CarShare Vermont 56
Shuttles 56
Monitoring, Compliance, and Enforcement 57
Other Key Areas of Concern 57

University of Vermont Medical Center 59

Existing & Anticipated Infrastructure and Development Plan 59
Existing & Anticipated Community Population 60
Existing & Anticipated Parking Demand 60
Fleet 65
Highlighted Strategies 65
Parking Restrictions and Permits 65
Telework & Telehealth 65
Carpool 66
Shuttle and Transit Services 66
Monitoring, Compliance, and Enforcement 67

Conclusions 68

Appendix A 70

Lot Counts 70
Survey Administration 70
Survey Weighting 71
Demand Calculation 71
Margin of Error 72

Appendix B 73

Comprehensive Development Ordinance – Parking 73

List of Tables

Table No.	Description	Page
Table 1	Current Institutional Parking Demand Summary	18
Table 2	Future Institutional Parking Demand Summary	18
Table 3	On-Street Parking at Peak Time	25
Table 4	Champlain College Previous and Current TDM Metrics	33
Table 5	University of Vermont Previous and Current TDM Metrics	34
Table 6	University of Vermont Medical Center Previous and Current TDM Metrics	35
Table 7	Existing and Anticipated Champlain College Infrastructure	38
Table 8	Champlain College Status of Previously Identified Projects	38
Table 9	Anticipated Champlain College Building Development Program	39
Table 10	Champlain College Current Parking Demand	42
Table 11	Champlain College Future Parking Demand 2028	43
Table 12	Existing UVM Campus Building Data	47
Table 13	Existing UVM Parking Capacity	48
Table 14	UVM Campus Building Program Data (completed and future)	49
Table 15	University of Vermont Current Parking Demand	53
Table 16	University of Vermont Future Parking Demand 2028	54
Table 17	University of Vermont Medical Center Current Parking Demand	63
Table 18	University of Vermont Medical Center Future Parking Demand 2028	64
Table A-1.	Overview of CATMA's 2022 Transportation Survey solicitation and responses.	71

Table A-2. Summary of peak parking demand on each campus as identified by the 2022 CATMA Employee and Student Transportation Surveys. 72

List of Figures

Figure No. Description Page

Figure 1 Champlain College Drive Alone Trends & Mode Split 22

Figure 2 University of Vermont Drive Alone Trends & Mode Split 23

Figure 3 University of Vermont Medical Center Drive Alone Trends & Mode Split 24

Figure 4 Highlighted Project Corridors Addressing Multimodal Connectivity (institutional areas highlighted in white) 31

Figure 5 Champlain College Parking Utilization Trends 40

Figure 6 Champlain College Average Parking Utilization Rates 41

Figure 7 University of Vermont Parking Utilization Trends 51

Figure 8 University of Vermont Average Utilization Rates 52

Figure 9 University of Vermont Medical Center Average Utilization Rates 61

Figure 10 University of Vermont Medical Center Parking Utilization Trends 62

Figure A-1. Top: Formula for calculating peak parking demand percent for employees and off-campus students. Bottom: Formula for calculating peak parking demand percent for on-campus students. 72

Executive Summary

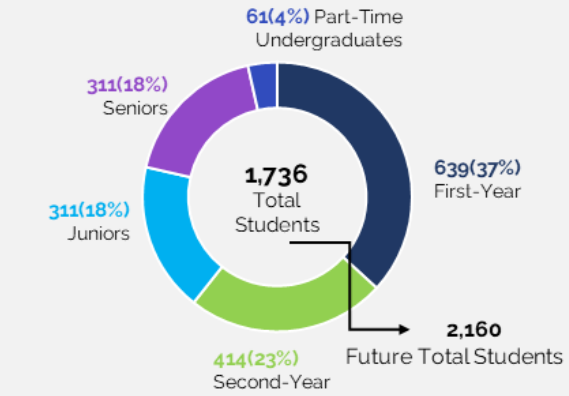
The Joint Institutional Parking Management Plan (JIPMP) submitted demonstrates current and anticipated parking demand for Burlington's "Hill" Institutions to meet the requirements set forth in Article 8 of the Comprehensive Development Ordinance. Comprised of Champlain College, University of Vermont (UVM), and University of Vermont Medical Center (UVMMC), the "Hill" Institutions' parking supply and demand are summarized within this 2023-2028 JIPMP based on data gathered during the Fall of 2022. This assembled data informs the analysis that demonstrates that the existing parking supply meets current demand for each institution. In addition, anticipated development and growth on each campus informs the anticipated parking supply and demand out to 2028, with a 5-year projection that coincides with the anticipated approval interval of this document.

Each institution's current and anticipated infrastructure, user populations, parking demand, fleet, and strategies to keep parking supply and demand in balance are summarized below as outlined in Article 8. These facts and figures are further detailed within the report and supplemental documentation.

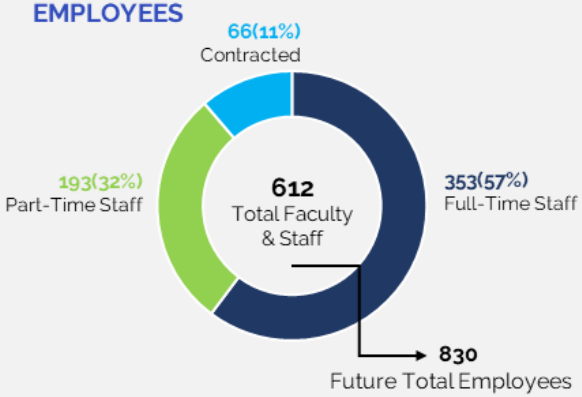
CHAMPLAIN FACT SHEET

CHAMPLAIN COLLEGE

STUDENTS



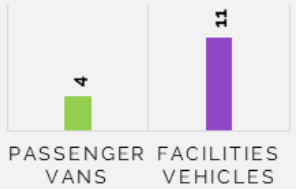
EMPLOYEES



CURRENT PEAK PARKING DEMAND

642	741	427	833
Total Parking Supply	Estimated Demand (based on Survey[1])	Utilization (based on Counts)	ITE Estimate[2]

FLEET VEHICLES



15 **Fleet Vehicles**

- All Fleet Vehicles parked in designated spaces

FUTURE DEVELOPMENT

39,000 gsf (approx.) will be added with future development projects and 30 residential beds

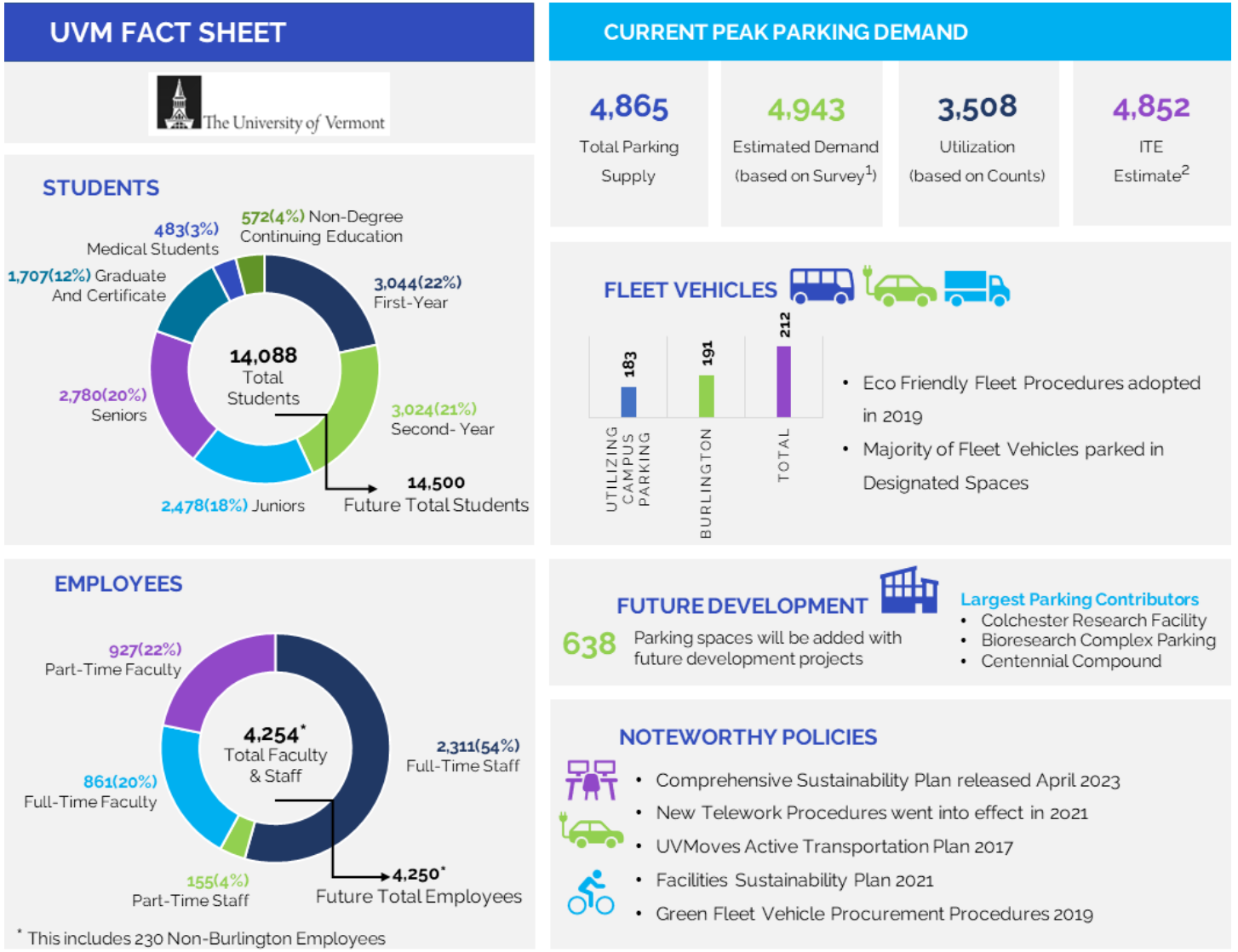
Future Projects

- Foster Hall Addition
- New ITS Building
- Conversion of Building to Residential Hall

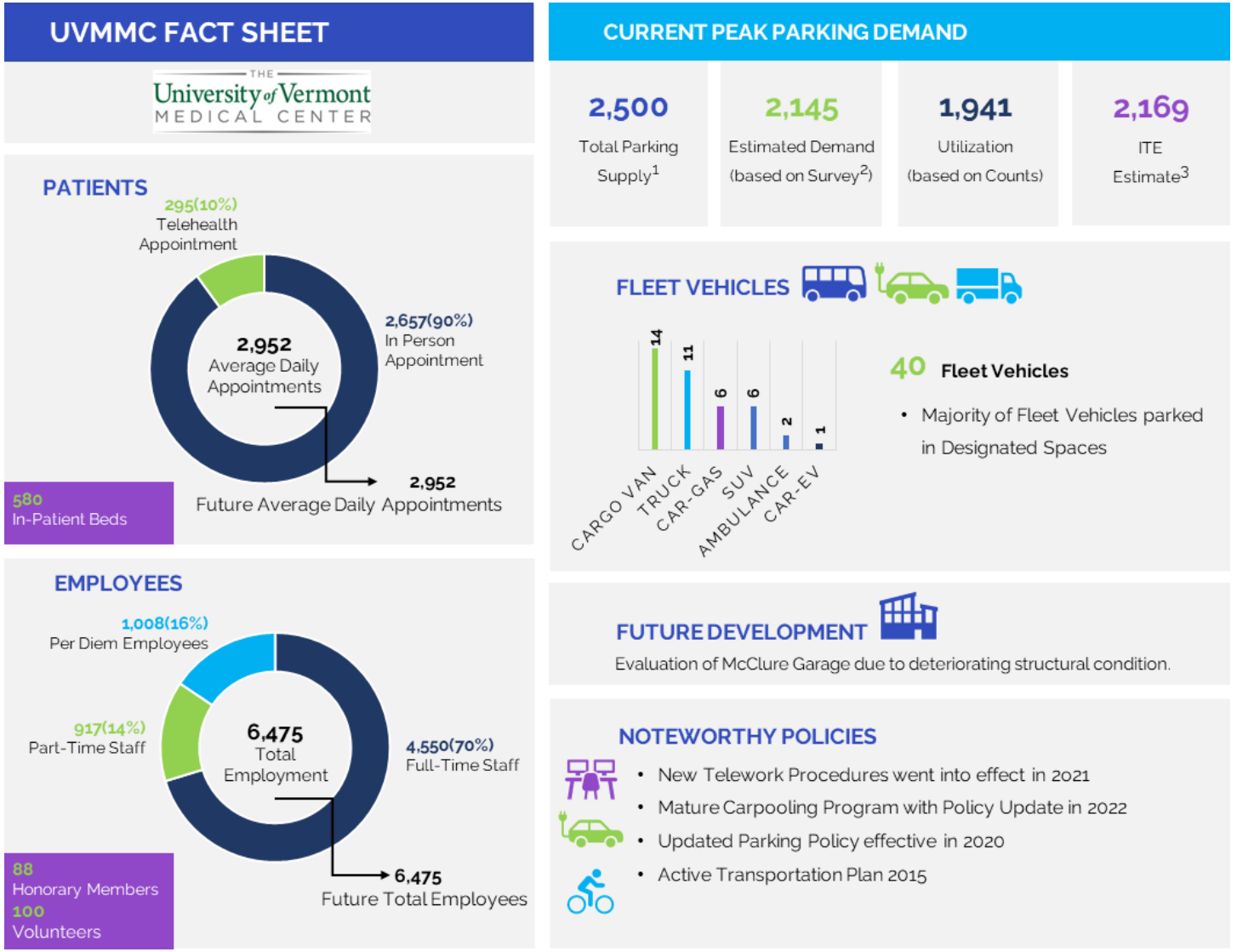
NOTEWORTHY POLICIES

- New Interim Workplace Flexibility People Center effective in 2022
- Sustainability Action Plan completed in 2013
- Active Transportation Plans effective in 2015
- Parking Policies effective in 2017
- Sustain Champlain Campaign

1. Estimated parking demand based on survey of employees and students reporting predominantly driving alone or carpooling to serve their transportation to campus and typically on campus at peak time, thus likely overestimating actual peak parking demand.
2. Estimated parking generation based on the total campus population fitted to the curve for a sample of institutions from the Institute of Transportation Engineers *Parking Generation Manual 5th Edition*.



1. Estimated parking demand based on survey of employees and students reporting predominantly driving alone or carpooling to serve their transportation to campus and typically on campus at peak time, thus likely overestimating actual peak parking demand.
2. Estimated parking generation based on the total campus population fitted to the curve for a sample of institutions from the Institute of Transportation Engineers *Parking Generation Manual 5th Edition*.



1. Total parking supply based on on-site parking spaces.
2. Estimated parking demand representing on-site parking based on survey of employees reporting predominantly driving alone or carpooling to serve their transportation to campus, typically on campus at peak time, and parking in on-site lots during peak times.
3. Estimated parking generation based on the number of in-patient beds sampled from the average trip rate for similar institutions from the Institute of Transportation Engineers *Parking Generation Manual 5th Edition*.

1

Introduction

The Joint Institutional Parking Management Plan (JIPMP) is submitted to the Planning Commission and Development Review Board to demonstrate current and anticipated parking demand for Burlington's "Hill" Institutions to meet the requirements set forth in Article 8 of the Comprehensive Development Ordinance. Burlington's "Hill" Institutions, comprised of Champlain College, University of Vermont (UVM), and University of Vermont Medical Center (UVMMC), are the founding members of the Chittenden Area Transportation Management Association (CATMA). CATMA has submitted Joint Institutional Parking Management Plan and annual updates to the City of Burlington on behalf of the "Hill" Institutions since 2009. This JIPMP may be approved by Burlington's Planning Commission and Development Review Board (DRB) for a period of up to five years with annual updates reported to the City's Office of City Planning and Department of Permitting & Inspections.

This introductory chapter summarizes the purpose and content of the JIPMP and provides a high-level overview of CATMA and their role in jointly supporting institutional transportation management.

Purpose & Content

The Joint Institutional Parking Management Plan advances the intent of PlanBTV by demonstrating the commitment of the Institutions to grow sustainably in support of the vision of Burlington as a *distinctive city*[1]. Recognized for their contributions to the *unique economic identity* of the City as a center for education and healthcare, the Institutions serve a key role in advancing

[1] Plan for Action | planBTV: Burlington's Comprehensive Plan (arcgis.com)

the core principles of PlanBTV by planning for well-connected, human-scale environments that integrate new development with the existing campus character. More specifically, the 5-Year JIPMP and its annual updates are intended to:

- Recognize the need to manage parking demand and resources holistically and creatively, employing transportation demand management (TDM) practices as well as supplying adequate parking facilities;
- Recognize the efficiencies gained when several neighboring institutions share resources and collaboratively participate in parking and TDM programs; and,
- Ensure that city streets in nearby neighborhoods are not unfairly burdened by parking demands from post-secondary education or medical institutions.

Based on the City of Burlington's Comprehensive Development Ordinance Article 8 Section 8.3.3[2], *an Institutional Parking Management Plan shall include the following:*

(a) A narrative that outlines how the proposed parking management plan addresses the specific needs of existing and anticipated development and effectively satisfies the intent of this Article and the goals of the Municipal Development Plan.

(b) Information specifying the current and anticipated numbers over the ensuing 5 year period for: number of students of all academic programs (full-time, part-time, commuter, on-campus, off-campus, and continuing education), faculty and staff (full-time and part-time), patients and visitors being served by the institution.

(c) An analysis of the anticipated parking demand by user group, time of day and/or demand by use and parking provided to meet that demand currently and anticipated over the ensuing five-year period;

(d) Information specifying the number and composition of the institution's vehicle fleet, where these vehicles are regularly kept, and designated "service vehicle-only" parking;

(e) Strategies used to reduce or manage the demand for parking which may include but are not limited to:

1. *Policies which restrict and/or prohibit the bringing of vehicles to the institution for various users or groups of users;*
2. *A telecommuting program;*
3. *Programs and employee and student subsidies to encourage the use of public transit, car-share, walking, and bicycling;*

[2] Zoning Ordinance | City of Burlington, Vermont (burlingtonvt.gov)

4. *Implementation of a shuttle service system serving off-site parking;*
5. *Implementation of a parking permit system to allocate parking throughout the system; and,*

(f) Implementation of a monitoring, compliance and enforcement system to measure and ensure compliance with the plan.

In order to convey the documented purpose, meet the requirements of the ordinance, and satisfy the intent of Article 8, the JIPMP is organized into chapters summarizing the parking management environment collectively for the institutions and individually for each institution. In an effort to streamline the content of this document, each institutional chapter contains the elements outlined in the ordinance above. The chapters are organized into existing and anticipated infrastructure and development (Section 8.3.3 (a)), existing and anticipated community population (Section 8.3.3 (b)), existing and anticipated parking demand (Section 8.3.3 (c)), fleet characteristics (Section 8.3.3 (d)), highlighted strategies (Section 8.3.3 (e)), and monitoring, compliance, and enforcement (Section 8.3.3 (f)). In addition, a *JIPMP Institutional Supplement* includes further detail but is not essential to the document.

CATMA

Originally established in 1992 by the "Hill" Institutions and expanded in 2015 to serve as a regional transportation management association, CATMA has served Chittenden County with transportation demand management services, incentives, and programs for over 30 years. CATMA's mission is to work with members and community partners to plan and manage safe, convenient, and economical transportation and parking options with the aim of reducing environmental impacts and improving coordination of land use. More information on CATMA can be found at catmavt.org.

Transportation Management Associations (TMA)

TMAs are associations, organizations, or cooperatives that provide transportation services and education to businesses, property owners, residents, and employees in a defined geographic area, combining their efforts to expand transportation options and reduce program costs. They are not-for-profit collaborations of private and public sector entities working together towards common goals, such as congestion mitigation, transportation services and pollution reduction.

Transportation Demand Management (TDM)

The term *transportation demand management* means the use of strategies to inform and encourage travelers to maximize the efficiency of a transportation system, leading to improved mobility, reduced congestion, and lower vehicle emissions, including strategies that use planning, programs, policies, marketing, communications, incentives, pricing, data and technology."[3]

[3] Association for Commuter Transportation. 2023, "What is TDM?" What is TDM - Association for Commuter Transportation (actweb.org)

2

Collective Institutional Summary

Each of the institutions' parking supply and demand are summarized within based on data gathered during the Fall of 2022. This assembled data informs the analysis that demonstrates that the existing parking supply meets current demand for each institution. In addition, information regarding the anticipated development and growth on each campus informs the anticipated parking supply and demand out to 2028, a time horizon of approximately 5 years. The 5-year projections coincide with the anticipated approval interval of this document.

The intent of the JIPMP, and parking management planning more generally, is to demonstrate the policies and programs that enable utilization of parking resources more efficiently. For the institutions, this has and continues to entail many strategies employed collectively, through CATMA and agreements among the institutions, as well as individually, to best utilize resources given the transportation mobility and parking needs of each institution's population.

Peak Parking Demand

Two primary methods were used to estimate the current peak parking demand for each institution: count and survey data. The methods employed have been utilized previously and are referenced in the *2020-2022 JIPMP*[4]. As has been noted in previous

[4] CATMA, *2020-2022 Joint Institutional Parking Management Plan*, Appendix A. https://catmavt.org/sites/default/files/uploads/2020-2022_jipmp.pdf

JIPMP documents, there are limitations to both methods of estimating parking demand, however, it is reasonable to assume that these two methodologies provide low and high estimates to represent the book ends of actual peak parking demand on each campus. It is noted that previous JIPMP documents had fewer counts to rely on, however, the representation of peak utilization via count data is considered reliable given the count programming that has been instituted.

Table 1 Current Institutional Parking Demand Summary

	Champlain College	UVM	UVM Medical Center
Current Conditions			
Potential Users[1]	2,348	17,540	9,427
Peak Parking Demand Survey	741	4,943	2,145
Peak Parking Utilization Counts	427	3,508	1,941
Total Parking Supply	642	4,865	2,500
Net Spaces Peak Demand	-99	-78	355
Net Spaces Peak Utilization	215	1,357	559

1. Potential users include students and employees for Champlain College and UVM and employees and patients at UVMMC.

Consistent, quarterly lot counts provided a ground truth during limited time windows (i.e. three days during peak periods at four times throughout the year) to demonstrate the utilization of the institutionally controlled lots. Although these time windows are targeted to capture peak times, it is recognized that these count data may slightly underestimate the typical peak parking demand as they only represent a limited time frame and may not capture peak parking demand due to variability. The peak of the utilization counts was used to represent peak parking based on lot counts.

Survey data provide samples from which estimates of peak parking demand can be derived based on user groups, mode trends, and other reported travel behaviors. These data summarize reported, typical patterns for different user groups but may not capture the daily variability that lot counts

Table 2 Future Institutional Parking Demand Summary

	Champlain College	UVM	UVM Medical Center
Future Conditions			
Potential Users	2,990	17,820	9,427
Total Peak Parking Demand	992	4,988	2,145
Total Parking Supply	642	5,503	2,500
Net Spaces Peak Demand	-350	515	355

are able to, thus providing an overestimate of typical peak demand. In addition, these trends by user group can be applied to future cases providing a reasonable means for forecasting peak parking demand.

Collectively, the institution's parking supply meets parking demand based on the peak parking utilization according to count data and are within the margin of error for the peak parking demand estimates based on survey data. Future parking supply similarly meet the anticipated parking demand out to forecasted 2028 conditions. These results are summarized in Tables 1 and 2, and further detailed in each institution's chapter below. It is noted that both current and future peak demand are likely inflated estimates based on the survey data. This is discussed in further detail below.

Trends & Patterns

This section outlines the context that influences the parking environment for the institutions collectively, including policy changes, pandemic disruptions, and surveyed and observed transportation behaviors. These trends and patterns, and their implications, are discussed within.

Policy Shift

Updates to the Article 8 Ordinance were approved by City Council on January 9th, 2023. These updates codify the shift away from parking minimums while adopting parking maximums, expanded transportation demand management, and updated institutional parking management plan requirements. It is important to note that with the amended ordinance moving away from parking minimums, the need for waiver requests when supply does not meet the minimum have been eliminated. Historically, the institutions have maintained a parking supply that was below previously mandated minimums and utilized the parking management plan to request a waiver for this discrepancy by demonstrating the supplied parking meets current and anticipated demand and enumerating the many mechanisms by which the institutions actively seek to reduce demand for parking on each respective campus. Although the waiver is no longer necessary in this shift towards a new parking paradigm, the 5-year JIPMP and annual updates will continue to demonstrate the current and anticipated parking supply and demand for each institution as well the strategies employed to continue towards more efficient utilization of parking resources. This policy step towards the City's climate action goals is expected to be bolstered in the near term by an upcoming transportation options study, which will recommend the policy framework for a comprehensive, citywide transportation demand management plan.

The updated ordinance and recommitment to broader transportation demand management at the city scale represent a shift towards efficiency-based standards. In parking management, efficiency-based standards refer to provision of optimal parking supply in a managed system, where supply meets demand and contingency plans account for potential variability in that

demand[5]. These managed systems consider the geography, proximity, cost, and convenience of parking supply and leverage mechanisms like pricing and regulation to optimize utilization. This allows a more holistic system to avoid the tendency to supply parking in excess while balancing appropriate pricing structures and recognizing the costs associated with oversupply. With efficiency-based standards, assessing "optimal" parking utilization based on 85th percentile occupancy has fallen out of favor. Instead, optimal parking utilization allows for spaces to fill to lot capacity on the condition that sufficient parking to serve demand is available elsewhere in close proximity and any potential spillover issues are addressed or managed. For example, an institution may provide parking in desirable proximity to key destinations, priced appropriately, and allow that parking to fill to capacity or 100% utilization. Say this parking fills twice a week for peak periods and, within the managed system, a shared satellite lot provides additional capacity to fulfill parking demand that exceeds the more proximal lot capacity. Monitoring of the system allows for management of the parking, so that adjustments to pricing or other strategies can be leveraged to induce changes in the system. Recent parking policy reforms and their strategies are well documented in resources like the searchable case study database assembled by the Urban Land Institute containing parking policy innovations across a multitude of jurisdictions[6].

COVID-19 Pandemic

A global pandemic significantly disrupted the typical operations of all three of these institutions when it arrived locally in March of 2020. There were many lessons learned in how each of these institutions continued to meet their mission while adapting to the situation as waves of increasing infections and different variants demanded a dynamic approach. During the height of the pandemic, this meant social distancing, masking, limiting in person gathering, and using technology to enable remote work, learning, and health appointments where feasible. The prevalence of hybrid virtual and in person environments to conduct work, enable learning, and deliver healthcare consultation during the pandemic have carried into the current landscape.

Telecommuting, telework, telelearning, and telehealth have all proven to be mainstays for the institutions at a baseline level. Each institution has its own policies around how this is enacted for employees, students, providers, and patients. Each institution also anticipates that with the ubiquity of these tools and protocols in place, this approach will continue to serve some portion of what might otherwise be demand for in person activities on each respective campus and thus demand for parking.

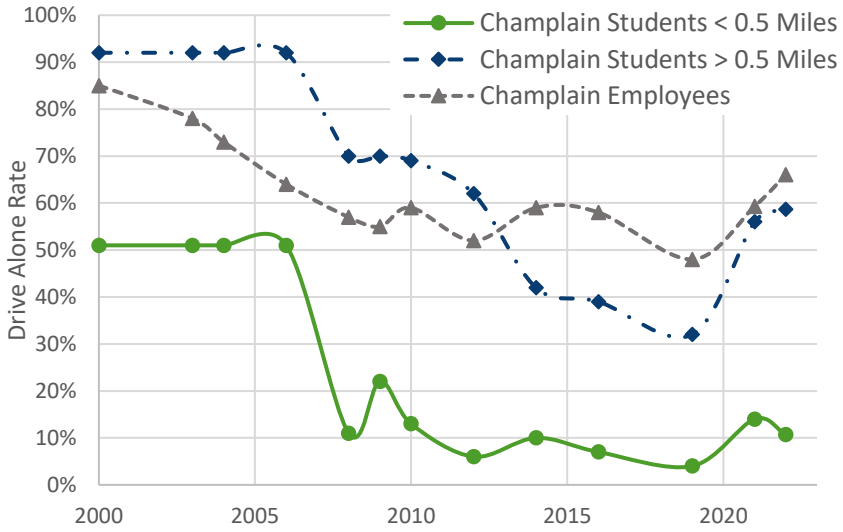
[5] Littman, T. (2022). *Parking Management: Strategies, Evaluation and Planning*. Victoria Transport Policy Institute (www.vtpi.org).
[6] ULI. (2021). Parking Policy Innovations in the United States

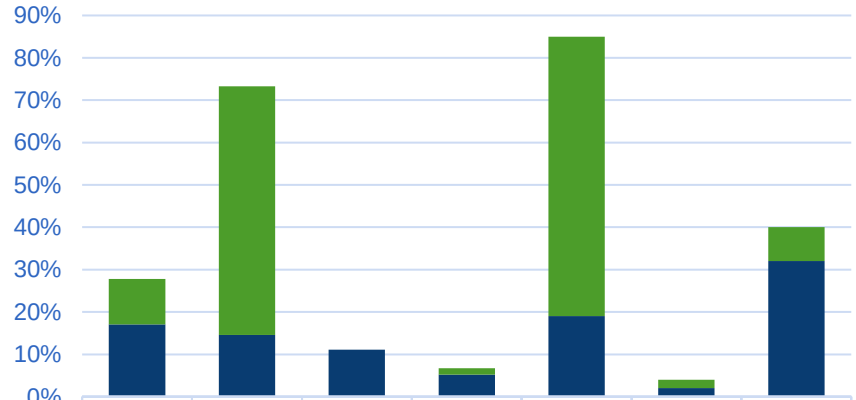
Survey Trends on Travel Behavior

CATMA administers a survey annually to track the longitudinal travel behavior trends of the membership that it serves. In Fall of 2022, the survey was administered to CATMA membership including the institutional partners. The survey revealed the drive alone rates for the institutional user groups, including employees, students within a half mile, and students greater than a half mile from campus. Year over year trends of the drive alone behavior of these groups are depicted in Figures 1, 2, and 3. Overall, drive alone rates have declined over the period of monitoring starting in 2000. It is noted that students within a short distance of their respective campus (i.e. less than a half mile) have the lowest drive alone rates. Within these distances, walking, biking, and campus transit modes meet the transportation demand effectively. Students with home locations outside of a half-mile radius of campus drive alone to campus at higher rates than their close to campus counterparts, but below the rates of employees. Employees of each institution have similar drive alone rates, between 61% and 66%.

Similarly, the survey revealed the mode split for each institution. Accompanying the drive alone trends over time in Figures 1, 2, and 3 are the mode splits for the different user groups. Drive alone, carpool, and telework rates as the primary mode and alternative mode are depicted for each user group. At Champlain College, over 30% of employees telework as an alternative mode and 8% as a primary mode. At UVM, students carpool at a rate of about 30% as an alternative mode while employees carpool as an alternative mode at a rate 11% and telework as an alternative mode at a rate of 34%. At UVMMC, employees at the Medical Center Campus and 1 South Prospect Street carpool as an alternative mode at rates of about 10% and telework at rates of 8% and 18%, respectively. That does not account for the 12% of 1 South Prospect employees that telework as a primary mode.

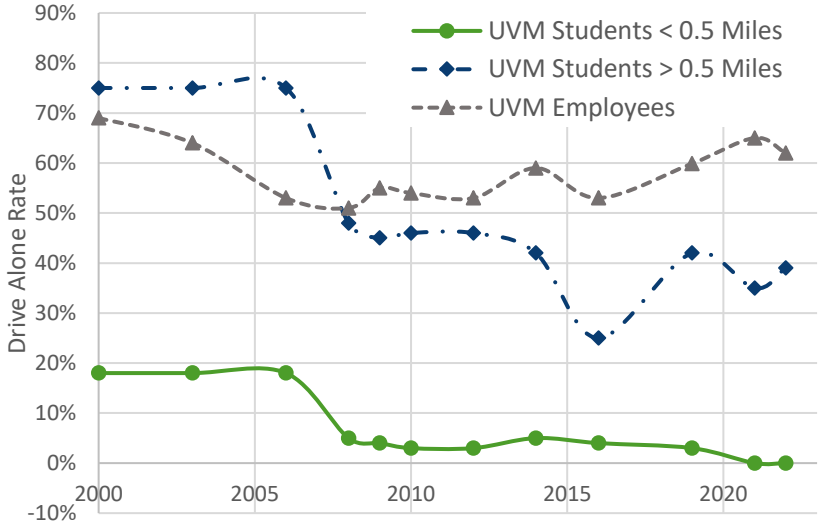
Figure 1 Champlain College Drive Alone Trends & Mode Split

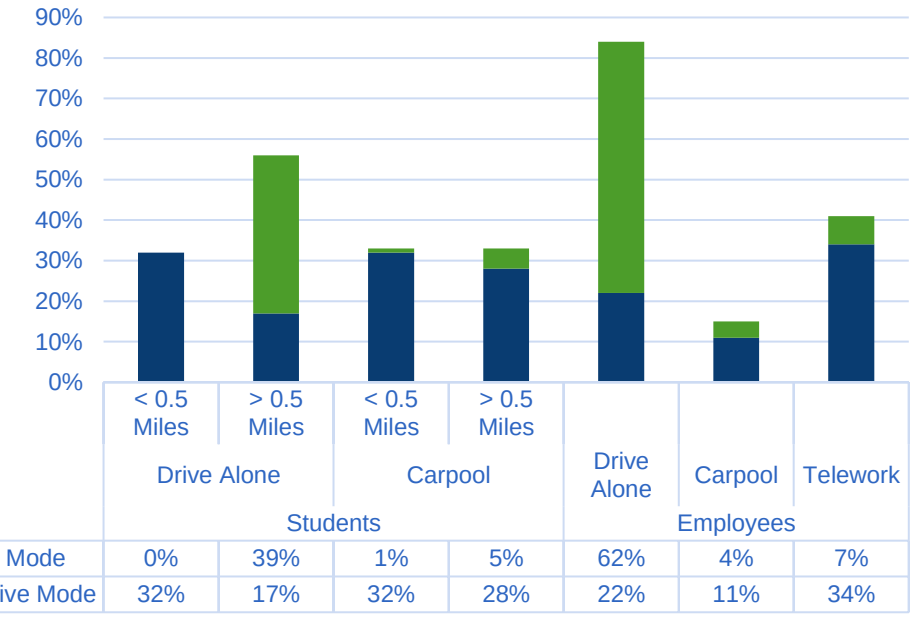




	< 0.5 Miles	> 0.5 Miles	< 0.5 Miles	> 0.5 Miles	Drive Alone	Carpool	Telework
	Drive Alone		Carpool		Drive Alone	Carpool	Telework
	Students				Employees		
Primary Mode	11%	59%	0%	2%	66%	2%	8%
Alternative Mode	17%	15%	11%	5%	19%	2%	32%

Figure 2 University of Vermont Drive Alone Trends & Mode Split

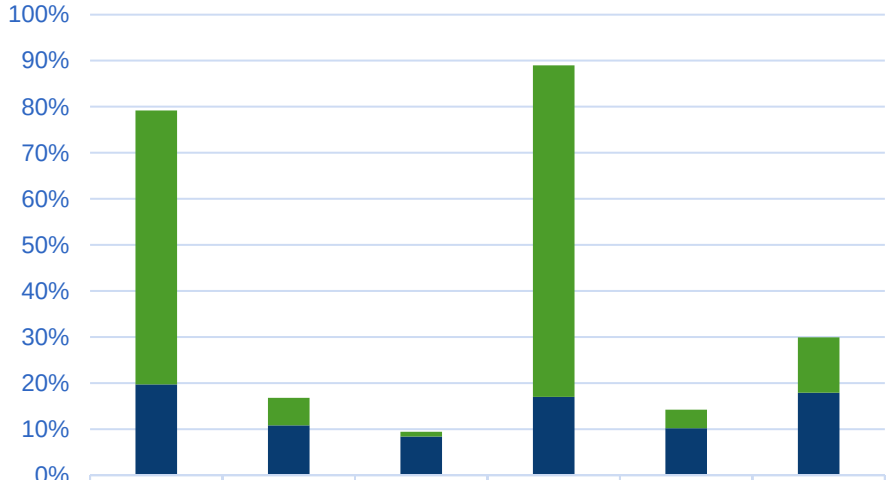




	Students				Employees		
	Drive Alone		Carpool		Drive Alone	Carpool	Telework
	< 0.5 Miles	> 0.5 Miles	< 0.5 Miles	> 0.5 Miles			
Primary Mode	0%	39%	1%	5%	62%	4%	7%
Alternative Mode	32%	17%	32%	28%	22%	11%	34%

Figure 3 University of Vermont Medical Center Drive Alone Trends & Mode Split





	Medical Center Campus			1 South Prospect		
	Drive Alone	Carpool	Telework	Drive Alone	Carpool	Telework
Primary Mode	60%	6%	1%	72%	4%	12%
Alternative Mode	20%	11%	8%	17%	10%	18%

On-Street Parking Adjacent to Institutions

There are some institutional affiliates who park on-street during peak time according to the survey administered to users in the Fall of 2022. Table 3 demonstrates the percent of students and/or employees that drive and are parking on-street during peak parking demand times. Additionally, the survey asks participants what streets they typically park on when they park on-street. Champlain College employee and student survey participants both indicated that they primarily park on South Willard Street, Maple Street, and Summit Street. UVM employee survey participants indicated that they park on Prospect Street and Williams Street. UVM student survey participants did not have a popular street that is utilized. UVMMC survey participants indicated that they park on Colchester Avenue, and the other two popular streets were North Prospect and South Prospect. These streets in proximity to the campus areas are generally unregulated, making them free and open to public parking.

To prevent institutional affiliates from parking on the city streets in residential areas, Champlain College made an agreement with the City of Burlington to allow a small number of locations where on-street parking was permitted for Champlain affiliates. It was agreed that all other streets on the "Hill" in Burlington are prohibited to affiliate parking. Champlain College has been increasing their parking enforcement to discourage the misuse of parking around campus. It should be noted that the three streets that are being frequently utilized by Champlain College employees and students are streets that fall within the campus. Parking on these segments is open to the public Monday through Friday 8:00 am to 4:00 pm and institution affiliates with a Zone 1 or MC parking permit are allowed to park in those spaces.

Table 3 On-Street Parking at Peak Time

	Champlain College	UVM	UVMMC
Students	5.6%	2.9%	N/A
Employees	11.6%	3.8%	1.1%

Collective Highlights & Strategies

This section outlines the collective institutional strategies that influence parking demand and transportation behavior more generally. Although the specific efficacy of a given strategy to offset demand for parking may not be known, these strategies collectively provide more viable transportation options to the populations accessing each campus. As demonstrated in the mode trends above, even if these options may not be used as primary means of accessing the campuses, they present feasible alternatives to driving and parking on site that can infrequently or frequently be used to offset parking demand, among other co-benefits. The individual institutional chapters delve further into the strategies on each campus regarding parking and demand management.

Transportation Demand Management

CATMA offers the member institutions a full menu of transportation demand management (TDM) programs to serve each community's mobility needs and provide sustainable transportation options. These services and incentives are intended to expand use of alternative modes and have demonstrated participation by the membership in pursuit of reducing single occupancy vehicle use to access the institutional campuses. These programs, incentives, and services include:

- Bike Share Discounts
- Bike / Walk Rewards Program
- Carpool and Vanpool Services
- CarShare Vermont Campus Program

- Commuter Champion Prize Drawings
- Education, Awareness, and Outreach
- Guaranteed Ride Home
- Off-site Parking
- Transit Discount Programs (i.e. Unlimited Access)

The TMA programming above represents just a portion of the collective opportunities for efficiently managed parking for the institutions. Other opportunities include shared parking, off-site parking, and shuttle services. For instance, UVM Medical Center leases parking from UVM to afford additional parking in close proximity to their campus. Off-site parking at 125 Lakeside Avenue affords just over 350 spaces of off-site parking for the institutions through CATMA contracting. UVMMC and Champlain College lease spaces to serve their users parking needs in the arrangement and provide shuttles to the off-site lot for their users. Each institution runs or contracts shuttle services to best meet the needs of their respective populations, however, employees across institutions can utilize other institutions shuttles as needed, provided there is capacity for the institution's employees to utilize the service. This sharing arrangement effectively increases shuttle service for all institutional partners.

Campus Shuttles and Transit

Green Mountain Transit (GMT) offers a multitude of options for local and regional transit service for Champlain, UVM, and UVMMC affiliates. Local and some regional routes are available with stops on or in close proximity to each campus, with additional connections to the Downtown Transit Center for transfers to a broader range of destinations. Local and regional GMT routes remain fare free through 2023 as part of the response to the COVID pandemic. Funding contributions from the institutions have continued as part of the Unlimited Access Program, in part enabling GMT to remain fare free for the general public. Should fares be implemented again in 2023, it is anticipated that Champlain and UVM will continue contributions to support their affiliates eligibility for free transit rides on any local or regional route with valid campus affiliation identification (i.e. the Unlimited Access Program) and UVMMC employees will be eligible for transit discounts. In general, ridership on GMT local routes have rebounded to near pre-pandemic levels and systemwide are down 18% compared to pre-pandemic averages.

Beyond the public transit system, each campus provides shuttle services to serve the campus and satellite facilities. These are detailed in each institution's section below.

Bike Share

In 2018 Greenride Bikeshare became Vermont's first public bike sharing system serving the greater Burlington area. There were over one hundred electric bikes in circulation across 30 hubs in Burlington, South Burlington, and Winooski through an expansion of the original system in 2021. These bikes could be accessed by a mobile app. Bolt, the e-bike vendor, ceased operations in July 2022 and the bikes were pulled from public use. Prior to their removal, there were many Greenride hub locations that helped to serve the micro-mobility needs of institutional affiliates including six located on UVM's campus, two on Champlain's campus, and one on the UVMMC campus. CATMA has issued a request for proposal (RFP) for a new bike share program which is anticipated to begin in Summer 2023. This bikeshare system will similarly provide another means of mobility for Champlain, UVM, and UVMMC affiliates with subsidized membership offerings.

CarShare

CarShare Vermont is a mission driven, local non-profit that aims to "provide an affordable, convenient, and reliable alternative to private car ownership." The network of 22 vehicles shared by members are located at pods throughout Burlington and in neighboring South Burlington with future plans to add vehicles in Winooski. Affiliates of UVM and Champlain College are eligible to subscribe to CarShare through a subsidized Campus Plan. Of CarShare's current 1,155 members, approximately 20% are subscribed to the subsidized Campus Plan and do not have a permit to park on their respective campus[7]. This plan provides a generous discount on annual membership. There are additionally campus affiliates that have membership through alternate rate plans (e.g. free membership for income-eligible households). It is noted that campus affiliates use all 22 CarShare vehicles in service.

For campus affiliates, CarShare Vermont has contributed to limited vehicle ownership. According to CarShare Vermont's 2022 Member Survey, 78% of student members reported that they avoided bringing a vehicle to campus and were using CarShare Vermont instead. Of those faculty and staff members, 30% reported not owning a vehicle and joining CarShare Vermont instead of acquiring one and an additional 30% reported avoiding the addition of a second household vehicle. Twenty-five percent of faculty and staff reported shedding a vehicle because of CarShare Vermont and an additional 15% reported not replacing a vehicle that stopped working.

CarShare has also contributed to the reduction of driving and increase in alternate modes among campus affiliate membership. According to the survey, 56% of students reported driving less since joining CarShare Vermont and 48% reported walking and biking more. Student members, at a rate of 76%, reported combining errands into a single trip. It is estimated that for every

[7] The membership numbers reflect data up to March 2023.

vehicle CarShare Vermont puts in service, 15 privately owned vehicles are removed[8]. This provides many communal benefits, including reduced demand for parking.

Climate Initiatives

Each institution has set out to tackle their environmental footprint and climate implications, particularly in regard to transportation and parking.

Sustain Champlain is the overarching campaign for Champlain College to integrate sustainability into the entire campus[9]. Sustain Champlain focuses on institution, operations, academics, and culture. Under their operations section they provide resources for transportation initiatives such as CATMA memberships, access to free rides on GMT buses, shower facilities for bicyclists, additionally locations to access bike parking, shuttle stops, and CarShare vehicles. In 2015, Champlain College revisited their Active Transportation Plan which sets out to reduce motorized vehicle use for Champlain affiliates, create an active transportation culture, decrease CO_2 emissions, and create safe, functional, and environmentally friendly transportation options for employees and students.

The University of Vermont has recently published their Facilities Sustainability Plan (FSP)[10]. This plan entails reducing the environmental footprint of all aspects of facilities management across the campus including transportation. The plan recognizes and builds upon the planning and programming foundation for limiting or reducing the climate implications of transportation including the Active Transportation Plan, Green Fleet Vehicle Procurement Procedures, Sustainable Transportation Module for parking pass acquisition, free on-campus and local bus transit, carpool matching, and electric vehicle charging infrastructure. Building on this foundation, the Facilities Sustainability Plan aims to enhance convenient, accessible, affordable, low-carbon transportation options, reduce single occupancy vehicles; increase use of alternatives and shared modes, and ensure that fleet vehicles are rightsized, shared, and alternatively fueled. The strategies that accompany these goals are further detailed in the UVM Chapter below. UVM has released a Comprehensive Sustainability Plan, integrating the goals identified in the FSP and including academics, research, and planning for the University[11].

UVMMC is committed to reducing its carbon footprint and mitigating health issues caused by climate change[12]. UVMMC has received recognition from local and national organizations for limiting onsite parking, encouraging carpooling, and providing

[8] See Appendix B: CarShare Vermont Parking Demand Impacts of the 2021 Joint Institutional Parking Management Plan Annual Update, jipmp_2021_annual_update.pdf (catmavt.org).
[9] https://www.champlain.edu/student-life/campus-and-community-programs/sustain-champlain
[10] University of Vermont, *Facilities Sustainability Plan 2021-2030*, https://www.uvm.edu/sites/default/files/Facilities-Management/pdf-docs/exec/Facilities_Sustainability_Plan_October_2021.pdf
[11] The Comprehensive Sustainability Plan was released on Earth Day 2023, Comprehensive Sustainability Plan | The University of Vermont (uvm.edu).
[12] Climate Change Initiatives (uvmhealth.org)

incentives for use of public transit. Additionally, UVMMC has partnerships with CATMA, Burlington 2030, and Vermont Climate Pledge Coalition. In 2017, their alternative transportation programs helped employees avoid 1,171,082 pounds of carbon. The Burlington 2030 initiative aims to reduce transportation emissions, energy use, and water consumption by 2030. Additionally, the Climate Pledge Coalition aims to uphold greenhouse gas emission reductions established by the Paris Climate Agreement.

Multimodal Connections

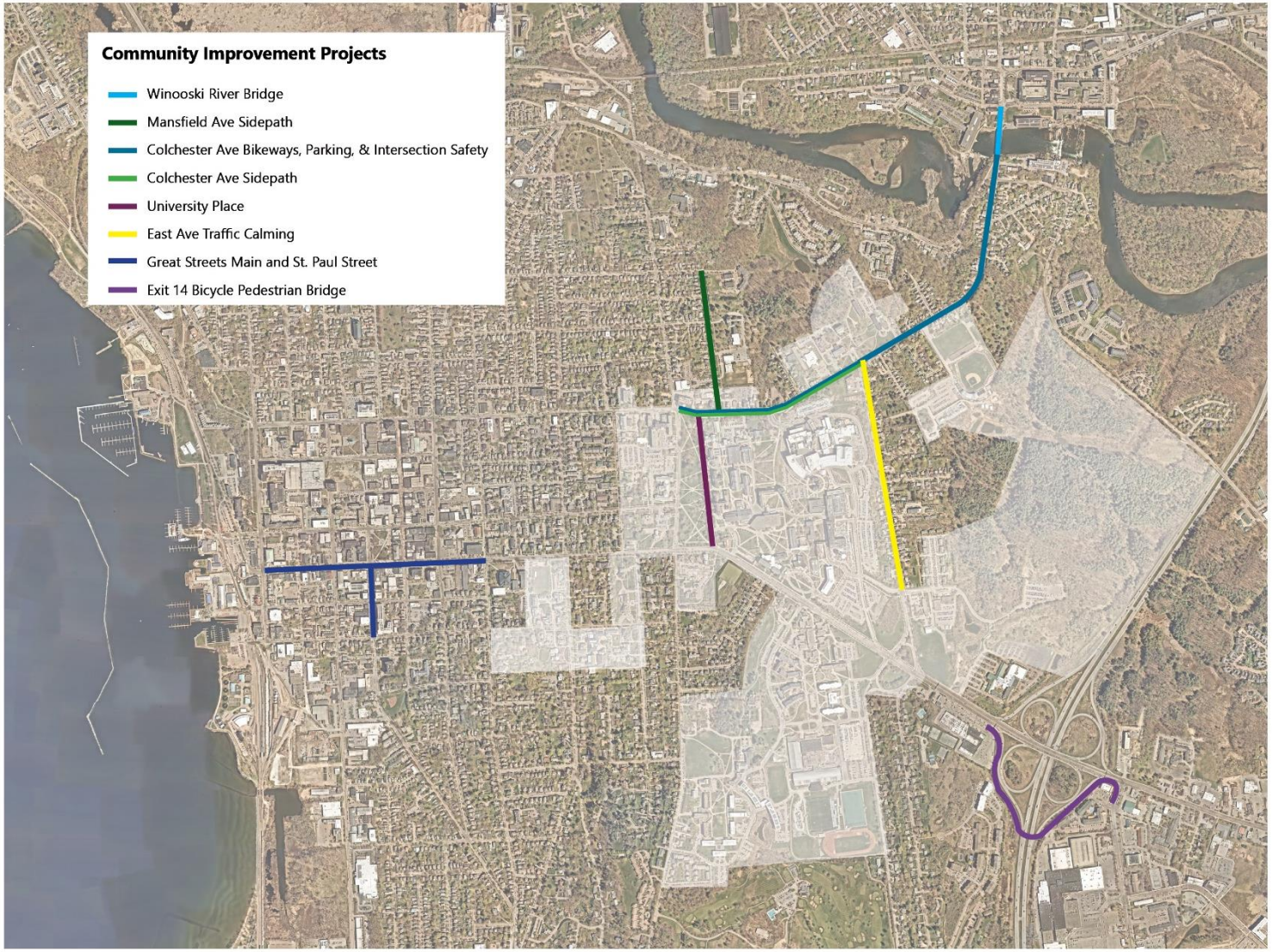
A critical focus on multimodal connections has emerged as Burlington and the surrounding communities tackle the climate emergency, demand management, and equitable transportation outcomes. In particular, places that have historically been barriers to or hostile to active modes of transportation have been under scrutiny as these areas hinder shifts towards more active transportation modes. This is evidenced in many high profile walking and biking infrastructure projects that have recently been constructed or are imminent in the planning, design, or construction phases. These projects in Burlington, South Burlington, and Winooski will improve the connectivity for residents and visitors, as well as serve the employees, students, patients, and visitors of each of the institutions. The improvement in connectivity and accommodations will provide safe and accessible routes to and from the institutions utilizing alternative modes of transportation. Some of the key projects are:

- **Winooski River Bridge:** The purpose of the project is to improve safety while maintaining structural integrity and continuity of this integral link between Winooski and Burlington across the Winooski River. The project will address deficiencies in the bridge while improving multi-modal (bike, pedestrian, vehicular) travel for people and goods. Scoping has been completed and the project is expected to move into design.
- **Mansfield Avenue Sidepath:** The sidepath replaced the existing sidewalk on the eastern side of Mansfield Avenue from Colchester Avenue to North Street with a wider asphalt path and markings. The project also included crossing improvements at the intersection of Colchester Avenue and Mansfield Avenue. This project is complete.
- **Colchester Avenue Bikeways, Parking, & Intersection Safety:** The purpose of the Colchester Avenue: Bikeways, Parking, & Intersection Safety Study was to identify and prioritize improvements that align with the City's vision for sustainable transportation infrastructure and enable a continuous, connected, and livable multimodal transportation corridor. This includes proposed improvements to the intersection of Colchester Avenue and East Avenue as well as creation of separated bike infrastructure along the length of Colchester Avenue. Scoping was completed.
- **Colchester Avenue Sidepath:** The existing Colchester Avenue southern Sidepath was removed and replaced to meet accessibility design criteria and widened to meet current design guidelines for shared bicycle & pedestrian paths. The project included a new 10' wide concrete sidepath to replace the sections of 8' wide sidepath east of Mansfield Avenue and the 5' wide sidepath west of Mansfield Avenue. The project is complete.

- **University Place:** The purpose of improvements to University Place were to enhance safety on the street for pedestrians, bicyclists, and other active transportation users. University Place is at the heart of UVM's central campus. As part of the project, buffered bike lanes in each direction and prioritized and comfortable pedestrian crossings were constructed. UVM and the City of Burlington shared the costs of this project on the city-owned street. The project is complete.
- **East Avenue Traffic Calming:** The purpose of the East Ave Traffic Calming project is to improve the safety along the corridor. There are currently issues of speeding and unsafe crossings for pedestrians. The project will implement traffic calming measures and create more conspicuity for crossings to improve connections along and across this critical corridor adjacent to UVM and UVMMC. Planning is complete and the project is in the design phase.
- **Great Streets Main and St. Paul Street:** Main Street is an important gateway into downtown Burlington and a vital connection from the waterfront to the "Hill" institute campuses. The goal of Great Streets Main Street project is to balance the use of the public right of way to provide wide sidewalks, protected bike accommodations, activation space, and parking. St. Paul Street similarly aimed to enhance the use of the public right-of-way for multimodal use. St. Paul Street construction is complete and Main Street is in the design phase.
- **Exit 14 Bicycle Pedestrian Bridge:** The goal of the project is to create a bicycle and pedestrian bridge across I-89 in the vicinity of the Exit 14 Interchange in South Burlington. While existing sidewalks, bicycle lanes, and transit service provide alternative transportation accommodations along US Route 2, these modes are likely underutilized due to the speed, numerous conflict points, and volume of traffic at this key regional junction. A scoping study was completed and the project is in the design phase.
- **South End Multimodal Center:** A collaborative study with the Chittenden County Regional Planning Commission, City of Burlington, and VHB evaluated the feasibility of constructing a multimodal transportation center and supporting uses on a City-owned parcel in the City's South End. Following the completion of the multimodal center feasibility study, VHB is currently assisting the City of Burlington, Champlain College, and Ride Your Bike, LLC to envision and evaluate various design concepts for three parcels in the City's south end, inclusive of the parcel evaluated for the multimodal transportation center.

Although it is anticipated that the infrastructure projects above will improve transportation options to and from the campuses, contributing to a shift towards active and transit modes of transportation, these potential mode shifts were not accounted for in future parking demand projections. As parking demand continues to be monitored through survey and count methods, the influence of these infrastructure projects on the Institutional populations' resulting travel behavior may be estimated.

Figure 4 Highlighted Project Corridors Addressing Multimodal Connectivity (institutional areas highlighted in white)



Monitoring Transportation Demand Management

CATMA and the "Hill" institutions work together to deliver a comprehensive suite of Transportation Demand Management strategies. These strategies aim to reduce traffic congestion and parking demand for the institutions on the "Hill" by encouraging and educating employees and students about alternative modes of transportation as opposed to driving alone. CATMA measures the effectiveness of these strategies by looking at the trends of surveyed mode splits, parking demand estimations, and lot utilization counts over time.

A matrix of monitoring metrics was created to provide a tool to visualize the collective TDM strategies and demonstrate how the various programs perform, interact, and depend on each other. The metrics are meant to inform the progress of institutions in their aim to improve employee and student use of alternatives modes. See Tables 4, 5, and 6 for TDM metrics for each institution.

It is important to note that the mode split data in these tables represent survey respondents self-reported primary mode, or mode they use with the most frequency, even though many utilize multiple strategies to meet their transportation needs getting to and from each institution. For instance, someone that drives alone 3 days a week and teleworks 2 days a week would be overrepresented in the drive alone category and underrepresented in the telework category. Refer to Figures 1, 2, and 3 for more detail on both primary and alternative modes reported for user groups at each institution.

Table 4 Champlain College Previous and Current TDM Metrics

	2019		2022	
	Employees	Off Campus Students	Employees	Off Campus Students
Primary Mode Split[1]				
Drive Alone	48%	14%	66%	45%
Carpool	2%	7%	2%	1%
Walk/Wheelchair	22%	42%	7%	23%
Bike	5%	2%	8%	5%
Public Bus	15%	17%	5%	7%
Telework[2]	N/A	N/A	8%	N/A
Other	8%	18%	4%	19%
Peak Parking Estimation and Counts[3]				
Current Net Peak Parking Demand Estimation (Survey)		+73		-99
Future Net Peak Parking Demand Estimation (Survey)		+69		-350
Net Peak Parking Lot Utilization (Lot Counts)		+111		+215
TDM Program Metrics				
Carshare Vermont Campus Plan Membership (# of members)	18	63	17	28
Bikeshare Discount Ridership[4]		N/A		N/A
GMT Unlimited Access Ridership (# of rides)[5]		42,776		N/A
Bike Walk Reward Users		87		38

[1] Mode Split data represents CATMA 2019 & 2022 survey respondents self-reported primary mode without accounting for other modes they may use.

[2]CATMA did not collect Telework data in the 2019 survey.

[3]For peak parking, a "+" denotes a surplus and "-" denotes a deficiency based on the method of estimation listed.

[4]There is no 2020 or 2022 bikeshare data as there was no program data available and there is no current bikeshare provider in Burlington.

[5]There is no institution specific GMT data as the bus has been fare free as of March 2020.

Table 5 University of Vermont Previous and Current TDM Metrics

	2019		2022	
	Employees	Off Campus Students	Employees	Off Campus Students
Primary Mode Split[1]				
Drive Alone	60%	24%	62%	30%
Carpool	7%	5%	4%	5%
Walk/Wheelchair	10%	37%	7%	34%
Bike	8%	10%	5%	6%
Public Bus	9%	15%	6%	23%
Telework[2]	N/A	N/A	7%	N/A
Other	6%	9%	9%	2%
Peak Parking Estimation and Counts[3]				
Current Net Peak Parking Demand Estimation (Survey)		+185		-78
Future Net Peak Parking Demand Estimation (Survey)		+277		+515
Net Peak Parking Lot Utilization (Lot Counts)		+803		+1357
TDM Program Metrics				
Carshare Vermont Campus Plan Membership (# of members)	58	274	57	194
Bikeshare Discount Ridership[4]		N/A		N/A
GMT Unlimited Access Ridership (# of rides)[5]		292,017		N/A
Bike Walk Reward Users		664		262
Carpool Permits Issued	34	N/A	100	N/A

[1] Mode Split data represents CATMA 2019 & 2022 survey respondents self-reported primary mode without accounting for other modes they may use.

[2]CATMA did not collect Telework data in the 2019 survey.

[3] For peak parking, a "+" denotes a surplus and "-" denotes a deficiency based on the method of estimation listed.

[4]There is no 2020 or 2022 bikeshare data as there was no program data available and there is no current bikeshare provider in Burlington.

[5]There is no institution specific GMT data as the bus has been fare free as of March 2020.

Table 6 University of Vermont Medical Center Previous and Current TDM Metrics

	2019		2022	
	Main Campus	1 South Prospect	Main Campus	1 South Prospect
Primary Mode Split[1]				
Drive Alone	64%	79%	60%	72%
Carpool	7%	5%	6%	4%
Walk/Wheelchair	5%	4%	6%	3%
Bike	3%	2%	3%	1%
Public Bus	5%	4%	5%	3%
Telework[2]	N/A	N/A	1%	12%
Other	16%	6%	19%	5%
Peak Parking Estimation and Counts[3]				
Current Net Peak Parking Demand Estimation (Survey)		+179		+355
Future Net Peak Parking Demand Estimation (Survey)		+179		+355
Net Peak Parking Lot Utilization (Lot Counts)		+101		+559
TDM Program Metrics				
Bikeshare Discount Ridership[4]		N/A		N/A
GMT Discount Use (# of discounted passes)[5]		241		N/A
Bike Walk Reward Users		440		251
Carpool Permits Issued	478	N/A	427	N/A

[1] Mode Split data represents CATMA 2019 & 2022 survey respondents self-reported primary mode without accounting for other modes they may use.

[2]CATMA did not collect Telework data in the 2019 survey.

[3] For peak parking, a "+" denotes a surplus and "-" denotes a deficiency based on the method of estimation listed.

[4]There is no 2020 or 2022 bikeshare data as there was no program data available and there is no current bikeshare provider in Burlington.

[5]There is no institution specific GMT data as the bus has been fare free as of March 2020.

In future JIPMP annual updates, CATMA will reinstate data on bikeshare and bus ridership for the "Hill" institutions as data becomes available. Since March 2020, when Green Mountain Transit implemented fare free service, there has been no transit data for CATMA's Unlimited Access Program (UVM & Champlain College) and Employee Transit Pass Program (UVMMC).

Future annual updates of the JIPMP may also include other multimodal strategies such as vanpooling, park & rides and/or microtransit. In addition, CATMA will have access to new data on its incentive reward program, as it transitions this summer to a new commuter solutions platform.

One key TDM strategy that will be included in future annual updates of the JIPMP is Marketing, Education, & Outreach. CATMA works collaboratively with the three "Hill" institutions to encourage, deliver, and promote transportation options and programs to employees and students that can influence their choice of travel to work/school via trip planning support, social media, communications, targeted campaigns and events.

CATMA will update this matrix in future JIPMP annual updates and in the next 5-year plan. The institutions continue to explore innovative strategies to decrease traffic congestion and parking demand to better coordinate land use and reduce environmental impacts. For more details on each institution's TDM programming, parking demand, parking utilization, and mode split, see individual institution sections in this 2023-2028 JIPMP.

3

Champlain College

Champlain College is a small, private, not-for-profit college in Burlington with sister campuses in Montreal, Canada and Dublin, Ireland. Champlain College prides itself on preparing students for top fields through career-oriented programming, earning accolades such as Princeton Review's "Top Schools for Game Design," the Broadcast Education Association's "Top Documentary Programs," and one of Niche.com's top 30 "Best Schools for Information Technology." Champlain College has been named "Most Innovative School" in the North seven years in a row by U.S. News & World Report's "America's Best Colleges."

Champlain College's main campus sits atop the hill overlooking downtown Burlington and Lake Champlain. The main campus is primarily concentrated between Main Street and Cliff Street to the north and south and Summit Street and South Union Street to the east and west. There are additional residence halls just north of Main Street and east of Summit Street as well as downtown apartments at the corner of St. Paul Street and Maple Street, four-tenths of a mile from the main campus. In addition, there are academic and facility buildings located approximately 1.3 miles from main campus off of Lakeside Avenue and Sears Lane.

Existing & Anticipated Infrastructure and Development

There are 47 buildings that provide Champlain College just over 850,000 gsf of academic, administrative, residential, athletic, dining, and facility space across the campus. Over half of the buildings are small residential halls with an average of just over 50 beds per location. These residential beds serve the majority of students that are enrolled in on campus programming. The campus infrastructure includes 642 spaces for parking, serving the range of users that access the campus or reside on campus.

Table 7 Existing and Anticipated Champlain College Infrastructure

Infrastructure	Existing[4]	Anticipated[5]	Units
Number of Buildings	47	48	buildings
Gross Square Footage[1]	851,517	890,517	gsf
Residential Beds[2]	1,418	1,448	beds
Parking Supply[3]	642	642	spaces

1. Leased facilities do not contribute to the number of buildings or total GSF.
2. Residential beds in leased facilities included in total.
3. Parking spaces from leased facilities included.
4. Existing data based on data from Fall 2022 to represent base year 2023.
5. Anticipated data based on estimates for 5-year plan to represent 2028.

Table 8 Champlain College Status of Previously Identified Projects

Building Project	Completion Status
Miller Information Commons Addition	No Longer Planned
Foster Hall Addition	Move Forward to 2023-2028 JIPMP
Information Technology & Sciences Building	
Career Center	

The previous two-year JIPMP identified four projects that require status updates in the current JIPMP. At this point, there are no plans to carry forward the Miller Information Commons Addition, however there are three projects that were identified in the previous JIPMP that are anticipated to be carried forward into the next 5-year development plan and will contribute additional building square footage. See Table 9 for preliminary estimates on building area changes and estimated completion dates for these projects. Champlain College additionally anticipates converting a building to residential use, contributing an additional 30 beds. The South End will be a very active area in the future around redevelopment. At this time, there are no plans to change Champlain College's parking supply or location.

Existing & Anticipated Community Population

Champlain College is considered a small college, a category with a ceiling student population of 5,000 enrollments. The on-campus undergraduate population includes 1,675 full time and 61 part-time students. Of the full-time students, 30 are enrolled in the study abroad programming offered on the Montreal and Dublin sister campuses and therefore not included in the user population accessing Burlington's campus. Over half of the College's enrollments are through Champlain College Online. This programming currently serves 559 graduate and 1,439 undergraduate students, totaling nearly 2,000 enrollees in the online programming. These students are similarly not counted towards the population accessing campus.

Table 9 Anticipated Champlain College Building Development Program

Project Name	Change in Building Area (gsf)	Associated Change in Parking (spaces)	Estimated Completion
Foster Hall Addition	3,500	0	2026
New ITS Building	31,500	0	2026
Career Center Addition	4,000	0	2025
Conversion of Building to Res Hall	N/A	0	2024

Champlain College employs just over 900 faculty, staff, and contractors split between the on-campus programming and off-campus and online programming. There are 353 full-time, 193 part-time, and 66 contracted employees that serve the Burlington campus. Additionally, there are 26 full-time, 263 part-time, and 22 abroad employees serving the off-campus and online programming that do not contribute to the user population accessing the Burlington campus.

It is anticipated that in the coming 5 years, the Champlain College student and employee populations will grow. Enrollment in on-campus programming is anticipated to expand to serve 2,080 full-time and 80 part-time undergraduate students. The Dublin and Montreal programs are expected to expand to serve 40 students. Similarly, the online programming is expected to expand to serve 740 graduate and 1,750 undergraduate students remotely, bringing the online programming to just under 2,500 students. Details on current and projected populations are further detailed in the Supplemental Materials.

Existing & Anticipated Parking Demand

As previously discussed, the peak parking demand was estimated using two methodologies: utilization counts and survey data. The parking supply for the campus is currently at 642 spaces. These spaces are spread across the College lots as depicted in Figure 6. In addition, Figure 6 demonstrates the average parking utilization rates for each Champlain College owned lot. These rates are based on the quarterly lot counts conducted by Champlain College across three days during peak periods. Although it is not accounted for in the parking supply, it is noted that there are 145 on-street spaces in designated zones adjacent to campus that Champlain College affiliates are allowed to park in, contributing informally to the supply of parking in the immediate adjacency of campus activities.

The maximum parking utilization was compared across the available data from previous peak period observations to demonstrate changes over time. The parking utilization trends in Figure 5 show there was significantly diminished utilization through the Fall 2020 to Summer 2021 period, resulting in peak period utilization of approximately 30%. The utilization, starting in Fall 2021, rebounded to a maximum peak utilization of 67% in Fall 2021 and again in Fall 2022. This remains below the peak utilization demonstrated in Fall 2019 of 84% and Winter 2020 of 75% (prior to the COVID pandemic).

Figure 5 Champlain College Parking Utilization Trends

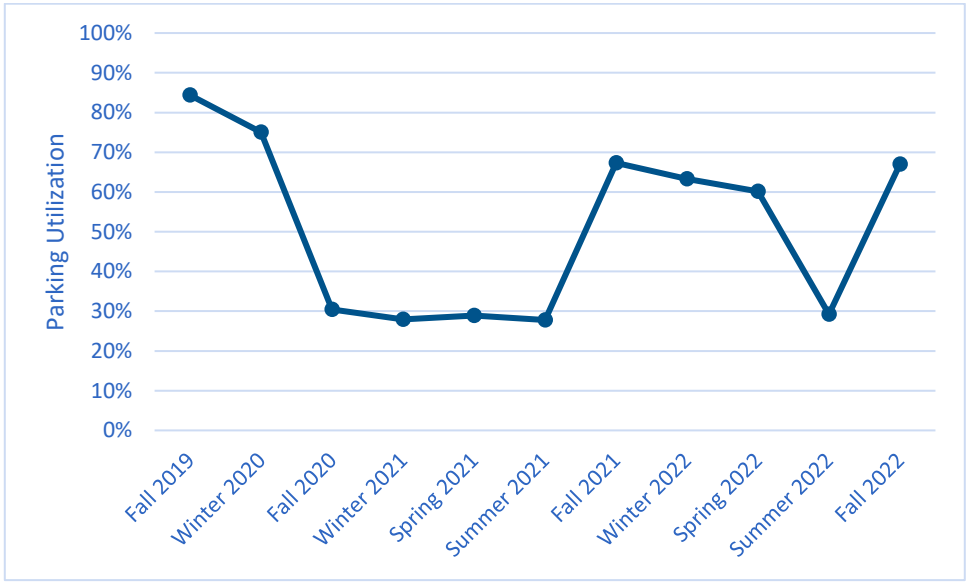
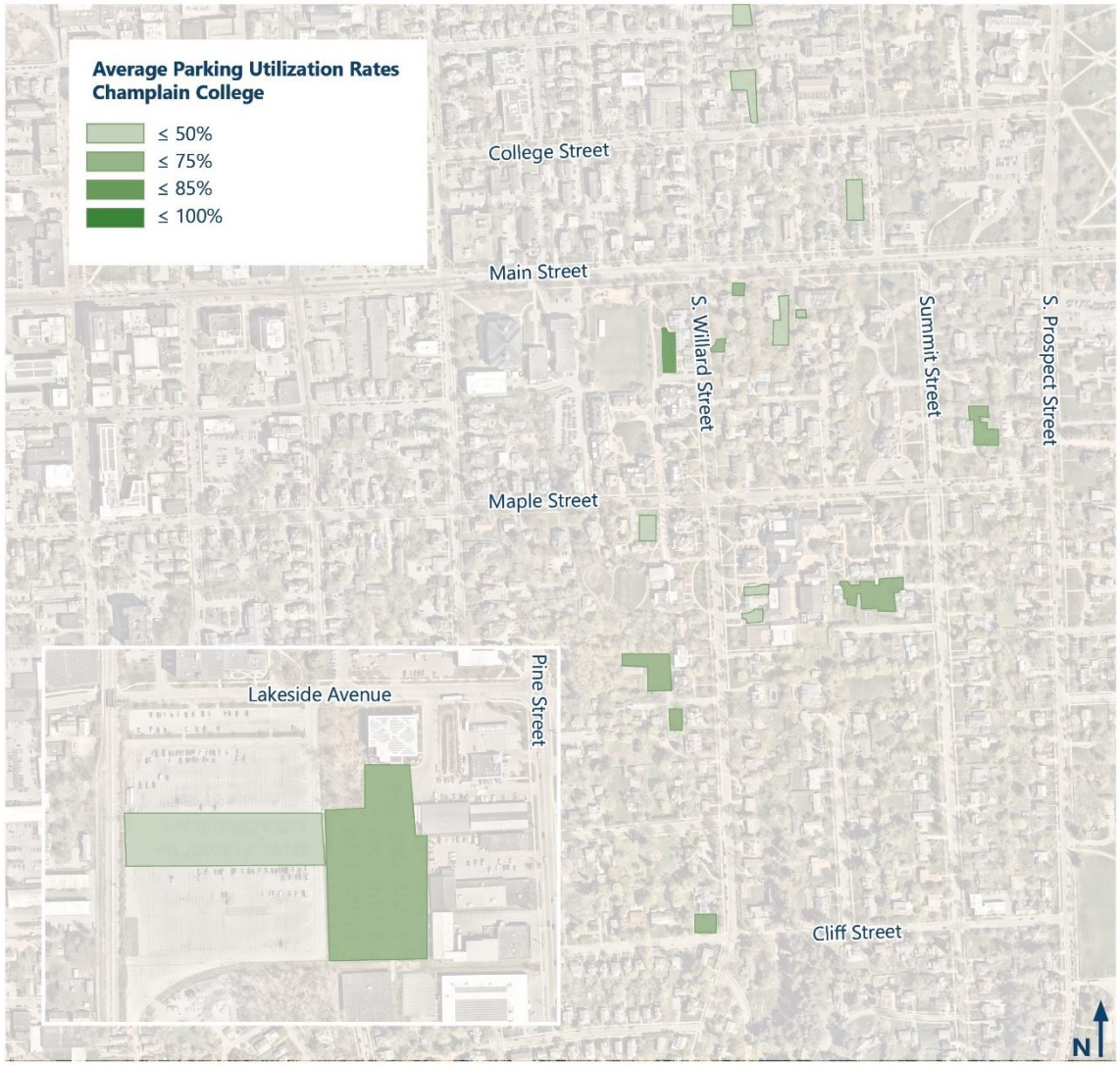


Figure 6 Champlain College Average Parking Utilization Rates



The current peak parking demand for Champlain College is estimated to be 427 vehicle spaces based on observed peak parking utilization counts, demonstrating a net available parking supply of 215 spaces. Peak parking demand based on survey data indicates peak parking demand of 741 spaces, or a net shortfall of 99 spaces. It is noted that this estimate and its future projections represent a likely overestimation of peak parking demand. The percent of users for each user group was estimated based on those that reported predominantly driving alone or carpooling to serve their transportation to campus and reported typically being on campus at the peak time. They may be using secondary modes at other times during a typical week, including teleworking. As such, it can be assumed that these estimates inflate the demand to represent an artificially high peak parking demand.

Table 10 Champlain College Current Parking Demand

Champlain College			
User Group	**Number of Potential Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Employees	612	58.0%	355
On-Campus Students	1418	18.9%	269
Off-Campus Students	318	29.9%	96
Visitors			15
Fleet[2]			6
Peak Parking Demand			
Demand Based on Survey[3]			**741**
Utilization Based on Counts[4]			**427**
Parking Supply			
Total Spaces[5]			**642**
Net Spaces			
Peak Demand			**-99**
Peak Utilization			**+215**

1. Peak parking demand is calculated from data collected in the 2022 CATMA Survey where "% of Users" consists only of car users who are on campus at peak time.
2. Champlain has 15 fleet vehicles but estimates only ~40% attempt to park on campus at peak time.
3. Total peak parking demand has a margin of error of ±89 spaces.
4. Peak observed utilization occurred on October 6th, 2022 at 2 PM and has a margin of error of ±31 spaces based on 2022 count data.
5. Total Parking Supply does not include 145 on-street parking spaces in Designated Zones.

Future parking demand was estimated from the surveyed mode trends by user groups, accounting for the anticipated changes to infrastructure and user populations described above. For Champlain College, there are anticipated increases in population that

account for the increased peak parking demand, assuming the mode trends remain consistent with current behavior for each user group.

Table 11 Champlain College Future Parking Demand 2028

Champlain College			
User Group	Number of Potential Users	Peak Parking Demand[1]	
		% of Users	Spaces
Employees	830	58.0%	482
On-Campus Students	1448	18.9%	275
Off-Campus Students	712	29.9%	214
Visitors			15
Fleet[2]			6
Peak Parking Demand			
Future Demand Based on Survey			**992**
Parking Supply			
Total Spaces[3]			**642**
Net Spaces			
Peak Demand			**-350**

1. Peak parking demand is calculated from data collected in the 2022 CATMA Survey where "% of Users" consists only of car users who are on campus at peak time.
2. Champlain has 15 fleet vehicles but estimates only ~40% attempt to park on campus at peak time.
3. Total Parking Supply does not include 145 on-street parking spaces in Designated Zones.

Fleet

Champlain College has a total of 15 fleet vehicles on their campus in designated "Service Only" spaces. Four passenger vans are typically parked in Rowell and Cushing, and eleven pick-up trucks and facilities vehicles are typically parked in the Sears Lane lot near the facilities building. There are no current plans to grow the fleet.

Highlighted Strategies

Parking Restrictions and Permits

Champlain College provides clear guidance for all campus community members to follow regarding parking policies. It is mandatory that all Champlain College affiliates obtain a permit for their vehicles each semester. Permits are affiliated with particular parking zones.

First year students are restricted from bringing vehicles to campus. This policy was approved in 2018 to align with the Master Plan and Sustainability Vision. There are waivers available for demonstrated need based on strict criteria around employment, medical conditions, long-distance travel, and transfer students from other institutions.

Telework

Champlain College provides an Interim Workplace Flexibility policy that was updated in December 2022. The workplace flexibility is opportunity to support employees' safety, work life, along with their personal and family responsibilities while still supporting the College's need for coverage, efficiency, and productivity. The workplace flexibility assesses the job and employee's suitability prior to approving a work arrangement. This varies depending upon the employee's role and the specific nature of the work required. The work arrangement can be occasional, hybrid, or fully remote and approval is at the supervisor's discretion and must be reviewed with the functional area's Dean, Vice President, COO, or Provost.

Transportation Demand Management

Champlain College encourages all employees and students to register for CATMA membership which provides carpool and vanpool matching, bike/walk rewards program, Guaranteed Ride Home Program, unlimited access free rides on local and regional bus routes, CarShare Vermont membership discounts, Park and Ride options, and commuter workshops.

CarShare Vermont

Champlain College has a partnership with CarShare Vermont via CATMA's Campus Programs Contract and provides funding to CarShare Vermont for program support. Through this contract with CATMA, CarShare Vermont provides significantly discounted membership to any campus affiliate that does not hold a parking permit[13]. As of December 2022, there were a total of

[13] Rates for CarShare Vermont Campus Programs can be viewed here: https://www.carsharevt.org/memberships/campus/

45 members (28 students and 17 employees) registered to CarShare Vermont through Champlain College. There are CarShare Vermont pods located on Maple Street near West Hall, on College Street near Sanders Hall, and on St. Paul Street near 194 St. Paul Street Apartments[14].

Shuttles

There is free commuter parking at 175 Lakeside Avenue for Zone 1 permit holders. Champlain operates a free shuttle service seven days a week between Lakeside Campus, 194 Saint Paul Street, and Main Campus. All Zone 2 permit holders are automatically enrolled in CATMA's Guaranteed Ride Home program, which provides a free cab ride if the shuttles are not operating. All Zone 1 permit holders are also eligible to enroll. Locations of the Champlain shuttles can be tracked in real-time providing up to date information to users via website or mobile app[15].

Monitoring, Compliance, and Enforcement

Champlain College diligently monitors and enforces the parking plan through the year, with parking enforced 24 hours per day, 7 days per week. Further, every Champlain College affiliate, employees and students alike, are required to get a parking pass for their vehicle every semester. Lots on the main campus in close proximity to academic buildings are either designated for main campus employees with an appropriate permit (i.e. Zone 1 permit holders) or pay per use on weekdays between 8 AM and 4 PM for appropriate permit holders. It is noted that the pricing is structured to be most expensive in the lots closest to the core of campus and in the highest demand, with lots further out becoming less expensive.

Further, on city streets that have not been identified as eligible locations for Champlain College affiliates to park, Champlain affiliated vehicles can be ticketed in accordance with Champlain College's parking policy. The College's lots are monitored and patrolled daily. The College issued 1,223 citations and 1,296 warnings during the 2021-2022 school year and 2022 summer programming. This enforcement action represents an average of nearly 7 warned or ticketed infractions per day. It also represents an increase in enforcement action of over three times the warned or ticketed infractions from the previous year (2020-2021).

In addition to the daily monitoring, quarterly counts are conducted for a three-day period at every lot during peak times (i.e. intervals starting at 10AM, 12PM, and 2PM). Champlain College also counts City streets in the vicinity of campus, which is likely capturing other users of these public streets, like on Main Street and Summit Street, beyond their affiliate use.

[14] Locations for CarShare Vermont vehicles can be viewed here: https://www.carsharevt.org/locations/
[15] https://shuttle.champlain.edu/

4

University of Vermont

Founded in 1791, the University of Vermont has been a cornerstone of Burlington throughout the period following European settlement of the area, established prior to the founding of the City itself. The University is a medium sized public university and land grant institution that is considered a "Public Ivy." This designation is based on the strength of selective and rigorous undergraduate educational programming as well as renowned research. Known as UVM, or University of the Green Mountains in Latin, the University prides itself on being the ideal size to foster academic and research prominence while encouraging close faculty-student mentorships across all levels of study. The location of UVM as part of the fabric of Burlington and the state of Vermont, and in close proximity to Lake Champlain and the Green Mountains, enriches student educational experience and enables service to the state's communities through its land grant mission.

The University of Vermont is situated at the top of the hill overlooking the City of Burlington and Lake Champlain to the west and the Green Mountains to the east. The Main Campus extends approximately 460 acres inclusive of central, athletic, Redstone, and Trinity campuses, as well as Centennial Woods. These areas are predominantly within Burlington with a small, connected land area that crosses over into South Burlington. One satellite site to this contiguous campus area is the Rubenstein Ecosystem Laboratory, which is situated directly on Burlington's waterfront and serves as a research and teaching laboratory regarding the Lake Champlain basin. Main Campus areas are generally accessed from Main Street, East Avenue, Colchester Avenue, Prospect Street, Spear Street, University Place, and Williams Street, as well as many additional roadways and pathways.

In addition to Main Campus, UVM has land holdings in South Burlington, Colchester, Essex, and many other areas across the state. South Campus includes land holdings predominantly in South Burlington with a small area in Burlington made up of mostly agricultural, horticultural, and natural areas. The Colchester Research Campus serves research purposes associated with

the College of Medicine. Fort Ethan Allen in Colchester/Essex includes facilities for maintenance purposes, including fleet services.

Existing & Anticipated Infrastructure and Development

There are 200 buildings and an additional 29 accessory buildings that serve the University, accounting for over 5.6M gross square footage. The buildings serve academic, research, residential, administrative, athletic, student support, facilities, and other purposes. Of these buildings, over 75 support academic and research purposes and over 50 support residential purposes. The residential buildings support 5,775 beds for students to reside on campus with an additional 617 beds for students and 164 beds for faculty and staff provided through third party partnerships. Primarily the on campus residential beds are for first- and second-year undergraduate students, as they are generally required to live on campus.

Table 12 Existing UVM Campus Building Data

Building Use	Accessory Buildings	Total Buildings	GSF	Residential Beds
Mixed Uses				
Academic / Administrative / Student Support	0	3	242,857	
Academic / Research	7	69	1,937,764	
UVM / UVMMC Academic Research	1	7	253,501	
Administration	10	33	510,524	
Athletics	6	17	475,948	
Student Support	3	20	501,978	
Residential				
Residential Academic	0	3	110,961	
Residential Dining	0	4	260,602	
Residential Central Campus	2	7	209,342	5,775
Residential Redstone Campus	0	14	408,954	
Residential Trinity Campus	0	12	147,174	
Residential Athletic Campus	0	11	591,503	
Total	**29**	**200**	**5,651,108**	**5,775**

Parking spaces are available across the various segments of campus. Athletic commuter lots make up the majority of spaces available, with over 1,700 spaces. Core campus areas account for over 1,600 additional parking spaces. There are commuter lots that are largely leased out to other entities. And finally, there are Redstone and Trinity campus lots that primarily serve residential second-year students with vehicles on campus as well as some employee use. The off-site spaces reflect satellite parking within and outside of Burlington. The off-site parking within Burlington does not account for the 200 spaces at 351 Pine Street, as a project has been identified to remove that parking from UVM's inventory.

Table 13 Existing UVM Parking Capacity

Parking Lot Location	Capacity	Leased Spaces	Usable Spaces
Athletic Commuter	1,733		1,733
Core Central	50		50
Core East	767	-100	667
Core North	369		369
Core South	135		135
Core West	431	-47	384
Commuter Lots	808	-485	323
Redstone Campus	626		626
Trinity Campus	314		314
Off-Site: Burlington[1]	54		54
Off-Site: Outside Burlington[2]	210		210
Total in Burlington	**5,287**	**-632**	**4,655**
Total	**5,497**	**-632**	**4,865**

1. Includes parking at the Rubenstein Laboratory and Bioresearch Complex (South Campus).
2. Includes parking spaces at the Colchester Research Facility, Forestry Laboratory, and Miller Barn.

The previous two-year JIPMP identified many projects that require status updates in the current JIPMP. There were projects that were completed from the last JIPMP including the Music Building Recital Hall Addition, Jeffords East Lower Lot, University Heights Road (Southwick), Pomeroy Barn & 172 South Prospect Buildings, and a New Research Facility for the College of Medicine. In addition, there are projects that were previously identified that no longer have plans to move forward, including Fleming Museum Parking, Outing Club Relocation, Southwick Hall Parking, Future Structured Parking, Colchester Avenue / Dewey Buildings, Back 5 & Cottages (Trinity Campus) Buildings. There are 22 other projects that have been identified for the next 5 years, including 9 newly identified projects that are not carried forward from the previous JIPMP. One of these projects, discussed above, includes the removal of the satellite spaces at 351 Pine Street. This 200-space lot at 351 Pine Street was originally leased in 2019 to comply with permit conditions for the Firestone addition. At the time of permitting that project, there was not an approved JIPMP in place, which meant that the City could not consider UVM's extensive system of TDM and had to apply the minimum parking requirements identified in the ordinance without considering a waiver as would be normally considered under an approved JIPMP. This temporary condition was later resolved by approval of the 2020-2022 JIPMP. This JIPMP included the lot at 351 Pine Street however the lot was never actually needed or used. For the past two years, UVM has completed campus wide monthly lot counts, which have consistently shown that UVM has adequate on-

campus parking space, and this remote parking lot is not needed. UVM intends to apply to amend the permit requirement for this lot and remove this lot from campus inventory. UVM will continue quarterly campus wide lot counts at peak times, to ensure ongoing management of parking spaces. Other projects will include future student housing, potentially increasing the number of residential beds by approximately 600-1200 beds, located at Trinity or elsewhere on campus as noted in Table 14 and footnote 3. It is anticipated that the full list of identified projects will have a limited impact on the gross square footage of building area on campus but will result in a net gain of approximately 638 parking spaces. See Table 14 for preliminary estimates on building area changes and estimated completion dates for these projects.

Table 14 UVM Campus Building Program Data (completed and future)

Project Name	Included in Previous JIPMP	Change in Building Area (gsf)	Associated Change in Parking (spaces)	Estimated Completion
Music Building Recital Hall Addition	Yes	3,942	3	Completed
Jeffords East Lower Lot	Yes		67	
University Heights Road (Southwick)	Yes		5	
Pomeroy Barn & 172 South Prospect Buildings	Yes	-6,067	-3	
New Research Facility for COM (Firestone)	Yes	75,000	-121	
Bioresearch Complex Parking	Yes		153	2023
Hills	No	6,408	1	
Centennial Compound	No		40	
ADA Code Compliance	Yes		-20	2024
284 East Avenue	No		30	
Waterman	No	3,000	-10	
Votey Lot	Yes		-10	
Torrey Hall Addition	Yes	2,860	-6	
Future Student Housing[3]	No	100,000	0	2025
Future Additional Parking to Accommodate New Housing	No		200	
Colchester Research Facility Lot 1 Parking[2]	Yes		200	
University Road (East Ave to Compound)	Yes		15	
Interfaith Center Parking Lot	Yes		30	
Future Student Housing[3]	No	150,000	-25	2026
Future Additional Parking to Accommodate New Housing	No		200	
Villa	No	12,618	-7	
Future Compound Expansion	No		66	
Virtue Field Phase 3	Yes	5,000	0	2027
Blundell Parking	Yes		5	

Tarrant (Multi-Purpose) Event Center Building	Yes	119,099	0	
Miscellaneous Parking Adjustments[1]	Yes		25	Unknown
351 Pine Street	Yes		-200	
Coolidge Hall Building	Yes	-30,510		Not moving forward at this time
Fleming Museum Parking	Yes			
Outing Club Relocation	Yes	13,250		
Southwick Hall Parking	Yes			
Future Structured Parking	Yes			
Colchester Ave/Dewey Buildings	Yes	-82,622		
Back 5 & Cottages (Trinity Campus) Buildings	Yes	-64,907		
Total[4]		**471,860**	**638**	

1. Where possible UVM attempts to reallocate space to create more parking. It is estimated this will result in ~25 spaces over 5-years based on previous experience.
2. This facility is estimated to house between 200 and 400 parking spaces. Though it is off-site it will impact on-campus demand depending on UVM policy.
3. UVM and the City of Burlington have engaged in a process to rezone Trinity Campus in order to enable the creation of additional student housing on campus. As of this report, City Council has tabled the proposed rezoning language and it is unclear whether housing at Trinity Campus will move forward. UVM is actively exploring options to increase student housing on Trinity and/or elsewhere. UVM is not in a position to discuss the other sites publicly at this time. None of the sites are associated with a project from the previous JIPMP to remove Coolidge Hall, which is not moving forward at this time. The low end of range of potential gsf estimates was used for totaling change in area.
4. Total includes projects except those not moving forward at this time.

Existing & Anticipated Community Population

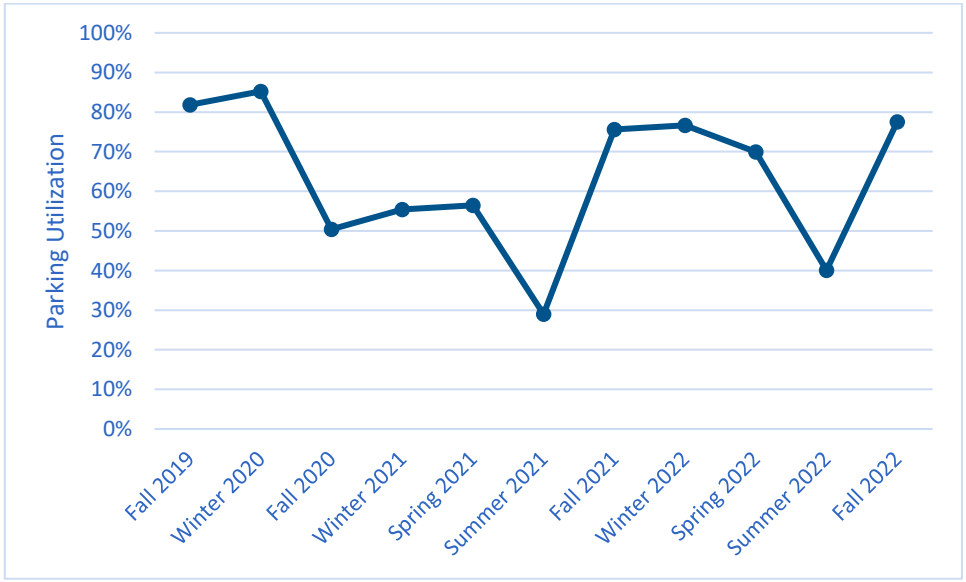
The UVM campus currently serves a total population of just over 18,000 on Burlington's Main Campus, inclusive of faculty, staff, and students. Employees include 2,311 full- and 155 part-time staff and 861 full- and 927 part-time faculty. These numbers include approximately 230 employees that are not Burlington based and therefore deducted from the employee users contributing to parking demand, which total approximately 4,024 employees. Student enrollment includes 11,326 undergraduate students, 1,707 graduate students, 483 medical students, and 572 continuing education students, totaling approximately 14,088 students. The majority of the first- and second-year undergraduate students reside on campus in the University's 5,775 residential beds.

The UVM campus population is expected to stay relatively consistent over the next five years based on projections from the date of this document. A slight increase in graduate and continuing education student enrollment are projected to account for the approximate 3% increase in student population. The undergraduate, staff, and faculty numbers are expected to remain largely consistent with present population levels.

Existing & Anticipated Parking Demand

As previously discussed, the peak parking demand was estimated using two methodologies: utilization counts and survey data. The parking supply for the campus is currently at 4,865 spaces. Sites within the campus that UVM ground-leases (and their associated parking spaces), such as Redstone Lofts, Redstone Commons, and Centennial Court Faculty/Staff Apartments, are not included in this total. When accounting for these additional 379 spaces that are nestled within the campus and utilized by students in Redstone Lofts & Apartments,

Figure 7 University of Vermont Parking Utilization Trends



but not part of UVM's parking supply for their exclusive use, there are 5,244 spaces. As such, there are two net parking space estimates provided to account for the UVM parking supply, and the UVM parking supply with consideration for these on site and student utilized spaces.

The UVM managed spaces are spread across the lots as depicted in Figure 8. In addition, Figure 8 demonstrates the average parking utilization rates for each UVM owned lot. These rates are based on the quarterly lot counts conducted by UVM across three days during peak periods.

The maximum parking utilization was compared across the available data from previous peak period observations to demonstrate changes over time. The parking utilization trends in Figure 7 demonstrate slightly reduced demand through the Fall 2020 to Summer 2021 period, where utilization ranged from 29% to 56%. Parking utilization rebounded starting in Fall 2021 with an in session (i.e. not summer) maximum utilization between 70% and 78% consistently. This more recent data falls below utilization observations made prior to the COVID pandemic, which were above 80%.

Figure 8 University of Vermont Average Utilization Rates



The current peak parking demand for UVM is estimated to be 3,508 vehicle spaces based on observed peak parking utilization counts, demonstrating a net available parking supply of 1,357 spaces. Peak parking demand based on survey data indicates peak parking demand of 4,943 spaces, or a net shortfall of 78 spaces. It is noted that this estimate and its future projections represent a likely overestimation of peak parking demand. The percent of users for each user group was estimated based on those that reported predominantly driving alone or carpooling to serve their transportation to campus and reported typically being on campus at the peak time. They may be using secondary modes at other times during a typical week, including carpooling, biking, and/or teleworking. As such, it can be assumed that these estimates inflate the demand to represent an artificially high peak parking demand.

Table 15 University of Vermont Current Parking Demand

University of Vermont			
User Group	**Number of Potential Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Employees[2]	4,024	55.4%	2,228
On-Campus Students	5,775	16.8%	971
Off-Campus Students[3]	7,741	17.8%	1,376
Visitors			185
Fleet[4]			183
Peak Parking Demand			
Demand Based on Survey[5]			**4,943**
Utilization Based on Counts[6]			**3,508**
Parking Supply			
Total UVM Managed			**4,865**
Total UVM + Ground-Lease Spaces[7]			**5,244**
Net Spaces			
Peak Demand in UVM Managed Spaces			**-78**
Peak Demand in UVM + Ground-Lease Spaces			**+301**
Peak Utilization in UVM Managed Spaces			**+1,357**

1. Peak parking demand is calculated from data collected in the 2022 CATMA Employee and Student Transportation Survey using the methodology described in Appendix A. "% of Users" consists only of car users who are on campus at peak time.

2. Employees not located on Main Campus are not included in this count.

3. Off-Campus Students does not include Continuing Education students.

4. Fleet vehicles not located on Main Campus or in Burlington not included in this count.

5. Total peak parking demand has a margin of error of ±1046 spaces.

6. October 4, 2022 at noon was the peak utilization count and has a margin of error of ±217 spaces based on 2022 count data.

7. Ground-lease spaces include spaces that are interior to the campus but exclusively used by Redstone Lofts and Apartments.

Future parking demand was estimated from the surveyed mode trends by user groups, accounting for the anticipated changes to infrastructure and user populations described above. For UVM, the undergraduate population is expected to remain consistent with population increases coming largely from increased graduate student enrollment. An increase in the number of beds available for on-campus students was provided with a range of 600 to 1200 beds projected. For the purposes of calculating demand, the low end of the anticipated range of new beds was assumed at 600 beds. These assumptions provided a conservative estimate even though additional housing is being contemplated and may contribute to further increases in on-campus housing for students. Parking supply is expected to increase in the future condition, contributing to the estimate of a 515-space surplus of parking anticipated in the projection to 2028. This estimate assumes the mode trends remain consistent with current behavior for each user group.

Table 16 University of Vermont Future Parking Demand 2028

University of Vermont			
User Group	**Number of Potential Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Employees[2]	4,020	55.4%	2,226
On-Campus Students	6,375	16.8%	1,073
Off-Campus Students[3]	7,425	17.8%	1,321
Visitors			185
Fleet[4]			183
Peak Parking Demand			
Demand Based on Survey			**4,988**
Total Parking Supply			
Total UVM Managed			**5,503**
Total UVM + Ground-Lease Spaces			**5,882**
Net Spaces			
Peak Demand in UVM Managed Spaces			**+515**
Peak Demand in UVM + Ground-Lease Spaces			**+894**

1. Peak parking demand is calculated from data collected in the 2022 CATMA Employee and Student Transportation Survey using the methodology described in Appendix A. "% of Users" consists only of car users who are on campus at peak time.

2. Employees not located on Main Campus are not included in this count.

3. Off-Campus Students does not include Continuing Education students.

4. Fleet vehicles not located on Main Campus or in Burlington not included in this count.

Fleet

In 2019, UVM created a Fleet Vehicle Procurement Procedure to attempt to achieve a high level of fiscal, social, and environmental responsibility in fleet vehicle procurement. This procedure defines the process for purchasing new or replacement vehicles. The University will prioritize alternative fuel vehicles (AFVs) and vehicles with high fuel economies relative to their market class.

UVM has 212 fleet vehicles that park throughout the main campus and other off campus locations. The fleet vehicles parked in Howe and Votey parking lots have designated "Service Only" spaces. The other lots the fleet vehicles are parked in have a combination of spaces, including designated "Service Only" spaces. Ambulances are parked in the Rescue Building and CATS shuttle buses are parked in Catamount West when not in use. CATS shuttle buses may be parked at the Bioresearch Complex in the future.

Highlighted Strategies

Parking Restrictions and Permits

The University of Vermont provides clear guidance for all campus community members to follow regarding parking policies. It is mandatory that all UVM affiliates obtain a permit for their vehicles each semester. Permits are affiliated with specific parking zones.

First year students living in residential halls are prohibited from registering a vehicle for campus parking. The University has determined approved, eligible employment and documented medical needs to be the only exceptions. Students are required to take a parking permit course prior to receiving a parking permit. This course is designed to educate potential permit holders on the alternatives to and impact of driving alone.

UVM has a virtual permit system that uses license plate recognition (LPR) technology to captures the vehicles license plate to confirm your vehicle is registered. Parking regulations are enforced on campus 24 hours a day, seven days a week using a system of warnings, citations, and/or removal of vehicles by towing.

Telework

UVM offers flexible working arrangements and telework policies. Telework requests are reviewed on a case-by-case basis in the context of established and consistent guidelines. Telework requests are approved or denied at the discretion of the appropriate Dean, Vice President or Vice Provost and may be discontinued at any time at the University's sole discretion.

Transportation Demand Management

UVM partners with CATMA to offer employees and students bike/walk rewards, personalized trip planning assistance, and Guaranteed Ride home. UVM affiliates have access to Go! Vermont resources and Carpool and Van Pool matching to find greener travel options. In addition, UVM provides funding to GMT through the Unlimited Access Program to offer affiliates free bus transit rides on GMT routes.

CarShare Vermont

UVM has a partnership with CarShare Vermont via CATMA's Campus Programs Contract and provides funding to CarShare Vermont for program support. Through this contract with CATMA, CarShare Vermont provides discounted membership to any campus affiliate that does not hold a parking permit[16]. As of December 2022, there were a total of 251 members (194 students and 57 employees registered to CarShare Vermont through UVM). There are two CarShare pods on the UVM campus including locations just off of University Place and on University Heights. Currently there are two cars located on UVM campus[17].

Shuttles

UVM provides an on-campus shuttle (CATS) for students that runs 7:30 am until 5:30 pm. On the weekdays, these shuttles generally run every 15 minutes between Redstone and Central campus, every 15-20 minutes on the on-campus route during the daytime, and every 15-30 minutes on-campus during the evening. Weekend service of the on-campus shuttle runs every 30 minutes in the evenings. Locations of the CATS shuttles can be tracked with the Real-Time CATS Shuttle Locations[18] providing up to date information to users via website or mobile app. In addition to the on-campus and Redstone Express routes, there has historically been an off-campus bus that serves key destinations beyond campus focused shuttle routes; however, it is not currently running due to driver shortages.

[16] Rates for CarShare Vermont Campus Programs can be viewed here: https://www.carsharevt.org/memberships/campus/
[17] A map of CarShare Vermont locations can be viewed here: https://www.carsharevt.org/locations/
[18] https://uvm.transloc.com/

UVM also offers CATSride as a shuttle service on a first come, first serve basis. The intent of this shuttle service is to provide transportation between UVM sites within 10 miles of central campus. UVM employees and students can reserve a ride with the demand response-based service by scheduling in advance or can reach out directly to the shuttle for same day service.

Local and regional bus routes via GMT serve students and employees beyond the on-campus routes, with fare free transit available to all users tentatively until later in 2023. It is anticipated that UVM will continue to provide funding to enable their affiliates to ride GMT bus routes for free with a valid UVM ID should fares be reinstated.

A key to limiting the need for students to come to campus with a vehicle is connecting students to transportation options around break times. UVM provides shuttle services between campus and Downtown Transit Center for connections to regional bus services, Amtrak stations in Burlington and Essex Junction, and Burlington International Airport prior to and following school recess periods. Shared shuttle services with Champlain College around break times are also offered.

Monitoring, Compliance, and Enforcement

UVM has enabled technology to assist their diligent efforts in monitoring and enforcing the parking plan on campus. UVM has implemented a virtual parking permit system that utilizes license plate reader technology. Permit holders no longer use hang tags, but rather their registered vehicle's license plate serves as the key to the permit they hold. LPR equipped service vehicles monitor all of the parking areas on campus routinely, identifying the vehicles parked on campus and whether they are parked appropriately given the permit type.

In 2022, over 8,000 citations were issued, with the most common violations of parking with no valid permit (2,994), in a restricted area (1,781), or parking in an expired space (1,268). Fines for expired metered spaces are $25, for parking in restricted areas are $30, and for parking with no valid permit are $50. Habitual offender fines go up significantly, with habitual offenders in expired spaces fined $80, in restricted areas fined $90, and without a valid permit $110. These fines act as a significant deterrent to improper parking on campus.

In addition to the daily monitoring, quarterly counts are conducted for a three-day period at every lot during peak times (i.e. intervals starting at 10AM, 12PM, and 2PM).

Other Key Areas of Concern

Although the JIPMP is generally focused on the peak demand for parking, it is recognized that concerns regarding special event parking have been raised. UVM has a clear set of procedures for accommodating events with significant parking demand on

campus. Event parking areas can be dedicated for an event or commingled, depending on the size of the event. These events tend to fall outside of the typical peak demand times, relegated generally to the evenings and weekends when many of the employee and student commuters accessing campus are not parked in campus spaces. In the efficiency-based standards framework, this opportunity to share parking resources during periods of underutilization for other purposes (i.e. daytime commuter parking) would be viewed positively. In alignment with efficiency-based standards, the written protocol for events allows for the parking in closest proximity to the event to fill up first. Should that primary parking fill, the assigned officer and staff will shift to reroute parking demand to overflow parking designated for the event. This overflow parking is served by shuttles to and from the main entrance of the event. For events that regularly utilize the overflow parking, like major sports events, attendees are encouraged to utilize the overflow parking and shuttle service. During Commencement, UVM's largest event annually, the University is able to manage the demand within the institution's resources to meet the needs of the event.

5

University of Vermont Medical Center

The University of Vermont Medical Center (UVMMC) is designated as a Level I Trauma Center situated in an academic teaching and research hospital serving the Vermont and Northern New York region. The campus in Burlington is the hub of a large, integrated healthcare system in partnership with an extensive network of hospitals and healthcare facilities throughout the region. Partnership with the Larner College of Medicine and College of Nursing and Health Sciences at UVM enables training for the next generation of healthcare professionals and innovation through advancing research.

The UVMMC campus sits prominently on the hill in Burlington adjacent to the UVM core campus area. Founded in 1879, the original hospital was partially housed in the Mary Fletcher Hospital building that still sits on the site today. The hospital's campus has expanded significantly over the years, adding buildings and square footage to support the hospital's mission and growing role in serving the communities of Vermont and Northern New York.

UVMMC campus is flanked on three sides by Colchester Avenue, East Avenue, and Main Street. Each of these three perimeter roadways provide entrance access points to the campus. Additional internal roadways and pathways, including Carrigan Drive and Beaumont Avenue, allow for circulation within the site.

Existing & Anticipated Infrastructure and Development Plan

The main medical center campus has 786,057 gsf serving the hospital's in-patient units, 35,597 gsf serving educational purposes, and an additional 877,085 gsf serving other purposes. Satellite sites within Burlington account for an additional 197,922 gsf of building space, with 1 South Prospect making up the majority of that area with 149,404 gsf. The hospital's infrastructure is served by 3,788 parking spaces, with 2,500 of the spaces in on-site facilities including the ACC Garage, Emergency Room Lot,

McClure Garage, South Lot, and 1 South Prospect. Off-site lots include 1,276 additional spaces with 86 spaces available at other off-site Burlington satellite facilities[19] and the remaining at lots served by shuttle services.

At the time of this document, projects being contemplated include evaluation of the McClure Parking Garage due to deteriorating structural conditions and potential adjustments to leased satellite parking. There are no plans for projects within Burlington that would alter building square footage. The previously approved JIPMP had no plans for changes to building or parking footprints for UVMMC.

Existing & Anticipated Community Population

The UVMMC is a hospital with 580 licensed in-patient beds. In 2022, the average daily number of appointments and procedures was approximately 2,952 per day across the Medical Center Campus, 1 South Prospect, and other Burlington sites, including in person and telehealth visits. That accounts for nearly 675,000 in person appointments or procedures across the year or over 750,000 total visits. One practice that continues to serve the patient population of UVMMC is telehealth visits. With a significant rise in telehealth visits during the COVID pandemic, data from 2022 indicates that this practice will continue to serve some baseline portion of visits that would otherwise be in person. For 2022, approximately 10% of appointments were served via telehealth, amounting to over 75,000 additional patient appointments over the year served without a need for patient transportation to or parking on campus.

There are a total of 6,475 employees of UVMMC that report to sites within Burlington. The main medical center campus accounts for 5,725 of those employees with another 646 at 1 South Prospect and the remaining 104 at other sites in Burlington. In addition to the paid staff, there are also honorary members of the medical staff and volunteers that are regularly on campus to serve the patients and visitors, with 188 total individuals that fill these roles.

Existing & Anticipated Parking Demand

As previously discussed, the peak parking demand was estimated using two methodologies: utilization counts and survey data. The parking supply for UVMMC is currently at 2,500 on-site spaces. The demand was evaluated based on the employees that report to sites within Burlington and are parking on-site, as well as patients and visitors accessing the facilities and parking on-site. The analysis here focused on the on-site parking supply and demand, however, the full system parking including off-site and satellite parking was included in the *Institutional Supplement*. These spaces within Burlington are spread across the lots as

[19] These additional spaces do not include 184 Peal Street, which is leased by UVMMC, but staffed by others with no UVMMC affiliated parking.

depicted in Figure 9. In addition, Figure 9 demonstrates the average parking utilization rates for each UVMMC lot. These rates are based on the quarterly lot counts conducted across three days during peak periods.

Figure 9 University of Vermont Medical Center Average Utilization Rates



The maximum parking utilization was compared across the available data from previous peak period observations to demonstrate changes over time. The parking utilization trends in Figure 10 demonstrate slightly reduced demand through the Fall 2020 to Summer 2021 period, but still remained above 73%. Parking utilization has not returned to the above 90% peak utilization like that observed prior to the COVID pandemic. The maximum peak utilization is most recently hovering in the mid-80% range.

The current peak parking demand for UVMMC is estimated to be 1,941 vehicle spaces based on observed peak parking utilization counts for on-site facilities, demonstrating a net available parking supply of 559 spaces. Peak parking demand based on survey data indicates peak parking demand of 2,145 spaces in on-site facilities, or a net surplus of 355 spaces. It is noted that this estimate and its future projections represent a likely overestimation of peak parking demand.

Future parking demand was estimated from the surveyed mode trends by user groups, accounting for any anticipated changes to infrastructure and user populations described above. For UVMMC, the employee population, patients served, and visitor activity are expected to remain consistent with the current status. The infrastructure is also anticipated to remain consistent with no changes to buildings and limited changes to on-site parking supply. Assuming mode trends remain consistent with current behavior for each user group, the on-site parking surplus is anticipated to be 355 spaces projected to 2028.

Figure 10 University of Vermont Medical Center Parking Utilization Trends

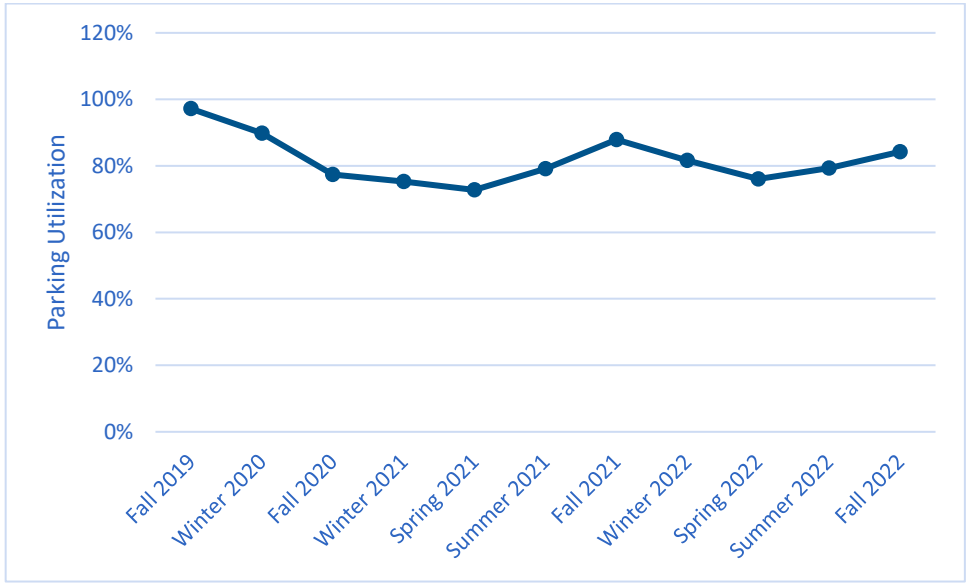


Table 17 University of Vermont Medical Center Current Parking Demand

UVM Medical Center			
User Group	**Number of Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Medical Center Campus			
Employees	5725	13.7%	785
Out-Patients[4]	2388		**700**
In-Patients[4]			**75**
Visitors[2]			**250**
Fleet			**11**
Subtotal			*1,821*
1 South Prospect			
Employees[3]	646	11.7%	75
Out-Patients[4]	563		**230**
Fleet			**10**
Subtotal			*315*
Other			
Employees	104	8.3%	9
Subtotal			*9*
Peak Parking Demand Based on Survey[5]			**2,145**
Peak Parking Utilization Based on Counts[6]			**1,941**
Total Parking Supply			**2,500**
Net Spaces Peak Demand			**+355**
Net Spaces Peak Utilization			**+559**

1. Peak parking demand is calculated from data collected in the 2022 CATMA Employee and Student Transportation Survey using the methodology described in Appendix A. "% of Users" consists only of car users who are on campus at peak time.

2. UVMMC volunteers are included in visitor parking demand, as volunteers park in the ACC Garage and get a voucher to avoid paying upon their departure.

3. Employees of 1 South Prospect assigned to Centennial have been allowed to park on-site due to suspended shuttle service.

4. Average daily patient estimates are based on total annual in person and telehealth appointments and procedures by location for 2022 at the Medical Center and 1 South Prospect facilities. Patient and visitor parking is allocated to 50% of the parking supply on-site. Policies are in place should the patient parking demand exceed this supply.

5. Total peak parking demand has a margin of error of ±122 spaces.

6. Peak observed parking utilization occurred on October 4th, 2022 at 10 AM and has a margin of error of ±65 spaces based on 2022 count data.

Table 18 University of Vermont Medical Center Future Parking Demand 2028

UVM Medical Center			
User Group	**Number of Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Medical Center Campus			
Employees	5725	13.7%	785
Out-Patients[4]	2388		**700**
In-Patients[4]			**75**
Visitors[2]			**250**
Fleet			**11**
Subtotal			*1821*
1 South Prospect			
Employees[3]	646	11.7%	75
Out-Patients[4]	563		**230**
Fleet			**10**
Subtotal			*315*
Other			
Employees	104	8.3%	9
Subtotal			*9*
Peak Parking Demand Based on Survey			**2,145**
Total Parking Supply			**2,500**
Net Spaces Peak Demand			**+355**

1. Peak parking demand is calculated from data collected in the 2022 CATMA Employee and Student Transportation Survey using the methodology described in Appendix A. "% of Users" consists only of car users who are on campus at peak time.
2. Average daily patient estimates are based on total annual in person and telehealth appointments and procedures by location for 2022 at the Medical Center and 1 South Prospect facilities. Patient and visitor parking is allocated to 50% of the parking supply on-site. Policies are in place should the patient parking demand exceed this supply.
3. Employees of 1 South Prospect assigned to Centennial have been allowed to park on-site due to suspended shuttle service.
4. Patient parking is allocated to 50% of the parking supply on-site. Policies are in place should the patient parking demand exceed this supply.

Fleet

UVMMC fleet is comprised of 40 vehicles total and 28 are typically circulating in Burlington. The fleet includes cargo vans, ambulances, trucks, SUVs, and other vehicles. All but five of UVMMC fleet vehicles are typically parked in designated "Service Only" spaces.

Highlighted Strategies

Parking Restrictions and Permits

There are clear directions and information regarding parking locations and prices for UVMMC patients and visitors on the UVMMC website. For patients and visitors, on-site parking is available in a garage adjacent to the main campus with entrances to the hospital at each garage level. There is also curbside service including assistance to patients and valet parking service. Valet service is available for $8 per vehicle Monday through Friday from 6 AM to 5 PM, with the ability to retrieve vehicles until 9 PM. Patients or visitors with valid handicapped parking placard or plate displayed can park for free in the parking garage.

For employees, UVMMC has a detailed parking policy that outlines parking requirements based on job title and shift. All UVMMC staff and affiliates who wish to park their vehicles in a UVMMC controlled parking lot must register their vehicle with the UVMMC Security Department. The hang tags are color coded based on parking assignment (on-site lot or satellite lot). The satellite lots include a free shuttle to the main campus. Generally on-site parking is limited to permits reserved for senior staff, physicians, residents, business needs, and medical needs. For on-call employees, parking is also available on site. In 2022, there were 1,773 permits issued for parking on-site of the 8,138 permits issued total.

Telework & Telehealth

UVMMC has a Remote and Hybrid Work Policy to increase employee engagement and job satisfaction. By allowing remote work, UVM Medical Center expects to realize the efficiencies of decreased turnover, reduced office and parking space needs, and increased work productivity. There are several remote designations, On-site Flex (0-30%), Hybrid Flex (31-70%), Remote Flex (71-100%). The amount of time spent remote is indicated by the numerical values.

Telehealth continues to serve some of the patient and visitor demand for parking on the Medical Center Campus. As previously discussed, telehealth visits represented approximately 10% of patient appointments and procedures for UVMMC based on 2022

figures. It is anticipated that this trend will continue to serve a baseline need in the community and effectively reduce the daily demand for patient and visitor parking on site.

Carpool

UVMMC has a robust and mature carpooling policy for employees with a strong incentive program. Employees who carpool are provided with the opportunity to park in more desirable parking lots, receive gas coupons, and utilize the guaranteed ride home program from CATMA. Employees who wish to carpool must register as a carpool group with the UVMMC Security Department. The carpool program issued 427 carpool permits for 854 participants in 2022, demonstrating the program's popularity.

Bike parking, in particular covered bike parking, is also an area receiving some attention from UVMMC. Re-envisioning of the covered bike parking just outside of the McClure building, which is often full, to maximize the space available and accommodate more bike parking in close proximity to a key entrance of the facility. UVMMC is exploring making this area secure bike parking with fencing for employee bike parking. This project is just one example of the multimodal enhancements taking place to better serve active or alternative modes of transportation to and from UVMMC.

Shuttle and Transit Services

For employees accessing the Medical Center Campus through off-site parking, UVMMC contracts with a bus company to serve the off-site lots with shuttle service. The shuttles serve AM and PM peaks with more frequency of service and more shuttle buses in circulation to serve start and end of shift transit. The off-site lots generally have between 59 and 76 shuttle runs per day serving trips between the hours of 4:15 AM and 9:20 PM. The exception to this is the shuttle serving Centennial and 1 South Prospect, which typically operates with 30 shuttle runs per day serving the AM and PM peaks and on demand service midday. These two lots are in close proximity of the Medical Center Campus, with many users choosing to walk between parking and campus. This Centennial and South Prospect shuttle service is currently suspended due to COVID, and 1 South Prospect staff assigned to Centennial are allowed to park on-site in the interim.

UVMMC has supported discounted local and regional bus transit service for employees in the past. With fare free transit in place, this subsidy has not been tracked through the pandemic. This discounted transit opportunity would return and be tracked should fares return as tentatively planned in 2023. UVMMC has continued to support subsidized ferry service for employees that reside in New York to utilize Lake Champlain Ferries for commuting purposes. For October 2021 through September 2022, an average of 93 monthly car and driver passes and 13 passenger ten ride passes were discounted through this program.

For patients, UVMMC and Special Services Transportation Agency (SSTA) have partnered to provide shuttle services between the Downtown Transit Center and practices within the UVMMC network, like the Tilley Drive and Hinesburg Road locations.

The shuttle service is a free, scheduled service running weekdays between 7:30AM and 4:25PM with reliable and accessible service. UVMMC continues to identify ways like the Tilley Drive Shuttle to serve employees and patients with more efficient transportation options.

Monitoring, Compliance, and Enforcement

The parking on-site and off-site that serves UVMMC is diligently monitored and regulated parking is enforced by UVMMC Security staff per the procedures set forth in the University of Vermont Medical Center Parking and Parking Enforcement Policy documents. UVMMC has a strict vehicle registration and parking permit system that employees are expected to comply with. There are penalties of $10 for violating any of the parking policies. Repeat offenders are subject to towing/booting at owner's expense with violation notifications to direct supervisors for corrective action. Repeat offenses may result in forfeiture of future parking in UVMMC facilities.

6

Conclusions

This JIPMP demonstrates the ability of the Hill institutions collectively and individually to meet parking demand both currently and in the near-term future. Champlain College, UVM, and UVMMC are jointly committed to continued progress on reducing drive alone, single occupancy vehicle access to their campuses rooted in overarching commitments to climate initiatives. They have demonstrated pursuit of efficiency-based parking management, enabling various TDM strategies to actively manage and mitigate parking demand and encourage alternative mode use.

Two different methodologies demonstrated that the parking supply will serve the peak demand for parking on each institution's campus both currently and into the future. It is noted that the more robust count program that is now in place serves to provide the ground truth for observed parking demand on each respective campus. This data is invaluable to demonstrating the ability of each institution to meet the peak parking demands of their populations. Given these data can only provide a look back at how the demand was served, it is important to have the secondary method of estimating demand based on survey data to demonstrate both current and future peak parking demand, even if these estimates are notably inflated compared to the demonstrated parking utilization. These two methods likely provide the book ends of the actual parking demand on campus at peak times.

The findings shared here will be supplemented over the next five years with annual updates to track demand trends and efficacy of demand management strategies employed.

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A

Appendix A

Lot Counts

The institutions continue conducting quarterly lot counts for three days (Tuesday, Wednesday, and Thursday) and three times (10:00 AM, 12:00 PM, 2:00 PM) to support the 5-year and annual JIPMPs. This constant and consistent data collection has strengthened our demand estimations in the 5-year JIPMP.

There are advantages and drawbacks to using lot counts or survey data to estimate demand. Though lot counts are an inexpensive method to calculate parking demand, they are also usually only representative of a limited time frame. This limitation means typical peak demand may not be captured due to variability (i.e. seasonal mode change, time-off, etc.), and may underestimate demand. Survey data may overestimate demand because it fails to capture daily variation seen in lot counts. However, survey data can break down demand by user group, understand different mode trends, and can forecast future demand patterns. For more information about the advantages and drawbacks of lot counts and survey data for estimating demand, please see the 2020-2022 JIPMP Appendix B which was provided by Jonathan Dowds formerly with UVM's Transportation Research Center.

Survey Administration

The 2022 CATMA Student & Employee Transportation Surveys were launched on October 4, 2022. Direct solicitation emails were sent to employees and students. Table A-1 describes the solicitation process in more detail.

Table A-1. Overview of CATMA's 2022 Transportation Survey solicitation and responses.

	Launch Date	Population Total	Solicitation Total	Total Responses	Response Rate	Margin of Error
	Student Survey					
Champlain	10/4/2022	1,736	1,781	416	24%	4%
UVM	10/4/2022	14,088	1,000	189	19%	7%
	Employee Survey					
Champlain	10/4/2022	612	944	175	19%	6%
UVM	10/4/2022	4,254	1,000	304	30%	5%
UVMMC	10/4/2022	6,371	8,572	2,279	27%	2%

Survey Weighting

With guidance from UVM's Transportation Research Center, the results of CATMA's 2022 surveys were weighted using population parameters provided by the institutions. Survey weighting is intended to weight survey responses in a way that is reflective of the actual population. This process corrects for segments in population who are either under or overrepresented by those who answered the survey.

Demand Calculation

The demand estimation calculation used in the 2020-2022 JIPMP was provided by UVM's Transportation Research Center. Rather than finding the peak time on campus for all users and the demand for parking of all users, this calculation relies on the peak time on campus for auto-users. This adjustment is reflected by the **peak parking demand percent** listed in each demand calculation (see Table A-2). By making this slight distinction, some overestimation of demand is reduced as well as a reduction in the margin of error.

Peak parking demand percent is calculated by first finding the time the most auto users are on each campus. For employees and off-campus students, auto users are either those who drive alone and half of those carpool as their main mode. For on-campus students, auto users are all individuals who own a car. Then, a proportion is created for each user group (employees, on-campus students, and off-campus students) by taking the number of auto users on campus at peak time and dividing it by the total number of individuals in that user group in the survey. That percentage (which is the peak parking demand percentage) is

multiplied by the total number of users in that group given by the institution which results in demand (see Figure A-1 for formulas).

Table A-2. Summary of peak parking demand on each campus as identified by the 2022 CATMA Employee and Student Transportation Surveys.

Champlain College	Thursday	12:00 PM – 2:00 PM
UVM	Wednesday	2:00 PM – 4:00 PM
UVM Medical Center	Monday	2:00 PM – 4:00 PM

Figure A-1. Top: Formula for calculating peak parking demand percent for employees and off-campus students. Bottom: Formula for calculating peak parking demand percent for on-campus students.

$$\text{Peak Parking Demand \%} = \frac{\text{Drive Alone at Peak Time} + \text{1/2(Carpool at Peak Time)}}{\text{All Users}}$$

$$\text{Peak Parking Demand \%} = \frac{\text{Own Vehicle}}{\text{All Users}}$$

Margin of Error

The margin of error is the range within which a true value may be found given a certain confidence interval. All margins of error reported in the 2023-2028 JIPMP are within a 95% confidence interval. The margins of error were calculated using the Complex Samples modules in SPSS and were found for the peak parking demand percent for each user group. For each of the institutions, the composite margin of error was found by summing the squares of each user group's margin of error and taking the square of root of the sum. Knowing the margin of error is useful, because within a 95% confidence interval, we can know the total parking demand for any institution is above or below a certain percentage of the estimated demand given.

B

Appendix B

Comprehensive Development Ordinance – Parking

Sec. 8.3.3 Institutional Parking Management Plans

An Institutional Parking Management Plan shall include the following:

(a) A narrative that outlines how the proposed parking management plan addresses the specific needs of existing and anticipated development and effectively satisfies the intent of this Article and the goals of the Municipal Development Plan.

(b) Information specifying the current and anticipated numbers over the ensuing 5 year period for: number of students of all academic programs (full-time, part-time, commuter, on-campus, off-campus, and continuing education), faculty and staff (full-time and part-time), patients and visitors being served by the institution.

(c) An analysis of the anticipated parking demand by user group, time of day and/or demand by use and parking provided to meet that demand currently and anticipated over the ensuing five-year period;

(d) Information specifying the number and composition of the institution's vehicle fleet, where these vehicles are regularly kept, and designated "service vehicle-only" parking;

(e) Strategies used to reduce or manage the demand for parking which may include but are not limited to:

1. Policies which restrict and/or prohibit the bringing of vehicles to the institution for various users or groups of users;

2. A telecommuting program;
3. Programs and employee and student subsidies to encourage the use of public transit, car-share, walking, and bicycling;
4. Implementation of a shuttle service system serving off-site parking;
5. Implementation of a parking permit system to allocate parking throughout the system; and,

(f) Implementation of a monitoring, compliance and enforcement system to measure and ensure compliance with the plan.

Sec. 8.3.4 Review and Approval of Institutional Parking Management Plans

(a) Plan Approval

Such a plan shall require review and approval by the DRB, after consultation with the planning commission, and after a public hearing. In order to approve a proposed Institutional Parking Plan, the DRB shall find:

a. the proposed Institutional Parking Plan adequately serves existing and proposed development and user groups by the institution(s);
b. the proposed Institutional Parking Plan effectively meets the intent of this Article and the goals of the municipal development plan.

Such a plan, if approved by the DRB, shall be applicable for a period not to exceed five (5) years, and may be amended as necessary pursuant to the requirements of this Part. The DRB may approve one extension of up to six (6) months so long as the extension is requested prior to the Plan's expiration.

(b) Annual Reporting

The institution shall provide a report annually to the administrative officer regarding the implementation and performance of the approved plan and any significant changes in the size or makeup of user groups, parking supply, travel by mode for user groups, availability and utilization of parking management strategies, anticipated development activity, and any other conditions impacting supply and/or demand.

Failure to submit such annual report shall be a violation of this ordinance.

Sec. 8.3.5 Review and Approval of Applications for Future Development

Pursuant to Sec. 2.7.8 of this ordinance, no zoning permit or certificate of occupancy may be granted for projects which will impact the supply of or demand for parking without an approved or amended plan. Projects such as routine maintenance, repair, equipment installation, walkways, landscaping, installation of public art, and the like are exempt from this requirement so long as they do not result in a change of use, habitable area, or parking facilities upon which a plan's supply and demand calculations are based.

(a) In reviewing any application for development from a post-secondary educational or medical institution within the Institutional district, the DRB shall find that the proposal is included and addressed within an approved Institutional Parking Plan and that the proposal is consistent with the approved Plan.

(b) Any development proposed by a post-secondary educational or medical institution within the Institutional district that is not included and addressed within an approved Institutional Parking Plan shall only be approved pursuant to the underlying parking requirements of Parts 1 and 2 of this Article and upon approval of an amendment to an approved plan.

In addition to application requirements specified in Article 3 and this Part, the Institutions(s) shall submit an amendment to an approved plan that addresses how the development is consistent with or modifies supply and demand calculations and applicable TDM strategies contained in the approved Plan. Amendments may be in the form of an addendum that addresses any relevant sections of an approved Plan. The amendment shall be approved by either the administrative officer or DRB based on the underlying application type. Such developments shall be reflected in subsequent annual reports submitted to the administrative officer, and future plan updates.

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CHAMPLAIN COLLEGE

The University of Vermont

THE University of Vermont MEDICAL CENTER

Joint Institutional Parking Management Plan

Institutional Supplement

2023-2028

Prepared For: Development Review Board
Date: July 18th, 2023

vhb

CATMA
We'll help you get there

Table of Contents

Purpose **4**

Champlain College **5**

University of Vermont **12**

University of Vermont Medical Center **19**

List of Tables

Table No.	Description	Page
Table 1	Champlain College Parking Lot Counts	5
Table 2	Champlain College Infrastructure (included in GSF calculation and parking supply)	6
Table 3	Additional Champlain College Infrastructure (not included in GSF calculation or parking supply)	8
Table 4	Current and Future Employment and Enrollment for Champlain College	8
Table 5	Champlain College permit types, cost, and number of permits issued	10
Table 6	Citations given by Champlain College Transportation	11
Table 7	University of Vermont Parking Lot Counts	12
Table 8	Infrastructure (by building use) included in UVM's GSF Calculation	13
Table 9	UVM Parking Supply by Campus Area	14
Table 10	Current and Future Employment and Enrollment for UVM	15
Table 11	UVM permit types, cost, and number of permits issued	16
Table 12	Citations given by UVM Transportation and Parking Services	18
Table 13	University of Vermont Parking Lot Counts – All Lots	19
Table 14	University of Vermont Parking Lot Counts – On-Site Lots Only	20
Table 15	GSF of UVM Medical Center buildings.	21
Table 16	UVM Medical Center parking supply included in JIPMP.	22
Table 17	UVM Medical Center off-site parking supply (not included in JIPMP calculations for on-site parking).	23
Table 18	Current and Future employment UVM Medical Center	24
Table 19	Annual Daily Appointments and Procedures at UVM Medical Center	25

Table 20 Annual Daily Telehealth Appointments and Procedures at UVM Medical Center..... 25

Table 21 Total permits issued by UVM Medical Center..... 26

Purpose

The *Institutional Supplement* is intended to further detail the data gathered and analyzed in support of the *Joint Institutional Parking Management Plan* (JIPMP). These data are either further summarized within the JIPMP or not required by the JIPMP and instead documented here in support of the JIPMP and institutional planning purposes.

Champlain College

Table 1 Champlain College Parking Lot Counts

	10:00 AM	12:00 PM	2:00 PM
Winter 2022			
2/8/2022	394	396	390
2/9/2022	187	297	299
2/10/2022	386	403	392
Average	350	55%	
Maximum	403	63%	
Spring 2022			
4/19/2022	309	320	347
4/20/2022	273	279	310
4/21/2022	352	383	382
Average	329	52%	
Maximum	383	60%	
Summer 2022			
7/19/2022	185	181	186
7/20/2022	172	157	150
7/21/2022	166	176	170
Average	172	27%	
Maximum	186	29%	
Fall 2022			
10/4/2022	418	418	409
10/5/2022	363	362	380
10/6/2022	376	419	427
Average	397	62%	
Maximum	427	67%	
Total			
Average	312	49%	
Maximum	427	67%	

Table 2 Champlain College Infrastructure (included in GSF calculation and parking supply)

Name	Primary Use	GSF	Residential Beds	Parking Spaces
194 St Paul Street	Residential/Retail	175000	312	0
	(4,455 GSF Retail)			
308 Maple	Residential	5223	13	0
371 Main	Residential	13326	36	22
396 Main	Residential	8801	36	21
Adirondack Hall	Residential	4631	19	0
Aiken Hall	Administrative/Academic	13701	0	0
Bader Hall	Residential	8140	21	0
Bankus Hall	Residential	10432	45	0
Butler Hall	Residential	26730	89	0
Carriage House	Residential	2376	10	0
Center for Communications and Creative Media (formerly Hauke/Alumni)	Administrative/Academic	87187	0	0
Cushing Hall	Residential	9095	27	7
Durick Hall	Administrative	4036	0	3
Foster Hall	Administrative/Academic	7008	0	0
Freeman Hall	Administrative/Academic	11992	0	0
Garden House (ARC)	Administrative	4371	0	0
Goodhue Coolidge House	Administrative/Academic	4054	0	0
Hill Hall	Residential	9203	37	0
IDX Student Life Center	Administrative/Athletic/	49939	0	5
	Dining			
Jensen Hall	Residential	9972	36	9
Joyce Learning Center	Academic	20483	0	0
Juniper	Residential	28732	95	0
Lakeside Campus	Administrative	39552	0	267
(Miller Center at Lakeside)			0	
Lakeview Hall	Residential	18033	81	0
Lyman Hall	Residential	8550	36	0
Boardman Hall	Residential	31932	59	28

Name	Primary Use	GSF	Residential Beds	Parking Spaces
McDonald Hall	Residential	10922	45	0
Miller Information Commons	Academic	29860	0	42
North House	Residential	5402	16	10
Pearl Hall	Residential	10874	49	0
Perry Caretaker's Cottage	Residential	444	0	0
Perry Carriage Barn	Academic	5546	0	0
Perry Hall	Administrative/Academic	27847	0	16
Rowell Annex	Administrative	2882	0	0
Rowell Hall	Residential	9954	44	36
Sanders Hall	Residential	9716	36	8
Schillhammer Hall	Residential	7836	26	0
SD Ireland Family Center for Global Bus & Tech	Administrative/Academic	24390	0	0
Skiff Hall	Administrative	12493	0	15
Skiff Annex	Administrative/Academic	3354	0	0
South House	Residential	12608	47	12
Summit Hall	Residential	15271	48	30
The Skiff Gallery	Academic	633	0	0
Valcour Hall	Residential	30028	91	0
West House	Administrative	3718	0	0
Whiting Hall	Residential	9975	31	0
Wick Hall	Administrative/Academic	5265	0	0
Subtotal		**851517**	**1385**	**531**
Leased Facilities/Lots				
115 Lakeside Lot				100
158 South Willard	Residential (temporary)	10900	33	11
Total included in GSF		**862417**	**1418**	**642**
Total				**717**

1. Leased facilities do not contribute to the number of buildings or total GSF of Champlain College.
2. Residential beds in leased facilities included in total.
3. Includes leased spaces but not Maximum Parking

Table 3 Additional Champlain College Infrastructure (not included in GSF calculation or parking supply)

Name	Primary Use	GSF	Parking Spaces
194 St Paul St	Retail	N/A	67
390 Maple St	Residential	3,768	2
436 Maple St	Residential	4,297	2
115 Summit St (President's House)	Residential	3,487	2
270 South Willard St (Provost's House)	Residential	7,478	2
Total		**19,030**	**75**

Table 4 Current and Future Employment and Enrollment for Champlain College

	Current (2022)	Future (2028)
Employment		
On-Campus		
Full-time	353	380
Part-time	193	350
Contracted	66	100
Subtotal	*612*	*830*
Off-Campus		
Full-time	26	30
Part-time	263	280
Dublin and Montreal Campuses	22	25
Total in Burlington	**901**	**1,140**
Total	**923**	**1,165**
Enrollment		
On-Campus		
Full-time Undergraduates	**1,675**	**2,080**
First-Year	639	

	Current (2022)	Future (2028)
Second-Year	414	
Junior	311	
Senior	311	
Part-time Undergraduates	**61**	**80**
First-Year	13	
Second-Year	8	
Junior	10	
Senior	30	
Full-time Graduates	0	0
Part-time Graduates	0	0
Subtotal	*1,736*	*2,160*
Study Abroad		
Dublin, Montreal, & Third Party	**30**	**40**
Subtotal	*30*	*40*
Champlain College Online		
Full-Time Graduates	407	590
Part-Time Graduates	152	150
Full-time Undergraduate	550	500
Part-time Undergraduate	889	1250
Subtotal	*1,998*	*2,490*
Total	**3,764**	**4,690**

Table 5 Champlain College permit types, cost, and number of permits issued

Type	Users	Cost Per Semester	Permits Issued
Zone 1	Employees	Free / Pay-per-use	277
	Off-Campus Students	Free / Pay-per-use	202
Zone 2	On Campus Students	$175	197
Main Campus	Main Campus Employee	$200	76
Zone 5	Education majors & other students with work requirements	$250	15
	Disabled	Free	17
	Contractor	Free	9
Total			**793**

Table 6 Citations given by Champlain College Transportation

Year/Semester	# of Valid Citations Issued	# of Warnings	Funds Collected	Cumulative Funds (Since 2004)
2006-2007	-	-	$ 57,390	$ 113,390
2007-2008	-	-	$ 44,175	$ 157,565
2008-2009	-	-	$ 57,195	$ 214,760
2009-2010	-	-	$ 42,165	$ 256,925
2010-2011	-	-	$ 38,550	$ 295,475
2011-2012	-	-	$ 51,065	$ 346,540
2012-2013	1,574		$ 43,840	$ 390,380
2013-2014	1,519		$ 41,680	$ 432,060
2014-2015	1,069		$ 30,600	$ 462,660
Summer 2015	111		$ 5,585	$ 468,245
2015-2016	1,326	105	$ 31,475	$ 499,720
Summer 2016	32		$ 2,300	$ 502,020
2016-2017	1,935	467	$ 26,481	$ 528,501
Summer 2017	156	46	$ 995	$ 529,496
2017-2018	2,073	274	$ 28,502	$ 557,998
Summer 2018	261	44	$ 2,795	$ 560,793
2018-2019	1,435		$ 20,625	$ 581,418
Summer 2019	245		$ 2,575	$ 583,993
2019-2020	1,113	92	$ 16,963	$ 600,956
Summer 2020	0		$ -	$ 600,956
2020-2021	456	335	$ 13,100	$ 614,056
Summer 2021	2		$ 25	$ 614,081
2021-2022	1201	1268	$ 22,402	$ 636,483
Summer 2022	22	28	$ 200	$ 636,683

University of Vermont

Table 7 University of Vermont Parking Lot Counts

	10:00 AM	12:00 PM	2:00 PM
Winter 2022			
2/8/2022	3,301	3,405	3,248
2/9/2022	3,387	3,469	3,219
2/10/2022	3,110	3,357	3,047
Average	3,283	73%	
Maximum	3,469	77%	
Spring 2022			
4/19/2022	2,882	2,868	2,801
4/20/2022	3,158	3,166	3,109
4/21/2022	3,058	3,038	3,033
Average	3,013	67%	
Maximum	3,166	70%	
Summer 2022			
7/19/2022	1,704	1,602	1,605
7/20/2022	1,788	1,790	1,736
7/21/2022	1,785	1,811	1,801
Average	1,736	38%	
Maximum	1,811	40%	
Fall 2022			
10/4/2022	3,320	3,508	3,331
10/5/2022	3,131	3,367	3,188
10/6/2022	3,432	3,342	3,174
Average	3,311	73%	
Maximum	3,508	78%	
Total			
Average	2,836	63%	
Maximum	3,508	78%	

Table 8 Infrastructure (by building use) included in UVM's GSF Calculation

Building Use	Accessory Buildings	Total Buildings	GSF	Residential Beds
Mixed Uses				
Academic / Administrative / Student Support	0	3	242,857	
Academic / Research	7	69	1,937,764	
UVM / UVMMC Academic Research	1	7	253,501	
Administration	10	33	510,524	
Athletics	6	17	475,948	
Student Support	3	20	501,978	
Residential				
Residential Academic	0	3	110,961	
Residential Dining	0	4	260,602	
Residential Central Campus	2	7	209,342	5,775
Residential Redstone Campus	0	14	408,954	
Residential Trinity Campus	0	12	147,174	
Residential Athletic Campus	0	11	591,503	
Total	**29**	**200**	**5,651,108**	**5,775**

Table 9 UVM Parking Supply by Campus Area

Parking Lot Location	Capacity	Leased Spaces	Usable Spaces
Athletic Commuter	1,733		1,733
Core Central	50		50
Core East	767	-100	667
Core North	369		369
Core South	135		135
Core West	431	-47	384
Commuter Lots	808	-485	323
Redstone Campus	626		626
Trinity Campus	314		314
Off-Site: Burlington[1]	54		54
Off-Site: Outside Burlington[2]	210		210
Total in Burlington	**5,287**	**-632**	**4,655**
Total	**5,497**	**-632**	**4,865**

1. Includes parking at the Rubenstein Laboratory and Bioresearch Complex (South Campus).
2. Includes parking spaces at the Colchester Research Facility, Forestry Laboratory, and Miller Barn.

Table 10 Current and Future Employment and Enrollment for UVM

	Current (2022)	Future[1] (2028)
Employment		
Staff		
Full-time	2,311	2,300
Part-time	155	160
Faculty		
Full-time	861	860
Part-time	927	930
Non-Burlington Employees[2]	*230*	*230*
Subtotal	*4,024*	*4,020*
Enrollment		
Undergraduate	*11,326*	*11,300*
First-Year	3,044	3,000
Second-Year	3,024	3,000
Junior	2,478	2,800
Senior	2,780	2,500
Graduate and Certificate	1,707	2,000
Medical Student	483	500
Non-Degree Continuing Education[3]	572	700
Subtotal	*14,088*	*14,500*
Total	**18,112**	**18,520**

1. These numbers are projections only, based on UVM's current estimates as of the date of this document.
2. These employees are subtracted when determining the subtotal of employees because it is unknown whether these employees are faculty/staff or part-time/full-time.
3. Most students in Professional and Continuing Education programs either participate virtually or are on campus for limited amounts of time.

Table 11 UVM permit types, cost, and number of permits issued

Category	Type	Cost	Permits Issued
Employee Permits			
Green	Pre-Tax Payroll Deduction	0.64%	2,939
	Affiliate	$ 329	
	Affiliate 30-Day	$ 41	
White	Pre-Tax Payroll Deduction	0.48%	
	Affiliate	$ 247	
	Affiliate 30-Day	$ 31	
Brown	Pre-Tax Payroll Deduction	0.32%	
	Affiliate	$ 165	
	Affiliate 30-Day	$ 21	
Silver (Off-Site)	Pre-Tax Payroll Deduction	N/A	
	Affiliate		
	Affiliate 30-Day		
Occasional Use	~~Permit 6-12 Days~~	~~N/A~~	193
	Brown (Peripheral)	$ 12	
	White (Proximate)	$ 18	
	Green (Main)	$ 24	
Carpool (All carpools are paid through Pre-Tax Payroll Deduction)	Green - 2 Person	0.32%	
	Green - 3 Person	0.21%	
	Green - 4 Person	0.16%	
	White - 2 Person	0.24%	
	White - 3 Person	0.16%	
	White - 4 Person	0.12%	
Student Permits			
Residential	30-Day Black, Blue, Purple, and Red	N/A	1,186
	Temporary (1 Semester)	$ 180	
	Black, Blue, Purple, and Red	$ 330	
	30-Day Brown	N/A	1,333

Category	Type	Cost	Permits Issued
Commuter and Graduate Students/Medical Students (1st & 2nd Year)	30-Day Gold	N/A	
	Gold - Evening	$ 69	
	Gold - Evening (1 Semester)	$ 45	
	Brown - Day & Evening	$ 115	
	Brown - Day & Evening (1 Semester)	$ 73	
Medical Students (3rd & 4th Year)	Yellow - Day & Evening	$ 329	303
	30-Day Yellow	$ 30	
Occasional Use	Brown	$ 12	11
	White	N/A	0
	Yellow	N/A	0

Table 12 Citations given by UVM Transportation and Parking Services

Violation	Fine	Citations Issued	Funds Collected
No Valid Permit	$ 50	2994	$ 149,700
Habituals/Warning-No Permit	$ 50	347	$ 17,350
Habitual Offender-No Permit	$ 110	409	$ 44,990
Restricted Area	$ 30	1781	$ 53,430
Habituals/Warning Restricted Area	$ 30	216	$ 6,480
Habitual Offender- Restricted Area	$ 90	307	$ 27,630
Expired Space	$ 25	1268	$ 31,700
Habituals/Warning-Expired Space	$ 25	206	$ 5,150
Habitual Offdender-Expired Space	$ 85	351	$ 29,835
Unauthorized Permit	$ 80	101	$ 8,080
Habitual Offender Unauthorized Permit	$ 140	4	$ 560
Falsified Information	$ 80	0	-
Handicap Space	$ 80	21	$ 1,680
Relocating at Owner's Expense			
Roadway			
Total		**8,005**	**$ 376,585**

University of Vermont Medical Center

Table 13 University of Vermont Parking Lot Counts – All Lots

	10:00 AM	12:00 PM	2:00 PM
Winter 2022			
2/8/2022	2,861	2,873	3,369
2/9/2022	2,886	2,944	3,306
2/10/2022	2,903	2,939	3,262
Average	3,039	75%	
Maximum	3,369	84%	
Spring 2022			
4/19/2022	2,828	N/A	2,865
4/20/2022	2,781	N/A	2,803
4/21/2022[1]	950	N/A	1,066
Average	2,216	55%	
Maximum	2,865	71%	
Summer 2022			
7/19/2022	3,098	N/A	3,141
7/20/2022	3,000	N/A	3,060
7/21/2022	2,892	N/A	2,997
Average	3,032	75%	
Maximum	3,141	78%	
Fall 2022			
10/4/2022	3,082	N/A	3,029
10/5/2022	2,897	N/A	2,944
10/6/2022	2,849	N/A	3,023
Average	2,971	74%	
Maximum	3,082	76%	
Total			
Average	2,839	70%	
Maximum	3,369	84%	

[1] Only satellite lots counted.

Table 14 University of Vermont Parking Lot Counts – On-Site Lots Only

	10:00 AM	12:00 PM	2:00 PM
Winter 2022			
2/8/2022	1,398	1,411	1,881
2/9/2022	1,458	1,482	1,804
2/10/2022	1,434	1,480	1,871
Average	1,580	69%	
Maximum	1,881	82%	
Spring 2022			
4/19/2022	1,697	N/A	1,753
4/20/2022	1,684	N/A	1,723
4/21/2022	N/A	N/A	N/A
Average	1,715	74%	
Maximum	1,753	76%	
Summer 2022			
7/19/2022	1,765	N/A	1,828
7/20/2022	1,681	N/A	1,774
7/21/2022	1,684	N/A	1,732
Average	1,744	76%	
Maximum	1,828	79%	
Fall 2022			
10/4/2022	1,941	N/A	1,885
10/5/2022	1,774	N/A	1,804
10/6/2022	1,728	N/A	1,929
Average	1,844	80%	
Maximum	1,941	84%	
Total			
Average	1,705	74%	
Maximum	1,941	84%	

Table 15 GSF of UVM Medical Center buildings.

Building Use	GSF
Medical Center Campus	
Hospital (In-Patient)	786,057
Education	35,597
Other	877,085
Subtotal	*1,698,739*
1 South Prospect	
Other	149,404
Other Burlington Sites[1]	
Other	48,518
Total	**1,896,661**

Notes

1. Not included in GSF for JIPMP calculations

Table 16 UVM Medical Center parking supply included in JIPMP.

Location	Number of Spaces
On-Site Parking	
Medical Center Campus	
ACC Garage	1,224
ACC Loading Dock	21
ER Lot	47
McClure Parking Garage	317
Patrick Loading Dock	9
South Lot	425
Subtotal	*2,043*
1 South Prospect	
Lot A	47
Lot B	178
Lot D	197
Pearl Street Lot	35
Subtotal	*457*
On-Site Total	**2,500**

Table 17 UVM Medical Center off-site parking supply (not included in JIPMP calculations for on-site parking).

Location	Number of Spaces
Off-Site Parking	
Other Burlington Sites	
95 St. Paul Street	0
112 Colchester Avenue	8
128 Lakeside Avenue	38
184 Pearl Street	12
195 Colchester Ave	40
199 Main Street	0
Subtotal	*98*
Off-Site Lots	
UVM Catamount East	285
UVM Centennial	200
UVM Jeffords Lot	100
UVM Core West	0
Fanny Allen Campus	155
Technology Park	200
115 Lakeside Ave	250
Subtotal	*1,190*
Off-Site Total	**1,288**

Table 18 Current and Future employment UVM Medical Center.

	Medical Center Campus	1 South Prospect	Other Burlington Sites	Total
	Current (2022)			
Day Shift	2382	418	88	2888
Evening Shift	261	10	0	271
Night Shift	599	6	0	605
Rotating Shift	744	37	5	786
Day Shift	548	68	7	623
Evening Shift	55	3	0	58
Night Shift	78	0	0	78
Rotating Shift	138	19	1	158
Per Diem Employees	920	85	3	1008
Employee Subtotal	*5,725*	*646*	*104*	*6,475*
Current Total	**5,725**	**646**	**104**	**6,475**
	Future (2028)			
Day Shift	2382	418	88	2888
Evening Shift	261	10	0	271
Night Shift	599	6	0	605
Rotating Shift	744	37	5	786
Day Shift	548	68	7	623
Evening Shift	55	3	0	58
Night Shift	78	0	0	78
Rotating Shift	138	19	1	158
Per Diem Employees	920	85	3	1008
Employee Subtotal				
Future Total	**5,725**	**646**	**104**	**6,475**

Table 19 Annual Daily Appointments and Procedures at UVM Medical Center

	2022 Annual Daily Appointments & Procedures	2022 Average Daily Appointments & Procedures (254 business days)
Medical Center Campus	566,847	2,232
1 South Prospect	108,061	425
Other Burlington Sites	23	-
Total	**674,931**	**2,657**

Table 20 Annual Daily Telehealth Appointments and Procedures at UVM Medical Center

	2022 Annual Daily Telehealth Appointments	2022 Average Daily Telehealth Appointments (254 business days)
Medical Center Campus	39,715	156
1 South Prospect	35,158	138
Other Burlington Sites	284	1
Total	**75,157**	**295**

Table 21 Total permits issued by UVM Medical Center

Location	Number of Permits
Medical Center Campus	
ACC permits	341
McClure Residents, Nurse practitioners, Phys Assistants, Midwives	565
Physicians (ACC permits)	138
Physicians (South Lot permits)	84
Carpools (854 Participants)	427
Business Needs	134
115 Lakeside, Day Shift	969
115 Lakeside, Rotator	593
Technology Park, Day Shift	418
Technology Park, Rotator Shift	178
Fanny Allen Shuttle Lot, Day Shift	368
Fanny Allen, Rotators	136
Centennial, Day Shift	302
Centennial, Rotators	241
South Lot	84
UVM Catamount East, Day Shift	407
UVM Catamount East ,Rotators	163
UVM Jeffords Lot, Day Shift	164
UVM Jeffords Lot, Rotators	101
Evening/Night	1240
1 South Prospect	
Centennial, Day Shift	679
Centennial, Rotator	129
Pearl	19
Taft	69
Main	189
Total Medical Center Campus	**7,053**
Total South Prospect	**1,085**
Total	**8,138**

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CATMA
Chittenden Area Transportation Management Association

To: Scott Gustin, Principal Planner
Burlington Development Review Board

From: Sandy Thibault, Executive Director CATMA

Date: June 28, 2023

Subj: Update to 2023-2028 JIPMP: TDM Matrix and Event Parking

Per the request of the DRB on 6/6/23 the 2023-2028 Joint Institution Parking Management Plan was updated in order to include a new Transportation Demand Management (aka TDM) matrix that supports the City's updated Article 8. The matrices on pages 32-26 of the updated JIPMP will serve as a tool to monitor travel behavior, TDM program participation and parking utilization for the institutions. I want to provide additional context on a couple of items.

1) Trends of Primary v. Alternative Modes

The matrices in the updated Plan provide only the primary mode as an indicator of the mode split for each institution. CATMA Employee and Student Transportation Surveys also capture alternative mode use for commuters as described on pg. 21 of the Plan. Survey participants indicate other modes they use for their commute, generally one to two times a week. Traditionally, the alternative mode informs us of other modes frequently used, however in today's hybrid work environment, the alternative mode demonstrates how people are traveling or teleworking to/from work on the other two to three days a week.

An illustration of the 2022 primary mode trends of driving alone, carpool and telework for each institution can be found in figures 1, 2, & 3 of the JIPMP, along with the alternative mode averages for these same modes. While under 10% of employees at Champlain College and UVM indicate telework as their primary mode, there are over 30% who indicated they telework as an alternative mode. In addition, while the 2022 drive alone use increased for UVM and Champlain College employees from 2019, they are driving less days to the site and parking utilization counts have also decreased. In fact, current utilization as reported in the Plan are the lowest they have ever been.

The industry market is seeing similar shifts with drive alone increases that can be attributed to post-COVID telework/hybrid schedules, cost of affordable housing not located near transit service, location of affordable child care, etc. We will continue to monitor these trends and factors, and also have plans to explore new TDM strategies such as microtransit, and a more robust carpool and vanpool matching platform via new CATMA App launching next month. The reinstatement of an electric assist bikeshare system in the cities of Burlington, South Burlington and Winooski, as well as on the "Hill" campus' is also expected to lessen vehicle use.

CATMA
Chittenden Area Transportation Management Association

Drive Alone Rates over Time

In addition to the institutional employee and student drive alone rates noted in figures 1, 2, & 3 of the JIPMP, the tables below offer some historical perspective with 2014 employee primary mode trends and 2016 student mode splits.

The individual institutional mode split data for 2019 & 2022 can be found in the TDM matrices located in tables 4, 5, & 6 of the updated JIPMP.

Table 1 Institutional Employee Primary Mode Split from 2014 CATMA Transportation Survey (unweighted).

	Champlain College	UVM	UVMMC	
	Employees	Employees	Main Campus	1 South Prospect
Drive Alone	59%	53%	60%	63%
Carpool	11%	13%	16%	11%
Walk/Wheelchair	9%	9%	5%	6%
Bike	4%	7%	3%	2%
Public Bus	5%	11%	8%	13%
Telework	1%	0%	0%	0
Other	12%	8%	8%	6%

Table 2 Institutional Off-Campus Student Mode Split from 2016 CATMA Transportation Survey (unweighted)

	Champlain College	UVM
	Off-Campus Students	Off-Campus Students
Drive Alone	35%	24%
Carpool	3%	3%
Walk/Wheelchair	39%	51%
Bike	4%	7%
Public Bus	6%	12%
Other	14%	3%

2) Event Parking at UVM

Traditionally, event parking has not been addressed in the JIPMP due to the majority of events occurring in the evening which enables UVM to utilize vacant staff/commuter parking areas. Over the past few years, the Planning Commission and DRB have expressed concern about the event demand being met. In addition to the information provided on pg. 57 of the 2023-2028 JIPMP, I offer the following:

UVM continues to meet the parking demand for evening campus events by utilizing staff/commuter parking that is vacant on evenings and weekends. Event parking has historically co-existed with other on-campus demand (resident student parking, various smaller events e.g. youth clubs & athletics practices) without issue over the past 20+ years.

CATMA
Chittenden Area Transportation Management Association

UVM Parking and Transportation Services manages their highest demand events (Currently Men's Basketball and Hockey) via the following process:

- Parking is allowed in two primary locations: Gutterson parking lots (817 total spaces), and Jeffords lot (400 total spaces) just north of Main Street with shuttle bus service to the event. If both of these lots fill, overflow is directed to the Given lot (159 spaces) just North of Jeffords.
- UVM Transportation & Parking staff are on site to manage parking operations, supported by contracted parking / event staff.
- Prior to the event, temporary signage (sandwich boards) provides parking direction to the Jeffords lot served by shuttles in an effort to bifurcate traffic flow.
- A flashing signal is activated on East Terrace in South Burlington to prohibit on-street parking by non-residents.
- Typically, event attendees park in the Gutterson lot until it is full, at which point UVM Transportation & Parking staff close the lot and direct traffic to Jeffords lot.

Gutterson lot is approximately 30% full or less at the start of a high-demand event. Parking for an event typically consumes 60-69% of capacity, resulting in the Gutterson lot being 90-99% full at the peak parking time coinciding with the start of the sporting event.

Since 2020, only one event, A VPA Hockey Tournament, filled the Gutterson lot to capacity and required parking to be diverted to the Jeffords lot, which did not fill to capacity. One event in the past decade has required use of back-up parking in the Given lot.

In regards to daytime events, there has never been an issue in meeting the parking demand.

I look forward to presenting the updated JIPMP to the Burlington Development Review Board on July 18, 2023. Please let me know if there are any immediate questions or information needed, so we can be prepared and have a productive discussion.

Thank you.

Department of Permitting & Inspections
Zoning Division
645 Pine Street
Burlington, VT 05401
Telephone:(802) 865-7188

William Ward, Director
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Garret King, Associate Planner
Joseph Cava, Permit Technician
Ted Miles, Code Compliance Officer
Ted Boylan, DPI Administrator

TO: Development Review Board
FROM: Scott Gustin & Garret King
DATE: July 18, 2023
RE: ZP-23-30; 483 Manhattan Drive

==========

Note: These are staff comments only; decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

Zone: RM Ward: 2C

Owner/Applicant: Green Mountain Habitat for Community / Chris Lane

Request: Demolish existing single family residence and replace with new duplex and shed in the rear yard.

Applicable Regulations:
Article 3 (Applications, Permits, and Project Reviews), Article 4 (Maps & Districts), Article 5 (Citywide General Regulations), Article 6 (Development Criteria & Guidelines

Background Information:
The applicants are looking to demolish the current single family home and to build a new duplex residence. In the rear yard there is also a proposed 3ft x 14ft shed.

A previous zoning permit was approved for a similar project over a year ago for a three story duplex but was never started.

The Design Advisory Board reviewed this application June 13, 2023 and unanimously recommended approval with advised changes to the side facades to include more windows that new designs have implemented.

Prior zoning permit actions for this property.

- 5/16/2022, Approval for demolition and construction of a new duplex

Recommendation: **Certificate of appropriateness approval** as per, and subject to, the following findings and conditions:

I. Findings
Article 3: Applications, Permits, and Project Reviews
Part 3: Impact Fees
Applicant will be required to pay impact fees set forth and calculated by the Impact Fee Administrative Regulations based on the net new square footage of the proposed residence as

compared to the existing/current building. **(Affirmative finding as conditioned)**

Article 4: Maps & Districts
Sec. 4.4.5, Residential Districts:
(a) Purpose
(2) Residential Medium Density (RM)
The property is in the RM zone and is subject to the development standards of this zone. The RM district is intended primarily for medium density residential development in the form of single-family detached dwelling and attached multi-family apartments. The proposed construction of a new duplex fits within the district's purpose. **(Affirmative finding)**

(b) Dimensional Standards & Density
Residential density will change from one to two units on the 4,721sf lot.

Prior/Current lot coverage is 23.22%, and proposed lot coverage will be 34.1% as calculated on project plans. The proposed increase in lot coverage complies with the 40% maximum permissible in this zone.

The home's setback from the road will be 18ft, greater than the averaging of neighboring front yard setbacks. Side setbacks will be 5ft which is greater than the district requirement of 10% of lot width of 5 ft.

The tallest point of the proposed home is noted at 27` 7" and is under the 35' maximum permitted height. **(Affirmative finding)**

(c) Permitted & Conditional Uses
The replacement single family home is a permitted use in the RL-W zone. **(Affirmative finding)**

(d) District Specific Regulations
1. Setbacks
See 4.4.5 above

2. Lot Coverage
See 4.4.5 above

3. Accessory Residential Structures and Uses
A rear yard detached shed is proposed in the back of the property. **(Affirmative finding)**

4. Residential Density
A change in density from one to two units, and the duplex is still limited to occupancy by a family as defined in Article 13 of the Comprehensive Development Ordinance. **(Affirmative finding)**

5. Uses
Not applicable

6. Residential Development Bonuses
Not applicable

Article 5: Citywide General Regulations
Sec. 5.2.3, Lot Coverage Requirements
The applicant is not seeking additional lot coverage. **(Not applicable)**

Sec. 5.2.4, Buildable Area Calculation
The lot is not subject to the steep slope overlay and is not over 2 acres in size so it does not qualify for buildable area calculation. **(Not applicable)**

Sec. 5.2.5, Setbacks
See 4.4.5 above.

Sec. 5.2.6, Building Height Limits
See 4.4.5 above.

Sec. 5.2.7, Density and Intensity of Development Calculations
See 4.4.5 above

Sec. 5.5.1, Nuisance Regulations
The proposed project will not create any nuisance, as the land use will not change. **(Affirmative finding)**

Sec. 5.5.2, Outdoor Lighting
Outdoor lighting fixture specifications have been provided. Lighting locations are shown in the elevations drawings. Fixtures include outdoor wall scones for the front and rear entrances and will be acceptable for this residential installation. **(Affirmative finding)**

Sec. 5.5.3, Stormwater and Erosion Control
See Sec 4.5.4 (c) for stormwater management.

Over 400sf of land disturbance is proposed, so and Erosion Prevention and Sediment Control plan is required. This plan is subject to final review and approval by the stormwater administrator. **(Affirmative finding as conditioned)**

Article 6: Development Review Standards
Part 1, Land Division Design Standards
Not applicable.

Part 2, Site Plan Design Standards
Sec. 6.2.2, Review Standards
(a) Protection of important natural features
The subject property does not have any significant natural features. **(Affirmative finding)**

(b) Topographical alterations
Existing topographic conditions are basically flat will remain largely unchanged. **(Affirmative finding)**

(c) Protection of important public views

No important public views are associated with this property. **(Affirmative finding)**

(d) Protection of important cultural resources
The property contains no known archaeological resources **(Affirmative finding)**

(e) Supporting the use of alternative energy
There is no indication that the proposed home will utilize alternative energy. Solar energy utilization is encouraged. In any event, the home will not adversely impact the actual or potential use of alternative energies by neighboring properties. **(Affirmative finding)**

(f) Brownfield sites
The subject property is not an identified brownfield. **(Not applicable)**

(g) Provide for nature's events
See Sec. 4.5.4 (c) for stormwater.

The project plans depict a sheltered entry for the front entryway as well as a covered rear deck. **(Affirmative finding)**

(h) Building location and orientation
The location of the proposed home will be shifted a few feet back from the adjacent properties. It will be set centered near the front of the property. The new home will have an open front porch that provides the main entrance to the duplex. **(Affirmative finding)**

(i) Vehicular access
The existing driveway will be removed, no replacement is proposed. **(Affirmative finding)**

(j) Pedestrian access
This criterion requires that a pedestrian walkway be provided from the front door to the public sidewalk or street. This property has individual pathways leading to the sidewalk. **(Affirmative finding)**

(k) Accessibility for the handicapped
No handicap accessibility is evident or required with this proposal. **(Not applicable)**

(l) Parking and circulation
Not applicable

(m) Landscaping, fences, and retaining walls
A landscaping plan has been provided showing that small shrubs will be planted in front of the front porch to provide additional privacy for the duplex. Fencing is also proposed to extend from the front façade of the house to screen the side and rear yards. **(Affirmative finding)**

(n) Public plazas and open space
No public plaza or open space is included or required in this proposal. **(Not applicable)**

(o) Outdoor lighting
See Sec. 5.5.2.

(p) Integrate infrastructure into the design
Gas and electric meters will be on the east side of the house and screened by the proposed fencing. **(Affirmative finding)**

Part 3, Architectural Design Standards
Sec. 6.3.2, Review Standards
(a) Relate development to its environment

1. Massing, Height, and Scale

The proposed home is similar in in height, massing, and scale as well as style to the current structure and surrounding homes. The massing of the duplex is mainly one central block with only one small porch extending out from the front of the building on the ground floor that also acts as the main entryway. Also, there is a covered deck in the rear of the building. The height of the proposed structure will be two stories, same as the existing and neighboring properties. The scale of the home is similar to the current as well as nearby properties.

Roofs and Rooflines

The roof is similar to neighboring properties with a gabled design and matches the style of the building.

2. Building Openings

Proposed fenestration is typical for that of a new home. Fenestration on the front façade is symmetrical with a covered front porch and provides a defined face of the residence. **(Affirmative finding)**

(b) Protection of important architectural resources
The current home is not listed on either the state or national registry. Its demolition will not adversely impact Burlington's wealth of historic resources. **(Affirmative finding)**

(c) Protection of important public views
See Sec. 6.2.2 (c).

(d) Provide an active and inviting street edge
The proposed duplex will be sited similarly to neighboring homes and will remain consistent with the neighborhood streetscape. The building contains no blank facades. While basic in appearance, the front façade does contain some fenestration and variation in plane with the addition of a covered front porch. **(Affirmative finding)**

(e) Quality of materials
As proposed, the new duplex will be clad in vinyl clapboard siding and trim. Vinyl windows will be installed throughout, and asphalt shingle roofing will be used. While not especially durable, these materials are fairly common and acceptable for new residential construction. **(Affirmative finding)**

(f) Reduce energy utilization
Proposed building must comply with current energy efficiency standards. **(Affirmative Finding as Conditioned)**

(g) Make advertising features complimentary to the site
Not applicable.

(h) Integrate infrastructure into the building design
The proposed gas and electric meters will be screened with wooden fencing. **(Affirmative finding)**

(i) Make spaces safe and secure
Proposed building must comply with the city`s current egress requirements, building entries will be illuminated. **(Affirmative finding)**

II. Conditions of Approval

1. **Prior to release of the zoning permit**, both the erosion prevention and sediment control plan and the stormwater management plan shall be reviewed and approved by the stormwater administrator in consultation with the Conservation Board.
2. At least **7 days prior to the issuance of a certificate of occupancy**, the applicant shall pay to the Planning & Zoning Department the impact fee as calculated by staff based on the net new square footage of the proposed development.
3. Vermont Residential Building Energy Standards apply to this project. Compliance with the standards is the Owner's responsibility. Prior to requesting a Certificate of Occupancy, a copy of a completed Vermont Residential Building Energy Standards Certificate shall be submitted with a Certificate of Occupancy (final or temporary) request, and filed in the Land Records located at the Clerk/Treasurers office in City Hall (149 Church Street). For more information, see http://publicservice.vermont.gov/energy_efficiency.
4. This permit incorporates timely comments from the VT Agency of Natural Resources as to special flood hazard area encroachment.
5. If, during construction, artifacts are unearthed, it is the applicant's responsibility to stop earthwork and to contact the Vermont Division for Historic Preservation for further guidance.
6. The Applicant/Property Owner is responsible for obtaining all necessary Zoning Permits and Building Permits through the Department of Public Works as well as other permit(s) as may be required, and shall meet all energy efficiency codes of the city and state.
7. Standard permit conditions 1-15.







To: Scott Gustin
From: Josh Katz, Program Analyst, CATMA
Sandy Thibault, Executive Director, CATMA
Date: May 10, 2023
Re: Submission of Joint Institutional Parking Management Plan (JIPMP) to DRB

On behalf of CATMA and our partnering institutions, we are pleased to submit the final 2023-2028 Joint Institutional Parking Management Plan (JIPMP) and Supplement, which we will present to the Burlington Development Review Board (DRB) on June 6, 2023. This is the first iteration of the JIPMP responding to the City's updated Comprehensive Development Ordinance (CDO) eliminating minimum parking requirements that was adopted January 25, 2023. As such, the intent of this report is no longer to request a parking waiver from the City of Burlington, but rather to demonstrate the Institutions' ability to meet the goals as outlined in Section 8.3.1 of the CDO:

a. Ensure that city streets in nearby neighborhoods are not unfairly burdened by parking demands from post-secondary educational or medical institutions; and,

b. Recognize the unique ability of institutions to manage their own parking resources in a comprehensive and creative way.

CATMA and our project consultant, VHB, presented the 2023-2028 JIPMP to the Planning Commission on April 25 and on May 9. We responded to some questions from City staff on this report, and also further discussed and addressed the following questions from Planning Commission meetings:

1.) **Margin of Error**. UVM's high margin of error can be attributed to the low number of total responses from UVM affiliates to CATMA's Fall 2022 Transportation Survey. In the past, the CATMA survey was issued to all UVM students and employees, and in 2021 the CATMA survey methodology transitioned to a random sample of 1,000 students and 1,000 employees which was the case for our 2022 Survey. This was a result of a policy change for surveys at UVM's Office of Institutional Research and Assessment.

   While the Margin of Error is high for UVM's parking demand estimate (1,000+ spaces), CATMA and VHB are confident that the actual demand number is on the lower end of that confidence interval due to the trend of the lot utilization counts that have been occurring since 2019. These counts show a parking surplus of 1,357 spaces with a margin of error of 217. It is noted that the lot count margin of error is conservative as it accounts for the full year's quarterly parking count data and would be even lower if the summer count data included in the calculation were aligned with the in-semester count data. While neither of the estimates (i.e. survey demand or lot count utilization methods) perfectly demonstrate demand, CATMA is confident that UVM has an excess of parking to meet current and future demand.

2.) **Efficiency Based Standards.** CATMA has also provided more context and an example of efficiency based standards (p. 20).

CATMA will provide annual updates to this 2023-2028 JIPMP to continue monitoring parking utilization on campus to ensure parking supply meets the institutional demand.

We look forward to presenting this plan to the DRB along with Karen Sentoff at VHB, our project consultant.

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Andy Montroll, Chair
Bruce Baker, Vice-Chair
Yves Bradley
Alexander Friend
Michael Gaughan
Emily Lee
Julia Randall

To: Burlington Development Review Board

From: Burlington Planning Commission

Date: May 11, 2023

RE: 2023-2028 Joint Institutional Parking Management Plan

The Planning Commission has recently completed its review of the 2023-2028 Joint Institutional Parking Management Plan (JIPMP) submitted by Champlain College, University of Vermont and the University of Vermont Medical Center to meet the requirements of Article 8 of the Comprehensive Development Ordinance. During its review, the Commission noted four topics that it recommends the DRB consider in its own review of the JIPMP.

1. Margin of Error: UVM Parking Demand

One of the JIPMP's primary tasks is to document existing and anticipated parking demand for each of the institutions. The JIPMP calculates demand using two methodologies: utilization counts and survey data. CATMA and their consultants VHB describe these two methods as providing high- and low-end "bookends" in understanding parking demand. Regarding the survey data that estimates parking demand, the margin of error (MOE) noted in *Table 12: University of Vermont Current Parking Demand* is approximately 21 percent, which is excessively high. For reference, this same demand calculation in the previous JIPMP was just 4 percent. When questioned on this high MOE, CATMA explained that the cause for such a high MOE is an altered survey method as dictated by UVM's Office of Institutional Research and Assessment that resulted in a response rate that is lower than in previous years. While CATMA insists that the actual demand is more consistent with utilization counts and is on the lower end of the "bookends," the Commission recognizes that this is cause for uncertainty in understanding actual parking demand and that the DRB should seek clarity on this issue now and mitigate similar concerns in future JIPMPs.

2. JIPMP intent and reduced parking demand

According to the CDO, managing the Institutions' parking impacts on adjacent neighborhoods is a primary intent of the JIPMP. The current JIPMP shows raises concerns that demand may be outstripping supply within the Institutions'' campuses. However, the Commission feels strongly that the focus of the JIPMP and related transportation planning should not be on increasing parking supply but reducing demand. To that end, the Commission would like to understand better what a healthy parking surplus would be at each of the institutions.

3. Transportation Demand Management and the JIPMP

As Burlington has removed minimum parking requirements and implemented parking maximums, the Commission feels that the intent of the JIPMP as stated in the CDO should be revised to reflect better an evolving transportation planning landscape. Rather than focus on a minimum supply of parking, the JIPMP should focus more on transportation demand management practices (TDM), which are a range of tools that the institutions employ to reduce vehicle miles traveled, decrease reliance on cars (especially single-occupancy vehicles), and encourage active transportation modes. To this end, the Commission feels that future JIPMPs should incorporate more objective data illustrating the impact of existing TDM practices and how those may be improved. Additionally, this goal should consider how the City's ongoing TDM revamp will inform future JIPMPs. Ultimately, these demand-side measurable standards should provide the basis for year-over-year comparisons of planning success.

4. Efficiency-based standards

On page 19, the JIPMP states that "the updated ordinance and recommitment to broader transportation demand management at the city scale represent a shift towards efficiency-based standards." The JIPMP defines efficiency-based standards as the "provision of optimal parking supply in an efficiently managed system." The definition is circular and it is the Commission's opinion that a new, non-circular definition should be provided in this and future JIPMPs. Future JIPMPs should also explain the ways that efficiency-based standards inform the methodology, analysis, and conclusions of the report.

Thank you,

Andy Montroll, Chair

Burlington Planning Commission

Department of Permitting & Inspections
Zoning Division
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Telephone:(802) 865-7188

William Ward, Director
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Garret King, Associate Planner
Joseph Cava, Planning Technician
Ted Miles, Code Compliance Officer
Ted Boylan, DPI Administrator

TO: Development Review Board
FROM: Scott Gustin
DATE: July 18, 2023
RE: Joint Institutional Parking Management Plan

==========

Note: These are staff comments only; decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

Applicant: CATMA

Request: Review of 2023-2028 Joint Institutional Parking Management Plan

Applicable Regulations:
Article 8 (Parking)

Background Information:
The applicant proposes a Joint Institutional Parking Management Plan (JIPMP) for a 5-year period spanning 2023-2028. The current JIPMP expired June 1, 2023. Sec. 8.3.2, *Applicability*, of the Comprehensive Development Ordinance requires the post-secondary and medical institutions within the Institutional zone to prepare, maintain, and monitor a comprehensive parking management plan. Institutional parking management plans are typically valid for 5 years. The latest plan was approved for only 2 years (plus a 6-month extension) due to a number of concerns related to COVID-19 impacts, event parking, transportation demand management, and off-peak parking demand. The proposed JIPMP addresses the points raised by the DRB in the prior plan approval.

The Planning Commission reviewed the proposed JIPMP at their April 25 and May 9, 2023 meetings. They voted to forward the plan to DRB for review and noted four topics for DRB consideration:

- Margin of Error: UVM Parking Demand
- JIPMP intent and reduced parking demand
- Transportation Demand Management and the JIPMP
- Efficiency-based standards

The cover memo accompanying the proposed JIPMP addresses two of these items – the margin of error and efficiency-based standards.

Since approval of the prior JIPMP, Article 8 has been substantially amended. Most significantly, parking minimums have been eliminated. Prior JIPMP's have basically served as parking waivers for the institutions. With the elimination of parking minimums, the institutional parking plan standards have been revised to more holistically address transportation demand management and the balance between parking supply and demand now and in the future.

The Development Review Board initially reviewed this JIPMP June 7, 2023. The Board continued review of the plan to a future date and requested that the applicant put together a matrix of TDM strategies and tracking suggestions. A revised JIPMP has been submitted and includes TDM matrixes for each of the institutions. See pgs. 32-36 of the revised plan. Changes to these findings are noted in red.

Recommendation: <u>Approval of the Joint Institutional Parking Management Plan</u> as per, and subject to, the following findings:

I. Findings
Article 8: Parking
Sec. 8.3.4 Review and Approval of Institutional Parking Management Plans
(a) Plan Approval.

Such a plan shall require review and approval by the DRB, after consultation with the planning commission, and after a public hearing. In order to approve a proposed Institutional Parking Plan, the DRB shall find:

a. the proposed Institutional Parking Plan adequately serves existing and proposed development and user groups by the institution(s);

The proposed JIPMP addresses each of the three institutions' parking supply and demand, now and 5 years in the future. Numbers for present demand are based on two methods – actual lot counts and user surveys. Numbers for future demand are based on user surveys. The plan notes that user survey numbers are likely overestimations due to characteristics of the survey population and limitations on the extent of the survey. Improvements to surveys should be sought with future JIPMP's to address these present shortcomings. Context and background to the numbers are provided with parking utilization trends since 2019.

Champlain College shows a current peak demand of 427 parking spaces based on lot counts and 741 based on user survey. There is a parking supply of 642 spaces (plus 145 on-street spaces available per agreement with the City). Projected peak demand grows to 992 spaces with no increase in available parking supply.

UVM shows a current peak demand of 3,508 parking spaces based on lot counts and 4,943 based on user survey. There is a parking supply of 4,865 spaces (plus 379 ground lease spaces within campus). Projected peak demand grows to 4,988 spaces with an increase in parking supply to 5,503 spaces (plus 379 ground lease spaces).

UVMMC shows a current peak demand of 1,941 parking spaces based on lot counts and 2,145 based on user survey. There is a parking supply of 2,500 spaces. Projected peak demand remains unchanged at 2,145 spaces with no change to the available parking supply of 2,500 spaces.

The proposed JIPMP shows that each of the three institutions are presently balancing parking demand and supply. UVM and UVMMC show continued balance in the future. Anticipated demand for Champlain College shows a likely imbalance 5 years in the future. Decrease in demand is preferable to increase in physical parking supply. Within the forthcoming annual updates, there needs to be some assurance that parking supply and demand remain more closely aligned and demonstration of measures taken to achieve that balance. **(Affirmative finding as conditioned)**

b. the proposed Institutional Parking Plan effectively meets the intent of this Article and the goals of the municipal development plan.

The express intent of Article 8 is to:

(a) Ensure there are adequate parking and loading facilities to serve the use or uses of the property;

(b) Ensure that parking facilities are designed to provide proper circulation, reduce hazards to pedestrians, and protect the users of adjoining properties from nuisance caused by the noise, fumes, and glare of headlights which may result from the operation of vehicles parking off the street;

(c) Reduce congestion in the streets and contribute to traffic safety; and

(d) Encourage alternate modes of travel that will reduce dependence upon the single-occupancy automobile.

The proposed JIPMP addresses each of these criteria.

In their approval of the prior JIPMP, the DRB requested that the next Plan (currently proposed) address the following:

- *Anticipated impact of COVID-19 on short- and long-term parking demand.*

  Part 2, Collective Institutional Summary, of the proposed JIPMP addresses COVID-19 impacts. Beyond the acute impacts to operations during the height of the pandemic, practices such as telecommuting, telelearning, and telehealth have been incorporated into ongoing operations of the institutions. Integration of these measures will enable ongoing lowered parking demand.

- *Available Parking Spaces on UVM campus. Please respond to concerns about available spaces on the UVM campus, including whether UVM's current parking demand exceeds UVM's effective available parking taking into account unmet/unfulfilled demand. Please respond to claimed discrepancies in actual parking limitations in approvals for individual projects on UVM campus*.

  Part 4, University of Vermont, of the proposed JIPMP addresses UVM's parking supply and demand. A comprehensive breakdown of existing parking supply and demand is provided, along with an articulation of anticipated demand based on future trends and potential construction within the University. Table 12 depicts current parking supply and demand utilizing both the survey and lot count methods noted above. Observed peak parking demand (3,508 spaces) is below parking supply (4,865 spaces). Based on survey data, peak parking demand is 4,943 spaces. As noted by the Planning Commission the survey demand number has a 21% margin of error. An accompanying memo by the applicant addresses this margin of error and points to the actual lot count numbers and to the parking utilization trends depicted in Figure 7. Future parking demand noted in Table 13 shows a parking supply surplus (demand of 4,988 spaces with 5,503 spaces provided).

- *Pursuant to Article 8.3.3.b, an analysis of parking demand outside of designated peak hours including during daytime and evening events. Please provide an evaluation of how parking required for future large events will impact surrounding neighborhoods. What is the baseline for parking at the times of day when these events would occur, is there enough capacity to handle the size of proposed events, and if not, how frequently will available*

parking be exceeded per month? If space is not available on the UVM campus how will this need be met and will it result in increased on-street parking during events?

Lot counts were taken at three different times of day over the course of three days each of every quarter of the year. These numbers provide the basis for peak parking demand, but they also reflect parking utilization during off-peak times. Event parking for UVM is addressed under Part 4, University of Vermont, Other Key Areas of Concern. This section asserts that event parking is handled within the University's existing parking capacity and functions on the basis of shared use. Most events take place during off-peak evening hours for typical parking demand (i.e. employee and commuter student use). As such, the same parking spaces serving daytime users can also serve nighttime users. The memo accompanying the revised JIPMP fleshes out UVM event parking in additional detail. Typically, there is ~70% capacity available in the Gutterson lot wherein most event parking is accommodated. If capacity is reached upon hosting an event, 400 spaces at the Jeffords lot may be used and an additional 159 at Given if necessary. Information provided notes that only one event since 2020 has required use of the Jeffords lot and just one event in the past 10 years has required overflow parking at the Given lot.

- *Additional data, analysis, and enforcement plans for city street parking in nearby neighborhoods that may be burdened by institutional parking demands. Specifically, please provide numbers from Champlain college monitoring of off-street parking violations - how do these numbers compare to survey data in the report?*

  Each of the institutions incorporate parking monitoring, compliance, and enforcement. The proposed JIPMP includes information as to nearby city streets that are commonly used by employees and students (see Part 2, On-Street Parking Adjacent to Institutions and related Table 3). Champlain College has an agreement with the City that allows for use of certain neighborhood streets by College affiliates and prohibits use of others. Part 3, Monitoring, Compliance, and Enforcement articulates enforcement measures specifically used by Champlain College. The College monitors and enforces its parking plan continuously, 24-hours per day and 7 days per week. Enforcement actions in the 2021-2022 school year reflected a 3X increase over the prior year.

- *TDM plans. Please provide additional information on what new measures are proposed by each institution as part of the JIPMP to reduce single occupancy vehicle trips and encourage greater public transportation/biking/walking/carpooling. What are the specific proposals to address existing increasing trends in single occupancy trips - particularly for UVM and UVM Medical. This should include a discussion of the effectiveness of prior TDM efforts and steps that can be taken to improve effectiveness as well as plans to mitigate any noted adverse trends such as increased drive-alone rates.*

  Part 2, Collective Highlights & Strategies, of the proposed JIPMP outlines specific TDM measures and elaborates in detail on several of them. Taken in its entirety, the proposed JIPMP shows trends in parking demand and transportation modes.

  As requested by the Development Review Board, the JIPMP has been revised to include matrixes for each one of the institutions that include primary modes of transportation and related percentages as to usage by employees and students, peak parking estimates and

counts, and TDM program metrics. Information is shown in 2019 and 2022. These initial matrixes show an increase in drive-alone transportation as the primary mode for UVM and Champlain College. The memo accompanying the revised JIPMP elaborates on these numbers and provides some context for the primary mode numbers. The primary mode is not the only mode used by students and employees. For example, telework is primary for just 10% and Champlain College and UVM employees, but it is a secondary mode for 30%. The overall mix of primary and secondary modes has resulted in lower parking demand at any given time as demonstrated by the comparatively low parking utilization rates.

The matrixes included in the revised JIPMP establish a foundation for tracking various TDM measures over time. To the extent that information is available, these matrixes should be updated in the annual parking management reports. The matrixes should definitely be carried forward into future JIPMP's and should show new, ongoing, and discontinued TMD measures, how effective (or ineffective) they are, how they affect institutional parking and transportation, and what adjustments are made to optimize alternative transportation modes.

- *Recommend TDM as a component of each institutions' Climate Initiatives. Please provide additional information whether each institutions' proposed TDM plans, programs, and efforts are consistent with the carbon emission reductions targets set by each organization. Please clarify how are the respective institutions' Climate initiatives integrated into the TDM in terms of parking demand, VMT and level-of-service goals, transit usage goals and public outreach.*

Part 2, Collective Highlights & Strategies, Climate Initiatives, addresses how each of the three institutions have integrated TDM into their climate action strategies. **(Affirmative finding as conditioned)**

II. Conditions of Approval

1. This approval is valid for 5 years.
2. Annual reporting is required per Sec. 8.3.4 (b) Annual Reporting of the CDO.
3. Annual reports must show that parking supply and demand for all three institutions remain balanced and shall demonstrate measures taken to achieve that balance. Information provided shall include, but not be limited to, TDM matrixes for each one of the institutions that show new, ongoing, and discontinued TMD measures, how effective (or ineffective) they are, how they affect institutional parking and transportation, and what adjustments are made to optimize alternative transportation modes.

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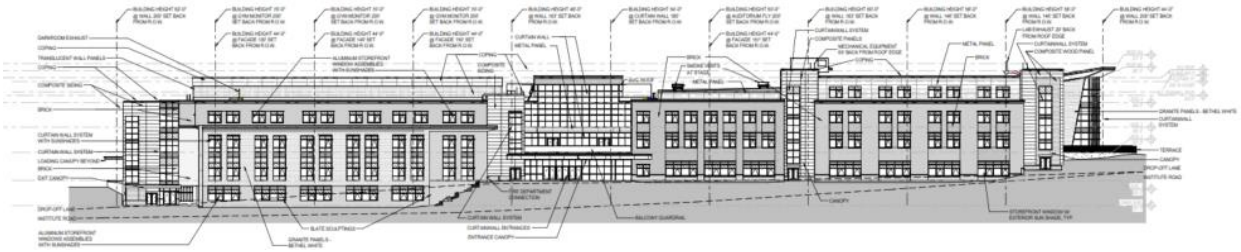
Garret King, Associate Planner
Joseph Cava, Planning Technician
Ted Boylan, Permit Administrator

MEMORANDUM

To: Development Review Board
From: Mary O'Neil, AICP, Principal Planner
Date: July 18, 2023
RE: ZP-23-276 52 Institute Road (BHS BTC)

Note: These are staff comments only. Decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.
File Number: ZP-22-546
Zone: I- ICC/BHS (Institutional Core Campus Overlay District – Burlington High School Campus) **Ward**: 4
Date application submitted to Open Gov: June 5, 2023
Applicant/ Owner: Joe Weith, White & Burke / Burlington School District
Request: Amendment to ZP-22-546 for reconstruction of the Burlington High School and Technical Center.



Background:

- **Zoning Permit ZP-22-546**; demolish and remediate existing high school and construct new 250,000 square foot high school/technical center. November, 2022.
- **Zoning Sketch Plan Review ZSP-22-7**, Sketch Plan Review, demolish and rebuild high school/technical center. September 2022.
- **Zoning Permit 21-0583CA**; Expansion and renovation of Burlington High School and Burlington Technical Center. Request for a parking waiver and a five year project timeline. February, 2021.
- **Zoning Review 20-0194SP**; Sketch Plan review for renovations to BHS. September 1, 2020.
- **Zoning Permit 15-0982CA;** addition of storage shed. April 2015.
- **Zoning Permit 13-0291CA;** installation of rooftop condensing units on Buildings A and B. June 2013.

The programs and services of the City of Burlington are accessible to people with disabilities. For accessibility information call 865-7188 (for TTY users 865-7142).

- **Zoning Permit 13-1037CA**; replace existing HVAC system with new heat pump system and condenser on roof of Building A. May 2013.
- **Zoning Permit 13-0053CA;** install new shed in north east portion of property. July 2012.
- **Non-Applicability of Zoning Permit Requirements 12-0558NA;** installation of photovoltaic system, Certificate of Public Good. November 2011.
- **Zoning Permit 11-1123CA**; install condensing unit on the side of F building at BHS. July 2011.
- **Zoning Permit 10-0850CA**; two new Energy Recovery Units on roof of A Building at Burlington High School. June 2010.
- **Zoning Permit 09-616CA**; Renovations to existing press box including new membrane roof covering, roof access hatch, ladder, and safety rail. March 2009.
- **Zoning Permit 09-321SN**; Electronic sign to be added to previously approved sign. October 2008.
- **Zoning Permit 09-241CA**; Relocate solar array from building side to flat roof of building with new rack mounting structure. September 2008.
- **Zoning Permit 09-137SN**; freestanding sign for Burlington High School. August 2008.
- **Zoning Permit 08-549SN**; one freestanding, internally lit, metal sign for Burlington High School. Application **denied**, February 2008.
- **Zoning Permit 06-457CA**; construction of 3,200 square foot building to house wood chip boiler system for existing high school. March 2006.
- **Zoning Permit 06-452CA**; redevelopment of high school athletic fields, parking, new service and entrance buildings and new sewage pump station. February 2006.
- **Zoning Permit 05-305CCA**; amended plan for building-mounted solar panels at BHS. Reduction from six panels to four. Child of permit 05-058CA. November 2004.
- **Zoning Permit 05-058CA;** Install 6 solar panels attaching to a pole located approximately 35 ft. off the SE corner of building A. July 2004.
- **Zoning Permit 04-723CA**; remove old green house. Enclose with walls, new roof and windows. July 2004.
- **Zoning Permit 00-028**; Installation of two metal halide flood lights on existing poles to illuminate the existing press box for the high school athletic field. July 1999.
- **Zoning Permit 99-186**; Amend previously approved bleacher system at the Burlington High School track to include a press box. October 1998.

- **Zoning Permit 98-305**; Replace existing steel and wood bleachers with new on the east and west sides of the Burlington High School track. Proposal includes installation of a slab on the east side (Portable units on the west). January 1998.
- **Zoning Permit 98-074**; Installation of a handicapped access ramp on the front of the existing Burlington high school. Materials to be painted metal (Dark green and concrete). August 1997.
- **Zoning Permit 97-033**; Add nonilluminated message board section under the existing freestanding sign for Burlington High School. Location on North Avenue and height and overall size to remain the same. July 1996.
- **Zoning Permit 87-678 / COA 87-215**; building three bay one-story garage for storage of aircraft parts for school program. January 1988.
- **Zoning Permit 87-320**; change an existing window on west side to exterior door to provide egress to new classroom. June 1987.
- **Zoning Permit 82-435**; construct bus shelter on the site of a removed bus shelter. September 1982.

Overview: A zoning permit was approved in November 2022 to allow remediation and demolition of Burlington High School; however recent project cost estimates have spurred a need to make revisions to the approved plan. The breadth of adjustments is outlined in the submission narrative, and includes:

1. Enlargement of the greenhouse
2. Relocation of the maintenance building
3. Inclusion of a salt shed
4. Relocation of GMT bus stop at the request of GMT
5. Addition of an ADA walkway in front of the building
6. Removal of 9 parking spaces (too allow access to the maintenance building)
7. Grading revisions, to eliminate blasting around the north parking tray
8. Less tree removal (due to less blasting and grading revisions)
9. Modifications to outside common area (due to grading revisions, rock ledges)
10. Addition of 4 bike parking spaces, moving some parking under entry canopies
11. Reduce auditorium height by 10’
12. Elimination of green roofs

Most of the revisions include reduction in scope; none substantively change the intent or core plan that was approved seven months ago.

The project development is subject to limited municipal review per **VSA §4413**:

Limitations on municipal bylaws

(a) The following uses may be regulated only with respect to ***location, size, height, building bulk, yards, courts, setbacks, density of buildings, off-street parking, loading facilities,***

traffic, noise, lighting, landscaping, and screening requirements, *and only to the extent that regulations do not have the effect of interfering with the intended functional use:*
(1) ***State or community owned and operated institutions*** *and facilities.*
(2) ***Public and private schools and other educational institutions certified by the state department of education****.*

A zoning amendment (ZA 22-05) relative to re-zoning the site as an Overlay within the Institutional Zoning District was warned July 28, 2022 and adopted August 15, 2022. The Zoning District is now Institutional Core Campus Overlay (ICC-BHS).

Recommended motion: Certificate of Appropriateness **Consent Approval**, per the following Findings and Conditions:

I. Findings

Article 2: Administrative Mechanisms
Section 2.7.8 Withhold Permit
Per this standard, the applicant is required to remedy all violations and close out all zoning permits issued after July 13, 1989 prior to issuance of a Certificate of Occupancy for this permit. There are a number of zoning permits that require Certificates of Occupancy:

ZP-13-456 17126 – PROJECT...	Zoning Permit	Jun. 21, 2013	ACTIVE
ZP-13-289 17612 – PROJECT...	Zoning Permit	May. 1, 2013	ACTIVE
ZP-12-515 15407 – PROJECT...	Zoning Permit	Jul. 17, 2012	ACTIVE
ZP-11-436 26399 – PROJEC...	Zoning Permit	Jun. 28, 2011	ACTIVE
ZP-09-102			
ZP-06-17 3967 – PROJECT_...	Zoning Permit	Jan. 17, 2006	ACTIVE
ZP-06-14 874 – PROJECT_1...	Zoning Permit	Jan. 16, 2006	ACTIVE
ZP-04-612 3789 – PROJECT_...	Zoning Permit	Nov. 11, 2004	ACTIVE
ZP-04-411 9668 – PROJECT...	Zoning Permit	Jul. 25, 2004	ACTIVE
ZP-04-360 3780 – PROJECT_...	Zoning Permit	Jun. 29, 2004	ACTIVE

ZP-1999-363 31132 – PROJECT...	Zoning Permit	Jul. 13, 1999	ACTIVE
ZP-1998-550 23567 – PROJECT...	Zoning Permit	Oct. 4, 1998	ACTIVE
ZP-1998-16 38092 – PROJEC...	Zoning Permit	Jan. 20, 1998	ACTIVE
ZP-1997-423 31624 – PROJECT...	Zoning Permit	Aug. 19, 1997	ACTIVE
ZP-1996-399 35228 – PROJEC...	Zoning Permit	Jul. 17, 1996	ACTIVE

Affirmative finding as conditioned.

Article 3: Applications, Permits and Project Reviews
Part 3: Impact Fees
Section. 3.3.2 Applicability

*Any new development or additions to existing buildings which result in new dwelling units or in **new nonresidential buildings square footage are subject to impact fees** as is any change of use which results in an added impact according to Sec. 3.3.4.*

The proposed new gross area (256,310 sq. ft.) is slightly larger than the previous gross floor area (255,600 sq. ft). As revisions have increased the gross floor area, Impact Fees will be assessed.
Affirmative finding as conditioned.

Section 3.3.8 Time and Place of Payment

(a) New Buildings: Impact fees must b epaid at least seven days prior to occupancy of a new building or any portion thereof.

Affirmative finding as conditioned.

Part 5: Conditional Use and Major Impact Review
Section 3.5.2 Applicability

(a) Conditional Use Review

Within the BHS overlay, (Section 4.5.2 4. Uses, School, - Secondary and School-Trade or Professional) are permitted uses. **Affirmative finding.**

(b) Major Impact Review

Major Impact Review shall be required for the approval of all development involving any one or more of the following:

Institutional: A development footprint of twenty thousand (20,000) s.f. or more, or the creation of forty thousand (40,000) s.f. or more of gross floor area.

Section. 3.5.3 Exemptions

Major Impact Review shall not be required for applications involving one or more of the following:

(e) Projects where the scope and authority of municipal regulation is limited by statute pursuant to 24 VSA 4413.

Development at Burlington High School is exempt from Major Impact Review under
§ 4413. Limitations on municipal bylaws:

(a) The following uses may be regulated only with respect to ***location, size, height, building bulk, yards, courts, setbacks, density of buildings, off-street parking, loading facilities, traffic, noise, lighting, landscaping, and screening requirements,*** *and only to the extent that regulations do not have the effect of interfering with the intended functional use:*

(1) State- or community-owned and operated institutions and facilities.

(2) Public and private schools and other educational institutions certified by the state department of education.

Affirmative finding.

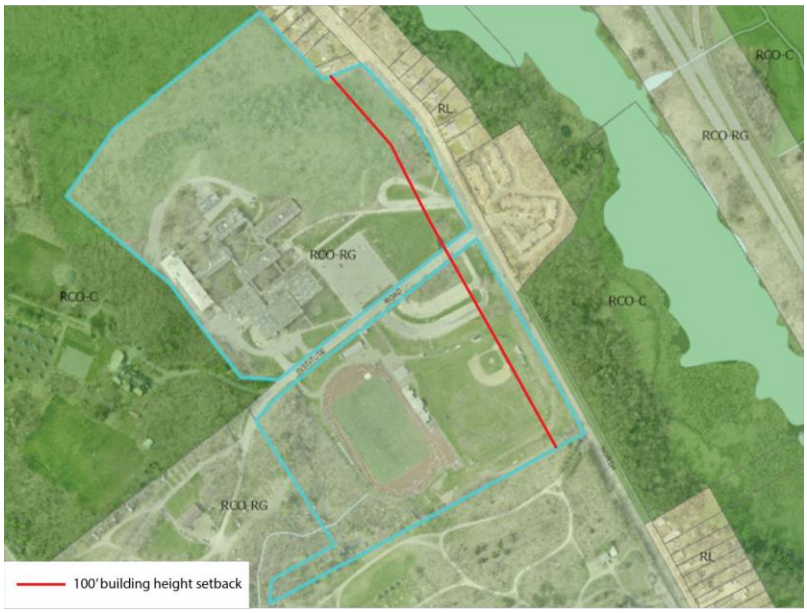
<u>Article 4: Zoning Maps and Districts</u>

Section 4.4.4 Institutional District

(a) *The Institutional District (I) as illustrated in Map 4.4.4-1 allows for increased development scale and intensity than would typically be found in the adjacent residential districts to support continued growth and flexibility of the city's major public and higher education and health care institutions within their respective institutional missions. New development is intended to be sensitive [to] the historic development pattern of the existing campuses as well as the surrounding residential neighborhoods.*
The district is intended to support a broad range of related uses reflecting the residential institution's roles as either regional education, healthcare, cultural and research centers or municipal educational facilities. Buildings should be designed with a high level of architectural detailing to provide visual interest and create enjoyable, human-scale spaces. Sensitive transitions between adjacent lower scale residential and open space areas and larger scale institutional development should be provided. Sites should be designed to be pedestrian friendly and encourage walking between buildings. Where parking is provided onsite, it is intended to be hidden behind, to the side, within, or underneath structures.

Section 4.5.2 Institutional Core Campus Overlay Districts

(b) Areas Covered



6. Burlington High School Campus (BHS) is intended to provide for increased development scale and intensity than would typically be found in the adjoining and underlying districts to facilitate the long-term use of this site as the city's public high school, and a hub of educational and athletic uses and other district services. Buildings are designed with architectural detailing to provide visual interest and create an enjoyable human-scale experience, both within its internal circulation and in relation to the surrounding neighborhood, with the majority of parking to be located behind, to the side, within or underneath structures particularly with respect to frontage along North Avenue. Development should reflect the district's core educational values in both design and quality.

(h) District Specific Regulations: Burlington High School Campus (BHS)

1. Lot Coverage

Maximum lot coverage shall be applied to the aggregate of all lots located within the ICC-BHS District. Lot coverage shall not exceed 60%.

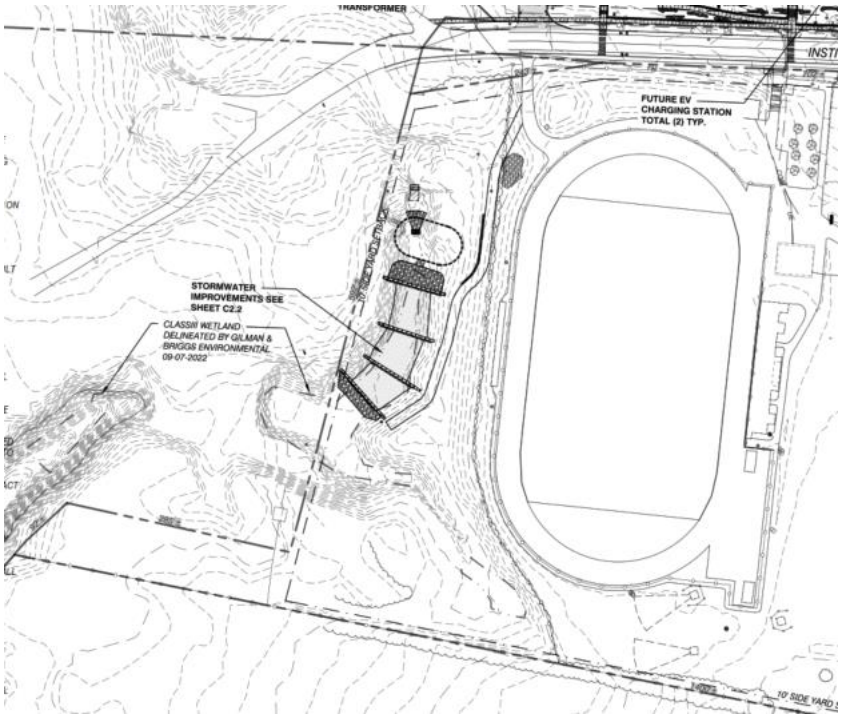
The proposed lot coverage for both parcels combined (north and south sides of Institute Road) remains at 27%; far less than the 60% lot coverage limitation. **Affirmative finding.**

2. Setbacks

A minimum 20 ft. front yard setback shall be applicable along North Avenue, and a 20 ft. minimum front yard setback along Institute Road. A minimum side setback of 10ft and a minimum rear setback of 20 ft. shall apply only along the perimeter of the ICC-BHS District.

The proposed setback from North Avenue is 318 feet, and 124 feet from Institute Road. (Plan C2.0.)

The irregular parcel boundaries of the two distinct lots create unique side boundaries. With front yard setbacks defined, and the remaining perimeter boundaries of the overlay, there are no rear yard setbacks. All buildings are placed the minimum 20' for Front Yard and Perimeter setback requirement.



The proposed stormwater structure has been isolated to the southern Institute Road parcel, although existing structure is proposed to be dug out on the North Beach parcel and an outlet will be formalized. (Reference is made to Plan C2.0 and Sheet C2.2.) The Stormwater requires an access road to attend to outfall maintenance; this is reflected in the revised plan C2.21 and was within the November 2022 approval. CEA defines the new access lane as grass covered and therefore not contributing to lot coverage.

Stormwater infrastructure must be limited to the parcels under review, or additional permitting for abutting properties shall accompany this application. For permanent infrastructure, an easement may be required. **Affirmative finding as conditioned.**

3. Building Height

Building Height shall be measured under the provisions of Article 5. Building Height within the ICC-BHS shall not exceed:

- *60 ft. for buildings or portions of buildings within 100 ft. from the property line along North Avenue.*
- *80 ft. for buildings or portions of buildings more than 100 ft. from the property line along North Avenue.*

The only change to building height and elevations is to the auditorium portion of the building (see south elevation on sheet PR-900). The height of the auditorium will be reduced by 10 feet. The maximum building heights along North Avenue and Institute Road will not change from what was approved in November. There is no structure within 100 ‘of either North Avenue or Institute Road, and the highest measurement (70” is at the Gym monitor) set back 200’ from the right-of-way. The maximum

building height as illustrated in the plan along both elevations is well below the maximum allowed height. **Affirmative finding.**

4. **Uses**

Within the ICC-BHS district, School-Post Secondary & Community College, School-Secondary, School-Primary, School-Preschool (see Section 5.4.1) and School-Trade or Professional are permitted. When part of the educational program associated with a School Use or when hosted within a School facility, the following uses are also permitted:

Permitted Uses:	
Automobile Body Shop	Museum Small
Automobile/Vehicle Repair	Museum Large
Café	Performing Arts Center
Community Center	Performing Arts Studio
Community Garden	Recreational Facility- Indoor
Conference Center	Recreational Facility- Outdoor
Composting	Recycling Center- Large
Daycare (See Sec. 5.4.1)	Recycling Center- Small
Health Club	Research and Development Facility
Library	Research Lab
	Park

As would be anticipated, the redeveloped school will include a library, an Auditorium/ performance space, a gymnasium plus a community gym, athletic facilities (including outdoor recreational facility with seating, and multiple technical / training program spaces.) All are permitted uses in this ICC-BHS overlay. **Affirmative finding.**

Article 5: Citywide General Regulations

Section 5.1.1 Uses

Previous to Zoning Amendment ZA 22-05, School-Secondary and School-Technical were not permitted uses in the RCO-RG zoning district. As the use was pre-existing / non-conforming, it could continue.

As a result of zoning amendment ZA-22-05 that re-zoned the BHS parcel, Post-Secondary & Community College, School-Secondary, School- Primary, School-Preschool and School-Trade or Professional are permitted. Additionally, all uses listed in the above table are permitted uses. **Affirmative finding.**

Section 5.2.1 Existing Small Lots

Not applicable.

Section 5.2.2 Required Frontage or Access

52 Institute Road has frontage on both North Avenue and Institute Road, with vehicular access from the latter. The primary façade will front Institute Road, however the North Avenue elevation presents a distinct and welcoming expression. **Affirmative finding.**

Section 5.2.3 Lot Coverage Requirements
See Section 4.5.2 (h) 1, above.

Section 5.2.4 Buildable Area Calculation



Map 5.2.4-1 Steep Slopes Overlay

(a) For any properties two (2) or more acres in size within any RCO, WRM, RM, WRL, or RL zoning district, the maximum building density or lot coverage shall be calculated using the buildable area only. With a change of zoning district to Institutional (ICC-BHS), this standard no longer applied. Not applicable.

(b) Steep Slopes Overlay District (As adopted by City Council August 15, 2022)

This overlay district consists of all lands delineated in Map 5.2.4-1 – Steep Slopes Overlay District. This overlay district contains expanses of contiguous land with an average slope of 15% or greater over 50-foot intervals and adjacent lands within 50 feet of the top of slope.

The boundaries shown on the Steep Slopes Overlay Map may be supplemented or modified by examination of one or more of the following sources by the Development Review Board whenever an application is submitted for review.

- *Contour maps prepared from the most current orthophotography.*
- *On-site survey prepared by a registered professional engineer or surveyor.*

The Zoning Administrative Officer or Development Review Board shall determine whether or not the Steep Slope Overlay District has been shown accurately on the application plans. The applicant may be required to revise the steep slope boundaries shown on the application plans.

The burden of proving the correct boundary shall be on the applicant, supported by engineering and/or surveying data or mapping.

1. *District Specific Regulations*

   A. *The Steep Slope Overlay District shall be an overlay on all zoning districts. The regulations in the overlay are in addition to those regulations of the underlying zoning district.*

B. These regulations apply to applications within the Overlay District that include 400 square feet or more of earth disturbance.

C. Finished slopes of all cuts and fills shall not exceed 30%, unless the applicant can demonstrate that steeper slopes can be stabilized and maintained adequately to the satisfaction of the ZAO or DRB in consultation with the City Engineer.

D. Any fills placed on a steep slope shall be property stabilized and, when necessary, supported by retaining walls or other appropriate measures as approved by the ZAO or DRB in consultation with the City Engineer.

E. Finished grades shall be reasonably safe from slide, collapse, or similar failure as determined by the ZAO or DRB in consultation with the City Engineer.

2. Additional Application Requirements

A. A site plan prepared by a registered professional engineer or surveyor that accurately depicts the proposed development and related land disturbance relative to the Steep Slope Overlay District boundaries, with all pertinent information describing the proposal, and a topographical survey depicting existing and proposed contour lines at no greater than 2-foot intervals. The plan shall depict all proposed cut, fill, and grading.

B. A plan depicting the extent of proposed vegetation clearing.

3. Approval Condition

A. Prior to construction, the applicant shall provide a geotechnical analysis prepared and stamped by a professional geotechnical engineer that determines the suitability of the steep slope for development.



The BHS Campus includes areas identified on the Steep Slopes Overlay Map. Areas where the project potentially impacts existing slopes of 30% or more were depicted on Sheet WS2 *Slope Analysis Proposed*.

The project has been designed in a manner where steep slopes greater than 40% are proposed to be employed as a means of minimizing earth disturbance. Slopes greater than 30% have been avoided except where subsurface groundwater conditions are favorable for the long-term stability of the unconsolidated soils. Specifically, some areas have been graded at 3:1 and will be temporarily stabilized with

the use of erosion control matting until vegetation with a suitable root mass has been established. For excavation into bedrock, the side slopes shall be no steeper than 6 vertical to 1 horizontal to reduce cyclical dislodgement of rock from the exposed face. In some areas 2H: 1V slopes may be employed with the use of angular stone substrate as a means of minimizing sloughing of saturated soil surfaces. The Steep Slopes analysis was prepared by an engineering firm (CEA); and was included within the November 2022 approval.
Affirmative finding.

Section 5.2.5 Setbacks
See Section 4.5.2 (h) 2, above.

Section 5.2.6 Building Height Limits
See Section 4.5.2 (h) 3, above.

Section 5.2.7 Density and Intensity of Development Calculations
There is no specific density or intensity of development provision provided under the ICC-BHS overlay. No dwelling units are proposed. **Affirmative finding.**

Part 3: Non Conformities
With warning and adoption of ZA 22-05, the existing non-conformities of use and general dimensional standards of the RCO zoning district have been eliminated. The new structure conforms to the use and dimensional standards provided for with the rezoned parcel and as defined in the amendment (ZA22-05). **Affirmative finding.**

Section 5.4.8 Historic Buildings and Sites
Not applicable.

Section 5.4.9 Brownfield Remediation
Extensive testing of building materials and soils for hazardous materials has been conducted on the property. Hazardous materials have been detected on site including asbestos, lead, PCBs, and polyaromatic hydrocarbons (PAHs) in the soils that exceed EPA and VTDEC standards. Testing and analysis determined that the most cost-effective approach to remediating hazardous materials is to fully demolish the buildings and dispose of all material as PCB bulk product waste. Therefore, demolition and removal of the buildings is a necessary component of the overall remediation plan.
BSD has been working closely with the Vermont Department of Environmental Conservation ("VTDEC") and EPA. **A Notice of Approved Corrective Action Plan ("CAP") was received February 17, 2022, with an amended approval issued May 1, 2023.**

Remediation of hazardous materials will consist of the following:

- Accessible asbestos containing materials (ACM) will be removed prior to demolition of the buildings.
- The interiors of Buildings A – G will be abated prior to demolition activities.

• There will likely be select remediation of PCB building materials on the exterior of the building including joint and door caulking.
• The entire buildings will be demolished and disposed of as PCB bulk product waste.
• Soil remediation will include select soil excavation and disposal to satisfy VTDEC and EPA regulations.

The abatement, remediation, and demolition will require the following regulatory agency permits and approvals to facilitate completion of the project:

• Site Investigation Report for hazardous building materials (PCBs) to be approved by VTDEC Sites Management Section (SMS).
• Site Investigation Report for soil materials to be approved by VTDEC SMS.
• Compliance with Vermont Department of Health lead and ACM regulations.
• Corrective Action Plan (CAP) for hazardous building materials (PCBs) and soil remediation to be approved by VTDEC SMS. This includes public notice and final decision.
• Corrective Action Construction Completion Report to be prepared for completed hazardous building materials (PCBs) and soil remediation.
• Performance based disposal of PCBs in accordance with the EPA 40 CFR section 761.61(b). This includes proper EPA notification and closure requirements.
Affirmative finding as conditioned.

Part 5: Performance Standards
Section 5.5.1 Nuisance Regulations
The proposed project will continue the existing use; however in more energy efficient buildings with upgraded infrastructure and improved pedestrian and vehicular parking facilities. No nuisance impacts are anticipated. **Affirmative finding**.

Section 5.5.2 Outdoor Lighting
The attached landscaping plan (L-300 – L-305 in LA drawings set) has been revised to incorporate recommendations by the City Arborist. This was a condition of the DRB's November approval. The submission documents (L-400 – L-404 in LA drawings set) overlaid on the new site and grading plans. There is no change to the statistical area summary table (sheet L400) approved by the DRB in November 2022.
Affirmative finding.

Section 5.5.3 Stormwater and Erosion Prevention
The EPSC site plan has been slightly revised to address the new grading area north of the north parking tray (see sheet C4.0 in the civil plans set). Written approval by Water Resources and the Stormwater Program will be a condition of any permit.
Affirmative finding as conditioned.

Section 5.5.4 Tree Removal

The rock wall and revised grading to the east of the parking tray will result in less tree removal and less impact to the Arms Forest. As shown on sheet WS2 in the civil plans set, the revised grading will reduce the area of tree removal from 4,155 sf (approved in November) to 1,820 sf.

Potential impacts to the Natural Resources Protection Overlay District were earlier assessed by Gilman & Briggs Environmental. As indicated in their assessment memorandum dated 9.30.22, Gilman & Briggs concluded that, overall, the project will not have significant effect on the forested community. **Affirmative finding as conditioned.**

Article 6: Development Review Standards

Part 1: Land Division Design Standards

No land division is proposed. Not applicable.

Part 2: Site Plan Design Standards

Sec. 6.2.2 Review Standards

(a) Protection of Important Natural Features:

A study was commissioned of Gilman and Briggs Environmental Consultants; provided in an earlier Skatch Plan Review and updated for this application. This analysis included a list of identified plant and tree species, with mapping to indicate both rare and endangered species. A comparison of the two plans shows that the current plan has two alterations in regard to any intrusions into the forested area:

1) Addition of a maintenance shed at the forest line above the upper parking lot, and

2) Deletion of a proposed salt shed a little east of that area.

This amendment includes the following:

- The proposed maintenance building on the northernmost portion of the site will be relocated and attached to the former wood chip plant building. This will reduce the area of tree removal and impact to the Arms forest.
- A salt shed is proposed in an area of existing pavement north of the former wood chip plant building. The shed will have 4 walls and covered and the floor will be designed to prevent any salt runoff from leaving the building (see salt shed elevations).

The ultimate examination of Gilman and Briggs resulted in a determination of no impact relative to the area of construction, a recommendation to limit tree clearing, and a return to a vegetative state within the outline of C Building. The relocated maintenance building will further reduce tree removal. **Affirmative finding as conditioned.**

(b) Topographical Alterations:

The grading plan has been revised in the areas of the north parking lot and west of the former wood chip plant building. There is a significant amount of ledge near the north parking lot. The plan approved in November proposed significant blasting on the north, south and east sides of the north parking tray to create a sloped grade. To reduce the amount of blasting and cost, the

applicant is now proposing exposed rock walls instead of sloped grades on the north, south and east sides of the north parking tray (see sheet C2.3 in the civil plans set). The re-grading plan will have less of an impact on the Arms Forest natural community compared to the previous plan reviewed by Gilman & Briggs and was approved by the DRB in November. The new plan will result in 2,335 less square feet of tree removal and impact area in the Arms Forest. As shown on sheet WS2 in the civil plans set, the revised grading will reduce the area of tree removal from 4,155 sf (approved in November) to 1,820 sf. **Affirmative finding.**

(c) Protection of Important Public Views:

There are no protected views from or through this site. Not applicable.

(d) Protection of Important Cultural Resources:

Not applicable.

(e) Supporting the Use of Renewable Energy Resources:

The redevelopment plan intends to achieve LEED certification.

The new BHS/BTC building will use a renewable primary heating system as required by Burlington Ordinance Chapter 8 Article 5. The building's heating, cooling, and domestic hot water will be provided by electric heat pumps connected via heat exchanger to an open-loop ground source (i.e., geothermal) heat pump loop. This system is designed to provide all anticipated heating and cooling needs for the project. This proposed system is based upon the confirmation of substantial water flows on site from a test well and design phase energy modeling of the building. The building enclosure performance will exceed VT CBES 2020 standards, with a particular focus on air tightness. Building and equipment performance values have been optimized through the energy modeling process.

The roof is arranged and structured to support solar photovoltaic arrays and infrastructure will be put in place to support BSD's plan to arrange for installation of solar PV by a third-party on the building's roof through a power purchase agreement. The BHS/BTC project is registered as a LEED project and the intent is to obtain LEED Certification. The project applicants will continue to refine and optimize energy and materials performance throughout the design and construction process.
The roof plan has been revised to eliminate green roofs (see attached BHS/BTC roof plan). After further review, it was determined that the green roof would present significant ongoing maintenance concerns in terms of time and cost. It was also determined that it would not provide the benefits associated with green roofs; storm water system design was not able to be reduced, building energy modeling revealed it had negligible impact on energy consumption, and it made compliance with LEED credits more challenging.
From Brian Leet, of Freeman French Freeman:

There are two factors on how the green roof design impacted LEED:

1. *Under older LEED standards the credit for urban heat island reduction was achievable simply by using a white or green roof. This credit is changed so in the current version of LEED to include other factors and our project could not get this credit regardless of these factors. (Additionally, there are convincing roof performance models which suggest that in our climate in a properly insulated building like this one, a dark roof has better durability and long-term performance).*
2. *Under LEED you can obtain simple credits for having no irrigation on site. However, due to exposure and anticipated staffing, it was determined that a green roof would require a permanently installed irrigation system. This would then require additional calculations and make one of these LEED points more challenging to obtain.*

Affirmative finding.

(f) Brownfield Sites:

Approval of a Corrective Action Plan ("CAP") was received February 17, 2023, with an amendment in May of 2023. All conditions and requirements of that plan remain in effect.
Affirmative finding as conditioned.

(g) Provide for nature's events:

Special attention shall be accorded to stormwater runoff so that neighboring properties and/or the public stormwater drainage system are not adversely affected. All development and site disturbance shall follow applicable city and state erosion and stormwater management guidelines in accordance with the requirements of Art 5, Sec 5.5.3.

Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.

The narrative defines the introduction of Stormwater Treatment; See comments from the Stormwater engineer under Section 5.5.3.

The project will be required to satisfy all Chapter 26 requirements, with written approval of the City Stormwater program.

Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.

Improvements to building entrances will assure enhanced shelter for students and staff. Some bike parking has been relocated to covered entrances to facilitate both parking and student entry.

Burlington School District maintains an active snow removal program for all their facilities.
Affirmative finding as conditioned.

(h) Building Location and Orientation:

The building will continue to front Institute Road, with enhanced building elevation design to create a street face toward North Avenue. Additionally and due to the location of parking,

another defined building "front" is proposed on the north elevation. Redevelopment will continue to emphasize and enrich the existing orientation to the street. **Affirmative finding.**

(i) Vehicular Access:

Normal access will continue as existing off Institute Road, with both a drop-off arc in front of the school (Institute Road) and an extended access northward for entrance to BTC, surface parking on the west and north, and bus turnaround. **Affirmative finding**.

(j) Pedestrian Access:

Much greater circulation will be afforded with the plan, Pedestrian paths original off North Avenue in several locations; leading students/staff to either the rear (north) access or the south (Institute Road) entrance. Paths circle the site, connecting to the BTC entrance on the west, the parking areas, and greenhouse. A sidewalk is being added on the south side of the building near Institute Road to improve ADA accessibility to the building's main southern entrance. **Affirmative finding.**

(k) Accessibility for the Handicapped:

A principal accomplishment of this redevelopment is to achieve access throughout the complex and across the campus. 10 HCParking is provided in the top two surface parking lots, and one near the (Institute Road) main entrance. Overall ADA access compliance is under the jurisdiction of Burlington's building inspector. **Affirmative finding as conditioned.**

(l) Parking and Circulation:

Total number of vehicle parking spaces is being reduced by 9 spaces from 362 spaces (approved in November) to 353 spaces. See attached Vehicle and Bicycle Parking table dated 6/5/23 (changes to table highlighted in yellow). 9 spaces have been removed north of the former wood chip plant building to provide room and allow for access to the relocated maintenance building. The CDO provides a maximum limit for parking at 385 vehicular parking spaces, so the plan is compliant.

Section 4.4.4 states: *Where parking is provided onsite, it is intended to be hidden behind, to the side, within, or underneath structures.*
The parking on the south side of Institute Road is not proposed to be altered.
New surface parking at 52 Institute Road (north side of Institute Road) is proposed in two parking trays to the north/rear of the building (also beside the entrance to BTC). There are a limited number of parking spaces in the entrance arc along Institute Road; these are intended for short term and visitor parking. These parking spaces do not adhere to the *behind/next to/underneath* guidance, but at Sketch Plan Review the DRB found some facility considering the need for handicap and visitor parking in close proximity to the secured school entry.

A loading dock is noted on the west elevation, near the BTC entrance.

As now within the Multi Modal Mixed Use Parking District, a Transportation Demand Management Plan has been provided and was included within the November 2022 approval.

Affirmative finding as conditioned.

(m) Landscaping and Fences:

The applicant has submitted an updated version of the Gilman and Briggs plan relative to impacts to the natural areas. The attached landscaping plan (L-300 – L-305 in LA drawings set) has been revised to incorporate recommendations by the City Arborist. This was a condition of the DRB's November approval.
The site is interconnected with walkways, seating walls, bicycle parking, meeting plazas and links to transportation paths; designed as a comprehensive whole.
Affirmative finding.

(n) Public Plazas and Open Space:

There are several areas of existing and proposed gathering space, including two outdoor amphitheaters, entry plazas on both the north and south, and areas surrounding bicycle parking facilities. The size of the outdoor learning/activity area east of the building will be slightly reduced in size (see sheet C2.5 in the civil plans set), in part due to reduced blasting and use of rock walls. The plan approved in November proposed significant blasting on the north, south and east sides of the north parking tray to create a sloped grade. To reduce the amount of blasting, (and cost) this revised application includes exposed rock walls instead of sloped grades on the north, south and east sides of the north parking tray (see sheet C2.3 in the civil plans set).

The courtyard patio is proposed to be slightly reconfigured (see sheet C2.5 in the civil plans set). DPW staff have been involved in discussions with GMT and are in agreement with moving the bus stop as depicted.

Of course the existing athletic fields on the south side of Institute Road satisfy the need for active Open Space. **Affirmative finding.**

(o) Outdoor Lighting:

Where exterior lighting is proposed the applicant shall meet the lighting performance standards as per Sec 5.5.2.

Attached are the lighting plans (L-400 – L-404 in LA drawings set) overlaid on the new site and grading plans. There is no change to the statistical area summary table (sheet L400) approved by the DRB in November 2022.
Affirmative finding.

(p) Integrate infrastructure into the design:

Exterior storage areas, machinery and equipment installations, service and loading areas, utility meters and structures, mailboxes, and similar accessory structures shall utilize setbacks, plantings, enclosures and other mitigation or screening methods to minimize their auditory and visual impact on the public street and neighboring properties to the extent practicable.

Utility and service enclosures and screening shall be coordinated with the design of the principal building, and should be grouped in a service court away from public view. On-site utilities shall be place underground whenever practicable. Trash and recycling bins and dumpsters shall be located, within preferably, or behind buildings, enclosed on all four (4) sides to prevent blowing trash, and screened from public view.

Any development involving the installation of machinery or equipment which emits heat, vapor, fumes, vibration, or noise shall minimize, insofar as practicable, any adverse impact on neighboring properties and the environment pursuant to the requirements of Article 5, Part 4 Performance Standards.

The approved greenhouse will be enlarged from approximately 600 sf to 1250 sf.
Underground electric utilities are required. Submission documents include utility plans overlaid on the new site and grading plans (see sheets C3.0 – C3.2 in civil plans set). A second ground mounted electrical transformer is proposed; both transformers are located next to the loading dock parking lot. While the overall utility plan is still the same, the exact locations of water, sewer and gas lines have been slightly shifted in certain locations.
Dumpsters are located on the west near a loading dock. Anticipated as roll-off dumpsters with lids, they are self-contained and will be screened by evergreen landscaping.
Affirmative finding.

Part 3: Architectural Design Standards
Sec. 6.3.2 Review Standards

State Statute §4413 Limits Municipal Review per the following:

§ 4413. Limitations on municipal bylaws

(a) The following uses may be regulated only with respect to ***location, size, height, building bulk, yards, courts, setbacks, density of buildings, off-street parking, loading facilities, traffic, noise, lighting, landscaping, and screening requirements,*** *and only to the extent that regulations do not have the effect of interfering with the intended functional use:*

(1) State- or community-owned and operated institutions and facilities.
(2) Public and private schools and other educational institutions certified by the state department of education.
(3) Churches and other places of worship, convents, and parish houses.
(4) Public and private hospitals.
(5) Regional solid waste management facilities certified under 10 V.S.A. chapter 159.
(6) Hazardous waste management facilities for which a notice of intent to construct has been received under 10 V.S.A. § 6606a.

(a)Relate development to its environment:

1. Massing, Height and Scale:

The proposed redevelopment of Burlington High School / Burlington Technical Center is typical in scale, massing and height of institutional buildings. The only change to building height and elevations is to the auditorium portion of the building (see south elevation on sheet PR-900). The height of the auditorium will be reduced by 10 feet. The maximum building heights along North Avenue and Institute Road will not change from what was approved in November 2022.
Affirmative finding.

2. Roofs and Rooflines.

Not applicable per **§ 4413. Limitations on municipal bylaws.**

3. Building Openings

Not applicable per **§ 4413. Limitations on municipal bylaws.**

(b) Protection of Important Architectural Resources:

Not applicable.

(c)Protection of Important Public Views:

Not applicable.

(d) Provide an active and inviting street edge:

Not applicable per **§ 4413. Limitations on municipal bylaws.**

(e)Quality of materials:

Not applicable per **§ 4413. Limitations on municipal bylaws.**

(f) Reduce energy utilization:

The BHS/BTC project is registered as a LEED project. From the 2022 submission narrative:
The new BHS/BTC building will use a renewable primary heating system as required by Burlington Ordinance Chapter 8 Article 5. The building's heating, cooling and domestic hot water will be provided by electric heat pumps connected via heat exchanger to an open-loop ground source (i.e. geothermal) heat pump loop. This system is designed to provide all anticipated heating and cooling needs for the project. The proposed system is based upon the confirmation of substantial water flows on site from a test well and design phase energy modeling of the building. The building enclosure performance will exceed VT CBES 2020 standards, with a particular focus on air tightness. Building and equipment performance values have been optimized through the energy modeling process.

The roof is arranged and structured to support solar photovoltaic arrays and infrastructure will be put in place to support the BSD's plan to arrange for installation of solar PV by a third-party on the buildings' roof through a power purchase agreement.

Aside from the removal of the approved green roofs, the energy plan remains consistent with the 2022 approval. **Affirmative finding.**

(g)Make advertising features complementary to the site:

Any signage will require a separate sign permit.

(i)Make spaces secure and safe:

Improved staff and student safety is core to the project. The inclusion of automatic sprinkler system throughout the complex, an addressable fire alarm system, new lighting, ventilation, and improved traffic circulation and parking are all identified as safety improvements. Additionally, the site has been designed to optimize circulation for emergency vehicle access as well as first responder entrances with a stretcher-sized elevator; significantly advancing site safety.
The development is obligated to meet all applicable building and life safety code per the guidance of Burlington's building officials and fire marshal. **Affirmative finding as conditioned.**

Article 8: Parking

Zoning Amendment ZA-22-05 re-assigned the parcel to the Multi Modal Mixed Use Parking District.
Nine (9) parking spaces have been removed from the plan approved in November 2022; those located near the former wood chip plant building to allow access and relocation of the maintenance building. As provided in the submitted Vehicle Parking Table, the maximum allowed number of parking spaces is 385 spaces (based on classrooms; 77 x 5); but the additional uses individually identified as associated with the secondary school could conceivably increase the maximum parking allowance to 1,275. The 353 parking spaces proposed, however, are compliant with the individual maximum allowance for Secondary School use.
Affirmative finding.

Vehicle Parking			
Maximum Parking Standard			
Use	Max Parking Standard	Proposed Metric	Max Parking Allowed
School Secondary	5 per Classroom	77 classrooms	385
Performing Arts Center	1 per 4 seats	750 seats	188
Recreational Facility - Outdoor Commercial	1 per 4 seats	1,000 seats	250
Recreational Facility - Indoor (Gym & Community Gym)	1 per 4 seats	1,750 seats	438
Total Max Parking Allowed			**1,261**
Proposed Parking			
Location	**No. of Spaces**		
South of Institute Road	144		
North of Institute Road	209		
Total Parking Spaces Proposed	**353**		

Sec. 8.1.16 Transportation Demand Management

(a) **Purpose**: *This section requires the implementation of a Transportation Demand Management (TDM) Program for certain projects for the purpose of advancing the goals of the City's land use and transportation plans, and promoting public health, safety, welfare, and protection of the environment by:*

- *Reducing parking demand;*

- *Reducing car ownership;*
- *Reducing vehicle miles traveled (VMT) and congestion; and,*
- *Increasing transit use and non-motorized travel;*

(b) **Applicability:** *A Transportation Demand Management Program shall be required for all projects located in the Multimodal Mixed Use Parking District (see Sec. 8.1.3(c)), and involving any one or more of the following:*

Dwelling Units	Creation of ten (10) or more dwelling units
Non-residential or Mixed Use Development	A building footprint of eight thousand (8,000) s.f. or more; or, the creation of fifteen thousand (15,000) s.f. or more of gross floor area.

For the redevelopment of BHS/BTC, a TDM is required.

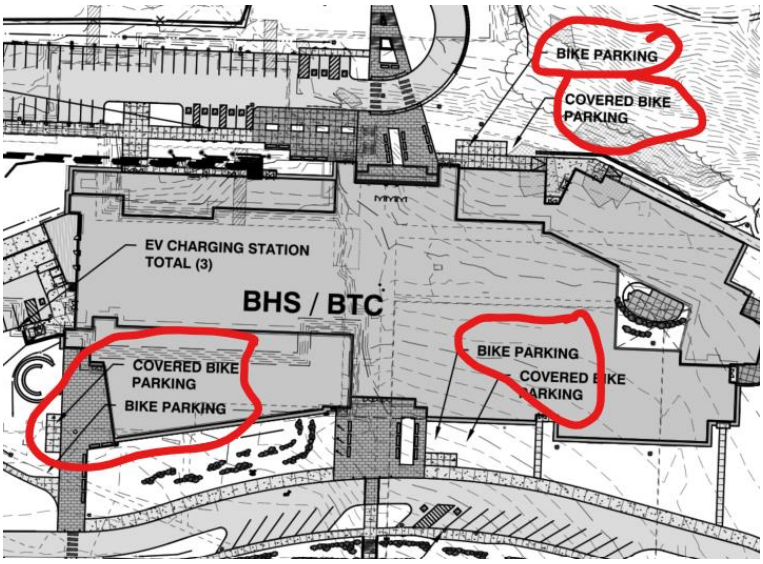
A TDM plan was included with the November 2022 approval. All conditions of that plan, including annual reporting and all conditions noted under ZP-22-546 remain in effect. **Affirmative finding as conditioned.**

Part 2: Bicycle Parking
Section 8.2.2
Bicycle parking requirements as set forth in this subpart shall apply to new development, changes in land use, and changes to a structure that cause an increase or decrease of 25% or greater in gross floor area, seating capacity, or number of dwelling units.
The new school facility will introduce approximately 256,310 sf of new development.

Bicycle Parking			
CDO Minimum Required Bicycle Parking			
Type	**Parking Standard**	**Proposed Metric**	**No. of Required Spaces**
Long Term	1 per 20K sf	260,825	13
	1 per 10 students	1,594 student capacity	159
Total Long Term Spaces			172
Short Term	4 per Classroom	77	308
Total Minimum Bicycle Parking			**480**
LEED Recommended Minimum Bicycle Parking			
Long Term	5% of student capacity	1,594 student capacity	80
	5% of faculty/staff	175 faculty/staff	9
Total Long Term Spaces			89
Short Term	2.5% of student capacity	1,594 student capacity	40
	2.5% of faculty/staff	175 faculty/staff	4
	2.5% of visitors	30 visitors estimated	1
Total Short Term Spaces			45
Total Minimum Bicycle Parking			**134**
Minimum Bicycle Parking Based on BHS Bicycle Parking Demand Study			
Total Bicycle Parking	0.03 spaces per student	1,594 student capacity	48
Proposed Bicycle Parking			
Type	**No. of Spaces**		
Long Term (Enclosed)	80		
Short Term	60		
Total Bicycle Parking Proposed	**140**		

The total number of bike parking spaces is being increased by 4 spaces from 136 spaces (approved in November) to 140 spaces. See attached Vehicle and Bicycle Parking table dated 6/5/23 (changes to table highlighted in yellow). The short-term (outside) bike parking plan is being optimized to take advantage of canopies attached to the building rather than providing stand alone, and more costly, bike shelters. A portion of the shortterm spaces will be located under the building canopies near the BHS south entrance and the BTC entrance, which will be more conveniently located next to the building entrances. This optimized bike parking plan still maintains 80 long term (indoor) spaces and increases short-term (outdoor) parking to 60 for a total of 140 bike parking spaces.

Bicycle parking is illustrated as distributed across the campus; at main entrances (two areas of substantial bike parking on both Institute Road entrance locations, at the north plaza entrance and adjacent to the technical center entrance.
Affirmative finding.



II. Conditions of Approval

1. Impact Fees shall be assessed for the gross new floor area. At the time of submission, 710 new sf were proposed (256,310 – 255,600 sf). Impact Fee assessment is:

SF of Project	710

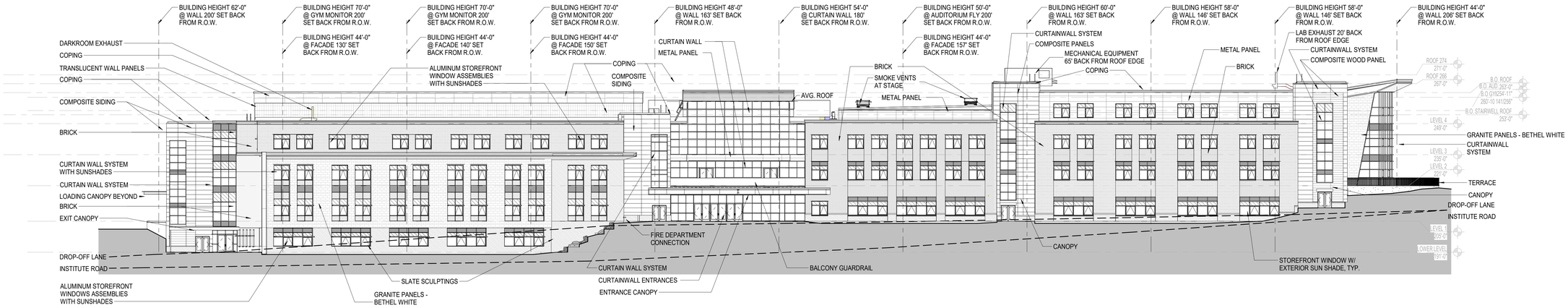
Department	Offices & Other Rate	Fee
Traffic	**0.771**	547.41
Fire	**0.227**	161.17
Police	**0.400**	284.00
Parks	**0.478**	339.38
Library	**0.000**	0.00
Schools	**0.000**	0.00
Total	1.876	**$ 1,331.96**

Impact Fees shall be paid at least 7 days prior to occupancy.

2. **Per Section 2.7.8 Withhold Permit,** the applicant is required to remedy all violations and close out all zoning permits issued after July 13, 1989 prior to issuance of a Certificate of Occupancy for this permit. There are a number of zoning permits that require Certificates of Occupancy.
3. All conditions of ZP-22-546 not specifically altered herein shall remain in effect.
4. The project will have a **four year permit life**. If the applicant team deems appropriate, a **phasing schedule** may accompany the application. This request should define the intended project segments and anticipated timing of each, which will, if approved by the DRB, allow for individual Certificates of Occupancy as each is completed.

5. **Confirmation of approval of the revised plan shall be required from the Stormwater Engineer prior to release of the zoning permit.**
6. The number and arrangement of the accessible parking spaces will need review by the building official for compliance with ADA.
7. Parking spaces in front of the building shall be limited to handicap and short term visitor spaces.
8. As part of the **Transportation Demand Management Plan** (to identify, encourage, promote and support different modes of transit) a Transportation Coordinator shall be identified. Both requirements of 8.1.16 b) (b) i. and ii are required, unless the applicant *maintains an ongoing and active membership in a Transportation Management Association (TMA) that offers equivalent TDM strategies or better.*
9. Trash and recycling bins and dumpsters shall be located, within preferably, or behind buildings, enclosed on all four (4) sides to prevent blowing trash, and screened from public view.
10. New electrical service shall be undergrounded.
11. Standard Permit Conditions 1-15.

NOTE: These are staff comments only. The Development Review Board, who may approve, table, modify, or deny projects, makes decisions.



1 PR-900 SCALE: 1" = 20'-0"

SOUTH ELEVATION ZONING OVERVIEW_BACKUP

2 PR-900 SCALE: 1" = 20'-0"

WEST ELEVATION ZONING OVERVIEW_BACKUP

3 PR-900 SCALE: 1" = 20'-0"

EAST ELEVATION ZONING OVERVIEW_BACKUP

4 PR-900 SCALE: 1" = 20'-0"

NORTH ELEVATION ZONING OVERVIEW_BACKUP

GRAPHIC SCALE : 1/8" = 1'-0"
0 4' 8' 16'

NOT FOR CONSTRUCTION

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CLA
Colin Lindberg Architects
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(802) 864-4950

DRA
Drummey Rosane Anderson, Inc.
Harvard Click Building
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Boston, MA 02114
617.964.1700
www.drainc.com

06/02/2023 - PRINT

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: Proj #2170

ORIGINATION DATE: 06/02/2023 | SCALE: As indicated

DRAWN BY: BDL | CHECKED BY: AH

ISSUE LOG: 06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS: ZONING ELEVATIONS

SHEET NO: PR-900

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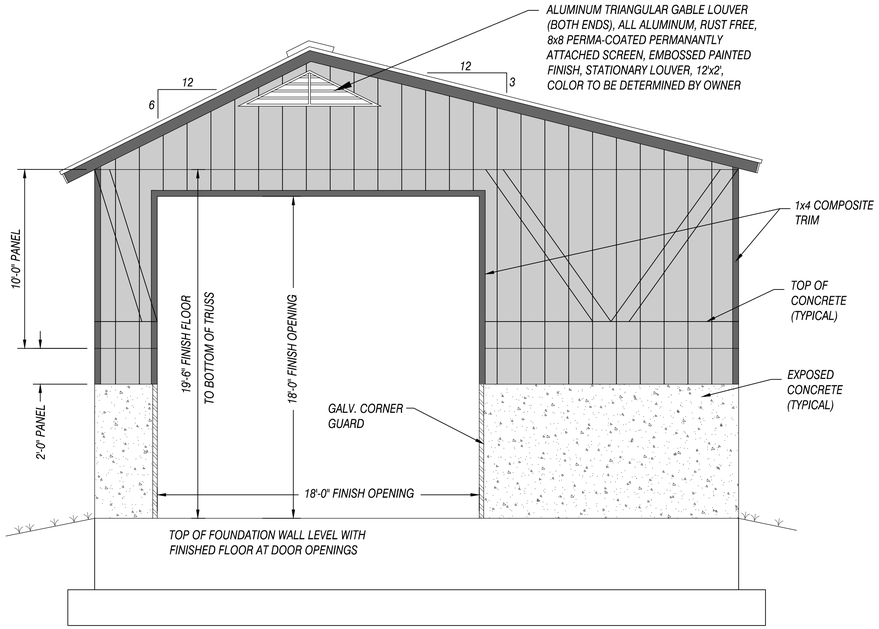
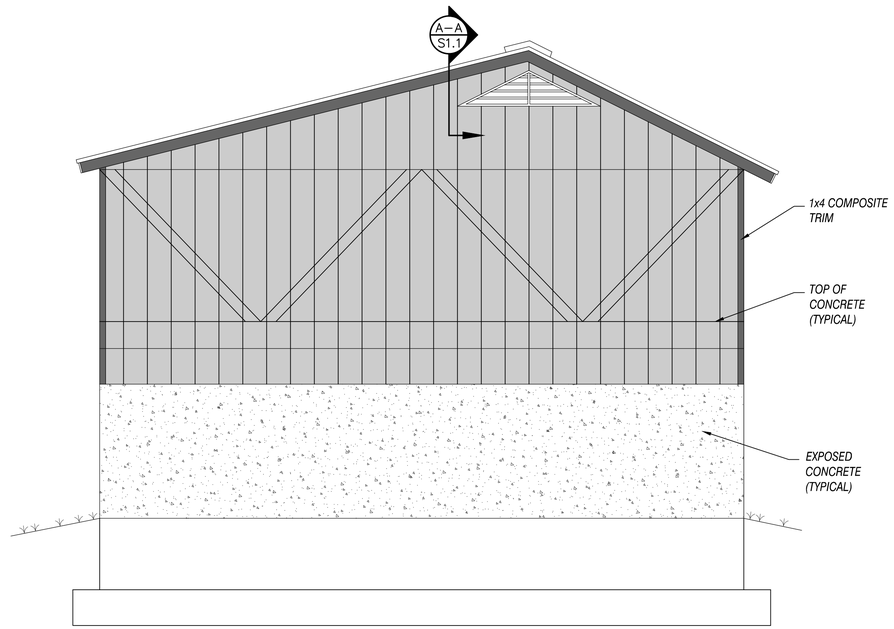
6/1/2023 1:22:54 PM



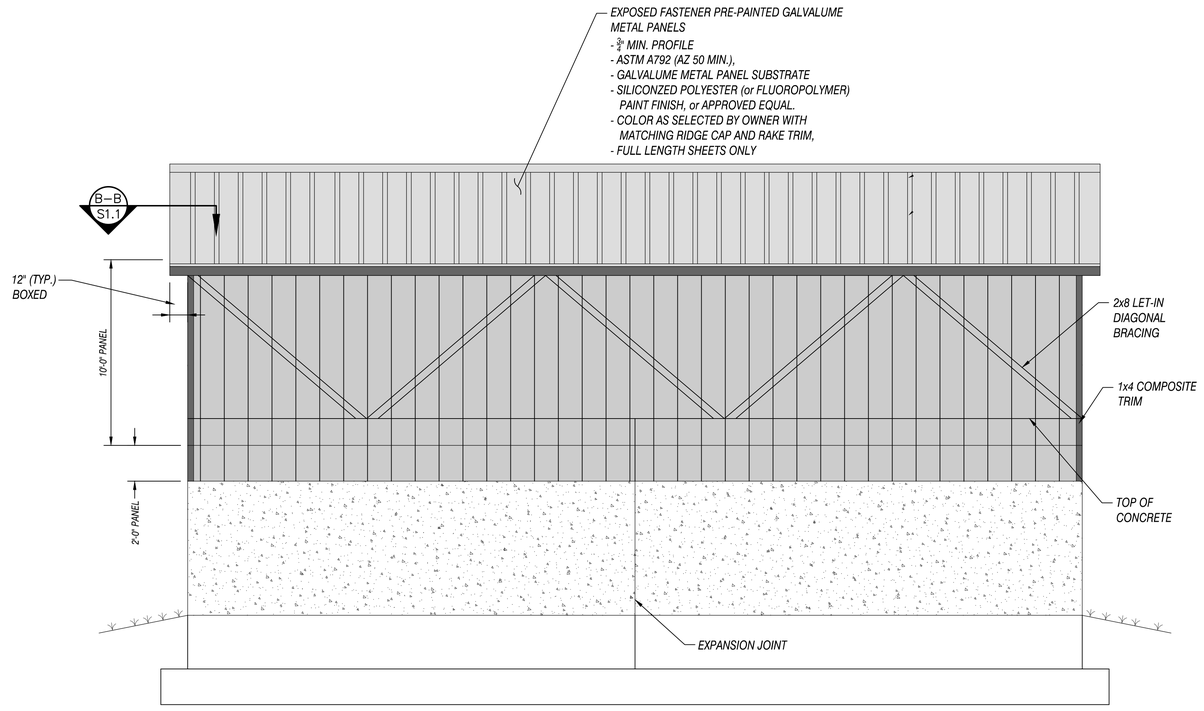
FRONT ELEVATION

1/4" = 1'-0"



BACK ELEVATION

1/4" = 1'-0"



SIDE ELEVATION

1/4" = 1'-0"

50% CD PROGRESS SET
-
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Colin Lindberg Architects
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DRA
Dreamway Roxanne Anderson, Inc.
Howard Clock Building
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Northern, MA 02053
617.864.1700
www.dranwc.com

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

PROPOSED SALT SHED

BURLINGTON, VT

FFF PROJECT NO: 21255	
ORIGINATION DATE: 04/28/2023	SCALE: AS SHOWN
DRAWN BY: MAB	CHECKED BY: BCE
ISSUE LOG:	

SHEET CONTENTS:
ELEVATIONS

SHEET NO:
S1.3

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white + burke
REAL ESTATE ADVISORS

M E M O R A N D U M

To: Mary O'Neil, Principal Planner
Scott Gustin, Principal Planner & Asst. Administrative Officer

From: Joe Weith, Senior Project Manager

Date: June 5, 2023

Re: BHS | BTC – Narrative for Amendment to ZP-22-546

This application is to amend ZP-22-546 for reconstruction of the Burlington High School/Burlington Technical Center ("BHS/BTC") property at 52 Institute Road. As final design has progressed, several relatively minor changes have been made to the plans approved by the Development Review Board (DRB) in November 2022. This narrative provides a description of the changes made to the plans since the DRB approval.

Project Square Footage - The size of the project has increased by 6,960 square feet. The BHS/BTC building increased from 250,000 sf to 256,310 sf, the greenhouse from 600 sf to 1,250 sf; the former wood chip plant building remains the same at 3,265 sf. While the BHS/BTC building footprint remains almost exactly the same, adjustments to the commons and auditorium (3 story spaces) resulted in a slight increase to interior floor area. The number of classrooms and instructional spaces remains the same, therefore, no change to student capacity.

Grading Plan – The grading plan has been revised in the areas of the north parking lot and west of the former wood chip plant building. There is a significant amount of ledge near the north parking lot. The plan approved in November proposed significant blasting on the north, south and east sides of the north parking tray to create a sloped grade. To reduce the amount of blasting, and cost, we are now proposing exposed rock walls instead of sloped grades on the north, south and east sides of the north parking tray (see sheet C2.3 in the civil plans set). The rock wall and revised grading to the east of the parking tray will result in less tree removal and less impact to the Arms Forest. As shown

on sheet WS2 in the civil plans set, the revised grading will reduce the area of tree removal from 4,155 sf (approved in November) to 1,820 sf.

The currently unused area west of the former wood chip plant building will be cleaned up and regraded. It currently consists of a mix of unsightly scrub trees and bushes. The revised plan is to regrade and seed this area with lawn.

Maintenance Building – The proposed maintenance building on the northernmost portion of the site will be relocated and attached to the former wood chip plant building. This will reduce the area of tree removal and impact to the Arms forest.

Salt Shed – A salt shed is proposed in an area of existing pavement north of the former wood chip plant building. The shed will have 4 walls and covered and the floor will be designed to prevent any salt runoff from leaving the building (see salt shed elevations).

Greenhouse – The proposed greenhouse will be increased in size from 600 sf (approved in November) to 1,250 sf.

New ADA Compliant Sidewalk – A sidewalk is being added on the south side of the building near Institute Road to improve ADA accessibility to the building's main southern entrance.

GMT Bus Shelter – The bus shelter on the west side of North Avenue is being moved further north at the request of GMT (see sheet C2.5 in the civil plans set).

Outdoor Learning Area – The size of the outdoor learning/activity area east of the building will be slightly reduced in size (see sheet C2.5 in the civil plans set).

Courtyard Patio – The courtyard patio is proposed to be slightly reconfigured (see sheet C2.5 in the civil plans set). DPW staff have been involved in discussions with GMT and are fine with moving the bus stop as shown.

Roof Plan – The roof plan has been revised to eliminate green roofs (see attached BHS/BTC roof plan). After further review, it was determined that the green roof would present significant ongoing maintenance concerns in terms of time and cost. It was also determined that it would not provide the benefits often cited with green roofs; storm water system design was not able to be reduced, building energy modeling revealed it had negligible impact on energy consumption, and it made compliance with LEED credits more challenging.

Lot Coverage – Total lot coverage is increasing by 1,367 square feet. In addition to the new ADA compliant sidewalk, a small area of impervious is being added to the south

side of the loading dock parking lot near an electrical transformer. While lot coverage is slightly increasing, total lot coverage remains at about 27% (60% max lot coverage allowed).

Building Height – The only change to building height and elevations is to the auditorium portion of the building (see south elevation on sheet PR-900). The height of the auditorium will be reduced by 10 feet. The maximum building heights along North Avenue and Institute Road will not change from what was approved in November.

Vehicle Parking – Total number of vehicle parking spaces is being reduced by 9 spaces from 362 spaces (approved in November) to 353 spaces. See attached Vehicle and Bicycle Parking table dated 6/5/23 (changes to table highlighted in yellow). 9 spaces have been removed north of the former wood chip plant building to provide room and allow for access to the relocated maintenance building.

Bike Parking – Total number of bike parking spaces is being increased by 4 spaces from 136 spaces (approved in November) to 140 spaces. See attached Vehicle and Bicycle Parking table dated 6/5/23 (changes to table highlighted in yellow). The short-term (outside) bike parking plan is being optimized to take advantage of canopies attached to the building rather than providing stand alone, and costly, bike shelters. A portion of the short-term spaces will be located under the building canopies near the BHS south entrance and the BTC entrance, which will be more conveniently located next to the building entrances. This optimized bike parking plan still maintains 80 long-term (indoor) spaces and increases short-term (outdoor) parking to 60, for a total of 140 bike parking spaces.

Utility Plans – Attached are the utility plans overlaid on the new site and grading plans (see sheets C3.0 – C3.2 in civil plans set). A second ground mounted electrical transformer is proposed; both transformers are located next to the loading dock parking lot. While the overall utility plan is still the same, the exact locations of water, sewer and gas lines have been slightly shifted in certain locations.

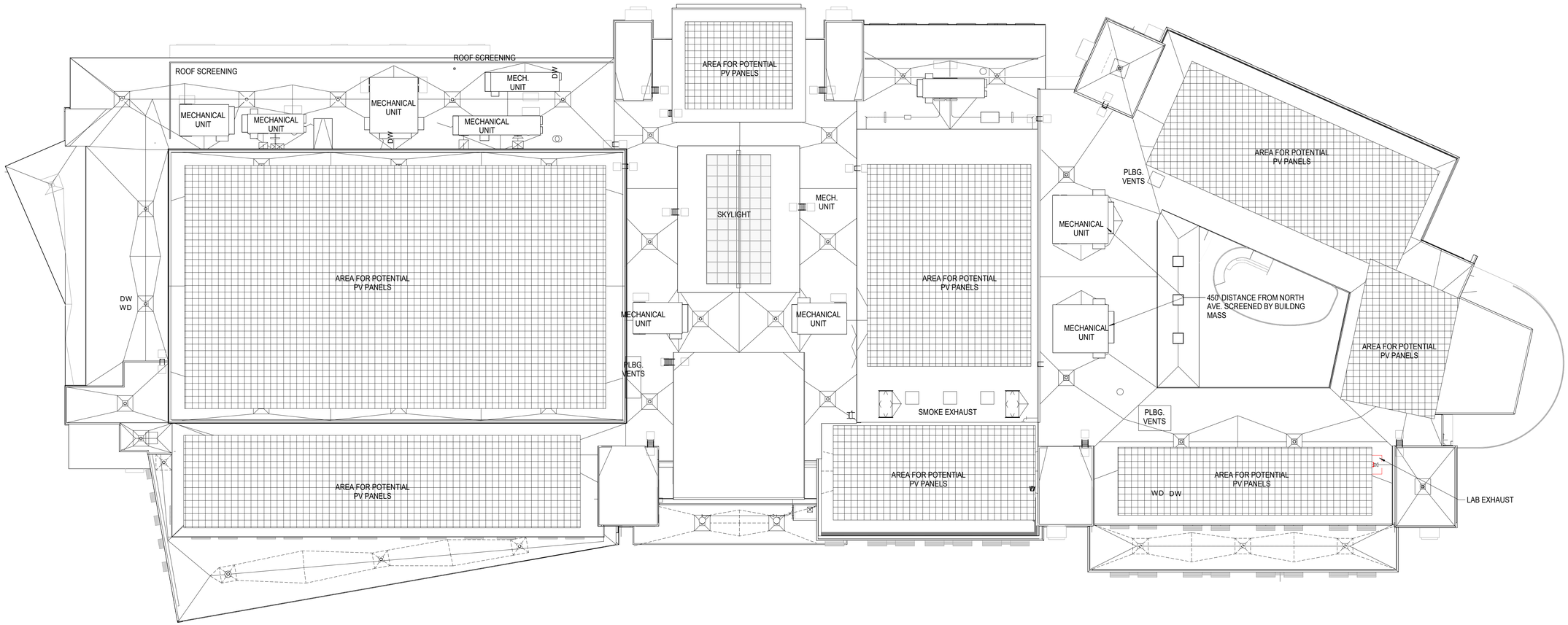
Landscaping and Lighting Plans – The attached landscaping plan (L-300 – L-305 in LA drawings set) has been revised to incorporate recommendations by the City Arborist. This was a condition of the DRB's November approval.

Attached are the lighting plans (L-400 – L-404 in LA drawings set) overlaid on the new site and grading plans. There is no change to the statistical area summary table (sheet L-400) approved by the DRB in November.

EPSC Site Plan – The EPSC site plan has been slightly revised to address the new grading area north of the north parking tray (see sheet C4.0 in the civil plans set).

Civil Detail Sheets – We are resubmitting detail sheets C4.4 – C4.7 and C5.0 – C5.4 as several minor changes have been made. For example:

- Sheet numbers for C4.3 – C4.5 changed.
- Bike rack and bollard details on C5.0 moved to the landscape plan detail sheets.
- Added loading dock concrete and concrete under brick pavers details to C5.0.
- Hydraulic inlet detail removed and geothermal well manhole detail added to C5.1.
- Added sprinkler backflow prevention and City of Burlington water system details to C5.2.
- Moved light pole detail to landscape/lighting details sheet and added ledge wall details to C5.3.
- C5.4 is a new detail sheet.



BURLINGTON SCHOOL DISTRICT

BHS | BTC

06/02/2023

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LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- 100 EXISTING CONTOUR
- EXISTING CURB
- X EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- OE EXISTING OVERHEAD ELECTRIC
- UE EXISTING UNDERGROUND ELECTRIC
- COM EXISTING UNDERGROUND COMMUNICATIONS
- FM EXISTING FORCEMAIN
- G EXISTING GAS
- ST EXISTING STORM
- S EXISTING GRAVITY SEWER
- T EXISTING TELEPHONE
- W EXISTING WATER
- EXISTING SWALE
- STREAM
- EXISTING SEWER MANHOLE
- EXISTING STORM MANHOLE
- EXISTING CATCH BASIN
- EXISTING HYDRANT
- EXISTING SHUT OFF
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING GUY WIRE/POLE
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- IRON ROD/PIPE FOUND
- PROJECT BENCHMARK
- 100 PROPOSED CONTOUR
- PROPOSED CURB
- PROPOSED GRAVEL
- PROPOSED PAVEMENT
- FO PROPOSED COMMUNICATION
- UE PROPOSED ELECTRIC
- G PROPOSED GAS
- ST PROPOSED STORM
- FD PROPOSED FOUNDATION DRAIN
- S PROPOSED GRAVITY SEWER
- W PROPOSED WATER
- PROPOSED SWALE
- PROPOSED STORM MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED YARD DRAIN
- PROPOSED HYDRANT
- PROPOSED SHUT OFF
- PROPOSED SIGN
- PROPOSED GEOTHERMAL WELL
- PROPOSED UTILITY POLE

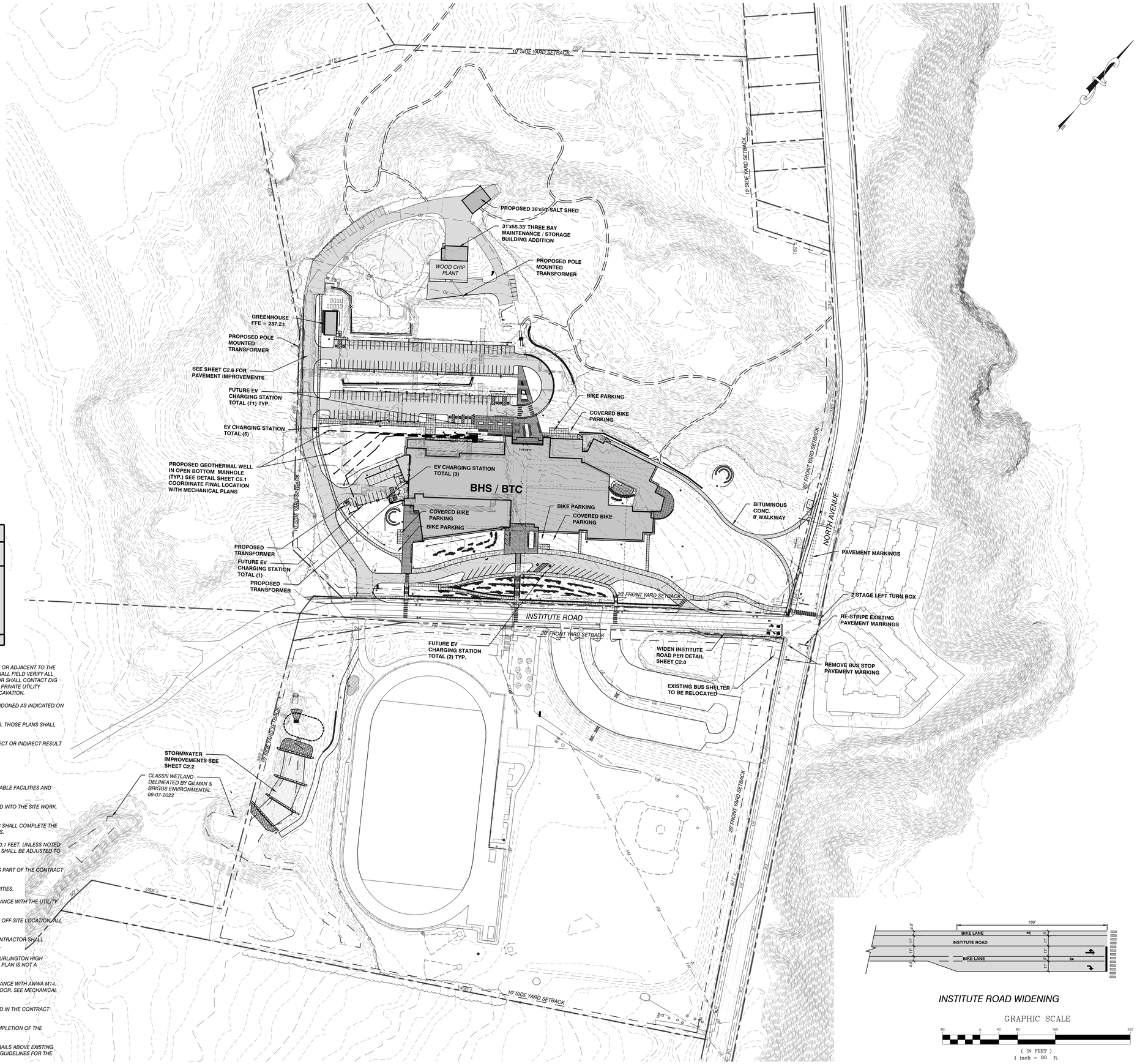
ZONING REQUIREMENTS:

ZONING DISTRICT: INSTITUTIONAL DISTRICT

CATEGORY	REQUIRED	EXISTING	PROPOSED
PARCEL		48.7± AC. 2,121,372± S.F.	48.7± AC. 2,121,372± S.F.
SETBACK			
FRONT YARD	20'		
NORTH AVE.		570'±	318'
INSTITUTE RD.		131'±	124'
SIDE YARD	10'		
WEST		11'±	60'±
NORTH		455'±	293±
LOT COVERAGE	60% MAX.	27%	27%

GENERAL NOTES

1. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION. IN ADDITION, THE CONTRACTOR SHALL HIRE A PRIVATE UTILITY LOCATING FIRM TO LOCATE OWNER OWNED UNDERGROUND UTILITIES PRIOR TO START OF ANY EXCAVATION.
2. ALL EXISTING UTILITIES NOT INCORPORATED INTO THE FINAL DESIGN SHALL BE REMOVED OR ABANDONED AS INDICATED ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. THE CONTRACTOR SHALL MAINTAIN AS-BUILT PLANS (WITH TIES) FOR ALL UNDERGROUND UTILITIES. THOSE PLANS SHALL BE SUBMITTED TO THE OWNER AT THE COMPLETION OF THE PROJECT.
4. THE CONTRACTOR SHALL REPAIR/RESTORE ALL DISTURBED AREAS (ON OR OFF THE SITE) AS A DIRECT OR INDIRECT RESULT OF THE CONSTRUCTION.
5. ALL GRASSED AREAS SHALL BE MAINTAINED UNTIL FULL VEGETATION IS ESTABLISHED.
6. MAINTAIN ALL TREES OUTSIDE OF CONSTRUCTION LIMITS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY FOR COMPLETE AND OPERABLE FACILITIES AND UTILITIES.
8. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL ITEMS AND MATERIALS INCORPORATED INTO THE SITE WORK. WORK SHALL NOT BEGIN ON ANY ITEM UNTIL SHOP DRAWING APPROVAL IS GRANTED.
9. IN ADDITION TO THE REQUIREMENTS SET IN THESE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL COMPLETE THE WORK IN ACCORDANCE WITH ALL PERMIT CONDITIONS AND ANY LOCAL PUBLIC WORKS STANDARDS.
10. THE TOLERANCE FOR FINISH GRADES FOR ALL PAVEMENT, WALKWAYS AND LAWN AREAS SHALL BE 0.1 FEET. UNLESS NOTED OTHERWISE, ALL EXISTING MANHOLE COVERS, VALVES, CURB STOPS AND OTHER ITEMS TO REMAIN SHALL BE ADJUSTED TO THE NEW FINISH GRADE.
11. ANY DEWATERING NECESSARY FOR THE COMPLETION OF THE SITEWORK SHALL BE CONSIDERED AS PART OF THE CONTRACT AND SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
12. THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN TOWN ROAD R.O.W. WITH TOWN AUTHORITIES.
13. THE CONTRACTOR SHALL INSTALL THE ELECTRICAL, CABLE AND TELEPHONE SERVICES IN ACCORDANCE WITH THE UTILITY COMPANIES REQUIREMENTS.
14. EXISTING PAVEMENT AND TREE STUMPS TO BE REMOVED SHALL BE DISPOSED OF AT AN APPROVED OFF-SITE LOCATION. ALL PAVEMENT CUTS SHALL BE MADE WITH A PAVEMENT SAW.
15. IF THERE ARE ANY CONFLICTS OR INCONSISTENCIES WITH THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR VERIFICATION BEFORE WORK CONTINUES ON THE ITEM IN QUESTION.
16. PROPERTY LINE INFORMATION IS BASED ON A PLAN ENTITLED "EXISTING CONDITIONS SURVEY OF BURLINGTON HIGH SCHOOL AND BURLINGTON TECHNICAL CENTER" PREPARED BY AES NORTHEAST DATED 2014. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO BE USED AS ONE.
17. IF THE BUILDING IS TO BE SPRINKLERED, BACKFLOW PREVENTION SHALL BE PROVIDED IN ACCORDANCE WITH AWWA M14. THE SITE CONTRACTOR SHALL CONSTRUCT THE WATER LINE TO TWO FEET ABOVE THE FINISHED FLOOR. SEE MECHANICAL PLANS FOR RISER DETAIL.
18. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING TESTING AND INSPECTION SERVICES INDICATED IN THE CONTRACT DOCUMENTS, TYPICAL FOR CONCRETE AND SOIL TESTING.
19. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT AND FIELD ENGINEERING REQUIRED FOR COMPLETION OF THE PROJECT. CIVIL ENGINEERING ASSOCIATES WILL PROVIDE AN AUTOCAD FILE WHERE APPLICABLE.
20. THE OWNER SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ANY AND ALL SAFETY FENCES OR RAILS ABOVE EXISTING AND PROPOSED WALLS. THE OWNER SHALL VERIFY LOCAL, STATE AND INSURANCE REQUIREMENT GUIDELINES FOR THE INSTALLATION AND VERIFY ANY AND ALL PERMITTING REQUIREMENTS.



INSTITUTE ROAD WIDENING

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE: 06/02/2023
SCALE: 1" = 80
DRAWN BY: MAB
CHECKED BY: DSM

ISSUE LOG:
06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS:
OVERALL PROPOSED SITE PLAN

SHEET NO:
C2.0

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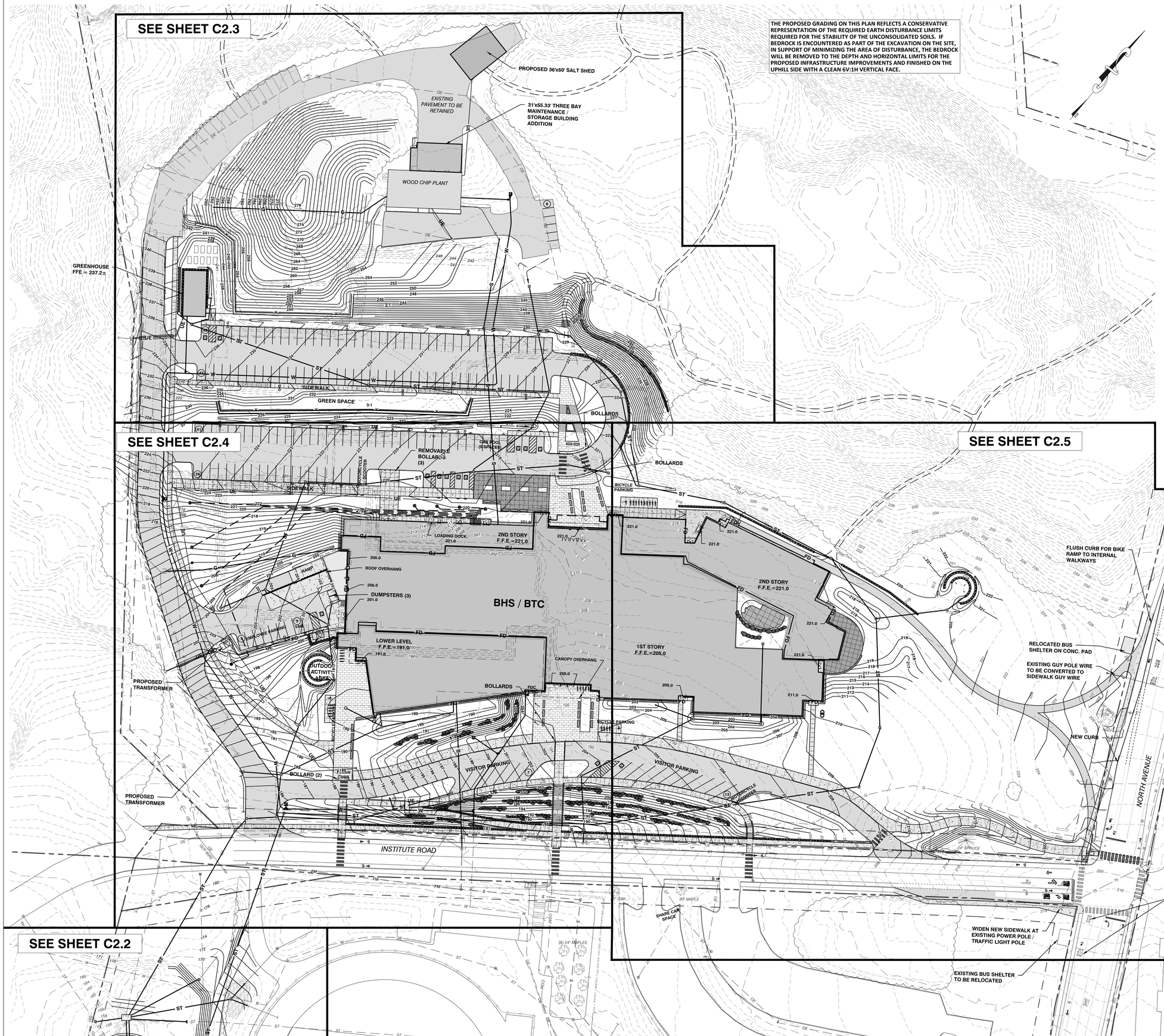

LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- EXISTING CONTOUR
- EXISTING CURB
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- EXISTING OVERHEAD ELECTRIC
- EXISTING UNDERGROUND ELECTRIC/COMMUNICATIONS
- EXISTING FORCEMAIN
- EXISTING GAS
- EXISTING STORM
- EXISTING GRAVITY SEWER
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- EXISTING LIGHT POLE
- EXISTING GUY WIRE/POLE
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- IRON ROD/PIPE FOUND
- PROJECT BENCHMARK
- PROPOSED CONTOUR
- PROPOSED CURB
- PROPOSED GRAVEL
- PROPOSED PAVEMENT
- PROPOSED COMMUNICATION
- PROPOSED ELECTRIC
- PROPOSED GAS
- PROPOSED STORM
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- PROPOSED SHUT OFF
- PROPOSED SIGN
- PROPOSED GEOTHERMAL WELL
- PROPOSED UTILITY POLE

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE:	SCALE:
06/02/2023	1" = 40
DRAWN BY: MAB	CHECKED BY: DSM

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06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS:
PROPOSED GRADING AND DRAINAGE NORTH

SHEET NO:
C2.1

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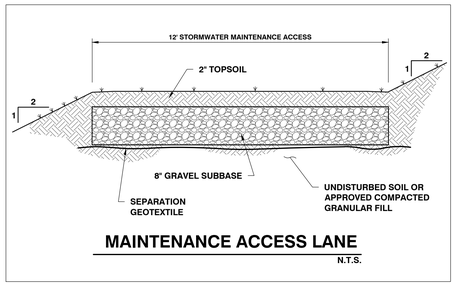


MAINTENANCE ACCESS LANE

N.T.S.

PLANTING NOTES:

1. EACH COIR LOG SHALL HAVE 'STREAMCO' PURPLEOSIER WILLOW (SALIX PURPUREA L.) ROOTED CUTTINGS LIVE-STAKED VERTICALLY IN THE TOP OF THE LOG AT 2' TO 2.5' CENTERS (380 TOTAL. PLANTINGS SHALL BE DONE IN THE EARLY SPRING OF THE YEAR PRIOR TO MAY 1.
2. THE AREA OF THE ACCESS DRIVE SHALL BE SEEDED WITH COMMERCIALLY AVAILABLE TURF GRASS (LAWN SEED) AT A RATE OF 3 LB. PER 1000 S.F. (7.2 LBS TOTAL)
3. ALL OTHER DISTURBED AREAS SHALL BE SEEDED WITH VERMONT WETLAND SUPPLY CONSERVATION MIX AT A RATE OF 1 LB. PER 12000 S.F. (6.25 LBS TOTAL)

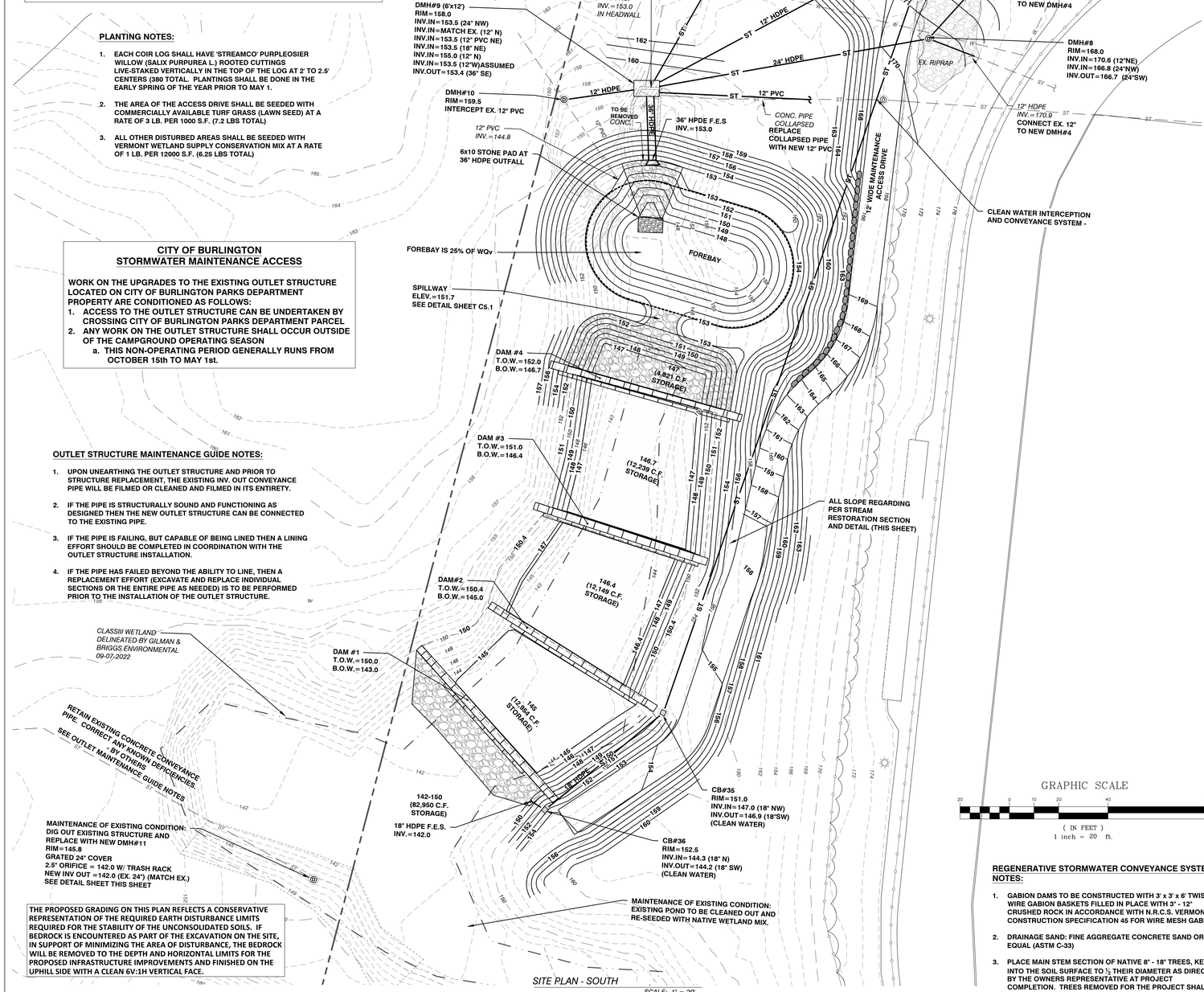
CITY OF BURLINGTON STORMWATER MAINTENANCE ACCESS

WORK ON THE UPGRADES TO THE EXISTING OUTLET STRUCTURE LOCATED ON CITY OF BURLINGTON PARKS DEPARTMENT PROPERTY ARE CONDITIONED AS FOLLOWS:

1. ACCESS TO THE OUTLET STRUCTURE CAN BE UNDERTAKEN BY CROSSING CITY OF BURLINGTON PARKS DEPARTMENT PARCEL
2. ANY WORK ON THE OUTLET STRUCTURE SHALL OCCUR OUTSIDE OF THE CAMPGROUND OPERATING SEASON
   a. THIS NON-OPERATING PERIOD GENERALLY RUNS FROM OCTOBER 15th TO MAY 1st.

OUTLET STRUCTURE MAINTENANCE GUIDE NOTES:

1. UPON UNEARTHING THE OUTLET STRUCTURE AND PRIOR TO STRUCTURE REPLACEMENT, THE EXISTING INV. OUT CONVEYANCE PIPE WILL BE FILMED OR CLEANED AND FILMED IN ITS ENTIRETY.
2. IF THE PIPE IS STRUCTURALLY SOUND AND FUNCTIONING AS DESIGNED THEN THE NEW OUTLET STRUCTURE CAN BE CONNECTED TO THE EXISTING PIPE.
3. IF THE PIPE IS FAILING, BUT CAPABLE OF BEING LINED THEN A LINING EFFORT SHOULD BE COMPLETED IN COORDINATION WITH THE OUTLET STRUCTURE INSTALLATION.
4. IF THE PIPE HAS FAILED BEYOND THE ABILITY TO LINE, THEN A REPLACEMENT EFFORT (EXCAVATE AND REPLACE INDIVIDUAL SECTIONS OR THE ENTIRE PIPE AS NEEDED) IS TO BE PERFORMED PRIOR TO THE INSTALLATION OF THE OUTLET STRUCTURE.



SITE PLAN - SOUTH

SCALE: 1" = 20'

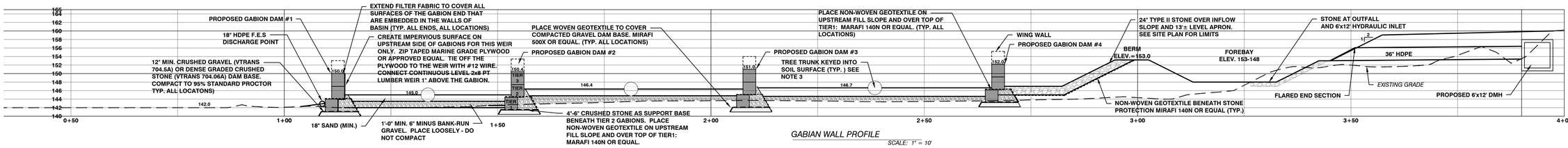
GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

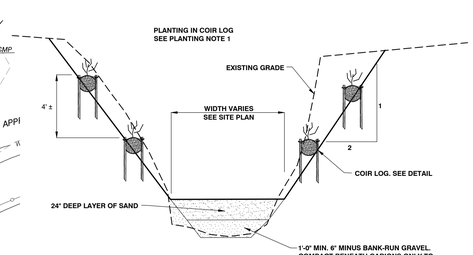
REGENERATIVE STORMWATER CONVEYANCE SYSTEM NOTES:

1. GABION DAMS TO BE CONSTRUCTED WITH 3' x 3' x 6' TWISTED WIRE GABION BASKETS FILLED IN PLACE WITH 3" - 12" CRUSHED ROCK IN ACCORDANCE WITH N.R.C.S. VERMONT CONSTRUCTION SPECIFICATION 45 FOR WIRE MESH GABIONS.
2. DRAINAGE SAND: FINE AGGREGATE CONCRETE SAND OR EQUAL (ASTM C-33)
3. PLACE MAIN STEM SECTION OF NATIVE 8" - 18" TREES, KEYED INTO THE SOIL SURFACE TO ½ THEIR DIAMETER AS DIRECTED BY THE OWNERS REPRESENTATIVE AT PROJECT COMPLETION. TREES REMOVED FOR THE PROJECT SHALL BE SET ASIDE AT PROJECT COMMENCEMENT FOR THIS PURPOSE.



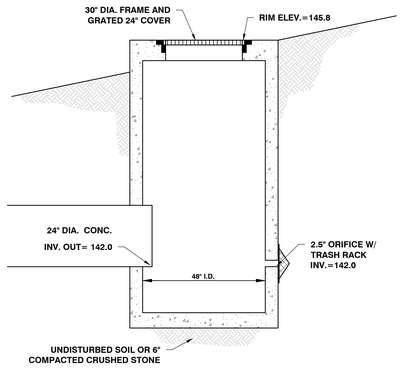
GABIAN WALL PROFILE

SCALE: 1" = 10'



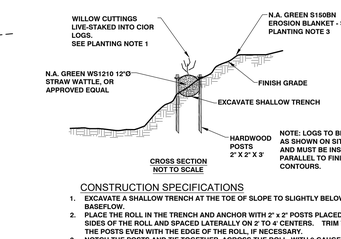
TYPICAL SECTION - STREAM RESTORATION

NOT TO SCALE



POND OUTLET STRUCTURE

MAINTENANCE ITEM N.T.S.

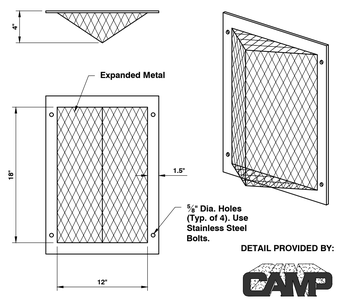


CONSTRUCTION SPECIFICATIONS

1. EXCAVATE A SHALLOW TRENCH AT THE TOE OF SLOPE TO SLIGHTLY BELOW BASEFLOW.
2. PLACE THE ROLL IN THE TRENCH AND ANCHOR WITH 2" x 2" POSTS PLACED ON BOTH SIDES OF THE ROLL AND SPACED LATERALLY ON 2' TO 4' CENTERS. TRIM THE TOP OF THE POSTS EVEN WITH THE EDGE OF THE ROLL, IF NECESSARY.
3. NOTCH THE POSTS AND TIE TOGETHER, ACROSS THE ROLL, WITH 9 GAUGE GALVANIZED WIRE OR 1/8" DIAMETER BRAIDED NYLON ROPE.
4. PLACE SOIL EXCAVATED FROM THE TRENCH BEHIND THE ROLL AND HAND TAMP. PLANT WILLOW CUTTINGS IN LOG AS SPECIFIED. SEE PLANTING NOTE 3.

DETAIL - COIR LOG BANK STABILIZATION

NOT TO SCALE



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PRECAST CONCRETE PRODUCTS
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TOLL FREE 1.888.299.2401 FAX 802.893.1542

ORIFICE TRASH RACK (12"X18")

N.T.S.

GABION DAM LAYOUT

SCALE: 1" = 10'

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE: 06/02/2023 | SCALE: 1" = 20

DRAWN BY: MAB | CHECKED BY: DSM

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SHEET CONTENTS:

PROPOSED GRADING AND DRAINAGE SOUTH

SHEET NO:

C2.2

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LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- 100 EXISTING CONTOUR
- EXISTING CURB
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- OE EXISTING OVERHEAD ELECTRIC
- UE EXISTING UNDERGROUND ELECTRIC
- COM EXISTING UNDERGROUND COMMUNICATIONS
- FM EXISTING FORCEMAIN
- G EXISTING GAS
- ST EXISTING STORM
- S EXISTING GRAVITY SEWER
- T EXISTING TELEPHONE
- W EXISTING WATER
- EXISTING SWALE
- STREAM
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- EXISTING STORM MANHOLE
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- PROPOSED GRAVEL
- PROPOSED PAVEMENT
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- UE PROPOSED ELECTRIC
- G PROPOSED GAS
- ST PROPOSED STORM
- FD PROPOSED FOUNDATION DRAIN
- S PROPOSED GRAVITY SEWER
- W PROPOSED WATER
- PROPOSED SWALE
- PROPOSED STORM MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED YARD DRAIN
- PROPOSED HYDRANT
- PROPOSED SHUT OFF
- PROPOSED SIGN
- PROPOSED GEOTHERMAL WELL
- PROPOSED UTILITY POLE

CAR POOL BETWEEN SIGNS

R7-1 (MOD.) 12"x18"

PROPOSED 36'x50' SALT SHED

EXISTING PAVEMENT TO BE RETAINED

31'x55.33' THREE BAY MAINTENANCE / STORAGE BUILDING ADDITION

WOOD CHIP PLANT

LEDGE (TYP.)

RAISED BEDS

PROPOSED WALL T.O.W.=239.5 B.O.W. = 237.0 SEE DETAIL SHEET CS.3

SEE SHEET C2.7 FOR WALL PROFILE

GREENHOUSE FFE = 237.2±

FFE=237.2

T.O.W.=238.5 B.O.W. = 237.0

APPROX. TOP OF LEDGE = 253±

APPROX. TOP OF LEDGE = 249±

CURTAIN DRAIN SEE DETAIL SHEET CS.1

YD#3 RIM=236.4 INV. IN=233.0 (4" W) INV. OUT=230.4 (12" SE)

YD#4 RIM=236.4 INV.IN=230.2 (12" NW) INV. OUT=229.8 (12" S)

PROPOSED LEDGE WALL 6'V:1'H. (ACTUAL LOCATION TO BE FIELD VERIFIED) WITH FENCE (275 LF.±)

CB#33 RIM=236.2 INV. IN=229.6 (12" N) INV.IN=230.0 (4" W) INV. OUT=229.5 (15"E)

PROPOSED LEDGE WALL 6'V:1'H.(ACTUAL LOCATION TO BE FIELD VERIFIED) WITH FENCE (295 L.F.±)

CB#32 RIM=231.5 INV.IN=227.4 (15"W) INV. OUT=227.3 (15"NE)

GREEN SPACE

APPROX. TOP OF LEDGE = 230±

PROPOSED GEOTHERMAL WELL IN OPEN BOTTOM MANHOLE (TYP.) SEE DETAIL SHEET C5.1 COORDINATE FINAL LOCATION WITH MECHANICAL PLANS

T.C. BC=224.0

CB#25 RIM=221.8 INV.IN= 210.6 (15"NE) INV.OUT= 210.5 (15" SE)

PROPOSED E/V CHARGER AND BOLLARDS (TYP.) SEE LANDSCAPE PLANS FOR DETAIL

CB#26 RIM=220.6 INV.IN=211.7 (15" NE) INV.OUT=211.6 (15" SW)

REMOVABLE BOLLARDS (3)

CB#27 RIM=218.0 INV.IN=213.0 (15" N) INV. OUT=212.9 (15" SW)

MOTORCYCLE SCORCHER

CAR POOL (5 SPACES)

CB#28 RIM=219.6 INV.IN= 215.2 (15" NE) INV. OUT = 215.1 (15"SW)

SS INV.=247.0 (ASSUMED)

SS INV.=210.8 (ASSUMED)

CB#34 RIM=249.1 INV.OUT= 232.9 (15"SE)

CB#1 RIM=227.6 INV. OUT=223.0 (15"NE)

CB#2 RIM=229.9 INV.IN=222.6 (15"W) INV. OUT=222.5 (15"E)

CLEAN WATER INTERCEPTION AND CONVEYANCE SYSTEM

TW=248.0 BW=247.0

TW=236.0 BW=235.0

APPROX. TOP OF LEDGE = 245±

DMH#1 RIM=229.0 INV.IN=225.4 (15"SW) INV. OUT=225.3 (15"NE)

DMH#2 RIM=224.2 INV.IN=221.6 (15"NW) INV. OUT=221.5 (15"SE)

PROPOSED LEDGE WALL 6'V:1'H (ACTUAL LOCATION TO BE FIELD VERIFIED) WITH FENCE (210 LF.±)

TW=246.0 BW=243.0

CB#31 RIM=227.2 INV.IN=223.0 (15"SW) INV.IN=223.0 (15"NW) INV. OUT=222.9 (15"S)

CB#30 RIM=217.6 INV.IN=214.0 (15" N) INV. OUT=213.9 (15" S)

DMH#3 RIM=220.5 INV.IN=213.8 (15"W) INV. OUT=213.7 (15"NE)

CB#29 RIM=221.0 INV. OUT=215.6 (15"SW)

CB#3 RIM=219.4 INV.IN=215.0 (15"NW) INV.IN=215.0 (12"W) INV. OUT=214.9 (15"NE)

CURTAIN DRAIN W-12" PERF. PVC.

TRANSITION CURB AT ALL FLUSH CURBS (TYP.)

BOLLARDS

BICYCLE PARKING

CONCRETE SCORE PATTERN SEE LANDSCAPE PLAN

CONCRETE SIDEWALK BROOMED CONCRETE SIDEWALK

LOADING DOCK 221.0

2ND STORY F.F.E.=221.0

BUILDING OVERHANG ABOVE

CONC. RETAINING WALL W/ HANDRAIL (SEE LANDSCAPE PLANS) (76 LF.±)

2:1 SLOPE W/ MIN. 4" TOPSOIL

3:1

FLUSH CURB

8" DEPTH SIDEWALK

6' FLUSH CURB

3' FLUSH CURB

12" HDPE

15" HDPE

18" HDPE

ST

UE

FD

W

S

G

THE PROPOSED GRADING ON THIS PLAN REFLECTS A CONSERVATIVE REPRESENTATION OF THE REQUIRED EARTH DISTURBANCE LIMITS REQUIRED FOR THE STABILITY OF THE UNCONSOLIDATED SOILS. IF BEDROCK IS ENCOUNTERED AS PART OF THE EXCAVATION ON THE SITE, IN SUPPORT OF MINIMIZING THE AREA OF DISTURBANCE, THE BEDROCK WILL BE REMOVED TO THE DEPTH AND HORIZONTAL LIMITS FOR THE PROPOSED INFRASTRUCTURE IMPROVEMENTS AND FINISHED ON THE UPHILL SIDE WITH A CLEAN 6V:1H VERTICAL FACE.

(IN FEET) 1 inch = 20 ft.

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SHEET CONTENTS:

PARTIAL GRADING AND DRAINAGE - NORTH

SHEET NO: C2.3

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GRAPHIC SCALE

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- EXISTING LIGHT POLE
- EXISTING GUY WIRE/POLE
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- IRON ROD/PIPE FOUND
- PROJECT BENCHMARK
- 100 **PROPOSED CONTOUR**
- **PROPOSED CURB**
- **PROPOSED GRAVEL**
- **PROPOSED PAVEMENT**
- FO **PROPOSED COMMUNICATION**
- UE **PROPOSED ELECTRIC**
- G **PROPOSED GAS**
- ST **PROPOSED STORM**
- FD **PROPOSED FOUNDATION DRAIN**
- S **PROPOSED GRAVITY SEWER**
- W **PROPOSED WATER**
- **PROPOSED SWALE**
- **PROPOSED STORM MANHOLE**
- **PROPOSED CATCH BASIN**
- **PROPOSED YARD DRAIN**
- **PROPOSED HYDRANT**
- **PROPOSED SHUT OFF**
- **PROPOSED SIGN**
- **PROPOSED GEOTHERMAL WELL**
- **PROPOSED UTILITY POLE**

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FF PROJECT NO:	21255
ORIGINATION DATE:	06/02/2023
SCALE:	1" = 20'
DRAWN BY:	MAB
CHECKED BY:	DSM
ISSUE LOG:	06/02/2023 ISSUE FOR PERMIT

SHEET CONTENTS:

PARTIAL GRADING AND DRAINAGE NORTH

SHEET NO:

C2.4

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GRAPHIC SCALE
20 5 10 20 40 60
(IN FEET)
1 inch = 20 ft.

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THE PROPOSED GRADING ON THIS PLAN REFLECTS A CONSERVATIVE REPRESENTATION OF THE REQUIRED EARTH DISTURBANCE LIMITS REQUIRED FOR THE STABILITY OF THE UNCONSOLIDATED SOILS. IF BEDROCK IS ENCOUNTERED AS PART OF THE EXCAVATION ON THE SITE, IN SUPPORT OF MINIMIZING THE AREA OF DISTURBANCE, THE BEDROCK WILL BE REMOVED TO THE DEPTH AND HORIZONTAL LIMITS FOR THE PROPOSED INFRASTRUCTURE IMPROVEMENTS AND FINISHED ON THE UPHILL SIDE WITH A CLEAN 6V:1H VERTICAL FACE.

TRANSITION CURB AT ALL FLUSH CURBS (TYP.)

CB#29
RIM=221.0
INV. OUT=215.6 (15"SW)

CB#3
RIM=219.4
INV.IN=215.0 (15"NW)
INV.IN=215.0 (12"W)
INV. OUT=214.9 (15"NE)

DMH#3
RIM=220.5
INV.IN=213.8 (15"SW)
INV. OUT=213.7 (15"NE)

CONCRETE SIDEWALK
BITUMINOUS CONCRETE SIDEWALK

CURTAIN DRAIN
W/ 12" PERF. PVC.

CONCRETE SCORE PATTERN
SEE LANDSCAPE PLAN

6" PERF. SCH. 40

2ND STORY
F.F.E.=221.0

1ST STORY
F.F.E.=205.0

CB#4
RIM=219.0
INV.IN=212.3 (15"W)
INV.IN=214.6 (12" W & E)
INV. OUT=212.2 (15"SE)

CB#5
RIM=217.4
INV.IN=211.0 (15"NW)
INV.IN=211.0 (15" NE)
INV. OUT=210.9 (15"SE)

SEE SHEET C2.7
FOR DETAILED
ELEVATIONS

CB#5A
RIM=219.0
INV.IN=215.0 (4" UD)
INV. OUT=214.9 (15"SW)

CB#8
RIM=208.0
INV.OUT=200.8 (15"SE)

YD#1
RIM=202.9
INV.OUT=198.9 (12" SW)

CB#10
RIM=202.9
INV.IN =196.6 (15"NE)
INV.IN= 196.6 (12" W)
INV.IN=196.6 (6" FOUNDATION DRAIN)
INV.OUT=196.5 (15"SW)

DRIP EDGE PER
DETAIL SHEET C5.1

NEW 250 GAL.
UNDERGROUND
PROPANE TANK

CB#6
RIM=210.8
INV.IN=206.8 (15"NW)
INV. OUT=206.7 (15"SE)

4' SQ. SCORE PATTERN WITH
EXPANSION JOINT ALONG
FACE OF BUILDING ONLY

CB#9
RIM=202.9
INV.IN=199.9 (12" ROOF DRAIN)
INV.IN=197.4 (15"NW)
INV.OUT=197.3(15"SW)

CB#7
RIM=209.3
INV.IN=204.0 (15"NW)
INV. OUT=203.9 (15"SW)

10' PANELS

4" SOLID PVC
INV.=195.5

4" PERF. PVC

DMH#12
RIM=190.8

DMH#4
RIM=189.4
INV.IN=183.3 (15"NE)
INV.OUT=183.2 (15"SW)

CURTAIN DRAIN W/ 4" PERF. PVC

DMH#11
RIM=198.4

NEW CURB

BITUMINOUS CONC.
8' WALKWAY

END BITUMINOUS CONCRETE SIDEWALK

EXTEND BIKE LANE MARKINGS

FLUSH CURB FOR BIKE
RAMP TO INTERNAL
WALKWAYS

RELOCATED BUS SHELTER
ON CONC. PAD

EXISTING GUY POLE WIRE
TO BE CONVERTED TO
SIDEWALK GUY WIRE

MIN. 8:1 TAPER TO
RIGHT TURN LANE

PAVEMENT MARKINGS

NORTH AVENUE

2 STAGE LEFT TURN BOX

RE-STRIPE EXISTING
PAVEMENT MARKINGS

REMOVE BUS STOP
PAVEMENT MARKING

WIDEN INSTITUTE
ROAD PER DETAIL
SHEET C2.0

WIDEN NEW SIDEWALK AT
EXISTING POWER POLE /
TRAFFIC LIGHT POLE

EXISTING BUS SHELTER
TO BE RELOCATED

BICYCLE PARKING

VISITOR PARKING

SHARE CAR SPACE

MOTORCYCLE SCOOTER 40 FLUSH CURB

3:1 SLOPE
W/ MIN. 4" TOPSOIL

5' SCORE PATTERN

30" OAK

30" MAPLE

24" SPRUCE

LEDGE (TYP.)

LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- EXISTING CONTOUR
- EXISTING CURB
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- OE — EXISTING OVERHEAD ELECTRIC
- UE — EXISTING UNDERGROUND ELECTRIC
- COM — EXISTING UNDERGROUND COMMUNICATIONS
- FM — EXISTING FORCEMAIN
- G — EXISTING GAS
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- EXISTING SWALE
- STREAM
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- EXISTING STORM MANHOLE
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- EXISTING SHUT OFF
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GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

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SHEET CONTENTS: PARTIAL GRADING AND DRAINAGE - NORTH

SHEET NO: C2.5

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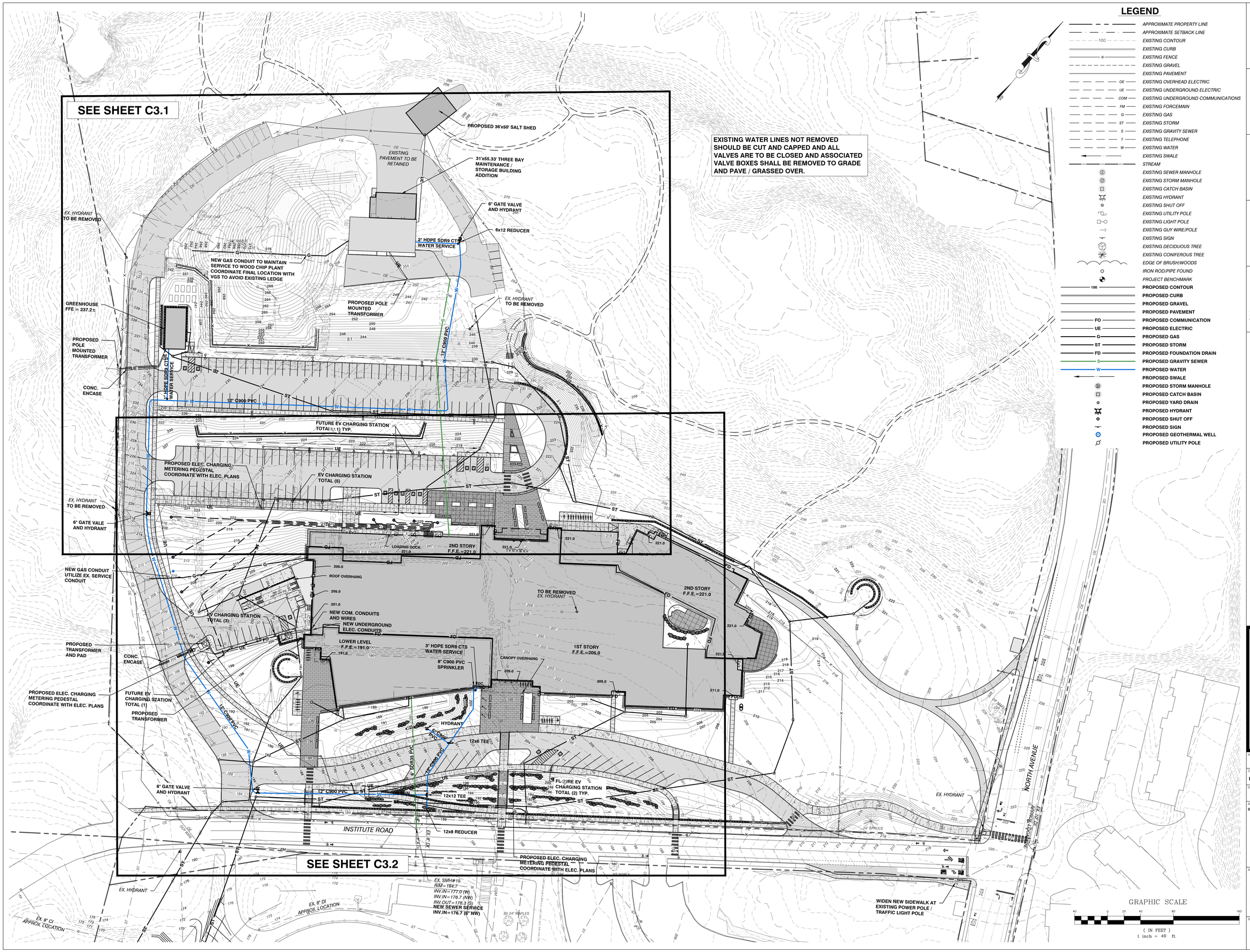

EXISTING WATER LINES NOT REMOVED SHOULD BE CUT AND CAPPED AND ALL VALVES ARE TO BE CLOSED AND ASSOCIATED VALVE BOXES SHALL BE REMOVED TO GRADE AND PAVE / GRASSED OVER.

LEGEND

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52 INSTITUTE ROAD, BURLINGTON, VERMONT

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SHEET CONTENTS: **PROPOSED UTILTIY PLAN NORTH**

SHEET NO: **C3.0**

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- PROPOSED SHUT OFF
- PROPOSED SIGN
- PROPOSED GEOTHERMAL WELL
- PROPOSED UTILITY POLE

PROPOSED 36'x50' SALT SHED

EXISTING PAVEMENT TO BE RETAINED

31'x55.33' THREE BAY MAINTENANCE / STORAGE BUILDING ADDITION

WOOD STORAGE

WOOD CHIP PLANT

FFE=255.8

6" GATE VALVE AND HYDRANT

6x12 REDUCER

2" HDPE SDR9 CTS WATER SERVICE

PORTION OF EXISTING SEWER LINE TO REMAIN

TO BE REMOVED EX. HYDRANT

NEW GAS CONDUIT TO MAINTAIN SERVICE TO WOOD CHIP PLANT COORDINATE FINAL LOCATION WITH VGS TO AVOID EXISTING LEDGE

CONTRACTOR TO TEST PIT TO FIELD VERIFY EX. SEWER SERVICE INVERT MIN. SLOPE= ¼" / FT.

C.O.

SS INV.=247.0 (ASSUMED)

PROPOSED POLE MOUNTED TRANSFORMER

EX. HYDRANT TO BE REMOVED

RAISED BEDS

PROPOSED WALL
T.O.W.=239.5
B.O.W. = 237.0
SEE DETAIL SHEET C5.3

GREENHOUSE
FFE = 237.2±

FFE=237.2

T.O.W.=238.5
B.O.W. = 237.0

PROPOSED POLE MOUNTED TRANSFORMER

CONC. ENCASE

1" HDPE SDR9 CTS WATER SERVICE

12" C900 PVC

INSTALL ANCHORS TO SEWER LINE AT ALL SLOPES GREATER THAN 20% DETAIL SHEET C5.2

INV.=242.0

INV.=225.0

10' MIN.

4" SDR35 PVC S= ¼" / FT. MIN.

MAINTAIN MIN. SEPARATION AT STORM / WATER CROSSING

G=232.0
W=224.8
ST=227.6
W CROWN=225.4
18" VERT.=226.9

G=228.5
W=221.7
SS=217.7
SS CROWN=218.2
18" VERT.=219.7

MAINTAIN MIN. SEPARATION AT STORM / WATER CROSSING

ST=224.4
SS=217.7
SS CROWN=218.2

INV.=218.9

PROPOSED HANDHOLD COORDINATE WITH ELEC. PLANS

INV.=214.0

CAR POOL SIGNS
CAR POOL
(6 SPACES)

PROPOSED HANDHOLD COORDINATE WITH ELEC. PLANS

PROPOSED ELEC. CHARGING METERING PEDESTAL COORDINATE WITH ELEC. PLANS

PROPOSED GEOTHERMAL WELL IN OPEN BOTTOM MANHOLE (TYP.) SEE DETAIL SHEET C5.1 COORDINATE FINAL LOCATION WITH MECHANICAL PLANS

EV CHARGING STATION TOTAL (5)

FUTURE EV CHARGING STATION TOTAL (11) TYP.

(2) 4" CONDUIT

MOTORCYCLE PARKING

G=219.3
SS INV.=212.8
ST INV.=213.4
SS CROWN=213.2

G=218.4
SS INV.=212.3
ST INV.=213.5
SS CROWN=212.8

EX. HYDRANT TO BE REMOVED

6" GATE VALE AND HYDRANT

G=220.0
INV.=214.5 (GEOTHERMAL)
15" ST INV.=207.8
15" CROWN = 209.4

G=213.5
INV.=208.5 (GEOTHERMAL)
15" ST INV.=204.6
15" CROWN = 206.1

3"-4" HDPE GEOTHERMAL SUPPLY LINES (MIN. 5' COVER)

GAS METER

LOADING DOCK 221.0

2ND STORY F.F.E.=221.0

SS INV.=210.8 (ASSUMED)

BUILDING OVERHANG ABOVE

TW=248.0
BW=247.0

TW=248.0
BW=236.0

TW=248.0
BW=239.0

TW=246.0
BW=245.0

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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C3.1

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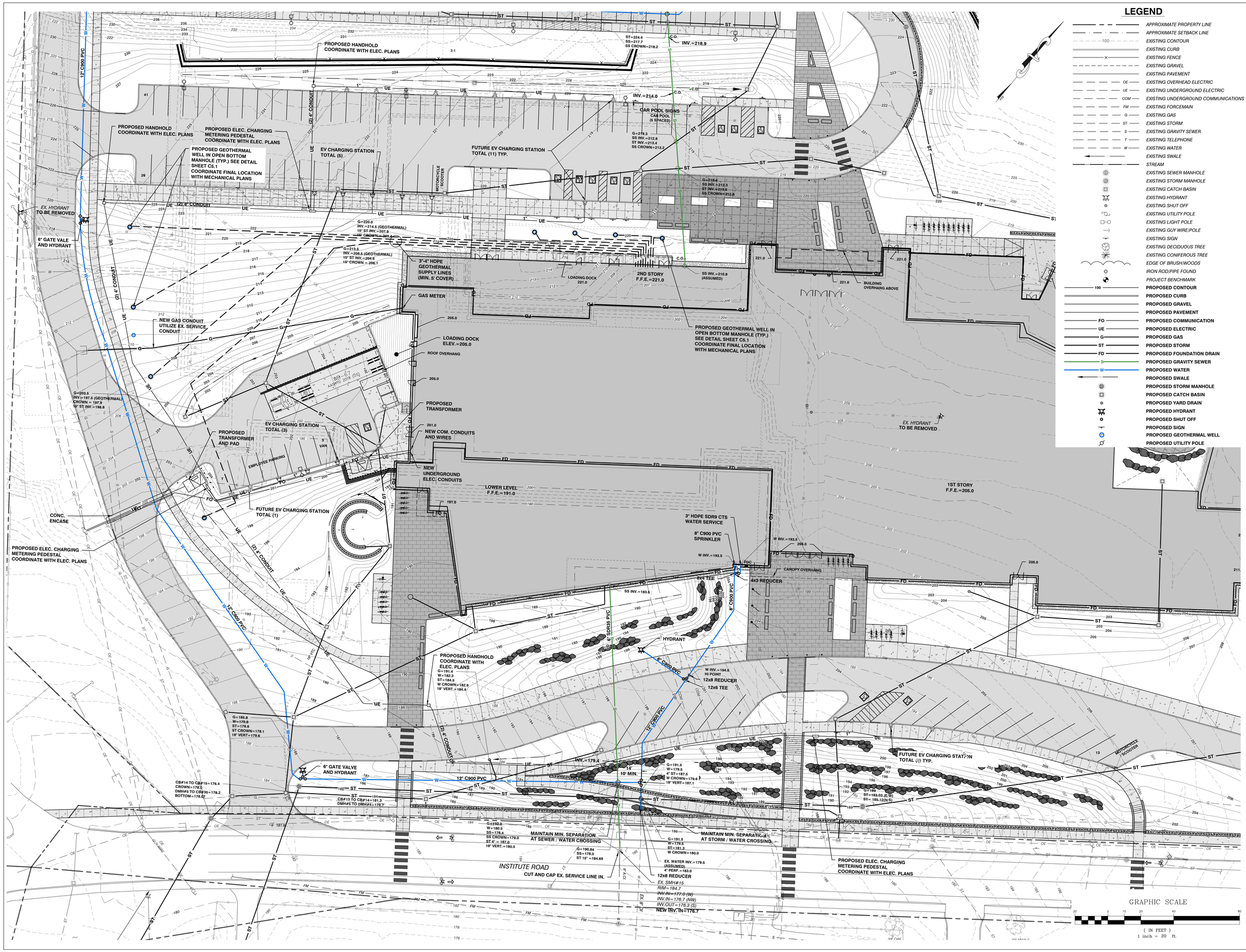

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PARTIAL UTILTIY PLAN NORTH

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LEGEND

- CONSTRUCTION LIMITS TAPE
- EROSION CONTROL MATTING
- SILT FENCE
- INLET PROTECTION
- TREE PROTECTION

CONSTRUCTION TAPE LIMITS OF DISTURBANCE

PROVIDE TEMPORARY DIVERSION OF SURFACE WATER RUNOFF

INSTALL INLET PROTECTION (TYP.)

INSTALL 4" TOPSOIL, FERTILIZE, LAWN SEE AND INSTALL ROLLED EROSION CONTROL MATTING (TYP.) AT ALL DISTURBED AREAS >3:1 SLOPES OR AS DEPICTED

GROUNDWATER DEWATERING
- PUMP DISCHARGE FROM DEWATERING AREA SHALL BE DIRECTED TO A SEDIMENT BASIN FOR SETTLING OF SEDIMENTS PRIOR TO DISCHARGE TO THE EXISTING STORMWATER CONVEYANCE SYSTEM "DIRT BAGS" ARE ACCEPTABLE ALTERNATIVE WHEN DISCHARGED TO A GRASS SURFACE WHEN THE DEWATERING VOLUMES ARE SMALL IN NATURE (<500 GALLONS)

LIMITS OF DISTURBANCE

PERMANENT STABILIZATION 8' BIT CONC. PATH

- ALL NON-GRANULAR SOIL STOCKPILES WILL BE TEMPORARILY MULCHED
- IF STOCKPILE IS CREATED PRIOR TO OCTOBER 1ST AND IS LEFT IN PLACE FOR MORE THAN 14 DAYS IT SHALL BE SEEDED AND THEN MULCHED

TEMPORARY TOPSOIL STOCKPILE

TEMPORARY CONSTRUCTION LAY DOWN AREA

INSTALL TREE PROTECTION (TYP.)

PERMANENT STABILIZATION 10' CONC. PATH

PERMANENT STABILIZATION 5' CONC. PATH

PERMANENT STABILIZATION BIT. CONC. SURFACE (TYP.)

PERMANENT STABILIZATION 5' CONC. PATH

INSTALL SILT FENCE DOWN GRADIENT OF ALL DISTURBED AREAS

WIDEN NEW SIDEWALK AT EXISTING POWER POLE / TRAFFIC LIGHT POLE

UTILIZE EXISTING PAVED ACCESS ROAD
- ALL SOIL DEPOSITED ON PAVEMENT TO BE SWEPT AT END OF BUSINESS DAY

EXISTING PAVEMENT TO BE RETAINED

INSTITUTE ROAD

NORTH AVENUE

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

SPECIFIC EPSC EXECUTION REQUIREMENTS

Applicant will call 863-4501 or email gjohnson@burlingtonvt.gov at least 24 hours prior to initiating earth disturbance and submit the name and contact (cell phone and email) of the erosion control coordinator for the project.

Applicant will post the attached notice in a visible location.

I acknowledge that it is the responsibility of the owner and his/her representatives to ensure that:

- sediment does not enter surface water bodies (streams, ditches, ponds, lakes, wetlands etc.)
- sediment does not enter City conveyance infrastructure (catch basins, sewers etc.) and
- All sediment must be removed from the city ROW (sidewalks and roadways) by the end of each work day.

Sediment control measures will be installed prior to the initiation of earth disturbance.

During the non-winter construction season (April 15 - October 15): After an initial 14 day period of initial disturbance, temporary or permanent stabilization (mulching, erosion control matting or tarps for stockpiles, or other approved method) of exposed areas and stockpiles will occur at the end of each work day unless:

- Earthwork is to continue in the area within the next 24 hours and there is NO liquid precipitation forecast for the next 24 hours; or
- If work is occurring in a self-contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches.)

During the winter construction period from October 15 to April 15, any new disturbance must be temporarily or permanently stabilized (mulching, erosion control matting or tarps for stockpiles, or other approved method)
will occur at the end of each work day unless:

- Earthwork is to continue in the area within the next 24 hours and there is NO liquid precipitation forecast for the next 24 hours; or
- If work is occurring in a self-contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches)

The perimeter of the site and all BMPs will be inspected at the end of each workday to ensure that sediment will not leave the site. If sediment has travelled beyond the site boundary, it shall be swept up or otherwise removed and deposited on-site in an upgradient area at the end of each work day.

The owner and his/her representatives shall abide by the best management practices (BMPs) indicated in this plan and conditions and in the Vermont DEC Low Risk Site Handbook for Erosion Prevention and Sediment Control (2006). Contact 802-863-4501 for a hard copy or go to the web: http://vtwaterquality.org/stormwater/docs/construction/sw_low_risk_site_handbook.pdf

If soils will be exposed after October 15 and winter construction has not been permitted the project will notify DPW prior to October 15th and ensure that sediment control is installed PRIOR to soil freezing. If the project is completed during the winter months, an additional inspection will be required to ensure that the site is buttoned up for the winter.

Within 48 hours of reaching final grading, the exposed soil will be seeded and mulched or covered with erosion control matting (for slopes steeper than 3:1 or high wind prone areas). Erosion control matting is preferred.

The owner will contact DPW to schedule a stabilization inspection when site work is finished and stabilization measures (seeding and mulching or matting) have been installed.

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FF PROJECT NO: 21255

ORIGINATION DATE:	SCALE:
06/02/2023	1" = 40
DRAWN BY: MAB	CHECKED BY: DSM

ISSUE LOG:
06/02/2023 ISSUE FOR PERMITTI

SHEET CONTENTS:
EPSC SITE PLAN NORTH

SHEET NO:
C4.0

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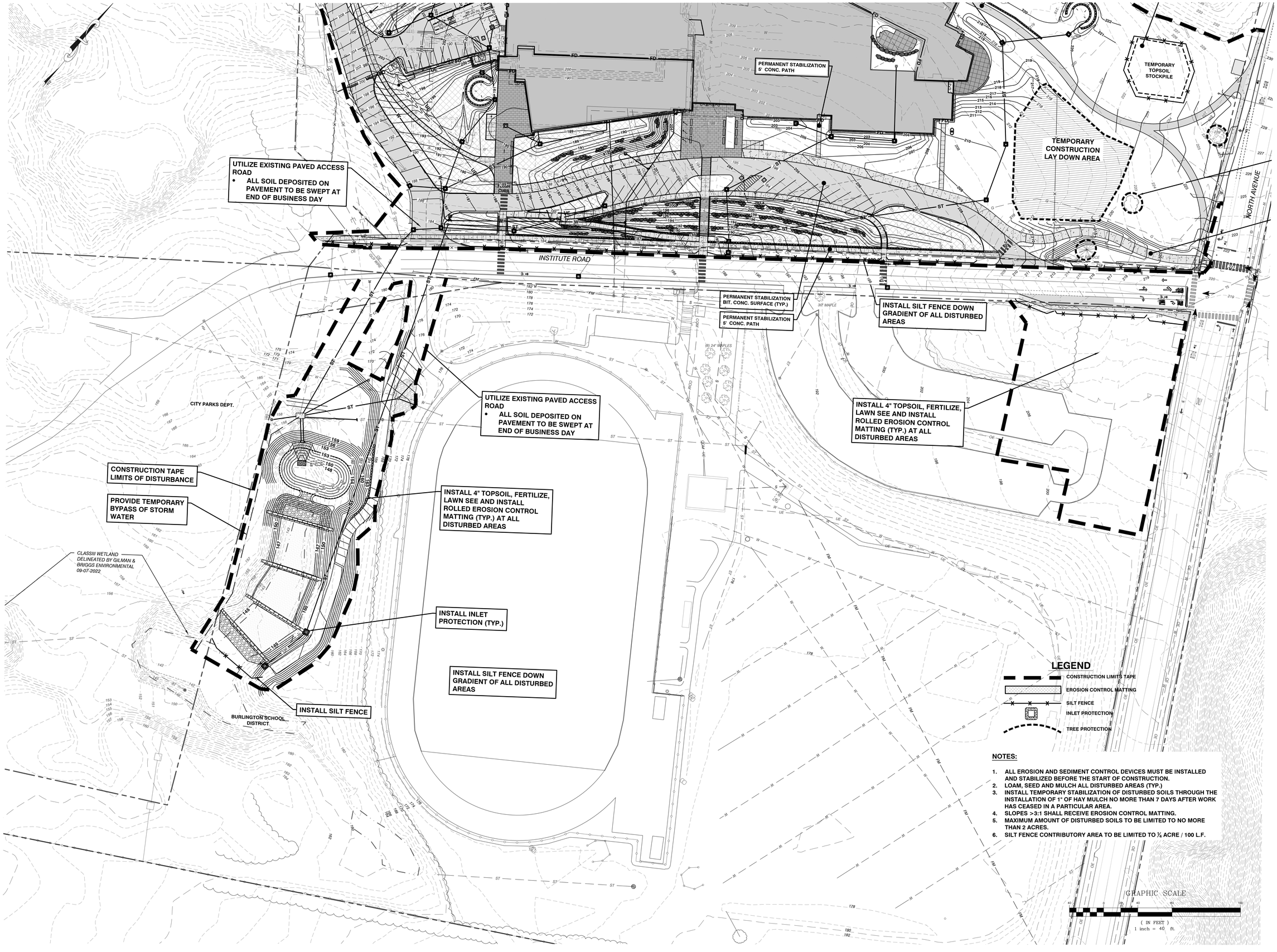

NOTES:

1. ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED AND STABILIZED BEFORE THE START OF CONSTRUCTION.
2. LOAM, SEED AND MULCH ALL DISTURBED AREAS (TYP.)
3. INSTALL TEMPORARY STABILIZATION OF DISTURBED SOILS THROUGH THE INSTALLATION OF 1" OF HAY MULCH NO MORE THAN 7 DAYS AFTER WORK HAS CEASED IN A PARTICULAR AREA.
4. SLOPES >3:1 SHALL RECEIVE EROSION CONTROL MATTING.
5. MAXIMUM AMOUNT OF DISTURBED SOILS TO BE LIMITED TO NO MORE THAN 2 ACRES.
6. SILT FENCE CONTRIBUTORY AREA TO BE LIMITED TO ¼ ACRE / 100 L.F.

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52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255	
ORIGINATION DATE: 06/02/2023	SCALE: 1" = 40
DRAWN BY: MAB	CHECKED BY: DSM
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SHEET CONTENTS:
EPSC SITE PLAN SOUTH

SHEET NO:
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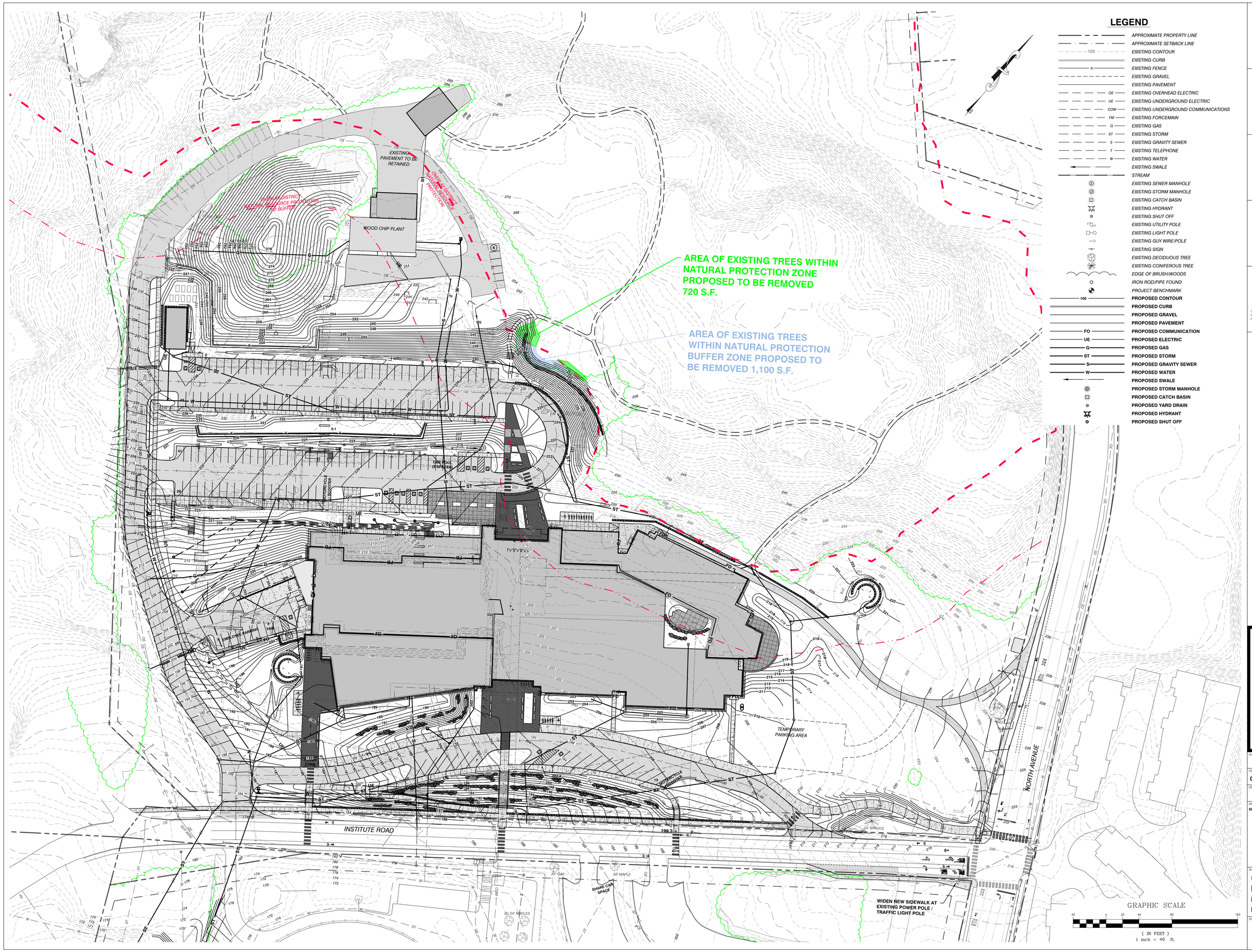

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SHEET CONTENTS:
OVERLAY DISTRICT NATURAL RESOURCE PROTECTION

SHEET NO: WS2

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Erosion Prevention and Sediment Control Program

Construction Stormwater Discharge
The development of a new educational facility by Burlington School District is to be permitted as a Moderate Risk site under the State of Vermont Construction General Permit (CGP# 3-9020) for Discharges of Stormwater from Construction Sites issued for this project.

Parties associated with the issuance and implementation of the requirements set forth in the General Permit and the details within this document include:

-State of Vermont Department of Environmental Conservation, Water Quality Division (State)
-On-Site Plan Coordinator (OSPC)
-Engineer (E)
-Site Owner (Owner)
-Site Erosion Prevention and Sediment Control Plan Designer (EPSC Designer)
-Owner's Builder/Contractor (Contractor)

This permit has the goal of minimizing discharges of sediment-laden water from the site by implementing appropriate best management practices (BMP's) during construction and stabilization of the site.

The Contractor will be responsible for ensuring compliance with all construction stormwater permit conditions within the entire project construction area.

Groundwater Dewatering
If dewatering of trenches, pits or other excavations is required during construction, the groundwater will be pumped to a suitable settling facility approved by the engineer and the VT DEC.

Inspection Program

The inspection responsibilities of the Contractor and the On-Site Plan Coordinator (OSC) are outlined in the chart below:

Feature	Daily	Weekly	After Rain Event
Storm Sewer Inlets	C	OSPC,	C, OSPC
Silt Fence	C	OSPC,	C, OSPC
Check Dams	C	OSPC,	C, OSPC
Construction Fencing	C	OSPC,	C, OSPC
Construction Entrance	C	OSPC,	C, OSPC
Stabilized Areas	C	OSPC,	C, OSPC
Report	C	OSPC,	OSPC

Burlington High School and Technical Center Erosion Protection and Sediment Control Narrative
November 10, 2022

Burlington School District proposes a project located on the property situated at 52 Institute Road in Burlington, Vermont.

The project proposes to create a new high school and technical center to replace the existing building.

Existing Conditions – The project is located on two parcels divided by Institute Road located in the north end of Burlington between North Avenue and Lake. The northern parcel is 32.43 acres property north of Institute Road and the southern portion is a 19.72 acre property to the south of Institute Road.

Of the total 52.15 acres of the property, approximately 14.1 acres or 27% of the property is proposed to be disturbed as part of this project.

The site is comprised of a series of terraces all comprised of sandy soils in nature. The NRCS soil mapping of the property is summarized below.

AdA – Adams and Windsor loamy sands, 0 to 5 percent slopes – 5% of the site and 5.1% of the disturbed areas.
AdE – Adams and Windsor loamy sands, 30 to 60 percent slopes – 3% of the site and 5.7% of the disturbed areas.
FaC – Farmington extremely rocky loam, 5 to 20 percent slopes – 53% of the site and 51.7% of the disturbed areas.
FaE – Farmington extremely rocky loam, 20 to 60 percent slopes – 30% of the site and 15.4% of the disturbed areas.
Fu – Fill land – 9% of the site and 22.1% of the disturbed areas.

All of the soils on the site have been identified through the NRCS WebSoil Survey to have a K value of 0.10-0.28. A portion of the site has been delineated as Class III wetlands.

The area of the Class III wetlands is the location of the existing stormwater outfall, which is proposed to be retained as the treatment and drainage as part of this project.

Large portions of the proposed development area are currently occupied by the existing Burlington High School and Technical Center Buildings. These buildings are built into the ledged hillside that is otherwise mostly open hillside with few trees sprinkled throughout the site. The area of the proposed stormwater improvements is mostly wooded. This area will be cleared for the grading and construction of the stormwater management facilities.

The topographical mapping for the property was developed from field survey which also located the specimen trees within the perimeter green space areas of the project to be retained.

Areas of Concern – The primary areas of concern for the management of EPSC include (These are depicted on Sheet C4.0 and C4.1):
1. The steep slope the existing school buildings are located on.
2. The Class III wetland where the stormwater upgrade is to occur.
3. The protection of the trees to be retained along the exterior portion of the property and specifically those along the north border which are subject to a Development Agreement with the City.
4. The drainages located at the far west side of the property.

Phasing – The project is proposed to be constructed in Phases beginning in 2023 and, market forces permitting, to be completed in the end of summer 2025. The individual phasing limits are depicted on Sheets C4.2 – C4.3.

The phasing generally begins central to the project by removing the existing Building A as a means to establish the groundwork for the ability to start the proposed foundation. Work continues in a counter-clockwise rotation continuing up the slope to the north by removing the rest of the buildings and moving on to ledge removal for the proposed parking lots and access drives. Supporting road and utility infrastructure will be constructed with a top down approach as a means of minimizing the amount of disturbance. Most of the phases include earth disturbance activities that range from 2.1 to 4.9 acres in size. The first phase represents the largest amount of disturbance at any one time as it includes multiple partners (demo contractor and site contractor) and supporting infrastructure (construction laydown area) in this phase. The estimate total area of disturbance is 14.1 acres with the requirement that no more than five (5) acres can be disturbed at any one time.

Best Management Practices– The project will use a series of surface water diversion to not only protect those areas under construction but to also temporarily convey stormwater from these sites to a series of stormwater treatment facilities. Each facility will be designed to provide sediment trap removal capacity before sending the water to an infiltration facility. The goal being to collect and manage stormwater before it reaches the previously described drainages.

Sediment Basin – The initial phase of the project will require the use of a sediment basin (Basin A) to comply with the contributory watershed sizing requirements for the project. With the understanding that this facility is designed to double as an infiltration basin, the normal vertical pipe outlet has been replaced with infiltrative capacity through the bottom of the main body of the pond. The emergency outlet will be sized to accommodate the 10-year design storm for the conditions draining to the structure.

Discharge Point and Conveyance – The project has been designed so as to match the operational stormwater 10-year peak event from the property. For storm events greater than the 10-year design storm, additional runoff from the site is expected beyond the match of existing conditions. As a means of protecting the existing steep slope drainages, the project proposes to extend a 36"storm drain line from the project limits down to Lake Champlain. This is the only discharge point for the project.

Based upon the proposed drain inlet locations, this conveyance will include a drainage area of approximately 28 acres.

Project Characteristics – The average slope of the areas of disturbance is 15%.

The project proposes to impact the Class 3 wetlands at the outfall of the existing stormwater system and adjacent to the track. A permit from the USACE will be required.

Preconstruction measures will include the use of construction fencing to demarcate the limits of disturbance along those areas where sensitive features are present (e.g. wetlands or tree retention areas), construction flagging for the remaining areas, Construction access (entrances road and laydown areas) stabilization, surveyed tree clearing limits and silt fence. These areas are shown on Sheets C1.4, C4.0 – C4.1 and C4.4 – C4.7

The on-site temporary measures will include the use of contained sites (e.g. foundation excavation, utility trenching), inlet protection, temporary stabilization of disturbed surfaces through the use of hay mulch.

The temporary off-site measures (outside of specific phase areas) to be employed will include the previously discussed diversion swales and stormwater management facilities. These are shown on Sheets C4.0 – C4.1

The permanent on-site measures to be used to stabilize the site will include, flat roofs, paved roads, concrete walkways, hardscape common areas, lawn and slopes planted with the appropriate grass types. These are shown on Sheets C4.0 – C4.1.

The project will require that within 7 days of initial disturbance that soils be permanently or temporarily stabilized through the use of hay mulch, ECM, or a crushed stone surface unless these areas are part of an on-going earth disturbance activity or are located within a contained area.

Winter Construction – Winter construction activities are proposed for the project and as such are subject to special measures to be employed between October 15 and April 15. This work will likely entail utility installation, excavating and backfilling of buildings. The winter construction requirements are specifically outlined on Sheet C4.7.

EROSION AND SEDIMENT CONTROL STRATEGY – The following techniques are anticipated to be utilized as part of the erosion and sediment control program. The timing and use of each of the techniques is further defined within the Construction Phasing of the project. But will be the responsibility of the contractor to implement on an as needed basis based upon the changing nature of the site disturbance activities only controlled by the site contractor.

1. Use rapidly germinating cover crops prior to seeding when the ground would otherwise be bare.
2. Include rapidly germinating grasses in the seed mixtures when they will not compromise the integrity of the final product.
3. Utilize hydroseeding with mulch when feasible.
4. Utilize erosion control netting or blankets, with or without seed contained in them on slopes greater than 3:1.
5. Utilizing stabilization materials or sodding areas where runoff is rapid or concentrated.
6. Limiting traffic in the vicinity of streams and wetlands and installing as few temporary crossings as possible.
7. Installing water bars (swale/berms) on slopes to and channels before it gains sufficient volume and momentum to cause scouring.
8. Using stone check dams and silt fences once the soil has begun to move.
9. Preserving existing trees and vegetation near and within buffer areas until after the site has been stabilized.
10. Controlling dust by providing parking lots with prepared surfaces, limiting traffic in all possible ways, planting stockpiles with cover crops or protective blankets, using water trucks, refraining from cultivating and smoothing seedbeds until immediately prior to seeding.

Field Protocol – Areas of special concern will be reviewed with the Contractor prior to initiating site clearing activities. These areas will be continually reviewed by the Contractor and the OSPC and any issues will be identified in the daily or weekly reports. All reports shall be distributed via e-mail to all parties in support of the efforts to address areas of concern in a timely manner.

Best Management Practices – BMP's – Examples include, but are not limited to: sediment fence, erosion control matting, seed, and mulch in accordance with the attached Construction Phasing plan and the Vermont Erosion Prevention and Sediment Control Filed Guide.

Installation Sequencing

1. Construction Staking
A. The construction limits are to be staked in the field by a qualified Surveyor.
B. The remaining clearing and site disturbance limits shall be reviewed by the Engineer prior to initiating any clearing. The Engineer shall designate specimen trees and critical vegetative cover along buffer areas that are to remain during the initial phases of construction.

2. Clearing – The clearing limits shall be demarcated in the field with continuous flagging. Construction fencing shall be installed along the edges of any stream or wetland buffer areas adjacent to or on the lot. Prior to any timber being harvested and removed from the site, a construction entrance pad shall be installed at the entrance point to the project site. Chipping of branches and other woody material is allowed but the material must be disposed of in an approved manner.

3. Inlet Protection – Ensure that BMP's are in place and functioning at catch basins, drainage swales, culvert inlets, and other areas as shown on the EPSC site plan.

4. Protection of Adjacent Sites – Install BMP's along the common lot line of adjacent sites. This would include construction fencing to help avoid unintentional encroachment onto the adjacent property and silt fence when the adjacent lot is downgradient of the construction site.

5. Protection of Construction Site – Prior to initiating earthwork on the lot, surface runoff from areas upgradient portions of the construction site shall be diverted from the proposed areas of disturbance using diversion swales, structures, sand bags, curbing, or other approved method. Protect steep exposed slopes from surface runoff by collecting runoff at the top of the slope and diverting it into a stabilized conveyance, such as a slope drain or stabilized swale.

6. Grubbing
A. Grubbing shall occur only after the erosion control measures around the downgradient perimeter of the site has been established. Those locations shall be reviewed with the Environmental Specialist and Independent Engineer. Existing topsoil shall be retained and stockpiled on site for re-use.
B. The Contractor shall remove all remaining woody material and tree stumps and dispose of them utilizing one or more of the following methods:
i. Burning, provided that permits are acquired from the State of Vermont Solid Waste Management Division and the City of Burlington.
ii. Disposal on site within designated slope disposal areas only after an insignificant waste Disposal Permit is acquired. At these sites the following standards shall be met
a. 3' separation to the seasonal high groundwater table.
b. 100' separation to surface waters.
c. Thorough mixing of soil and woody material to minimize future settlement.
d. Covering with a minimum of four (4) feet of cover material.
iii. Chipping with on-site disposal in accordance with Item 5 or disposal off-site in accordance with State requirements.
iv. Disposal at a certified landfill facility.
C. All grubbing of woody materials shall be completed to a depth of at least 12".
D. The Contractor shall remove all medium to large stones and boulders present within the limits of disturbance including future drainage and infrastructure improvements.
i. The larger boulders shall be saved for use in retaining walls.
ii. The smaller stones may be buried in predetermined disposal sites.

7. Soil Stockpiles
A. The Contractor shall strip and stockpile as much as possible of the native topsoil for re-use during a later stage of the project.
B. Each topsoil stockpile shall be placed in locations respective of existing environmental features of the site. Special consideration shall be made to maximize the distance (minimum 100') to the nearest water course.
C. Each topsoil pile shall be surrounded on the downgradient side by a row of silt fence.
D. Any topsoil pile which is to remain in place for greater than 15 days shall be temporarily seeded with winter rye to preserve the integrity and minimize the erosion of the soil constituents and release of soluble nutrients.
E. The Contractor shall locate stockpiles on the uphill side of the disturbed areas, if possible. During windy conditions, stockpiled material shall be covered or watered appropriately to prevent wind erosion.

8. Earth Excavation/Grading
A. Mass earth placement to create the building plateau shall commence only after all remaining EPSC measures depicted on the plans are installed.
B. Surface water diversion BMP's shall employed at the high point of the site until the new drainage swale/hollow is installed.
C. The Contractor shall also limit the soil disturbance and seeding application dates to between April 16th and September 15th.

D. All exposed soils areas (not including structural fill soils or stabilized stone areas) shall be protected prior to any forecasted rain event with mulch or erosion control matting. Pin matting with wire staples in accordance with the manufacturers recommendations to ensure full bonding with soil surface.
E. Install stone check dams in grass-lined swales 50 feet on center to prevent silt from washing into the drainage system during construction. Check dams are to be removed when vegetation is established.

9. Temporary Construction Entrance – Required for entrance and egress points from the site.

10. Planting Preparation, Seed, Mulch, Germination, Maintenance
A. The preparation of the topsoil for planting includes final smoothing and removal of small stones. This work shall occur immediately prior to seeding or placement of EC matting so as to avoid exposure to erosion damage and to reduce the amount of dust generated as part of this process.
B. Planting is to occur immediately after the topsoil preparation with special caution being given to upcoming storm events that may displace the seed/soil.
C. The planted areas shall be water regularly to protect the new plants but not over watered so as to cause excess runoff and erosion.
D. All ditches that are not stone-lined shall be topsoiled, and stabilized with erosion control matting. Any area which shows signs of erosion shall be restabilized immediately and maintained until permanent vegetation is established. of
E. Maintenance:
1. All erosion control measures shall be inspected weekly and repaired and/or replaced as needed.
2. All erosion control measures shall be inspected after periods of heavy rain.
3. The stabilized road entrance shall be top dressed with additional stone should the existing stone become clogged with sediment.
4. Hay or straw mulch is subject to wind action. Mulch, where permitted) may require anchoring as the weather conditions warrant.

11. Surface Stabilization – The following stabilization methods are required:
A. Temporary stabilization – Straw mulch (during the earliest phases of the project) or erosion control matting placement is required on all non-contained disturbed areas prior to forecasted rain events.
B. Install stone check dams in drainage swales 50 feet on a center to prevent silt from washing into the drainage system during construction. Check dams shall be removed when vegetation is established.
C. Control dust through the application of water. The exact number of applications and amount shall be based upon field and weather conditions. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is ordered placed.
D. Install crushed stone apron of at least 15' width around the perimeter of the building following backfill of the foundation walls.
E. Install temporary (sacrificial) crushed stone on all access ways and laydown areas. These areas will be covered later with the roadway/parking lot base materials or with topsoil.
F. Permanent Stabilization – Required of all surfaces at the completion of construction. The Contractor will install 4" topsoil, sod, seed (where permitted), fertilize, lime, and mulch (seeded areas) the disturbed areas as soon as possible following completion of construction.

1. Use rapidly germinating cover crops prior to seeding when the ground would otherwise be bare.
2. Include rapidly germinating grasses in the seed mixtures when they will not compromise the integrity of the final product.
3. Utilize hydroseeding with mulch when feasible.

Owner/Contractor Responsibilities:
1. The Owner/Contractor (O/C) is responsible for the on-going maintenance of all lot specific erosion prevention and sediment control devices and practices. Any subcontractor conducting earth disturbance activities on the project site shall review the EPSC plan and General Permit and shall complete an application and file with the State a request for Co-Permittee status.

2. Periodic inspections shall be performed in accordance with the above schedule to ensure that the erosion and sediment control measures are functioning as required. In addition to the standard periodic inspections, inspections of all of the on-site systems shall be conducted after a rain event causing stormwater to leave the site. Any problems noted during these inspections shall be corrected immediately.

3. Once construction has commenced, the O/C is responsible for the maintenance of erosion and sediment control measures protecting nearby stormwater collection systems and water courses. It is critical that sediment not be allowed to invade the receiving waters.

4. The temporary construction entrance provides a place for parking vehicles off-street and a spot where material can be off-loaded. The intent of the requirement is to provide a stable surface for parking vehicles where mud and debris is not likely to be tracked onto the street. Proper maintenance of the area is required until such time as a permanent driveway can be put into place.

5. During the entire construction process, the O/C is responsible for ensuring that mud, dirt, rocks, and other debris are not allowed to erode or be tracked onto the street system by construction vehicles. Should any mud or other debris find its way to the road system, the O/C shall take immediate steps to have it removed.

6. Maintenance – Silt Fence

A. Inspect sediment fences daily to ensure that construction activities have not impacted their operability and after each rainfall event causing runoff from the site.
B. Should the fabric of the sediment fence collapse, tear, decompose, or become ineffective, replace promptly.
C. Remove the sediment deposits as necessary to provide adequate storage volume for the next rain event and to reduce pressure on the fence. Take care to avoid damaging or undermining the fence during clean-out.
D. If the utilities are installed after BMP's have been put into place, the permit holder is responsible for control of erosion and sediment during the construction process and for ensuring that all BMP devices are re-installed per the original design.

On-Site Plan Coordinator Inspections
1. The OSPC will normally inspect erosion prevention and sediment control measures in conjunction with routine inspections. Inspections will ensure that proper placement and installation of the erosion prevention and sediment control measures are in place.

2. The first inspection will occur prior to clearing of the site to ensure that proper BMP's are in place, including proper demarcation of the clearing limits, installation of construction fencing along the stream/wetland buffer limits, and any other devices required to protect the receiving waters from sediment deposition during the clearing phase.

3. Prior to initiating grubbing and mass earth excavation, the OSPC shall inspect the site to ensure that the construction fencing, silt fence, construction entrance, and other required BMP's are in place.

4. The OSPC will conduct weekly inspections and will prepare weekly reports which are to remain on-site until final stabilization is achieved.

Additional Requirements:

1. All sediment removed from sediment control practices as part of maintenance shall be disposed of in an area that is:
a. Less than 5% slope.
b. At least 100ft from any downslope water body or conveyance to a waterbody (including storm drain inlet or ditch)
c. Area shall be vegetated

2. Stabilize Exposed Soil

Purpose:
Seeding and mulching, applying erosion control matting, and hydroseeding are all methods to stabilize exposed soil. Mulches and matting protect the soil surface while grass is establishing.

Requirements:
All areas of disturbance must have temporary or permanent stabilization within 7 days of initial disturbance, as stated in the project authorization. After this time, any disturbance in the area must be stabilized at the end of each work day.

The following exceptions apply:

- Stabilization is not required if earthwork is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
- Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).

All areas of disturbance must have permanent stabilization within 48 hours of reaching final grade.

How to comply:
Prepare bare soil for seeding by grading the top 3 to 6 inches of soil and removing any large rocks or debris.

Seeding Rates for Temporary Stabilization
April 15 – Sept. 15 --- Ryegrass (annual or perennial: 20 lbs/acre)
Sept. 15 – April 15 --- Winter rye: 120 lbs/acre

Seeding Rates for Final Stabilization: Choose – See Sheet C6.6

Mulching Rates
April 15 – Sept.15 -- Hay or Straw: 1 inch deep (1-2 bales/1000 s.f.)
Sept.15 – April 15 -- Hay or Straw: 2 in. deep (2-4 bales/1000 s.f.)

Erosion Control Matting
As per manufacturer's instructions

Hydroseed
As per manufacturer's instructions

1. Stabilize Soil at Final Grade

Purpose:
Stabilizing the site with seed and mulch or erosion control matting when it reaches final grade is the best way to prevent erosion while construction continues.

Requirements:
Within 48 hours of final grading, the exposed soil must be seeded and mulched or covered with erosion control matting.

How to comply:
Bring the site or sections of the site to final grade as soon as possible after construction is completed. This will reduce the need for additional sediment and erosion control measures and will reduce the total disturbed area.
For seeding and mulching rates, follow the specifications under Rule 8, Stabilizing Exposed Soil.

2. Dewatering Activities

Purpose:
Treat water pumped from dewatering activities so that it is clear when leaving the construction site.

Requirements:
Water from dewatering activities that flows off of the construction site must be clear. Water must not be pumped into storm sewers, lakes, or wetlands unless the water is clear.

How to comply:
Using sock filters or sediment filter bags on dewatering discharge hoses or pipes, discharge water into silt fence enclosures installed in vegetated areas away from waterways. Remove accumulated sediment after the water has dispersed and stabilize the area with seed and mulch.

END OF SECTION ESPC NARRATIVE

SECTION 02150 – EROSION CONTROL

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:
1. The work under this section includes but is not limited to providing all labor, equipment and materials for the installation of all required site related erosion control measures. If not otherwise directed on the plans, erosion control shall be in strict conformity with the latest revision of the "Vermont Erosion Prevention and Sediment Control Field Guide" available from the Stormwater Section of the Vermont Water Quality Division.

B. Related sections:
1. Section 02210 – Site Earthwork
2. Section 02936 – Permanent Seeding

1.02 GENERAL NOTES

A. The discharge of sediment laden water from the project site is prohibited. All discharged water from dewatering operations shall discharge into a temporary sedimentation basin.

B. Contractor shall install all erosion control measures as depicted on plans and details or as recommended by the Stormwater Section of the Vermont Water Quality Division prior to any construction. Contractor shall also be responsible for inspecting and maintaining all erosion control measures until project is completed.

C. Contractor shall also limit the soil disturbance and seeding application dates to between April 15th and September 15th. If soil disturbance occurs later than October 15th and prior to April 15th, winter erosion control measures will be necessary. Contractor shall consult with the Engineer for additional site specific winter erosion control measures.

D. All stockpile material (topsoil, borrow, etc.) will have a silt fence constructed around the perimeter. Seed and mulch stockpiled material as soon as possible to prevent soil erosion and sedimentation off site. Locate stockpiles on the uphill side of the disturbed areas, if possible. During windy conditions, stockpiled material shall be covered or watered appropriately to prevent wind erosion.

E. Slopes greater than 3:1 (H:V) shall have erosion control matting installed to stabilize the slope and reduce the erosion potential. Install matting so that all parts are in contact with the underlying soil. Pin matting with wire staples 3' o.c. to ensure full bonding with soil surface. Matting shall be installed in accordance with manufacturer's recommendations.

F. Control dust through the application of calcium chloride or water. An average application of one pound of calcium chloride per square yard of exposed area should be considered for each treatment. The exact number of applications and amount of dust controller shall be based upon field and weather conditions. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is ordered placed.

PART 2 – PRODUCTS

2.01 EROSION CONTROL NETTING

A. Jute netting shall consist of undyed and unbleached yarn woven into a uniform open plain weave mesh.

2.02 EROSION CONTROL MATTING

A. Where required on the plans or where directed by the Engineer, erosion control blankets (matting) shall be North American Green S150BN for swales and slope stabilization, or approved equal, for all areas for permanent installation, and C125 and SC150 where matting is being used as temporary protection of disturbed soils until a final surface stabilization method is employed.

2.03 FILTER FABRIC

A. When filter fabric is required, it shall conform to the requirements of Mirafi 500X or approved equivalent.

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE: 06/02/2023 | SCALE: AS SHOWN

DRAWN BY: MAB | CHECKED BY: DSM

ISSUE LOG: 06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS: EPSC NARRATIVE

SHEET NO: C4.4

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2.04 CALCIUM CHLORIDE

A. Calcium chloride shall conform to the requirements of AASHTO M 144. Either regular flake calcium chloride, Type 1 or concentrated flake, pellet or other granular calcium chloride, Type 2, may be used.

2.05 WATER

A. All water used shall be clean and free of harmful amounts of oil, salt, acids, alkalies, sugar, organic matter and other substances injurious to the finished product, plant life or the establishment of vegetation.

2.06 SEDIMENT WATTLES

A. Sediment wattles shall be King Fibre Corporation silt trapper sediment wattles or approved equal.

2.07 POLYACRUMIDE

A. Polyacrumide (polymer) logs (blocks) shall only be used with permission from the Engineer and VT ANR Water Quality Division. Type shall be Applied Polymer Systems, Inc. floc log or approved equal. The type of floc log used shall be based upon a site specific testing of the native soils.

2.08 STONE CHECK DAMS

A. Stone check dams should be constructed of 2 to 3 inch stone. Hand or mechanical placement will be necessary to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges. The maximum contributing drainage area from any one check dam shall not exceed two acres. See the detail drawing in the Erosion Control Details Drawings for the proper installation of stone check dams.

PART 3 – EXECUTION

3.01 HAY BALE CHECK DAM AND INLET PROTECTION

A. Hay bales shall not be used to construct check dams or as a means of inlet protection.

3.02 SILT FENCES

A. The silt fences shall be constructed in accordance with the construction detail. The fence shall generally be placed 10 feet from the toe of the slope or as shown on the plans. The ends of the fence shall be placed uphill to form a horseshoe shape to trap all runoff. Silt fence shall not be placed across areas of concentrated flow.

B. The silt fences shall be inspected periodically for damage or build–up of sediments. All damaged fences shall be repaired or replaced. Sediment deposits shall be removed from the fence as they build up and be placed in an area where there is no danger of further erosion.

3.03 EROSION MATTING

A. Erosion matting shall be placed on all grass–lined ditches with profile grades exceeding 5.0% and all other areas called out on the plans, and shall be placed and maintained in accordance with the Vermont Agency of Transportation Standard Specifications Sections 654 and 755.07.

3.04 RESTORATION

A. As soon as construction is completed in a given area, it shall be topsoiled, seeded, fertilized and mulched as specified in Section 02936 – Permanent Seeding.

3.05 STABILIZED ROAD ENTRANCE

A. A stabilized pad of crushed stone located at any point where traffic will be entering or leaving the construction site to or from a public right–of–way or street or as shown on the drawings shall be constructed for the purpose of preventing the tracking of sediment onto public rights–of–way.

B. Design Criteria:
1. Use 1.5 to 2.5 inch stone.
2. Use 8 inch layer of stone.
3. Stone pad shall be full width of entrance.
4. Minimum length shall be 50 feet.

3.06 GRASS–LINED DITCHES

A. All ditches that are not stone–lined shall be topsoiled, seeded, fertilized and mulched. Any area which shows signs of erosion shall be reseeded immediately and maintained until permanent vegetation is established.

3.07 MAINTENANCE

A. All erosion control measures shall be inspected daily and repaired and/or replaced as needed.

B. All erosion control measures shall be inspected after periods of heavy rain.

C. The stabilized road entrance shall be top dressed with additional stone should the existing stone become clogged with sediment.

D. Hay or straw mulch is subject to wind action. Mulch may require anchoring as the weather conditions warrant.

3.08 STONE CHECK DAMS

A. The drainage area of the ditch or swale being protected should not exceed 10 acres.

B. The drainage area to any check dam shall not exceed 2 acres.

C. The maximum height of the check dam should be 2 feet. The center of the check dam must be at least 6 inches lower than the outer edges. The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

D. Check dams should be installed before runoff is directed to the swale or drainage ditch.

3.09 DEWATERING METHODS

A. All dewatering methods associated with this project are to be approved by the VT DEC and the engineer prior to use.

END OF SECTION 02150

SECTION 02936 – PERMANENT SEEDING

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:
1. Furnishing all labor, materials, and equipment to complete all seeding work as shown on the drawings and specified herein.
2. Except where otherwise shown or specified, the Contractor shall seed all areas where new contours are shown on the drawings and all areas where existing ground cover has been disturbed by the Contractor's operations.

B. All work and materials of this Section shall conform to the applicable requirements of the VAOT Standard Specifications, Division 600.

1.02 SUBMITTALS

A. Provide the following for approval prior to delivery to the site:
1. Supplier's Certificate of Compliance attesting that lime, fertilizer and seed meet the requirements specified.
2. The Contractor shall provide representative topsoil samples for testing and approval, deliver samples to a public extension service agency testing laboratory, have testing report sent directly to the Engineer and pay all costs. Testing shall report on mechanical and chemical (pH soluble salts) analysis. Report shall be submitted at least one month before any loaming is to be done.

1.03 SEEDING SEASONS

A. Seeding and initial fertilizing shall be done between April 1 and June 1, between August 15 and October 15, or as permitted. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untillable. If seeding is done during July or August, additional mulch material may be required by the Engineer.

PART 2 – PRODUCTS

2.01 LIME

A. Lime shall be standard, ground dolomite limestone, agricultural grade, containing a minimum of 95% of calcium and magnesium carbonates. 100% shall pass the 10 mesh sieve; minimum 90% shall pass the 20 mesh sieve; minimum 40% shall pass the 100 mesh sieve.

2.02 FERTILIZER

A. Fertilizer shall be commercial grade granular fertilizer as required for soil conditions as specified in Section 643 of the VAOT Standard Specifications. The fertilizer shall be delivered to the project in new, clean, sealed containers which bear a label fully describing the contents, the chemical analysis of each nutrient, the fertilizer grade, the net bulk, the brand and the name and address of the manufacturer. The fertilizer and labels shall conform to all existing State and Federal regulations, and shall meet the standards of the Association of Official Agricultural Chemists.

2.03 GRASS SEED

A. Provide fresh, clean, new–crop seed of the grass species, proportions and minimum percentages of purity, germination and maximum percentage of weed seed as follows:

1. Park seed shall normally be used on loam areas. This seed mixture shall conform to the following table:

Kind of Seed	Minimum Purity	Minimum Germination	Lbs/Acre
Creeping Red Fescue	96%	85%	40
Perennial Ryegrass	98%	90%	50
Kentucky Bluegrass	97%	85%	25
Redtop	95%	80%	5
		TOTAL =	120

2. Slope seed shall normally be used for all slope work, usually 3:1 or steeper and shall conform to the following table:

Kind of Seed	Minimum Purity	Minimum Germination	Lbs/Acre
Creeping Red Fescue	96%	85%	35
Perennial Ryegrass	98%	90%	30
Redtop	95%	80%	5
Alsike Clover	97%	90%	5
Birdsfoot Trefoil	98%	80%	5
		TOTAL =	80

3. Shade seed shall normally be used in shaded areas in or along the edge of wooded areas. This seed mixture shall conform to the following table:

Kind of Seed	Minimum Purity	Minimum Germination	Lbs/Acre
Creeping Red Fescue	95%	80%	30
Tall Fescue	96%	80%	20
Crownvetch	95%	80%	30
		TOTAL =	80

B. The seed mixture shall be delivered in new, clean, sealed containers. Labels and contents shall conform to all State and Federal regulations. Seed shall be subject to the testing provisions of the Association of Official Seed Analysts.

C. Seed that has become wet, moldy, or otherwise damaged will be rejected.

2.04 MULCH

A. Mulch must be installed on all seeded areas. The following mulches are acceptable for use.
1. Hay mulch free of weeds and coarse matter at a rate of 90 pounds per 1,000 square feet.
2. Wood fiber applied in a slurry (1/6" or longer) at a rate of 40 pounds per 1,000 square feet.

2.05 WATER

A. All water used shall be obtained from fresh water sources and shall be free from injurious chemical and other toxic substances harmful to plant life. No water which is brackish will be permitted at any time. The Contractor shall identify to the Engineer all sources of water at least two weeks prior to use. The Engineer, at his discretion, may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source which is disapproved by the Engineer following such tests.

PART 3 – EXECUTION

3.01 PREPARATION

A. Examine finish surfaces and grades. Do not start seeding work until unsatisfactory conditions are corrected. Perform seeding work only after planting and other work affecting ground surface has been completed.

B. Notify Landscape Architect at least seven (7) working days prior to starting seeding.

C. Prepare areas immediately prior to seeding as follows:
1. Loosen soil of seed areas to a minimum depth of 4".
2. Remove stones over 1" in any diameter and sticks, roots, rubbish and extraneous matter.
3. Remove existing weeds and grasses by pulling or tilling under.
4. Grade areas to be seeded to a smooth, free draining even surface with a loose, moderately coarse texture.
5. Remove ridges and fill depressions as required to drain.
6. Restore prepared areas if eroded or disturbed prior to seeding.

3.02 SEEDING CONDITIONS

A. Seeding shall not be done when the ground is frozen, snow covered, muddy, or in any other unsatisfactory condition for planting. No seeding operations shall be conducted under adverse weather conditions or when soil moisture conditions are unfavorable (too wet or too dry) or when winds exceed 5 MPH.

B. Construction methods shall be those established as agronomically acceptable and feasible. The Contractor shall keep all equipment and vehicular and pedestrian traffic off areas that have been seeded to prevent excessive compaction and damage to young plants. Where such compaction has occurred, the Contractor shall rework the soil to make a suitable seed bed; then reseed and mulch such areas with the full amounts of the specified materials, at no extra expense to the Owner.

C. Surface and seepage water should be drained or diverted from the site to prevent drowning or winter killing of the plants.

D. All areas and parts of areas which fail to show a uniform stand of grass for any reason whatsoever shall be reseeded, and such areas and parts of areas shall be seeded repeatedly until all areas are covered with a satisfactory growth of grass.

E. Watering is considered a necessary element for establishment and survival.

F. Where ryegrass has been planted for temporary erosion control and has not been eliminated prior to the completion of the work, such areas shall be disced at least 3 inches deep and seeded to permanent grasses to prevent the ryegrass from reseeding and becoming competitive with and retarding development of the permanent cover.

3.02 SEEDING

A. Lime and fertilizer should be applied prior to or at the time of seeding and incorporated into the soil. Kinds and amounts of lime and fertilizer should be based on an evaluation of soil tests. When a soil test is not available, the following minimum amounts should be applied:

Agricultural limestone, 2 tons per acre or 100 lbs. per 1,000 square feet.

Nitrogen (N), 50 lbs. per acre or 1.1 lbs. per 1,000 square feet.

Phosphate (P205), 100 lbs. per acre or 2.2 lbs. per 1,000 square feet.

Potash (K20), 100 lbs. per acre or 2.2 lbs. per 1,000 square feet.

(Note: This is the equivalent of 500 lbs. per acre of 10–20–20 fertilizer or 1,000 lbs. per acre 5–10–10).

B. Seed should be spread uniformly by the method most appropriate for the site. Methods include broadcasting and hydroseeding as follows:
1. Broadcasting: Sow seed using mechanical spreader at a rate of 4 lbs./1,000 square feet. Distribute seed evenly over entire area by sowing equal quantity in tow directions at right angles to each other. Rake seed lightly into top 1/8" of topsoil, roll lightly and water with a fine spray.
2. Hydroseeding: Mix specified seed, fertilize and pulverize mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application. Apply slurry uniformly to all areas to be seeded. Rate of application as required to obtain specified seed sowing rate.

3.03 MULCHING

A. Mulch materials shall be spread uniformly by hand or machine at a rate of two 50 lb. bales per 1,000 square feet.

B. Organic Mulch Anchoring – Straw or hay mulch must be anchored immediately after spreading to prevent wind blowing.

3.04 MAINTENANCE

A. The maintenance period shall begin immediately after seeding and shall continue until acceptance.

B. All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. Where erosion is observed, additional mulch shall be applied. Net should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, reinstall net as necessary after repairing damage to the slope. Inspections should take place until grasses are firmly established. Grasses shall not be considered established until a ground cover is achieved which is mature enough to control soil erosion and to survive severe weather conditions. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.

C. Seeding areas shall be protected and maintained by watering, reseeding, mowing, weeding, rolling, insect or disease control measures, re–fertilizing and repair of washouts which are necessary.

D. The Contractor shall maintain all seeded areas until full vegetation is established.

E. All seeded areas shall be kept free from weeds and debris, such as stones, cables, baling wire, and all slopes 4:1 or less (flatter) and level turf shall be mowed in the following manner:

1. When grass reaches a height of 4–6", mow to a height of 3".
2. At least two cuttings shall be made prior to final acceptance.

F. Following mowing, all permanent seeding grass areas (mowed and unmowed) shall receive a uniform application of slow release fertilizer hydraulically placed at the rate of 10 pounds per 100 square feet.

3.05 ACCEPTANCE

A. Inspection to determine acceptance of seeded areas will be made by the Landscape Architect, upon Contractor's written request.
1. Provide notification at least ten (10) working days before requested inspection date.

B. Seeded areas will be acceptable provided all installation and maintenance requirements have been complied with and a healthy uniform lawn is established.

C. Upon acceptance, the Owner will assume maintenance.

3.06 WARRANTY

A. All seeded areas will be warranted for a period of twelve months from date of Owner's acceptance. Should any seeded areas fail to maintain full vegetation, failed areas will be refurbished until this specification is achieved at the cost of the Contractor.

END OF SECTION 02936

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52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE:	SCALE:
06/02/2023	AS SHOWN
DRAWN BY:	CHECKED BY:
MAB	DSM

ISSUE LOG:
06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS:
EPSC NARRATIVE

SHEET NO:
C4.5

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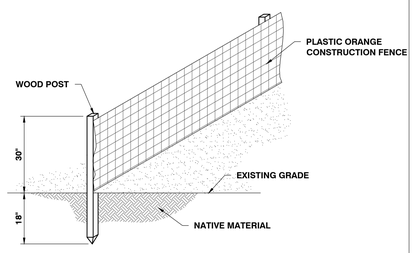
E-002 Constr Fence

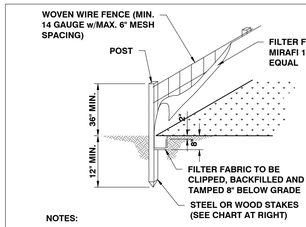


CONSTRUCTION FENCE DETAIL

N.T.S.

E-002 REVISED 08/01/2014

E-003 Silt Fence - wire



POST SPACING	
2½ X 2½ WOOD	2.5'
METAL POST	10'
4 x 4 WOOD	10'

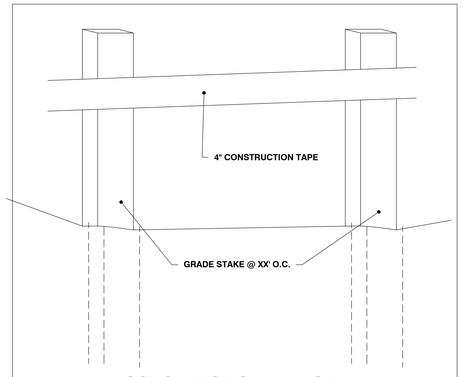
NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. WIRE FENCE REINFORCEMENT REQUIRED WITHIN 100 FT UPSLOPE OF RECEIVING WATERS.
2. INSTALL MIRAFI ENVIROFENCE, OR APPROVED EQUAL OR AS DETAILED HEREIN.
3. INSTALL SILT FENCES AT TOES OF ALL UNPROTECTED SLOPES AND AS PARALLEL TO CONTOURS AS POSSIBLE. THIS INCLUDES ALL FILLED OR UNPROTECTED SLOPES CREATED DURING CONSTRUCTION, NOT NECESSARILY REFLECTED ON THE FINAL PLANS. CURVE THE ENDS OF THE FENCE UP INTO THE SLOPE. REMOVE SEDIMENT WHEN ACCUMULATED TO HALF THE HEIGHT OF THE FENCE. SILT FENCES ARE TO BE MAINTAINED UNTIL SLOPES ARE STABILIZED.
4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6", FOLDED AND STAPLED.

REINFORCED SILT FENCE DETAIL

N.T.S.

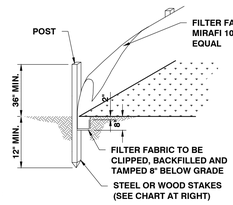
E-003 REVISED 09/24/2014



CONSTRUCTION LIMITS TAPE

N.T.S.

E-003 Silt Fence



POST SPACING	
2½ X 2½ WOOD	2.5'
METAL POST	10'
4 x 4 WOOD	10'

NOTES:

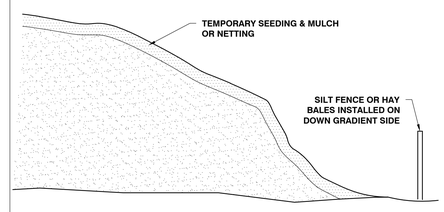
1. INSTALL MIRAFI ENVIROFENCE, OR APPROVED EQUAL OR AS DETAILED HEREIN.
2. INSTALL SILT FENCES AT TOES OF ALL UNPROTECTED SLOPES AND AS PARALLEL TO CONTOURS AS POSSIBLE. THIS INCLUDES ALL FILLED OR UNPROTECTED SLOPES CREATED DURING CONSTRUCTION, NOT NECESSARILY REFLECTED ON THE FINAL PLANS. CURVE THE ENDS OF THE FENCE UP INTO THE SLOPE. REMOVE SEDIMENT WHEN ACCUMULATED TO HALF THE HEIGHT OF THE FENCE. SILT FENCES ARE TO BE MAINTAINED UNTIL SLOPES ARE STABILIZED.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6", FOLDED AND STAPLED.

SILT FENCE DETAIL

N.T.S.

E-003 REVISED 08/01/2014

E-005 Stockpile

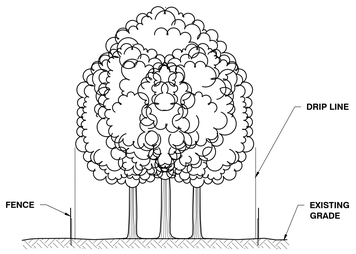


TEMPORARY STOCKPILE DETAIL

N.T.S.

E-005 REVISED 08/01/2014

L-006 Tree Protection



NOTES:

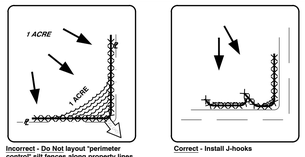
1. THIS FENCE SHALL BE LOCATED OUTSIDE THE DRIP LINE OF THE TREE TO BE SAVED AND IN NO CASE CLOSER THAN 6' TO THE TRUNK OF ANY TREE.
2. FENCE POST SHALL BE STANDARD STEEL POSTS OR WOOD POSTS WITH A MINIMUM CROSS SECTIONAL AREA OF 3.0 SQ. IN.
3. THE FENCE MAY BE EITHER 40" HIGH SNOW FENCE, 40" PLASTIC WEB FENCING OR ANY OTHER MATERIAL AS APPROVED BY THE ENGINEER.

TREE PROTECTION - FENCING

N.T.S.

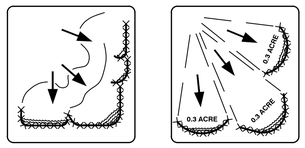
L-006 REVISED 2/12/2015

E-010 Silt Fence Perimeter Control



Incorrect - Do Not layout "perimeter control" silt fences along property lines. All sediment laden runoff will concentrate and overwhelm the system.

Correct - Install J-hooks



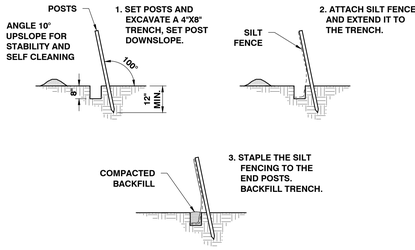
Discreet segments of silt fence, installed with J-hooks or 'smiles' will be much more effective.

SILT FENCE PLACEMENT FOR PERIMETER CONTROL

N.T.S.

E-010 REVISED 12/19/2014

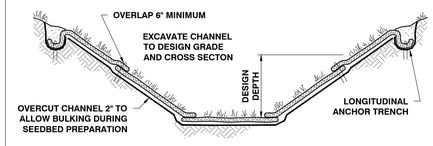
E-007 Infilt Sect

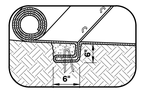


SILT FENCE CONSTRUCTION DETAIL

N.T.S.

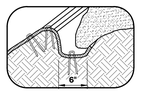
E-007 REVISED 08/01/2014





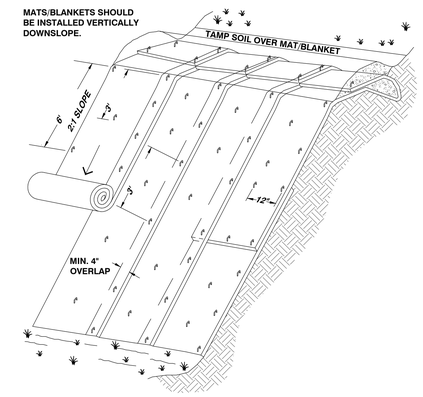
INTERMITTENT CHECK SLOT

TYPICAL INSTALLATION WITH EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS



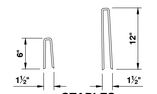
LONGITUDINAL ANCHOR TRENCH

E-009 Slope Erosion Blankets

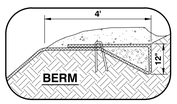


ISOMETRIC VIEW

TYPICAL SLOPE SOIL STABILIZATION



STAPLES



NOTES:

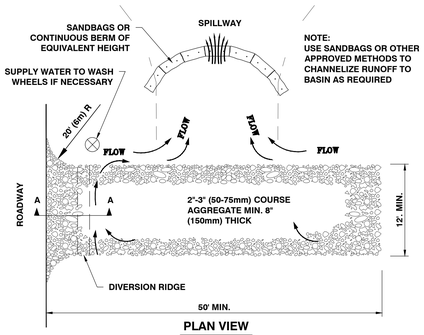
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION

N.T.S.

E-009 REVISED 08/01/2014

E-004 Constr. Ent



PLAN VIEW

NOTE: USE SANDBAGS OR OTHER APPROVED METHODS TO CHANNELIZE RUNOFF TO BASIN AS REQUIRED



SECTION A-A

NOTES:

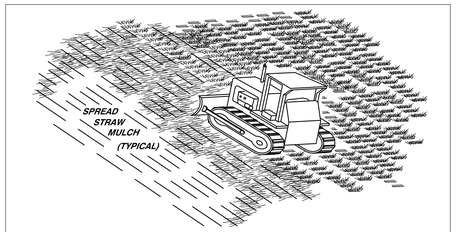
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

STABILIZED CONSTRUCTION ENTRANCE

N.T.S.

E-004 REVISED 08/01/2014

E-012 Straw Anchoring



'TRACKING' WITH MACHINERY ON SANDY SOIL PROVIDES ROUGHENING WITHOUT UNDUE COMPACTION.

NOTES:

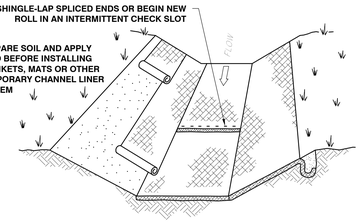
1. ROUGHEN SLOPE WITH BULLDOZER.
2. BROADCAST SEED AND FERTILIZER.
3. SPREAD STRAW MULCH 3' (2½ TONS PER ACRE)
4. PUNCH STRAW MULCH INTO SLOPE BY RUNNING BULLDOZER UP AND DOWN SLOPE.

STRAW ANCHORING

N.T.S.

E-012 REVISED 12/19/2014

E-011 Grass Lined Channel



NOTES:

1. DESIGN VELOCITIES EXCEEDING 2 FT./SEC./ REQUIRE TEMPORARY BLANKETS, MATS OR SIMILAR LINERS TO PROTECT SEED AND SOIL UNTIL VEGETATION BECOMES ESTABLISHED.
2. GRASS-LINED CHANNELS WITH DESIGN VELOCITIES EXCEEDING 6 FT./SEC. SHOULD INCLUDE TURF REINFORCEMENT MATS.

GRASS-LINED CHANNEL TYPICAL INSTALLATION

N.T.S.

E-011 REVISED 12/19/2014

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE:	SCALE:
06/02/2023	AS SHOWN
DRAWN BY:	CHECKED BY:
MAB	DSM

ISSUE LOG:
06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS:
EPSC DETAILS

SHEET NO:
C4.6

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Winter EPSC Requirements

Introduction - Rains in late fall, thaws throughout the winter, and spring melt and rains can produce significant flows over frozen and saturated ground, greatly increasing the potential for erosion. At the same time as the erosion risk increases, the "toolbox" available to the contractor and on-site plan coordinator shrinks significantly over this period (Table 3.4 below).

Table 3.4 Effects of Winter on EPSC Practices

EPSC Measure	Effect of Winter Conditions
Vegetative Ground Cover	Cannot be established outside of growing
Hydroseeding	Stabilizers are poor in cold conditions, poor/no growth of seed over
Diversion Structures	Difficult or impossible to implement in frozen soils.
Sedimentation Basins	Must be installed pre-ground freezing. Can be overwhelmed by spring flows
Silt Fence	Difficult to install in frozen ground. Often fail during spring melt.
Erosion Blankets	Cannot be installed correctly on frozen ground. Improper installations (not keyed in) melt flows. wash away in melt flows.
Grassed line swales	Installation following ground freezing difficult, leaving unprotected concentrated flows with significant erosion potential
Impervious Stabilization	Paving, other measures cannot be completed in winter

In particular, establishing vigorous vegetation during winter construction is not possible. Based upon the activities anticipated to be undertaken during this period, the Contractor shall plan and implement the following Winter EPSC measures.

EPSC Plan Requirements for -Winter Shutdown-

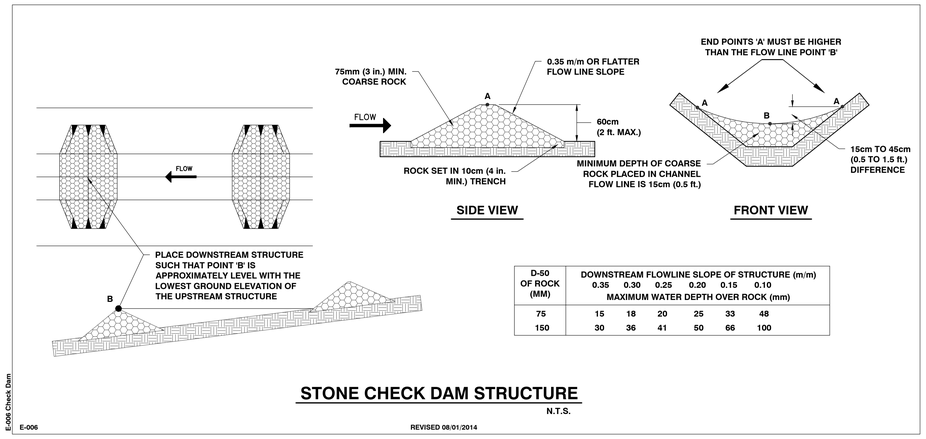
For those projects that will complete earth disturbance activities prior to the winter period (October 15), the following must be implemented by the Site Contractor in coordination with the On-Site Plan Coordinator:

1. For areas to be stabilized by vegetation, all seeding shall be completed no later than September 15 to ensure adequate growth and cover.
2. Non-vegetative stabilization of all areas of disturbed soils without existing vegetation shall be completed no later than October 15.
3. When mulch is used as a temporary means of stabilization, the rate of application shall be double that of the regular construction season rate, or roughly 2 inches of mulch with 80-90% cover. Mulch should be tracked in when weather permits or stabilized with netting or an approved tackifier.

EPSC Plan Requirements for -Winter Construction-

If construction activities involving earth disturbance continue past October 15 or begin before April 15, the following must be implemented by the Owner/Site Contractor:

1. Enlarged stabilized access points to provide for snow stockpiling.
2. Limits of disturbance flagging moved or replaced to reflect the boundaries of winter work.
3. A snow management plan which implements the following requirements:
   a. adequate storage and control of snowmelt by diverting these flows around the work area,
   b. cleared snow is to be stored down gradient of all areas of disturbance
   c. Storage of snow in stormwater treatment structures is prohibited.
   d. All drainage structures shall be kept open and free of snow/ice.
   e. buffer is to be maintained from the perimeter controls such as silt fence to allow for snow clearing and maintenance.
   f. Install silt fence a minimum of 25 feet down gradient of areas of disturbance and snow storage areas. Reinforce fence in areas where snow load forces may be an issue due to site constrictions.
4. In areas of disturbance within 100 feet of a receiving water, silt fence shall be reinforced or else replaced with perimeter dikes, swales, or other practices resistant to the forces of snow loads.
5. All silt fence and other practices requiring earth disturbance shall be installed ahead of ground freezing.
6. Where mulch is the selected stabilization measure, the mulch shall be installed at double the standard rate of mulch, or roughly 2 inches of mulch with 80-90% cover.
7. Mulch should be tracked in when weather permits or stabilized with netting or an approved tackifier to prevent removal by wind.
8. To ensure cover of disturbed soil in advance of a melt event, areas of disturbed soil must be stabilized at the end of each work day, with the following exceptions:
   a. If no precipitation within 24 hours is forecast and work will resume in the same disturbed area within 24 hours, daily stabilization is not necessary.
   b. Disturbed areas that collect and retain runoff, such as house foundations or open utility trenches."
9. Directions to remove snow or ice to less than 1" thickness prior to temporary or permanent stabilization.
10. Stone stabilization shall be installed a width of 10 to 20ft wide around the perimeter of buildings under construction, where construction vehicle traffic is anticipated.



D-50 OF ROCK (MM)	DOWNSTREAM FLOWLINE SLOPE OF STRUCTURE (m/m) 0.35	0.30	0.25	0.20	0.15	0.10
	MAXIMUM WATER DEPTH OVER ROCK (mm)					
75	15	18	20	25	33	48
150	30	36	41	50	66	100

STONE CHECK DAM STRUCTURE

N.T.S.

E-006 REVISED 08/01/2014

E-006 Check Dam

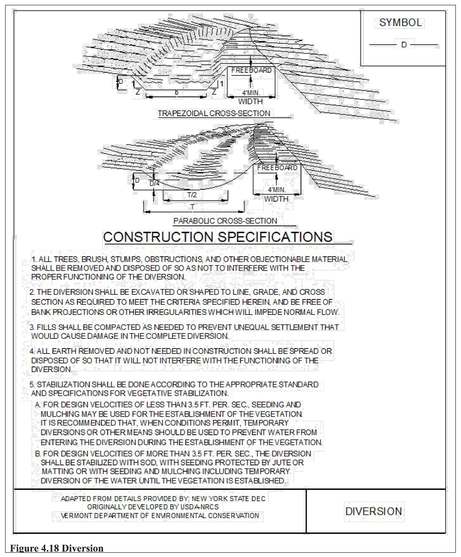
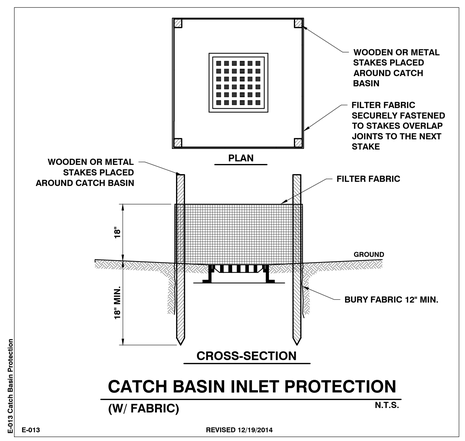


Figure 4.18 Diversion

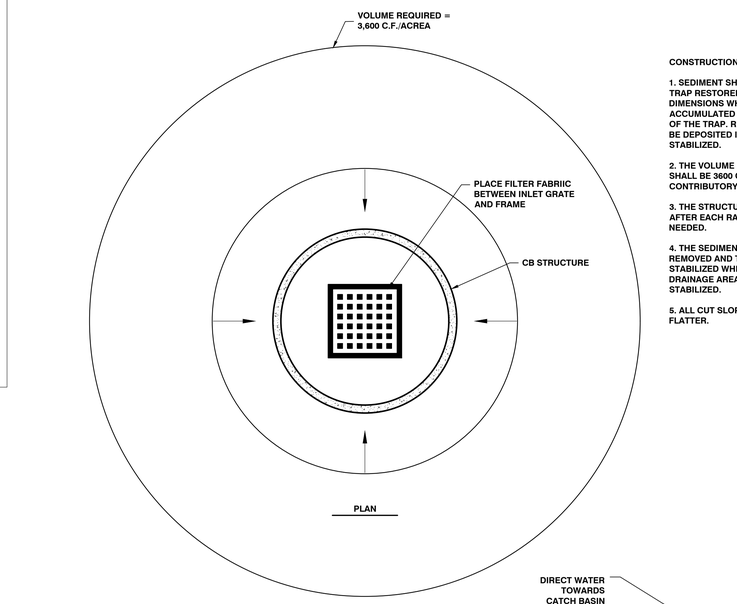


CATCH BASIN INLET PROTECTION

(W/ FABRIC) N.T.S.

E-013 REVISED 12/19/2014

E-013 Catch Basin Protection



CATCH BASIN SEDIMENT TRAP

N.T.S.

CONSTRUCTION NOTES:

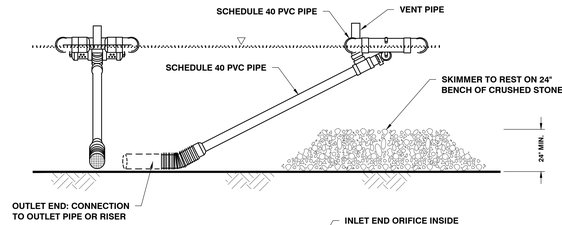
1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.

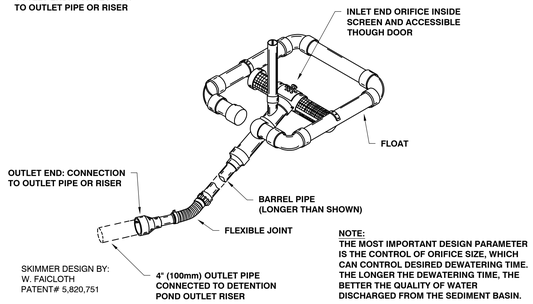
2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.

3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.

4. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

5. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

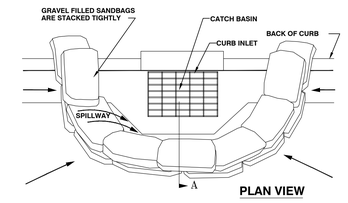




NOTE:
THE MOST IMPORTANT DESIGN PARAMETER IS THE CONTROL OF ORIFICE SIZE, WHICH CAN CONTROL DESIRED DEWATERING TIME. THE LONGER THE DEWATERING TIME, THE BETTER THE QUALITY OF WATER DISCHARGED FROM THE SEDIMENT BASIN.

"SKIMMER" SEDIMENT POND OUTLET

N.T.S.



NOTES:
1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
2. SANDBAGS, OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY.
3. LEAVE ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.
4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.

CURB INLET SEDIMENT BARRIER (SANDBAG)

N.T.S.

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FFF PROJECT NO: 21255

ORIGINATION DATE: 06/02/2023 | SCALE: AS SHOWN

DRAWN BY: MAB | CHECKED BY: DSM

ISSUE LOG: 06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS: EPSC DETAILS AND SPECIFICATIONS

SHEET NO: C4.7

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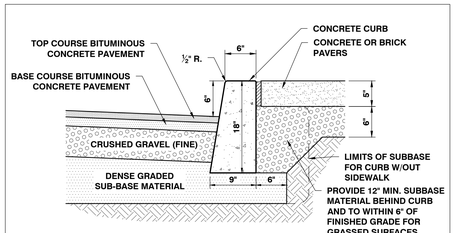
S-001 Curb



NOTES:

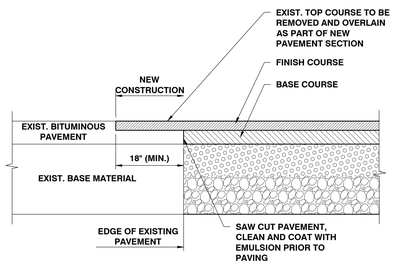
1. CURBING SHALL BE CONSTRUCTED IN 10' SECTIONS WITH ½" JOINT BETWEEN SECTIONS.
2. CURBING EXPANSION JOINTS SHALL BE CONSTRUCTED EVERY 20' AND SHALL BE CONSTRUCTED OF MATERIAL CONFORMING TO AASHTO DESIGNATION M-153 (½" SPONGE RUBBER OR CORK).
3. ASPHALT TREATED FELT TO BE USED BETWEEN SIDEWALK AND CONCRETE CURB TOP.

CURB w/SIDEWALK DETAIL

(SIMILAR WITH OUT SIDEWALK) N.T.S.

S-001 REVISED 10/07/2015

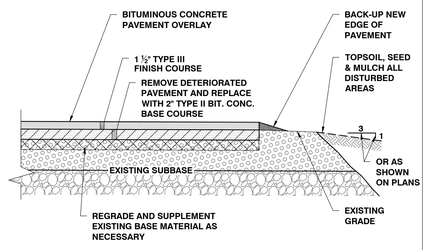
S-014 Pavement Transition



TRANSITION FROM NEW PAVEMENT TO EXISTING PAVEMENT

N.T.S.

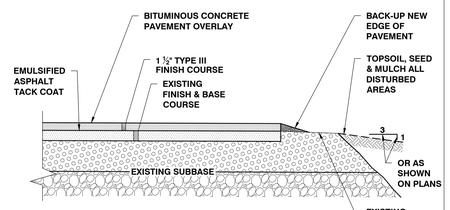
S-014 REVISED 6/15/2017



TYPICAL PAVEMENT REGRADING SECTION

N.T.S.

S-003a Pave Overlay Exc-Shoulder

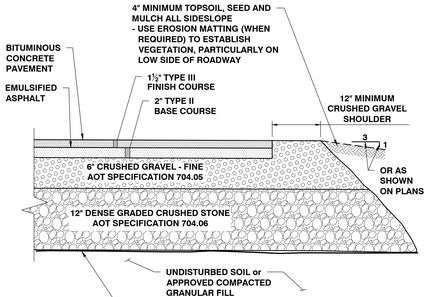


TYPICAL PAVEMENT OVERLAY SECTION

N.T.S.

S-003a REVISED 6/19/2019

S-003 Pave Sec-Shoulder

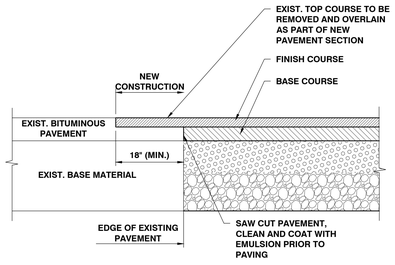


TYPICAL PAVEMENT SECTION

(FULL DEPTH CONSTRUCTION SECTION) N.T.S.

S-003 REVISED 12/03/2020

S-014 Pavement Transition

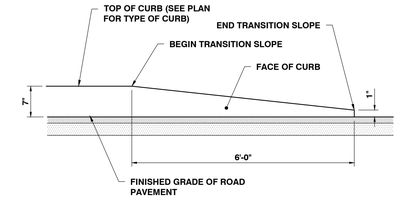


TRANSITION FROM NEW PAVEMENT TO EXISTING PAVEMENT

N.T.S.

S-014 REVISED 6/15/2017

S-006 Trans Curb

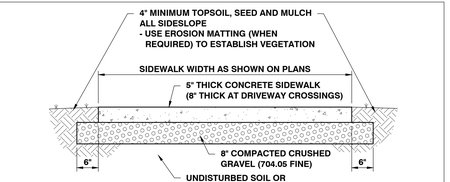


TRANSITION CURB DETAIL

N.T.S.

S-006 REVISED 08/01/2014

S-002 Conc Walk



CONCRETE SIDEWALK DETAIL

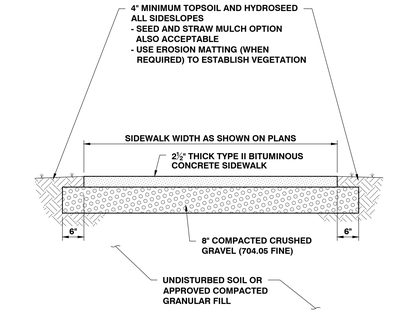
N.T.S.

NOTES:

1. SIDEWALK JOINTS:
   - CONSTRUCTION JOINTS: SET CONSTRUCTION JOINTS AT SIDE AND END TERMINATIONS OF PAVING AND AT LOCATIONS WHERE PAVING OPERATIONS ARE STOPPED FOR MORE THAN ONE-HALF HOUR UNLESS PAVING TERMINATES AT ISOLATION JOINTS.
   - ISOLATION JOINTS: FORM ISOLATION JOINTS OF PREFORMED JOINT-FILLER STRIPS ABUTTING CONCRETE CURBS, CATCH BASINS, MANHOLES, INLETS, STRUCTURES, OTHER FIXED OBJECTS, AND WHERE INDICATED.
   - CONTRACTION JOINTS: FORM WEAKENED-PLANE CONTRACTION JOINTS, SECTIONING CONCRETE INTO AREAS AS INDICATED. TYPICAL JOINT SPACING IS 5 FEET BUT MAY BE INDICATED DIFFERENTLY ON PLANS FOR WIDER SIDEWALKS OR PLAZA AREAS. CONSTRUCT CONTRACTION JOINTS FOR A DEPTH EQUAL TO AT LEAST ONE-FOURTH OF THE CONCRETE THICKNESS, CONTRACTION JOINTS MAY BE EITHER GROOVED or SAWED JOINTS.
2. NO DEICER SHALL BE APPLIED TO SIDEWALK UNTIL AT LEAST 30 DAYS OF AIR DRYING TIME HAS OCCURRED.
3. LIQUID MEMBRANE-FORMING CURING AND SEALING COMPOUNDS SHALL MEET ASTM C309 or C1315. SEALERS SHALL BE BASED ON SILANE OR SILOXANE TECHNOLOGY FOR BEST SALT AND WATER REPELLENCY FOR CONCRETE PAVEMENTS. TWO COATS SHALL BE APPLIED AT RIGHT ANGLES FOR EVEN COVERAGE. INSTALL IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.
4. INSTALL POLYURETHANE ELASTOMERIC SEALANT AT ALL SAWED JOINTS.

S-002 REVISED 7/01/2019

S-002b Bit Conc Walk

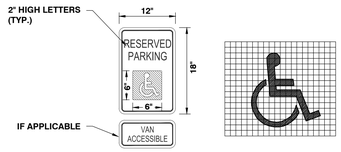


BITUMINOUS CONCRETE SIDEWALK DETAIL

N.T.S.

S-002b REVISED 1/28/2021

S-015b HC Sign



COLOR: LEGEND AND BORDER - GREEN
WHITE SYMBOL ON BLUE BACKGROUND
BACKGROUND - WHITE

MATERIAL: AS PER VAOT STANDARD E-143M

POST: 2" (14 ga.) SQUARE STEEL SIGN POST
INSTALL IN ACCORDANCE w/VAOT STANDARD E-164

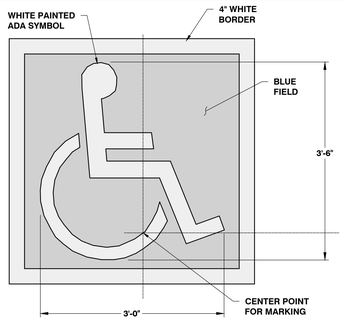
ACCESSIBLE PARKING SIGN DETAIL

N.T.S.

SIGN SHALL BE POSTED AT THE HEAD OF EACH ACCESSIBLE SPACE. MOUNTING HEIGHT IS 60" MINIMUM TO BOTTOM OF SIGN.

S-015b REVISED 2/27/2020

S-015a HC Pave Marking



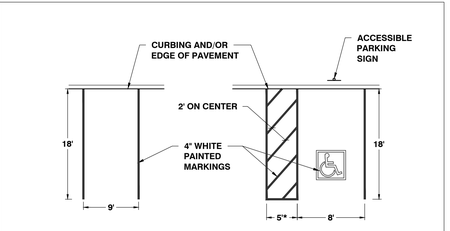
NOTE: PAVEMENT MARKINGS TO MEET STATE STANDARDS E-191

ACCESSIBLE PARKING MARKING DETAIL

N.T.S.

S-015a REVISED 2/27/2020

S-015 Parking Space Striping



*8' FOR VAN ACCESSIBLE SPACE (UNLESS OTHERWISE NOTED ON PLANS)

STANDARD PARKING SPACE ACCESSIBLE PARKING SPACE

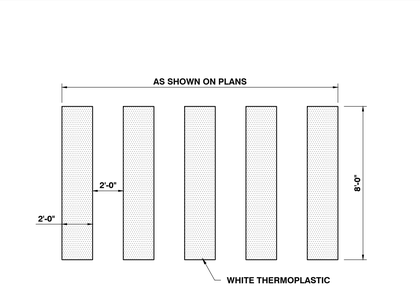
TRAFFIC MARKING PAINT TO BE READY-MIXED TRAFFIC PAINT SUITABLE FOR MARKING ON EITHER BITUMINOUS OR PORTLAND CEMENT CONCRETE PAVEMENT. READY-MIXED LOW VOC TRAFFIC PAINT SHALL CONSIST OF 100% ACRYLIC TYPE, FAST DRYING TRAFFIC PAINT.

LINE STRIPING DETAIL

N.T.S.

S-015 REVISED 2/27/2020

S-008 Crosswalk

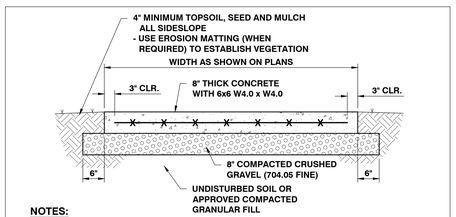


CROSSWALK DETAIL

N.T.S.

S-008 REVISED 12/19/2014

S-002 Conc Walk



LOADING DOCK TRUCK / RAMP CONCRETE PAD

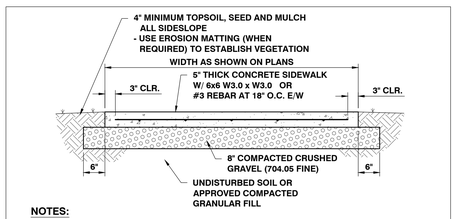
N.T.S.

NOTES:

1. SIDEWALK JOINTS:
   - CONSTRUCTION JOINTS: SET CONSTRUCTION JOINTS AT SIDE AND END TERMINATIONS OF PAVING AND AT LOCATIONS WHERE PAVING OPERATIONS ARE STOPPED FOR MORE THAN ONE-HALF HOUR UNLESS PAVING TERMINATES AT ISOLATION JOINTS.
   - ISOLATION JOINTS: FORM ISOLATION JOINTS OF PREFORMED JOINT-FILLER STRIPS ABUTTING CONCRETE CURBS, CATCH BASINS, MANHOLES, INLETS, STRUCTURES, OTHER FIXED OBJECTS, AND WHERE INDICATED.
   - CONTRACTION JOINTS: FORM WEAKENED-PLANE CONTRACTION JOINTS, SECTIONING CONCRETE INTO AREAS AS INDICATED. JOINT SPACING IS INDICATED ON PLANS FOR THE BRICK PLAZA AREAS. CONSTRUCT CONTRACTION JOINTS FOR A DEPTH EQUAL TO AT LEAST ONE-FOURTH OF THE CONCRETE THICKNESS, CONTRACTION JOINTS WILL BE SAWED JOINTS.
2. NO DEICER SHALL BE APPLIED TO SIDEWALK UNTIL AT LEAST 30 DAYS OF AIR DRYING TIME HAS OCCURRED.
3. LIQUID MEMBRANE-FORMING CURING AND SEALING COMPOUNDS SHALL MEET ASTM C309 or C1315. SEALERS SHALL BE BASED ON SILANE OR SILOXANE TECHNOLOGY FOR BEST SALT AND WATER REPELLENCY FOR CONCRETE PAVEMENTS. TWO COATS SHALL BE APPLIED AT RIGHT ANGLES FOR EVEN COVERAGE. INSTALL IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.
4. INSTALL POLYURETHANE ELASTOMERIC SEALANT AT ALL SAWED JOINTS.

S-002 REVISED 7/01/2019

S-002 Conc Walk



NOTES:

1. SIDEWALK JOINTS:
   - CONSTRUCTION JOINTS: SET CONSTRUCTION JOINTS AT SIDE AND END TERMINATIONS OF PAVING AND AT LOCATIONS WHERE PAVING OPERATIONS ARE STOPPED FOR MORE THAN ONE-HALF HOUR UNLESS PAVING TERMINATES AT ISOLATION JOINTS.
   - ISOLATION JOINTS: FORM ISOLATION JOINTS OF PREFORMED JOINT-FILLER STRIPS ABUTTING CONCRETE CURBS, CATCH BASINS, MANHOLES, INLETS, STRUCTURES, OTHER FIXED OBJECTS, AND WHERE INDICATED.
   - CONTRACTION JOINTS: FORM WEAKENED-PLANE CONTRACTION JOINTS, SECTIONING CONCRETE INTO AREAS AS INDICATED. JOINT SPACING IS INDICATED ON PLANS FOR THE BRICK PLAZA AREAS. CONSTRUCT CONTRACTION JOINTS FOR A DEPTH EQUAL TO AT LEAST ONE-FOURTH OF THE CONCRETE THICKNESS, CONTRACTION JOINTS WILL BE SAWED JOINTS.
2. NO DEICER SHALL BE APPLIED TO SIDEWALK UNTIL AT LEAST 30 DAYS OF AIR DRYING TIME HAS OCCURRED.
3. LIQUID MEMBRANE-FORMING CURING AND SEALING COMPOUNDS SHALL MEET ASTM C309 or C1315. SEALERS SHALL BE BASED ON SILANE OR SILOXANE TECHNOLOGY FOR BEST SALT AND WATER REPELLENCY FOR CONCRETE PAVEMENTS. TWO COATS SHALL BE APPLIED AT RIGHT ANGLES FOR EVEN COVERAGE. INSTALL IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.
4. INSTALL POLYURETHANE ELASTOMERIC SEALANT AT ALL SAWED JOINTS.

CONCRETE UNDER BRICK PAVERS DETAIL

N.T.S.

S-002 REVISED 7/01/2019

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FF PROJECT NO: 21255

ORIGINATION DATE: 06/02/2023 | SCALE: AS SHOWN

DRAWN BY: MAB | CHECKED BY: DSM

ISSUE LOG: 06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS: SITE DETAILS

SHEET NO: C5.0

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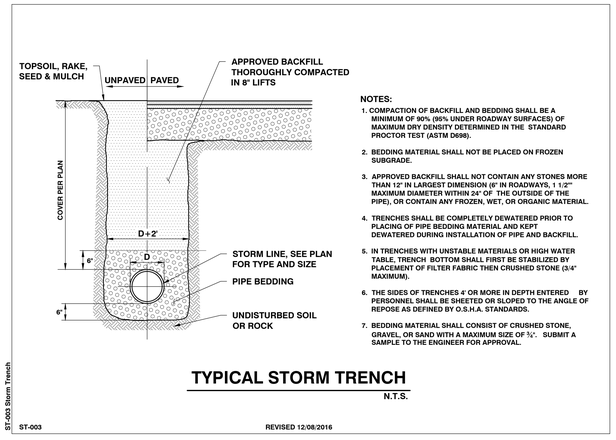


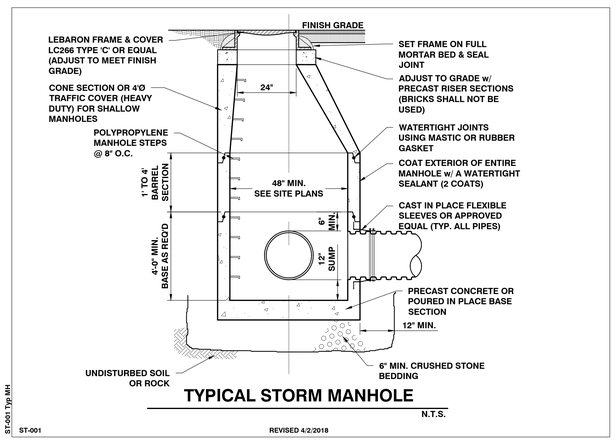
NOTES:

1. COMPACTION OF BACKFILL AND BEDDING SHALL BE A MINIMUM OF 90% (95% UNDER ROADWAY SURFACES) OF MAXIMUM DRY DENSITY DETERMINED IN THE STANDARD PROCTOR TEST (ASTM D698).
2. BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN SUBGRADE.
3. APPROVED BACKFILL SHALL NOT CONTAIN ANY STONES MORE THAN 12" IN LARGEST DIMENSION (6" IN ROADWAYS, 1 1/2"" MAXIMUM DIAMETER WITHIN 24" OF THE OUTSIDE OF THE PIPE), OR CONTAIN ANY FROZEN, WET, OR ORGANIC MATERIAL.
4. TRENCHES SHALL BE COMPLETELY DEWATERED PRIOR TO PLACING OF PIPE BEDDING MATERIAL AND KEPT DEWATERED DURING INSTALLATION OF PIPE AND BACKFILL.
5. IN TRENCHES WITH UNSTABLE MATERIALS OR HIGH WATER TABLE, TRENCH BOTTOM SHALL FIRST BE STABILIZED BY PLACEMENT OF FILTER FABRIC THEN CRUSHED STONE (3/4" MAXIMUM).
6. THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED TO THE ANGLE OF REPOSE AS DEFINED BY O.S.H.A. STANDARDS.
7. BEDDING MATERIAL SHALL CONSIST OF CRUSHED STONE, GRAVEL, OR SAND WITH A MAXIMUM SIZE OF ¾". SUBMIT A SAMPLE TO THE ENGINEER FOR APPROVAL.

TYPICAL STORM TRENCH

N.T.S.

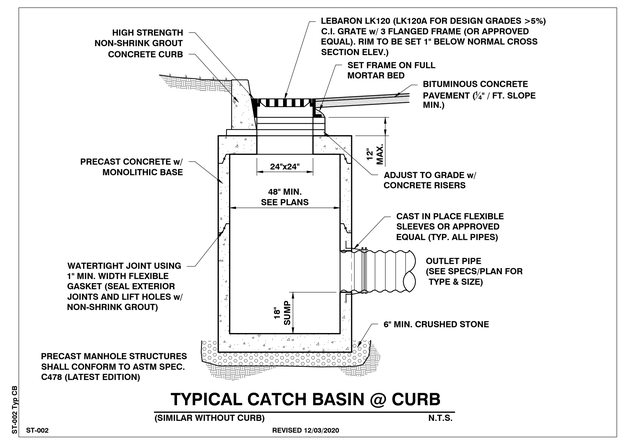
ST-003 Storm Trench | ST-003 | REVISED 12/08/2016



TYPICAL STORM MANHOLE

N.T.S.

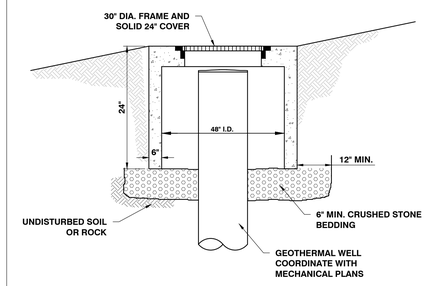
ST-001 Typ MH | ST-001 | REVISED 4/2/2018



TYPICAL CATCH BASIN @ CURB

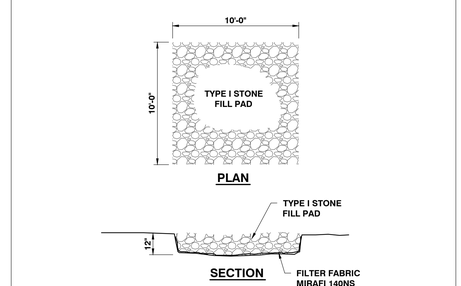
(SIMILAR WITHOUT CURB) N.T.S.

ST-002 Typ CB | ST-002 | REVISED 12/03/2020



GEOTHERMAL WELL MANHOLE

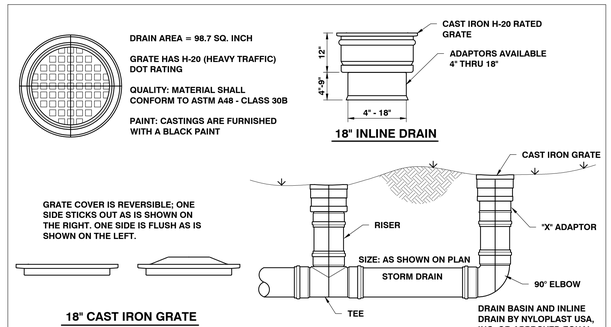
N.T.S.



STONE FILL PAD

N.T.S.

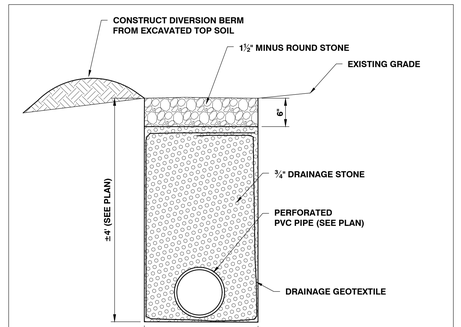
ST-013 Stone Pad | ST-013 | REVISED 08/01/2014



YARD DRAIN DETAILS

N.T.S.

ST-009 Yard Drain | ST-008 | REVISED 08/01/2014



TYPICAL CURTAIN DRAIN SECTION

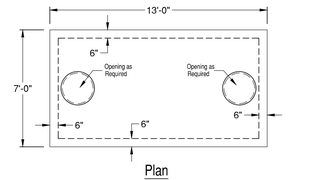
N.T.S.

ST-026 Curtain Drain | ST-026 | REVISED 1/28/2015

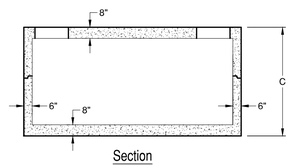
6' x 12' Heavy Duty Vault

1,000 - 3,500 Gallon (HD6-12)

538 Gal. / Vertical ft.



Plan



Section

CONTRACTOR TO FIELD VERIFY EX. INVERTS PRIOR TO ORDERING

	Model	Tank Capacity	Height (C)	Weight
*	HD6-12-1000	1000 gallon	52"	26,490 lb
*	HD6-12-1500	1500 gallon	64"	29,300 lb
	HD6-12-2000	2000 gallon	76"	32,110 lb
	HD6-12-2500	2500 gallon	82"	33,520 lb
	HD6-12-3000	3000 gallon	94"	36,330 lb
	HD6-12-3500	3500 gallon	106"	39,140 lb

SPECIFICATIONS:

- Concrete Minimum Strength 5000psi @ 28 days
- Steel Reinforcement Grade 60
- Joints Sealed with Butyl Sealant
- (*) Top Seam Construction
- H-20 Loading Available
- Pipe Penetrations Supplied per Specifications
- Weights Subject to Variation

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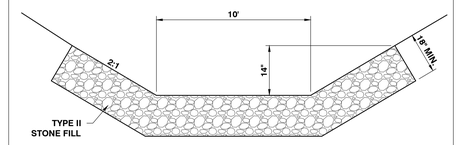
TOLL FREE 1.888.299.2401 FAX 802.893.1542

CAMP Precast Concrete Products www.CAMPPRECAST.com | Revision Date : 2/16/2006 | Section : 7

OR APPROVED EQUAL



EMERGENCY SPILLWAY

N.T.S.

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ORIGINATION DATE:	SCALE:
06/02/2023	AS SHOWN
DRAWN BY:	CHECKED BY:
MAB	DSM

ISSUE LOG:
06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS:
STORMWATER DETAILS

SHEET NO:
C5.1

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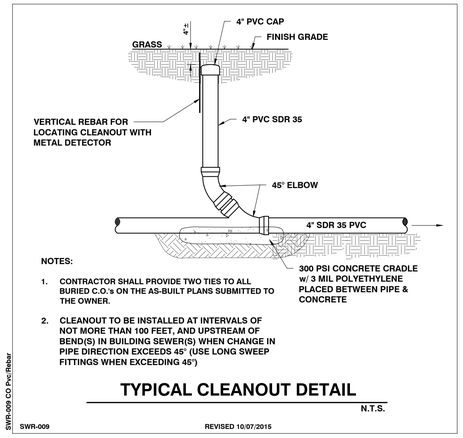


NOTES:

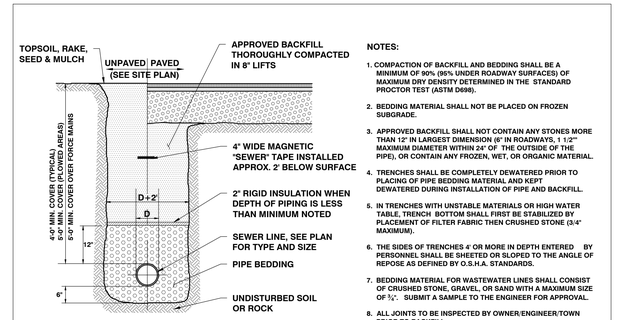
1. CONTRACTOR SHALL PROVIDE TWO TIES TO ALL BURIED C.O.'s ON THE AS-BUILT PLANS SUBMITTED TO THE OWNER.
2. CLEANOUT TO BE INSTALLED AT INTERVALS OF NOT MORE THAN 100 FEET, AND UPSTREAM OF BEND(S) IN BUILDING SEWER(S) WHEN CHANGE IN PIPE DIRECTION EXCEEDS 45° (USE LONG SWEEP FITTINGS WHEN EXCEEDING 45°)

TYPICAL CLEANOUT DETAIL

N.T.S.

SWR-009 CO Pvc Rebar

SWR-009 REVISED 10/07/2015



NOTES:

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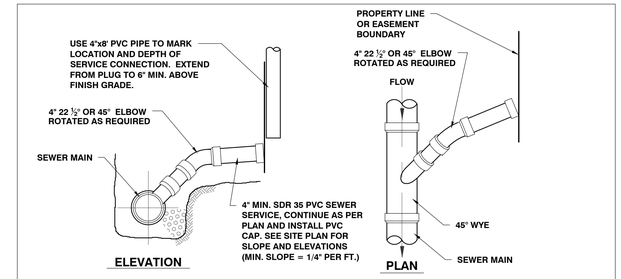
2. BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN SUBGRADE.
3. APPROVED BACKFILL SHALL NOT CONTAIN ANY STONES MORE THAN 12" IN LARGEST DIMENSION (6" IN ROADWAYS, 1 1/2"" MAXIMUM DIAMETER WITHIN 24" OF THE OUTSIDE OF THE PIPE), OR CONTAIN ANY FROZEN, WET, OR ORGANIC MATERIAL.
4. TRENCHES SHALL BE COMPLETELY DEWATERED PRIOR TO PLACING OF PIPE BEDDING MATERIAL AND KEPT DEWATERED DURING INSTALLATION OF PIPE AND BACKFILL.
5. IN TRENCHES WITH UNSTABLE MATERIALS OR HIGH WATER TABLE, TRENCH BOTTOM SHALL FIRST BE STABILIZED BY PLACEMENT OF FILTER FABRIC THEN CRUSHED STONE (3/4" MAXIMUM).
6. THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED TO THE ANGLE OF REPOSE AS DEFINED BY O.S.H.A. STANDARDS.
7. BEDDING MATERIAL FOR WASTEWATER LINES SHALL CONSIST OF CRUSHED STONE, GRAVEL, OR SAND WITH A MAXIMUM SIZE OF ½". SUBMIT A SAMPLE TO THE ENGINEER FOR APPROVAL.
8. ALL JOINTS TO BE INSPECTED BY OWNER/ENGINEER/TOWN PRIOR TO BACKFILL.

TYPICAL SEWER TRENCH DETAIL

N.T.S.

SWR-001 Trench

SWR-001 REVISED 12/08/2016



- CONTRACTOR TO PROVIDE 3 LOCATION TIES TO END OF LATERAL TO BE INCLUDED ON "AS-BUILT" DRAWINGS. (IF CONSTRUCTION IS NOT CONCURRENT WITH LATERAL)
- SEE TYPICAL TRENCH FOR BEDDING AND BACKFILL REQUIREMENTS.

SEWER SERVICE CONNECTION

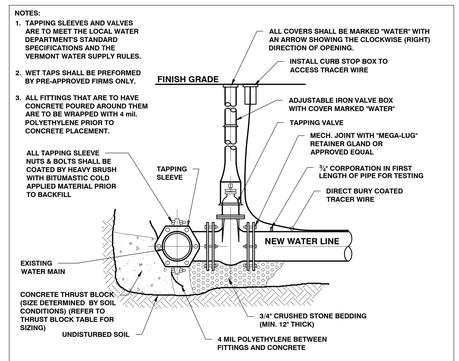
N.T.S.

SWR-002 Service Con

SWR-002 REVISED 08/01/2014

NOTES:

1. TAPPING SLEEVES AND VALVES ARE TO MEET THE LOCAL WATER DEPARTMENT'S STANDARD SPECIFICATIONS AND THE VERMONT WATER SUPPLY RULES.
2. WET TAPS SHALL BE PREFORMED BY PRE-APPROVED FIRMS ONLY.
3. ALL FITTINGS THAT ARE TO HAVE CONCRETE POURED AROUND THEM ARE TO BE WRAPPED WITH 4 mil. POLYETHYLENE PRIOR TO CONCRETE PLACEMENT.

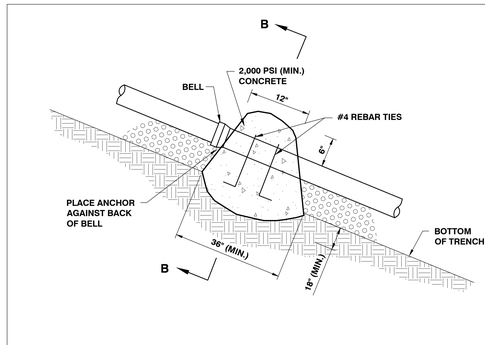


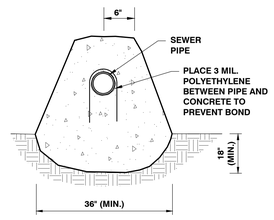
TAPPING SLEEVE & VALVE DETAIL

N.T.S.

W-002 Tap

W-002 REVISED 6/15/2015

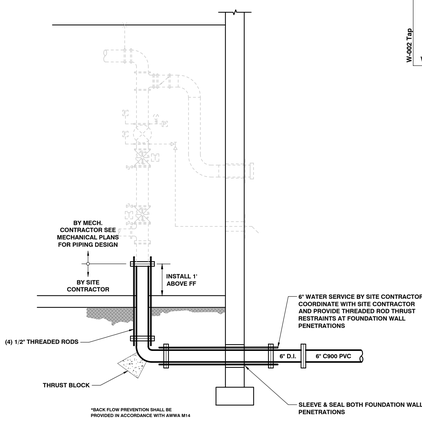




SECTION B-B

TYPICAL CONCRETE ANCHOR DETAIL

N.T.S.

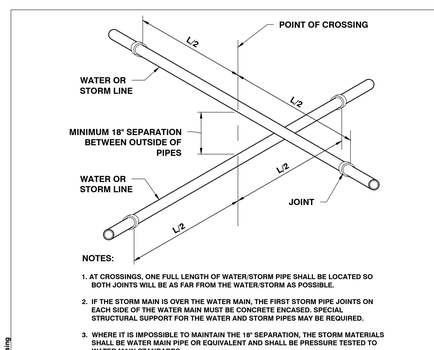

5' MIN. PAVMENT LIMIT FOR WATER TRENCH
PAVED
UNPAVED
SEE PAVEMENT REPLACEMENT DETAILS AND SPECIFICATIONS
COMPACTED GRAVEL
6" MIN.
GRAVEL BACKFILL 6" +/-
NATIVE BACKFILL
SEE TABLE BELOW
MINIMUM BURIAL DEPTH
NOTES 1. WHERE BOUNDARY TO BE DETERMINED "COMPACTED", USE MEANS SHOWN TO YIELD STANDARD PROCTOR DENSITY (ASTM D-698). 2. ALL BACKFILL MATERIAL SHALL BE FREE OF ROCKS LARGER THAN 6" DIA.
3. FOR ALL TRENCHES WITH A GRADE GREATER THAN 4% AND/OR WHERE UNSUITABLE IS APPARENT, INSTALL CLAY DAMS AROUND PIPE AT 100' INTERVALS.
4. INSTALL TRACER WIRE AND DETECTABLE TAPE PER NOTE #1 ON THIS SHEET.
SAND BEDDING
HAND PLACED AND COMPACTED SAND
UNDISTURBED SOIL OR ROCK
TYPICAL TRENCH DETAIL
N.T.S.
T - DIMENSION
CONDITION 1 PIPE
★★ SELECT MATERIAL
LINING
6"
DUCTILE IRON PIPE IN "ORDINARY SOIL"
TYPE I II OR III
-
6"
ALL PIPE OVER BEDROCK OR FILL
TYPE II OR III
SAND OR TYPE III
4"
DUCTILE IRON PIPE IN CLAY OR MUCK
TYPE II OR III
SAND
6"
PLASTIC - ALL
SAND
SAND
★ SUITABLE MATERIAL SHALL CONTAIN NO STONES GREATER THAN 4" IN DIAMETER, NO FROZEN LUMPS, AND ONLY MINOR AMOUNTS OF CLAY OR ORGANIC MATERIAL. ALL MATERIAL TO BE PLACED IN MAXIMUM OF 18" LIFTS AND COMPACTED BEFORE PLACING NEXT LIFT.
★★ TYPE I MATERIAL SHALL BE EITHER GRAVEL OR EXCAVATED MATERIAL CONTAINING NO STONES GREATER THAN 1 1/2" IN DIAMETER, NO FROZEN MATERIAL, NO CLAY, AND NO ORGANIC MATERIAL.
★★ TYPE II MATERIAL SHALL BE CLEAN, HARD, CRUSHED OR NATURAL STONE WITH A GRADATION BY WEIGHT OF 1005 PASSING A 1 1/2" SQUARE OPENING, NOT MORE THAN 45% PASSING A 3/4" SQUARE OPENING, AND NOT MORE THAN 5% PASSING A 1/2" SQUARE OPENING.
★★ TYPE III MATERIAL SHALL BE CLEAN, HARD, CRUSHED STONE FREE FROM COATINGS AND THOROUGHLY WASHED WITH A GRADATION BY WEIGHT OF 100% PASSING A 1" SQUARE OPENING AND 0 TO 5% PASSING A 1/4" SQUARE OPENING.
BURIED GATE VALVE DETAIL
N.T.S.
TRENCH WALL BEYOND
FINISHED GRADE
WATERTIGHT TRAFFIC VAVE PACKET, COVER TOP OF VALVE WITH CONCRETE & INSTALL A BOLLARD NEAR
ADJUSTABLE IRON VALVE BOX WITH COVER MARKED "WATER"
AVAN GATE VALVE
SEE TABLE BELOW
FOR PLASTIC PIPE, WRAP VALVE WITH 4 mil POLYETHYLENE BEFORE BACKFILLING
SECTION
UNDISTURBED SOIL
ELEVATION
BURIED BUTTERFLY VALVE DETAIL
N.T.S.
TRENCH WALL BEYOND
FINISHED GRADE
ADJUSTABLE IRON VALVE BOX WITH COVER MARKED "WATER"
AVAN BUTTERFLY VALVE
SECTION
UNDISTURBED SOIL
ELEVATION
NOTES:
Before construction of any utilities or improvements, the Contractor shall notify the Public Works Department at least five (5) days before proceed.
1. All water mains, fittings, appurtenances and other materials, and construction shall conform to all applicable AWWA, State and City codes, standards and regulations. In the case of conflict between these construction details and specifications and a code or regulation, the code or regulation having the Vermont Department of Health or VTSEC Water Supply shall be binding.
2. All water mains, fittings, appurtenances shall be installed in a workmanlike manner and shall be subject to inspection and approval by the Public Works Department. Before any water line work is commenced by the Contractor, they shall notify the Public Works Department at least five (5) work days in advance of his intention to proceed.
3. Connection to an existing water main shall be done under the supervision of the Public Works Department at the Contractor's expense. It is the Contractor's responsibility to secure ALL necessary permits and permission to make the connection and to coordinate all parties involved in the connection. The Public Works Department shall be notified AT LEAST five (5) work days in advance of the intended connection time.
4. An inspector employed by the Public Works Department shall be notified at least two (2) days in advance of water line installations. Said inspector shall be on the premises for all water line installations.
5. No water line shall be put in service until approved by the Public Works Department at the time of the completion of the water system. The contractor shall provide accurate tie sheets for all new valves, fittings and curb stops. The contractor shall allow the city to access the construction site to obtain additional infrastructure information throughout construction.
6. All water mains shall have horizontal and vertical distances as detailed on this drawing.
7. Water service (private water mains) 1) 4" or greater shall be C-900 pipe (per note 8) Details 2) less than 4" in diameter shall be ULTRA-HIGH WEIGHT, CTS POLYETHYLENE TUBING DESIGNED FOR A WORKING PRESSURE OF 200 PSI (AWWA C-901, ASTM-D-2148 AND ASTM-D-2737). All water line fittings shall be ductile iron, (AWWA C-153), cement-lined. For water lines less than 4 inches in diameter, flared copper fittings may be used. (SEE MANUFACTURER'S RECOMMENDATIONS AND MEET VERMONT ACT 193 REQUIREMENTS FOR LEAD CONTENT
8. All buried valves shall conform to AWWA C-504 or C-509, and be resilient wedge type. Valves shall open by turning counterclockwise. Butterfly valves for larger sizes. All valves shall open right (clockwise) and shall have adjustable iron valve boxes extending to the finished grade (see Typical Details).
9. Hydrants shall be in accord with AWWA C-502, 3-way post type conforming to AWWA C-502. Hydrants shall have two (2) 4-1/2" and one (1) 6-1/2" steamer nozzle. Nozzle threads shall be National Standard threads. Hydrants shall be provided with a 6.5" bury (clear). In all cases, it is the Contractor's responsibility to verify the bury depth of the hydrant with the requirements of the selected hydrantist and secure consistently. All hydrant drains shall be permanently plugged, or a non-draining hydrant shall be installed. All hydrants shall be set back a minimum of three (3) feet from paved surfaces. In addition, wherever a traffic hazard appears to exist in the opinion of the Public Works Department, the hydrant will be protected by guarding and/or post-installation.
10. Curb boxes shall be Buffalo type with telescoping top and bottom caps.
11. No water lines and appurtenances shall be placed in service and leak tested before being placed in service. Acceptance shall be under AWWA C-600. The test pressure shall be 200 psi measured at the highest point in the low point portion of the system being tested, and the test shall be run for two (2) hours. The Public Works Department shall be given at least twenty-four (24) hours notice of the test so that a representative of the department may witness the test. Allowable leakage shall be computed by the following formula. L=Q X D x sq root(P)/133200, where L=number of gallons allowed leakage per hour, D=length of pipe tested in feet, D=inches of nominal pipe diameter, P=average test pressure (psi gauge). The personnel conducting the test(s) shall be fully qualified to perform the test(s) in a workmanlike manner.
12. All water lines, before being put into service, shall be disinfected in accordance with the latest edition of AWWA C-651, or as directed by the Public Works Department. The method used shall be the "slug" method or the "continuous" injection. Top shall be located as approved by the Public Works Department. The personnel responsible for disinfection shall certify, IN WRITING, to the Public Works Department and Vermont Department of Health that this disinfection procedure was followed and the required minimum results were obtained before the water line is placed in service. Two consecutive sets of tests (AT LEAST ONE FOOT APART) shall be utilized and passed PRIOR TO BACKFILL. The contractor shall perform all construction activities in conformance with the requirements of the VERMONT WATER SUPPLY RULE, CHAPTER 21, SECTION 21-1204, EDITION OF FEBRUARY 2007. ALL NEW WATER MAINS SHALL COMPLY WITH ANSI/NSF STANDARD 61, SECTION 9. THE CITY REQUIRES EACH SAMPLE BE COLLECTED AND TESTED AT TIME THE CONTRACTOR FLUSHES AND DISINFECTS THE LINE.
13. Water main valves and curb stops shall be inside city right-of-way.
14. All connections and core stops shall be cambridge with stone gaskets.
15. All hydrants, curb stops, valves etc. shall be operated only by authorized personnel by the Public Works Department.
16. All taps larger than 1" require the use of bronze saddles. SADDLES ARE REQUIRED FOR ALL TAPS ON C-900 PVC.
17. All water mains and service pipes shall be laid to the lines and grades established by the Public Works Department.
18. All connections and core stops shall be cambridge with stone gaskets.
19. All water mains 4" and greater shall be AWWA C-900 PVC pipe with a pressure class of 305 psi (DR14). Mains 3" or less shall conform to AWWA C901 and be HDPE, PE 3408 with a pressure class of 200 psi (DR9). ALL WATER MAIN AND SERVICE SERVICES will require a 12 AWG high strength copper clad steel tracer wire with blue insulation fastened directly to the top of pipe with nylon tie wraps or electrical tape. This tracer wire shall be a continuous run (no splices) between valves with ends for attaching a locating signal at every valve box. Wire shall be brought into each valve box and left in the box. Splices are located within 100' of each other, a magnetized tracer box is required. Waterproof splices shall be allowed in valve boxes as per the detail on this sheet. Splices shall be made using direct burial splice kits available from Copperhead Industries or approved equal. In addition, detectable metallic underground tape labeled "Caution Buried Water Line Below" shall be manufactured by Trumbull Industries or approved equal and buried approx. 2' below finished grade.
20. Thermal Gasket Rubber (NBR) gaskets shall be used in lieu of the standard Styrene Butadiene Rubber (SBR) gaskets for C900 water pipe and fittings.
CONSTRUCTION RESTRICTIONS
1. BLAK MESH CONSTRUCTION, SHOWING 'N' SHALL NEVER BE LESS THAN 'L'.
2. WOVEN BLK CONSTRUCTION, THE CROSSING SHALL BE ARRANGED AS SHOWN IN THE DRAWING, TO INSURE MAXIMUM SEPARATION AT THE CROSSING.
3. IF THE WATER MAIN MUST PASS BENEATH THE SEWER IN ROW, BOTH THE WATER AND SEWER SHALL BE CONSTRUCTED OF WATER MAIN QUALITY MATERIALS. EQUIVALENT PIPE MAY BE REQUIRED FOR THE SEWER. SPECIAL SUPPORT FOR THE WATER AND STORM PIPES MAY BE REQUIRED FOR THE UNDERCROSSING.
TYPICAL HYDRANT INSTALLATION
N.T.S.
1. ALL HYDRANT DRAINS MUST BE PLUGGED SEE SPECIFICATION NO. 9
2. WHERE VALVE CANNOT BE RESTRAINED TO MAIN TEE, ANCHOR VALVE AS IN BURIED
3. USE MEGALUG RETAINER GLANDS FOR ALL CONNECTIONS
1" TO 2" CURB BOX
N.T.S.
NOTES:
1. CONNECTION TO BE ENGINEERED/DESIGNED FOR EACH SITE BY A LICENSED ENGINEER.
2. CONTRACTOR TO BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE DESIGN, PERMITTING, AND CONSTRUCTION OF THE BACKFLOW PREVENTION DEVICE.
3. BACKFLOW PREVENTION DEVICE TO BE INSTALLED AT THE BUILDING AS CLOSE AS POSSIBLE TO THE POINT OF ENTRY. IF IMPRACTICAL FOR BELOW GRADE INSTALLATION, THE DEVICE MAY BE LOCATED OUTSIDE THE BUILDING WITH APPROPRIATE FREEZE PROTECTION.
WATER / SEWER CROSSING DETAILS
N.T.S.
WATER MAIN
SEWER MAIN
SEWER MAIN
SEAL WITH NON-SHRINK GROUT
PLUG
SEAD END
WYE
90, 45, 22.5, OR 11.25 DEG BEND
TEE
CURB STOP WITH BOX - TAPPED OR TEE CONNECTION
N.T.S.
FINISHED GRADE OF C.C. BLOCK TOP OF C.C. BLOCK
UNPAVED
PAVED
12" MIN.
CONCRETE BLOCK
BOLT TO PREVENT CAP FROM BLOWING OFF
PLAN DETAIL
HOUSE FOUNDATION WALL
TRENCH WALL TO BE INSTALLED AFTER NEW SERVICE HAS BEEN INSTALLED
WALL ELEVEL SEE NOTE 3
WATER MAIN
1" DR AWWA SERVICE PLASTIC PIPE WITH TRACER WIRE OR 1" TYPE K COPPER
NOTES:
1. ALL WORK MUST BE PERFORMED BY A LICENSED PLUMBER AND MUST BE DONE IN ACCORDANCE WITH ALL APPLICABLE CODES.
2. IF A PLASTIC PIPE TYPE IS USED FOR SERVICE, TRACER WIRE SHALL BE INSTALLED ALONG THE ENTIRE LENGTH OF THE PIPE. THE WIRE SHALL BE TERMINATED AT THE CURB STOP AND AT THE BUILDING.
3. IF THE CURB STOP IS USED FOR SERVICE SHUTOFF, IT MUST BE LOCATED AT THE HOUSE SERVICE BOX DETAILED.
4. IF A CURB STOP IS NOT USED, A SHUTOFF VALVE SHALL BE INSTALLED NO MORE THAN 5 FEET FROM THE CONNECTION
THRUST BLOCK DETAILS
N.T.S.
MINIMUM AREA OF BEARING SURFACE OF CONC. THRUST BLOCKS IN SQUARE FEET

2"			4"			6"			8"			12"				
HORIZ. OR VERT. DOWN	VERT. UP	22½° OR 11¼°	HORIZ. OR VERT. DOWN	VERT. UP	22½° OR 11¼°	HORIZ. OR VERT. DOWN	VERT. UP	22½° OR 11¼°	HORIZ. OR VERT. DOWN	VERT. UP	22½° OR 11¼°	HORIZ. OR VERT. DOWN	VERT. UP	22½° OR 11¼°	SOIL CONDITION	ASSUMED SOIL BEARING
0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0	2.0	2.0	2.0	3.5	3.5	3.5	GRAVEL GRADE	3,000
1.0	1.0	1.0	1.0	0.5	1.0	2.5	2.0	2.5	4.5	3.5	4.5	9.5	7.5	9.5	GRAVELLY SANDY, SILTY SAND	4,000
1.0	1.0	1.0	1.0	0.5	1.0	3.0	2.0	3.0	5.5	4.0	5.5	11.5	8.5	11.5	SANDY CLAY, SILT	5,000
1.5	0.5	1.5	1.5	0.5	1.5	4.0	1.5	4.0	7.5	3.0	7.5	15.5	6.0	15.5	CLAY (SOFT)	2,000
1.5	2.0	1.5	1.5	2.0	1.5	9.0	7.5	9.0	16.5	14.5	16.5	33.5	29.5	33.5	SPECIAL CONDITIONS	6
NOTES: 1. FOR MINIMUM WATER PRESSURE = 200 PSI. 2. FOR SOILS WITH ALLOWABLE BEARING VALUES OTHER THAN THOSE LISTED ABOVE, THE REQUIRED BEARING AREA = 40 SQ. INCHES DIVIDED BY THE ALLOWABLE BEARING VALUE IN PSI. 3. FOR BENDS WITH DEFLECTION ANGLES OTHER THAN THOSE LISTED ABOVE, THE REQUIRED BEARING AREA IS PROPORTIONAL TO THE VALUES LISTED.																

SPRINKLER BACKFLOW PREVENTION DETAIL

N.T.S.

*BACK FLOW PREVENTION SHALL BE PROVIDED IN ACCORDANCE WITH AWWA M14



NOTES:

1. AT CROSSINGS, ONE FULL LENGTH OF WATER/STORM PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE WATER/STORM AS POSSIBLE.
2. IF THE STORM MAIN IS OVER THE WATER MAIN, THE FIRST STORM PIPE JOINTS ON EACH SIDE OF THE WATER MAIN MUST BE CONCRETE ENCASED. SPECIAL STRUCTURAL SUPPORT FOR THE WATER AND STORM PIPES MAY BE REQUIRED.
3. WHERE IT IS IMPOSSIBLE TO MAINTAIN THE 18" SEPARATION, THE STORM MATERIALS SHALL BE WATER MAIN PIPE OR EQUIVALENT AND SHALL BE PRESSURE TESTED TO WATER MAIN STANDARDS.
4. WATER MAINS AND STORM LINES OR MANHOLES SHALL HAVE AT LEAST 5' HORIZONTAL SEPARATION. THIS DISTANCE SHALL BE MEASURED EDGE TO EDGE.

WATER/STORM CROSSING

N.T.S.

W-007A Water-Storm Crossing

W-007A REVISED 11/16/2021

Table 11-1
Horizontal Isolation Distances, in Feet for Potential Sources of Contamination

Potential Source of Contamination	Potable Sources in Bedrock or Confined Surficial Aquifer	Potable Water Sources in Unconfined Surficial Aquifer	Water Service Lines and Water Service Pipes (Pressure)	Water Service Lines and Water Service Pipes (Suction)	Water Storage Tanks (Atmospheric Below Ground Surface)
Agricultural cropland	100	200	25	100	50
Building or structures, porches, foundations of building or structures	5	5	N/A	N/A	N/A
Cemeteries	100	150	25	100	50
Composting sites (commercial or agricultural) [1]	200	300	25	300	50
Concentrated livestock holding areas barnyard [2]	200	500	25	100	50
Driveways (fewer than 3 residences)	5	10	N/A	N/A	10
Driveways (3 or more residences), roadways, parking lots	25	25	N/A	N/A	25
Fertilizers or pesticide storage structures (buried tank of any size; above ground tank >1,500 gallons; dry or liquid; and piping serving a non-residential facility)	100	200	50	200	50
Fuel oil, gasoline & other petroleum tanks and piping (not including liquefied petroleum gas tank)	25	100	25	100	50
Herbicide or pesticide application on utility right of way where herbicides or pesticides either have been applied in the last 12 months or may be applied within the next 12 month [3]	100	200	25	200	100
Leachfields (proposed, existing, or permitted)	Requires isolation zone (see Table 11-2)		25	100	100
Manure storage systems, above ground [7]	50	100	25	50	50
Manure storage systems, in- ground concrete or geosynthetic lined [7]	100	200	25	200	100
Manure storage systems, earthen lined [7]	200	500	25	200	200
Property lines	10	10	N/A	N/A	10
Salvage yards [4]	300 [8]	300 [8]	25	300	100
Sanitary sewer collection lines and sanitary sewer service lines	50	75	Distances and requirements established in Section 1-1204 apply in lieu of this Section		50
Silage storages	50	75	25	75	50
Solid waste transfer facilities [5]	100	200	25	200	100
Stormwater conveyance/treatment/control practice (lined)	10	10	10	10	10
Stormwater conveyance/treatment/control practice (unlined and subsurface systems)	100	150	10	150	25
Storm sewers	10	50	Distances and requirements established in Section 1-1204 apply in lieu of this Section		10
Surface water, normal high water elevation [6]	10	25	N/A	N/A	25
Wastewater disposal spray area and lagoons	200	300	50	300	100
Wastewater tanks (proposed, existing, or permitted) [7]	Requires isolation zone (See Table 11-2)		25	50	50

[1] Isolation distances for composting sites (commercial or agricultural) shall be measured from the perimeter of the composting are or area used for storage of composted material.
[2] Isolation distances for concentrated livestock holding areas and manure storage systems shall be measured from the perimeter of the holding area or outside perimeter of the manure storage system.
[3] Isolation distances for herbicide or pesticide application on utility right of way where herbicides or pesticides either have been applied in the last 12 months or may be applied within the next 12 month shall be measured from points of application of the herbicide or pesticide.
[4] Isolation distances for salvage yards shall be measured from the perimeter of the area used for the storage of salvaged materials to the component.
[5] Isolation distances for solid waste transfer facilities shall be measured from points within the transfer facility used for storing solid waste.
[6] The horizontal location to surface water shall allow for possible future widening of the surface water due to bank expansion.
[7] Wastewater Tanks include septic tanks, pump stations, dosing siphons, holding tanks, wastewater storage tanks, wastewater treatment tanks, sand filters, constructed wetlands, and grease tanks.
[8] If the applicant's designer demonstrates that the groundwater flow from the salvage yard is not in the direction of the potable water source, the isolation distance shall be 100 feet rather than 300 feet.

VERMONT WATER SUPPLY RULE - CHAPTER 21
TABLE 11-1 - HORIZONTAL ISOLATION DISTANCES

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CEA
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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE: 06/02/2023 | SCALE: AS SHOWN

DRAWN BY: MAB | CHECKED BY: DSM

ISSUE LOG: 06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS: UTILITY DETAILS

SHEET NO: C5.2

REV. NO.	DATE	DESCRIPTION	DRAWN	CHECKED

WATER SYSTEM DETAILS

CITY OF BURLINGTON, VT

DESIGNED: DSJ/MKL
DRAWN: MAB
CHECKED: DSM/MKL
APPROVED: DSJ/MKL
SCALE: NONE
DATE: 12/11/18

DRAWING NO. D-1

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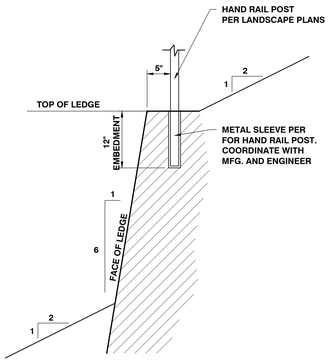
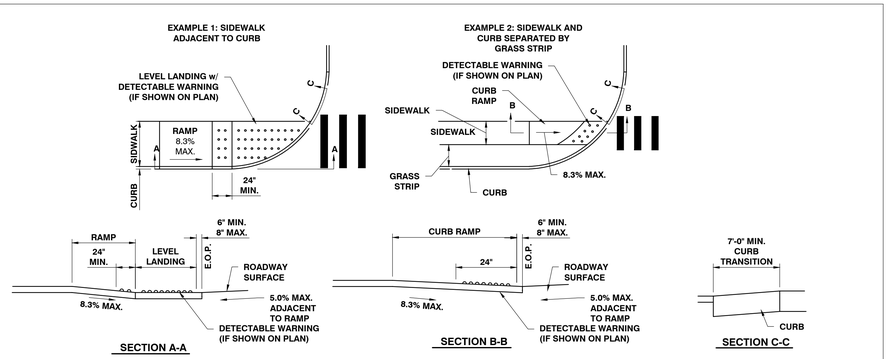


LEDGE WALLS

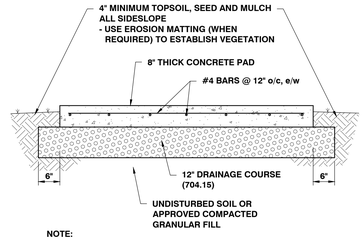


TYPICAL HANDICAP RAMP - TYPE 1

SINGLE WALK-STRAIGHT APPROACH TO PARALLEL RAMP — N.T.S.

M-002 HC Ramp I

M-002 — REVISED 08/01/2014



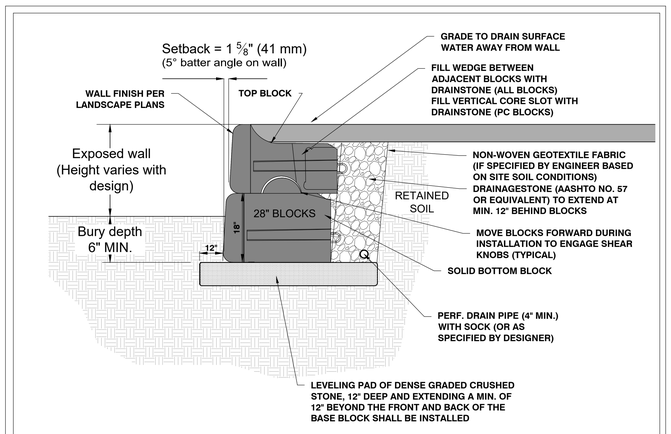
NOTE:
COORDINATE REQUIRED SIZE AND LOCATION(S)
WITH MEP PLANS AND SHOP DRAWINGS

MEP SITE PAD DETAIL

N.T.S.

M-017 MEP Pad

M-017 — REVISED 01/22/2018



This drawing is for reference only. Determination of the suitability and/or manner of use of any details contained in this document is the sole responsibility of the design engineer of record. Final project designs, including all construction details, shall be prepared by a licensed professional engineer using the actual conditions of the proposed site.

Typical Gravity Wall Detail

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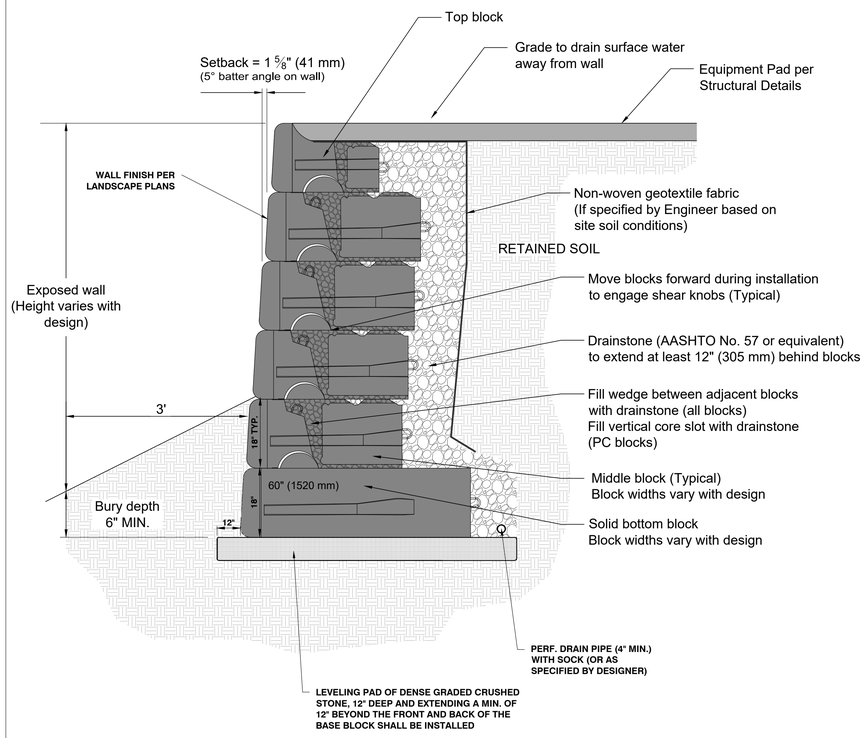
GREENHOUSE RETAINING WALL

Typical Gravity Wall Section



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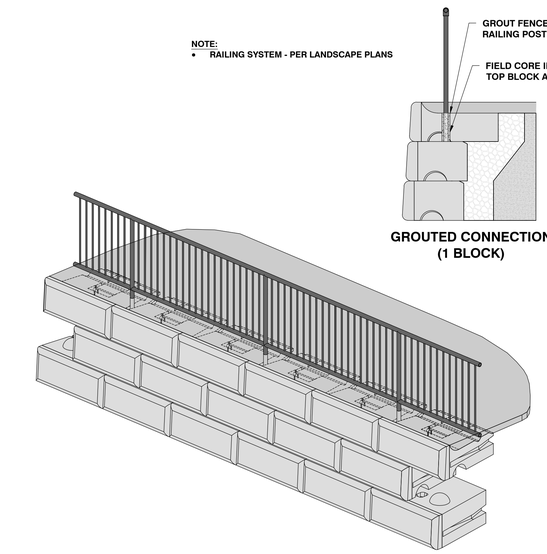
APPROVED BY:	JRJ		
DATE:	17MAR2016		
SHEET:	1 of 1	FILE: 1 Typical Gravity Wall Detail 031716.dwg	

TRANSFORMER RETAINING WALL



RAILING CONNECTION FOR WALLS

N.T.S.

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SHEET CONTENTS: MISC. DETAILS

SHEET NO: C5.3

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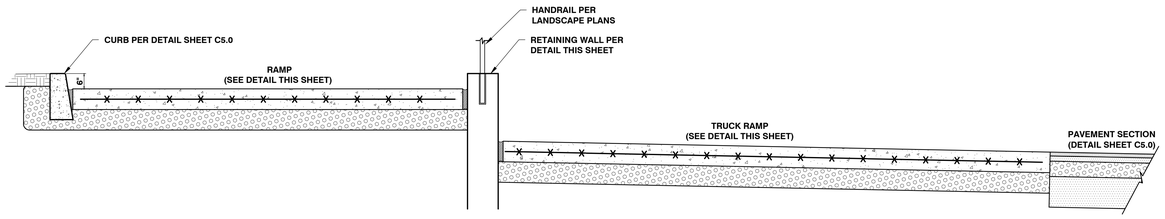
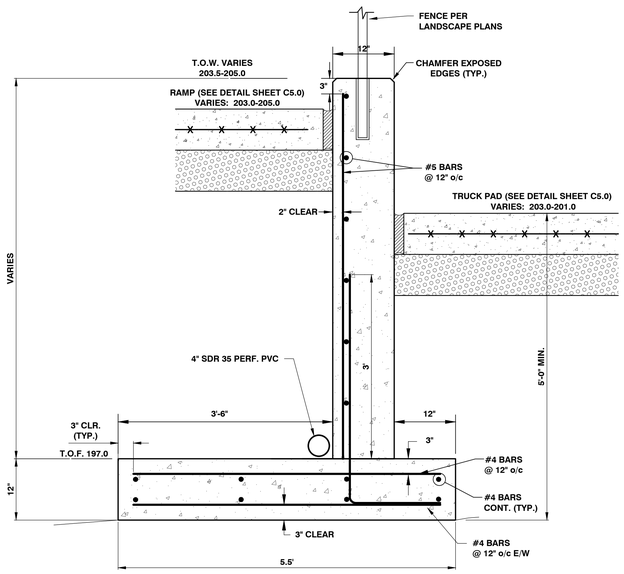


LOADING DOCK RAMP SECTION

N.T.S.



CONCRETE RETAINING WALL

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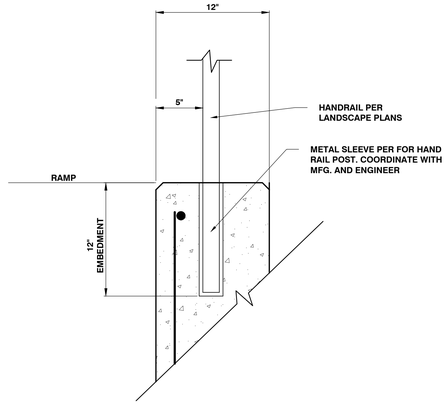


HANDRAIL POST INSERTION DETAIL

N.T.S.

EXTERIOR CAST-IN-PLACE CONCRETE

1. Concrete shall be composed of Type I Portland Cement conforming to ASTM C150, fine and coarse aggregates conforming to ASTM C33, and mixing water free of oil, acid, or injurious amounts of alkalis and other salts. Air entraining admixtures shall conform to ASTM C260.

2. Concrete shall conform to the following compressive strength and slump requirements:

Concrete Location	Min. f'c (28 days)	Slump*	Air Entrainment	max w/c
Footings	3,000 psi	4" max.	Not Required	0.58
Foundation walls/Columns/Piers	4,000 psi	4" max.	Required (6% ±1.5)	0.45
Exterior Conc. Slab	4,000 psi	4" max.	Required (6% ±1.5)	0.45

* At Contractor's option, an approved admixture may be used to produce flowable concrete. Maximum slump shall not exceed 7 inches.

3. Chemical Admixtures: If used, provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water–soluble chloride ions by mass of cementitious material.
   A. Water–Reducing Admixture: ASTM C494, Type A.
   B. Retarding Admixture: ASTM C494, Type B.
   C. Water–Reducing and Retarding Admixture: ASTM C494, Type D.
   D. High–Range, Water–Reducing Admixture: ASTM C494, Type F.
   E. High–Range, Water–Reducing and Retarding Admixture: ASTM C494, Type G.
   F. Plasticizing and Retarding Admixture: ASTM C1017, Type II.
   G. Corrosion–Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, type C.

4. All concrete work shall conform to the requirements of ACI 301, "Specifications for Structural Concrete Buildings". Hot weather concreting shall be in accordance with ACI 305. Cold weather concreting shall be in accordance with ACI 306.

5. All reinforcing steel shall be set and tied in place prior to pouring of concrete, except that vertical dowels for masonry wall reinforcing may be "floated" in place. Do not field bend bars partially embedded in hardened concrete unless specifically indicated or approved by the Engineer. Support for reinforcing shall be via protected metal spacers, chairs, bolsters, or ties.

6. All edges of permanently exposed concrete surfaces shall be chamfered 3/4" unless otherwise noted.

7. Slabs on Grade
   A. Support for reinforcing shall be via protected metal spacers, chairs, bolsters, or ties.
   B. Slabs to be permanently exposed to weather shall be air entrained to 6% (±1.5%) with an admixture that conforms to ASTM C–260.
   C. Slope slab to drains where shown.
   D. Slab joints shall be filled with approved material. This should take place as late as possible, preferably 4 to 6 weeks after the slab has been cast. Prior to filling, remove all debris from the slab joints, then fill in accordance with the Manufacturer's recommendations.
   E. Ramps shall have a broom finish. All other floors shall have a steel trowel finish.

8. Use corrosion–inhibiting admixture in reinforced concrete subject to chloride after construction, not required in footings.
   – Use dosage rate of 3 gallons/cubic yard

9. Concrete Curing/Sealing
   Curing and Sealing may be accomplished with a dissipating curing compound in conjunction with a sealer, moisture curing with a sealer or one step curing and sealing compound.
   – Protect newly placed concrete against low and high temperature effects and against rapid loss of moisture. Cure all concrete for at least seven (7) days at a temperature of at least 50 degrees Fahrenheit by approved curing methods.
   – Moisture curing with silane based sealer is recommended during hot weather applications.
   – liquid membrane–forming curing and sealing (or sealing) compounds shall meet ASTM C309 or C1315. Sealers shall be based on silane or siloxane technology for best salt and water repellency for concrete pavements. Two coats shall be applied at right angles for even coverage, allowing first coat to dry before applying second coat. Install in conformance with manufacturers recommendations.

REINFORCING STEEL

1. Epoxy–Coated Welded–Wire Reinforcement: ASTM A884/A884M, Class A, plain steel (where shown on plans).

2. Epoxy–Coated Reinforcing Bars: ASTM A775/A775m or ASTM A934/A934M; with ASTM A615/A615M, Grade 60 deformed bars (where shown on plans).

3. Epoxy Repair Coating: Liquid, two–part, epoxy repair coating, compatible with epoxy coating on reinforcement.

4. Reinforcing Bars: ASTM A615/A615M, Grade 60; deformed.

5. All horizontal rods are continuous. Lap all splices 30 diameters unless otherwise noted. Provide corner bars and dowel into existing walls. 4. Provide a clear cover from reinforcing steel to adjacent concrete surfaces as follows:
   A. Concrete cast against earth: 3"
   B. Formed concrete exposed to earth or weather:
      #5 and smaller – 1 1/2"
      #6 and larger – 2"
   C. Formed concrete not exposed to earth or weather:
      Slabs, walls – 3/4"

CONCRETE FIELD QUALITY CONTROL

1. Testing Agency: Obtain a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

2. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

   A. Testing Frequency: Obtain at least 1 composite sample for each 50 cu. yd. or fraction thereof of each concrete mix placed each day.

   B. Slump: ASTM C 143; one test at point of placement for each load, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

   C. Air Content: ASTM C 231, pressure method; one test for each load, but not less than one test for each day's pour of each concrete mix.

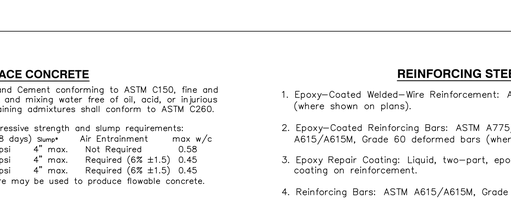
   D. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each load.

   E. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.

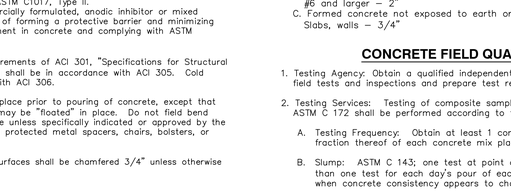
   F. Compressive–Strength Tests: ASTM C 39; test 1 specimen at 7 days and 2 specimens at 28 days. Retain one specimen for a 56 day test in the event the 28 day tests do not meet the specifications.
      1. A compressive–strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

3. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive–strength tests equals or exceeds specified compressive strength and no compressive–strength test value falls below specified compressive strength by more than 500 psi.

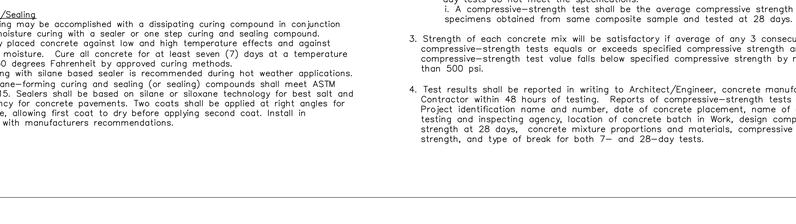
4. Test results shall be reported in writing to Architect/Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive–strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7– and 28–day tests.



SNOW REMOVAL SIDEWALK / CURB



SNOW REMOVAL CURB



TRANSITION CURB AT SNOW STORAGE AREAS DETAIL

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: 21255

ORIGINATION DATE:	SCALE:
06/02/2023	AS SHOWN
DRAWN BY:	CHECKED BY:
MAB	DSM

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SHEET CONTENTS:
CONC. WALL DETAILS

SHEET NO:
C5.4

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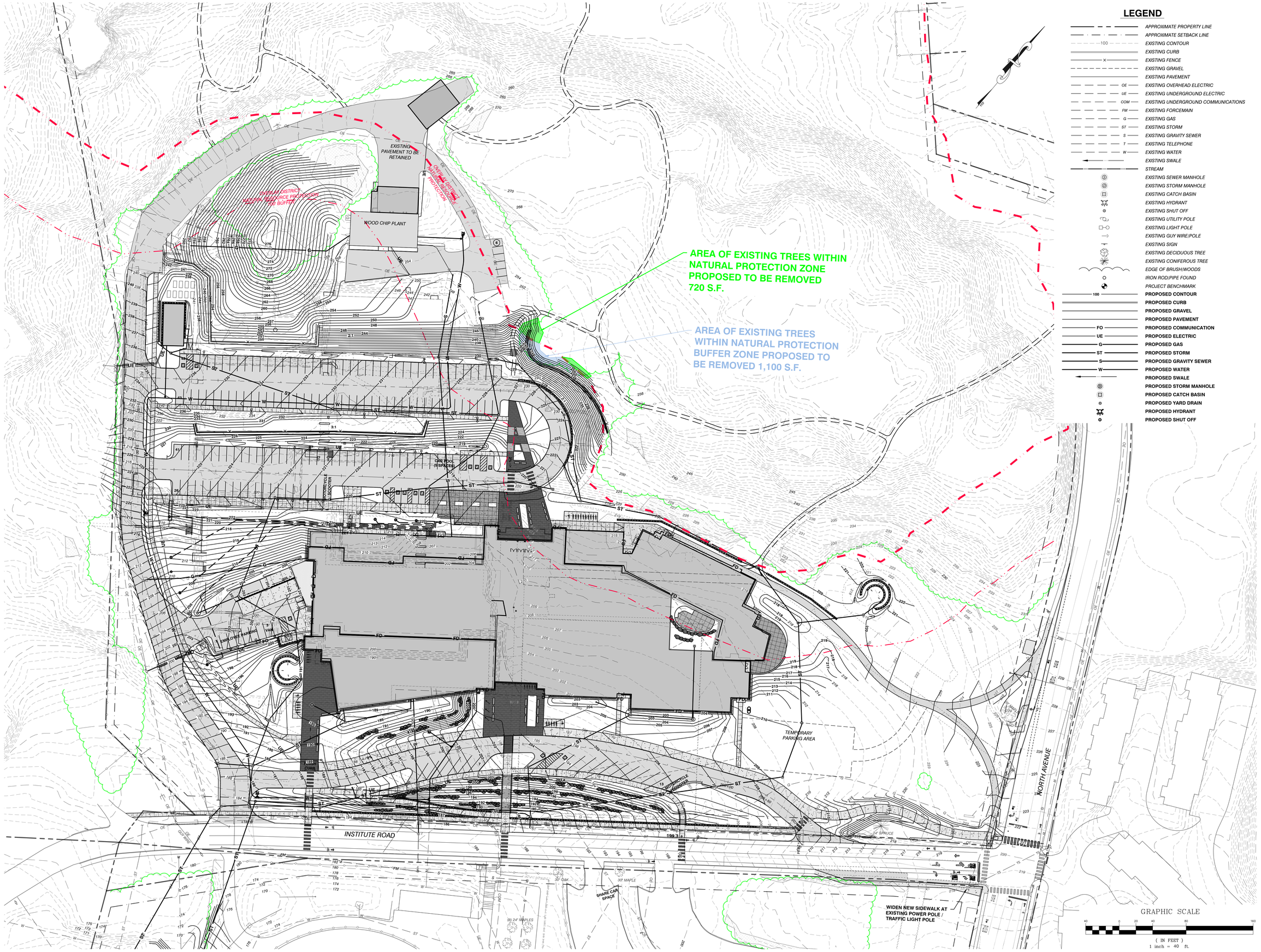
Burlington High School and Technical Center

Vehicle and Bicycle Parking

6/5/2023

Vehicle Parking			
Maximum Parking Standard			
Use	**Max Parking Standard**	**Proposed Metric**	**Max Parking Allowed**
School Secondary	5 per Classroom	77 classrooms	385
Performing Arts Center	1 per 4 seats	750 seats	188
Recreational Facility - Outdoor Commercial	1 per 4 seats	1,000 seats	250
Recreational Facility - Indoor (Gym & Community Gym)	1 per 4 seats	1,750 seats	438
Total Max Parking Allowed			**1,261**
Proposed Parking			
Location	**No. of Spaces**		
South of Institute Road	144		
North of Institute Road	209		
Total Parking Spaces Proposed	**353**		

Bicycle Parking			
CDO Minimum Required Bicycle Parking			
Type	**Parking Standard**	**Proposed Metric**	**No. of Required Spaces**
Long Term	1 per 20K sf	260,825	13
	1 per 10 students	1,594 student capacity	159
Total Long Term Spaces			172
Short Term	4 per Classroom	77	308
Total Minimum Bicycle Parking			**480**
LEED Recommended Minimum Bicycle Parking			
Long Term	5% of student capacity	1,594 student capacity	80
	5% of faculty/staff	175 faculty/staff	9
Total Long Term Spaces			89
Short Term	2.5% of student capacity	1,594 student capacity	40
	2.5% of faculty/staff	175 faculty/staff	4
	2.5% of visitors	30 visitors estimated	1
Total Short Term Spaces			45
Total Minimum Bicycle Parking			**134**
Minimum Bicycle Parking Based on BHS Bicycle Parking Demand Study			
Total Bicycle Parking	0.03 spaces per student	1,594 student capacity	48
Proposed Bicycle Parking			
Type	**No. of Spaces**		
Long Term (Enclosed)	80		
Short Term	60		
Total Bicycle Parking Proposed	**140**		



LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- EXISTING CONTOUR
- EXISTING CURB
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- OE — EXISTING OVERHEAD ELECTRIC
- UE — EXISTING UNDERGROUND ELECTRIC
- COM — EXISTING UNDERGROUND COMMUNICATIONS
- FM — EXISTING FORCEMAIN
- G — EXISTING GAS
- ST — EXISTING STORM
- S — EXISTING GRAVITY SEWER
- T — EXISTING TELEPHONE
- W — EXISTING WATER
- EXISTING SWALE
- STREAM
- EXISTING SEWER MANHOLE
- EXISTING STORM MANHOLE
- EXISTING CATCH BASIN
- EXISTING HYDRANT
- EXISTING SHUT OFF
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING GUY WIRE/POLE
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- IRON ROD/PIPE FOUND
- PROJECT BENCHMARK
- PROPOSED CONTOUR
- PROPOSED CURB
- PROPOSED GRAVEL
- PROPOSED PAVEMENT
- FO — PROPOSED COMMUNICATION
- UE — PROPOSED ELECTRIC
- G — PROPOSED GAS
- ST — PROPOSED STORM
- S — PROPOSED GRAVITY SEWER
- W — PROPOSED WATER
- PROPOSED SWALE
- PROPOSED STORM MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED YARD DRAIN
- PROPOSED HYDRANT
- PROPOSED SHUT OFF

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52 INSTITUTE ROAD, BURLINGTON, VERMONT

FF PROJECT NO: 21255

ORIGINATION DATE:	SCALE:
06/02/2023	1" = 40
DRAWN BY: MAB	CHECKED BY: DSM

ISSUE LOG: 06/02/2023 ISSUE FOR PERMITTING

SHEET CONTENTS: OVERLAY DISTRICT NATURAL RESOURCE PROTECTION

SHEET NO: WS2

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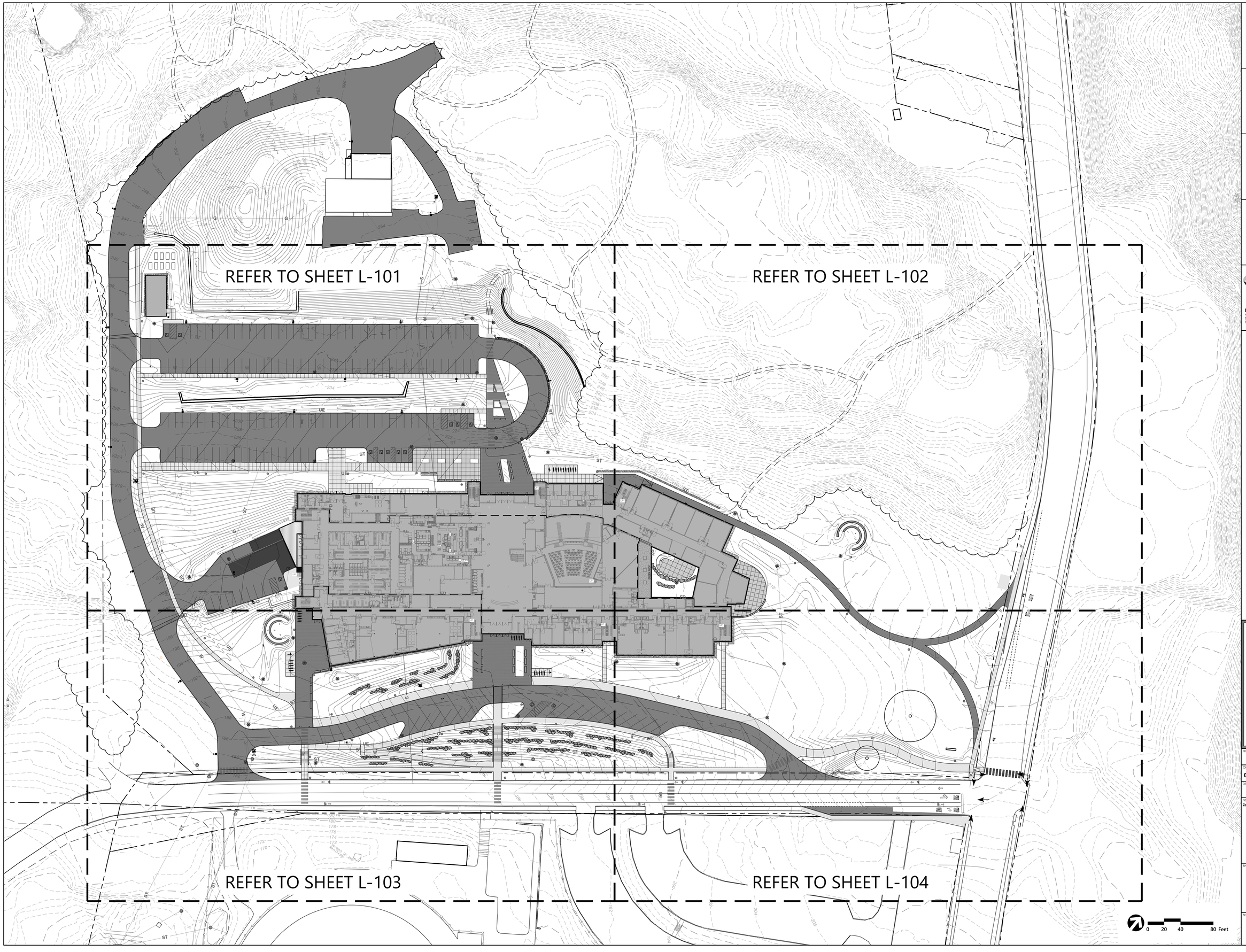

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FFF PROJECT NO: Proj #2170

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JRD/MKW	MKW

ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS:
OVERALL LANDSCAPE LAYOUT PLAN

SHEET NO:
L-100

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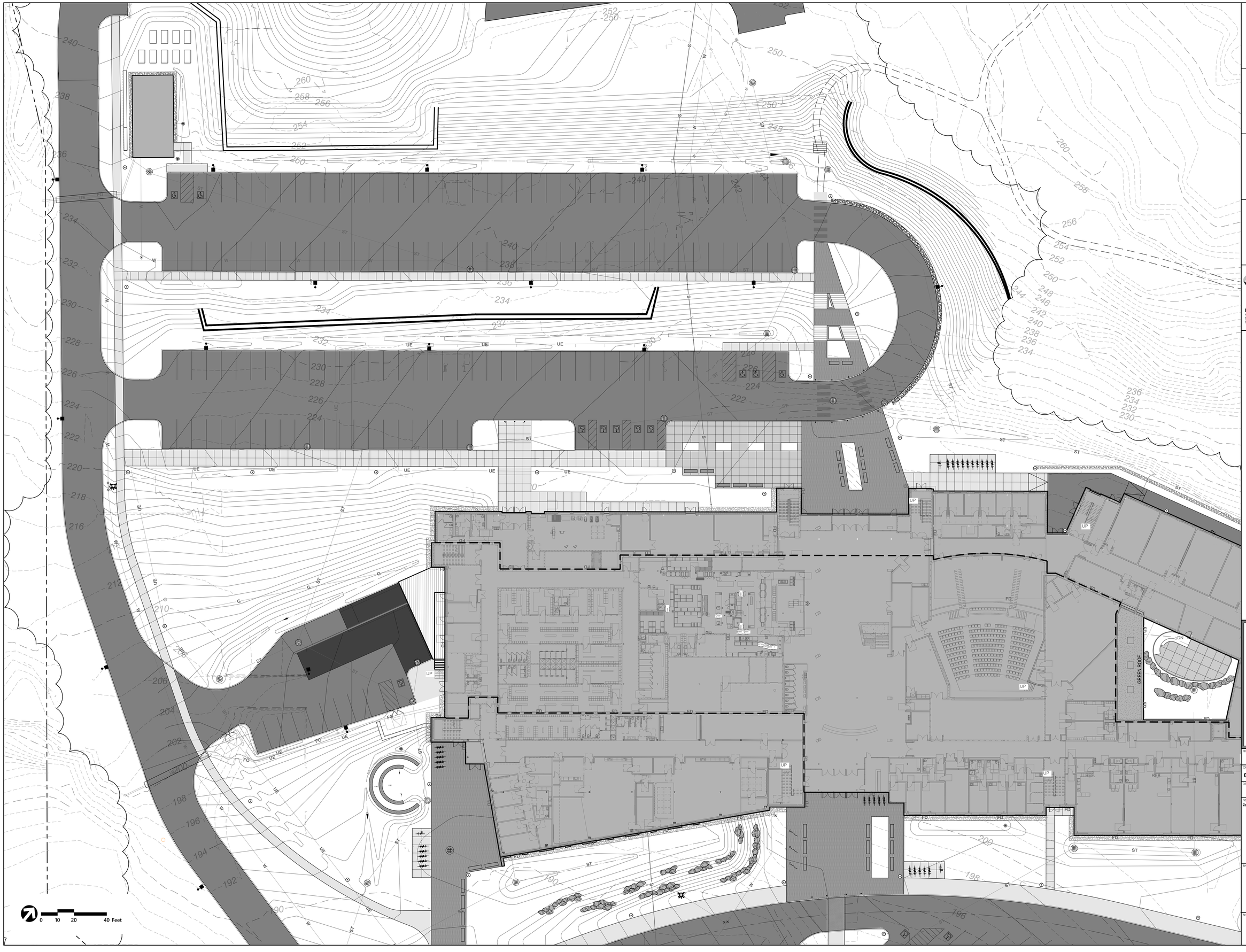

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SHEET CONTENTS:

LANDSCAPE LAYOUT PLAN

SHEET NO:

L-101

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ORIGINATION DATE: 01/20/2023	SCALE: 1"=20'
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SHEET CONTENTS:

LANDSCAPE LAYOUT PLAN

SHEET NO:

L-102

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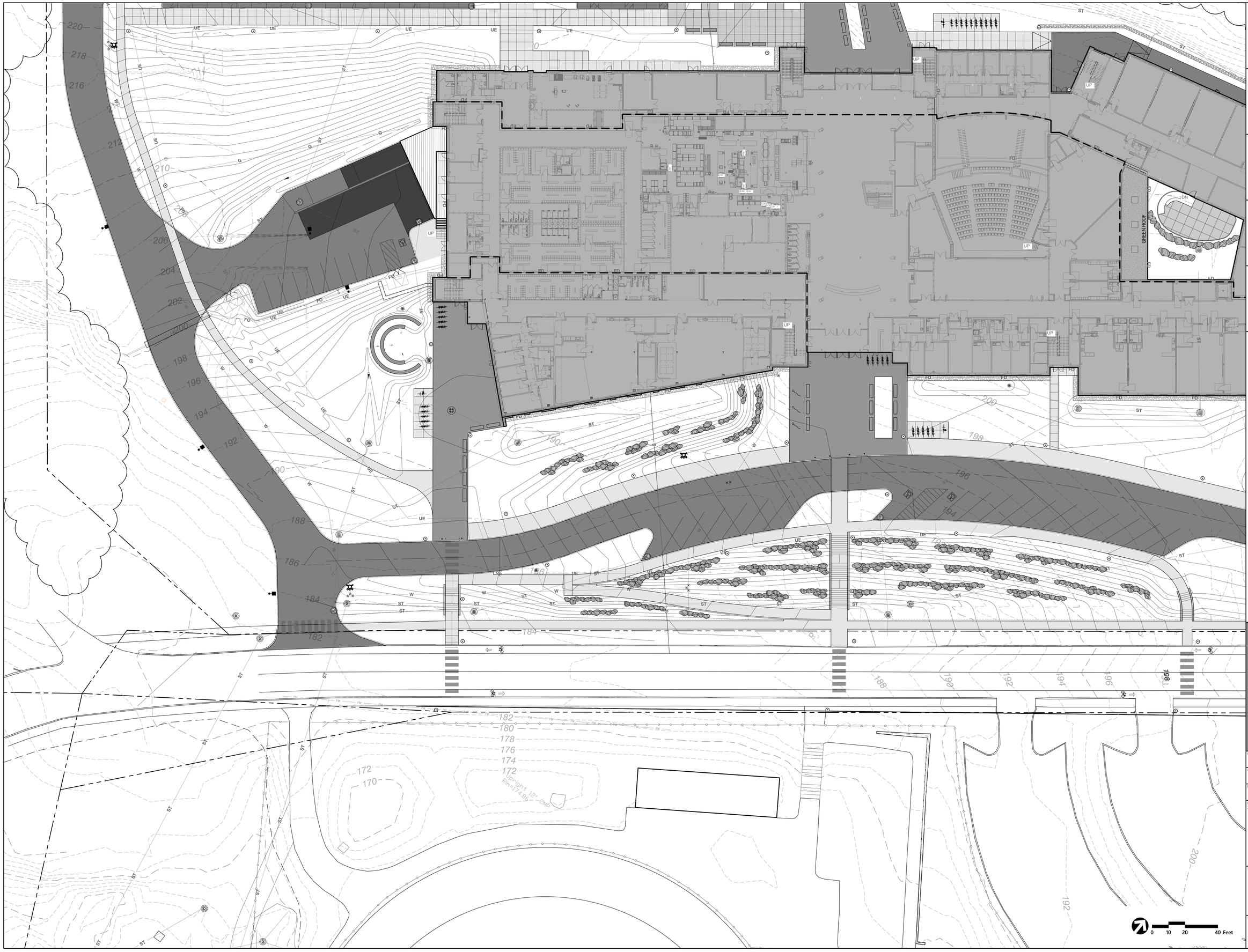

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SHEET CONTENTS:

LANDSCAPE LAYOUT PLAN

SHEET NO:

L-103

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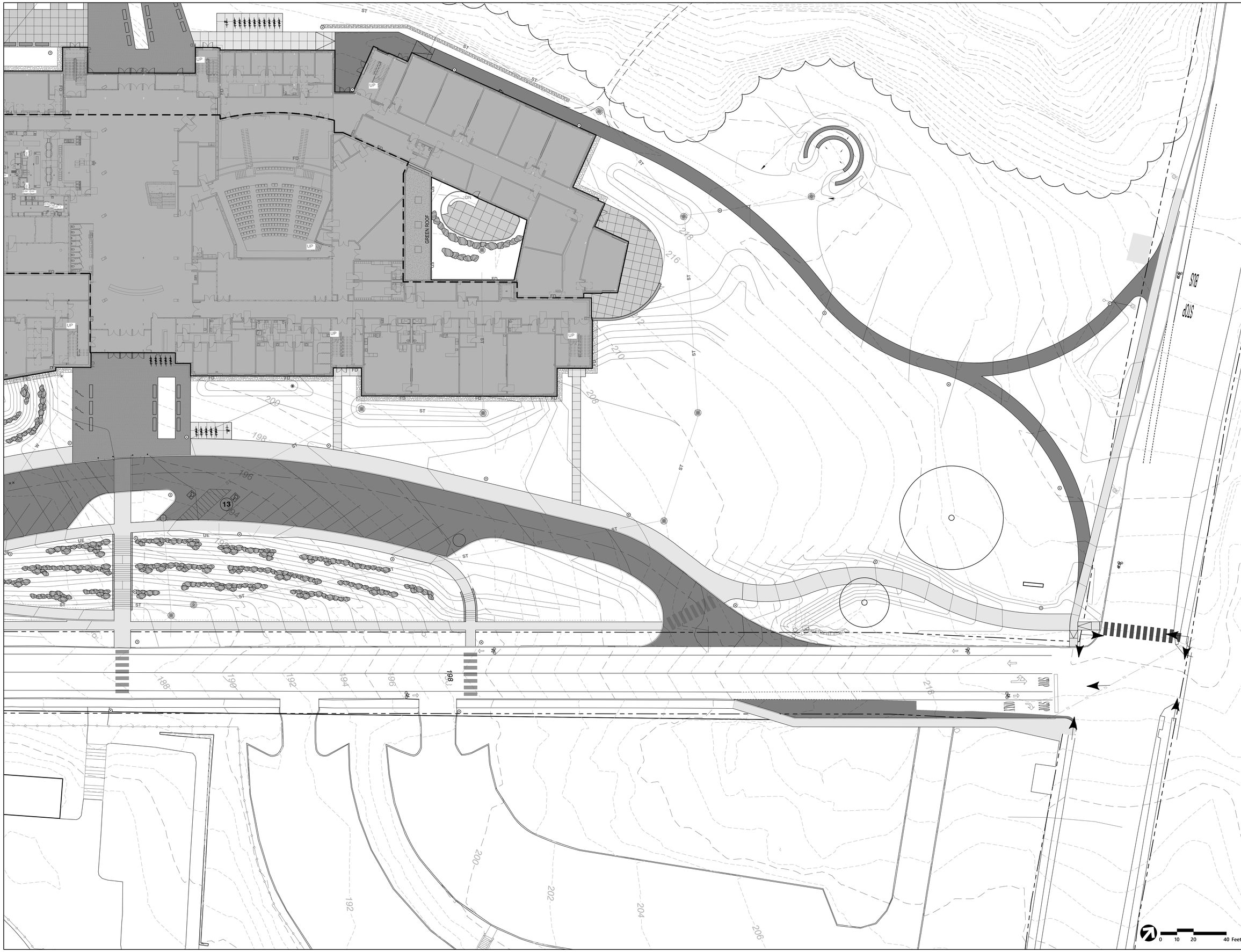

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LANDSCAPE LAYOUT PLAN

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L-104

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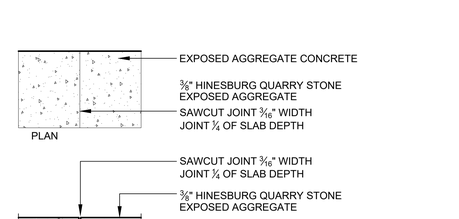
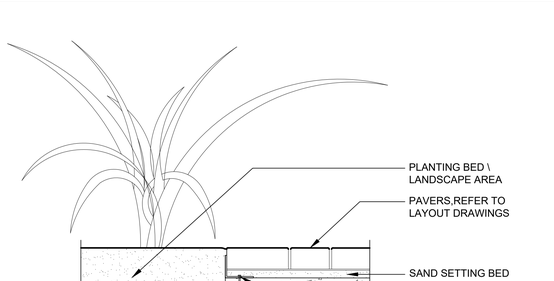


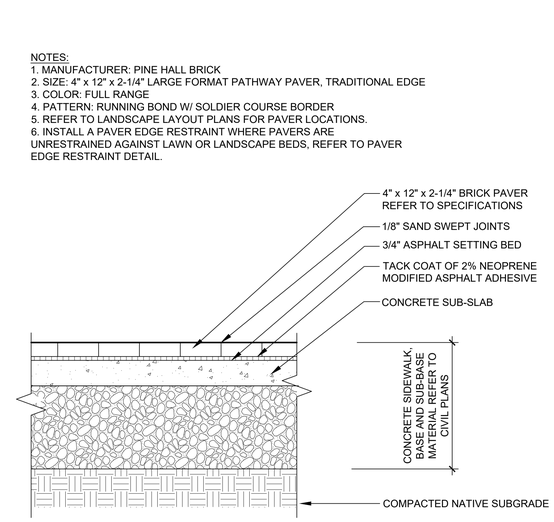
NOTES:
1. REFER TO LAYOUT PLANS FOR SCORING PATTERNS
2. APPLY A CONCRETE SEALER TO ALL EXPOSED AGGREGATE WALK SURFACES

E EXPOSED AGGREGATE CONCRETE
SCALE 1" = 1'-0"



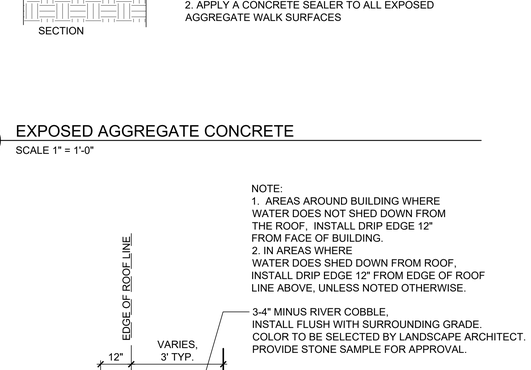
C PAVER EDGE RESTRAINT
SCALE 2" = 1'-0"

NOTES:
1. MANUFACTURER: PINE HALL BRICK
2. SIZE: 4" x 12" x 2-1/4" LARGE FORMAT PATHWAY PAVER, TRADITIONAL EDGE
3. COLOR: FULL RANGE
4. PATTERN: RUNNING BOND W/ SOLDIER COURSE BORDER
5. REFER TO LANDSCAPE LAYOUT PLANS FOR PAVER LOCATIONS.
6. INSTALL A PAVER EDGE RESTRAINT WHERE PAVERS ARE UNRESTRAINED AGAINST LAWN OR LANDSCAPE BEDS, REFER TO PAVER EDGE RESTRAINT DETAIL.

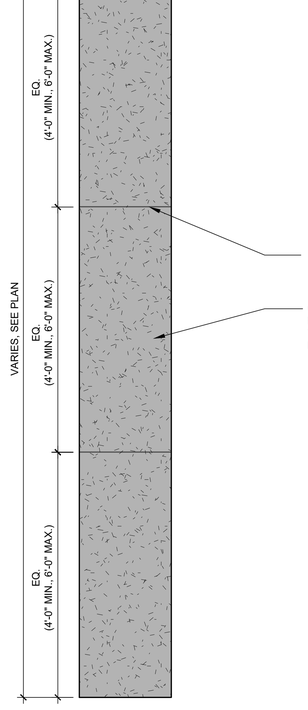


A BRICK PAVERS OVER CONCRETE
SCALE 1" = 1'-0"

NOTE:
1. AREAS AROUND BUILDING WHERE WATER DOES NOT SHED DOWN FROM THE ROOF, INSTALL DRIP EDGE 12" FROM FACE OF BUILDING.
2. IN AREAS WHERE WATER DOES SHED DOWN FROM ROOF, INSTALL DRIP EDGE 12" FROM EDGE OF ROOF LINE ABOVE, UNLESS NOTED OTHERWISE.



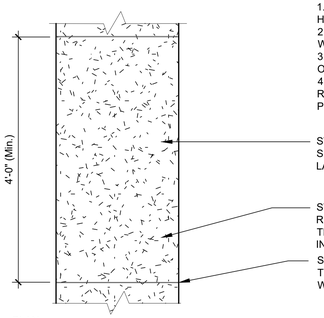
F STONE DRIP EDGE
SCALE 1/2" = 1'-0"



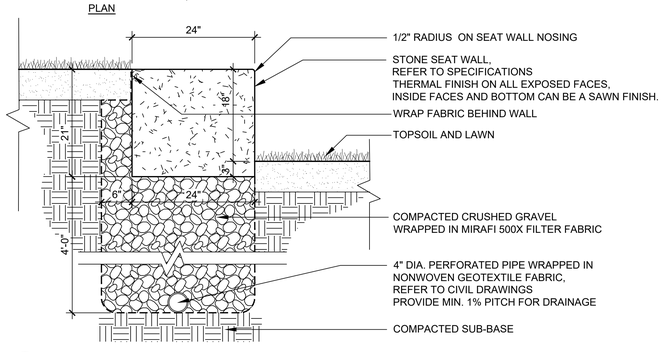
NOTES:
1. REFER TO LAYOUT DRAWINGS FOR HORIZONTAL LAYOUT INFORMATION
2. COORDINATE FINISHED GRADES WITH GRADING PLAN DRAWINGS.
3. DRILL MARKS ARE NOT ACCEPTABLE ON ANY FACE OF STONE MATERIAL
4. SAW CUT INTERIOR ENDS OF STONE PIECES.
5. DIVIDE STONE WALL INTO EQUAL SECTIONS (4'-0" MIN., 6'-0" MAX.)
6. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY LANDSCAPE ARCHITECT PRIOR TO FABRICATION.

PLAN

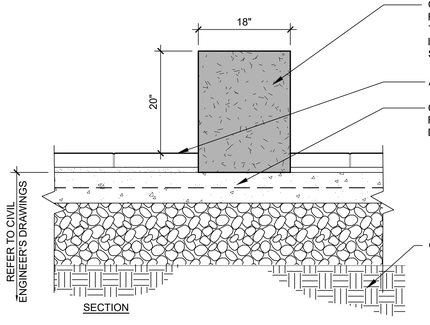
NOTES:
1. REFER TO LANDSCAPE LAYOUT DRAWINGS FOR HORIZONTAL LAYOUT INFORMATION
2. COORDINATE FINISHED GRADES WITH LANDSCAPE AND CIVIL ENGINEER'S DRAWINGS.
3. DRILL MARKS ARE NOT ACCEPTABLE ON ANY FACE OF STONE MATERIAL
4. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY LANDSCAPE ARCHITECT PRIOR TO FABRICATION.



PLAN



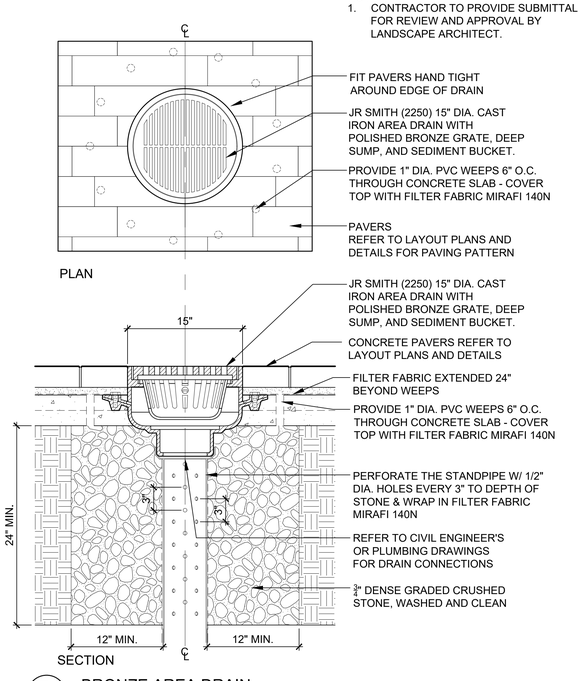
G STONE SEAT WALL - AMPHITHEATER
SCALE 1" = 1'-0"



SECTION

D STONE BENCH
SCALE 1" = 1'-0"

NOTES:
1. CONTRACTOR TO PROVIDE SUBMITTAL FOR REVIEW AND APPROVAL BY LANDSCAPE ARCHITECT.



SECTION

B BRONZE AREA DRAIN
SCALE: 1 1/2" = 1'-0"

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ISSUED FOR EARLY BID PACKAGE 1 - SITE, FOUNDATION, STEEL, CONCRETE AND ELECTRICAL SWITCHGEAR. DRAWINGS ISSUED ARE IN PROGRESS AND WILL BE PUBLISHED WITH NEW ORIGINATION DATES (NO REVISION CLOUDS) WHEN COMPLETE. ENLARGED ARCHITECTURAL DRAWINGS, DETAILS, AND SIMILAR ARE SHOWN AS REFERENCES, BUT ARE NOT INCLUDED IN THIS SUBMISSION.

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: Proj #2170

ORIGINATION DATE:	SCALE:
01/20/2023	AS NOTE
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SHEET CONTENTS:
LANDSCAPE DETAILS

SHEET NO:
L-200

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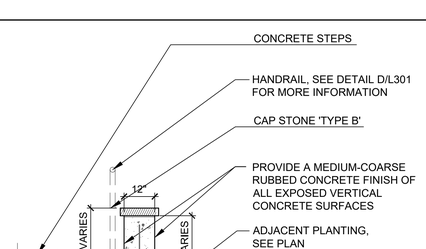
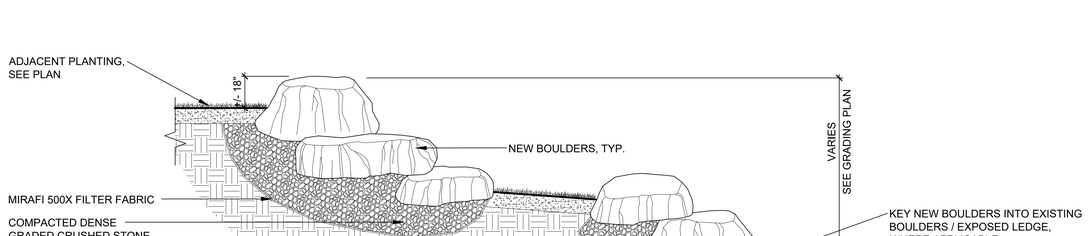
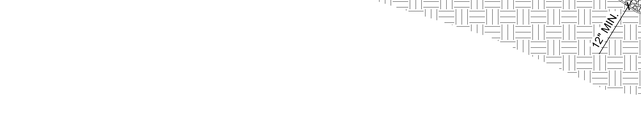


D SECTION: CONCRETE CHEEK WALL
SCALE: 1/2" = 1'-0"

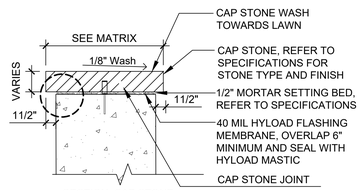


A TERRACED BOULDER WALL
SCALE 1/2" = 1'-0"

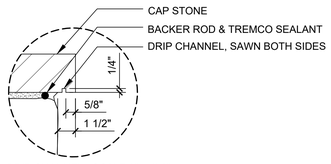


PLAN: CAP STONE A SCALE 1"= 1'-0"

CAPSTONE MATRIX		
TYPE	WIDTH	THICKNESS
A	15"	3"

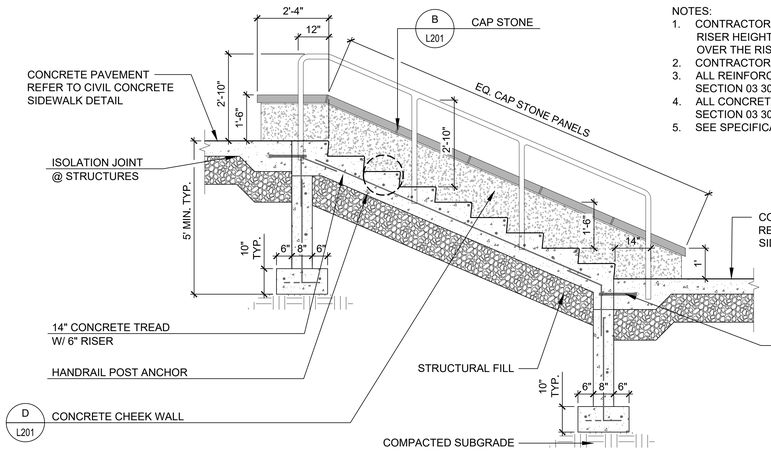


SECTION: CAP STONE
SCALE 1" = 1'-0"

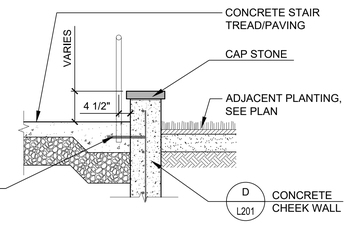


DRIP CHANNEL - SCALE 3" = 1'-0"

B CAP STONE
SCALE: 1"=1'-0"



NOTES:
1. CONTRACTOR SHALL VERIFY NUMBER OF TREADS AND RISERS ON THE LAYOUT AND GRADING PLANS. RISER HEIGHTS WILL NEED TO BE VERIFIED BASED ON FIELD CONDITIONS AND EQUALLY DIVIDED OVER THE RISERS.
2. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR HANDRAILS FOR REVIEW AND APPROVAL.
3. ALL REINFORCING IN THE STAIRS, AND STAIR FOUNDATIONS SHALL MEET THE REQUIREMENTS OF SECTION 03 3000
4. ALL CONCRETE IN THE STAIRS, AND STAIR FOUNDATIONS SHALL MEET THE REQUIREMENTS OF SECTION 03 3000
5. SEE SPECIFICATIONS & GEOTECH REPORT FOR EARTHWORK.



SECTION: CONCRETE CHEEK WALL - SCALE 1/2"= 1'-0"

C SECTION: CONCRETE STEPS
SCALE: 1/2" = 1'-0"

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FFF PROJECT NO: Proj #2170

ORIGINATION DATE:	SCALE:
01/20/2023	AS NOTE
DRAWN BY:	CHECKED BY:
JRD/MKW	MKW

ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS:
LANDSCAPE DETAILS

SHEET NO:
L-201

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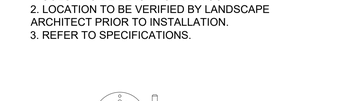
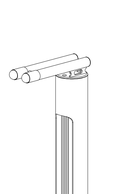
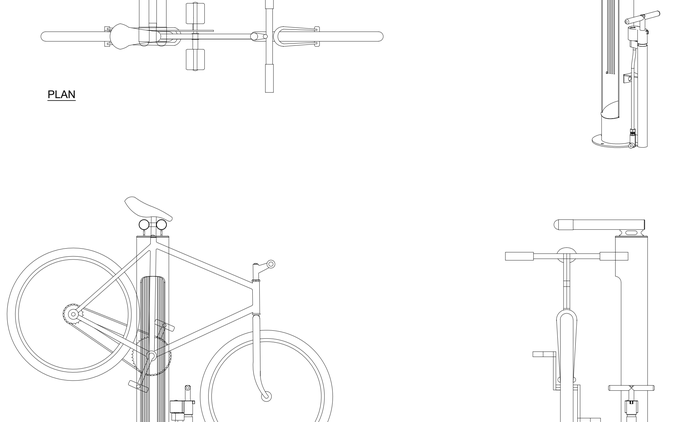
NOTES:
1. COLOR TO BE BLACK POWDER COAT.
2. LOCATION TO BE VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
3. REFER TO SPECIFICATIONS.



PLAN

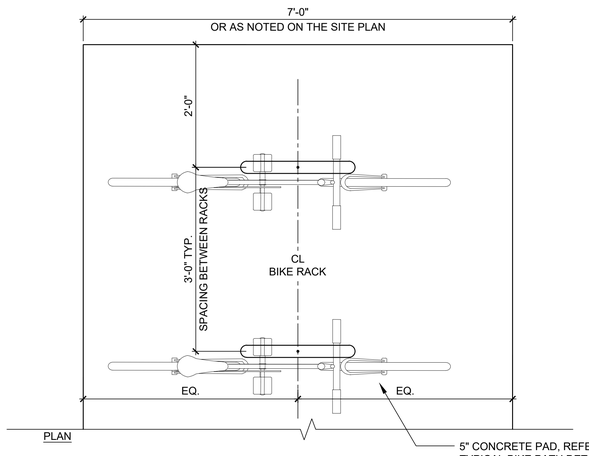




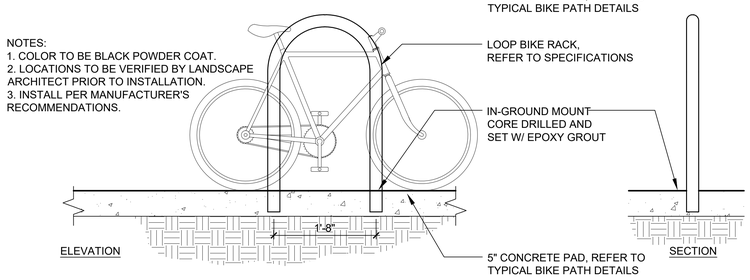
ELEVATION

ELEVATION

C BIKE TUNING STATION
SCALE 1" = 1'



PLAN

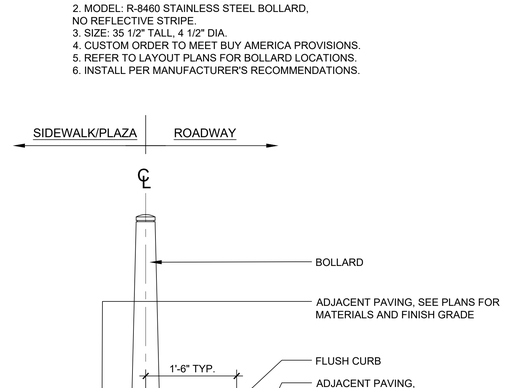


ELEVATION

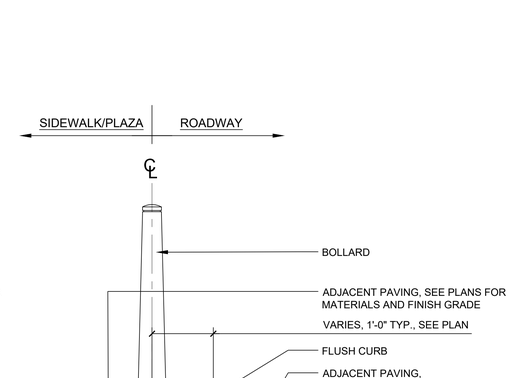
SECTION

D BIKE RACK
SCALE 1" = 1'

NOTES:
1. MANUFACTURER: RELIANCE FOUNDRY
2. MODEL: R-8460 STAINLESS STEEL BOLLARD, NO REFLECTIVE STRIPE.
3. SIZE: 35 1/2" TALL, 4 1/2" DIA.
4. CUSTOM ORDER TO MEET BUY AMERICA PROVISIONS.
5. REFER TO LAYOUT PLANS FOR BOLLARD LOCATIONS.
6. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

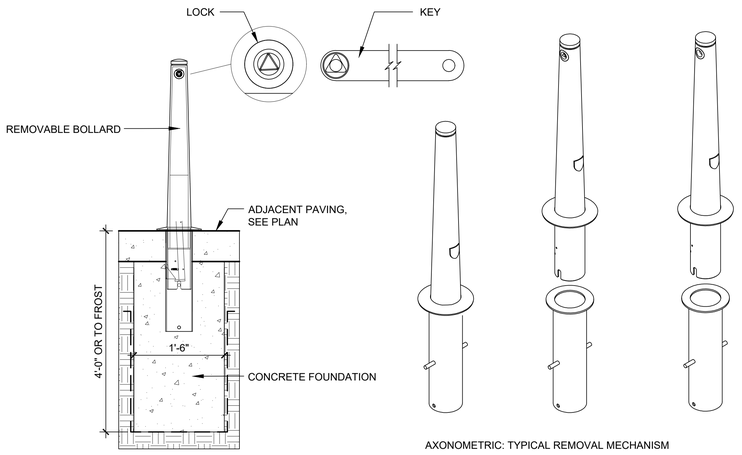


SECTION: BOLLARD AT RAISED CURB

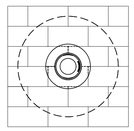


SECTION: BOLLARD AT FLUSH CURB

A BOLLARD - FIXED
SCALE N.T.S.



AXONOMETRIC: TYPICAL REMOVAL MECHANISM



PLAN

NOTES:
1. MANUFACTURER: RELIANCE FOUNDRY
2. MODEL: R-8464 STAINLESS STEEL REMOVABLE BOLLARD, INTERNAL LOCKING HARDWARE, NO REFLECTIVE STRIPE.
3. SIZE: 35 1/2" TALL, 4 1/2" DIA.
4. CUSTOM ORDER TO MEET BUY AMERICA PROVISIONS.
5. REFER TO LAYOUT PLANS FOR BOLLARD LOCATIONS.
6. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

B BOLLARD - REMOVABLE
SCALE N.T.S.

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52 INSTITUTE ROAD, BURLINGTON, VERMONT

FFF PROJECT NO: Proj #2170

ORIGINATION DATE:	SCALE:
01/20/2023	AS NOTE
DRAWN BY:	CHECKED BY:
JRD/MKW	MKW

ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS:
LANDSCAPE DETAILS

SHEET NO:
L-202

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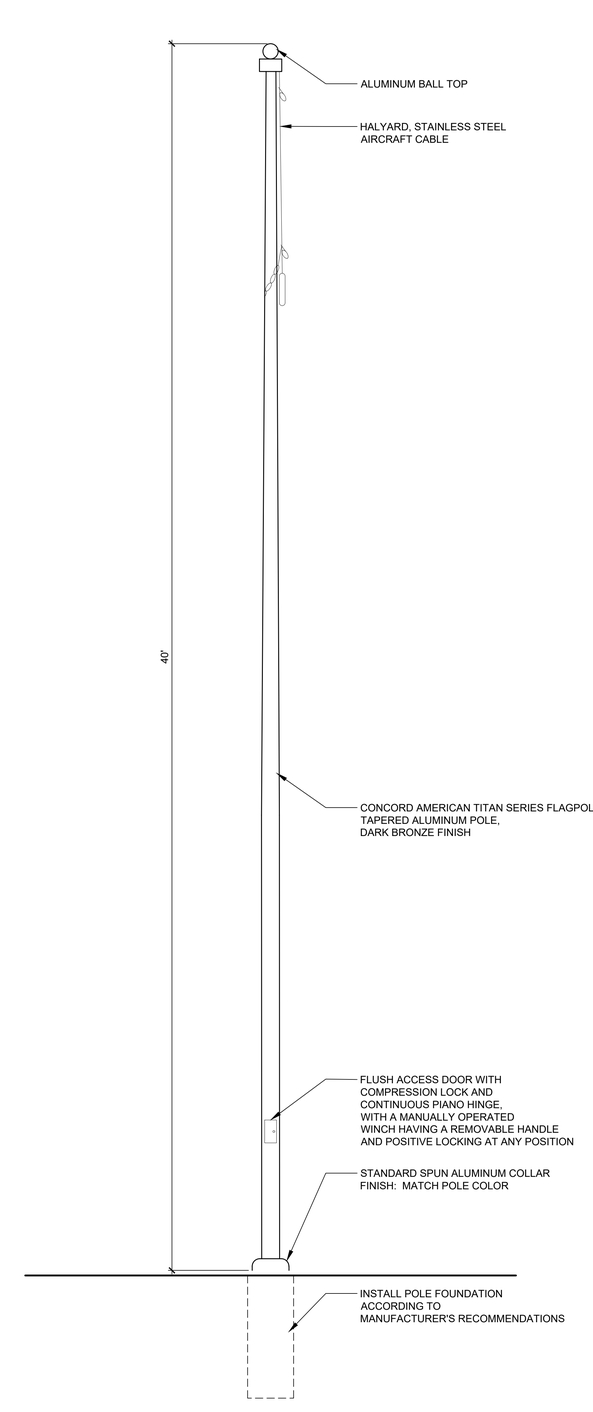
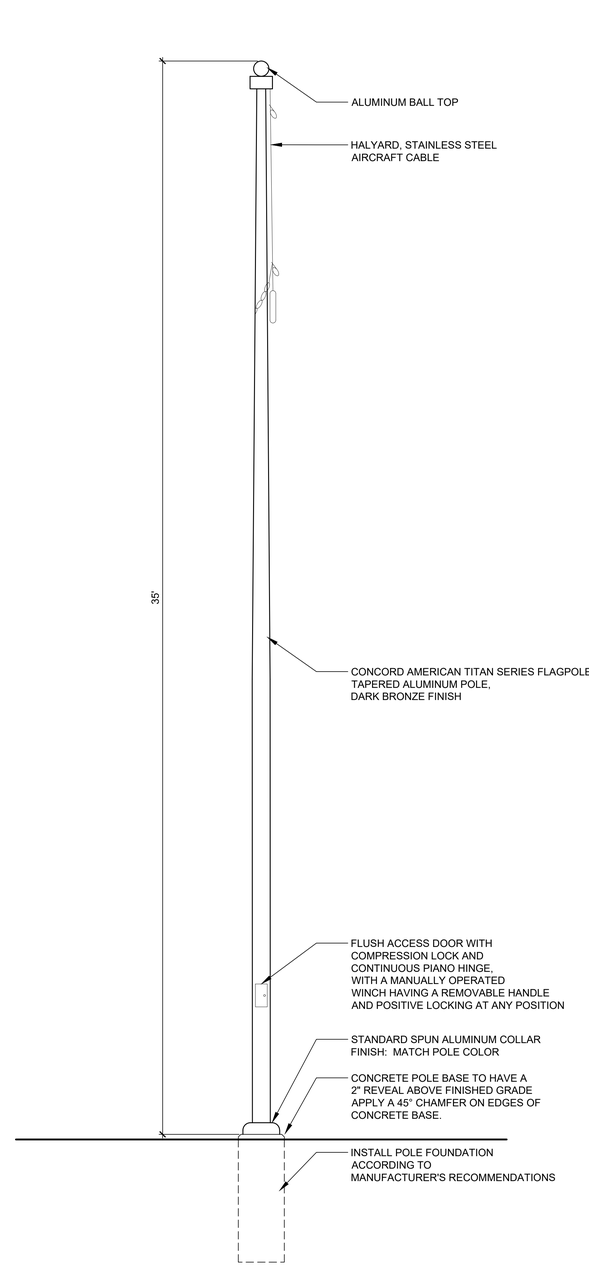


B FLAGPOLE 40'
SCALE 1/2" = 1'-0"



A FLAGPOLE 35'
SCALE 1/2" = 1'-0"

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FFF PROJECT NO:
Proj #2170

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01/20/2023	AS NOTE
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ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS:
LANDSCAPE DETAILS

SHEET NO:
L-203

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PLANT SCHEDULE

DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
ARA	3	Acer rubrum `Armstrong`	Armstrong Red Maple	2 1/2 - 3" CAL.
AF	29	Acer x freemanii `Sienna`	Sienna Glen Maple	2 1/2 - 3" CAL.
AG3	34	Amelanchier x grandiflora `Autumn Brilliance`	`Autumn Brilliance` Serviceberry	4-5` HT./Multi-stem
BN	23	Betula nigra `Heritage`	Multi-Stem Heritage River Birch	12 -14` HT.
GBP	10	Ginkgo biloba `Princeton Sentry`	Princeton Sentry Ginkgo	2 1/2 - 3" CAL.
GT	39	Gleditsia triacanthos inermis `Shademaster`	Shademaster Locust	2 1/2 - 3" CAL.
QS	14	Quercus robur `Fastigiata`	Skyrocket® English Oak	2 1/2 - 3" CAL.
QR	5	Quercus rubra	Red Oak	2 1/2 - 3" CAL.
TB	34	Tilia americana `Bailyard`	Frontyard® American Linden	2 1/2 - 3" CAL./ B&B
UP2	42	Ulmus x `Morton Glossy`	Triumph™ Elm	2 1/2 - 3" CAL.

EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
PG3	14	Picea glauca	White Spruce	6 - 8` HT./ B&B
PG2	8	Picea glauca	White Spruce	8 - 10` HT., B&B

SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AK	48	Aronia melanocarpa `Iroquois Beauty`	Iroquois Beauty Black Chokeberry	18 - 24" SPD
CSK	37	Cornus sericea `Kelseyi`	Kelseyi Dogwood	18 - 24" SPD
CA2	75	Cornus stolonifera `Arctic Fire`	Arctic Fire Dogwood	18 - 24" SPD
DL	63	Diervilla lonicera	Dwarf Bush Honeysuckle	18 - 24" SPD
JP3	50	Juniperus horizontalis `Prince of Wales`	Prince Of Wales Juniper	18 - 24" SPD
MD	134	Microbiota decussata	Russian Cypress	18 - 24" SPD
RH	72	Rhus aromatica `Gro-Low`	Gro-Low Fragrant Sumac	18 - 24" SPD

ORNAMENTAL GRASSES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CA	548	Calamagrostis x acutiflora `Karl Foerster`	Karl Foerster Feather Reed Grass	2 GAL.
PVS	123	Panicum virgatum `Shenandoah`	Shenendoah Switch Grass	2 GAL.
SS	151	Schizachyrium scoparium	Little Bluestem Grass	2 GAL.

PERENNIALS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
PN3	79	Perovskia atriplicifolia `Blue Jean Baby`	Blue Jean Baby Russian Sage	1 GAL.

EXISTING BUILDING

REFER TO SHEET L-301

REFER TO SHEET L-302

REFER TO SHEET L-303

REFER TO SHEET L-304

ENTRY (Second Floor)

PROPOSED BURLINGTON HIGH SCHOOL / BURLINGTON TECHNICAL CENTER

ENTRY (Lower Level)

ENTRY (First Floor)

EXISTING TREES TO REMAIN, TYP.

INSTITUTE ROAD

INSTITUTE ROAD

NORTH AVENUE

NORTH AVENUE

EXISTING PARKING

EXISTING PARKING

EXISTING ATHLETIC FIELDS

0 20 40 80 Feet

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ORIGINATION DATE:	SCALE:
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DRAWN BY: JRD/MKW	CHECKED BY: MKW

ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS: OVERALL PLANTING PLAN

SHEET NO: L-300

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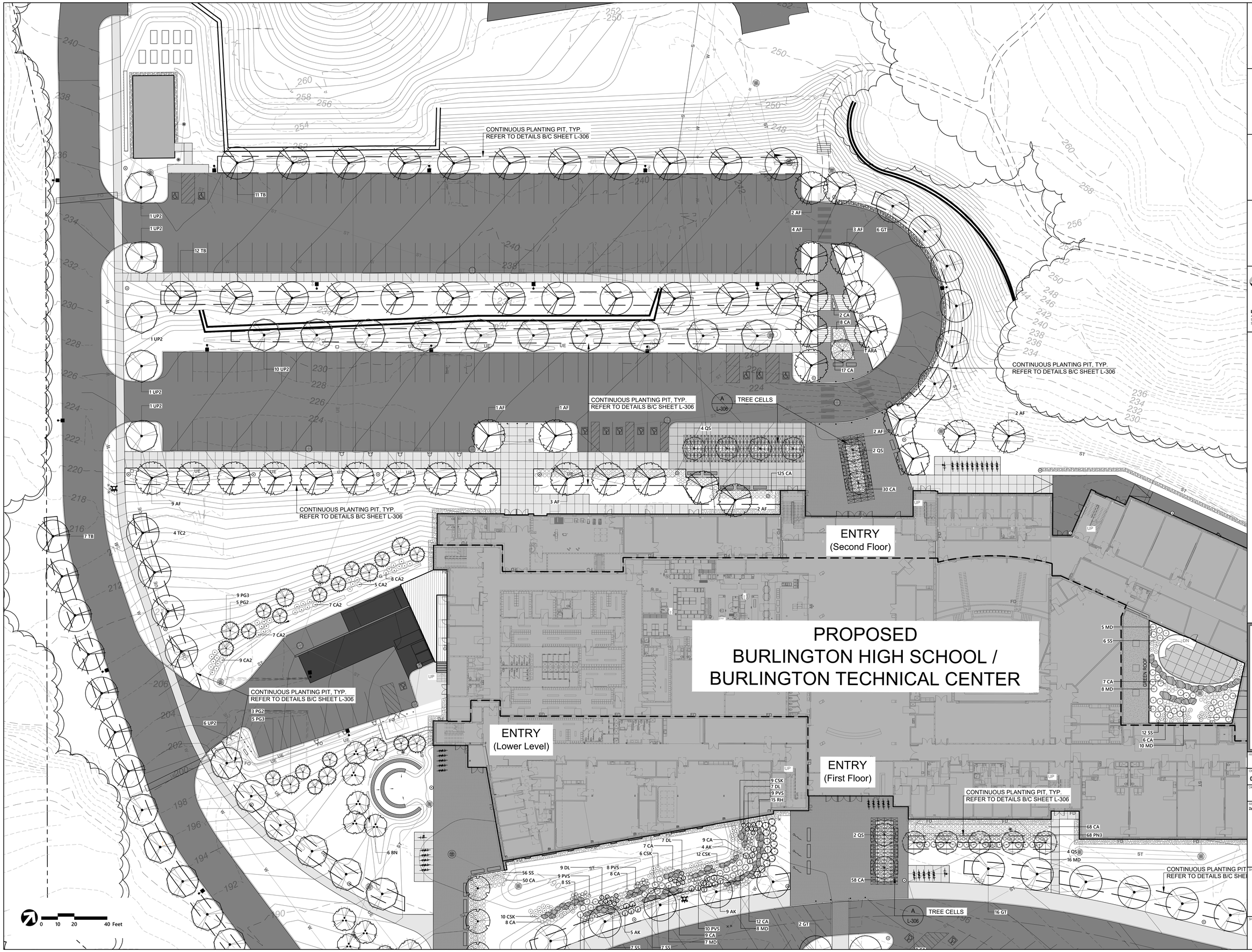

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SHEET CONTENTS:
PLANTING PLAN

SHEET NO:
L-301

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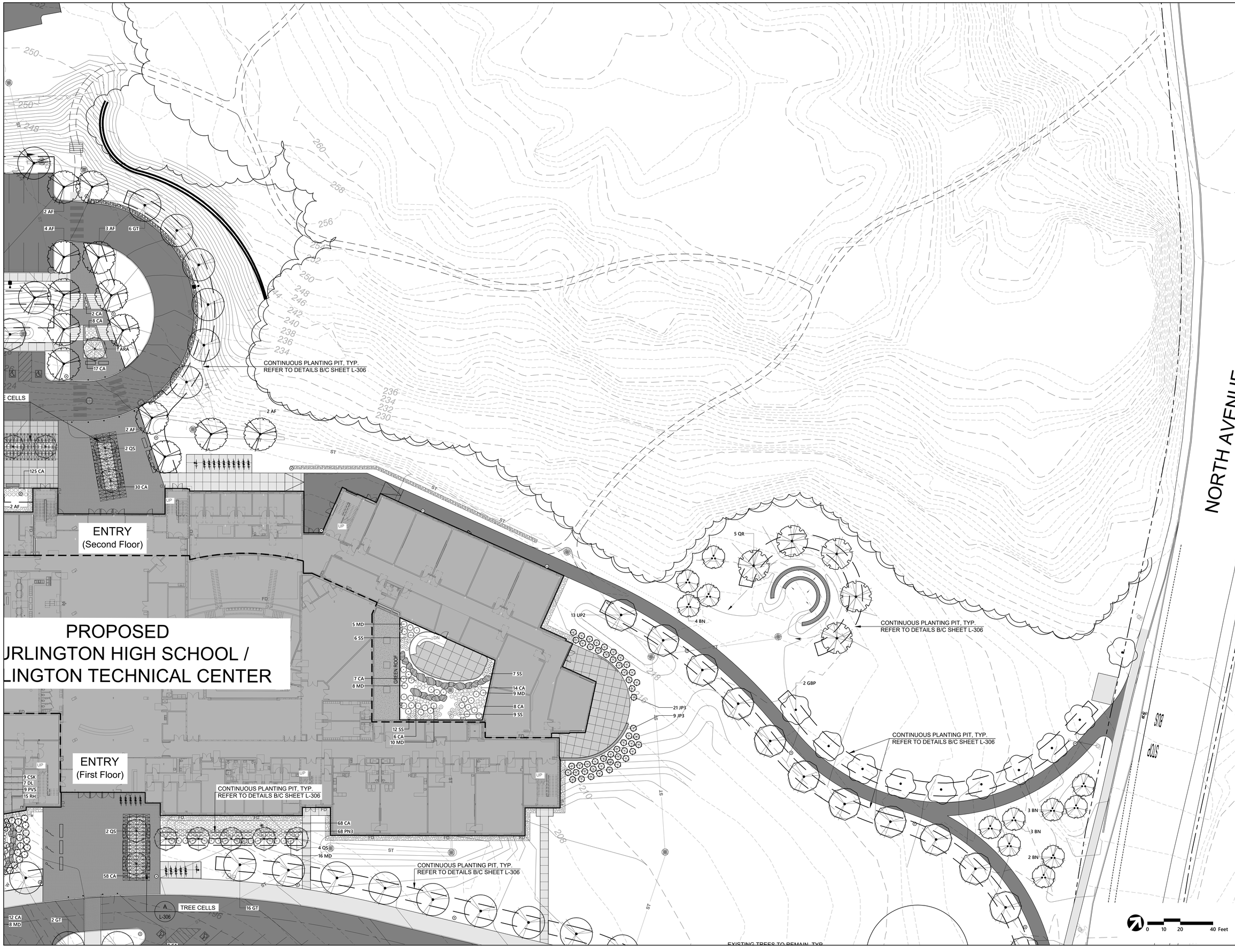

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ORIGINATION DATE: 01/20/2023	SCALE: 1"=20'
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ISSUE LOG: Zoning Permit	05/02/23

SHEET CONTENTS:

PLANTING PLAN

SHEET NO:

L-302

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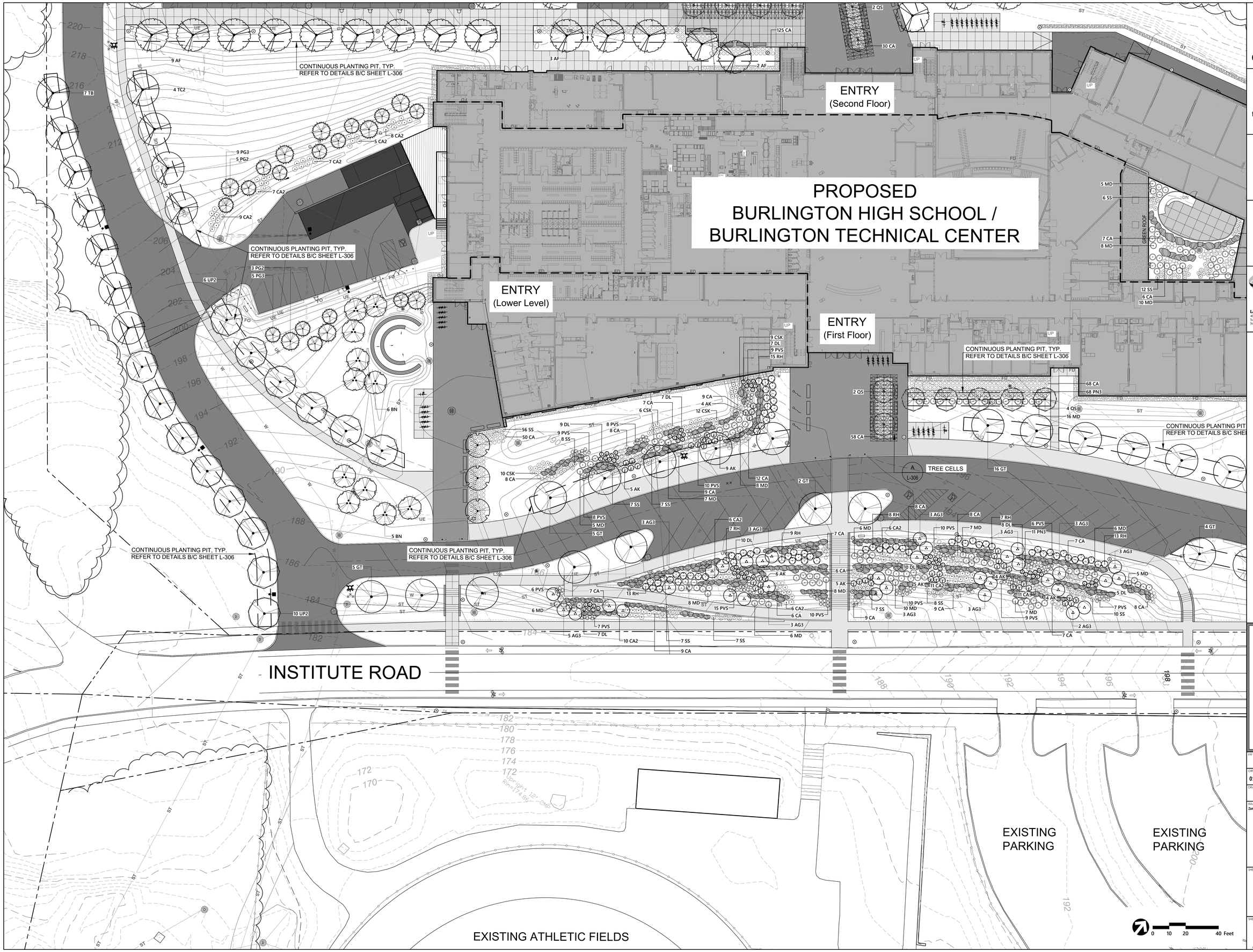

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FFF PROJECT NO: Proj #2170	
ORIGINATION DATE: 01/20/2023	SCALE: 1"=20'
DRAWN BY: JRD/MKW	CHECKED BY: MKW
ISSUE LOG: Zoning Permit	05/02/23

SHEET CONTENTS:
PLANTING PLAN

SHEET NO:
L-303

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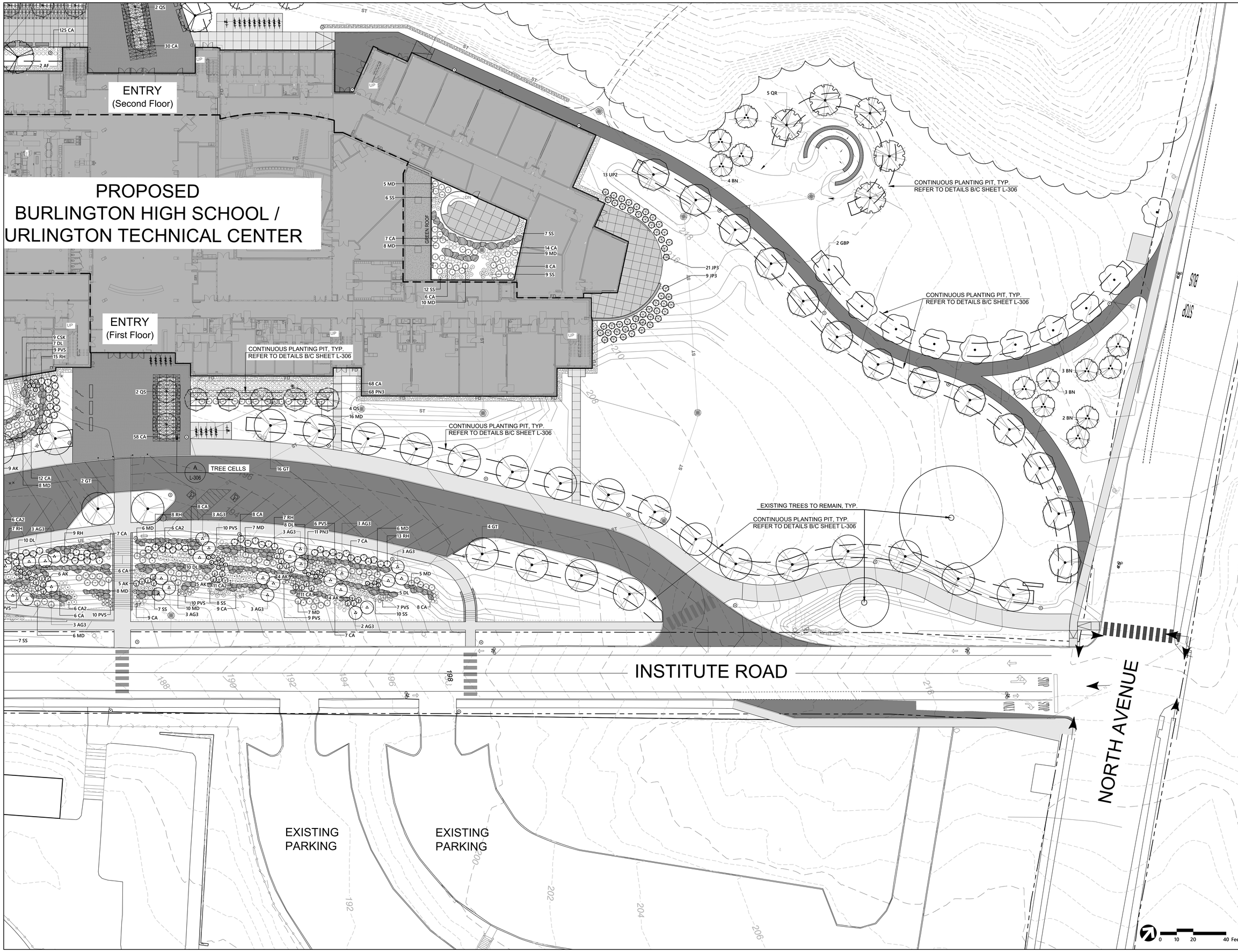

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FFF PROJECT NO:
Proj #2170

ORIGINATION DATE:	SCALE:
01/20/2023	1"=20'
DRAWN BY:	CHECKED BY:
JRD/MKW	MKW

ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS:
PLANTING
PLAN

SHEET NO:
L-304

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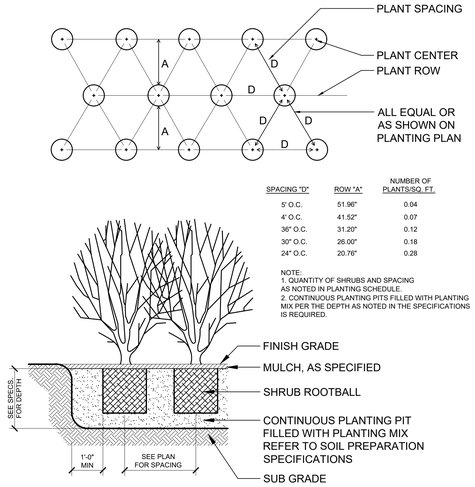
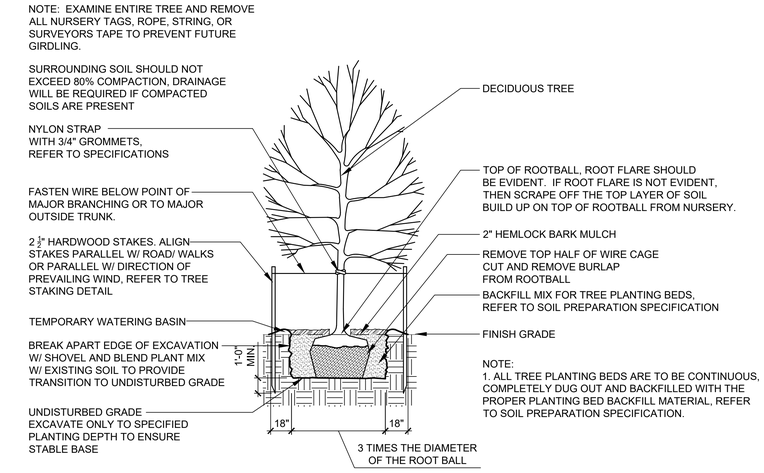
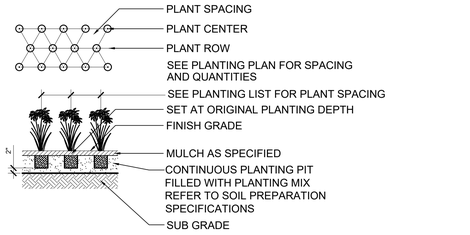


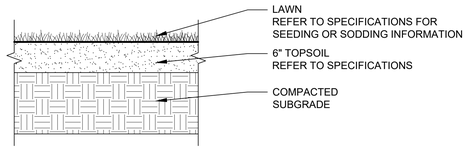
D SHRUB PLANTING
SCALE: 1/2" = 1'-0"



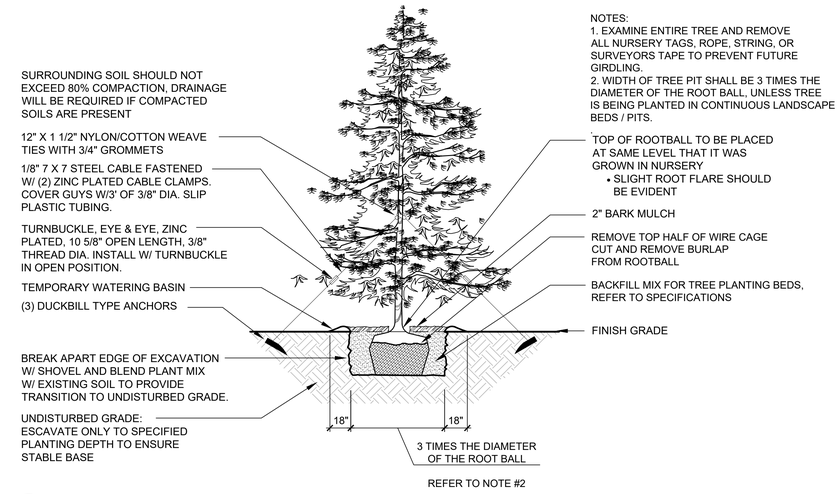
A TREE PLANTING
SCALE 1/4" = 1'-0"



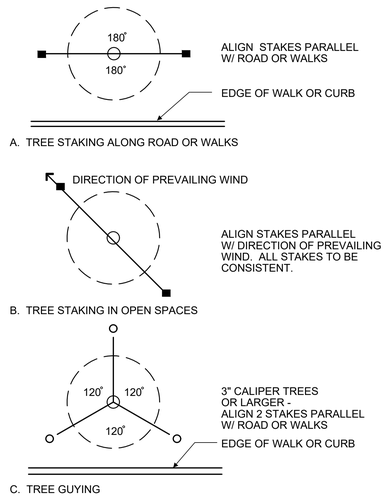
E PERENNIAL PLANTING
SCALE: 1/2" = 1'-0"



F LAWN
SCALE 1" = 1'-0"
p-lawn.dwg



B EVERGREEN PLANTING
SCALE 1/4" = 1'-0"



C TREE STAKING LAYOUT
NO SCALE
p-stake.dwg

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FFF PROJECT NO: Proj #2170

ORIGINATION DATE: 01/20/2023 | SCALE:

DRAWN BY: JRD/MKW | CHECKED BY: MKW

ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS: PLANTING DETAILS

SHEET NO: L-305

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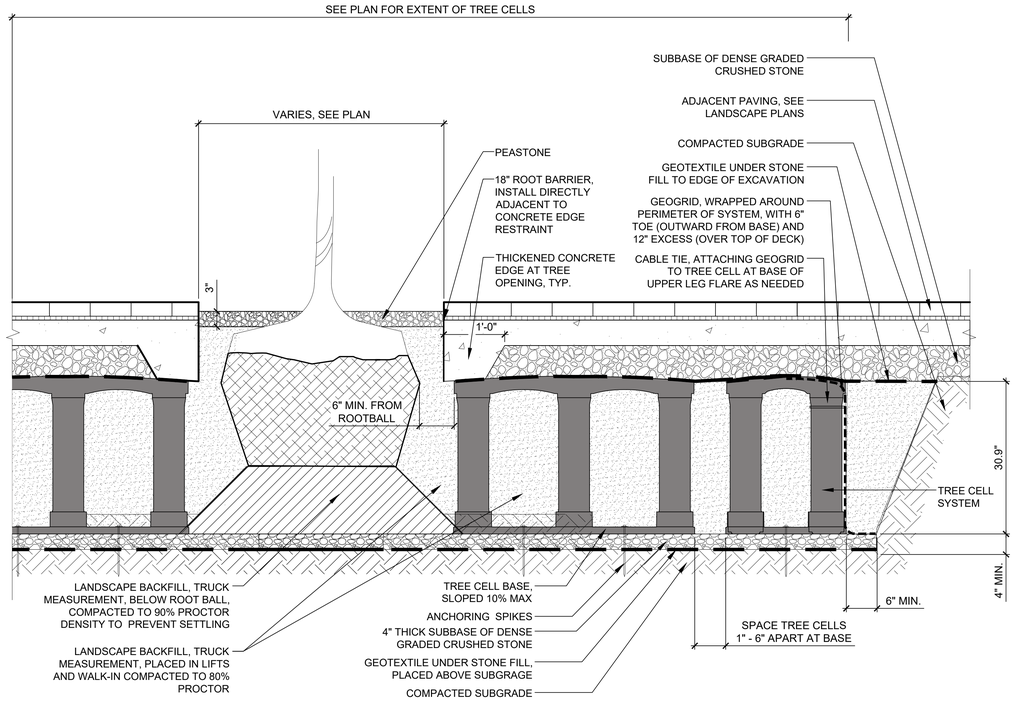
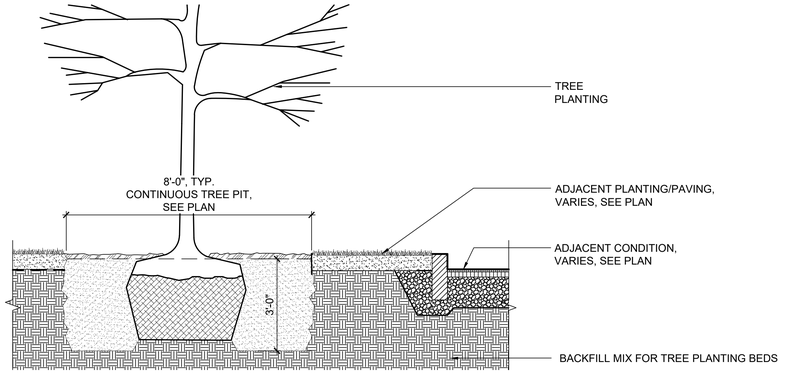


A TREE CELL

SCALE 1" = 1'-0"

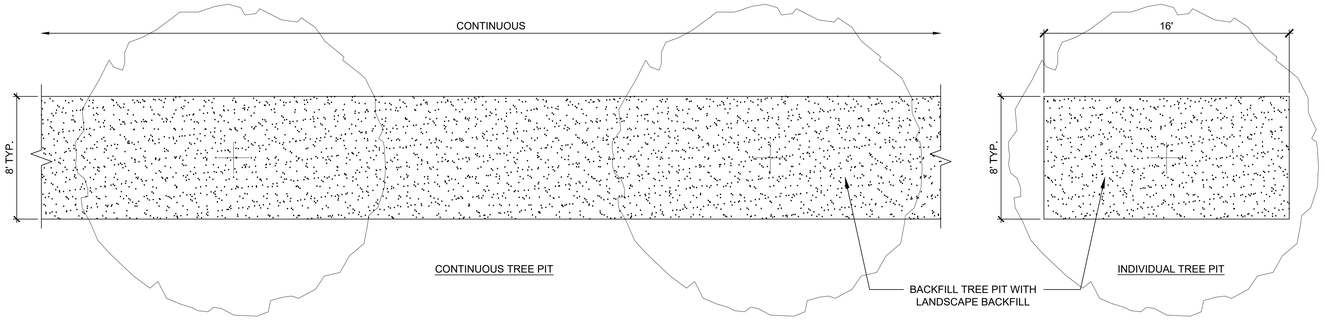
NOTES:
1. REFER TO PLANTING PLAN FOR INTENDED LAYOUT OF THE CELLS FOR EACH TREE. DUE TO UNFORESEEN CONDITIONS ACTUAL LAYOUT OF CELLS MAY VARY IN THE FIELD.
2.FINAL LAYOUT OF TREE CELLS WILL BE DONE IN A MANNER TO CREATE SHARED SOIL VOLUME WITH NEIGHBORING TREES WHENEVER POSSIBLE.
3. FINAL LAYOUT OF TREE CELLS WILL BE REVIEWED BY LANDSCAPE ARCHITECT PRIOR TO BACKFILLING.
4. INSTALL TREE CELLS PER MANUFACTURER'S INSTRUCTIONS.
5. ACTUAL TREE CELL INSTALLATION LAYOUT MAY VARY DEPENDING ON SELECTED PRODUCT / VENDOR.



B CONTINUOUS TREE PLANTING PIT

SCALE 1/2" = 1'-0"

s-continuous tree pit.dwg



C TREE PLANTING PIT PLAN

SCALE 1/4" = 1'-0"

p-tree planting pit plan.dwg

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FFF PROJECT NO: Proj #2170

ORIGINATION DATE: 01/20/2023 | SCALE:

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ISSUE LOG:
Zoning Permit 05/02/23

SHEET CONTENTS: PLANTING DETAILS

SHEET NO: L-306

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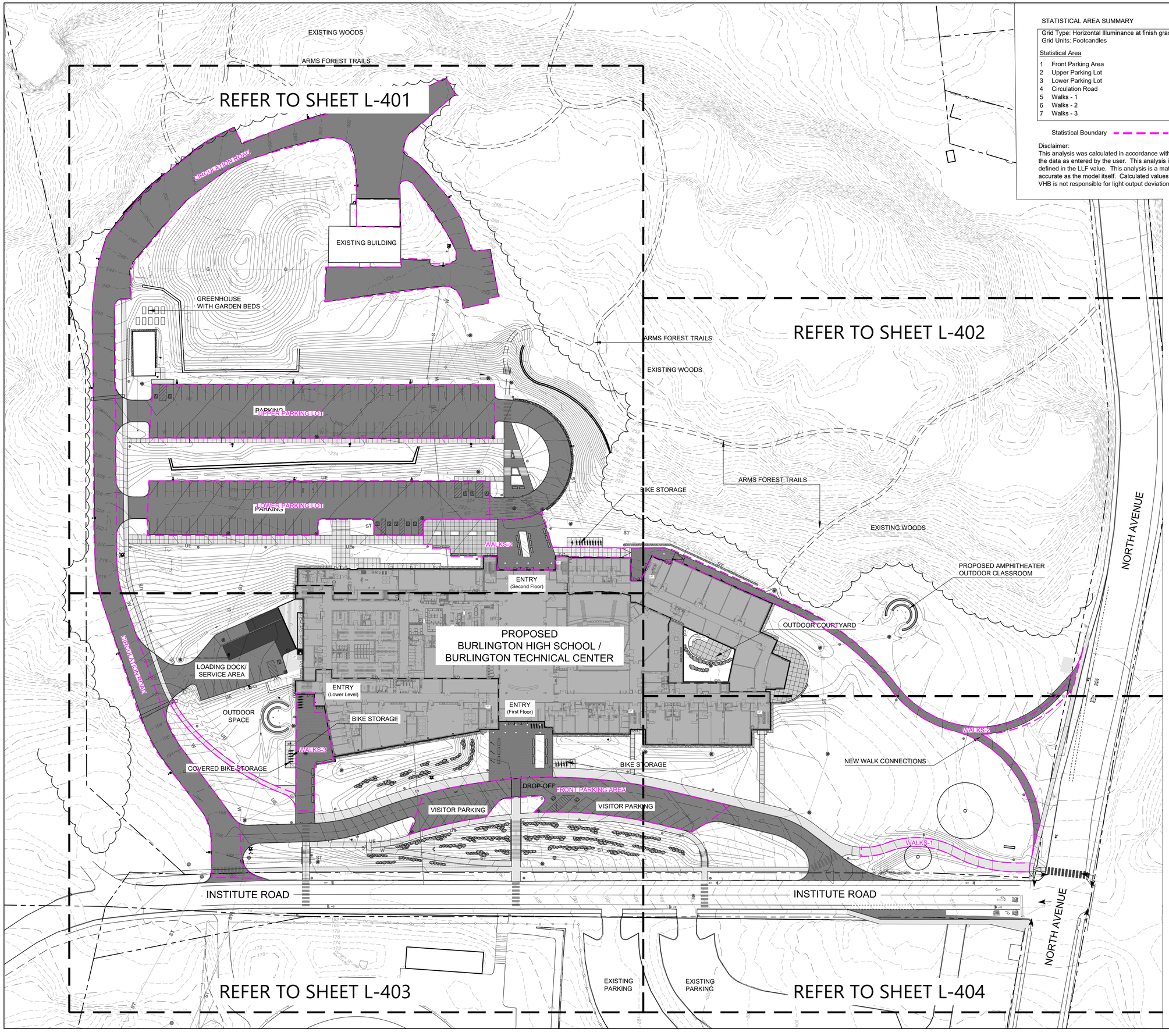

STATISTICAL AREA SUMMARY

Grid Type: Horizontal Illuminance at finish grade.
Grid Units: Footcandles

Statistical Area		Avg	Max	Min	Avg/Min	Max/Min
1	Front Parking Area	1.39	3.90	0.20	6.95	19.50
2	Upper Parking Lot	2.01	3.40	0.30	6.70	11.33
3	Lower Parking Lot	1.54	3.20	0.20	7.70	16.00
4	Circulation Road	1.70	3.60	0.00	N.A.	N.A.
5	Walks - 1	0.71	1.80	0.10	7.10	18.00
6	Walks - 2	0.68	1.90	0.00	N.A.	N.A.
7	Walks - 3	0.79	1.90	0.20	3.95	9.50

Statistical Boundary

Disclaimer:
This analysis was calculated in accordance with published IES calculation methods and procedures with the data as entered by the user. This analysis is based on tested IES photometric data, light loss factors as defined in the LLF value. This analysis is a mathematical model of real life situations, and it can be only as accurate as the model itself. Calculated values may vary from actual measurements in certain situations. VHB is not responsible for light output deviations due to light source, or other variables.

LIGHT FIXTURE AND POLE SPECIFICATIONS

Fixture A
Manufacturer: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R3
Mounting: 1
Light Engine: 5G700
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: 16-feet
Voltage: 120-277V

Fixture B
Manufacturer: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R5R
Mounting: 1
Light Engine: 5G700
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: 16-feet
Voltage: 120-277V

Fixture C
Manufacturer: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R3
Mounting: 1
Light Engine: 5G450*
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: 16-feet
Voltage: 120-277V
* - Reduce output of approx. 45% factory setting

Fixture D
Manufacturer: Beacon Lighting
Fixture: VP-Micro Strike
LED Engine: Size 2 - 320L-145
Color Temperature: 3,000k
Distribution: Type 3
Configuration: Single
Finish: Black Matte Textured
Pole Height: 25-feet
Voltage: 120-277V

Fixture E
Manufacturer: Beacon Lighting
Fixture: VP-Micro Strike
LED Engine: Size 2 - 320L-145
Color Temperature: 3,000k
Distribution: Type 4 Wide
Configuration: Single
Finish: Black Matte Textured
Pole Height: 25-feet
Voltage: 120-277V

Fixture F
Manufacturer: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R3
Mounting: 1
Light Engine: 5G450*
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: Wall Mounted - 14-feet
Voltage: 120-277V
* - Reduce output of approx. 45% factory setting

Fixture G
Manufacturer: Prescolite
Fixture: LFR-6RD
Optics: Wide
Lumens: 1,000
Color Temperature: 3,000K
Mounting Height: Canopy Mounted
varies 8-feet to 12-feet

0 20 40 80 Feet

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FFI PROJECT NO: Proj #2170
ORIGINATION DATE: 01/20/2023
SCALE: 1"=40'
DRAWN BY: JRD/MKW
CHECKED BY: MKW
ISSUE LOG: Zoning Permit 05/02/23

SHEET CONTENTS: OVERALL LANDSCAPE LIGHTING PLAN

SHEET NO: L-400

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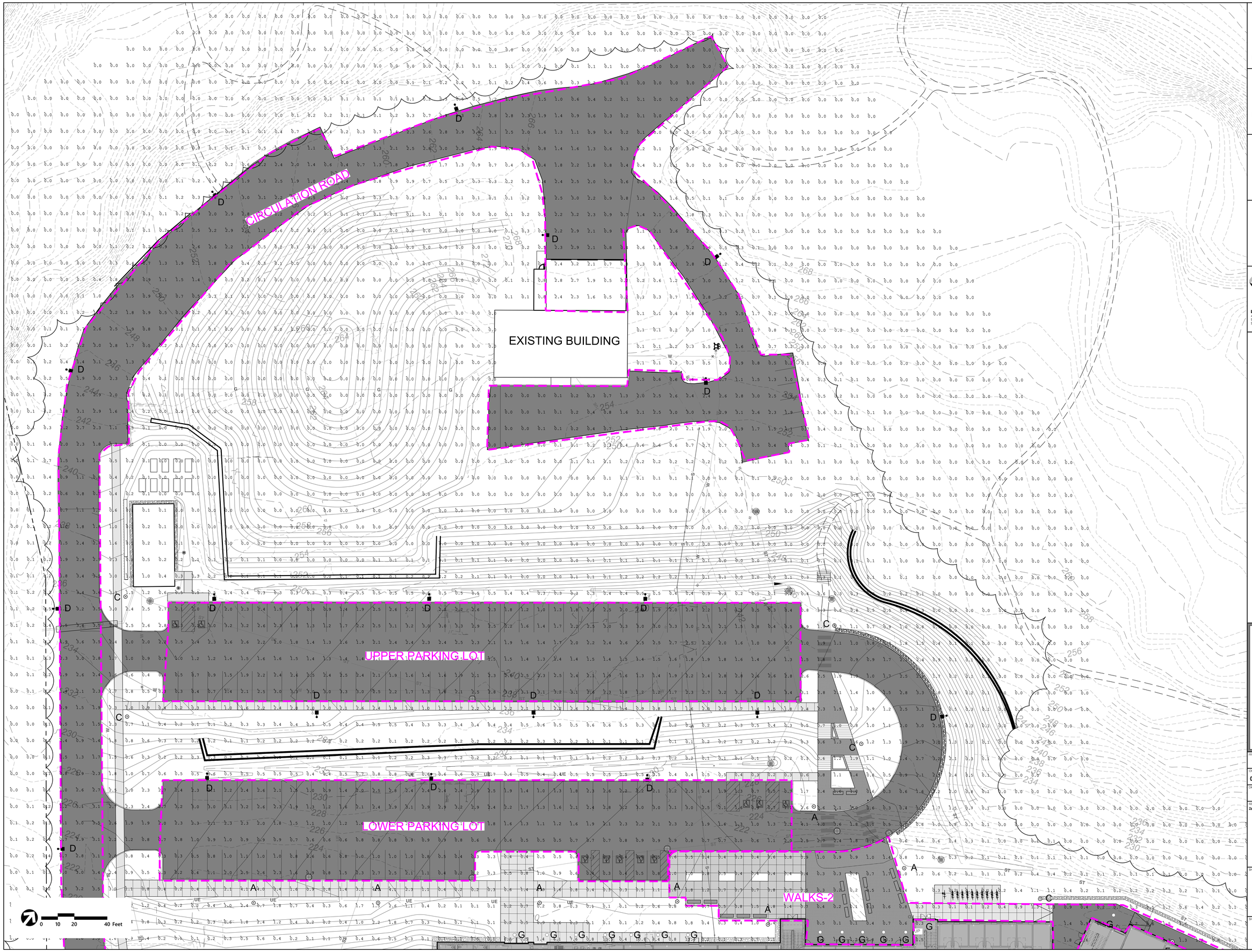

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FFF PROJECT NO: Proj #2170

ORIGINATION DATE:	SCALE:
01/20/2023	1"=20'
DRAWN BY: JRD/MKW	CHECKED BY: MKW

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SHEET CONTENTS:

LANDSCAPE LIGHTING PLAN

SHEET NO:

L-401

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South Burlington, VT 05403

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ORIGINATION DATE:	SCALE:
01/20/2023	1"=20'
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JRD/MKW	MKW

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SHEET CONTENTS:
LANDSCAPE LIGHTING PLAN

SHEET NO:
L-402

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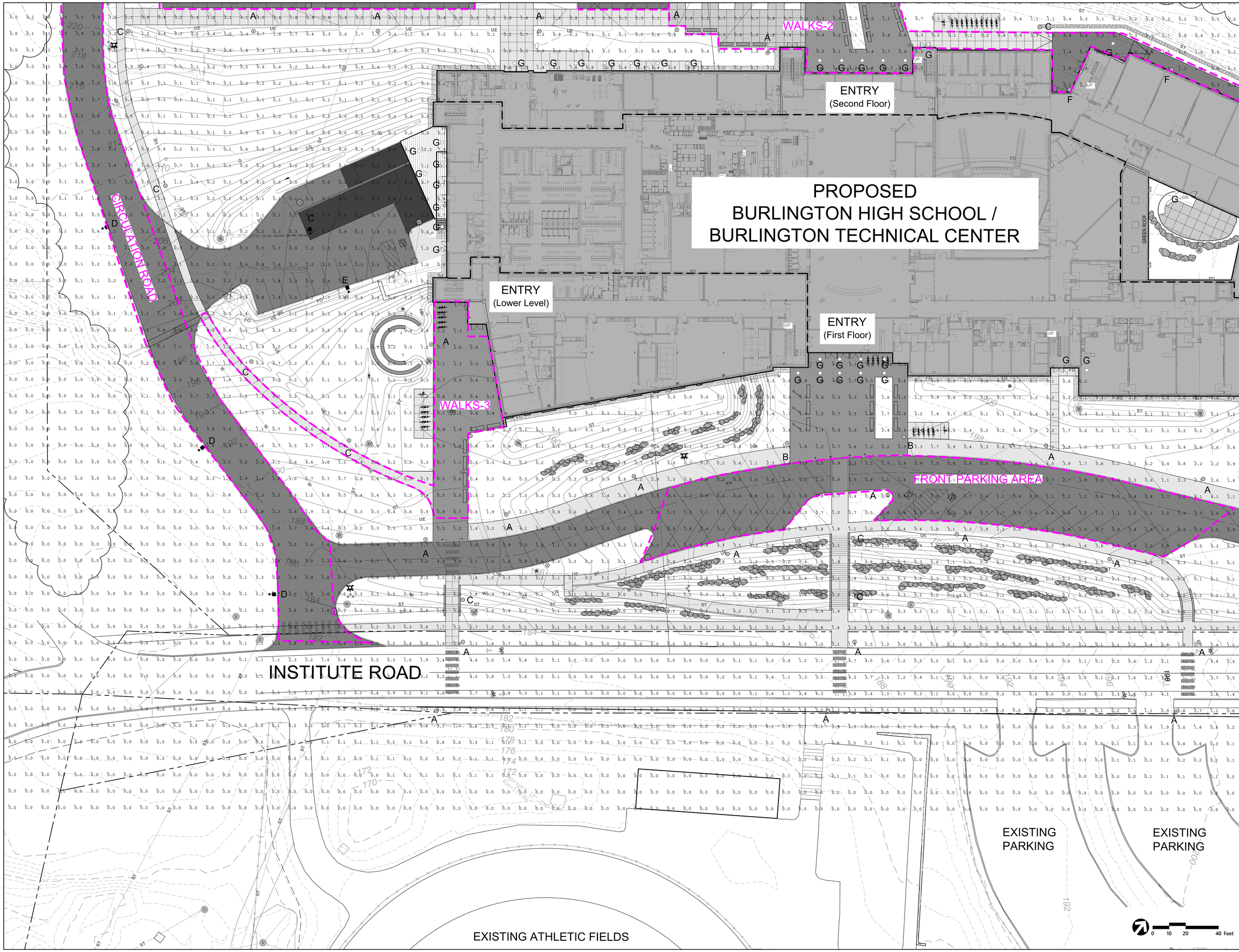

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ORIGINATION DATE: 01/20/2023	SCALE: 1"=20'
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ISSUE LOG: Zoning Permit	05/02/23

SHEET CONTENTS:

LANDSCAPE LIGHTING PLAN

SHEET NO:

L-403

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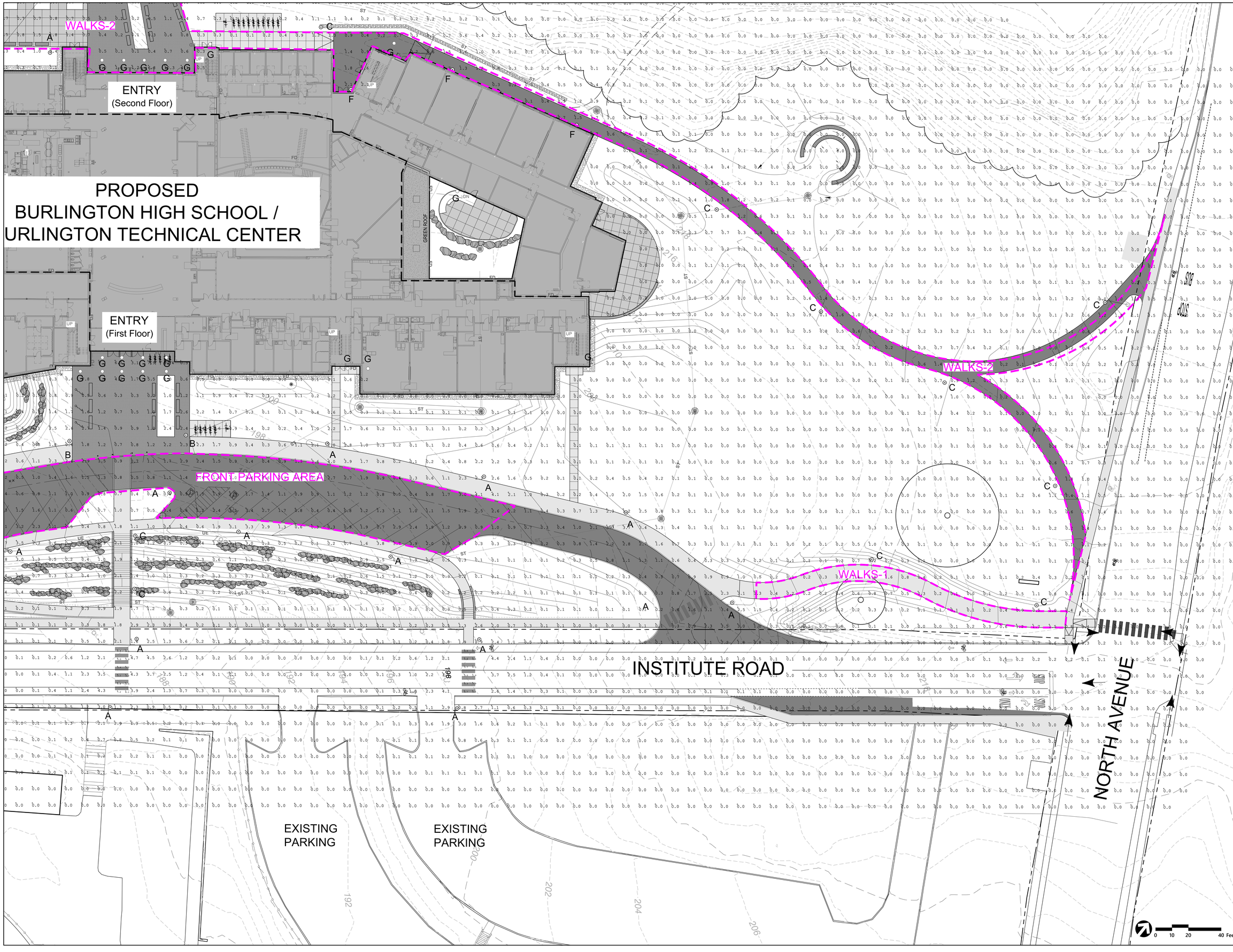

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www.drasc.com

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Suite 200
South Burlington, VT 05403

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ORIGINATION DATE: 01/20/2023	SCALE: 1"=20'
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ISSUE LOG: Zoning Permit	05/02/23

SHEET CONTENTS:

LANDSCAPE LIGHTING PLAN

SHEET NO:

L-404

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Date: _____ Customer: _____

Project: _____

Type: _____ Qty: _____

selux

Fixtures A, B, C, and F

Saturn Cutoff LED



Order Code: _____ - _____ - _____ - _____ - _____ - _____ - _____ - _____ - _____

Pole Order Code: _____ - _____ - _____ - _____ - _____ - _____

		Series	Height	Finish	Options

SACL

Series	SACL Saturn Cutoff LED							
Optics	R1 Type I	R2 Type II	R3 Type III	R3W Type III (Wide)	R4 Type IV	R5R Type V (Round)	R5S Type V (Square)	R5Q Type V (Rectangular)
Mounting	1 Single	1A Single Arm Mount	2 Double	W Wall Mount				
Light Engine	5G450 37kV/445mA	5G700 37kV/668mA	5G105 39kV/926mA					
CCT	27' 2700K	30' 3000K	40 4000K					
Power Cord Length	08 8 ft	10 10 ft	12 12 ft	14 14ft	16 16 ft	18 18 ft	XX XX	
Finish	WH White	BK Black	BL Semi-Matte Black	BZ Bronze	SV Silver	SP Specify Premium Color		
Voltage	UNV 120 - 277	120 120V	240 240V	277 277V	347[2] 347V	480[2] 480V		
Options	DM[4] Dimming (0-10V)	HS[5] House Side Shield (180°)	HL30[6,5] House Side Shield Low Output 30%	HL50[6,5] House Side Shield Low Output 50%	DS No Uplight Finish	PCT[7] Photocell Tenon	MS[8,9] Pole Motion Sensor with Optional Photocell (See page 3 for order code)	

[1] Based on R1 distribution in 3000K CCT

[2] IDA Approved *For other CCT please consult factory

[3] For 1 mounting use the pole height. For 1A or 2 mounting use the pole height +2

[4] Equipped with step-down transformer

[5] Type I, II, III, and IV only

[6] DM, HLXX or MS only. Cannot be combined.

[7] 120V, 240V or 277V only

[8] PCT or MS only. Cannot be combined.

Product Modifications

Please list modification requirements for review by factory:

Approvals

Date:

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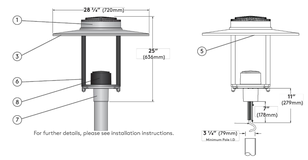
In a continuing effort to offer the best product possible, we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product. Specification sheets found at www.selux.us are the most recent versions and supercede all other printed or electronic versions.

Saturn Cutoff LED

selux

SACL-1-XX-DS



For further details, please see installation instructions.

Specifications

1. Luminaire Cover - Die cast aluminum cover made from low copper alloy, designed to ensure optimal thermal management for extra long life time of LED light engine.

2. Gasketing - (not shown) Continuous gasket provides weatherproofing, dust and insect control at all fixture connections.

3. Luminaire Hood - Aluminum shade with white painted interior.

4. LED Array - (not shown) High flux LEDs mounted to PC boards and attached to aluminum heat sink for maximum LED performance and life. CCT tolerance ¼ step binning for 3000K, and 4000K. CRI minimum 80. Complete light engine can be removed easily for future upgrade. LED light engine provides a reported lumen maintenance of 93% at 50,000 hours. L70 calculated greater than 100,000 hours.

5. LED Optics - Technical Optics (R1, R2, R3, R3W, R4, R5S, R5Q and R5R) use Selux signature light pattern acrylic lens holder to secure proprietary silicone optics. Internal micro house side shield available for distributions types I, II, III & IV.

6. LED Driver - (not shown) LEDs are driven by RoHS compliant constant current programmable LED driver. Driver includes 0-10V dimming to 10%, meets the requirements of IP66. Driver assembly located inside the head.

7. Hood Supports - Two aluminum arms support shade and optic assembly and attach to the die cast aluminum pole fitter (shown painted matte black for DS option).

8. Pole Fitter - Self-leveling, die-cast low-copper aluminum alloy, fitter base secured to pole with three, stainless steel, Allen head set screws. Fitter for 3 ½" (90mm) O.D. poles.

9. Driver cover - Die cast aluminum cover made from low copper alloy, removes for tool-less access to driver. Driver secured to removable tray for ease of maintenance (shown painted matte black for DS option).

10. Surge Protector - (not shown) Designed to protect luminaire from electrical surge (20kA).

11. Power Cord - (not shown) Pre-installed at factory. Please specify power cord length in accordance to height of the pole. Add 2 feet to power cord length if double mounting (2) is specified.

Exterior Luminaire Finish - Selux utilizes a high quality Polyester Powder Coating. All Selux luminaires and poles are finished in our Tiger Drylac certified facility and undergo a five stage intensive pretreatment process where product is thoroughly cleaned, phosphated and sealed. Selux powder coated products provide excellent salt and humidity resistance as well as ultraviolet resistance for color retention. All products are tested in accordance with test specifications for coatings from ASTM and PCI.

Standard exterior colors are White (WH), Black (BK), Semi-Matte Black (BL), Bronze (BZ), and Silver (SV). Selux premium colors (SP) are available, please specify from your Selux color selection guide.

5 Year Limited LED Luminaire Warranty - Selux offers a 5 Year Limited Warranty to the original purchaser that the Saturn Cutoff LED luminaire shall be free from defects in material and workmanship for up to five (5) years from date of shipment. This limited warranty covers the LED driver and LED array when installed and operated according to Selux instructions. For details, see "Selux Terms and Condition of Sale."

Listings and Ratings: Luminaire and LED tested to IP65 and IESNA LM-79-08 standards. Luminaire and LED tested at 25ºC ambient temperature.

Luminaire suitable for ambient temperature of 45°C. Minimum operating temperature of luminaire at -40°C (-40°F)

NRTL Listed (i.e. UL, CSA)

Visit selux.us for our LED End of Life recycling policy.

For Buy American compliance on poles, please consult the factory.

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BEACON Design. Perform. Value. Technology

Fixtures D and E

DATE: LOCATION:

TYPE: PROJECT:

CATALOG #:

MICROSTRIKE | STRIKE optics

VIPER Area/Site

VIPER LUMINAIRE



FEATURES

- Low profile LED area/site luminaire with a variety of IES distributions for lighting applications such as auto dealership, retail, commercial, and campus parking lots
- Featuring two different optical technologies, Strike and Micro Strike Optics, which provide the best distribution patterns for retrofit or new construction
- Rated for high vibration applications including bridges and overpasses. All sizes are rated for 1.5G
- Control options including photo control, occupancy sensing, NX Distributed Intelligence™, wiSCAPE and 7-Pin with networked controls
- New customizable lumen output feature allows for the wattage and lumen output to be customized in the factory to meet whatever specification requirements may entail
- Field interchangeable mounting provides additional flexibility after the fixture has shipped

cULus IP65

DesignLights Consortium® Qualified

CONTROL TECHNOLOGY

NX DISTRIBUTED INTELLIGENCE wiSCAPE

SPECIFICATIONS

CONSTRUCTION
- Die-cast housing with hidden vertical heat fins are optimal for heat dissipation while keeping a clean smooth outer surface
- Corrosion resistant, die-cast aluminum housing with 1000 hour powder coat paint finish
- External hardware is corrosion resistant

OPTICS
- Micro Strike Optics (160, 320, 480, or 720 LED counts) maximize uniformity in applications and come standard with mid-power LEDs which evenly illuminate the entire luminous surface area to provide a low glare appearance. Catalog logic found on page 2
- Strike Optics (36, 72, 108, or 162 LED counts) provide best in class distributions and maximum pole spacing in new applications with high powered LEDs. Strike optics are held in place with a polycarbonate bezel to mimic the appearance of the Micro Strike Optics so both solutions can be combined within the same application. Catalog logic found on page 3
- Both optics maximize target zone illumination with minimal losses at the house-side, reducing light trespass issues. Additional backlight control shields and house side shields can be added for further reduction of illumination behind the pole
- One-piece silicone gasket ensures a weatherproof seal
- Zero up-light at 0 degrees of tilt
- Field rotatable optics

INSTALLATION
- Mounting patterns for each arm can be found on page 11
- Optional universal mounting block for ease of installation during retrofit applications. Available as an option (ASQU) or accessory for square and round poles.
- All mounting hardware included

INSTALLATION (CONTINUED)
- Knuckle arm fitter option available for 2-3/8" OD tenon
- For products with EPA less than 1 mounted to a pole greater that 20ft, a vibration damper is recommended

ELECTRICAL
- Universal 120-277 VAC or 347-480 VAC input voltage, 50/60 Hz
- Ambient operating temperature -40°C to 40°C
- Drivers have greater than 90% power factor and less than 20% THD
- LED drivers have output power over-voltage, over-current protection and short circuit protection with auto recovery
- Field replaceable surge protection device provides 20kA peak current meeting ANSI/ IEEE C62.41.2 Category C High and Surge Location Category C3. Automatically takes fixture off-line for protection when device is compromised

CONTROLS
- Photo control, occupancy sensor programmable controls, and Zigbee wireless controls available for complete on/off and dimming control
- Please consult brand or sales representative when combining control and electrical options as some combinations may not operate as anticipated depending on your application
- 7-pin ANSI C136.41-2013 photocontrol receptacle option available for twist lock photocontrols or wireless control modules (control accessories sold separately)
- 0-10V Dimming Drivers are standard and dimming leads are extended out of the luminaire unless control options require connection to the dimming leads. Must specify if wiring leads are to be greater than the 6" standard

CONTROLS (CONTINUED)
- NX Distributed Intelligence™ available with in fixture wireless control module, features dimming and occupancy sensor
- wiSCAPE® available with in fixture wireless control module, features dimming and occupancy sensor. Also available in 7-pin configuration

CERTIFICATIONS
- Meets the qualifications for DLC Premium
- Listed to UL1598 and CSA C22.2#250.0-24 for wet locations and 40°C ambient temperatures
- 1.5 G rated for ANSI C136.31 high vibration applications
- Fixture is IP65 rated
- Meets IDA recommendations using 3K CCT configuration at 0 degrees of tilt
- This product qualifies as a "designated country construction material" per FAR 52.225-11 Buy American-Construction Materials under Trade Agreements effective 04/23/2020. See Buy American Solutions.

WARRANTY
- 5 year warranty
- See HLI Commercial and Industrial Outdoor Lighting Warranty for additional information

KEY DATA	
Lumen Range	5,000–80,000
Wattage Range	36–600
Efficacy Range (LPW)	92–155
Weight lbs. (kg)	13.7-30.9 (6.2-13.9)

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701 Millennium Boulevard • Greenville, SC 29607 / Tel 864.678.1000 / Website www.beaconproducts.com

HUBBELL Lighting

BEACON Design. Perform. Value. Technology

DATE: LOCATION:

TYPE: PROJECT:

CATALOG #:

VIPER Area/Site

VIPER LUMINAIRE

MICROSTRIKE OPTICS – ORDERING GUIDE

Example: VP–2–320L-145–3K7–2–R–UNV–A3–BLT

CATALOG #

| VP | | | | | | | |

Department of Permitting & Inspections
Zoning Division
645 Pine Street
Burlington, VT 05401
Telephone:(802) 865-7188

William Ward, Director
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Garret King, Associate Planner
Joseph Cava, Permit Technician
Ted Miles, Code Compliance Officer
Ted Boylan, DPI Administrator

TO: Development Review Board
FROM: Garret King
DATE: July 18, 2023
RE: ZP-23-222; 10-12 Oak Street

==========

Note: These are staff comments only; decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

Zone: RM Ward: 2C

Owner/Applicant: Harold Moran/Anna Thelemarck

Request: Establish dwelling unit within the garage and reconfigure driveway. PUD for 2nd detached dwelling unit.

Applicable Regulations:
Article 4 (Maps & Districts),Article 5 (Citywide General Standards), Article 6 (Development Review Standards), Article 8 (Parking), Article 11 (Planned Unit Development)

Background Information:
The proposed plan is to renovate and refurbish part of the garage structure into an apartment unit. Sometime since 2010 part of this space was used as a unit while the other parts have been storage/mechanical, and office. The garage area will remain the same while the rest of the space will be turned into an apartment. Because the main house is not owner occupied and is in the RM district the new apartments may be established under PUD regulations in Art. 11.

Prior zoning permit actions for this property.

- Zoning permit: ZP-01-498 Enlarge dormer on front of house to 3` from roof edge on either side while maintaining existing height. Replace asphalt shingles on front of house.
- Zoning permit ZP-10-22 Repair existing accessory structure; rebuild 3 exterior walls, new wood clapboard sheathing, new garage door. No change to footprint or use.

Recommendation: **Consent approval** as per, and subject to, the following findings and conditions:

I. Findings

Article 4: Maps & Districts
Sec. 4.4.5, Residential Districts:
(a) Purpose
(1) Residential Medium Density (RM)

The property is in the RM zone and is subject to the development standards of this zone. This district is intended primarily for medium density residential development in the form of single-family detached dwellings and attached multi-family apartment. Creating an additional detached unit is allowable under Art. 11. **(Affirmative finding)**

(b) Dimensional Standards & Density
Residential density will increase by one unit and will stay under the maximum density of 20 units/acre on this 0.19 acre lot.

Lot coverage will not be decreasing from 43% to 41% and stay under the maximum allowable lot coverage.

The minimum required yard setbacks will not be changing. Footprint of the building will be only changing slightly with the expansion and bump out to accommodate a new porch. The new additions will not encroach into any setbacks.

Max height will not be changing for the building. **(Affirmative finding)**

(c) Permitted & Conditional Uses
The proposed residence will be a detached dwelling unit next to the existing single family home. Both are permitted in the RM zone. **(Affirmative finding)**

(d) District Specific Regulations
1. Setbacks
See Sec. 4.4.5 above

2. Lot Coverage
See Sec. 4.4.5 above

3. Accessory Residential Structures and Uses
No Accessory structures are proposed. **(Not applicable)**

4. Residential Density
Occupancy of the new dwelling unit is limited to that by a family as defined in the CDO.
(Affirmative finding as conditioned)

5. Uses
(Not Applicable)

6. Residential Development Bonuses
(Not Applicable)

Article 6: Development Review Standards
Part 1, Land Division Design Standards
Not applicable

Part 2, Site Plan Design Standards
Sec. 6.2.2, Review Standards

(a) Protection of important natural features
(Not Applicable)

(b) Topographical alterations
The lot is flat and will remain unchanged. **(Affirmative finding)**

(c) Protection of important public views
The property is not associated with any important public views. **(Affirmative finding)**

(d) Protection of important cultural resources
The property is not listed on a state or national register of historic places or known to be an important archeological site. **(Affirmative finding)**

(e) Supporting the use of alternative energy
(Not Applicable)

(f) Brownfield sites
The subject property is not an identified brownfield. **(Affirmative finding)**

(g) Provide for nature's events
The proposed plan shows that a sheltered entry will be constructed for the main entryway. **(Affirmative finding)**

(h) Building Location and Orientation
(Not Applicable)

(i) Vehicular access
The current driveway is gravel with 4 parking spaces, the new configuration of the driveway will still be 4 parking spaces but will be smaller in area. The new parking has both normal and tandem parking. **(Affirmative finding)**

(j) Pedestrian access
For the new PUD unit a pedestrian pathway should connect from the entrance to the public sidewalk. **(Affirmative finding as conditioned)**

(k) Accessibility for the handicapped
No handicapped accessibility is shown and is not required. **(Affirmative finding)**

(l) Parking and circulation
See Sec. 6.2.2.(c) above

(m) Landscaping, fences, and retaining walls
Additional landscaping of some plants to the Oak St frontage and/or along the walkway to the sidewalk will add to the overall design of the project. **(Affirmative finding as conditioned)**

(n) Public plazas and open space
(Not Applicable)

(o) Outdoor lighting
Lighting for the new unit will be located near the front porch entrance. **(Affirmative finding as conditioned)**

(p) Integrate infrastructure into the design
No new gas, electric and water meters are indicated in the proposal, if any are added they must be screened. **(Affirmative finding as conditioned)**

Part 3, Architectural Design Standards
Sec. 6.3.2, Review Standards
(a) Relate development to its environment

1. Massing, Height, and Scale
The size of the structure will remain essential unchanged, with only slight changes to the south façade. A new front porch and bump out will provide a new entrance for the unit. The change is roughly 160ft in area with the majority of that space as an open porch. **(Affirmative finding)**

2. Roofs and Rooflines
The roof will remain essentially unchanged with only the addition of a new metal roof along the section that will be the apartment unit. **(Affirmative finding)**

3. Building Openings
The new doors and windows are similar to the design and style of the other buildings in the neighborhood and fit with the use of the structure. **(Affirmative finding)**

(b) Protection of important public views
(Not Applicable)

(c) Protection of important architectural resources
The proposed project will not affect any important public views. **(Affirmative finding)**

(d) Provide an active and inviting street edge
The new entrance and porch area will be a significant improvement to what is currently existing. Having an updated entrance will give the building a clear entrance and will add variation to the front façade of the structure. An additional pedestrian walkway from the new PUD to the public sidewalk will provide a clear and easy access to the new unit. **(Affirmative finding as conditioned)**

(e) Quality of materials
The apartment section of the structure is to be clad in the current wooden clapboard siding, restoring and patching where applicable unless required to use a more fire retardant material to meet safety codes. If that is the case, codes new fiber cement clapboards will be used. The existing asphalt roofing will remain and be replaced if needed, with new metal edging to prevent snow buildup near the entrance. The updates to the building will retain most of the current material and new materials will be similar to match. **(Affirmative finding)**

(f) Reduce energy utilization
Proposed building must comply with current energy efficiency standards. **(Affirmative finding as conditioned)**

(g) Make advertising features complimentary to the site
Not applicable

(h) Integrate infrastructure into the building design
No new gas, electric and water meters are indicated in the proposal, if any are added they must be screened. **(Affirmative finding)**

(i) Make spaces safe and secure
Proposed building must comply with the city`s current egress requirements, building entries will be illuminated. **(Affirmative finding)**

Article 8: Parking

Sec. 8.1.9, Maximum On-Site Parking Spaces
The existing lot has 4 parking spaces organized in a tandem layout covering around 1064ft. The parking will be reconfigured to have still 4 parking spaces with two tandem and two side by side. The overall area will be reduced to 760 sf. As the new configuration could enable cars to park on the yard, barriers will be needed to prevent parking on the lawn. (**Affirmative finding as conditioned)**

Article 11: Planned Unit Development

Sec. 11.1.1 Intent

(a) Promote the most appropriate use of land through flexibility of design and development of land.
The existing building is quite large for an accessory building and fitting another dwelling onto the lot will help increase the amount of housing available in the city. **(Affirmative finding)**

(b) Facilitate the adequate and economical provision of streets and utilities.
The existing building will retain access to streets and utilities in the same manner as before. **(Affirmative finding)**

(c) Preserve the natural and scenic qualities of open space
The building will retain essentially the same dimensions and footprint and will not cause any reduction to scenic qualities of open space or any significant natural areas. **(Affirmative finding)**

(d) Provide for a variety of housing types.
The proposed apartment unit will add another dwelling unit to the property that currently only has a single family home. **(Affirmative Finding)**

(e) Provide a method of development for existing parcels which because of physical, topographical, or geological conditions could not otherwise be developed.
(Not Applicable)

(f) Achieve a high level of design quality and amenities.
See Sec. 6.3.2. above.

Sec. 11.1.5 Approval Requirements

(a) The minimum project size requirements of Sec. 11.1.3 shall be met

In RM districts no minimum project size exists. **(Affirmative finding)**

(b) The minimum setbacks required for the district have been met at the periphery of the project

See Sec. 4.4.5 above

(c) The project shall be subject to design review and site plan review of Article 3, Part 4.

See Sec. 6.3.4. above

(d) The project shall meet the requirements of article 10 for subdivision where applicable.

(Not Applicable)

(e) Density, frontage, and lot coverage requirements of the underlying zoning district have been met as calculated across the entire project.

See Sec. 4.4.5. above.

(f) All other requirements of the underlying zoning district have been met as calculated across the entire project.

See Sec. 4.4.5. above

(g) Open space or common land shall be assured and maintained in accordance with the conditions as prescribed by the DRB.

Open space within the property will be available for use by the residents. There is no set aside open spaces as may be the case with much larger PUD`s. **(Affirmative finding)**

(h) The development plan shall specify reasonable periods within which development of each phase of the planned unit development may be started and shall be completed. Deviation from the required amount of useable open space per dwelling unit may be allowed to provide such deviation shall be provided for in other section of the planned unit development.

The project is small in scale and these is no phasing schedule included in the application. The standard time frame of 3 years will apply to this project. **(Affirmative finding)**

(i) The intent as defined in Sec. 11.1.1 is met in a way not detrimental to the city`s interests.

The refurbishment of the building into a unit is within the rules and regulations of the city`s comprehensive development ordinance. **(Affirmative finding)**

(j) The proposed development shall be consistent with the municipal development plan

The proposed dwelling unit will double the current units on the property and will serve as a second detached dwelling unit.

Similar to the many accessory dwelling units that exist in the neighborhood areas of the city, the additional unit would be similar in function as an ADU on this property, although owner-occupancy will not be required. In the planBTV Comprehensive Plan one of the goals for sustaining residential neighborhoods involves addressing the continuously rising cost of

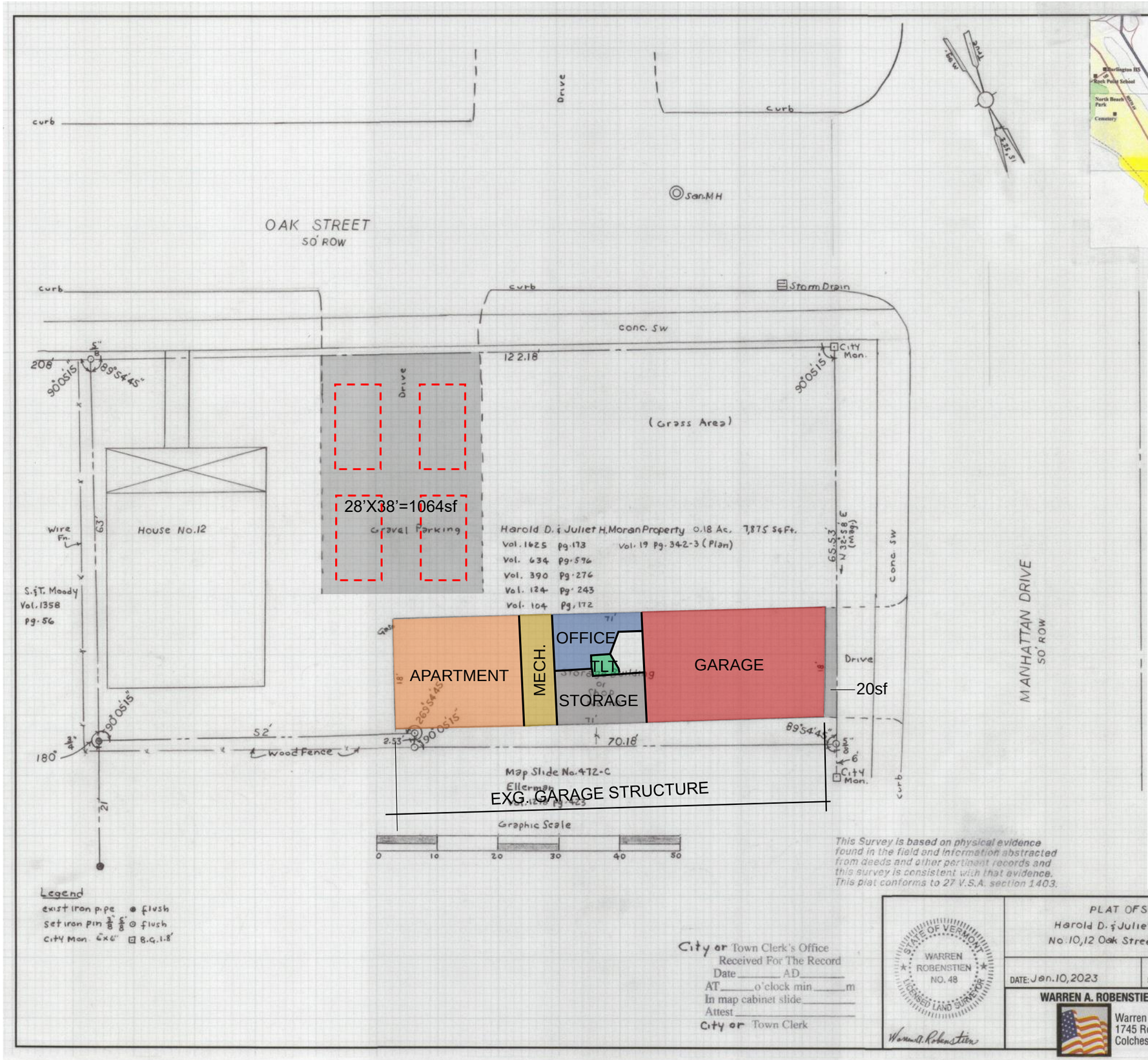
housing. This modestly sized dwelling unit should be more affordable than a typical detached dwelling unit on its own lot. **(Affirmative finding)**

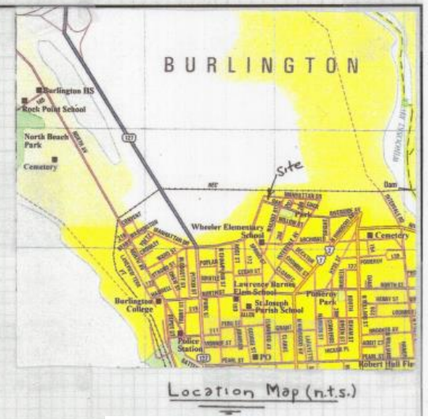
(k) Any proposed accessory uses and facilities shall meet the requirements of Sec. 11.1.6 below.

(Not Applicable)

II. Conditions of Approval

1. **Prior to the release of the zoning permit:** the following shall be submitted for staff review and approval.
    a. Plans for a pedestrian walkway from the entrance of the PUD to the public sidewalk, within the limits of lot coverage.
    b. Submission of a landscaping plan for the Oak street frontage of the PUD
    c. To prevent parking on the lawn, plans for barriers to be constructed around the perimeter of the parking area.
    d. Specs and locations for exterior lightings.
2. Vermont Residential Building Energy Standards apply to this project. Compliance with the standards is the Owner's responsibility. Prior to requesting a Certificate of Occupancy, a copy of a completed Vermont Residential Building Energy Standards Certificate shall be submitted with a Certificate of Occupancy (final or temporary) request, and filed in the Land Records located at the Clerk/Treasurers office in City Hall (149 Church Street). For more information, see http://publicservice.vermont.gov/energy_efficiency.
3. The Applicant/Property Owner is responsible for obtaining all necessary Zoning Permits and Building Permits through the Department of Public Works as well as other permit(s) as may be required, and shall meet all energy efficiency codes of the city and state.
4. Not more than four unrelated adults may occupy either dwelling unit per the Functional Family provisions of the Comprehensive Development Ordinance.
5. Standard permit conditions 1-15.





Zoning Review:
10-12 Oak Street
Zone: RM = 40% + 10% Coverage

Lot Size:	7875 sf (Site Plan)
	8426 sf (Property Database)

EXISTING COVERAGE:

House:	832 sf
Side Deck:	32 sf
Porch:	208 sf
Garage Building:	1278 sf
Driveway: 1064+20=	1084 sf

Allowable 40% = 3194 (832+1278+1084)/7875=40%
Allowable 10% = 208+ 32= 3%

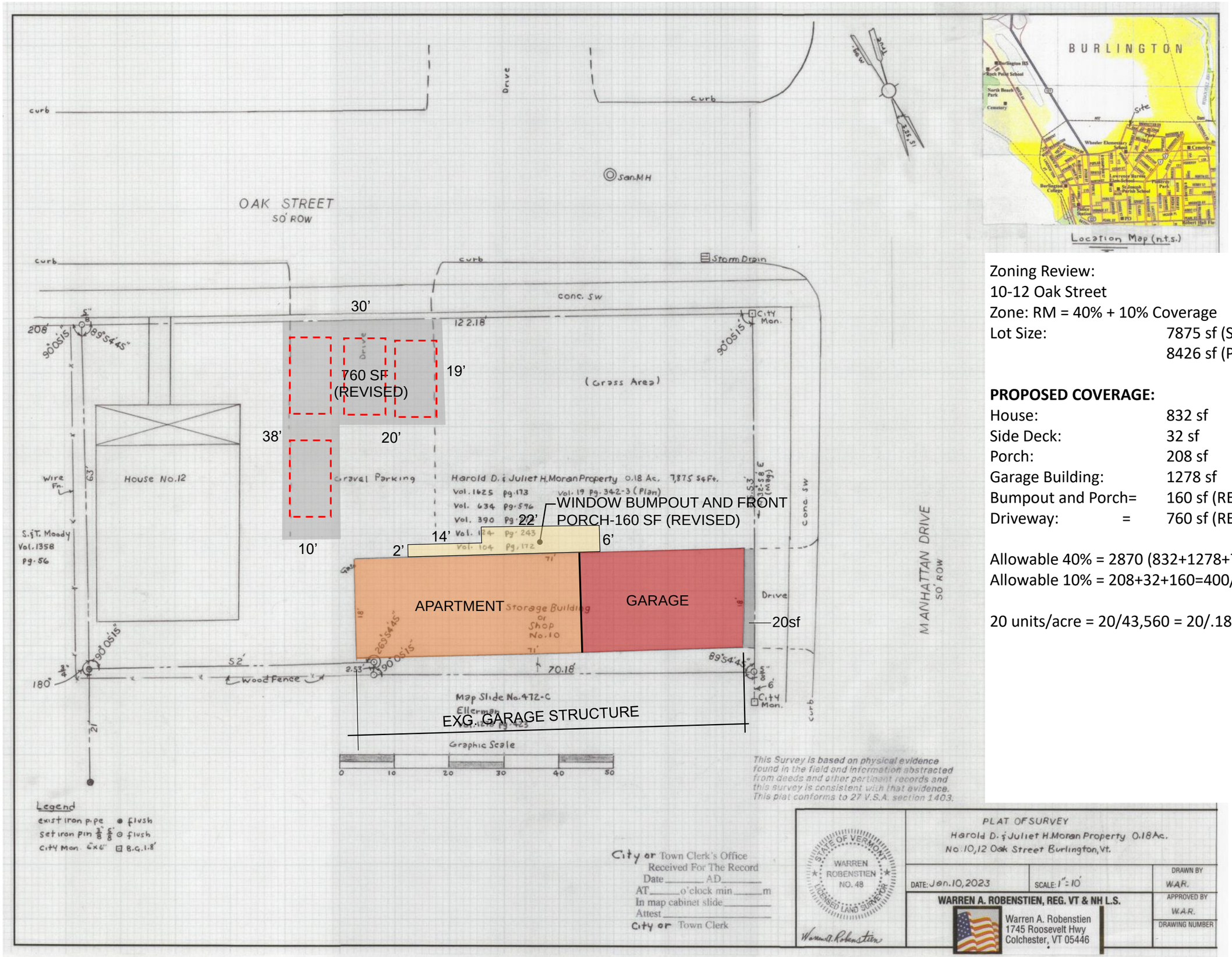
20 units/acre = 20/43,560 = 20/.18 = 3.6 units/acre

PZ1

5.8.23
R 6.1.23

EXISTING SITE COVERAGE

Harold & Juliet Moran
10-12 Oak Street



Zoning Review:
10-12 Oak Street
Zone: RM = 40% + 10% Coverage

Lot Size:	7875 sf (Site Plan)
	8426 sf (Property Database)

PROPOSED COVERAGE:

House:	832 sf
Side Deck:	32 sf
Porch:	208 sf
Garage Building:	1278 sf
Bumpout and Porch=	160 sf (REVISED)
Driveway: =	760 sf (REVISED)

Allowable 40% = 2870 (832+1278+760)/7875=36% (REVISED)
Allowable 10% = 208+32+160=400/7875 = 5% (REVISED)

20 units/acre = 20/43,560 = 20/.18 = 3.6 units/acre

PZ2

5.8.23
R 6.1.23

PROPOSED SITE COVERAGE

Harold & Juliet Moran
10-12 Oak Street



SOUTH /EAST ELEVATIONS



NORTH ELEVATION



WEST ELEVATION

PZ3

5.8.23
R 6.1.23

EXISTING SITE PHOTOS

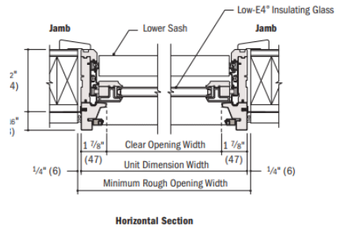
Harold & Juliet Moran
10-12 Oak Street

WINDOW SPECS

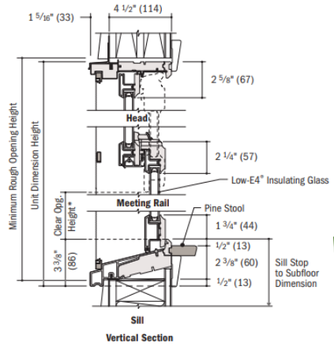
New windows to be clad wood windows similar to Andersen A-400 series

400 SERIES WOODWRIGHT® DOUBLE-HUNG FULL-FRAME WINDOWS ANDERSEN WINDOWS & DOORS

Woodwright® Double-Hung Window Details
Scale 1½" (38) = 1'-0" (305) – 1:8

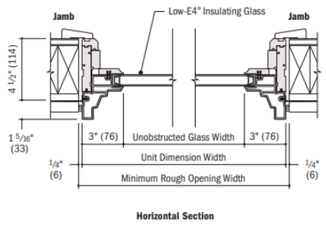


Horizontal Section

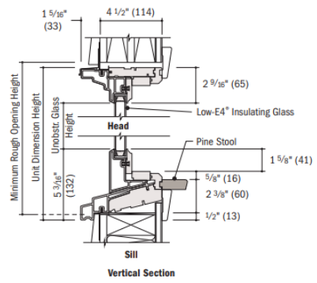


Vertical Section

Woodwright® Picture Window Details
Scale 1½" (38) = 1'-0" (305) – 1:8



Horizontal Section



Vertical Section

SIDING SPECS

Barn siding to remain wood clapboard on all sides except north, which may require rated siding for fire protection.

New Apt. siding to be wood clapboard on all sides , as shown, except on the north side which may require rated siding, on the north side for fire protection.

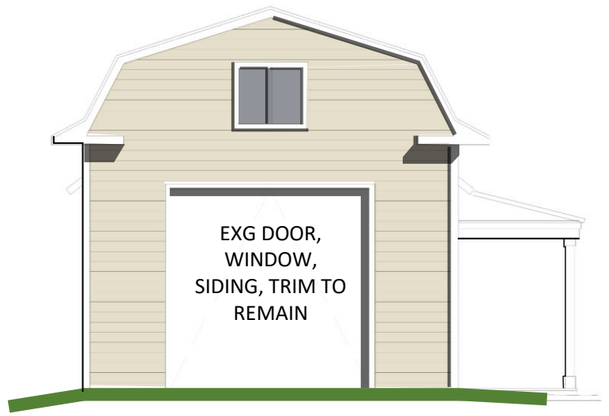
Proposed products:
James Hardy Lap Siding-smooth finish (exposure TBD)
LP Smartsiding – Lap Siding –smooth (exposure TBD)
Or similar

ROOFING SPECS

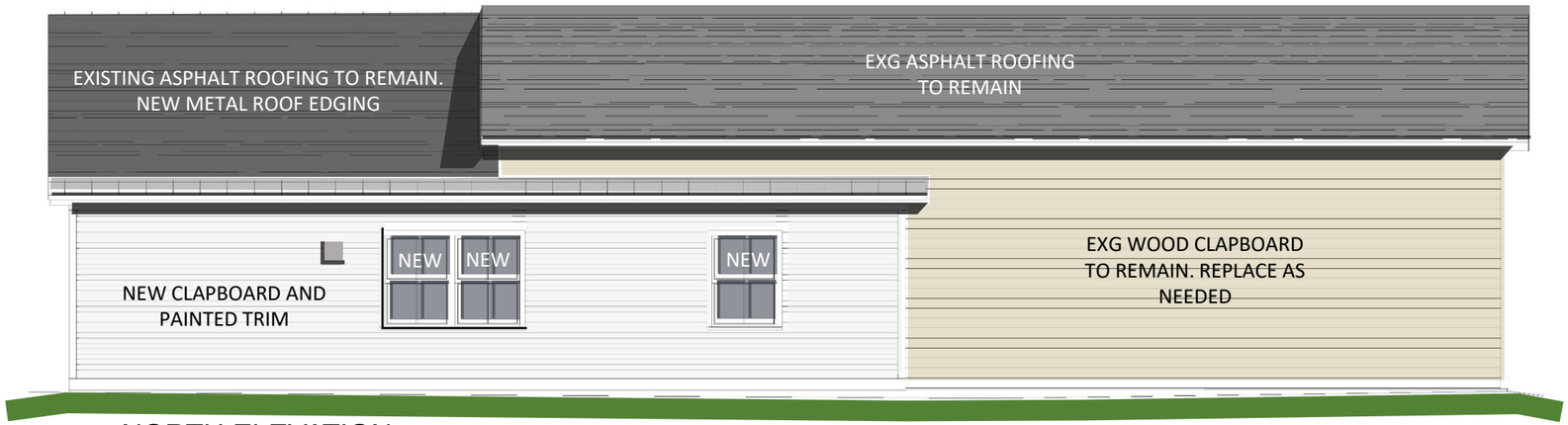
Existing asphalt roofing to remain
New standing seam at porch roof and Apartment roof edge



EAST ELEVATION



WEST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION (REVISED)

PZ4

5.8.23
R 6.1.23

PROPOSED ELEVATIONS

Harold & Juliet Moran
10-12 Oak Street

Department of Permitting and Inspections
Zoning Division
645 Pine Street
Burlington, VT 05401
https://www.burlingtonvt.gov/DPI/Zoning-Permits
Telephone: (802) 865-7188
(802) 865-7195 (FAX)

William Ward, Director
Theodore Miles, Code Compliance Officer
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Garret King, Associate Planner
Joseph Cava, Planning Technician
Ted Boylan, Permit Administrator

MEMORANDUM

To: Development Review Board
From: Mary O'Neil, AICP, Principal Planner
Date: July 18, 2023
RE: ZP-23-253; 453 Pine Street

Note: These are staff comments only. Decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

File: ZP-23-253
Location: 453 Pine Street
Zone: E-LM **Ward**: 5S
Parking District: Multi-Modal (first 200' off Pine Street); Shared Use beyond
Date application accepted: May 25, 2023
Applicant/ Owner: Kelley DesRoches, Wiehmann Lamphere / Jovial King
Request: Construction of 30,000 sf health club (spa/bathhouse) and 12,400 sf retail/commercial building with associated site improvements. A private rental building is not included in this application review.



Background:

- **Zoning Sketch Plan ZSP-22-10;** Sketch Plan Review of 26,000 sf bowling alley, 4,000 sf commercial building and 20,000 nordic-inspired bathhouse. December, 2022.
- **Zoning Sketch Plan ZSP-21-10;** Sketch Plan Review, new construction of 15,000 sf Silt Bathhouse ("Health Club") *at 180 Flynn Avenue*. November 2021.
- **Zoning Permit 19-0605CA;** construct driveway, parking lot, and shared path. March 19, 2019. Application withdrawn.
- **Non-applicability of Zoning Permit Requirements;** brush clearing and removal; erection of two post to show front corners of proposed building. January 1999.

Overview: In November 2021 the applicants came before the DRB to ascertain whether the proposed use (Nordic bathhouse) could be interpreted as a Health Club under the definitions of the Comprehensive Development Ordinance. Although the location was different (180 Flynn Avenue), this application assumes the acceptability of the bathhouse as a Health Club in the E-LM zoning district based on that earlier Sketch Plan. Another Sketch Plan Review was held before the DRB in December 2022. The zoning district in which the uses are proposed remains the same: Enterprise – Light Manufacturing.

The earlier inclusion of a bowling alley has been dismissed: The scope of this application is a 30,000 health club (Silt Bathhouse) and 12,400 sf retail/commercial building with associated site improvements. The site is 4.8 acres and is currently enrolled in the State's Brownfields Economic Revitalization Alliance (BERA) Program. The developers and design team have been working with the Vermont Department of Environmental Conservation, Civil, Environmental and Geotech Engineers on an Evaluation of Corrective Action Alternatives (ECAA) which evaluates the existing site conditions and studies alternative options for remediation and development. Once the ECAA is complete, the project will move into the Corrective Action Plan (CAP) phase.

An imminent zoning amendment to create an overlay district (South End Innovation District) has been warned and is now in effect; however this application submission preceded that action.

The **Design Advisory Board** reviewed the application at their June 27, 2023 meeting and voted unanimously to recommend approval, with a recommendation to revise the southerly parking lot to a crescent to soften the edge of the development.

Recommended motion: Continue the hearing subject to submission and review of a Transportation Demand Management plan.

I. Findings

Article 3: Applications, Permits and Project Reviews
Part 3: Impact Fees
Section 3.3.2 Applicability

Any new development or addition to existing buildings which result in new dwelling units or in any new nonresidential building square footage are subject to impact fees as is any change ofuse which results in an added impact according to Section 3.3.4.

Section 3.3.5 Calculation of Impact Fee

The amount of impact fees whall be as set forth in the Impact Fee Administrative Regulations as established by resolution of the City Council. Impacts fees are calculated on the total gross square footage of the principal use of a building, including accessory uses. In the event there is more than one principal use within a building, impact fees will be calculated separately for each principal use and aassociated accessory uses, with common space computed on a pro-rata basis.

Based on a gross area calculation of 30,000 sf health club and 12,400 retail/commercial, Impact Fees are estimated as follows:

Nordic Bathhouse

SF of Project 30,000

	Offices & Other	
Department	**Rate**	**Fee**
Traffic	**0.771**	23,130.00
Fire	**0.227**	6,810.00
Police	**0.400**	12,000.00
Parks	**0.478**	14,340.00
Library	**0.000**	0.00
Schools	**0.000**	0.00
Total	1.876	**$ 56,280.00**

Retail/commercial space

SF of Project 12,400

	Retail	
Department	**Rate**	**Fee**
Traffic	**0.839**	10,403.60
Fire	**0.227**	2,814.80
Police	**0.400**	4,960.00
Parks	**0.478**	5,927.20
Library	**0.000**	0.00
Schools	**0.000**	0.00
Total	1.944	**$ 24,105.60**

	$
Total	**80,385.60**

Section 3.3.8 Time and Place of Payment
Impact fees must be paid to the city's chief administrative officer/city treasurer according to the following schedule:

(a) New Buildings: Impact fees must be paid at least seven (7) days prior to occupancy of a new building or any portion thereof.

Affirmative finding as conditioned

Part 5: Conditional Use and Major Impact
Sec. 3.5.6 Review Criteria
The application and supporting documentation submitted for proposed development involving Conditional Use and/or Major Impact Review, including the plans contained therein, shall indicate how the proposed use and associated development will comply with the review criteria specified below:

a) Conditional Use Review Standards:

Approval shall be granted only if the DRB, after public notice and public hearing, determines that the proposed conditional use and associated development shall not result in an undue adverse effect on each of the following general standards:

1. *Existing or planned public utilities, facilities or services are capable of supporting the proposed use in addition to the existing uses in the area;*

Burlington's Department of Water Resources has confirmed, in a May 31, 2023 letter, that Burlington's water and wastewater facilities have sufficient capacity to handle flows associated with the development. The letter further defines that it does not include assurance of distribution or collection system capacity. For Water Resource approval, the applicant must agree to specific conditions (1-4) must be incorporated into the plan.
Plan C4 supports the recommended surcharge floats at pumpstations.
A State Wastewater permit will be required as well.
The site is accessed by a public road (Pine Street); sewer and electrical service are available.

2. *The character of the area affected as defined by the purpose or purposes of the zoning district(s) within which the project is located, and specifically stated policies and standards of the municipal development plan;*

From Plan BTV:

- *Burlington will preserve and foster its distinctive identity by creating new opportunities for mixed-use infill and redevelopment in the most densely developed areas consistent with the city's scale and urban form, while conserving and strengthening adjacent residential neighborhoods.* (p. 37, Plan BTV.)
- *…Leveraging the city's unique characteristics, economic advantages, and core industries to further strengthen its economy.* (p. 37, Plan BTV.)

- *Evaluate changes to the one-size-fits-all approach to land use policy within the South End Enterprise Zone, in order to preserve and expand the unique and varied character of the district as an arts, innovation, and industrial distrit.* (p. 42, Plan BTV.)

And from Plan BTV South End: (March 2019):

- *Continue to provide a platform for innovation and enterprise to take root and grow through creativity and collaboration.* (p. 64; PlanBTV South End.)
- *Strategies for a Creative & Vibrant Economy: evaluate possible changes to the Enterprise Zoning District that will reflect and enhance the experiences created by the built environment and types of activities within and around the district.* (p. 65, PlanBTV South End.)

As noted, the office of City Planning is moving an amendment through the Planning Commission for significant changes, and a potential overlay district to be known as the South End Innovation District (SEID). This parcel is within the proposed overlay. Although not yet adopted by City Council the following is included in that purpose statement:

The overlay prioritizes arts and employment uses within an amenity-rich, convenient urban residential neighborhood, while permitting in a limited fashion non-residential uses that are secondary to, but supportive of those primary objectives.
This project, as defined, falls within that intention.

3. *The proposed use will not have nuisance impacts from noise, odor, dust, heat, and vibrations greater than typically generated by other permitted uses in the same zoning district;*

The only defined outdoor activities are saunas, hammocks, a botanical garden, a greenhouses; hot pools and cold plunge pools and an outdoor patio. None of the identified uses are likely to have nuisance impacts within this Enterprise zone.

The use of the 12,400 commercial building has been initially identified as general retail with accommodation for 3 tenants. The applicant team intends to identify uses associated with general health and well-being, as complimentary to the Nordic bathhouse.

4. *The transportation system is capable of supporting the proposed use in addition to the existing uses in the area. Evaluation factors include street designations and capacity; level of service and other performance measures; access to arterial roadways; connectivity; transit availability; parking and access; impacts on pedestrian, bicycle and transit circulation; safety for all modes; and adequate transportation demand management strategies;*

The chosen site is an empty parcel east of the Barge Canal, a federal Super Fund site. There are public sidewalks that run along the west side of Pine Street which are within the scope of the Champlain Parkway and will be improved as a Shared Use path. The development parcel is on a regular route of Green Mountain Transit. The parcel fronts Pine Street which is set to

undergo major improvements associated with the Southern Connector/Champlain Parkway project.

Burlington's Senior Public Works Engineer Corey Mimms, a lead in the Champlain Parkway project, articulated the concerns the City has about the redevelopment in a May 15, 2023 email to project partners:

1) Southern Parking Lot Access curb cut relocation request:
    a. As this property development is not permitted we generally do not have a practice of making changes to active projects based on proposed development site sketch plans. The access that is being installed per the Champlain Parkway project is to maintain the existing vehicle access location. Changes to this location can be done by the property owner once the appropriate development plans have been permitted. Additionally changes to property curb cuts require that a permit be applied for with the City to ensure the widths and proposed curb radii are in accordance with City Standards.
2) Proposed Multiple connections to shared use path:
    a. Appreciate the work to reduce the number of access points. The shared use path detail for the Champlain Parkway Project also includes a minimum 2 FT buffer at 1:6 slope on each side of the 10 FT wide path that should be considered in your future plans. If a steeper slope is intended adjacent to the proposed shared use path, the buffer width would be wider in accordance with applicable federal and state guidance.
3) Lane Marking change request to Maltex Drive:
    a. As mentioned in previous conversation, the proposed 3 lane driveway is not supported by the Champlain Parkway design team. The increased potential for pedestrian and bicyclist conflicts with vehicles using multiple turn lanes is not desirable from a safety perspective.
4) Bus Shelter relocation request:
    a. Relocation of the shelter to the proposed northern location does not work for the City. The proposed location would impact the existing mature trees that are required to be saved per property owner and legal agreements. The typical GMT bus is ~40 FT and there is approximately 48 FT at the bus shelter that the bus would use to load and unload passengers. With those dimensions the GMT buses would not appear to be blocking the Maltex driveway during passenger dropoff and pickup. During conversations with GMT during the design of the Champlain Parkway, it was noted that GMT did not want a situation where drivers would attempt to drive around the buses when they are loading or unloading passengers nor did GMT desire to have their buses need to pull back into a line of traffic on Pine Street after they finished loading and unloading passengers.

There is no current plan to modify the Champlain Parkway design, but collaboration and coordination with the project team to meet these concerns is desired.

A traffic analysis has been provided with the application; reference is made to that document. In Vermont, VTrans' level of service policy sets LOS D as the desired design standard for two-way stop controlled (unsignalized) intersections having greater than 100 vph (vehicles per hour) approach volume on a single-lane side street approach or greater than 150 vph approach volume on a two-lane side street approach. There is no level of service standard for unsignalized intersections with lower than the above indicated side street volume thresholds. Future traffic volumes exiting Howard Street and the Maltex driveway will be less than the thresholds for side street approaches, both with and without this Project. VTrans' LOS D traffic congestion design standard therefore does not apply at this location.

The project plan does, however, propose three lanes at the Maltex intersection. To reduce the delays which would otherwise be experienced by that movement, the two "Build" intersection capacity analyses in Table 3 include a second right-turn exit lane. Such a lane is possible due to the Maltex Driveway being reconstructed as part of the Champlain Parkway construction to provide a 32 ft wide approach width, and can be accomplished by striping two 10 ft wide exit lanes plus one 12 ft wide enter lane on the Maltex Driveway approach. As noted above, the Champlain Parkway Design team does not support the three-lane driveway from Maltex, as it poses increased potential for pedestrian and bicyclist conflicts.

The traffic analysis concludes that while their analysis indicates that Pine Street north of Lakeside Ave will experience traffic congestion during peak periods in the future, such

conditions are not unexpected on a heavily traveled street located in a densely developed urban area. The Champlain Parkway improvements and application of TDM strategies will be important factors in encouraging the use of alternative travel modes and maintaining safe traffic conditions for all users along the Pine St corridor. As of this date, a TDM has not been provided.

and,

5. The utilization of renewable energy resources;

The project is planning to use a closed loop geothermal system for heating and cooling. State reviewers must provide support for introducing this heating system which may include site drilling for installation. With energy modeling and incentives from Burlington Electric towards efficiency, it is likely that the project will benefit from Burlington's available renewable energy options.

and,

6. Any standards or factors set forth in existing City bylaws and city and state ordinances;

The applicants presented before the Ward 5 Neighborhood Planning Assembly (NPA) May 18, 2023, as the project will introduce more than 10,000 sf of non-residential development. Conservation Board review is required (as the corners of the site dip into a National Resource buffer zone) and was scheduled for July 10, 2023. A State Wastewater permit will be required. Site disturbance will spur the need for an Erosion Prevention and Sediment Control Plan, as well as Stormwater review.

The applicant is obligated to secure any and all state and federal permits.

The Stormwater Engineering program shared the following information:

It looks like the Applicant is aware of the Combined Sewer Offset Policy that will be an important factor for the Applicant to address moving forward.

Given the known contamination on site infiltrating treatment practices will not be available to the developers. Knowing this, the Stormwater Program will need to better understand how the site will manage the 1-yr, 24-hr storm even to ensure that the post-development peak flow hydrograph is equal to or less then the pre-development peak flow hydrograph. Essentially this means that the Applicant will need to ensure that the runoff leaving the site is no greater than current conditions following development.

While we don't yet know the total impervious proposed on site, it's safe to say that the value will be greater than 10,000 ft^2. Accordingly, the applicant will also need to document Treatment, Runoff reduction, and detention for 100% of the net new impervious surfaces (essentially all new impervious). What somewhat complicates this is the fact that runoff will likely both flow towards the street (which contributes to our combined system and flows to Main Plant) and back towards the Barge Canal (which would be considered a Lake Champlain Direct contribution). For flows to the combined sewer the CSOP will be applicable along with the 1-yr, 24-hr treatment requirement mentioned above. For the Lake Champlain direct flows we are less concerned about the peak hydrograph standard and more focused on water quality treatment as laid out in the Vermont Stormwater Manual.

Lastly, the Stormwater Program will look for documentation that the State/Feds overseeing the Pine Barge Canal Superfund Site are in support of any additional

stormwater contributions to the Barge Canal. The State/Federal approval of any additional contributions will be a requirement for SW Program approval."

No finding possible without a TDM plan.

(C) Conditions of Approval:

In addition to imposing conditions of approval necessary to satisfy the General Standards specified in (a) or (b) above, the DRB may also impose additional conditions of approval relative to any of the following:

1. Mitigation measures, including but not limited to screening, landscaping, where necessary to reduce noise and glare and to maintain the property in a character in keeping with the surrounding area.

The plan illustrates extensive plantings/trees around the site, with significant program areas behind the bathhouse for outdoor activities relating to the use. The staff parking for the silt bathhouse is placed south of the structure, and is proposed to be heavily screened with landscaping to block any visibility from the street. The DAB made a recommendation to design the staff parking lot as a crescent, to bring the use and design together with the remaining redevelopment.

The rear (west) of the development area is parking, mixed with accessory features customary to the proposed use. With the proposed additional landscaping, no identified negative impacts are anticipated. **Affirmative finding as conditioned.**

2. Time limits for construction.

A zoning permit has a three-year life. The project will be conditioned to be completed within that time frame, unless a phasing schedule is requested. **Affirmative finding as conditioned.**

3. Hours of operation and/or construction to reduce the impacts on surrounding properties.

Construction activities are limited to M-F 7:30 AM to 5:30 PM. Typically Saturday construction is limited to interior work; however in the Enterprise Zone there are at present no residential uses that may be impacted. No construction is allowed on Sunday. **Affirmative finding as conditioned.**

4. That any future enlargement or alteration of the use return for review to the DRB to permit the specifying of new conditions;

Any alteration or enlargement will be reviewed under the regulations in effect at the time of application. **Affirmative finding.**

and,

5. Such additional reasonable performance standards, conditions and safeguards, as it may deem necessary to implement the purposes of this chapter and the zoning regulations.

Technical Review occurred June 2022 with subsequent review by the Conservation Board (December 5) and the Development Review Board (as Sketch Plan) occurred in December 2022. The DRB is at liberty to add any additional standards as it sees fit. **Affirmative finding.**

Article 4: Zoning Maps and Districts

Section 4.4.3 Enterprise Districts

(a) Purpose

The light manufacturing (E-LM) district is the primary commercial/industrial center of Burlington, and is intended primarily to accommodate enterprises engaged in the manufacturing, processing, distribution, creating, repairing, renovating, painting, cleaning, or assembling of goods, merchandise, or equipment without potential conflicts from interspersed residential uses. Other accessory commercial uses are allowed to support a wide range of services and employment opportunities. This district is intended to ensure that sufficient land area is appropriately designated with the city to provide an adequate and diversified economic base that will facilitate high-density job creation and retention. This district is primarily intended to provide for industrial uses suitable for location in areas of proximity to residential development. Development is intended to respect interspersed historic industrial buildings, and reflect the industrial aesthetic of the district's past. Parking is intended to be hidden within, behind, or to the side of structures.

The proposed health/wellness bathhouse (a use not clearly identified within Appendix A) was positively reviewed by the DRB as a Health Club under the earlier Sketch Plan Review. This application is based on that use interpretation.

Parking is arranged both to the side of and behind the new structures.

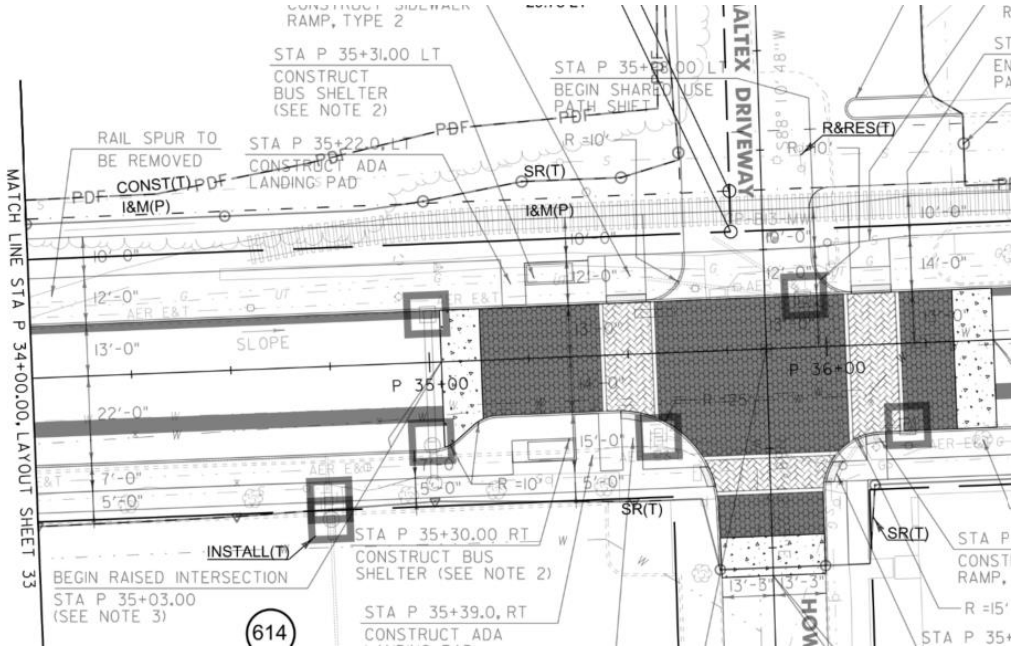
(a) Dimensional Standards and Density

Table 4.4.3 -1 Dimensional Standards and Density

Districts	**Max. Intensity** (floor area ratio[1])	**Max. Lot Coverage**[1]	**Minimum Building Setbacks**[1] (feet) Front	Side	Rear[3]	**Max. Height**[1] (feet)
Light Manufacturing	2.0 FAR	80%	5 min	0[2]	10%[2]	45'

453 Pine Street	With proposed building footprints of 42,400 .20; < 2.0 maximum.	40%	Buildings are set back 34.3' from the property line due to an easement to the City for expansion of City ROW related to the Champlain Parkway and creation of a Shared Use path along Pine Street.	35.7 north; 158.13' from a structure to south boundary line; parking lot is 46.27' from boundary line.	Lot depth varies, but development is setback 54' from rear boundary line to void the westerly, more sensitive portion of the lot; meeting the required 10% rear setback.	Mid-rise of gabled roof on bathhouse is 34' 8"; Commercial building is one story.

2 – Structures shall be setback a minimum of 25-feet along any zoning district boundary line that abuts a residential zoning district. Lots of record existing as of September 9, 2015 that are split by enterprise and residential zones are exempt from this district boundary setback.
3 – Percentage of the lot depth.



MEGC M 5000 (l) detail of expanded ROW associated with Champlain Parkway

Affirmative finding.

(b) Permitted and Conditional Uses:
Health Clubs and General Merchandise/Retail ≥ 4,000 sf are Conditional uses in the E-LM. See Section 3.5.6 (a), above.
The bowling alley has been eliminated from this application.

(c) District Specific Regulations
1. *Convenience Stores*
   At present the 12,400 sf commercial building is proposed as General Merchandise/Retail. If the intent is to create a convenience store, additional standards apply. More information will be required.
2. *Drive throughs* (Not applicable.)

Affirmative finding as conditioned.

Section 4.5.4 Natural Resource Protection Overly (NR) District
453 Pine Street falls within the Natural Resource Protection Overlay District, and includes wetlands at both the northwest and southwest corners of the parcel. The Barge Canal,

immediately west of this parcel is a Natural Resource Feature on Map 4.5.4-1. The project was reviewed by the Conservation Board July 10, 2023; their conditions are attached.
Below are the District-Specific Regulations for the Wetland Conservation Zone:

Section 4.5.4 (d) Wetland Conservation Zone:



1. Additional Application Requirements

The following information shall be submitted in addition to the applicable requirements of Article 3 for any development involving a wetland or wetland buffer zone:

A. Boundary Determination: The boundaries of a wetland shall be determined in the field by a qualified professional with expertise in wetland delineation and surveyed by a licensed land surveyor or other qualified individual. The boundary between wetland and upland shall be delineated by the methodology set forth in the Vermont Wetland Rules. The identification and delineation of wetlands for a proposed project must be performed within a five-year period prior to submission and acceptance of a complete zoning application;

B. A report addressing the project's impact on the wetland functions and values, and the measures that the applicant has incorporated into the project to avoid and minimize wetland impacts shall be prepared by a qualified professional with expertise in wetland delineation and evaluation;

C. A site plan for a project that will impact a wetland or buffer zone shall include delineated wetland boundaries, buffer zone boundaries, erosion control measures, and all components of the proposed project, including, but not limited to all structures, driveways, parking areas, lawns, utilities, and the overall footprint of the construction area/zone of disturbance; and,

D. As part of their application, applicants must submit a complete stormwater management, erosion prevention and sediment control plan pursuant to the requirements of Sec 5.5.3, and successfully demonstrate how the project will prevent adverse impacts to surface water and groundwater quality before, during, or after construction. At a minimum, an applicant should demonstrate how a project will meet the standards outlined in the latest edition of the Vermont Soil Erosion Handbook.

2. Permitted Uses:

Except where otherwise noted herein, only the following uses are permitted within a wetland and its buffer zone subject to the requirements and limitations set forth below under Subpart 6.

A. *Normal maintenance of existing lawns and maintained grounds including mowing, trimming of vegetation and the removal of dead or diseased vegetation around a residence, decorative landscaping and planting, vegetable and flower gardens, and the repair of existing private landscaping structures such as walkways and walls;*

B. *"Accepted agricultural and silvicultural practices" as defined under 24 VSA Ch 117.*

C. *Normal maintenance of constructed wetlands and stormwater systems, provided that naturally occurring wetlands are not disturbed in conjunction with the maintenance;*

D. *Normal maintenance of existing roads, rail lines, bridges, and culverts provided that disturbance to naturally occurring wetlands and shorelands is minimized in conjunction with such maintenance;*

E. *Selective cutting of less than 25 percent of the trees six inches or more in diameter at breast height over any 10 year cycle; and,*

F. *Recreational and educational activities such as fishing, walking, hiking, nature study, and bird watching.*

3. Prohibited Uses:

Except where noted herein, the following uses shall be prohibited within a wetland and its buffer zone.

A. *The deposition or introduction of organic and inorganic chemicals, including pesticides, except when the application of pesticides is reviewed and approved by the BCB and DRB, and performed by an applicator certified by the Vermont Department of Agriculture for the sole purpose of controlling invasive species and subject to the requirements of the City's pesticide application ordinance (Burlington Code of Ordinances, Chapter 17, Section 9); and,*

B. *The off-road use of any motorized vehicles including ATVs or dirt bikes (the temporary use of motorized construction vehicles used to construct permitted or regulated activities in the wetland are specifically exempted from this prohibition) ;*

4. Regulated Uses:

Except where noted herein, all uses permitted or conditionally permitted in the respective underlying zoning district, including the list of activities below, may be

approved within a wetland and its buffer zone after review and approval pursuant to the requirements and limitations set forth below under Subpart 6 below.

A. *The construction of buildings or other structures, and roads, parking areas or other impervious surface;*

B. *Any form of drainage, dredging, excavation, or removal of material either directly or indirectly;*

C. *Alteration or modification of natural drainage patterns, natural features and contours;*

D. *Installation of docks, rip-rap or other shoreline stabilization features;*

E. *Installation of utility poles or utility service lines, underground pipes or cable conduits, and wells;*

F. *Cutting of greater than 25 percent of the trees six inches or more in diameter at breast height over any 10 year cycle;*

G. *Construction, expansion or placement of any structure;*

H. *Construction or expansion of roads, rail lines parking areas, trails, and sidewalks;*

I. *Introduction of any form of pollution, including but not limited to the installation of a septic tank, the running of a sewer outfall, or the discharge of sewage treatment effluent or other liquid wastes into or so as to drain into a wetland;*

J. *The construction of a stormwater outfall as part of a stormwater management plan approved by the city engineer. In making determinations and decisions required herein, the city engineer shall consider the requirements of the most recent State of Vermont Stormwater Management Rules and Guidance document. The city engineer shall require the best practicable means be used to manage stormwater and prevent erosion and control sediment and the city engineer is hereby authorized to develop performance standards to ensure conformance with these state stormwater management rules; and,*

K. *Application of pesticides performed by an applicator certified by the Vermont Department of Agriculture for the sole purpose of controlling invasive species and subject to the requirements of the City's pesticide application ordinance (Burlington Code of Ordinances, Chapter 17, Section 9). In no other cases shall pesticides be applied.*

5. Prohibited activities in a vernal pool and buffer zone:

Except where noted herein, the following uses shall be prohibited within a vernal pool and its respective buffer.

A. *Any activities which disturb the area within 100 feet of a vernal pool, including, but not limited to timber harvesting, disturbance of the understory vegetation,*

pesticide or herbicide application, the erection of fences or other barriers to amphibian dispersal, barriers and any other type of human activities that disturb the vegetation or water quality in the pool and buffer.

6. Criteria for Review

In granting, denying, or conditioning any permit involving a wetland, vernal pool or respective buffer zone, the DRB, in consultation with the conservation board, will consider the project's impact on the functions and values of the wetland, and the measures that the applicant has incorporated into the project to avoid and minimize impacts. The DRB shall only approve a project having an impact on a wetland or wetland buffer zone if an applicant can demonstrate that any adverse impact is de minimus on the significant functions and values of the wetland including:

A. Water storage for floodwater and stormwater;

B. Erosion and sedimentation control through binding and stabilizing the soil or shoreline;

C. Surface water and groundwater protection, including sediment and toxicant retention, nutrient retention and transformation, and groundwater discharge and recharge;

D. Fisheries habitat;

E. Wildlife habitat;

F. Examples of natural community types that are exemplary, rare, or make an important contribution to the natural heritage of Burlington and Vermont;

G. Habitat for rare, threatened and endangered species;

H. Education and research in natural sciences;

I. Recreational and economic benefits; and,

J. Open space and aesthetics.

In addition, the review of a project having involving a wetland or wetland buffer zone shall also be subject to the following requirements and limitations:

K. Any land disturbing activities (i.e., vegetation has been removed, or the landscape has been graded or filled resulting in bare soil surfaces) shall include a stormwater management, erosion prevention and sediment control plan pursuant to the requirements of Sec 5.5.3 to be reviewed by the conservation board and approved by the city engineer;

L. No new stormwater outfall shall directly discharge into surface water without approval and implementation of a stormwater management plan approved by the city engineer;

M. No installation of docks, rip-rap or other shoreline stabilization features shall be

installed without review approval by the city engineer;

N. Agricultural and silvicultural activities shall follow Best Management Practices for the Protection of Water Quality; and,

O. Stormwater management, erosion, and sedimentation control plans shall be submitted for review by the conservation board who shall consult with the development review board and city engineer prior to issuance of a recommendation to the city engineer who shall render a final decision on such plans.

In making determinations and decisions required herein, the city engineer shall consider the requirements of the most recent State of Vermont Stormwater Management Rules and Guidance document. The city engineer shall require the best practicable means be used to manage stormwater and control erosion and sedimentation and the city engineer is hereby authorized to develop performance standards to ensure conformance with these state stormwater management rules.

The redevelopment plan is intentional in creating recreational and economic benefits, as well as maintaining open space and improving site aesthetics. The parcel has been under review for more than a year to address site-specific challenges and address any potential conflicts. The applicant has included a Wetland memo which includes the following:

An analysis of the functions and values of the wetland buffer area is provided. Also provided is an assessment of the potential impacts of the proposed Project on the functions and values of the wetland complex. The Project as designed will have no adverse impact on the wetland, and has the potential to improve the overall water quality through stormwater treatment and enhance wildlife habitat with invasive species management and naturalization of vegetation.

A. Water storage for floodwater and stormwater;
    - The Project area, including the wetland buffer have the potential to provide water storage for floodwater although contiguity with Lake Champlain significantly diminishes this function. The control of stormwater is addressed by design of a site specific Erosion Prevention and Sediment Control (EPSC) and Post-Construction Stormwater Management System. The Project will have no impact on the capacity of the overall wetland to provide flood storage.
B. Erosion and sedimentation control through binding and stabilizing the soil or shoreline;

- The Project area, including wetland buffer, are not in close proximity to high velocity currents with the closest shoreline approximately 350' to the west. The Project will have no impact on the capacity of the overall wetland to provide erosion control.

C. Surface water and groundwater protection, including sediment and toxicant retention, nutrient retention and transformation, and groundwater discharge and recharge;
    - The wetland buffer provides water quality protection which the applicant intends to address by designing its Erosion Prevention and Sediment Control (EPSC) and Post-Construction Stormwater Management Systems to comply with City Ordinance Chapter 26, the State of Vermont Stormwater Management Rules and Guidance documents as well as the EPA ROD Institutional Controls. The proposed stormwater management system filters stormwater from the site through 2 feet of soil media with plantings and then has the opportunity to infiltrate into the ground as it fills up a shallow stone reservoir and reaches a perforated underdrain before flowing out to the discharge points in the wetland buffer. To avoid concentrated flow at the outlet, the discharge line will terminate at a "T" into perforated pipe covered in stone. This system spreads out the clean (filtered by the bioretention) stormwater and mimics sheet flow as it discharges to the wetland. The design will result in no reduction in water quality to the wetland, and due to existing site conditions may have the potential to improve current runoff conditions.

D. Fisheries habitat;
    - There are no streams or open water within the Project area. The closest open water with the potential to support fish is approximately 350' to the west. The wetland buffer in the Project area does not provide, support or protect fisheries habitat. The Project will have no impact on fisheries habitat.

E. Wildlife habitat;
    - The Project area, including wetland buffer, does not contain significant wildlife features due to the dominance of non-native invasive species and existing vegetation management. Enhancement of portions of the wetland buffer with invasive species management and naturalization of vegetation will increase the capacity of the wetland buffer and wetland to provide wildlife habitat.

F. Examples of natural community types that are exemplary, rare, or make an important contribution to the natural heritage of Burlington and Vermont;
    - The Project area is highly disturbed, dominated by non-native invasive species. The site, including the wetland buffer, is not an example of an exemplary or rare natural community type and does not contribute toward the overall natural heritage of Burlington.

G. Habitat for rare, threatened and endangered species;

- The Project area, including the wetland buffer, does not provide habitat for rare, threatened and endangered species. The Project will have no impact on habitat for rare, threatened and endangered species.

H. Education and research in natural sciences;
   - The Project area is highly disturbed, including the wetland buffer, and does not contain elements that contribute toward the study of natural sciences. The overall wetland provides an outdoor classroom for the study of impacts from the super fund site.

I. Recreational and economic benefits; and,
   - The Project site, including the wetland buffer, does not provide opportunity for wetland dependent recreation and economic benefits. The development of 453 Pine St does open up the opportunity to create a conservation area at 0 Pine St with the donation of adjacent property 501 Pine St which will allow more public accessibility to the future conservation area.

J. Open space and aesthetics.
   - The Project site, including the wetland buffer, does not possess special or unique aesthetic qualities due to the past disturbance and dominance by non-native invasive species. The site does provide open space in an urban landscape, however, this is not a wetland or wetland buffer function in this context. The development of 453 Pine St does open up the opportunity to create a conservation area at 0 Pine St with the donation of adjacent property 501 Pine St which will allow more public accessibility to the future conservation area.

The submission is further supported with a bat memo, a wildlife memo and a plant memo. EPSC and Stormwater plans are a requirement. As noted, the project was reviewed by the Conservation Board December 5, 2022 under Sketch Plan review, and was reviewed July 10, 2023. Their conditions require a Corrective Action Plan (CAP), and movement of non-native plants inside the 50-100' buffer.
Affirmative finding as conditioned.

Article 5: Citywide General Regulations

Section 5.2.1 Existing Small Lots.
Not applicable.

Section 5.2.2 Required Frontage or Access
The parcel has access onto Pine Street, an accepted city street.

Section 5.2.3 Lot Coverage Requirements
See Table 4.4.3-1, above.

Section 5.2.4 Buildable Area Calculation

E-LM is not subject to this regulation. Not applicable.

Section 5.2.5 Setbacks
See Table 4.4.3-1, above.

Section 5.2.6 Building Height Limits
See Table 4.4.3-1, above.

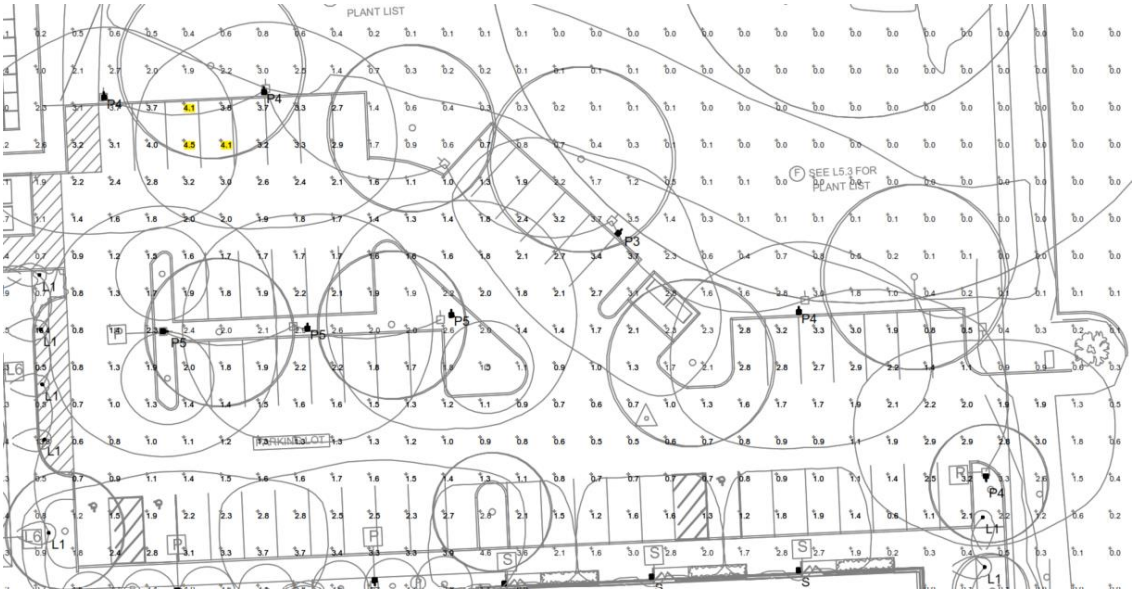
Section 5.2.7 Density and Intensity of Development Calculations
See Table 4.4.3-1, above.

Part 3: Non Conformities
There are no identified non-conformities on this (vacant) parcel.
Affirmative finding.

Section 5.4.8 Historic Buildings and Sites
Not applicable.

Section 5.5.1 Nuisance Regulations
Nothing in the proposal appears to constitute a nuisance under this criterion.
Affirmative finding.

Section 5.5.2 Outdoor Lighting
The submitted lighting plan is equally complex. There are a few "hot spots" on Plan SL-1 that must be adjusted: Walkway lighting may not exceed 2 footcandles, and there are several areas in conflict: At the rear of the commercial building and around the plaza gardens. Entrance lighting is limited to 5 fc.



Parking lot lighting standards limit maximum footcandle measurement at 4 fc; exceeded at the south/west of the parking lot. A revised photometric reflecting these changes will be required.

The photometric does not reflect any lighting at the staff parking lot. For security reasons, some should be provided.

Uplighting is prohibited (some of the fixtures within the 59 page lighting documents appear to be just that). Decorative fixtures using low output lamps used for landscaping that do not emit direct illumination or glare are allowed. All lighting fixtures, other than those using only low output lamps and alternatives specifically allowed, shall be "full cut-off".

The maximum mounting height of pole fixtures shall be 25'.

Additional light fixture information is provided on Plan L 6.1.
Affirmative finding as conditioned.

Article 6: Development Review Standards:
Part 1: Land Division Design Standards
No subdivision is proposed. The site is arranged with a network of walkways to connect clients and pedestrians to various buildings, sites, and the the public right-of-way.
Not applicable.

Part 2: Site Plan Design Standards
Sec. 6.2.2 Review Standards

(a)Protection of Important Natural Features:
The site is identified within Burlington's Open Space Plan as filled land; inventoried with transitional brush cover. Existing trees are identified on Plan C3, the redevelopment will occur east of the treeline.

This is an environmentally sensitive site, with an extensive history of analysis and a current partnership with the state to remediate existing conditions. The applicants have engaged the services of Arrowwood Environmental (AE) to identify and map the natural resources on the site. AE has conducted that work and identified Class II wetlands on the subject parcel and adjoining site at 0 Pine Street, therefore a 50' State wetland's buffer and 100' City Wetland Conservation Zone apply at the 453 Pine Street site. The project does not propose any uses within the 50' State buffer, and no landscape features will be installed here. However, the project is required to have a perimeter fence, and it will be installed outside of the woods edge with helical piles to minimize impacts within the 50' State buffer. No trees will be removed for the installation of the fence. **Affirmative finding as conditioned**.

(b) Topographical Alterations:
Site disturbance is limited due to the nature of the soils. A berm is proposed in front of the Silt Bathhouse, through which entrances are designed. **Affirmative finding.**

(c) Protection of Important Public Views:

There are no protected public views from or through this site. The development of this site has opened a conversation about creation of a conservation area at 0 Pine Street with the donation of adjacent property at 501 Pine, which would allow more public accessibility to any future conservation area. **Affirmative finding.**

(d) Protection of Important Cultural Resources:

This parcel is just outside the mapped boundaries of the Pine Street Industrial District.
Not applicable.

(e) Supporting the Use of Renewable Energy Resources:

See Section 3.5.6 (a) 5, above for further discussion.
Affirmative finding.

(f) Brownfield Sites:

The site is 4.8 acres and is currently enrolled in the State's Brownfields Economic Revitalization Alliance (BERA) Program. The developers and design team have been working with the Vermont Department of Environmental Conservation, Civil, Environmental and Geotech Engineers on an Evaluation of Corrective Action Alternatives (ECAA) which evaluates the existing site conditions and studies alternative options for remediation and development. Once the ECAA is complete, the project will move into the Corrective Action Plan (CAP) phase. The applicant shall identify completed or planned remediation necessary to support the intended use.
Affirmative finding as conditioned.

(g) Provide for nature's events:

Special attention shall be accorded to stormwater runoff so that neighboring properties and/or the public stormwater drainage system are not adversely affected. All development and site disturbance shall follow applicable city and state erosion and stormwater management guidelines in accordance with the requirements of Art 5, Sec 5.5.3.

The site and stormwater systems have been designed to mimic the current drainage patterns at the site to the maximum extent possible to help ensure that hydrology and hydrogeology are not drastically altered.

Stormwater flows east to west across the site and flows to bioretention swales and basins that will be landscaped as gardens. The bioretention swales are designed to function as a level spreader for larger storms so that stormwater will sheet flow across the landscape. Reference is made to Plan C6.

Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.

The entrances to the Bathhouse are both located within a created berm; structurally providing some shelter from inclement weather. The commercial building has no identified protective

canopy to shelter tenants as they enter/exit the building; however entrances appear to be recessed which may offer a modicum of shelter.

Four parking spaces in each of the parking areas are identified for snow storage areas. (See Plan C5.) **Affirmative finding as conditioned.**



(h) Building Location and Orientation:

Both the Nordic Bathhouse and the Commercial building are placed in an orientation to Pine Street, with a pedestrian path between the buildings. The commercial building has three, clearly identifiable entrances facing the street. The Bathhouse provides an entrance both from the sidewalk and the plaza through an earthern berm. The standards states: *Principal buildings shall have their main entrance facing and clearly identifiable from the public street.* The bathhouse entrance is designed to create mystery and intrigue, effectively achieved with the addition of an earthern berm. The Design Advisory Board found the design so compelling that they would consider a recommendation for approval as a "one-off" from the standard in part due to the use (where activities and uses are largely oriented towards the rear of the lot), and the very

compelling architectural design of the bathhouse. They also found strength in the secondary entrance from the plaza that bisects the site, and is directly off the Shared Use path.



The commercial building, looking southwest down Shared Use Path. Building fronts Pine Street.

Affirmative finding with DRB concurrence.



(i) Vehicular Access:

The primary vehicular entrance is via a re-aligned Maltex Drive.
This arrangement must be accompanied by an application from the owners of that abutting parcel (as the proposal is outside the 453 property boundaries) and is entirely dependent upon a shared-driveway agreement with those owners. This newly design access must also be agreeable to the Department of Public Works as it relates to the Champlain Parkway improvements on Pine Street. The three lanes (specifically, two exit lanes) are not supported by the Parkway Design team.

There is a secondary access on the southerly section of the lot; intending entirely to provide staff parking and a service court for the bathhouse. This standards requires "Curb Cuts shall be arranged and limited in number to reduce congestion and improve traffic safety." Although there are currently no curbs on Pine Street, this secondary curb cut will be almost directly across from the access to Dealer, and is likely to introduce additional vehicular delays and turns. (The provided Traffic Analysis does not include any study of trips generated by the Dealer access drive, nor does it include those trips as part of the calculated traffic impacts.) While the Traffic analysis opts for a second right-turn exit lane from the Maltex Drive, and acknowledges that Pine Street north of Lakeside Avenue will experience traffic congestion during peak periods in the future, the plan relies on employing (at application, unidentified) TDM strategies to address the new peak trips introduced by the redevelopment. (145 new PM peak trips anticipated; with a "20 % TDM credit" of -29.)

The DAB did not initially support the additional (staff) parking lot on the south of the development site, but ultimately supported the plan with a recommendation to redesign the layout in a crescent shape to support the development area and soften the southern edge.
The secondary access from Pine Street additionally bisects the new Shared Use Path. Its placement must meet with the approval of the Parkway Design team.
A TDM plan is a requirement.

Affirmative finding as conditioned.

(j) Pedestrian Access:

The improvements associated with the Champlain Parkway include a Shared Use path along Pine Street, as well as an interconnecting pedestrian network throughout the site. **Affirmative finding**.



(k) Accessibility for the Handicapped:

Access is at grade for both the Bathhouse and commercial building. An elevator is provided at the bathhouse. 4 ADA parking spaces are illustrated on the parking plan (C5): 1 directly behind the commercial building; 2 north of the bathhouse, and one in the staff parking lot. ADA compliance is under the jurisdiction of the building officials. **Affirmative finding as conditioned.**

(l)Parking and Circulation:

A total of 77 parking spaces are proposed: 59 at the rear lot and 18 for staff parking. Maximum parking limits the total number to 85 spaces. As proposed, the parking does not exceed the maximum allowance.

As noted, parking access is intended through a shared access drive from the Maltex site. Reference is made to the Traffic Impact Assessment and comments submitted by the Department of Public Works. **Affirmative finding as conditioned.**

(m) Landscaping and Fences:

The landscaping plan is complex (see L2.1 and L5.1.) Gardens are individually designed to enhance the specific site features and/or uses: "South Woodland Garden", "Plaza Gardens".) The Plant schedule includes trees, shrubs and perennials; as well as greef roof and berm plantings. "Rooms" are created with walls and water features (L2.1), as well as pergolas, arbors, and awnings (for shade over outdoor dining) connected by heated and unheaded paths, terraces, and patios. Perimeter fencing is proposed for both privacy and utility. Benches, fireplaces, hammocks and planters are included.

A specific focus of the planting plan will be management of invasive species, and intended plantings for the 50' and 100' wetland buffers. Plan L5.3 defines the schedule for the latter, including the Stormwater garden.

The Conservation Board reviewed the plan July 10, 2023 and conditioned support with movement of non-native plants inside the 50' and 100' buffers.
Affirmative finding as conditioned.

(n) Public Plazas and Open Space:

While public areas are not required, they are incorporated within the design schedule to support the proposed use. The pedestrian walkway introduces a kind of Plaza between the bathhouse and commercial building. **Affirmative finding.**

(o) Outdoor Lighting:

Where exterior lighting is proposed the applicant shall meet the lighting performance standards as per Sec 5.5.2.

See Section 5.5.2. **Affirmative finding as conditioned.**

(p) Integrate infrastructure into the design:

Exterior storage areas, machinery and equipment installations, service and loading areas, utility meters and structures, mailboxes, and similar accessory structures shall utilize setbacks, plantings, enclosures and other mitigation or screening methods to minimize their auditory and visual impact on the public street and neighboring properties to the extent practicable.

Utility and service enclosures and screening shall be coordinated with the design of the principal building, and should be grouped in a service court away from public view. On-site utilities shall be place underground whenever practicable. Trash and recycling bins and dumpsters shall be located, within preferably, or behind buildings, enclosed on all four (4) sides to prevent blowing trash, and screened from public view.

Any development involving the installation of machinery or equipment which emits heat, vapor, fumes, vibration, or noise shall minimize, insofar as practicable, any adverse impact on neighboring properties and the environment pursuant to the requirements of Article 5, Part 4 Performance Standards.

A dumpster/enclosure is illustrated on the south of the parking lot. No details are included, but it appears to be enclosed on all four sides to prevent blowing trash. New electric utility shall be

undergrounded, unless the site conditions specifically prohibit it. **Affirmative finding as conditioned.**

Part 3: Architectural Design Standards
Sec. 6.3.2 Review Standards

(a)Relate development to its environment:

1. Massing, Height and Scale:

While the commercial building is limited to one story, the Nordic bathhouse rises to three stories (the first floor partially within the street grade). Both can find similarities in existing buildings along Pine Street: Arts Riot is one story, Maltex is three stories over a raised basement, 400 Pine (at the corner of Howard) is two stories rising to three, and Dealer is 2 stories. **Affirmative finding.**

2. Roofs and Rooflines.

The commercial building is flat roofed, while the bathhouse has a gabled roof that sits atop a flat roofed 2nd story. A square window puncture on the third floor presents a modern dormer in function. A greenhouse in the rear is also gabled, with a second, hoop greenhouse. **Affirmative finding.**



3. Building Openings

The bathhouse has the noted entry within the concrete and earther berm on the streetfront, with limited vertically oriented windows on the second floor (individual treatment rooms) and the dormer/skylights on the third floor. Executed in a very modern vocabulary, the limited first floor access and sparingly added windows presents an austere face to the public way. The DAB found this design compelling; meeting both the function of the bathhouse (where public view of treatments would be discouraged) and the desire to create mystery and discovery.

The commercial building is highly glazed, with broad expanses of windows along both the streetfront and west elevation. **Affirmative finding with DRB concurrence.**





3 WEST ELEVATION

(b) Protection of Important Architectural Resources:

Not applicable.

(c) Protection of Important Public Views:

Not applicable.

(d) Provide an active and inviting street edge:

Admittedly the bathhouse is designed for function; outdoor elements of the business program are evident on the west (rear) of the lot, while the streetscape remains somber and elusive.. The applicant has defined the intent to create mystery and discovery in the design and plan. This standard states:

The use of architectural recesses and articulations at the street-level are particularly important in order to facilitate the flow of pedestrian traffic.

Non-residential buildings should provide visual access into the interior of the building at the street level through the use of large transparent windows and/or window displays in order to create a dynamic and engaging public streetscape.



The DAB found the design and site layout created interest with mystery, and presented a novel method to entice and invite public interaction with a building that is intended to provide personal services. Inventive and pioneering, the plan offers to gather attention with a veiled entry, inviting investigation. The DAB also found the invitation was doubled with the entry off the plaza walkway. For the specific function, they found the plan successful. **Affirmative finding with DRB concurrence**.

(e) Quality of materials:

All development shall maximize the use of highly durable building materials that extend the life cycle of the building, and reduce maintenance, waste, and environmental impacts. Such materials are particularly important in certain highly trafficked locations such as along major streets, sidewalks, loading areas, and driveways. Efforts to incorporate the use of recycled content materials and building materials and products that are extracted and/or manufactured within the region are highly encouraged.

The bathhouse employs a standing seam metal roof, thermally modified wood siding in a black finish, board form concrete and cast-in-place concrete as well as slatted wood and the planted earthen berm. See Plan A-2.

The commercial building features insulated metal panels, thermally modified wood siding and corten steel.

Although the independent rental building is not included within this permitting phase, it, too is proposed to be sheathed in thermally modified wood siding with a standing seam metal roof to match the bathhouse. Reference is made to Plan A-3.

The structural materials are all of acceptable durability for new construction. **Affirmative finding.**

(f) Reduce energy utilization:

All new construction is required to meet the Guidelines for Energy Efficient Construction pursuant to the requirements of Article VI. Energy Conservation, Section 8 of the City of Burlington Code of Ordinances. Vermont Commercial Building Energy Standards apply to this project. Compliance with the standards is the Owner's responsibility. For more information, see http://publicservice.vermont.gov/energy_efficiency. **Affirmative finding as conditioned.**

(g)Make advertising features complementary to the site:

Any signage shall require separate sign permits. **Affirmative finding as conditioned.**

(h) Integrate infrastructure into the building design:

See Section 6.2.2. (p), above.

(i)Make spaces secure and safe:

Building entrance points shall be visible and adequately lit. Spaces shall be designed to provide for adequate and secure visibility for persons using and observing such spaces.

Development shall comply with all applicable building and life safety code as defined by the building official(s) and fire marshal. **Affirmative finding as conditioned.**

Article 7: Signs

Any signage will require separate permitting. For three or more separate uses, a Master Sign Plan is encouraged. **Affirmative finding as conditioned.**

Article 8: Parking

Section 8.1.9 Maximum On-Site Parking Spaces

The adoption of Zoning Amendment 22-07 resulted in the elimination of minimum parking standards in favor of maximum allowances. As noted in Section 6.2.2. (l) above, here are the maximum parking counts permissible:

Health Club is 2 parking spaces per 1,000 sf. For a 30,000 sf building, **60** parking spaces are the maximum parking count.

The commercial building, at 12,400 sf of General Merchandise/retail would have a maximum of 2 per 1,000 sf, or **25** spaces maximum. That collectively caps the parking for the proposed uses at **85 parking spaces**. 77 Parking spaces are proposed; less than the maximum allowance. Deductions for exceptions (ADA Accessible) would further reduce the parking count. **Affirmative finding.**

Section 8.1.16 Transportation Demand Management

(b) Applicability

Table 8.1.16.1 Program Type

Non-residential or Mixed Use development with a building footprint of eight thousand sq. ft. or more; or the creation of fifteen thousand (15,000) sq. ft. or more of gross floor area.

With the creation of a 30,000 sf bathhouse and a 12,400 sf commercial/retail structure, a TDM is triggered. As of this date, A TDM has not been provided.

Applicable TDM Sections: All provisions of Sec. 8.1.16 (c).

(c) ***Transportation Demand Management (TDM) Program****: A TDM Program shall include each of the following elements at a minimum:*

a. ***Outreach and Education****:*

i. *Designation of a Transportation Coordinator who directly, or indirectly through membership in a Transportation Management Association, shall be responsible for each of the following:*

1. *Prepare and always make available to all residents and employees informational and educational materials regarding available TDM strategies and opportunities for increased use and participation;*

2. *Preparation and dissemination of an annual travel survey of all residents and employees; and,*

3. *Record-keeping and reporting to City upon request of all TDM activities offered and rates of participation (including parking utilization if applicable).*

b. ***TDM Strategies****: In addition to compliance with the on-site Bicycle Parking requirements found in Article 8, Part 2, each TDM Program must incorporate TDM strategies to minimize the amount of parking demand associated with the project. At a minimum, a TDM Program shall select no less than two (2) of the following TDM strategies, which shall be selected and filed with the Administrative Officer on an annual basis:*

i. *Maintain an ongoing and active membership in a Transportation Management Association (TMA);*
ii. *Provide GMT Transit passes to all residents and employees at a minimum discount of 50%;*
iii. *Provide a free car share membership to all residents and employees;*
iv. *Provide a free bike share membership to all residents and employees;*
v. *If not already provided through a TMA membership, provide residents and employees with a shuttle service, guaranteed ride home program, or ride to a nearby transit center.*

c. ***Parking Management****: Where on-site or off-site parking is also made available:*

i. *Conduct parking utilization studies at least annually for a period of 7 years from receipt of a Certificate of Occupancy;*

ii. *With the exception of permanently affordable housing units, the cost of parking shall be un-bundled from all residential and non-residential leases and deeds and made available at a market rate;*

iii. *Where parking spaces are made available to off-site users, parking spaces may be made available by a renewable lease, provided the term of any lease does not exceed one (1) year; and,*

iv. *Priority parking spaces: when on-site parking is provided, the following must be located in closest proximity to a primary building entrance and/or public street frontage:*

1. *ADA Accessible spaces;*
2. *Bicycles, scooters, and motorcycles spaces;*
3. *Car-share: where 1 space must be offered for projects with 20 or more residential units, subject to an agreement with a car-share provider; and,*
4. *Carpool and/or Vanpool vehicles: where more than 20 spaces are available for non-residential uses. In such cases, 5 spaces or 5% of the parking spaces on site, whichever is less, must be reserved for carpool/vanpool use before 9:00 AM on weekdays.*

d. ***TDM Agreement****: Each TDM Plan shall include a signed commitment to and acknowledgement of each of the following on a form provided by the Administrative Officer:*

i. *Commitment to ongoing implementation of the TDM requirements as set forth above;*

ii. *Acknowledgement that the project has no claim to the ongoing availability of nearby on-street public parking, and that, as is the case with other on-street public parking, the City retains the right to charge for, restrict or remove such on-street parking at any time;*

iii. *Acknowledgement that failure to maintain transportation demand management as required above is a violation of this ordinance, and understanding that, pursuant to Sec. 2.7.8 of this ordinance, no zoning permit or certificate of occupancy may be granted until any such violation has been remedied; and,*

iv. *Commitment to notify any subsequent owners and tenants in writing of their obligations under this section as part of any purchase and sale and/or lease agreements.*

Review and Enforcement: *The Administrative Officer shall be responsible for determining compliance with the TDM Program requirements as set forth above, and ongoing implementation shall be included as a condition of any discretionary or administrative permit required for development subject to the conditions of this Section.*

Failure to maintain a TDM Program as required above shall be a violation of this ordinance, and pursuant to Sec. 2.7.8 of this ordinance no zoning permit or certificate of occupancy may be granted without a TDM Program in effect.

Guidelines regarding compliance with these TDM requirements shall be developed and provided to applicants by the Administrative Officer.

No finding possible.

Part 2: Bicycle Parking

Table 8.2.4.1-1 Bicycle Parking Requirements requires the following for the applicable uses:

Use	Long Term Spaces	Short Term Spaces
Office	1/5,000 sf	1/10,000 sf
Retail sales and service	1/12,000 sf	1/2,000 sf

The following are what the project is showing for bike parking based on the table above:
Commercial Building @ 12,400 sf (Retail sales and service)

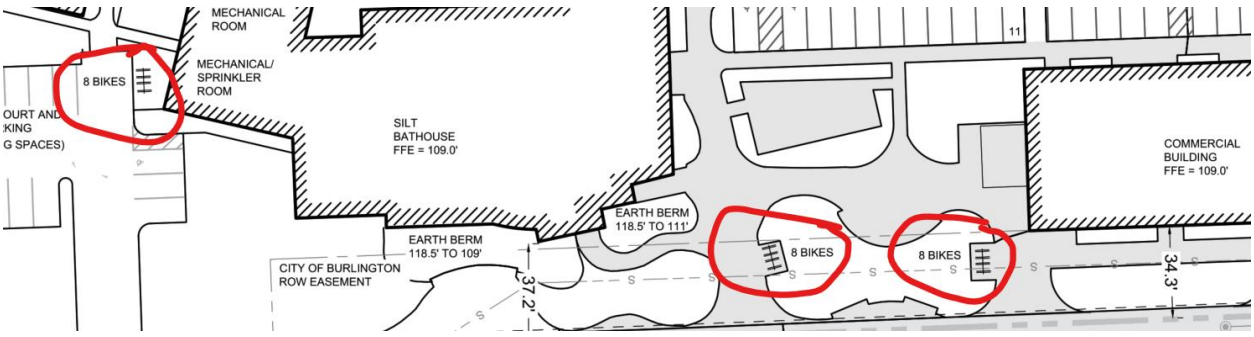
- 2 long term spaces
- 6 short term spaces

Bicycle parking allocations for the Bathhouse are based on input from the City's Transportation Planner with a suggested count of 10 long- and short-term bike parking spaces.

Total spaces shown on the proposed development are:

- 4 long term (2 @ Commercial Building and 2 @ Bathhouse)
- 24 short term

Bicycle racks are included on the site plan, with locations along the Shared Use Path and adjacent to the staff parking/service court. Long term bike parking will be inside the buildings.





Affirmative finding.

II. Recommended Conditions of Approval

1. If the applicants desire a Phasing schedule to extend their permit timeline, they are obligated to present that request to the DRB during the public hearing.
2. Plans for the dumpster enclosure shall be submitted for review and approval by staff.
3. Conditions imposed by Burlington's Water Resources Division:
    1. That the two (2) pumps station increase storage capacity above normal pump operating levels from the State required four (4) hours to eight (8) hours to accommodate surcharging within our combined sewer system. This storage volume is sized to accommodate big storms with power outages.
    2. That a float system be installed in manhole MY3.16 to disable both pump stations when water levels are 15" and above in this 21" pipe (>75% hydraulic pipe capacity) and re-enable pumps when tank storage levels exceed 90% full.
    3. That an alarm system notify the property manager and/or contracted septic company when above sized storage tanks hit predetermined high water levels that still allow sufficient time for managers/contractors to respond.
    4. That an Emergency Action Plan be submitted to the Water Resource's office for review and approval. This plan shall include at a minimum calculated average and peak wastewater flows, calculated storage times, pump cycle setpoints, alarm levels with calculated response times, and emergency contacts.
4. A State Wastewater permit is required; it is the applicants' responsibility to secure said permit.
5. Due to the Champlain Parkway construction project, three lanes at the Maltex entrance/exit are not supported by the Parkway Design team, as they increase the potential for pedestrian and bicyclist conflicts. The plan shall be revised to eliminate the additional exit lane unless collaboration with the Parkway Design Team returns a different opinion.
6. The proposed relocation of the bus shelter is not supported by the Champlain Parkway Project Design team. See email of May 15, 2023 from Corey Mimms to Scott Michael Mapes.
7. Any connections to the Shared Use Path, or bisection (staff parking access) shall meet the guidance of DPW engineers.

8. If supported by the DRB, the additional curb cut for the staff parking lot will require a curb cut permit from the Department of Public Works.
9. As the principal entry to the site is across another parcel, an application shall be submitted from that property owner reflecting the change to the site and concurrence with the shared access plan.
10. Uplighting is prohibited. The exception is decorative fixtures using low output lamps used for landscaping that do not emit direct illumination or glare, or cast a shadow onto adjacent property. **A revised photometric** shall be provided confirming elimination of "hot spots" as noted under Section 5.5.2. The photometric plan shall be revised to lower light levels along walkways (2 fc max) and within the parking areas (4 fc max.)
11. ADA compliance is under the jurisdiction of the building officials.
12. A **Transportation Demand Management Plan** shall be required to address parking demand. See Section 8.1.16 for required submittals and conditions.
13. This project is subject to any and all conditions imposed by the Vermont Department of Environmental Conservation, Civil, Environmental and Geotech Engineers within their Evaluation of Corrective Action Alternatives (ECAA) and the ultimate Corrective Action Plan (CAP.)
14. At the recommendation of Burlington's transportation planner, **24 short term and 4 long term** bicycle parking spaces shall be provided.
15. The Conservation Board conditions support on movement of non-native plants inside the 50' and 100' buffers.
16. All construction is required to meet the guidelines for Energy Efficient construction pursuant to the requirements of Article VI. Energy conservation, Section 8 of the City of Burlington Code of Ordinances.
17. Any signage shall require separate sign permits. For three or more businesses, a Master Sign Plan may be appropriate.
18. At present the 12,400 sf commercial building is proposed as General Merchandise/Retail. If the intent is to create a convenience store, additional standards apply. A separate zoning application shall be required for independent review.
19. Impact Fees shall be assessed for new development/new nonresidential buildings square footage; see Section 3.3.5. Impact fees shall be paid to the City Administrative Officer 7 (seven) days prior to occupancy of a new building or any portion thereof.
20. Standard Permit Conditions 1-15.

NOTE: These are staff comments only. The Development Review Board, who may approve, table, modify, or deny projects, makes decisions.

453 Pine St – Burlington, VT
COA Level II Application – Project Narrative
5/22/23

We're excited to submit our application for a proposed project at 453 Pine Street. The proposed development includes two separate business entities, Silt Bathhouse, and a Commercial building. The site is 4.8 acres and is currently enrolled in the State's Brownfields Economic Revitalization Alliance (BERA) Program. The developers and design team have been working with the Vermont Department of Environmental Conservation, Civil, Environmental and Geotech Engineers on an Evaluation of Corrective Action Alternatives (ECAA) which evaluates the existing site conditions and studies alternative options for remediation and development. Once the ECAA is complete, the project will move into the Corrective Action Plan (CAP) phase.

The site is within the Enterprise – Light Manufacturing (E-LM) District, Design Review District, Natural Resource Protection District, Shared Use Parking District and Multi-Modal Mixed-Use Corridor. The Commercial building does not have an intended use at this time but will be classified as General Merchandise/Retail which is allowed in the E-LM District. The Bathhouse is being classified as a Health Club and is conditional use. The Silt Bathhouse project was presented at DRB Sketch Plan in November of 2021 for a different location of which the DRB had agreed at the time on the Health Club interpretation since the building use didn't fall under one specific category within the Use Table. The 453 Pine St project was also submitted for Sketch Plan review in November 2022 and at this time it also included a bowling alley, Backside Bowl. Since the Sketch Plan submission, the bowling alley has been omitted from the project.

The total site area is 4.8 acres or 209,088 sf with a FAR of 2.0 in the E-LM district which means the total buildable area allowed is 418,176 sf. Silt Bathhouse main building plus outbuildings total approximately 30,000 gsf and the Commercial building is 12,400 gsf making the proposed project 42,400 sf in total, far under the allowed. Front yard setback requirement is 5'-0" and the buildings are setback approximately 35'-0" from the property line, mainly due to the 35'-0" City of Burlington Right-Of-Way along Pine Street. Reference C5 for additional setback information.

The buildings are oriented along Pine Street with primary vehicular access from the current Maltex Drive which will be moved to align with Howard Street during the forthcoming Champlain Parkway work. The Champlain Parkway work includes a shared use path for pedestrians and bicycles along Pine Street and the proposed development project includes a pedestrian plaza between Silt Bathhouse and the Commercial building. There is currently a bus stop at the corner of the Maltex driveway and Pine Street that is proposed to incorporate a bus shelter within the Champlain Parkway work. There is a secondary curb cut to the south of Silt Bathhouse which will be for service and staff parking. The side yard parking will be screened, and signage will aid in discouraging the public from entering this location and direct visitors in vehicles to the main entrance at the Maltex driveway. The landscape design along Pine Street is intended to provide a pedestrian activated streetscape with pedestrian plaza and café seating that celebrates the spirit of the project and the South End. See landscape narrative further down in this document.

There are a total of 77 parking spaces between 59 parking spaces at the rear lot and 18 spaces at the Silt service court & staff side parking lot. Table 8.1.9-1 Maximum Off-Street Parking Requirements lists the following for the Shared Use and Multimodal Mixed-Use District in the applicable use categories for this Project.

Use	Shared Use District	Multimodal Mixed-Use District
Health Club	3/1,000 sf of gfa	2
Cafe	4/1,000 sf of gfa	3
General Merchandise/Retail	3/1,000 sf of gfa	2

The buildings fall within 200'-0" of Pine Street putting them into the Multimodal Mixed-Use District. The Health Club use total is 30,000 gsf therefore with 2 spaces per 1,000 sf, the maximum parking allowed for this use is 60 spaces. And the General Merchandise/Retail use total is 9,800 gsf therefore with 2 spaces per 1,000 sf, maximum parking is 20 spaces for this use. This totals 80 maximum parking spaces. The proposed site plan shows 77 spaces, under the maximum allowed parking spaces.

Table 8.2.4.1-1 Bicycle Parking Requirements requires the following for the applicable uses:

Use	Long Term Spaces	Short Term Spaces
Office	1/5,000 sf	1/10,000 sf
Retail sales and service	1/12,000 sf	1/2,000 sf

The following are what the project is showing for bike parking based on the table above:
Commercial Building @ 12,400 sf (Retail sales and service)

- 2 long term spaces
- 6 short term spaces

Bicycle parking allocations for the Bathhouse are based on input from the City's Transportation Planner with a suggested count of 10 long- and short-term bike parking spaces.

Total spaces shown on the proposed development are:

- 4 long term (2 @ Commercial Building and 2 @ Bathhouse)
- 24 short term

Site & Stormwater Narrative

The site and stormwater systems have been designed to mimic the current drainage patterns at the site to the maximum extent possible to help ensure that hydrology and hydrogeology are not drastically altered. Stormwater flows east to west across the site and flows to bioretention swales and basins that will be landscaped as gardens. The bioretention swales are designed to function as a level spreader for larger storms so that stormwater will sheet flow across the landscape.

We have engaged the services of Arrowwood Environmental (AE) to identify and map the natural resources on the site. AE has conducted that work and identified Class II wetlands on the subject parcel and adjoining site at 0 Pine Street, therefore a 50' State wetland's buffer and 100' City Wetland Conservation Zone apply at the 453 Pine Street site. The project does not propose any uses within the 50' State buffer, and no landscape features will be installed here. However, the project is required to have a perimeter fence, and it will be installed outside of the woods edge with helical piles to minimize impacts within the 50' State buffer. There will be no trees cut down for the installation of the fence.

There are currently invasive species within the 50' buffer to the wetland and the intention is to remove the invasives and replace them with native plants and vegetative cover indigenous to the conditions of the upland environments on the site. The long term 'maintenance' that will be prescribed for the 50' buffer inside the fence will be 'Low-Mow' or Naturalization as is the current management regime. The buffer will not be cut more than one time per year, allowing the new vegetation to grow and mature.

The proposed project does encroach into the 50'-100' City Wetland Conservation Zone and these items are within the permitted and regulated uses in Article 4.5.4(d). The features proposed within the 50'-100' area of the zone are stormwater treatment areas, some of which will include the installation of plants native to an upland buffer, and (2) geodesic domes as well as mowed walking paths and relaxation zones. The geodesic domes will require a concrete pier foundation. There is also a Phase 2 being proposed which is a private rental building and associated outdoor space that is within the 50'-100' City Wetland Conservation Zone. If the owner decides to proceed with the Phase 2 portion then a separate zoning permit will be required. Due to poor soil conditions on the site, there is limited development use to the west therefore why the Phase 2 building is proposed in the southeast corner, where there are better soils and less impact to the current site conditions.

AE will be preparing a report documenting their work and assessing any project impacts on the functions and values of the wetlands and overall natural area at the site.

Landscape Narrative

The proposed 453 Pine Street landscape is designed to reflect the main intention for the Silt Bath House landscape, which includes an inviting outdoor environment that provides:

-Beauty rich in colors, textures and patterns
-Serenity and relaxation
-Sound and fragrances
-Habitat for pollinators
-Connection to nature

The 453 Pine Street landscape will begin in the south end as a woodland garden that is an extension of the wooded and less developed character of the adjacent 501 Pine Street property. The native trees and shrubs will help to anchor the Silt Bath House into this natural environment. The character of Pine Street becomes more urban as you head north, and so will the landscape as it transitions to paved outdoor spaces in the main plaza surrounded by native tree/shrub/perennial gardens that reflect the intentions for the Bath House landscape. Planted berms embrace the Silt Bath House and mimic the rolling topography of Vermont meadows. Gathering spaces with benches, paths and gentle outdoor lighting will weave throughout the main plaza. The hope is this entire streetscape of 453 Pine will be inviting and interesting, and create a strong connection between the northern, more developed part of Pine Street to the open natural beauty of the southern part.

Silt Botanica Bathhouse Narrative

Silt Botanica is a Nordic bathhouse, offering indoor & outdoor heated pools, cold plunges, steam rooms, saunas, relaxation areas, expansive outdoor botanical gardens, and a four-season greenhouse.

All over the world bathhouses are used as community hubs, bringing people together across boundaries of age, gender, politics, and socioeconomics. They are a place to relax, catch up with your neighbors and get

the news of the day. Our goal is to create an immersive wellness destination for the Burlington community and the many visitors that enjoy Burlington on an annual basis. This will be a state-of-the-art health club offering a place to unwind, focus on self-care and build individual and community health and well-being.

The primary building's exterior design is made up of two simple gable forms hugging the southwest outdoor programmed, landscaped space. There are two entry/exit points, one facing Pine and one facing the pedestrian plaza. The journey to the bathhouse is meant to start at the procession to entry with a sense of calm, mystery, excitement, therefore why both entrances are incorporated into an earthen berm. The main building fronting Pine St houses lobby, locker rooms, treatment spaces and back of house spaces. The secondary form facing the parking lot is the four-season greenhouse which acts as relaxation space and a café for bathhouse visitors. The exterior design is inspired by Scandinavian Design Principles that include function, simple forms, natural light, sustainability, and connection to nature. The simple form allows for a calm façade and a calm guest experience without visual clutter. The earthen berm at the entry connects to nature and emphasizes the ethos of the bathhouse focused on botanicals and extensive gardens. The dark cladding creates a sense of mystery and curiosity. The rear portion of the building to the west has expansive outdoor botanical gardens, hot and cold thermal spas, saunas, and relaxation space within the landscape. There is also an accessory use 2,000 sf Café primarily for bathhouse guests but also available to the public for dining. The principal building height of the main building is approximately 34'-0" high, under the 45' maximum as stated in Table 4.4.3-1. There is also an elevator shaft roof that extends up to 40'-7" high, also under the maximum allowable height.

The facility would be open year-round except for 2-3 holidays/year where it would be closed. Operating hours are planned to be from 9am to 9pm with a possible change to an 11am opening during slower seasons (spring/winter) and an 8am during busier seasons (summer). The estimated number of employees working on-site at one time is 40.

Commercial Building Narrative

The commercial building at the north end of the site will serve as office or retail space. The footprint of the building is 4,200 gsf and is expected to be subdivided into three separate tenant spaces. Each tenant space includes a mezzanine providing a total building area of 12,400 gsf.

The building is to be situated 35' west of the property line and approximately 25'-0" from the northern property line. There are three main storefront entrances to the east facing Pine Street. Secondary entries will be provided at the building west side facing the rear parking lot. Mezzanines will be provided within each of the tenant spaces. The building is a simple rectilinear form with a flat roof. The exterior is clad in dark metal panels to complement Silt Bathhouse and the storefront glazing is picture framed in Corten steel providing an entry canopy at each entrance. Mezzanine level & transom windows facing south & west are planned to have Corten sunshade louvers. There is a small Corten steel pergola structure to the south activating the pedestrian plaza between the buildings and providing opportunity for outdoor use for the most southern tenant.

SILT BATHHOUSE & 453 PINE STREET

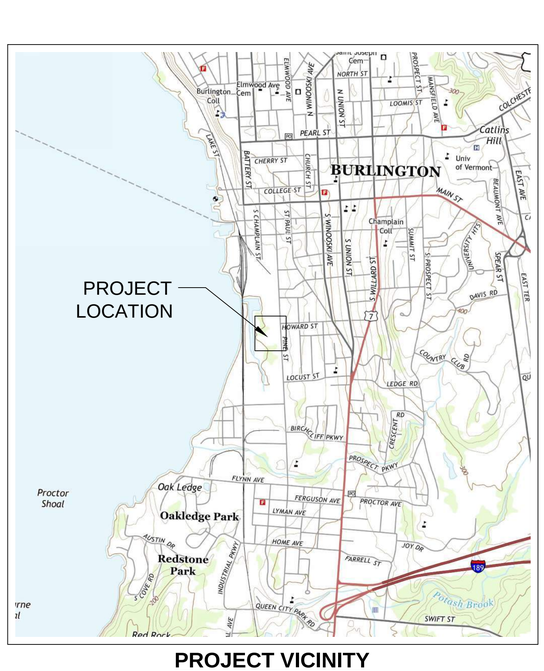
CITY OF BURLINGTON, VERMONT

PREPARED FOR:
453 ENTERPRISES LLC

PREPARED BY:
STONE ENVIRONMENTAL, INC.

ISSUED: MAY 22, 2023

FOR: COA LEVEL II ZONING PERMIT & MAJOR IMPACT APPLICATIONS



PROJECT VICINITY
SCALE: 1" = 2000'



PROJECT LOCATION
SCALE: 1" = 500'

DRAWING INDEX:

SHEET	TITLE
C1	COVER SHEET
C2	GENERAL NOTES
C3	EXISTING CONDITIONS SITE PLAN
C4	PROPOSED CONDITIONS SITE PLAN
C5	ZONING & PARKING SITE PLAN
C6	EROSION PREVENTION & SEDIMENT CONTROL, ACCESS & STAGING PLAN
C7	EROSION PREVENTION & SEDIMENT CONTROL DETAILS
C8	STORMWATER DETAILS
C9	WASTEWATER & WATER SUPPLY DETAILS

NOT FOR CONSTRUCTION

DRAWING CREDITS

DRAWN ON:	05/22/2023
DRAWN BY:	APH
CHECKED ON:	05/22/2023
CHECKED BY:	PCL
PROJECT NO:	2022-1060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

STONE ENVIRONMENTAL
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

SILT BATHHOUSE & 453 PINE STREET

COVER SHEET

BURLINGTON VERMONT

SHEET NO. C1

GENERAL NOTES:

1. SPECIFICATIONS FOR DESIGN, MATERIALS AND CONSTRUCTION SHALL MEET OR EXCEED THE FOLLOWING:

 1.1. VTRANS - VERMONT AGENCY OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION", 2018, WITH CURRENT STANDARD PLANS AND SUPPLEMENTAL SPECIFICATIONS.

 1.2. THIS PLAN SET AND ALL CONDITIONS, SPECIFICATIONS AND SUPPLEMENTS TO STANDARD SPECIFICATIONS CONTAINED WITHIN THE CONTRACT DOCUMENTS.

2. FINAL RESOLUTION TO CONFLICTS WITHIN THE SPECIFICATIONS OR ANY SUBSTITUTIONS SHALL BE DETERMINED BY THE ENGINEER.

3. UTILITIES:

 3.1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE LOCATION OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION PROCEDURE. THERE ARE NUMEROUS UTILITIES IN THE IMMEDIATE VICINITY OF THE PROJECT. THE CONTRACTOR IS ADVISED THAT EXTREME CAUTION WILL BE REQUIRED IN THE OPERATION OF EQUIPMENT. CONTACT DIG-SAFE AT 1-888-DIG-SAFE. CONTACT CAMELS HUMP MIDDLE SCHOOL, RICHMOND ELEMENTARY SCHOOL, AND TOWN OF RICHMOND FOR MARKING OF THEIR UTILITIES.

 3.2. TEMPORARY RELOCATION OF UTILITIES, IF NECESSARY, DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR AND CONSIDERED INCIDENTAL TO THE WORK.

 3.3. DAMAGE TO ANY UTILITY BY THE CONTRACTOR SHALL BE REPORTED TO THE UTILITY COMPANY. REPAIR OF THE UTILITY SHALL BE PAID FOR BY THE CONTRACTOR.

4. THE CONTRACTOR SHALL NOT DISTURB ANY EXISTING PROPERTY CORNER, MONUMENT, SURVEY MARKER, OR BENCHMARK WITHOUT FIRST MAKING PROVISIONS FOR ITS REPLACEMENT OR RELOCATION.

SHOP DRAWING APPROVAL PROCESS:

1. THE FOLLOWING PROCESS WILL BE FOLLOWED REGARDING THE SUBMISSION AND APPROVAL OF SHOP DRAWINGS.

 1.1. CONTRACTOR SUBMITS SHOP DRAWING TO ENGINEER FOR REVIEW AND COMMENT.

 1.2. FOLLOWING REVIEW, THE ENGINEER SENDS COMMENTS BACK TO THE CONTRACTOR.

 1.3. CONTRACTOR SUBMITS REVISED SHOP DRAWINGS (IF NECESSARY) TO ENGINEER; ENGINEER ENSURES COMMENTS ARE INCORPORATED INTO THE REVISED SHOP DRAWINGS.

 1.4. IF COMMENTS ARE ADDRESSED APPROPRIATELY, ENGINEER WILL PROVIDE SHOP DRAWING APPROVAL STAMP, DISTRIBUTE COPIES TO APPLICABLE PARTIES, AND STORE APPROVED DOCUMENTS IN PROJECT FILES.

 1.5. IF COMMENTS ARE NOT ADDRESSED, REPEAT STEPS 1A THROUGH 1C.

2. ENGINEER REVIEW AND APPROVAL DOES NOT RELIEVE THE CONTRACTOR OF FULL RESPONSIBILITY FOR ANY NEGLIGENCE IN THE CONSTRUCTION OF THE PROJECT RESULTING FROM SHOP DRAWINGS. ENGINEER REVIEW AND APPROVAL OF SHOP DRAWINGS IS NOT A WARRANTY OF THE ADEQUACY AND CORRECTNESS OF SHOP DRAWINGS; THE CONTRACTOR IS RESPONSIBLE FOR THE CORRECTNESS OF SHOP DRAWINGS AND ALL ASSOCIATED CALCULATIONS.

3. CONTRACTOR SHALL SUBMIT MATERIALS SPECIFICATIONS AND LABORATORY TEST RESULTS FOR EACH MATERIAL PROPOSED TO BE USED FOR CONSTRUCTION.

PIPE WORK NOTES:

1. THE CONTRACTOR SHALL MAKE PROVISIONS FOR MAINTAINING FLOW THROUGH EXISTING FORCE MAINS, SEWER LINES, WATER LINES, STORM DRAINS AND CHANNELS WHICH MUST BE INTERRUPTED DURING THE WORK. ONCE WORK IS COMPLETE, ALL FLOWS SHALL BE RESTORED AND TEMPORARY FLOW DIVERSIONS AND ASSOCIATED PIPING SHALL BE REMOVED FROM THE SITE.

2. THE CONTRACTOR IS REQUIRED TO MANAGE ANY GROUNDWATER ENCOUNTERED AND MAINTAIN STABLE SLOPES DURING EXCAVATION.

3. EXISTING WATER MAINS ARE UNDER PRESSURE. CONTRACTOR IS ADVISED TO TAKE PRECAUTIONS WHILE EXCAVATING AROUND EXISTING INFRASTRUCTURE. TEMPORARY SHEETING AND/OR BRACING MAY BE REQUIRED.

4. THE CONTRACTOR SHALL INSTALL MECHANICAL PLUGS IN THE END OF ALL PIPE WORK AT THE COMPLETION OF EACH WORK DAY TO SEAL IT FROM WATER AND SOIL.

GENERAL CONSTRUCTION NOTES:

1. ALL ITEMS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN ON THE DRAWINGS. ANY CHANGES REQUIRE APPROVAL BY THE ENGINEER.

2. PRIOR TO BEGINNING CONSTRUCTION THE FOLLOWING PEOPLE SHALL BE NOTIFIED:

 2.1. DIG-SAFE
 2.2. CITY OF BURLINGTON
 2.3. PROJECT ENGINEER

3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER IMMEDIATELY IF PROBLEMS OR UNFORESEEN CIRCUMSTANCES ARISE DURING CONSTRUCTION.

4. ALL TESTING SHALL BE ORDERED BY THE ENGINEER AND COORDINATED BY THE CONTRACTOR IN ACCORDANCE WITH VTRANS AND PROJECT SPECIFICATIONS. CONTRACTOR SHALL GIVE THE ENGINEER 24 HOURS ADVANCE NOTICE PRIOR TO PLACING MATERIALS REQUIRING TESTING. TESTING COSTS ARE SUBSIDIARY AND SHALL BE INCLUDED IN THE ITEM UNIT PRICE.

5. DETERMINATION OF MAXIMUM DENSITIES FOR SAND AND GRAVELS IS THE RESPONSIBILITY OF THE CONTRACTOR. MODIFIED PROCTOR TESTS ORDERED BY THE ENGINEER SHALL BE SAMPLED AND PERFORMED BY AN INDEPENDENT TESTING LABORATORY AND PAID FOR BY THE CONTRACTOR. TESTING COSTS ARE SUBSIDIARY AND SHALL BE INCLUDED IN THE ITEM UNIT PRICE.

6. ALL SOIL MOVING EQUIPMENT SHALL BE THOROUGHLY CLEANED PRIOR TO BEING DELIVERED TO THE PROJECT SITE TO MAKE IT FREE OF SOIL, NON-NATIVE INVASIVE SPECIES OR OTHER DEBRIS THAT COULD CONTAIN OR HOLD SEEDS. EQUIPMENT SHALL BE CONSIDERED FREE OF NON-NATIVE OR INVASIVE SPECIES AND OTHER SUCH DEBRIS WHEN A VISUAL INSPECTION BY THE ENGINEER, COMPLETED PRIOR TO THE EQUIPMENT BEING MOVED TO THE SITE, DOES NOT DISCLOSE SUCH MATERIAL PRESENT.

7. WHERE RELEVANT, TOPSOIL SHALL BE STRIPPED AND STOCKPILED TO BE USED TO RESTORE DISTURBED AREAS.

8. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANY REQUIRED TRAFFIC CONTROL INCLUDING, BUT NOT LIMITED TO JERSEY BARRIERS OR OTHER BARRICADES, SIGNAGE AND FLAGGERS.

9. CONTRACTOR SHALL PROTECT EXISTING FACILITIES AND UTILITY LINES FROM ALL DAMAGE. NOTED AND/OR OBSERVABLE SUBSURFACE IMPROVEMENTS SUCH AS UTILITIES, WATER LINES, AND CULVERTS SHALL BE AVOIDED AND REPAIRED AND/OR REPLACED AS NEEDED. REPAIR OF UNFORESEEN SUBSURFACE IMPROVEMENTS WILL BE NEGOTIATED.

10. JOB-SITE SAFETY CONDITIONS, INCLUDING BUT NOT LIMITED TO, MOBILIZATION/DEMOBILIZATION, EXCAVATION, STOCKPILING, MATERIAL PLACEMENT, WETLAND CONSTRUCTION, GULLY RESTORATION, AND PAVING SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

11. LEGALLY DISPOSE OF EXCESS MATERIAL OFF SITE.

12. BASIC CONSTRUCTION STANDARDS FOR STORAGE OF MATERIALS, SAFETY PROTECTION, PROTECTION OF NEIGHBORING PROPERTIES, AND RECLAMATION OF DISTURBED AREAS SHALL BE FOLLOWED. ALL LANDSCAPING MUST BE RETURNED TO THE ORIGINAL CONDITION OR AS MODIFIED PER THESE PLANS.

13. CONTRACTOR SHALL CONSTRUCT APPROPRIATE FENCES AND BARRIERS AROUND ALL CONSTRUCTION SITES, STORAGE SITES, AND EXCAVATIONS TO SAFE GUARD THE PUBLIC FROM THE CONSTRUCTION SITE.

14. DETAILS SHOWN ON ANY DRAWINGS ARE TO BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS, UNLESS OTHERWISE NOTED.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY UTILITIES AND SHALL REPAIR ANY DAMAGE AS QUICKLY AS POSSIBLE AT THEIR OWN EXPENSE. ALL REPAIRS SHALL MEET TOWN STANDARDS AND APPROPRIATE TESTING. REPAIRS SHALL BE INSPECTED BY THE ENGINEER AND THE TOWN PRIOR TO BACKFILL.

16. ALL EXCAVATION AND BACKFILL SHALL BE COMPLETED AS SOON AS POSSIBLE. OPEN TRENCHES SHALL BE PROPERLY BARRICADED AND WARNED FOR PEDESTRIANS AND VEHICLES.

17. GRANULAR BACKFILL FOR STRUCTURES SHALL CONSIST OF SATISFACTORILY GRADED, FREE DRAINING GRANULAR MATERIAL REASONABLY FREE FROM LOAM, SILT, CLAY AND ORGANIC MATERIAL IN ACCORDANCE WITH SECTION 704.08 OF THE VT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION.

EROSION PREVENTION & SEDIMENT CONTROL NOTES:

1. BEFORE ANY CLEARING, GRUBBING, OR DEMOLITION OF THE SITE IS INITIATED, AND DURING ALL EARTHWORK PHASES, EROSION CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED AT THE INLET OF ANY STORM DRAINS, SWALES, AND DITCHES RECEIVING WATER FROM THE PROJECT. SEE TYPICAL DETAILS AND PLANS FOR TYPES AND LOCATIONS.

2. SILT FENCE OR FIBER ROLL SHALL BE PLACED DOWN GRADIENT OF ALL DISTURBED AREAS. IF THE DISTURBED AREA IS 100' OR LESS FROM THE WATERS OF THE STATE THE SILT FENCE SHALL BE REQUIRED AND SHALL BE WIRE MESH REINFORCED.

3. ALL STOCKPILED SOIL SHALL BE ENCIRCLED WITH SILT FENCE OR FIBER ROLL, UNLESS AN EXISTING BARRIER WILL ENTRAP ALL EROSION FROM SUCH A STOCKPILE OR THE STOCKPILE IS COMPLETELY COVERED WITH VEGETATION THAT PREVENTS EROSION.

4. NO MORE THAN 500 FEET OF TRENCH SHALL BE OPEN AT ONE TIME AND EXCAVATED MATERIAL TO BE USED FOR BACKFILL SHALL BE PLACED ON THE UPHILL SIDE OF THE TRENCH. ALL OTHER EXCAVATED MATERIAL SHALL BE DISPOSED OF OFF-SITE AT AN APPROVED LOCATION.

5. EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER ANY RAIN EVENT WHICH PRODUCES RUNOFF BY THE ON-SITE COORDINATOR, WHO WILL BE RESPONSIBLE FOR RECTIFYING ANY PROBLEMS FOUND. ALL INSPECTION FORMS SHALL BE KEPT ON-SITE AS RECORDS OF THE CONDITION OF THE EROSION CONTROL MEASURES. TEMPORARY EROSION CONTROL MEASURE SHALL BE REMOVE WITH 30 DAYS OF PERMANENT SITE STABILIZATION.

6. NO MORE THAN 1 ACRE SHALL BE DISTURBED (WITHOUT TEMPORARY OR FINAL STABILIZATION) AT ANY ONE TIME.

7. BEFORE AND AFTER EVERY STORM ALL STRUCTURAL EROSION CONTROL MEASURES SHALL BE INSPECTED FOR FAILURES OR CLOGGING, AND ANY FAILURE OR CLOGGING SHALL BE RECTIFIED. DURING THE WINTER CONSTRUCTION SEASON SPECIAL ATTENTION SHALL BE PAID TO THE CHANGES IN WEATHER THAT COULD CAUSE SIGNIFICANT SNOW MELT AND RUNOFF.

8. STONE INLET PROTECTION OR SEDIMENT TRAP CATCH BASIN INSERTS SHALL BE PLACED IN ALL NEW AND EXISTING CATCH BASINS WHICH RECEIVE RUNOFF FROM DISTURBED AREAS. THE PLACING OF THESE TRAPS SHALL BE AS SHOWN ON THE PLANS. MAINTENANCE SHALL BE AS IN #7 ABOVE.

9. EROSION CONTROL MEASURES INDICATED ON THE PLANS ARE THE MINIMUM NUMBER REQUIRED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO USE ADDITIONAL BARRIERS AS FIELD CONDITIONS DICTATE AND TO ENSURE THAT ANY EROSION CREATED BY THIS PROJECT DOES NOT REACH THE WATERS OF THE STATE OR LEAVE THE SITE.

10. NEW SWALES AND DITCHES (AND ANY OTHER AREA SUBJECT TO CONCENTRATED STORM RUNOFF) SHALL BE FERTILIZED AND SEEDED WITH AS PER WIEMANN & LAMPHERE LANDSCAPE PLAN L5.1-L5.3 TO AT LEAST TWO (2) FEET ABOVE THE CHANNEL BOTTOM ALONG THE CHANNEL BANKS:

11. IN ALL SWALES AND DITCHES, AND WHERE SLOPE GRADE EXCEEDS 25 PERCENT (1 ON 4 SLOPE), JUTE MATTING SECURELY ATTACHED TO THE GROUND SHALL BE PLACED OVER MULCH AND MAINTAINED UNTIL A PERMANENT GRASS COVER IS ESTABLISHED.

12. STONE LINE ALL SWALES AND DITCHES WHERE SLOPE GRADES ARE BETWEEN 5 PERCENT (1 ON 20 SLOPE) AND 10 PERCENT (1 ON 10 SLOPE) WITH 7.5" OF STONE FILL, TYPE I.

13. STONE LINE ALL SWALES AND DITCHES WHERE SLOPE GRADES EXCEED 10 PERCENT (1 ON 10 SLOPE) WITH 12" OF STONE FILL, TYPE II.

14. CONTRACTOR SHALL APPLY DUST CONTROL MEASURES AS NECESSARY OR AS DIRECTED BY THE ENGINEER TO PREVENT THE AIR MOVEMENT OF DUST. ACCEPTABLE METHODS OF DUST CONTROL ARE VEGETATIVE COVER, MULCHING, SPRINKLING OF WATER, OR THE USE OF CALCIUM CHLORIDE.

15. AT THE COMPLETION OF THE PROJECT, ALL STORMWATER DRAINAGE FACILITIES INCLUDING DITCHES, GRASSED SWALES, CATCH BASINS, SUMPS, CULVERTS, STORM DRAINS, STORM MANHOLES, OUTLET STRUCTURES, STORM FILTERS, ETC SHALL BE CLEANED AND FREE OF SILT, SEDIMENT, OR DEBRIS WHICH MIGHT IMPAIR THE PROPER OPERATION OF THE FACILITIES.

16. ALL DISTURBED TERRAIN AT FINAL GRADE SHALL BE SEEDED AND MULCHED WITHIN 48 HOURS OF COMPLETION, AND BY SEPTEMBER 15TH AT THE LATEST. BEFORE APPLYING FINAL SEEDING A FOUR (4) INCH AVERAGE DEPTH OF TOPSOIL SHALL BE PLACED IN ALL DISTURBED AREAS TO BE SEEDED. FERTILIZER SHALL BE APPLIED TO THE TOP 2-INCHES OF TOPSOIL AT A RATE OF 500 LBS/ACRE. SEED MIXTURES SHALL BE ONE AS SPECIFIED PER WIEMANN & LAMPHERE LANDSCAPE PLAN L5.1-L5.3. IF NO SEED MIXTURE IS SPECIFIED IT SHALL BE ONE OF THE FOLLOWING, AS APPROPRIATE.

EMBANKMENT/SLOPING GROUND

	LBS/ACRE
MIXTURE#1	
CREEPING RED FESCUE	20
REDTOP	2
BIRDSFOOT TREFOIL	8
OR CROWNVETCH	15
MIXTURE#2	
TALL FESCUE	10
REDTOP	2
FLAT PEA (LATHCO)	30
MIXTURE#3	
CREEPING RED FESCUE	15
FLAT PEA (LATHCO)	30

EROSION PREVENTION & SEDIMENT CONTROL NOTES:

FLAT/LEVEL GROUND

	LBS/ACRE
MIXTURE#1	
KENTUCKY BLUE GRASS	20
CREEPING RED FESCUE	20
RYE (PERENNIAL), OR REDTOP	5
MIXTURE#2	
CREEPING RED FESCUE	20
REDTOP	2
TALL FESCUE	20

17. ALL NEWLY SEEDED AREAS SHALL BE MULCHED AT A RATE OF TWO (2) TONS PER ACRE OF HAY OR STRAW. DURING WINTER CONSTRUCTION MULCH SHALL BE APPLIED AT A RATE OF 4 TONS PER ACRE. JUTE OR OTHER EQUAL NETTING SHALL BE USED WHERE WIND OR WATER MAY ERODE NEWLY-PLACED SEED OR MULCH OR WHERE GRADE EXCEEDS 25% (1:4). ALL NETTING, WHERE USED, SHALL BE STAKED TO THE GROUND IN COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

18. ALL HAY MULCH SHALL BE TACKED DOWN TO PREVENT WINDTHROW. JUTE MATTING OR EQUIVALENT SHALL BE USED WHERE INDICATED ON PLANS. IN ALL OTHER AREAS MULCHED SHALL BE TRACKED WITH A BULLDOZER. THE CLEATS OF THE BULLDOZER SHALL BE PARALLEL TO THE CONTOURS. DURING THE WINTER CONSTRUCTION SEASON NETTING OR JUTE MATTING SHALL BE USED TO TACK DOWN ALL MULCH.

19. ALL DISTURBED AREAS NOT AT FINAL GRADE THAT WILL NOT BE DISTURBED AGAIN FOR A PERIOD OF GREATER THAN THIRTY (30) DAYS, SHALL BE SEEDED WITH A TEMPORARY, RAPID-GROWING COVER CROP, SUCH AS RYE GRASS AND MILLET, AND SHALL BE MULCHED. NETTING SHALL ALSO BE APPLIED, AS SPECIFIED IN ITEM 15, TO STABILIZE THE MULCH AND SEED.

20. ALL DISTURBED AREAS MUST HAVE TEMPORARY OR FINAL STABILIZATION WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME, ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY: I) STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA IN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST FOR THE NEXT 24 HOURS. II) STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION (I.E. NO OUTLET) WITH A DEPTH OF 2-FEET OR GREATER (E.G. FOUNDATION EXCAVATION, UTILITY TRENCHES).

SURVEY NOTES:

1. BOUNDARY LINES DEVELOPED FROM O'LEARY & BURKE, 2004.

2. TOPOGRAPHIC INFORMATION DEVELOPED FROM FIELD SURVEYS BY BUTTON PROFESSIONAL LAND SURVEYORS (BPLS) ON FEBRUARY 4 TO MARCH 4, 2016.

3. ALL EXISTING UTILITIES ARE APPROXIMATE AND BASED UPON THE BEST AVAILABLE INFORMATION AT THE TIME THIS PLAN WAS DEVELOPED AND ARE SUBJECT TO FIELD VERIFICATION.

4. ALL PROPOSED AND EXISTING BOUNDARY LINES, EASEMENT, SETBACKS, AND LOT AREAS DEPICTED ON THIS PLAN ARE CONSIDERED APPROXIMATE FOR PLANNING REVIEW PURPOSES.

5. NORTH ORIENTATION IS BASED ON SURVEY GRADE STATIC GPS OBSERVATIONS MADE ON MARCH 4, 2016. THE RESULTANT HORIZONTAL DATUM IS NAD 83. THIS REALIZATION IS CALLED NAD 83(2011) EPOCH 2010.0. THE RESULTING ORTHOMETRIC HEIGHT IS NAVD 88 (GEOID12A).

6. THE EXISTING FEATURES SHOWN HEREON WERE LOCATED DURING FIELD SURVEYS CONDUCTED BETWEEN FEBRUARY 4, 2016 TO MARCH 4, 2016.

7. THE PREMISES SHOWN AND DESCRIBED HEREON MAYBE SUBJECT TO EXISTING BURIED UTILITIES, EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, COVENANTS, PERMITS, REGULATIONS, AND/OR SETBACK LINES. CLEAR EVIDENCE OF STRUCTURES THAT ARE READILY APPARENT FROM A CASUAL ABOVE GROUND VIEW ARE DELINEATED HEREON. NO LAND RECORD RESEARCH HAS BEEN PERFORMED BY THIS OFFICE IN THE ACQUISITION OF THIS TOPOGRAPHY.

8. AT THE TIME OF THE FIELD SURVEY IN FEBRUARY 4, 2016, THERE WAS APPROXIMATE SNOW DEPTHS OF 2" TO 4" AND AREAS OF ICE. NO LIABILITY IS ASSUMED FOR ANY UTILITIES, TOPOGRAPHIC FEATURES, OR STRUCTURES THAT MAY HAVE BEEN MISSED DUE TO THE SNOW COVER.

9. THIS IS NOT A BOUNDARY SURVEY. ANY PROPERTY LINE INFORMATION SHOWN HEREON IS APPROXIMATE. ANY PROPERTY LINES, EASEMENTS, AND/OR OTHER REAL PROPERTY DESCRIPTIONS SHOWN ON THIS PLAN ARE FOR THE USE OF THE OWNER ONLY. THEY DO NOT DEFINE LEGAL RIGHTS OR MEET LEGAL REQUIREMENTS FOR A LAND SURVEY AS DESCRIBED IN 26 V.S.A. SECTION 2502(4), AND SHOULD NOT BE USED IN LIEU OF A BOUNDARY AND/OR EASEMENT SURVEY AS THE BASIS OF ANY LAND TRANSFER OR ESTABLISHMENT OF ANY PROPERTY RIGHT.

10. SUFFICIENT GROUND MEASUREMENTS WERE COLLECTED TO PRODUCE 1-FOOT CONTOUR INTERVALS OF THE EXISTING GROUND SURFACE, AS SHOWN HEREON. THE CONTOUR PRECISION MEETS THE NATIONAL MAPPING STANDARD OF HALF THE CONTOUR INTERVAL.

LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOUR
- EDGE OF ROAD/PATH
- PEAT LINE
- PARCEL BOUNDARIES
- FENCE
- SILT FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE
- SEWER LINE
- OVERHEAD UTILITY
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- STONE HATCH
- CONSTRUCTION STAGING AREA
- MALTEX DRIVE REALIGNMENT SOW
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST
- IRON ROD FOUND
- MONITORING WELL

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

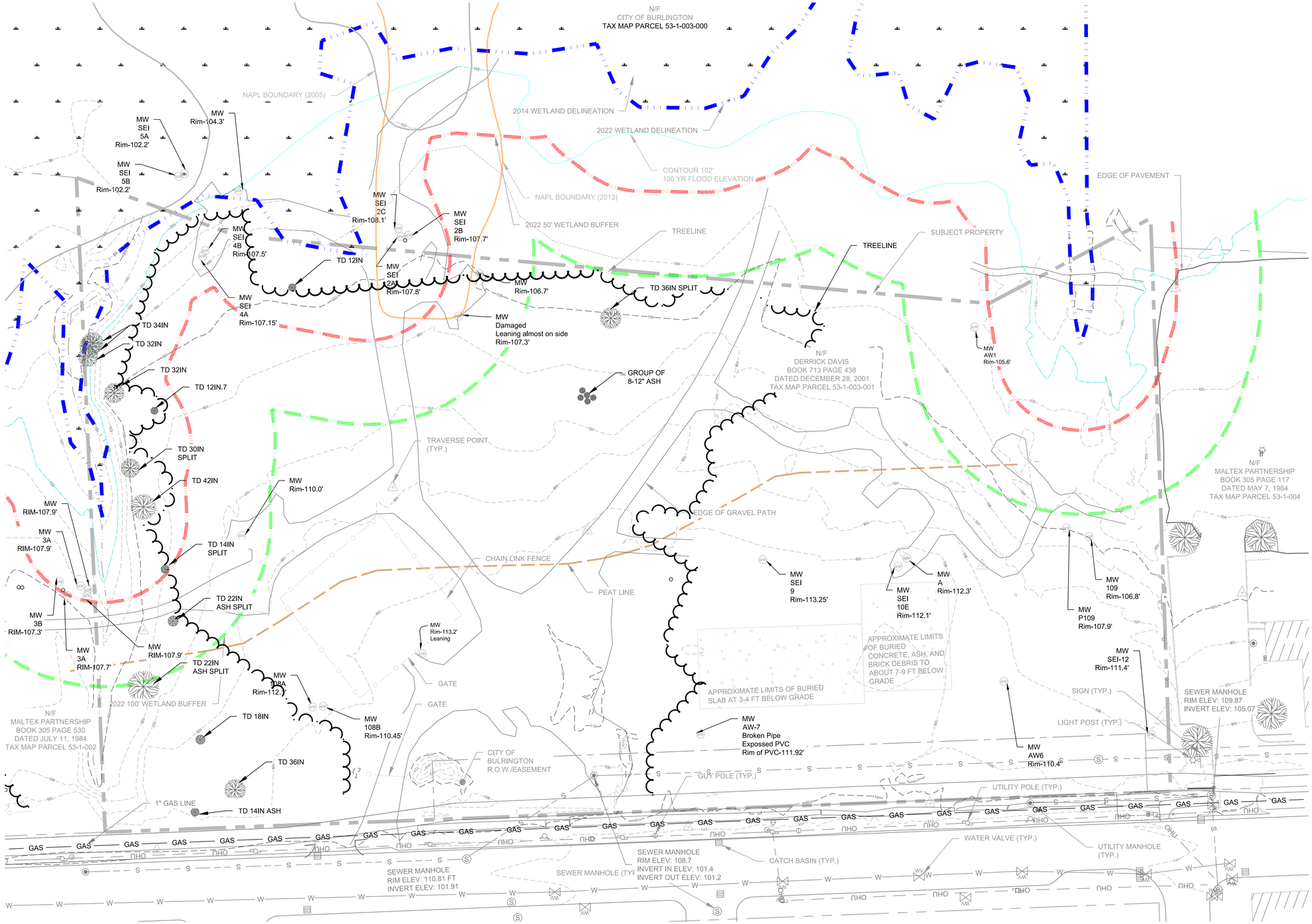
STONE ENVIRONMENTAL
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

SILT BATHHOUSE & 453 PINE STREET

NOTES

BURLINGTON VERMONT

SHEET NO. C2



LEGEND

- EXISTING MAJOR CONTOUR (100)
- EXISTING MINOR CONTOUR (99)
- EDGE OF ROAD/PATH
- PEAT LINE
- PARCEL BOUNDARIES
- FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE (W)
- SEWER LINE (S)
- OVERHEAD UTILITY (OHU)
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST
- IRON ROD FOUND
- MONITORING WELL

LOT INFORMATION:

OWNER: DERRICK DAVIS CHARITABLE REM TRUST
1381 WILLISTON ROAD
SOUTH BURLINGTON, VT

APPLICANT: 453 PINE ENTERPRISES, LLC

DEED: PART OF BOOK 713, PAGE 438

SPAN #: 114-035-18312

CITY OF BURLINGTON ZONING DISTRICT: ENTERPRISE DISTRICT

EXISTING LOT AREA: 4.8 ACRES±

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30 feet
(1 : 360)

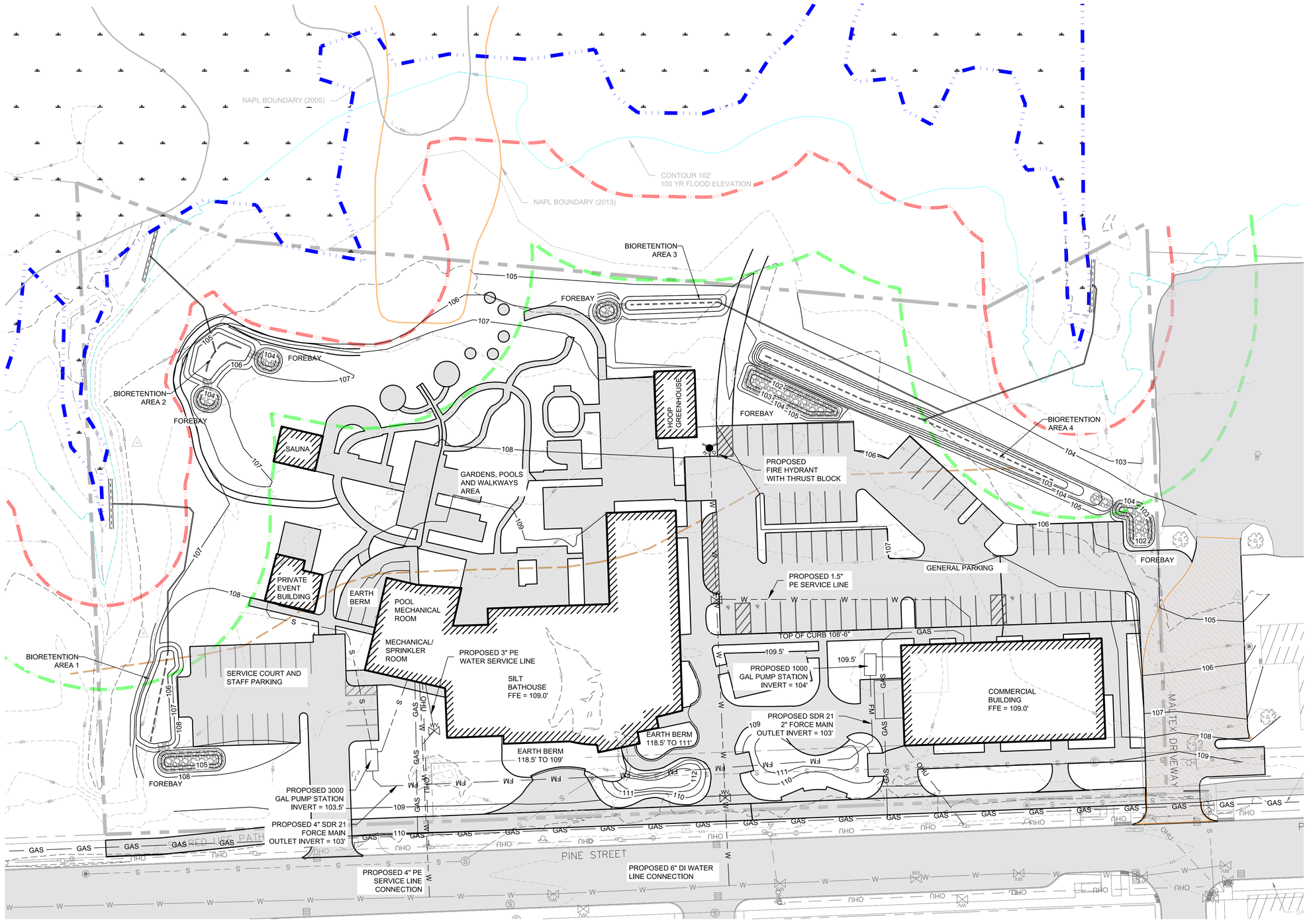
STONE ENVIRONMENTAL
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

SILT BATHHOUSE & 453 PINE STREET

EXISTING CONDITIONS SITE PLAN

BURLINGTON VERMONT

SHEET NO. C3



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOUR
- EDGE OF ROAD/PATH
- PEAT LINE
- PARCEL BOUNDARIES
- FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE
- SEWER LINE
- OVERHEAD UTILITY
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- STONE HATCH
- MALTEX DRIVE REALIGNMENT SOW
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST

STORMWATER

NO STORMWATER WILL BE ENTERING THE CSO SYSTEM AS A RESULT OF THIS PROJECT. ALL STORMWATER DISCHARGES ARE TREATED FOR WATER QUALITY VOLUME AND DISCHARGED TO THE WEST OF THE PROPERTY.

- BIORETENTION 1
- BIORETENTION 2
- BIORETENTION 3
- BIORETENTION 4

WATER SUPPLY

- ONE 4" WATER LINE TAPPED INTO CITY OF BURLINGTON 12" WATER MAIN FOR SPRINKLER SYSTEM AND POTABLE WATER SUPPLY TO THE SILT BATHHOUSE BUILDING. SEPARATE 3" LINE BRANCHES OFF OF 4". WATER LINE TAP SHALL MEET THE SPECIFICATION OF THE CITY OF BURLINGTON DPW ENGINEER.
- ONE 6" DUCTILE IRON WATER LINE TAPPED INTO CITY OF BURLINGTON 12" WATER MAIN FOR HYDRANT AND 1.5" SERVICE LINE TO 453 PINE COMMERCIAL BUILDING. WATER LINE TAP SHALL MEET THE SPECIFICATION OF THE CITY OF BURLINGTON DPW ENGINEER.

WASTEWATER

- WASTEWATER CAPACITY IS REQUESTED FOR 2965 GPD
- 3000 GALLON PUMPSTATION SERVICING MAIN SILT BATHHOUSE BUILDING AND PRIVATE EVENT BUILDING. THIS WILL INCLUDE 2 PUMPING UNITS AND DISCHARGE TO THE EXISTING SEWER MANHOLE AS SHOWN.
- 453 PINE COMMERCIAL BUILDING TO BE SERVICED BY A 1000 GAL PUMPSTATION PUMPING TO THE SAME SEWER MANHOLE.
- BOTH PUMPSTATIONS TO BE OUTFITTED WITH SURCHARGE FLOATS IN DISCHARGE MANHOLE TO SWITCH OFF PUMPING DURING LARGE STORMS PER CITY OF BURLINGTON DPW ENGINEER RECOMMENDATIONS.

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30 feet
(1 : 360)

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SILT BATHHOUSE & 453 PINE STREET

PROPOSED CONDITIONS SITE PLAN

BURLINGTON VERMONT

SHEET NO. C4



LEGEND

- EDGE OF ROAD/PATH
- PARCEL BOUNDARIES
- EXISTING STORMWATER SYSTEM
- W — W — WATER LINE
- S — S — SEWER LINE
- OHU — OVERHEAD UTILITY
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- MALTEX DRIVE REALIGNMENT SOW
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST

SETBACKS	FRONT (FT)	SIDE (FT)	REAR (FT)
REQUIRED	5.0	0.0	39.0
PROVIDED	34.3	35.7	54.4

NOTE: MINIMUM REQUIRED SETBACKS ARE SOURCED FROM ARTICLE 4 OF THE CITY OF BURLINGTON ZONING AND SUBDIVISION ORDINANCE.

	LOT COVERAGE (%)
MAXIMUM	80
ACTUAL	40

NOTE: MAXIMUM COVERAGE VALUE SOURCED FROM ARTICLES 4 OF THE CITY OF BURLINGTON ZONING AND SUBDIVISION ORDINANCE.

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CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30.000008
(1 : 360)

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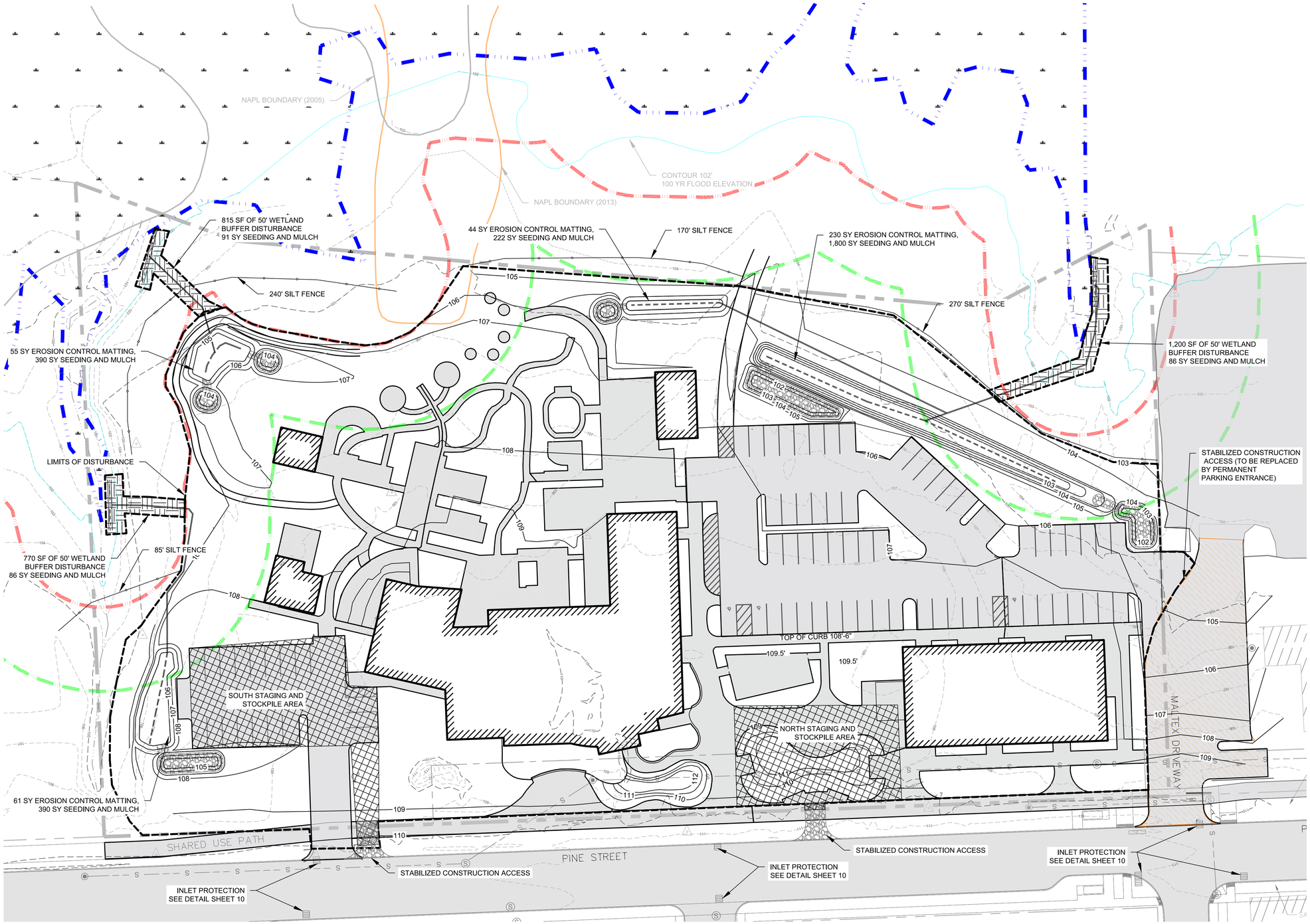
SILT BATHHOUSE & 453 PINE STREET

ZONING & PARKING SITE PLAN

BURLINGTON VERMONT

SHEET NO. C5



LEGEND

- EXISTING MAJOR CONTOUR (100)
- EXISTING MINOR CONTOUR (99)
- PROPOSED CONTOUR (100)
- EDGE OF ROAD/PATH
- PARCEL BOUNDARIES
- FENCE
- SILT FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE (W)
- SEWER LINE (S)
- OVERHEAD UTILITY (OHU)
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- STONE HATCH
- CONSTRUCTION STAGING AREA
- MALTEX DRIVE REALIGNMENT SOW
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST

NOTE:
UNSTABLE CONSTRUCTION SOILS SHALL NOT RUN OFF INTO THE BIORETENTION AREAS. FOREBAYS AND BIORETENTION AREAS SHALL BE DISCONNECTED DURING CONSTRUCTION AND UNSTABLE SOILS MANAGED WITH EROSION CONTROL MEASURES.

TOTAL 50' WETLAND BUFFER DISTURBANCE = 2,790 SF

1.98 ACRES OF CLEARING REQUIRED

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30 feet
(1 : 360)

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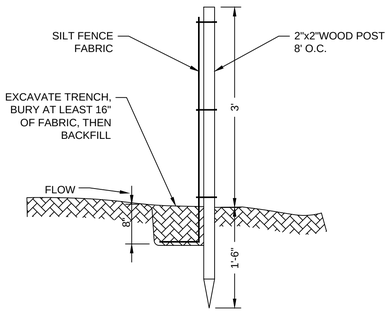
SILT BATHHOUSE & 453 PINE STREET

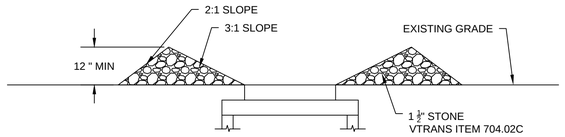
EROSION PREVENTION & SEDIMENT CONTROL PLAN
BURLINGTON VERMONT

SHEET NO. C6

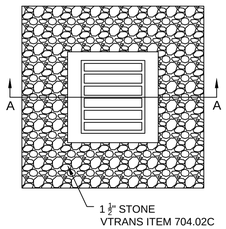


SILT FENCE DETAIL

NOT TO SCALE

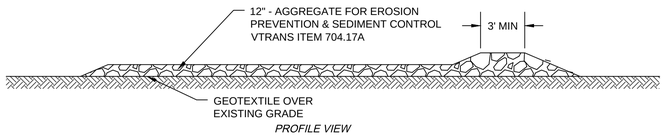


SECTION A-A

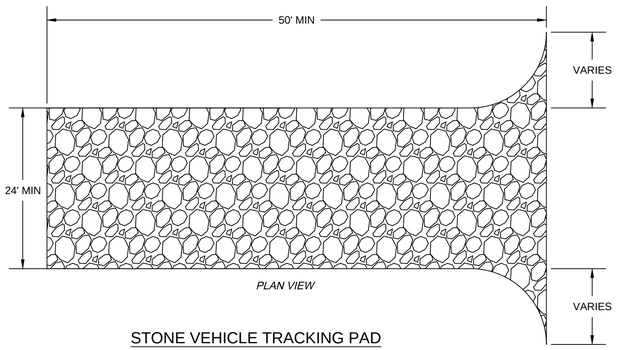


STONE INLET PROTECTION

NOT TO SCALE



PROFILE VIEW



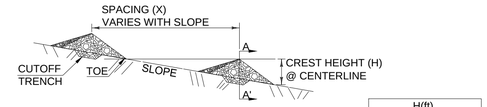
PLAN VIEW

STONE VEHICLE TRACKING PAD

NOT TO SCALE

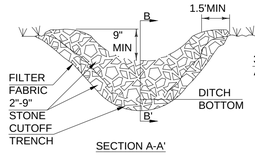
NOTES:

1. TRACKING PAD SHALL BE INSTALLED PRIOR TO SITE DISTURBANCE.
2. TRACKING PADS WILL REQUIRE PERIODIC CLEANING TO MAINTAIN EFFECTIVENESS, WHICH MAY INCLUDE REMOVAL AND RE-INSTALLATION OF STONE.
3. STONE SHALL BE REPLACED WHEN STONE BECOMES BURIED OR SEDIMENT IS NOT BEING REMOVED EFFECTIVELY FROM TIRES.
4. SEDIMENT TRACKED INTO ROADWAYS SHALL BE REMOVED IMMEDIATELY.

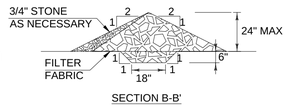


PROFILE

$$X = \frac{H(ft)}{SLOPE(ft/ft)}$$



SECTION A-A'



SECTION B-B'

TYPICAL CHECK DAM DETAIL

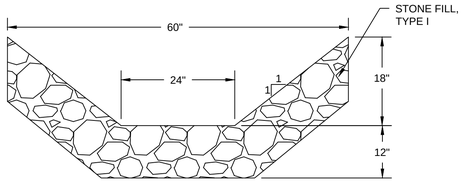
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. CHECK DAMS SHALL BE SPACED SO THAT THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION AS THE TOE OF THE UPSTREAM DAM.
3. 3/4" FILTERING STONE MAY BE ADDED TO THE FACE OF THE CHECK DAM AS NECESSARY.
4. EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
5. PROTECT CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
6. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

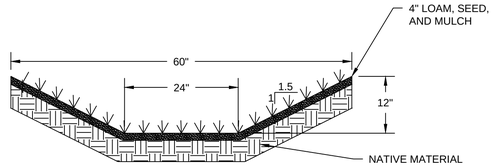
NOTES:

1. REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
2. THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR TEMPORARY STONE CHECK DAM, TYPE I (PAY ITEM 653.25)



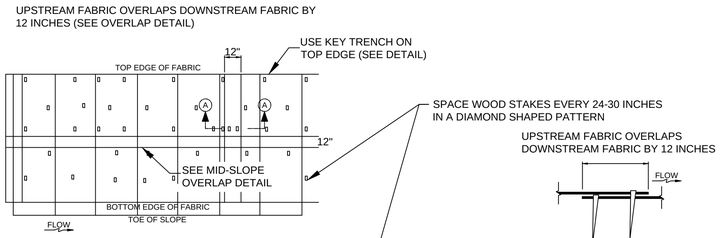
STONE LINED STORMWATER SWALE DETAIL

NOT TO SCALE



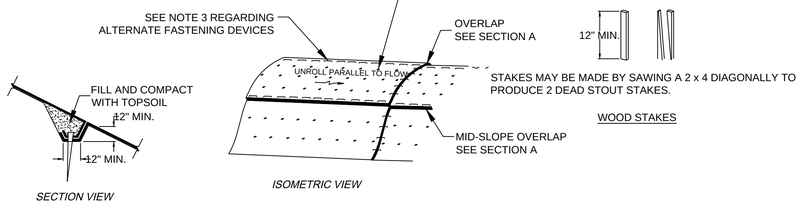
GRASSED STORMWATER SWALE DETAIL

NOT TO SCALE



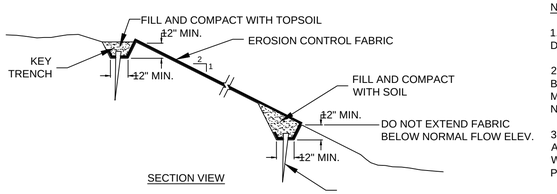
PLAN VIEW

OVERLAP SECTION A



SECTION VIEW *ISOMETRIC VIEW*

MID-SLOPE OVERLAP DETAIL



SECTION VIEW

NOTES:

1. PREPARE SOIL SURFACE AND INSTALL ACCORDING TO THIS DETAIL AND SPECIFICATIONS.
2. EROSION CONTROL FABRIC MUST BE MADE OF NATURAL, BIODEGRADABLE FIBERS, AND SHOULD NOT INCLUDE MATERIALS OR WELDED PLASTIC OR 'BIODEGRDABLE PLASTIC' NETTING OR THREAD.
3. ALTERNATE FASTENING DEVICES REQUIRE ENGINEER'S APPROVAL BEFORE USE. ALL FASTENERS MUST BE MADE OF WOOD PRODUCTS; PLASTIC OR BIODEGRADABLE COMPOSITE PRODUCTS WILL NOT BE ACCEPTED.

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

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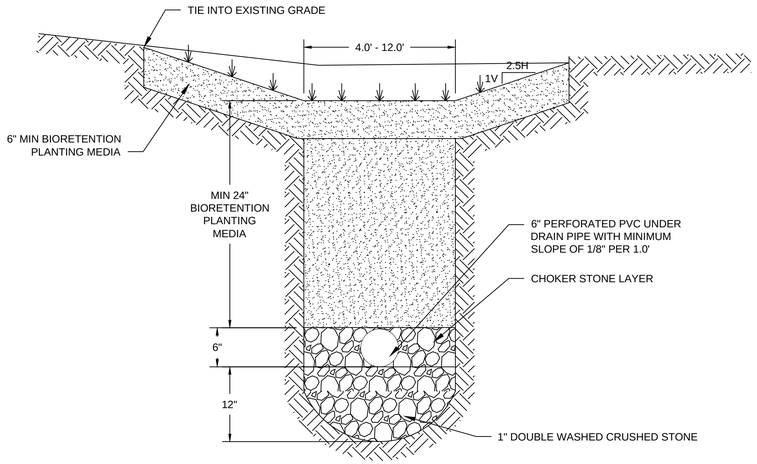
SILT BATHHOUSE & 453 PINE STREET

EROSION PREVENTION & SEDIMENT CONTROL DETAILS

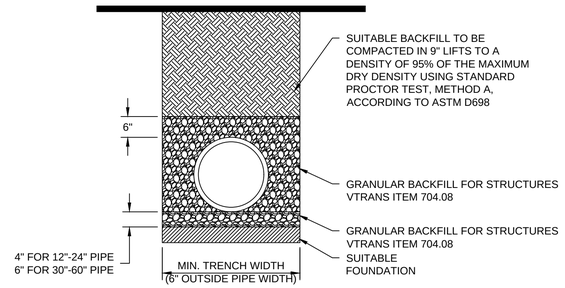
BURLINGTON VERMONT

SHEET NO. C7



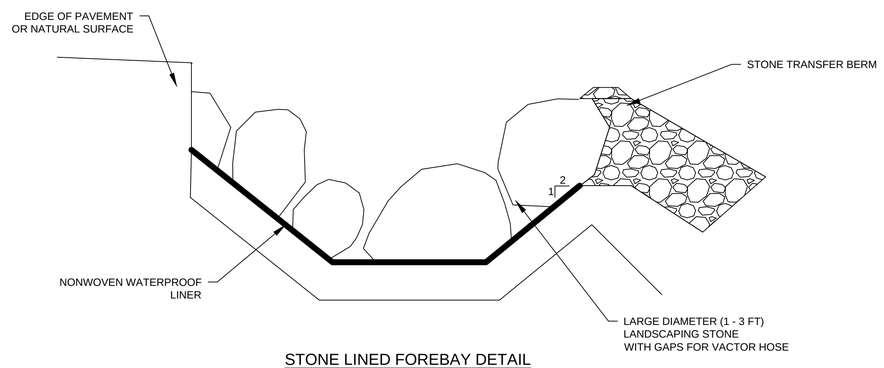
BIORETENTION WITH UNDERDRAIN DETAIL

NOT TO SCALE



TYPICAL PIPE TRENCH DETAIL

NOT TO SCALE



STONE LINED FOREBAY DETAIL

NOT TO SCALE

DRAWING CREDITS

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DRAWN BY: APH
CHECKED ON: 05/22/2023
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PROJECT NO: 20221060

REVISIONS

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DRAWING SCALE

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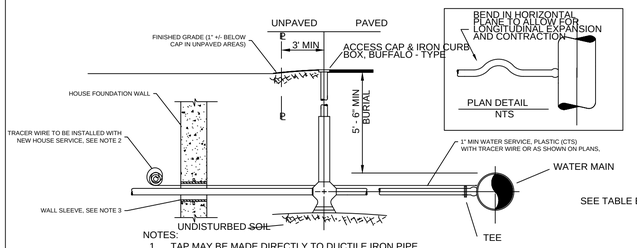
SILT BATHHOUSE & 453 PINE STREET

STORMWATER DETAILS

BURLINGTON VERMONT

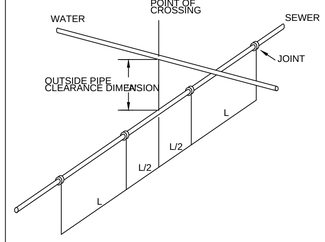
SHEET NO. C8



NOTES:
1. TAP MAY BE MADE DIRECTLY TO DUCTILE IRON PIPE. WITH OTHER PIPE MATERIALS USE EITHER A COUPLING CONTAINING A FACTORY - TAPPED BRASS BUSHING OR USE A DOUBLE STRAP SERVICE CLAMP. USE TEFLON TAPE ON THREADS.
2. IF PLASTIC (CTS) PIPE IS USED FOR HOUSE SERVICE, TRACER WIRE IS TO BE INSTALLED FROM THE MAIN, AROUND THE CURB STOP INTO THE HOUSE WITH A COIL OF ADDITIONAL TRACER WIRE INSIDE THE HOUSE.
3. WALL SLEEVE SHALL BE TWO (2) TIMES THE DIAMETER OF THE HOUSE SERVICE BEING INSTALLED.
4. IN THE EVENT THAT A HOUSE SERVICE IS NOT BEING INSTALLED FROM THE CURB STOP, THE CONNECTION SHALL BE SEALED FOR FUTURE INSTALLATION.

CURB STOP WITH BOX - TAPPED OR TEE CONNECTION

NOT TO SCALE

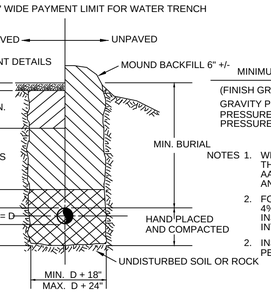


CONSTRUCTION RESTRICTIONS

1. IN ALL NEW CONSTRUCTION, DIMENSION 'A' SHALL NEVER BE LESS THAN 18"
2. WITH ALL NEW CONSTRUCTION, THE CROSSING SHALL BE ARRANGED AS SHOWN IN THIS DIAGRAM, SO THAT THE SEWER JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.
3. IF THE WATER MAIN MUST PASS BENEATH THE SEWER IN NEW CONSTRUCTION, OR IT IS IMPOSSIBLE TO MAINTAIN THE 18 - INCH SEPERATION DUE TO EXISTING UTILITY (PREVIOUS CONSTRUCTION ONLY), THEN ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER, PLUS THE WATER MAIN OR THE SEWER SHALL BE COMPLETELY ENCASED IN A SEAMLESS SLEEVE CONSISTING OF A FULL (MINIMUM 19 FEET) LENGTH OF PIPE (e.g. SDR 35 PVC), CENTERED ON THE CROSSED UTILITY.

WATER / SEWER CROSSING DETAILS

NOT TO SCALE



MINIMUM BURIAL DEPTH

(FINISH GRADE TO TOP OF PIPE)

GRAVITY PIPE - SEE PLAN OR PROFILE
PRESSURE PIPE BENEATH PAVING - 6'-0"
PRESSURE PIPE BENEATH UNPAVED AREAS - 5'-6"

NOTES
1. WHERE BACKFILL IS DESIGNATED "COMPACTED", THIS MEANS 90% TO 95% STANDARD PROCTOR, AASHTO T-99. ALL FILL PLACED BELOW PIPES AND STRUCTURES TO MEET THIS REQUIREMENT.
2. FOR ALL TRENCHES WITH A GRADE GREATER THAN 4% AND/OR WHERE GROUNDWATER IS APPARENT, INSTALL CLAY DAMS AROUND PIPE AT 100' INTERVALS.
2. INSTALL TRACER WIRE AND DETCTABLE TAPE PER NOTE 21 ON THIS SHEET.

TYPICAL TRENCH DETAIL

NOT TO SCALE

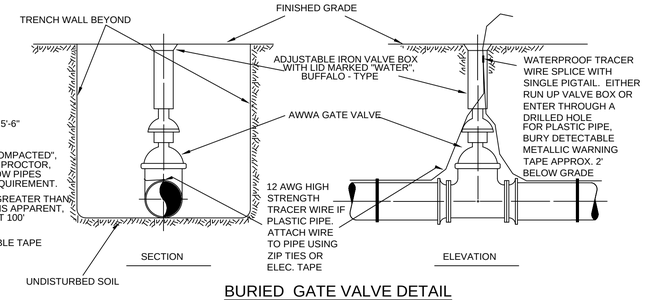
Y - DIMENSION	CONDITION & PIPE	* * SELECT MATERIAL	LINING
0"	DUCTILE IRON PIPE IN "ORDINARY SOIL"	TYPE I II OR III	-
6"	ALL PIPE OVER BEDROCK OR LEDGE	TYPE II OR III	SAND OR TYPE III
4"	DUCTILE IRON PIPE IN CLAY OR MUCK	TYPE II OR III	SAND
6"	PLASTIC - ALL	SAND	SAND

* SUITABLE MATERIAL SHALL CONTAIN NO STONES GREATER THAN 4" IN DIAMETER, NO FROZEN LUMPS, AND ONLY MINOR AMOUNTS OF CLAY OR ORGANIC MATERIAL. ALL MATERIAL TO BE PLACED IN MAXIMUM OF 12" LIFTS AND COMPACTED BEFORE PLACING NEXT LIFT.

** TYPE I MATERIAL SHALL BE EITHER GRAVEL OR EXCAVATED MATERIAL CONTAINING NO STONES GREATER THAN 1 1/2" IN DIAMETER, NO FROZEN MATERIAL, NO CLAY, AND NO ORGANIC MATERIAL.

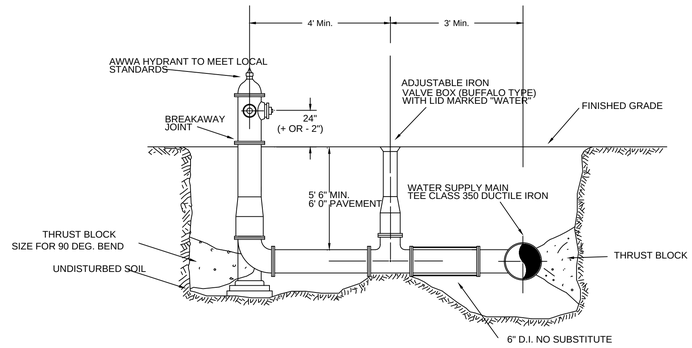
** TYPE II MATERIAL SHALL BE CLEAN, HARD, CRUSHED OR NATURAL STONE WITH A GRADATION BY WEIGHT OF 100 % PASSING A 1 1/2" SQUARE OPENING, NOT MORE THAN 25% PASSING A 3/4" SQUARE OPENING, AND NOT MORE THAN 5 % PASSING A 1/2" SQUARE OPENING.

** TYPE III MATERIAL SHALL BE CLEAN, HARD, CRUSHED STONE FREE FROM COATINGS AND THOROUGHLY WASHED WITH A GRADATION BY WEIGHT OF 100 % PASSING A 1" SQUARE OPENING AND 0 TO 5 % PASSING A 1/4" SQUARE OPENING.



BURIED GATE VALVE DETAIL

NOT TO SCALE



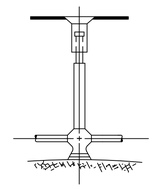
1 ALL HYDRANT DRAINS MUST BE PLUGGED SEE SPECIFICATION NO. 8

2 WHERE VALVE CANNOT BE RESTRAINED TO MAIN TEE, ANCHOR VALVE AS IN BURIED GATE VALVE DETAIL

3 USE MEGALUG RETAINER GLANDS FOR ALL CONNECTIONS

TYPICAL HYDRANT INSTALLATION

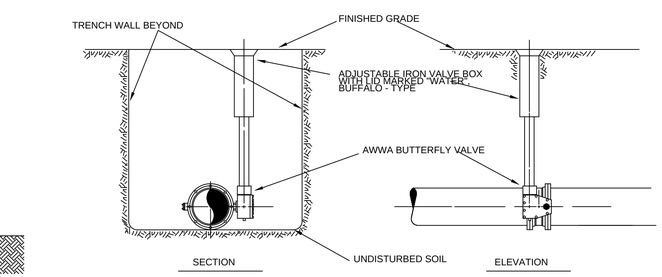
NOT TO SCALE



NOTES:
1. CONNECTIONS SHALL BE COMPRESSION FITTINGS FOR PLASTIC (CTS) WITH STAINLESS STEEL INSERT STIFFENERS REQUIRED.
2. EVERY NEW CURB BOX REQUIRES THE EXTENSION OF THE TRACER WIRE FROM THE WATER MAIN PER NOTE 21 ON THIS SHEET. TRACER WIRE SHALL FOLLOW THE SERVICE CONNECTION PIPE FROM THE WATER MAIN TO THE CURB BOX. THE TRACER WIRE SHALL BE WOUND AROUND THE CURB BOX A MINIMUM OF 2 TIMES BELOW GRADE. AT APPROXIMATELY 1 FOOT BELOW GROUND SURFACE A ¼" HOLE SHALL BE PLACED IN THE NEW CURB BOX AND THE TRACER WIRE SHALL BE EXTENDED INTO THE CURB BOX WITH APPROXIMATELY 1' OF EXCESS WIRE.

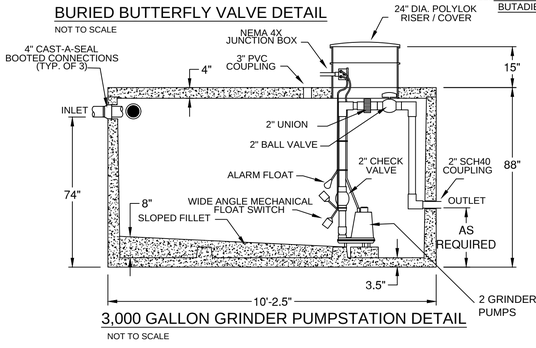
1" TO 2" CURB BOX

NOT TO SCALE



BURIED BUTTERFLY VALVE DETAIL

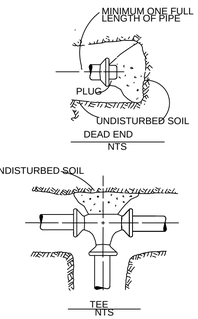
NOT TO SCALE

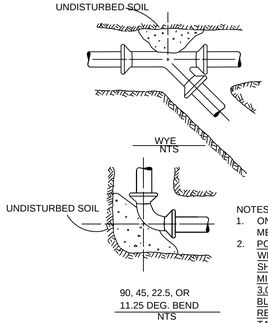


3,000 GALLON GRINDER PUMPSTATION DETAIL

NOT TO SCALE

SPECIFICATIONS:
- CONCRETE MINIMUM STRENGTH 5000PSI @ 28 DAYS
- STEEL REINFORCEMENT GRADE 60
- JOINTS SEALED WITH BUTYL SEALANT
- INLET AND OUTLET BAFFLES BY OTHERS
- (*) DENOTES TOP SEAM CONSTRUCTION
- WEIGHTS SUBJECT TO VARIATION





NOTES:
1. ON ALL MECHANICAL JOINTS, USE MEGALUG RETAINER GLANDS.
2. POURED CONCRETE THRUST BLOCKS WILL NOT BE ALLOWED. THRUST BLOCK SHALL BE PRECAST CONCRETE WITH A MINIMUM COMPRESSION STRENGTH OF 3,000 PSI. PRECAST CONCRETE THRUST BLOCKS SHALL MEET THE SURFACE AREA REQUIREMENTS PRESENTED IN THE TABLE.

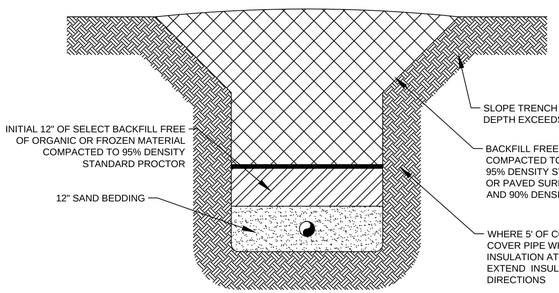
THRUST BLOCK DETAILS

NOT TO SCALE

MINIMUM AREA OF BEARING SURFACE OF CONC. THRUST BLOCKS (IN SQUARE FEET)

3"				4"				6"				8"				12"				SOIL CONDITION	SAFE BEARING LOAD (PSF)
ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.		
0.5	0.5	0.5	0.5	0.5	1.0	0.5	0.5	1.0	1.5	1.0	0.5	2.0	2.5	1.5	1.0	4.0	5.5	3.0	1.5	SOUND SHALE	10,000
1.0	1.0	1.0	0.5	1.5	2.0	1.0	0.5	3.0	4.0	2.0	1.0	4.5	6.5	3.5	2.0	10.0	14.0	7.5	4.0	CEMENTED GRAVEL & SAND	4,000
1.0	1.5	1.0	0.5	2.0	2.5	1.5	1.0	3.5	5.0	3.0	1.5	6.0	8.5	5.0	2.5	13.0	18.5	10.0	5.0	COARSE & FINE COMPACT SAND	3,000
1.5	2.5	1.5	1.0	2.5	3.5	2.0	1.0	5.5	7.5	4.0	2.0	9.0	13.0	7.0	3.5	20.0	27.5	15.0	8.0	MEDIUM CLAY (CAN BE SPADED)	2,000
3.0	4.5	2.5	1.5	5.0	7.0	4.0	2.0	10.5	15.0	8.0	4.0	18.0	25.0	14.0	7.0	39.0	55.0	30.0	15.0	SOFT CLAY	1,000

MAXIMUM WATER PRESSURE = 300 PSI NOTE: REDUCER BEARING AREA = 45 DEG. BEND, LARGER PIPE



SEWER TRENCH DETAIL

N.T.S.

NOTES:

BEFORE CONSTRUCTION OF ANY UTILITIES OR IMPROVEMENTS, THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS (DPW), IN WRITING, OF INTENT TO PROCEED.

1. ALL WATER MAINS, FITTINGS, APPURTENANCES AND OTHER MATERIALS, AND CONSTRUCTION SHALL CONFORM TO ALL APPLICABLE AWWA, STATE AND CITY CODES, STANDARDS AND REGULATIONS. IN THE CASE OF CONFLICT BETWEEN THESE CONSTRUCTION DETAILS AND SPECIFICATIONS AND A CODE OR REGULATION, THE DECISION OF THE VERMONT DEPARTMENT OF HEALTH OR VTDEC WATER SUPPLY SHALL BE BINDING.
2. ALL WATER MAINS, FITTINGS, APPURTENANCES SHALL BE INSTALLED IN A WORKMANLIKE MANNER. INSTALLATION SHALL BE UNDER THE GENERAL INSPECTION OF THE PUBLIC WORKS DEPARTMENT, BEFORE ANY WATER LINE WORK IS COMMENCED BY THE CONTRACTOR, THEY SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT AT LEAST FIVE (5) WORK DAYS IN ADVANCE OF HIS INTENTION TO PROCEED.
3. CONNECTION TO AN EXISTING WATER MAIN SHALL BE DONE UNDER THE SUPERVISION OF, AND WITH THE APPROVAL OF THE PUBLIC WORKS DEPARTMENT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SECURE ALL NECESSARY PERMITS AND PERMISSION TO MAKE THE CONNECTION AND TO COORDINATE ALL PARTIES INVOLVED IN THE PROCESS. THE PUBLIC WORKS DEPARTMENT SHALL BE NOTIFIED AT LEAST FIVE (5) WORK DAYS IN ADVANCE OF THE INTENDED CONNECTION TIME.
4. AN INSPECTOR EMPLOYED BY THE PUBLIC WORKS DEPARTMENT SHALL BE NOTIFIED AT LEAST TWO (2) DAYS IN ADVANCE OF ALL WATER LINE INSTALLATIONS. SAID INSPECTOR SHALL BE ON THE PREMISES FOR ALL WATER LINE INSTALLATIONS.
5. AS-BUILTS PREPARED BY THE CONTRACTOR ARE REQUIRED BY THE PUBLIC WORKS DEPARTMENT AT THE TIME OF THE COMPLETION OF THE WATER SYSTEM. THE CONTRACTOR SHALL PROVIDE ACCURATE TIE SHEETS FOR ALL NEW VALVES, FITTINGS AND CURB STOPS. THE CONTRACTOR SHALL ALLOW THE CITY TO ACCESS THE CONSTRUCTION SITE TO OBTAIN ADDITIONAL INFRASTRUCTURE INFORMATION THROUGHOUT THE PROJECT.
6. ALL WATER MAINS SHALL HAVE HORIZONTAL AND VERTICAL DISTANCES AS DETAILED ON THIS DRAWING.
7. ALL PUBLIC AND PRIVATE WATER MAINS: 1) 4" OR GREATER SHALL BE C-900 PIPE (PER NOTE 21 BELOW); 2) LESS THAN 4" IN DIAMETER SHALL BE ULTRA-HIGH WEIGHT, CTS POLYETHYLENE TUBING DESIGNED FOR A WORKING PRESSURE OF 200 PSI (AWWA C-901, ASTM-D-1248 AND ASTM-D-2737). ALL WATER LINE FITTINGS SHALL BE DUCTILE IRON, (AWWA C-110), CEMENT-LINED. FOR WATER LINES LESS THAN 4 INCHES IN DIAMETER, FITTINGS (OTHER THAN VALVES) SHALL MEET MANUFACTURER'S RECOMMENDATIONS AND MEET VERMONT ACT 193 REQUIREMENTS FOR LEAD CONTENT.
8. ALL BURIED VALVES SHALL CONFORM TO AWWA C-504 OR C-509, AND BE RESILIENT WEDGE GATE VALVES UP TO 12 INCH IN SIZE, AND EITHER RESILIENT WEDGE OR BUTTERFLY VALVES FOR LARGER SIZES. ALL GATE VALVES SHALL OPEN RIGHT (CLOCKWISE) AND SHALL HAVE ADJUSTABLE IRON VALVE BOXES EXTENDING TO THE FINISHED GRADE (SEE TYPICAL DETAILS).
9. HYDRANTS SHALL BE IN ACCORD WITH AWWA C-502, 3-WAY POST TYPE BREAKAWAY KENNEDY K81-A, WITH TWO (2) 2-1/2" HOSE NOZZLES AND ONE (1) 4-1/2" STEAMER NOZZLE. NOZZLE THREADS SHALL BE ROXBURY DOUBLE-START. HYDRANTS SHALL BE PROVIDED WITH A 6.5' BURY (RISER). IN ALL CASES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK WITH THE PUBLIC WORKS DEPARTMENT TO SECURE APPROVAL OF THE SELECTED HYDRANT(S) AND ASSURE COMPATIBILITY. ALL HYDRANT DRAINS SHALL BE PERMANENTLY PLUGGED, OR A NON-DRAINING HYDRANT SHALL BE INSTALLED. ALL HYDRANTS SHALL BE SET BACK A MINIMUM OF THREE (3) FEET FROM PAVED SURFACES. IN ADDITION, WHEREVER A TRAFFIC HAZARD APPEARS TO EXIST (IN THE OPINION OF THE PUBLIC WORKS DEPARTMENT), THE HYDRANT SHALL BE PROTECTED BY CURBING AND/OR POST-STANCHIONS.
10. CURB BOXES SHALL BE BUFFALO TYPE WITH TELESCOPING TOP AND BOLT-ON CAPS.
11. ALL WATER LINES AND APPURTENANCES SHALL BE PRESSURE AND LEAK-TESTED, BEFORE BEING PLACED INTO SERVICE, ACCORDING TO AWWA STANDARD C-600. THE TEST PRESSURE SHALL BE 200 PSI (+/- 5PSI), MEASURED AT OR NEAR THE HIGH POINT IN THE PORTION OF THE SYSTEM BEING TESTED, AND THE TEST SHALL BE RUN FOR TWO (2) HOURS. THE PUBLIC WORKS DEPARTMENT SHALL BE GIVEN AT LEAST TWENTY-FOUR (24) HOURS NOTICE BEFORE THE TEST IS TO BE CONDUCTED, AND DPW PERSONNEL SHALL WITNESS THE TEST. ALLOWABLE LEAKAGE SHALL BE COMPUTED BY THE FOLLOWING FORMULA, L=(S X D X SQ. ROOT(P))/133200, WHERE L=NUMBER OF GALLONS ALLOWED LEAKAGE PER HOUR, S=LENGTH OF PIPE TESTED IN FEET, D=INCHES OF NOMINAL PIPE DIAMETER, P=AVERAGE TEST PRESSURE (PSI GAUGE). THE PERSON(S) CONDUCTING THE TEST(S) SHALL, IN WRITING, CERTIFY THE RESULTS TO THE PUBLIC WORKS DEPARTMENT.
15. ALL WATER LINES, BEFORE BEING PUT INTO SERVICE, SHALL BE DISINFECTED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-651, OR AS DIRECTED BY THE PUBLIC WORKS DEPARTMENT. CONTRACTOR SHALL INSTALL 1" DIAMETER TAP IN WATER MAIN FOR CHLORINE INJECTION. TAP SHALL BE LOCATED AS APPROVED BY THE PUBLIC WORKS DEPARTMENT. THE PERSON(S) RESPONSIBLE FOR DISINFECTION SHALL CERTIFY, IN WRITING, TO THE PUBLIC WORKS DEPARTMENT AND VERMONT DEPARTMENT OF HEALTH THAT THIS DISINFECTION PROCEDURE WAS FOLLOWED AND THE REQUIRED MINIMUM RESULTS WERE OBTAINED. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAMPLING AND ANALYSIS COSTS. TAP USED FOR CHLORINATION SHALL BE CLOSED AND PLUGGED PRIOR TO BACKFILL. THE CONTRACTOR SHALL PERFORM ALL CONSTRUCTION ACTIVITIES IN CONFORMANCE WITH THE LATEST EDITION OF AWWA C-651. THE CONTRACTOR SHALL RECEIVE THE LATEST EDITION OF BURLINGTON'S WATER REPAIR FLOW CHART TO ENSURE CONFORMANCE WITH AWWA C-651. THE CITY REQUIRES BAC-T SAMPLES BE COLLECTED AND TESTED ANY TIME THE EXISTING WATER SYSTEM IS CUT INTO.
16. WATER MAIN VALVES AND CURB STOPS SHALL BE INSIDE CITY RIGHT-OF-WAY.
17. NO VALVES, HYDRANTS, CURB STOPS, ETC. SHALL BE OPERATED WITHOUT PRIOR APPROVAL BY THE PUBLIC WORKS DEPARTMENT.
18. ALL TAPS LARGER THAN 1" REQUIRE THE USE OF BRONZE SADDLES. SADDLES ARE REQUIRED FOR ALL TAPS ON PVC PIPE.
19. ALL BRASS UNIONS AND ADAPTERS SHALL BE LOW-LEAD BY CAMBRIDGE.
20. ALL CORPORATIONS AND CURB STOPS SHALL BE CAMBRIDGE WITH NITRILE GASKETS.
21. WATER MAINS 4" AND LARGER SHALL BE AWWA C900 PVC PIPE WITH A PRESSURE CLASS OF 305 PSI (DR14). MAINS 2" OR LESS SHALL CONFORM TO AWWA C901 AND BE HDPE CTS PIPE WITH A PRESSURE CLASS OF 200 PSI (SDR 9). ALL PLASTIC PIPE (INCLUDING SERVICES) WILL REQUIRE A 12 AWG HIGH STRENGTH COPPER CLAD STEEL TRACER WIRE WITH BLUE INSULATION FASTENED DIRECTLY TO THE TOP OF PIPE WITH NYLON TIE WRAPS OR ELECTRICAL TAPE. THIS TRACER WIRE SHALL BE A CONTINUOUS RUN (NO SPLICES) BETWEEN VALVES WITH ENDS FOR ATTACHING A LOCATING SIGNAL AT EVERY VALVE BOX, END OF PIPE RUN OR EVERY 500' OF PIPE, WHICHEVER IS LESS. IF NO VALVE BOXES ARE LOCATED WITHIN 500' OF EACH OTHER, A MAGNETIZED TRACER BOX IS REQUIRED. WATERPROOF SPLICES SHALL BE ALLOWED IN VALVE BOXES AS PER THE DETAIL ON THIS SHEET. TRACER WIRE, TRACER BOXES AND WIRE NUTS SHALL BE MANUFACTURED BY COPPERHEAD INDUSTRIES OR APPROVED EQUAL. IN ADDITION, DETECTABLE METALLIC UNDERGROUND TAPE LABELED "CAUTION BURIED WATER LINE BELOW" SHALL BE MANUFACTURED BY TRUMBULL INDUSTRIES OR APPROVED EQUAL AND BURIED APPROX. 2' BELOW FINISHED GRADE.
22. NITRILE BUTADIENE RUBBER (NBR) GASKETS SHALL BE USED IN LIEU OF THE STANDARD STYRENE BUTADIENE RUBBER (SBR) GASKETS FOR C900 WATER PIPE AND FITTINGS.

DRAWING CREDITS
DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE
N.T.S.

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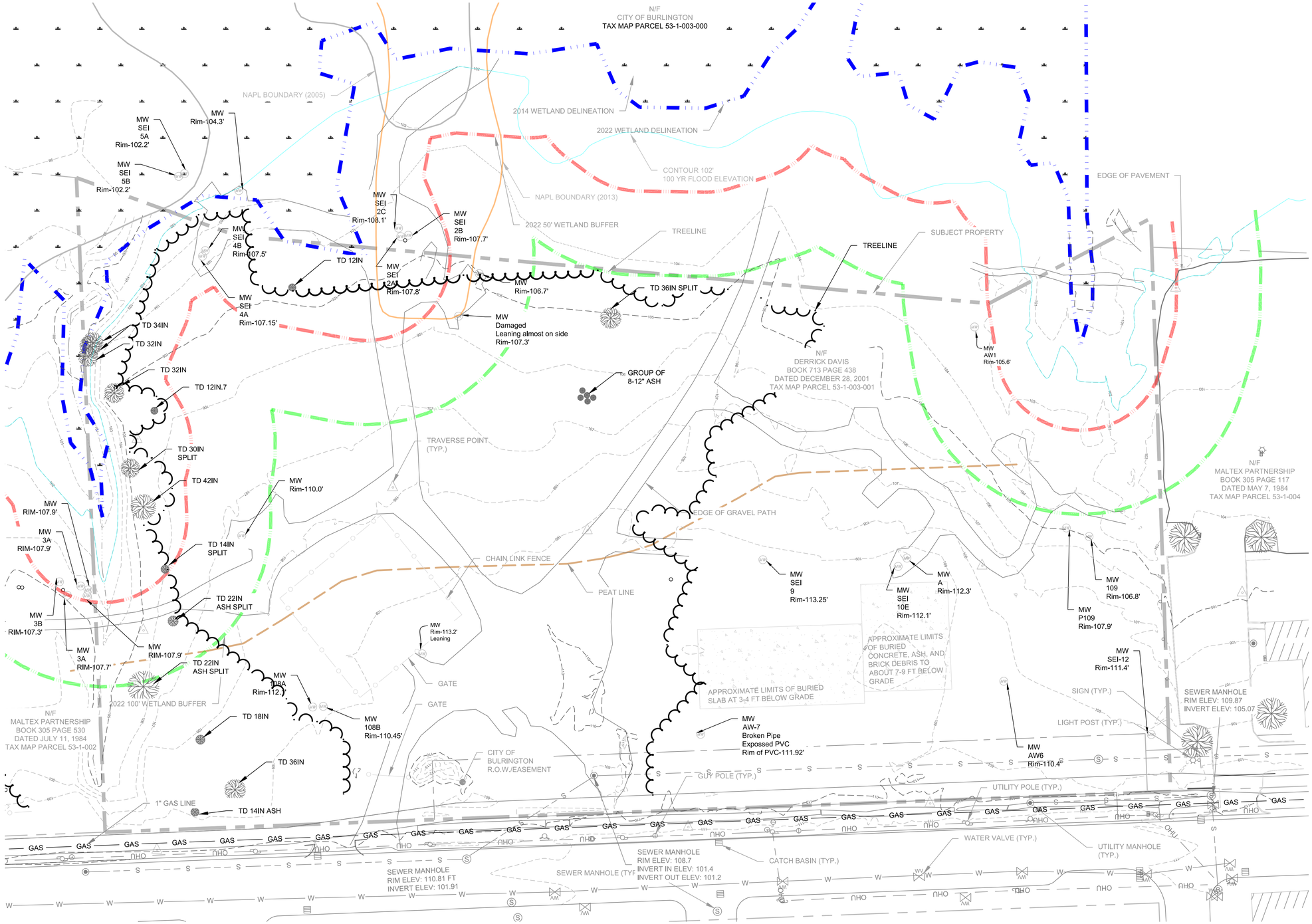
SILT BATHHOUSE & 453 PINE STREET

WASTEWATER & WATER SUPPLY DETAILS

BURLINGTON VERMONT

SHEET NO. C9



LEGEND

- EXISTING MAJOR CONTOUR (100)
- EXISTING MINOR CONTOUR (99)
- EDGE OF ROAD/PATH
- PEAT LINE
- PARCEL BOUNDARIES
- FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE (W)
- SEWER LINE (S)
- OVERHEAD UTILITY (OHU)
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST
- IRON ROD FOUND
- MONITORING WELL

LOT INFORMATION:

OWNER: DERRICK DAVIS CHARITABLE REM TRUST
1381 WILLISTON ROAD
SOUTH BURLINGTON, VT

APPLICANT: 453 PINE ENTERPRISES, LLC

DEED: PART OF BOOK 713, PAGE 438

SPAN #: 114-035-18312

CITY OF BURLINGTON ZONING DISTRICT: ENTERPRISE DISTRICT

EXISTING LOT AREA: 4.8 ACRES±

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30 feet
(1 : 360)

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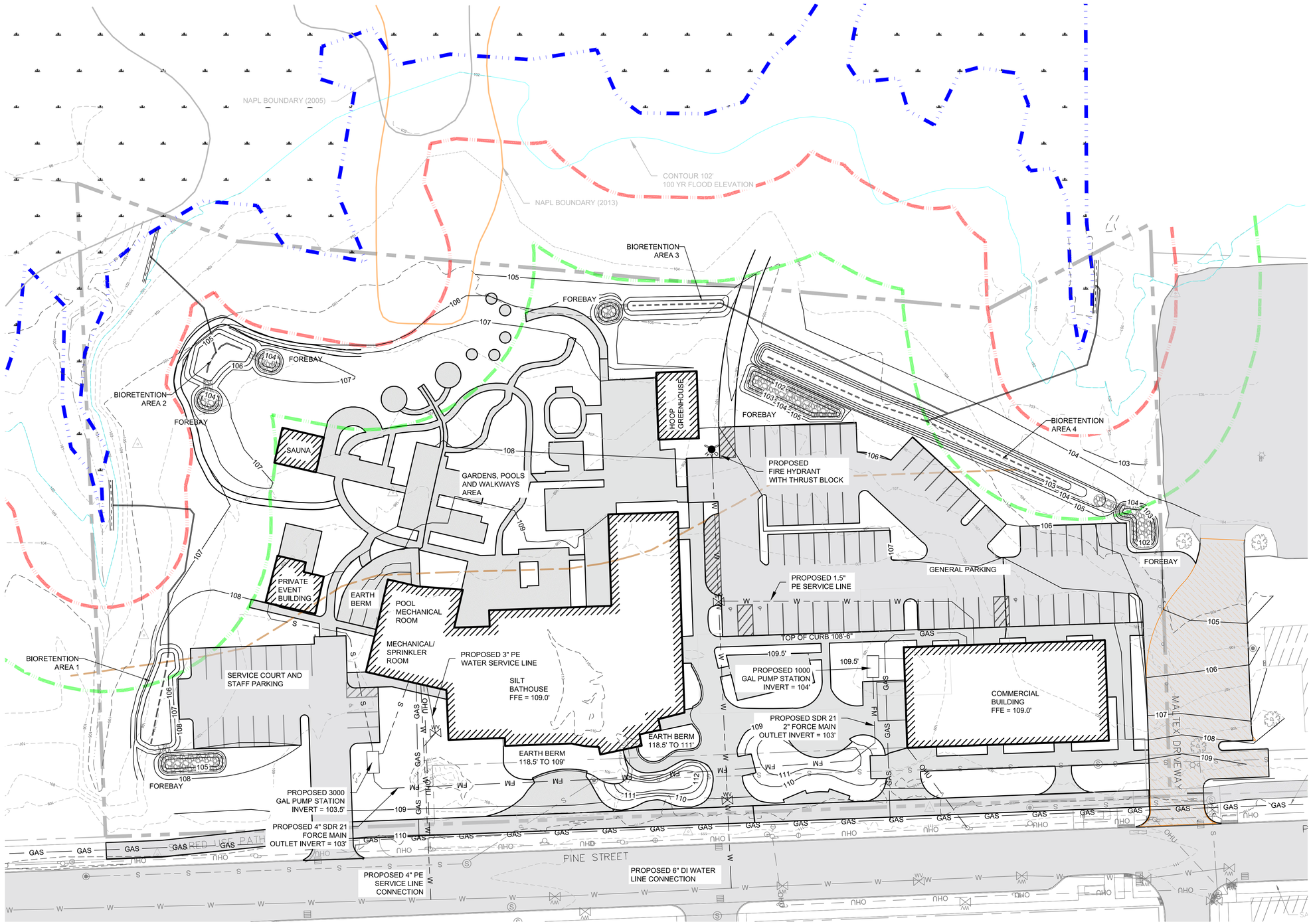
SILT BATHHOUSE & 453 PINE STREET

EXISTING CONDITIONS SITE PLAN

BURLINGTON VERMONT

SHEET NO. C3



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOUR
- EDGE OF ROAD/PATH
- PEAT LINE
- PARCEL BOUNDARIES
- FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE
- SEWER LINE
- OVERHEAD UTILITY
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- STONE HATCH
- MALTEX DRIVE REALIGNMENT SOW
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST

STORMWATER

NO STORMWATER WILL BE ENTERING THE CSO SYSTEM AS A RESULT OF THIS PROJECT. ALL STORMWATER DISCHARGES ARE TREATED FOR WATER QUALITY VOLUME AND DISCHARGED TO THE WEST OF THE PROPERTY.

- BIORETENTION 1
- BIORETENTION 2
- BIORETENTION 3
- BIORETENTION 4

WATER SUPPLY

- ONE 4" WATER LINE TAPPED INTO CITY OF BURLINGTON 12" WATER MAIN FOR SPRINKLER SYSTEM AND POTABLE WATER SUPPLY TO THE SILT BATHHOUSE BUILDING. SEPARATE 3" LINE BRANCHES OFF OF 4". WATER LINE TAP SHALL MEET THE SPECIFICATION OF THE CITY OF BURLINGTON DPW ENGINEER.
- ONE 6" DUCTILE IRON WATER LINE TAPPED INTO CITY OF BURLINGTON 12" WATER MAIN FOR HYDRANT AND 1.5" SERVICE LINE TO 453 PINE COMMERCIAL BUILDING. WATER LINE TAP SHALL MEET THE SPECIFICATION OF THE CITY OF BURLINGTON DPW ENGINEER.

WASTEWATER

- WASTEWATER CAPACITY IS REQUESTED FOR 2965 GPD
- 3000 GALLON PUMPSTATION SERVICING MAIN SILT BATHHOUSE BUILDING AND PRIVATE EVENT BUILDING. THIS WILL INCLUDE 2 PUMPING UNITS AND DISCHARGE TO THE EXISTING SEWER MANHOLE AS SHOWN.
- 453 PINE COMMERCIAL BUILDING TO BE SERVICED BY A 1000 GAL PUMPSTATION PUMPING TO THE SAME SEWER MANHOLE.
- BOTH PUMPSTATIONS TO BE OUTFITTED WITH SURCHARGE FLOATS IN DISCHARGE MANHOLE TO SWITCH OFF PUMPING DURING LARGE STORMS PER CITY OF BURLINGTON DPW ENGINEER RECOMMENDATIONS.

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30 feet
(1 : 360)

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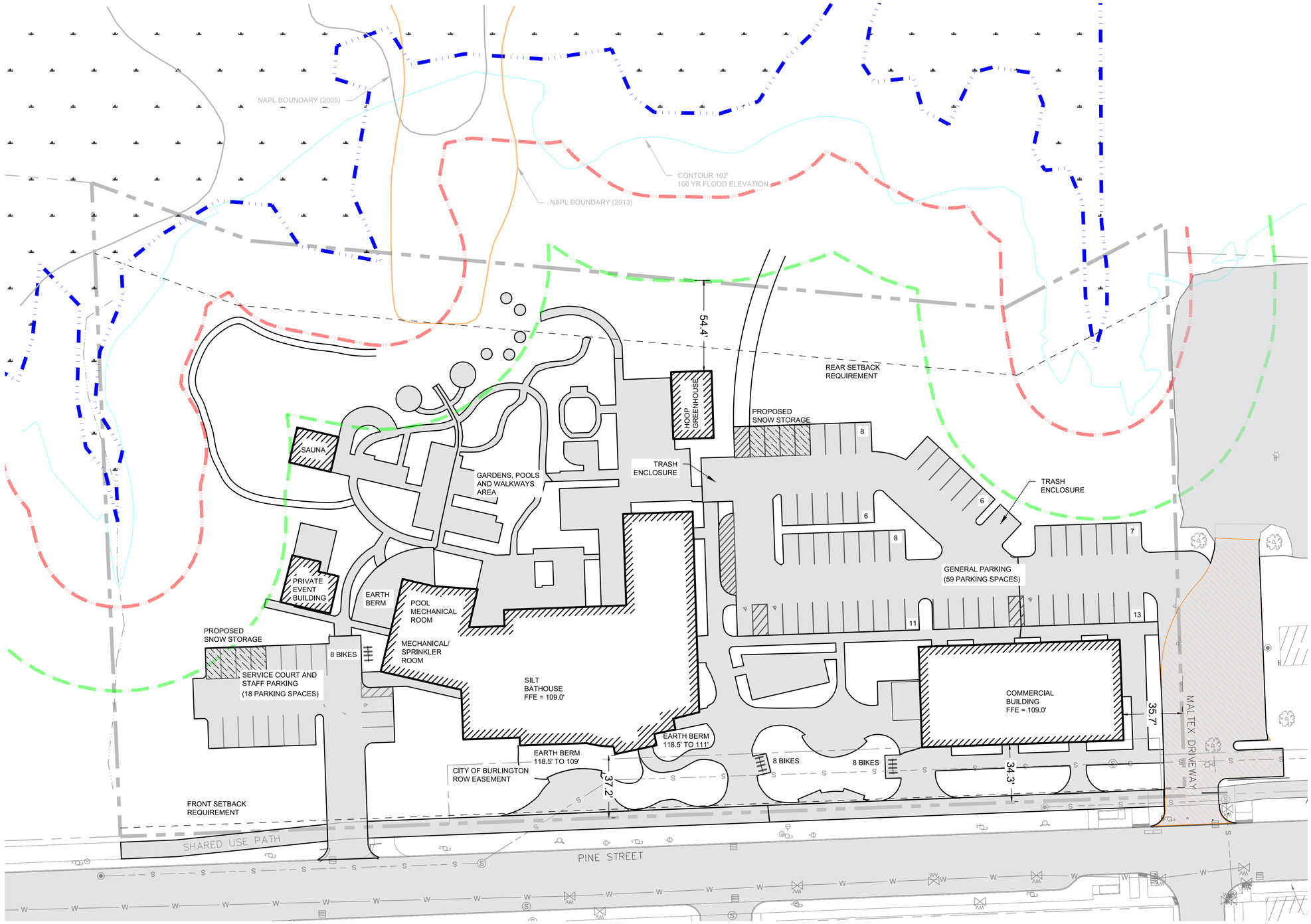
SILT BATHHOUSE & 453 PINE STREET

PROPOSED CONDITIONS SITE PLAN

BURLINGTON VERMONT

SHEET NO. C4



LEGEND

- EDGE OF ROAD/PATH
- PARCEL BOUNDARIES
- EXISTING STORMWATER SYSTEM
- W — W — WATER LINE
- S — S — SEWER LINE
- OHU — OVERHEAD UTILITY
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- MALTEX DRIVE REALIGNMENT SOW
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST

SETBACKS	FRONT (FT)	SIDE (FT)	REAR (FT)
REQUIRED	5.0	0.0	39.0
PROVIDED	34.3	35.7	54.4

NOTE: MINIMUM REQUIRED SETBACKS ARE SOURCED FROM ARTICLE 4 OF THE CITY OF BURLINGTON ZONING AND SUBDIVISION ORDINANCE.

	LOT COVERAGE (%)
MAXIMUM	80
ACTUAL	40

NOTE: MAXIMUM COVERAGE VALUE SOURCED FROM ARTICLES 4 OF THE CITY OF BURLINGTON ZONING AND SUBDIVISION ORDINANCE.

DRAWING CREDITS

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CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30.000008
(1 : 360)

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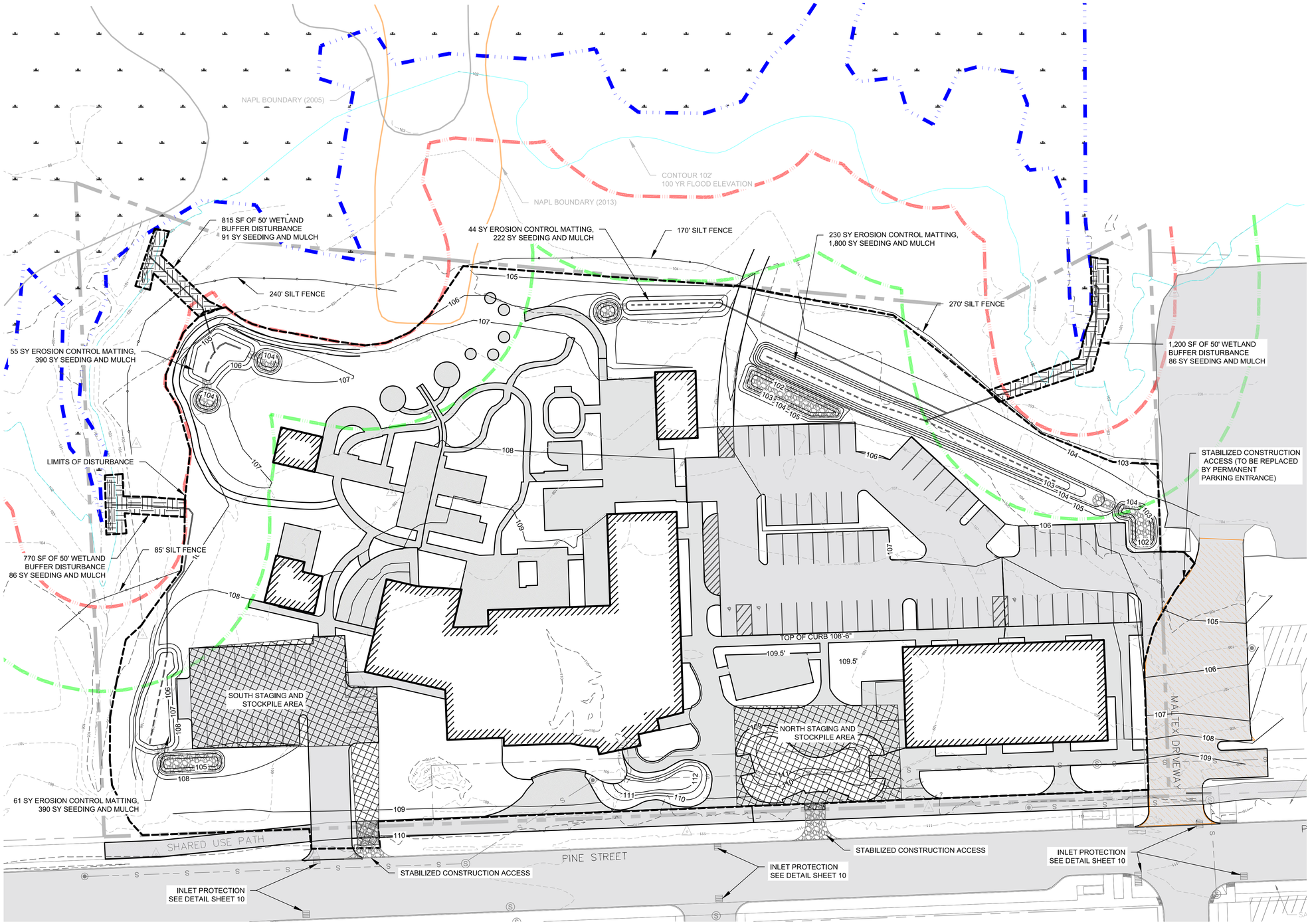
SILT BATHHOUSE & 453 PINE STREET

ZONING & PARKING SITE PLAN

BURLINGTON VERMONT

SHEET NO. C5



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOUR
- EDGE OF ROAD/PATH
- PARCEL BOUNDARIES
- FENCE
- SILT FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE
- SEWER LINE
- OVERHEAD UTILITY
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- BUILDING HATCH
- STONE HATCH
- CONSTRUCTION STAGING AREA
- MALTEX DRIVE REALIGNMENT SOW
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST

NOTE:
UNSTABLE CONSTRUCTION SOILS SHALL NOT RUN OFF INTO THE BIORETENTION AREAS. FOREBAYS AND BIORETENTION AREAS SHALL BE DISCONNECTED DURING CONSTRUCTION AND UNSTABLE SOILS MANAGED WITH EROSION CONTROL MEASURES.

TOTAL 50' WETLAND BUFFER DISTURBANCE = 2,790 SF

1.98 ACRES OF CLEARING REQUIRED

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30 feet
(1 : 360)

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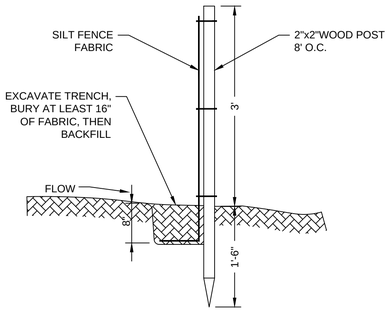
SILT BATHHOUSE & 453 PINE STREET

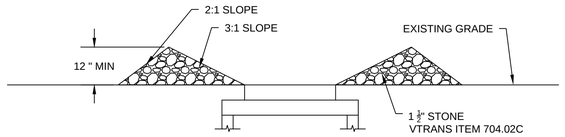
EROSION PREVENTION & SEDIMENT CONTROL PLAN
BURLINGTON VERMONT

SHEET NO. C6

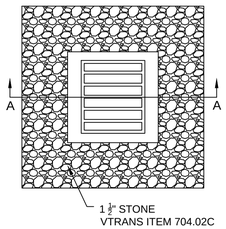


SILT FENCE DETAIL

NOT TO SCALE

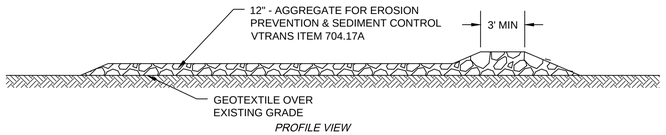


SECTION A-A

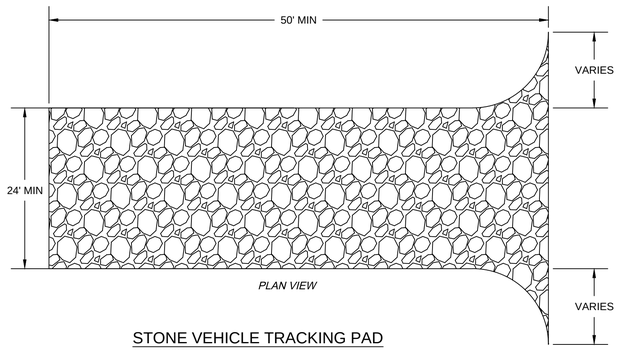


STONE INLET PROTECTION

NOT TO SCALE



PROFILE VIEW



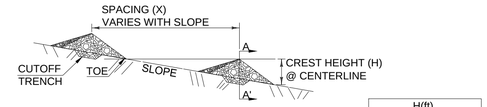
PLAN VIEW

STONE VEHICLE TRACKING PAD

NOT TO SCALE

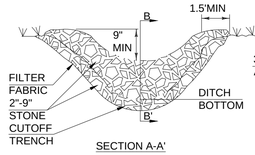
NOTES:

1. TRACKING PAD SHALL BE INSTALLED PRIOR TO SITE DISTURBANCE.
2. TRACKING PADS WILL REQUIRE PERIODIC CLEANING TO MAINTAIN EFFECTIVENESS, WHICH MAY INCLUDE REMOVAL AND RE-INSTALLATION OF STONE.
3. STONE SHALL BE REPLACED WHEN STONE BECOMES BURIED OR SEDIMENT IS NOT BEING REMOVED EFFECTIVELY FROM TIRES.
4. SEDIMENT TRACKED INTO ROADWAYS SHALL BE REMOVED IMMEDIATELY.

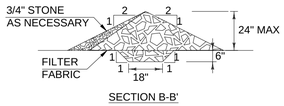


PROFILE

$$X = \frac{H(ft)}{SLOPE(ft/ft)}$$



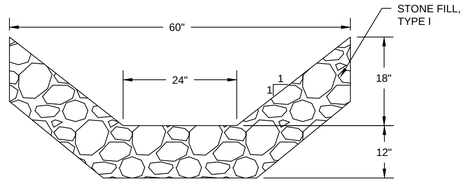
SECTION A-A'



SECTION B-B'

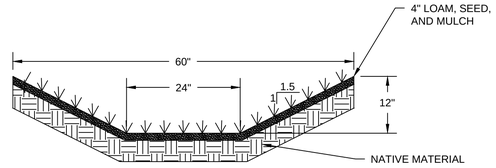
TYPICAL CHECK DAM DETAIL

NOT TO SCALE



STONE LINED STORMWATER SWALE DETAIL

NOT TO SCALE



GRASSED STORMWATER SWALE DETAIL

NOT TO SCALE

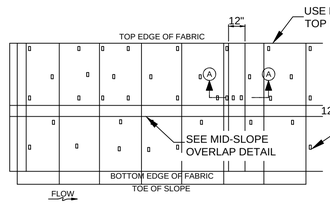
CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. CHECK DAMS SHALL BE SPACED SO THAT THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION AS THE TOE OF THE UPSTREAM DAM.
3. 3/4" FILTERING STONE MAY BE ADDED TO THE FACE OF THE CHECK DAM AS NECESSARY.
4. EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
5. PROTECT CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
6. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

NOTES:

1. REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
2. THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR TEMPORARY STONE CHECK DAM, TYPE I (PAY ITEM 653.25)

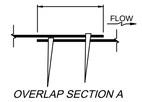
UPSTREAM FABRIC OVERLAPS DOWNSTREAM FABRIC BY 12 INCHES (SEE OVERLAP DETAIL)



PLAN VIEW

SPACE WOOD STAKES EVERY 24-30 INCHES IN A DIAMOND SHAPED PATTERN

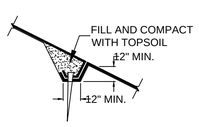
UPSTREAM FABRIC OVERLAPS DOWNSTREAM FABRIC BY 12 INCHES



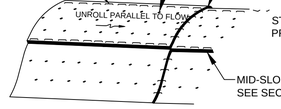
OVERLAP SECTION A

SEE NOTE 3 REGARDING ALTERNATE FASTENING DEVICES

OVERLAP SEE SECTION A



SECTION VIEW

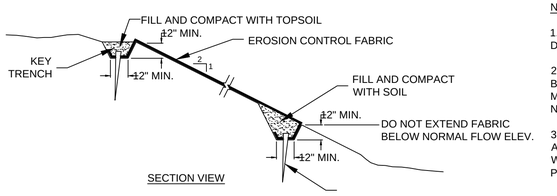


ISOMETRIC VIEW

STAKES MAY BE MADE BY SAWING A 2 x 4 DIAGONALLY TO PRODUCE 2 DEAD STOUT STAKES.

WOOD STAKES

MID-SLOPE OVERLAP DETAIL



SECTION VIEW

NOTES:

1. PREPARE SOIL SURFACE AND INSTALL ACCORDING TO THIS DETAIL AND SPECIFICATIONS.
2. EROSION CONTROL FABRIC MUST BE MADE OF NATURAL, BIODEGRADABLE FIBERS, AND SHOULD NOT INCLUDE MATERIALS OR WELDED PLASTIC OR 'BIODEGRDABLE PLASTIC' NETTING OR THREAD.
3. ALTERNATE FASTENING DEVICES REQUIRE ENGINEER'S APPROVAL BEFORE USE. ALL FASTENERS MUST BE MADE OF WOOD PRODUCTS; PLASTIC OR BIODEGRADABLE COMPOSITE PRODUCTS WILL NOT BE ACCEPTED.

DRAWING CREDITS

DRAWN ON:	05/22/2023
DRAWN BY:	APH
CHECKED ON:	05/22/2023
CHECKED BY:	PCL
PROJECT NO:	20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

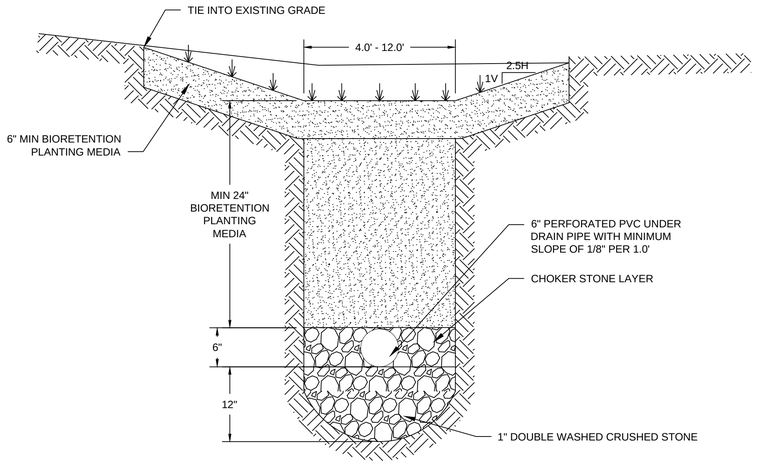
STONE ENVIRONMENTAL
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

SILT BATHHOUSE & 453 PINE STREET

EROSION PREVENTION & SEDIMENT CONTROL DETAILS

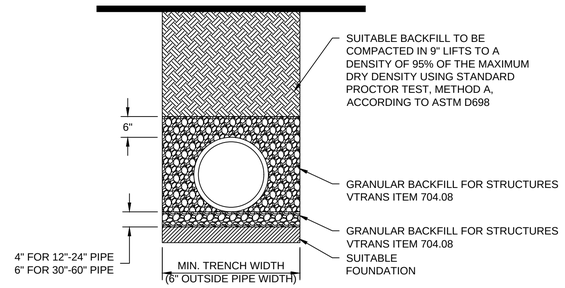
BURLINGTON VERMONT

SHEET NO. C7



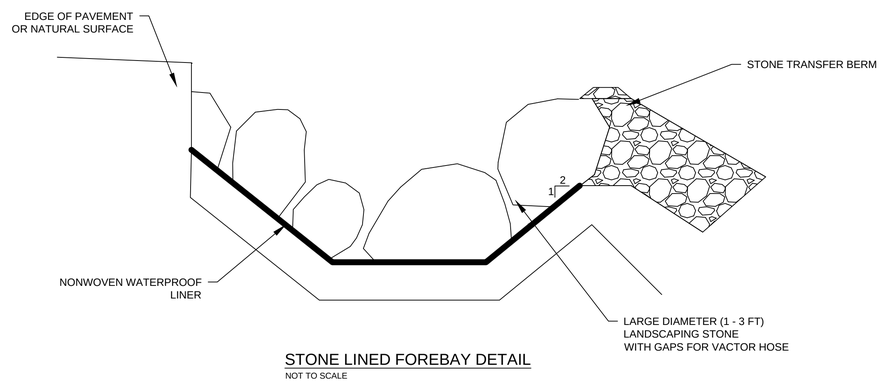
BIORETENTION WITH UNDERDRAIN DETAIL

NOT TO SCALE



TYPICAL PIPE TRENCH DETAIL

NOT TO SCALE



STONE LINED FOREBAY DETAIL

NOT TO SCALE

DRAWING CREDITS

DRAWN ON: 05/22/2023
DRAWN BY: APH
CHECKED ON: 05/22/2023
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

STONE ENVIRONMENTAL
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
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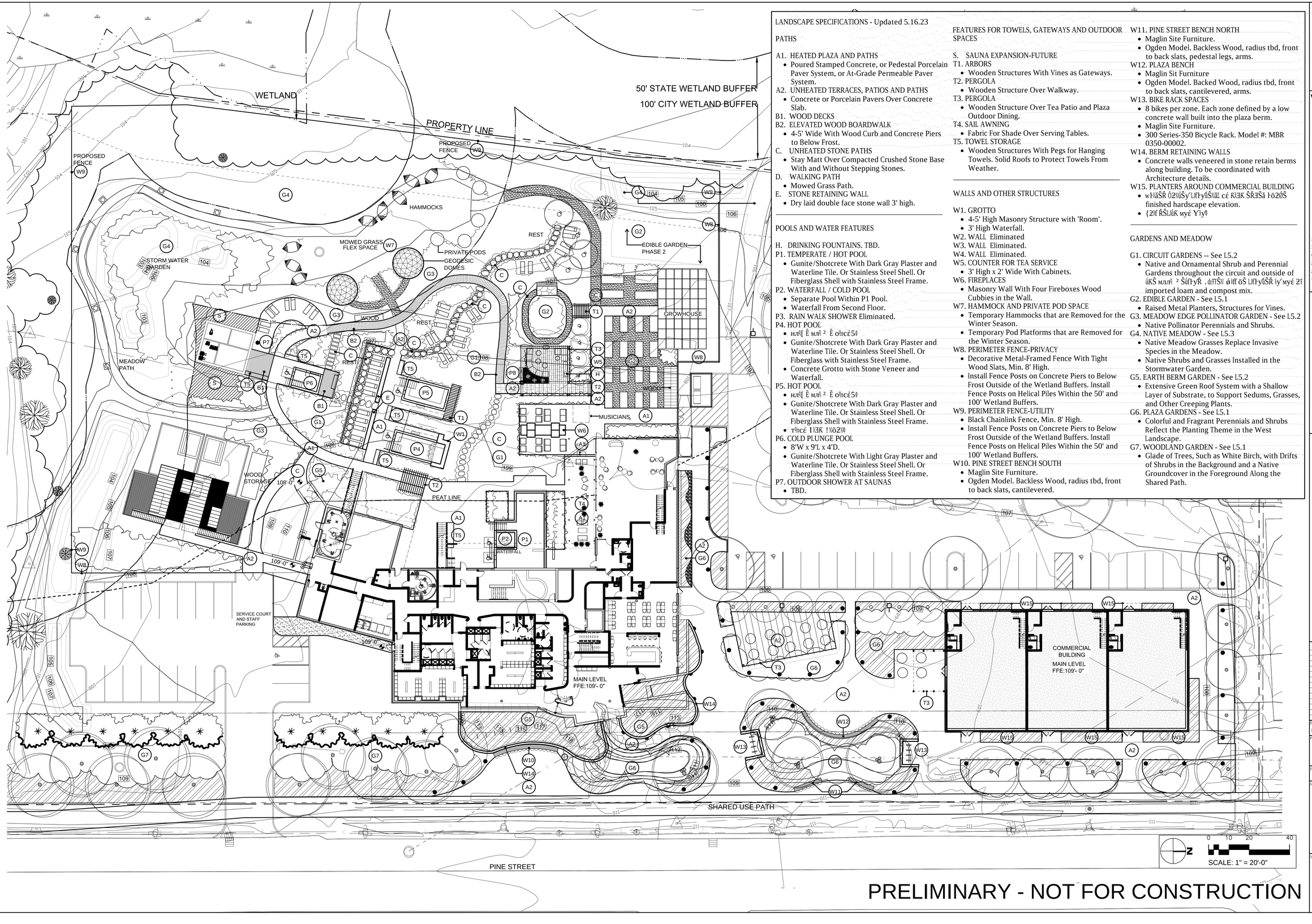
SILT BATHHOUSE & 453 PINE STREET

STORMWATER DETAILS

BURLINGTON VERMONT

SHEET NO. C8



LANDSCAPE SPECIFICATIONS - Updated 5.16.23

PATHS

A1. HEATED PLAZA AND PATHS
- Poured Stamped Concrete, or Pedestal Porcelain Paver System, or At-Grade Permeable Paver System.

A2. UNHEATED TERRACES, PATIOS AND PATHS
- Concrete or Porcelain Pavers Over Concrete Slab.

B1. WOOD DECKS

B2. ELEVATED WOOD BOARDWALK
- 4-5' Wide With Wood Curb and Concrete Piers to Below Frost.

C. UNHEATED STONE PATHS
- Stay Matt Over Compacted Crushed Stone Base With and Without Stepping Stones.

D. WALKING PATH
- Mowed Grass Path.

E. STONE RETAINING WALL
- Dry laid double face stone wall 3' high.

POOLS AND WATER FEATURES

H. DRINKING FOUNTAINS. TBD.

P1. TEMPERATE / HOT POOL
- Gunite/Shotcrete With Dark Gray Plaster and Waterline Tile. Or Stainless Steel Shell. Or Fiberglass Shell with Stainless Steel Frame.

P2. WATERFALL / COLD POOL
- Separate Pool Within P1 Pool.
- Waterfall From Second Floor.

P3. RAIN WALK SHOWER Eliminated.

P4. HOT POOL
- нлґ[È млґ ² È o¶c£5¶
- Gunite/Shotcrete With Dark Gray Plaster and Waterline Tile. Or Stainless Steel Shell. Or Fiberglass with Stainless Steel Frame.
- Concrete Grotto with Stone Veneer and Waterfall.

P5. HOT POOL
- нлґ[È млґ ² È o¶c£5¶
- Gunite/Shotcrete With Dark Gray Plaster and Waterline Tile. Or Stainless Steel Shell. Or Fiberglass Shell with Stainless Steel Frame.
- т¶c£ È ĪƎK ↑¼ō2¼

P6. COLD PLUNGE POOL
- 8'W x 9'L x 4'D.
- Gunite/Shotcrete With Light Gray Plaster and Waterline Tile. Or Stainless Steel Shell. Or Fiberglass Shell with Stainless Steel Frame.

P7. OUTDOOR SHOWER AT SAUNAS
- TBD.

FEATURES FOR TOWELS, GATEWAYS AND OUTDOOR SPACES

S. SAUNA EXPANSION-FUTURE

T1. ARBORS
- Wooden Structures With Vines as Gateways.

T2. PERGOLA
- Wooden Structure Over Walkway.

T3. PERGOLA
- Wooden Structure Over Tea Patio and Plaza Outdoor Dining.

T4. SAIL AWNING
- Fabric For Shade Over Serving Tables.

T5. TOWEL STORAGE
- Wooden Structures With Pegs for Hanging Towels. Solid Roofs to Protect Towels From Weather.

WALLS AND OTHER STRUCTURES

W1. GROTTO
- 4-5' High Masonry Structure with 'Room'.
- 3' High Waterfall.

W2. WALL Eliminated

W3. WALL Eliminated.

W4. WALL Eliminated.

W5. COUNTER FOR TEA SERVICE
- 3' High x 2' Wide With Cabinets.

W6. FIREPLACES
- Masonry Wall With Four Fireboxes Wood Cubbies in the Wall.

W7. HAMMOCK AND PRIVATE POD SPACE
- Temporary Hammocks that are Removed for the Winter Season.
- Temporary Pod Platforms that are Removed for the Winter Season.

W8. PERIMETER FENCE-PRIVACY
- Decorative Metal-Framed Fence With Tight Wood Slats, Min. 8' High.
- Install Fence Posts on Concrete Piers to Below Frost Outside of the Wetland Buffers. Install Fence Posts on Helical Piles Within the 50' and 100' Wetland Buffers.

W9. PERIMETER FENCE-UTILITY
- Black Chainlink Fence, Min. 8' High.
- Install Fence Posts on Concrete Piers to Below Frost Outside of the Wetland Buffers. Install Fence Posts on Helical Piles Within the 50' and 100' Wetland Buffers.

W10. PINE STREET BENCH SOUTH
- Maglin Site Furniture.
- Ogden Model. Backless Wood, radius tbd, front to back slats, cantilevered.

W11. PINE STREET BENCH NORTH
- Maglin Site Furniture.
- Ogden Model. Backless Wood, radius tbd, front to back slats, pedestal legs, arms.

W12. PLAZA BENCH
- Maglin Sit Furniture
- Ogden Model. Backed Wood, radius tbd, front to back slats, cantilevered, arms.

W13. BIKE RACK SPACES
- 8 bikes per zone. Each zone defined by a low concrete wall built into the plaza berm.
- Maglin Site Furniture.
- 300 Series-350 Bicycle Rack. Model #: MBR 0350-00002.

W14. BERM RETAINING WALLS
- Concrete walls veneered in stone retain berms along building. To be coordinated with Architecture details.

W15. PLANTERS AROUND COMMERCIAL BUILDING
- wЧäŠŘ Ø2ЧūŠy'ĺŕŧyūŠЧāℓ cé ЌlƷK ŠŘƎŠā ŀ6ƨØŠ finished hardscape elevation.
- {2ĺŕ ŘŠlúK муé Y'ly¶

GARDENS AND MEADOW

G1. CIRCUIT GARDENS -- See L5.2
- Native and Ornamental Shrub and Perennial Gardens throughout the circuit and outside of ūKŠ млґ ² ŝūŧŀyŘ . ∂ŧfŠ¶ ǿlff oŠ lЛŧyūŠŘ ly'муé 2ŧ imported loam and compost mix.

G2. EDIBLE GARDEN - See L5.1
- Raised Metal Planters, Structures for Vines.

G3. MEADOW EDGE POLLINATOR GARDEN - See L5.2
- Native Pollinator Perennials and Shrubs.

G4. NATIVE MEADOW - See L5.3
- Native Meadow Grasses Replace Invasive Species in the Meadow.
- Native Shrubs and Grasses Installed in the Stormwater Garden.

G5. EARTH BERM GARDEN - See L5.2
- Extensive Green Roof System with a Shallow Layer of Substrate, to Support Sedums, Grasses, and Other Creeping Plants.

G6. PLAZA GARDENS - See L5.1
- Colorful and Fragrant Perennials and Shrubs Reflect the Planting Theme in the West Landscape.

G7. WOODLAND GARDEN - See L5.1
- Glade of Trees, Such as White Birch, with Drifts of Shrubs in the Background and a Native Groundcover in the Foreground Along the Shared Path.

PRELIMINARY - NOT FOR CONSTRUCTION

Wiemann Lamphere ARCHITECTS
525 Hercules Drive
Suite Two
Colchester, VT 05446
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802.622.6567
wiemannlamphere.com

HARDY STRUCTURAL ENGINEERING
875 Roosevelt Hwy, Ste. 130, Colchester, VT 05446 PH (802.655.8755) www.hardyse.com

LN CONSULTING
Vermont: 208 Flynn Avenue #2J, Burlington, VT 05401, (802) 655-1753, Fax (802) 655-7628
Massachusetts: 32 Masonic St., Unit E, Northampton, MA 01060, (413) 376-9580
lnconsulting.com

design for Leisure One Union Studio

Knauf LANDSCAPE ARCHITECTURE 828 HERCULES DRIVE, SUITE 2 COLCHESTER, VT 05446 802.999.5678 CONTACT@KNAUFLA.COM CONTINUEKNAUF.COM

Landscape Plan for Silt Bathhouse and 453 Pine Street — Burlington, Vermont

#	DATE	REVISION DESCRIPTION

DATE: MAY 22, 2023
PLAN NORTH
SCALE: As Indicated
PROJECT NO:
DRAWN BY: FRC
CHECKED BY: CK
SHEET TITLE: LANDSCAPE PLAN
SHEET NUMBER: L2.1

FILENAME:
PRINTED:

PLANT SCHEDULE -- SOUTH WOODLAND GARDEN

TREES

Key	Botanical Name / Common Name	Characteristics	Size	Qty.
BN	Betula nigra / River Birch	40'-70' tall, 40'-50' wide, interesting bark, fall foliage	2.5-3" cal.	10
PG	Picea Glauca / White Spruce	40'-60' tall, 10'-20' wide, evergreen	8-10' hgt.	10

SHRUBS

Key	Botanical Name / Common Name	Characteristics	Size	Qty.
CS	Cornus sericea 'Baileyi' / Red Stemmed Dogwood	spring blooms, fall foliage/berries, yearlong red stems	3 gal	56
RH	Rhododendron viscosum 'Pink and Fragrant' / Deciduous Azalea	Fragrant spring blooms	3 gal	13
RH	Rhododendron 'White Lights' / Deciduous Azalea	Fragrant spring blooms	3 gal	13

PERENNIALS

KEY		Characteristics	Size	Qty.
CV	Carex volpinoidea / Fox Sedge	all season grassy groundcover		250
HH	Hemerocallis 'Happy Returns' / Daylily	season long yellow fragrant blooms		250

PLANT SCHEDULE - PLAZA GARDENS AND PARKING LOT

TREES

Key	Botanical Name / Common Name	Characteristics	Size	Qty.
AFA	Acer x freemanni 'Autumn Blaze' / Freeman Maple	40'-60' tall x 30-40' wide, fall foliage	2.5-3"cal.	2
AFC	Acer x freemanni 'Celebration' / Freeman Maple	45'-50' tall x 20-25' wide, fall foliage	2.5-3" cal.	3
AFS	Acer x freemanni 'Sienna' / Freeman Maple	40' tall x 40' wide, fall foliage	2.5-3" cal.	2
CB	Carpinus betula 'Fastigiata' / Hornbeam	30'-40' tall x 20'-30' wide, fall foliage	2.5-3" cal.	4
CC	Cercis canadensis 'Alba' / Redbud	20'-30' tall x 20'-30 wide, white spring blooms, fall foliage	2.5-3" cal.	1
CJ	Cercidiphyllum japonicum / Katsuratree	40'-50' tall x 25-30' wide, spring blooms, fall foliage	2.5-3" cal.	3
MM	Magnolia loebneri 'Dr. Merrill' / Magnolia	30'-40' tall x 20'-30' wide, white spring blooms, fall foliage	2.5-3" cal.	1
NS	Nyssa sylvatica 'Red Sylyndor / Sweet Gum	40'-50' tall x 20'-30' wide, fall foliage	2.5-3" cal.	4
QB	Quercus bicolor / Swamp Oak	40'-50' tall x 40'-50' wide, interesting bark, fall foliage	2.5-3" cal.	3
SR	Syringa reticulata 'Ivory Silk' / Tree Lilac	20-25' high x 15' wide, interesting bark, fall foliage	2.5-3" cal.	7
UT	Ulmus minor 'Triumph' / Elm Cultivar	50'-60' tall x 40'-50' wide, interesting shape, fall foliage	2.3-3" cal.	2

(S) SHRUBS

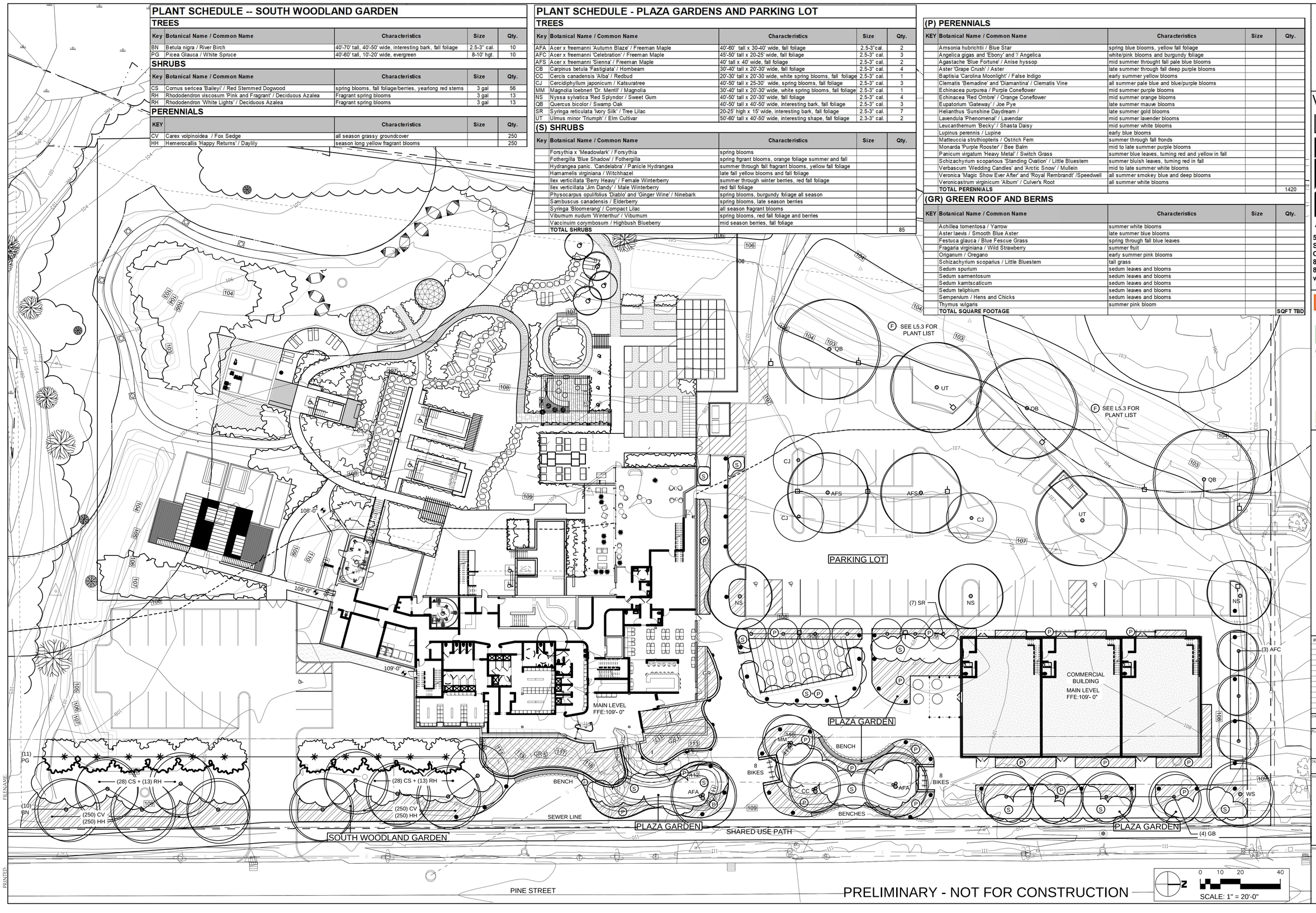
Key	Botanical Name / Common Name	Characteristics	Size	Qty.
	Forsythia x 'Meadowlark' / Forsythia	spring blooms		
	Fothergilla 'Blue Shadow' / Fothergilla	spring fgrant blooms, orange foliage summer and fall		
	Hydrangea panic. 'Candelabra' / Panicle Hydrangea	summer through fall fragrant blooms, yellow fall foliage		
	Hamamelis virginiana / Witchhazel	late fall yellow blooms and fall foliage		
	Ilex verticillata 'Berry Heavy' / Female Winterberry	summer through winter berries, red fall foliage		
	Ilex verticillata 'Jim Dandy' / Male Winterberry	red fall foliage		
	Physocarpus opulifolius 'Diablo' and 'Ginger Wine' / Ninebark	spring blooms, burgundy foliage all season		
	Sambuscus canadensis / Elderberry	spring blooms, late season berries		
	Syringa 'Bloomerang' / Compact Lilac	all season fragrant blooms		
	Vibumum nudum 'Winterthur' / Vibumum	spring blooms, red fall foliage and berries		
	Vaccinium corymbosum / Highbush Blueberry	mid season berries, fall foliage		
	TOTAL SHRUBS			85

(P) PERENNIALS

KEY	Botanical Name / Common Name	Characteristics	Size	Qty.
	Amsonia hubrichtii / Blue Star	spring blue blooms, yellow fall foliage		
	Angelica gigas and 'Ebony' and '/ Angelica	white/pink blooms and burgundy foliage		
	Agastache 'Blue Fortune' / Anise hyssop	mid summer throught fall pale blue blooms		
	Aster 'Grape Crush' / Aster	late summer through fall deep purple blooms		
	Baptisia 'Carolina Moonlight' / False Indigo	early summer yellow blooms		
	Clematis 'Bemadine' and 'Diamantina' / Clematis Vine	all summer pale blue and blue/purple blooms		
	Echinacea purpurea / Purple Coneflower	mid summer purple blooms		
	Echinacea 'Red Ombre' / Orange Coneflower	mid summer orange blooms		
	Eupatorium 'Gateway' / Joe Pye	late summer mauve blooms		
	Helianthus 'Sunshine Daydream /	late summer gold blooms		
	Lavendula 'Phenomenal' / Lavendar	mid summer lavender blooms		
	Leucanthemum 'Becky' / Shasta Daisy	mid summer white blooms		
	Lupinus perennis / Lupine	early blue blooms		
	Matteuccia struthiopteris / Ostrich Fern	summer through fall fronds		
	Monarda 'Purple Rooster' / Bee Balm	mid to late summer purple blooms		
	Panicum virgatum 'Heavy Metal' / Switch Grass	summer blue leaves, turning red and yellow in fall		
	Schizachyrium scoparious 'Standing Ovation' / Little Bluestem	summer bluish leaves, turning red in fall		
	Verbascum 'Wedding Candles' and 'Arctic Snow' / Mullein	mid to late summer white blooms		
	Veronica 'Magic Show Ever After' and 'Royal Rembrandt' /Speedwell	all summer smokey blue and deep blooms		
	Veronicastrum virginicum 'Album' / Culver's Root	all summer white blooms		
	TOTAL PERENNIALS			1420

(GR) GREEN ROOF AND BERMS

KEY	Botanical Name / Common Name	Characteristics	Size	Qty.
	Achillea tomentosa / Yarrow	summer white blooms		
	Aster laevis / Smooth Blue Aster	late summer blue blooms		
	Festuca glauca / Blue Fescue Grass	spring through fall blue leaves		
	Fragaria virginiana / Wild Strawberry	summer fruit		
	Origanum / Oregano	early summer pink blooms		
	Schizachyrium scoparius / Little Bluestem	tall grass		
	Sedum spurium	sedum leaves and blooms		
	Sedum sarmentosum	sedum leaves and blooms		
	Sedum kamtscaticum	sedum leaves and blooms		
	Sedum teliphium	sedum leaves and blooms		
	Sempervium / Hens and Chicks	sedum leaves and blooms		
	Thymus vulgaris	summer pink bloom		
	TOTAL SQUARE FOOTAGE			SQFT TBD



PRELIMINARY - NOT FOR CONSTRUCTION

0 10 20 40
SCALE: 1" = 20'-0"

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520 HERCULES DRIVE, SUITE 2B, COLCHESTER, VT 05446, 802.503.0928, CONTACT@KNAUFLA.COM

Silt Bathhouse and 453 Pine Street
Streetscape and Parking Lot Planting Plan
Burlington, Vermont

#	DATE	REVISION DESCRIPTION

DATE: MAY 22, 2023
PLAN NORTH
SCALE: As Indicated
PROJECT NO.
DRAWN BY: FRC
CHECKED BY: CK
SHEET TITLE:

SHEET NUMBER: L5.1

FILENAME:
PRINTED:

WETLAND

50' STATE WETLAND BUFFER

100' CITY WETLAND BUFFER

I. WEST LANDSCAPE -- CIRCUIT GARDENS AND GREEN ROOF

ZONE A: POOL GARDEN
Colorful tapestry of native and non-invasive pollinator perennials and shrubs with year-round interest.

ZONE B: GLADE GARDEN
A serene setting for quiet and rest with delicate medium size trees with interesting patterns of groundcover.

ZONE E: MEADOW GARDEN
Drifts of native meadow perennials and shrubs, which provide a smooth transition to the natural wetland buffer meadow beyond.

TREES
Amelanchier canadensis / Native Serviceberry
Betula nigra / Native River Birch
Carpinus caroliniana / Native Musclewood
Cercis canadensis / Native Redbud

SHRUBS
Aronia melanocarpa 'Viking' / Purple Chokeberry
Clethra alnifolia / White Summersweet
Cornus sericea / Red Stem Dogwood
Fothergilla major 'Blue Shadow' / Fothergilla
Hamamelis virginiana / Witch Hazel
Hydrangea arborescens 'Annabelle' / Annabelle Hydrangea
Hydrangea paniculata 'Tardiva' / Panicle Hydranagea
Ilex verticillata 'Afterglow' / Female Winterberry
Ilex verticillata 'Jim Dandy' / Male Winterberry
Physocarpus opulifolius / Ninebark
Rosa virginiania and caroliniana / Native Rose
Syringa vulgaris and prestoniea / Lilac
Viburnum dentatum 'Autumn Jazz' / Arrowwood

PERENNIALS
Agastache foeniculum 'Blue Fortune' / Anise hyssop
Actaea ramosa 'Atropurpurea' / Bugbane
Achillea 'Moonshine' and 'Paprika' / Yarrow
Aster novae angliae / New England Aster
Baptisia australis / False Indigo
Clematis, Lonicera, Grapes (Vines)
Cimicifuga ramosa 'Pink Spike' / Bugbane
Delphinium 'Cobolt Dreams' / Delphinium
Echinops 'Blue Glow' / Globe Thistle
Echinacea purpurea 'Magnus' / Coneflower
Eupatorium purpurea / Joe Pye
Lavendula 'Hidcote' and 'Phenomenal' / Lavendar
Leucanthemum 'Alaska' / Shasta Daisy
Liatrus spicata 'Kobold' / Gayfeather
Ligularia dentata 'Britt Marie Crawford' / Bigleaf Ligularia
Lobelia cardinalis / Red Cardinal Flower
Lobelia siphilitica / Blue Cardinal Flower
Matteuccia struthiopteris / Ostrich Fern
Osmunda cinnamomea / Cinnamon Fern
Phlox paniculata 'David' and 'Jenna' / Tall Garden Phlox
Rudbeckia fulgida 'Goldstrum' / Black Eyed Susan
Salvia 'Caradonna' and 'Purple Rain' / Meadow Sage
Veronicastrum 'Diana' and 'Erica' / Culver's Foot

GRASSES
Calamagrostis 'Karl Foerster'
Panicum virgatum / Switch Grass
Schizachyrium scoparius / Little Bluestem

ZONE C: EDIBLE AND HERB GARDEN
Colorful plants for fragrance and culinary use in Silt's restaurant.

RAISED BEDS
Vegetables and Annual and Perennial Herbs and Fragrant Flowers

TREES/SHRUBS
Malus domestica / Domestic Apple Trees
Prunus spp. / Dwarf and Semi Dwarf Cherry Trees
Rosa caroliniana / Native Rose
Sambucus canadensis / American Elderberry
Vaccinium corymbosum / Highbush Blueberry

ZONE D: BERM / GREEN ROOF GARDEN
Intensive roof garden that blends with the surrounding garden and native meadow.

PERENNIALS
Achillea tomentosa / Yarrow
Aster laevis / Smooth Blue Aster
Festuca glauca / Blue Fescue Grass
Fragraria virginiana / Wild Strawberry
Origanum / Oregano
Schizachryium scoparius / Little Bluestem
Sedum spurium / sarmentosum / kamtscaticum / teliphium
Sempervivum / Hens and Chicks
Thymus vulgaris

II. WEST LANDSCAPE -- NATIVE MEADOW, STORMWATER GARDEN, EVERGREEN GLADE

ZONE F: STORMWATER GARDENS WITHIN THE 100' CITY WETLAND BUFFER
Vermont native plants for the specific stormwater features. See L5.3 for Plant List.

ZONE G1: NATIVE, NO-MOW MEADOW WITHIN THE 50' STATE WETLAND BUFFER
Vermont plants native to this type of upland wetland. See L5.3 for Plant List.

ZONE G2: NATIVE MEADOW WITHIN THE 100' CITY WETLAND BUFFER
Vermont plants native to this type of upland wetland. See L5.3 for Plant List.

ZONE H: EVERGREEN GLADE WITHIN THE 100' CITY WETLAND BUFFER / 50' WETLAND BUFFER
Vermont native evergreens for visual screen and noise buffer from Pine Street.

Abies balsamea / Balsam Fir
Juniperus virginiana / Eastern Red Cedar
Picea glauca / White Spruce

SEE L5.3 FOR PLANT LIST

SEE L5.3 FOR PLANT LIST

MAIN LEVEL FFE:109'- 0"

COMMERCIAL BUILDING
MAIN LEVEL FFE:109'- 0"

BENCH

8 BIKES

BENCH

8 BIKES

BENCHES

SEWER LINE

SHARED USE PATH

PINE STREET

0 10 20 40

SCALE: 1" = 20'-0"

PRELIMINARY - NOT FOR CONSTRUCTION

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Silt Bathhouse
West Landscape Planting Plan

Vermont

Burlington

#	DATE	REVISION DESCRIPTION

DATE: MAY 22, 2023

PLAN NORTH

SCALE: As Indicated

PROJECT NO.

DRAWN BY: FRC

CHECKED BY: CK

SHEET TITLE:

SHEET NUMBER:

L5.2

WETLAND

50' STATE WETLAND BUFFER

100' CITY WETLAND BUFFER

G2

G1

F

E

H

MAIN LEVEL FFE-109'-0"

BENCH

SEWER LINE

8 BIKES

BENCHES

SHARED USE PATH

PINE STREET

PLANT LIST AND SPECIFICATIONS FOR 50' AND 100' WETLAND BUFFERS 4.27.23

ZONE E - PARTIALLY INSIDE THE 100' CITY WETLAND BUFFER AND PARTIALLY OUTSIDE OF BOTH WETLAND BUFFERS

OBJECTIVES: LOW MAINTENANCE POLLINATOR MEADOW EDGE OF NATIVE SHRUBS AND PERENNIALS.

1. Remove all invasives from the site by a one-time treatment of herbicide.
2. Restore area with native species. See Shrub/Perennial/Grass list below.
3. No mowing in this zone. Management as required of a garden (weeding, reseeding, pruning, etc).
4. No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

SHRUBS
Aronia melanocarpa / Native Chokeberry
Clethra alnifolia / Native Summersweet
Cornus sericea / Native Red Stem Dogwood
Fothergilla / Fothergilla
Hamamelis virginiana / Native Witch Hazel
Hydrangea arborescens / Arborescens Hydrangea
Hydrangea paniculate / Panicle Hydrangea
Ilex verticillata / Female and Male Winterberry
Physocarpus opulifolius / Ninebark
Rosa virginiania and caroliniana / Native Rose
Syringa vulgaris and prestoniea / Lilac
Viburnum dentatum / Native Arrowwood Viburnum

PERENNIALS
Agastache / Anise hyssop
Actaea racemosa / Cohosh
Achillea / Yarrow
Aster novae angliae / New England Aster
Baptisia australis / False Indigo
Echinacea purpurea / Coneflower
Eupatorium purpurea / Joe Pye
Liatrus spicata / Gayfeather
Lobelia cardinalis / Red Cardinal Flower
Lobelia siphilitica / Blue Cardinal Flower
Phlox paniculata / Tall Garden Phlox
Rudbeckia fulgida 'Goldsturm / Black Eyed Susan
Salvia / Ornamental Sage
Veronica spicata / Speedwell
Calamagrostis 'Karl Foerester'
Panicum virgatum / Native Switch Grass
Schizachyrium scoparius / Native Little Bluestem

ZONE F - STORMWATER GARDEN WITHIN THE 100' CITY WETLAND BUFFER

OBJECTIVES:
1. Remove all invasives from the site by a one-time treatment of herbicide.
2. Restore area with native species. See Shrub/Perennial/Grass list below.
3. No mowing in this zone. Management as required of a garden (weeding, reseeding, pruning, etc).
4. No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

MIX FROM VERMONT WETLAND PLANT SUPPLY
Panicum virgatum / Switchgrass
Panicum clandestinum / Deertongue
Bidens cernua / Nodding Bur Marigold
Carex vulpinoidea / Fox Sedge
Deschampsia cespitosa / Tufted Hairgrass
Elymus virginicus / Virginia Wild Rye
Eupatorium perfoliatum / Boneset
Eutrochium maculatum / Joe Pye
Juncus effusus / Soft Rush
Onoclea sensibilis / Sensitive Fern
Poa palustris / Fowl Bluegrass
Scirpus cyperinus / Woolgrass
Scirpus atrovirens / Green Bulrush
Symphyotrichum nova-angliaea / New England Aster
Verbena hastata / Blue Vervain

SHRUBS
Aronia melanocarpa / Chokeberry
Cephalanthus occidentalis / Buttonbush
Clethra alnifolia / Meadowsweet
Cornus sericea / Red Stem Dogwood
Hamamelis virginiana / Witch Hazel
Ilex verticillata / Winterberry
Salix discolor / Pussy Willow
Viburnum dentatum / Arrowwood Viburnum
Viburnum nudum / Wild Raisin Viburnum

ZONE G1 - 50' STATE WETLAND BUFFER

OBJECTIVES: NATIVE MEADOW, LOW-MOW ZONE.

1. Remove all invasives (mostly phragmites) from the site by a one-time treatment of herbicide. State approvals will be obtained.
2. Restore area with native species. See mix for C1 and C2 below.
3. Mow once per year to prevent invasive species from taking hold again and to allow for native species to grow and mature. If the phragmites begin to re-establish regardless of the annual mowing, then removal by handpulling (and possibly mechanical removal) will be considered and explored with consultants. Permits will be pursued if necessary.
4. No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

G2 - 100' CITY WETLAND BUFFER

OBJECTIVES: NATIVE MEADOW, OCCASIONAL USE

1. Remove all invasives from the site by a one-time treatment of herbicide.
2. Restore area with native species. See mix for C1 and C2 below.
3. The grass path for occasional strolling and Flex Space will be mowed twice per month July-September. Markers such as boulders or bird houses will delineate the 50' State Wetland Buffer side to contain the path within Zone C2. The C2 Native Meadow outside of the grass path and flex space will be mowed once per year to prevent invasive species from taking hold again and to allow for the native species to grow and mature.
4. No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

SEED MIX FOR ZONES G1 AND G2 FROM VERMONT WETLAND PLANT SUPPLY
Carex vulpinoidea / Fox Sedge
Carex comosa / Long-haired Sedge
Carex crinita / Nodding Sedge
Carex lurida / Shallow Sedge
Carex stricta / Tussock Sedge
Carex vulpinoidea / Fox Sedge
Juncus effusus / Soft Rush
Leersia oryzoides / Rice Cutgrass
Onoclea sensibilis / Sensitive Fern
Panicum clandestinum / Deertongue
Poa palustris / Fowl Bluegrass
Scirpus atrovirens / Green Bulrush
Schoenoplectus tabernaemontani / Softstem Bulrush
Aesclepias incarnata / Swamp Milkweed
Lobelia cardinalis / Cardinal Flower

ZONE H - EVERGREEN GLADE, MOSTLY WITHIN THE 50' AND 100' WETLAND BUFFERS

Abies balsamea / Balsam Fir
Juniperus virginiana / Eastern Red Cedar
Picea glauca / White Spruce

MARKERS TO DEMARCATE THE 50' STATE WETLAND BUFFER

SCALE: 1" = 20'-0"

PRELIMINARY - NOT FOR CONSTRUCTION

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Knauf LANDSCAPE ARCHITECTURE

Silt Bathhouse
Wetland Buffer Planting Plan
Burlington Vermont

#	DATE	REVISION DESCRIPTION

DATE: MAY 22, 2023
PLAN NORTH
SCALE: As Indicated
PROJECT NO.
DRAWN BY: FRC
CHECKED BY: CK
SHEET TITLE:
SHEET NUMBER: L5.3

FILENAME:
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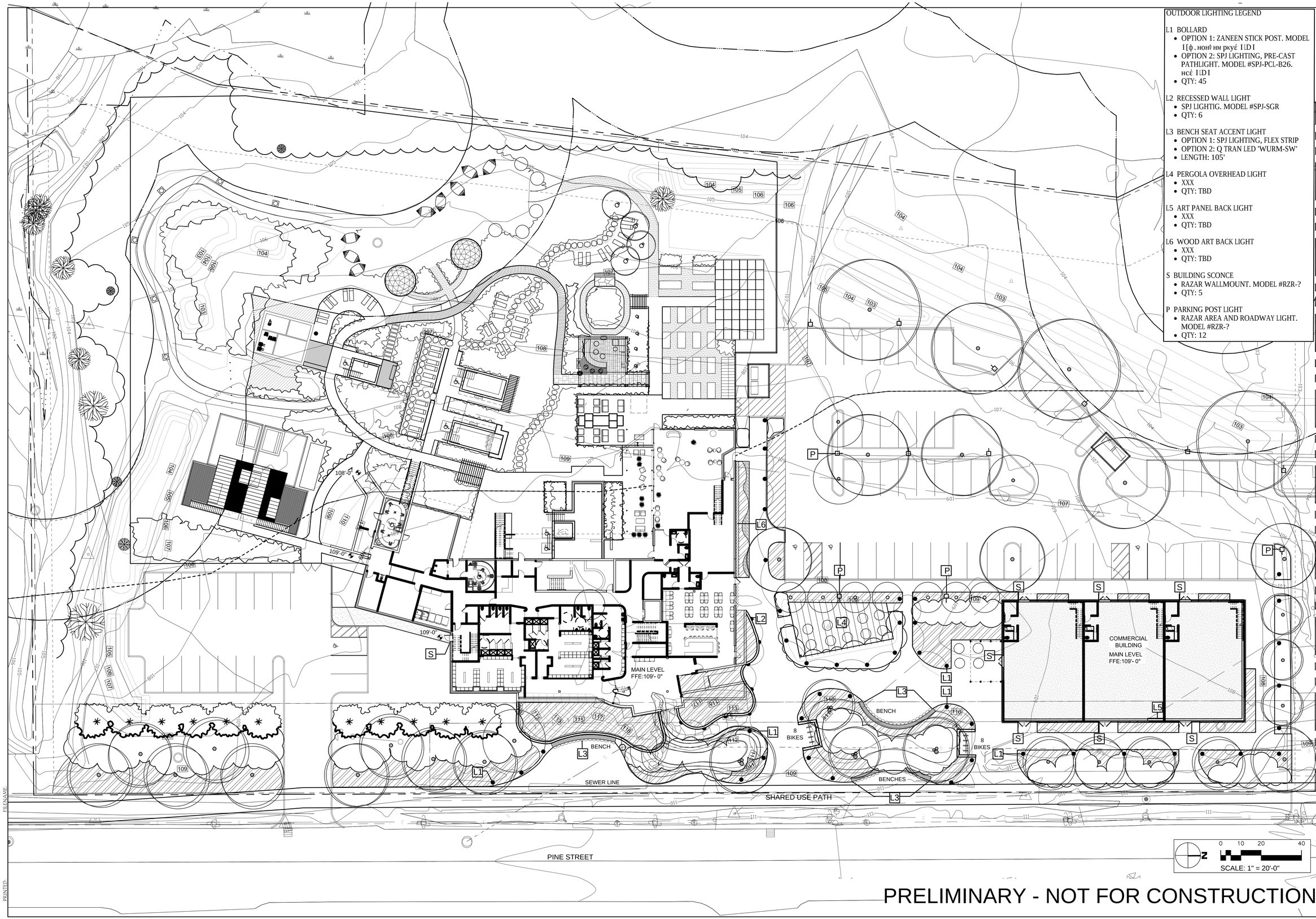

OUTDOOR LIGHTING LEGEND

L1 BOLLARD
- OPTION 1: ZANEEN STICK POST. MODEL I[ф.нонф нм ркуέ IЦD I
- OPTION 2: SPJ LIGHTING, PRE-CAST PATHLIGHT. MODEL #SPJ-PCL-B26. нсέ IЦD I
- QTY: 45

L2 RECESSED WALL LIGHT
- SPJ LIGHTIG. MODEL #SPJ-SGR
- QTY: 6

L3 BENCH SEAT ACCENT LIGHT
- OPTION 1: SPJ LIGHTING, FLEX STRIP
- OPTION 2: Q TRAN LED 'WURM-SW'
- LENGTH: 105'

L4 PERGOLA OVERHEAD LIGHT
- XXX
- QTY: TBD

L5 ART PANEL BACK LIGHT
- XXX
- QTY: TBD

L6 WOOD ART BACK LIGHT
- XXX
- QTY: TBD

S BUILDING SCONCE
- RAZAR WALLMOUNT. MODEL #RZR-?
- QTY: 5

P PARKING POST LIGHT
- RAZAR AREA AND ROADWAY LIGHT. MODEL #RZR-?
- QTY: 12

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Knauf LANDSCAPE ARCHITECTURE

Silt Bathhouse and 453 Pine Street Streetscape and Parking Lot Lighting Plan

Burlington Vermont

#	DATE	REVISION DESCRIPTION

DATE: MAY 22, 2023

PLAN NORTH

SCALE: As Indicated

PROJECT NO:

DRAWN BY: FRC

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SHEET TITLE:

SHEET NUMBER:

L6.1

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453 PINE ST

BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023

SCALE: 1"=30'-0"

PROJECT NO: 2021085

DRAWN BY: AA

CHECKED BY: KCD

SHEET TITLE: ILLUSTRATIVE SITE PLAN

SHEET NUMBER: A-0

PRINTED: 5/17/2023 12:52:41 PM FILENAME: C:\Users\kdesroches\Documents\2022032_R23_SITE_453 PINE ST_KDesRoches.rvt







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SILT BATHHOUSE

453 PINE ST

BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023

SCALE:

PROJECT NO: 2021085

DRAWN BY: JB/KCD

CHECKED BY: KCD

SHEET TITLE:

EXTERIOR PERSPECTIVE VIEWS

SHEET NUMBER:

A-1

PRINTED: 5/23/2023 8:26:53 AM FILENAME: C:\Users\kdesrochers\Documents\2021085_823_SILT BATHHOUSE_KDesRochers.rvt

MATERIAL 1: STANDING SEAM METAL ROOF



MATERIAL 2: THERMALLY MODIFIED WOOD SIDING, BLACK SANSIN FINISH



MATERIAL 3: BOARD FORM CONCRETE





1 A-2 EXTERIOR ELEVATION - EAST
3/32" = 1'-0"

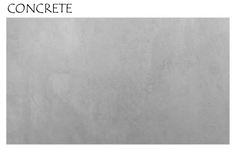


2 A-2 EXTERIOR ELEVATION - NORTH
3/32" = 1'-0"



4 A-2 EXTERIOR ELEVATION - SOUTH
3/32" = 1'-0"

MATERIAL 4: CAST-IN-PLACE CONCRETE



MATERIAL 5: STAINLESS STEEL CABLE VERTICAL TRELLIS



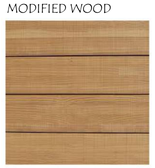
MATERIAL 6: PLANTED EARTHEN BERM



MATERIAL 7: SLATTED WOOD



MATERIAL 8: THERMALLY MODIFIED WOOD





3 A-2 EXTERIOR ELEVATION - WEST
3/32" = 1'-0"

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SILT BATHHOUSE

453 PINE ST
BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 3/32" = 1'-0"
PROJECT NO: 2021085
DRAWN BY: BH/KCD
CHECKED BY: KCD

SHEET TITLE: EXTERIOR ELEVATIONS

SHEET NUMBER: A-2

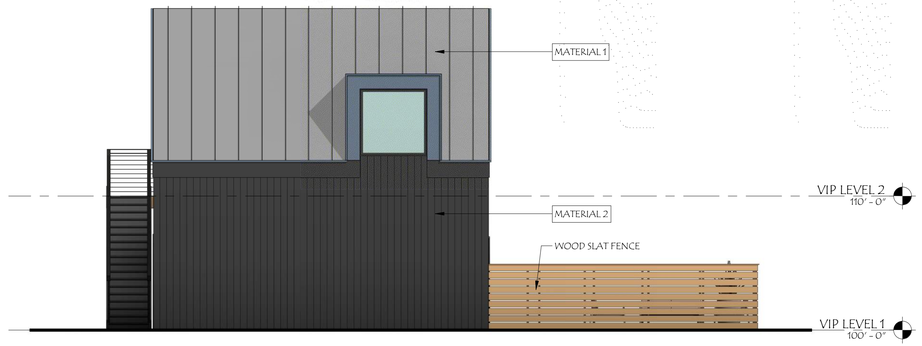
PRINTED: 5/25/2023 8:28:24 AM FILENAME:C:\Users\kdesrochers\Documents\2021085 825 SILT BATHHOUSE_KDesRochers.rvt

MATERIAL 1: STANDING SEAM METAL ROOF

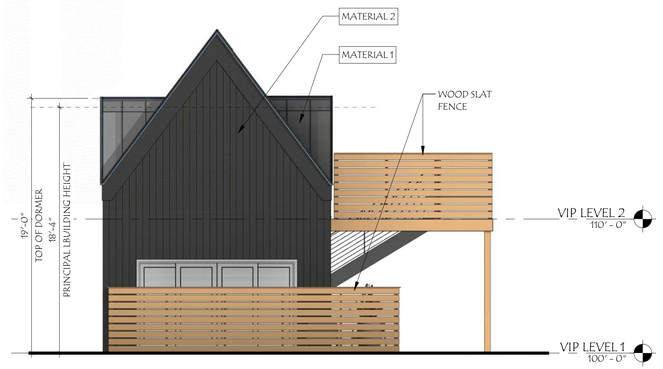


MATERIAL 2: THERMALLY MODIFIED WOOD SIDING, BLACK SANSIN FINISH





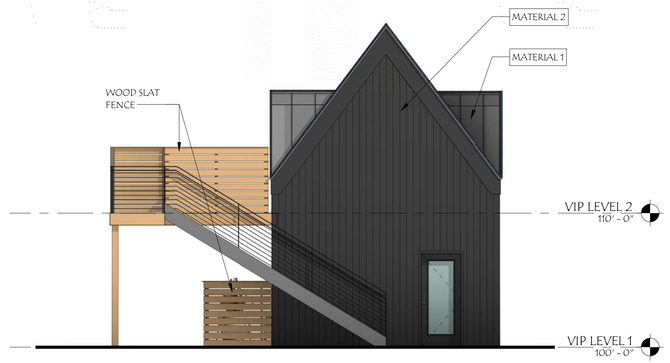
5 EXTERIOR ELEVATION - EAST
A-3 3/16" = 1'-0"



4 EXTERIOR ELEVATION - WEST
A-3 3/16" = 1'-0"



6 EXTERIOR ELEVATION - NORTH
A-3 3/16" = 1'-0"



3 EXTERIOR ELEVATION - SOUTH
A-3 3/16" = 1'-0"

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SILT BATHHOUSE

453 PINE ST

BURLINGTON VERMONT

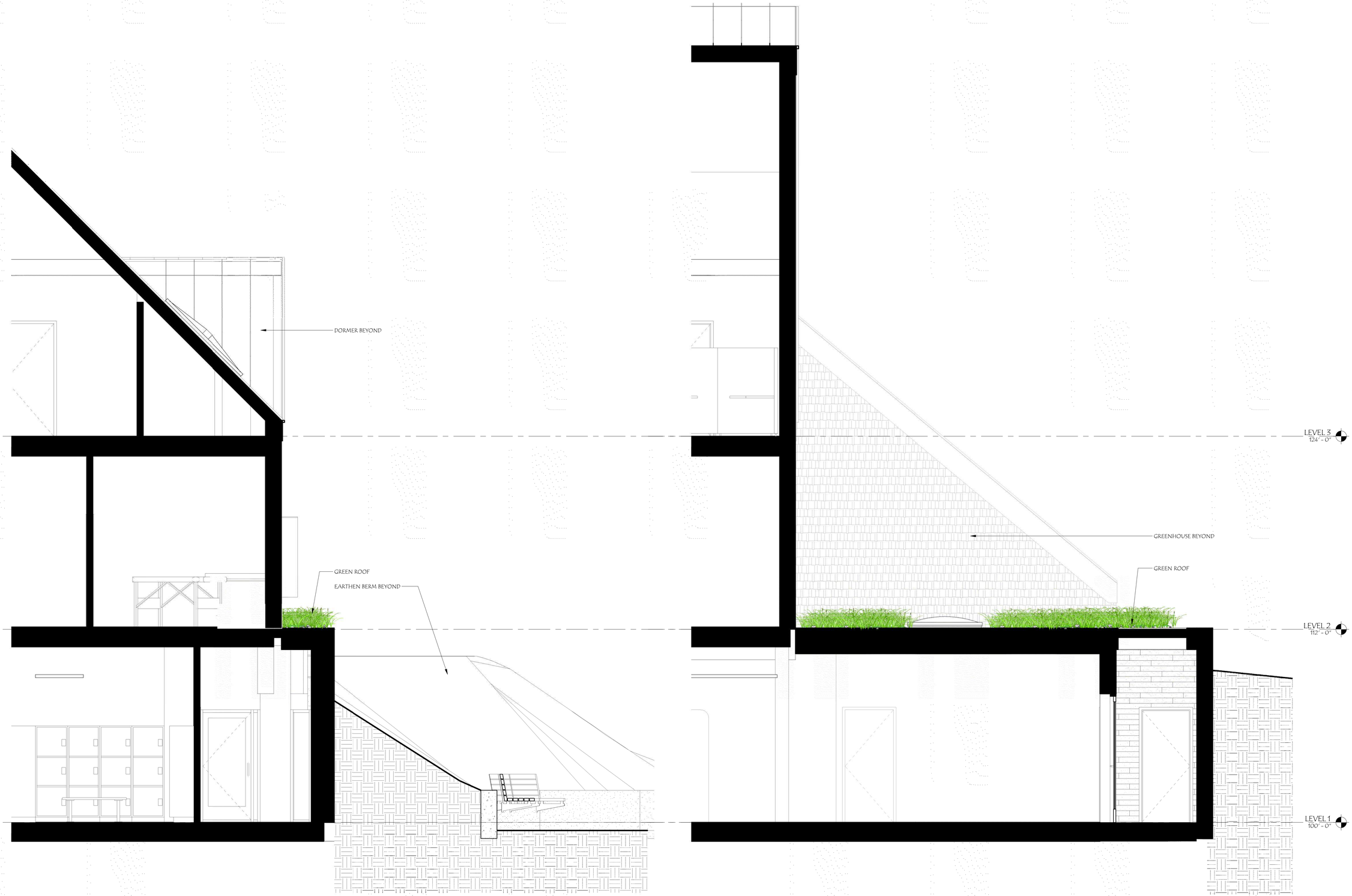
#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 3/16" = 1'-0"
PROJECT NO: 2021085
DRAWN BY: RJH
CHECKED BY: KCD

SHEET TITLE:
PRIVATE RENTAL BUILDING ELEVATIONS

SHEET NUMBER:
A-3

PRINTED: 5/25/2023 8:59:21 AM FILENAME:C:\Users\kdesrochers\Documents\A2021085_825 SILT VIP BLDG_KDesRochers.rvt



1 A-4 FRONT WALL CROSS-SECTION
3/8" = 1'-0"

2 A-4 SIDE WALL CROSS-SECTION
3/8" = 1'-0"

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SILT BATHHOUSE

453 PINE ST
BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 3/8" = 1'-0"
PROJECT NO: 2021085
DRAWN BY: BH/KCD
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SHEET TITLE:
ARCHITECTURAL WALL CROSS-SECTIONS

SHEET NUMBER:
A-4

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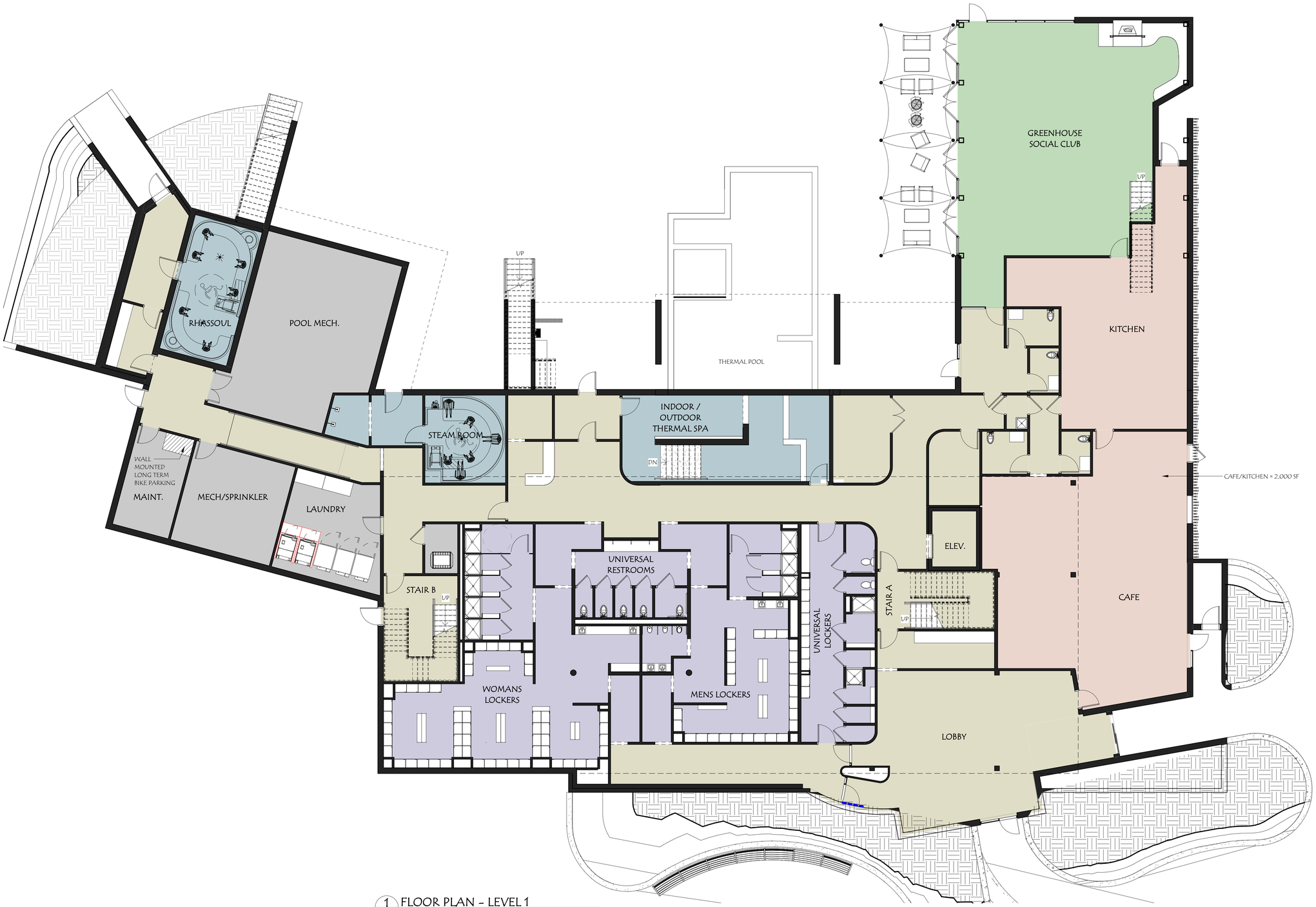

1 A-5 FLOOR PLAN - LEVEL 1
1/8" = 1'-0"

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SILT BATHHOUSE

453 PINE ST
BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 1/8" = 1'-0"
PROJECT NO: 2021085
DRAWN BY: BH/KCD
CHECKED BY: KCD
SHEET TITLE: LEVEL 1 PLAN
SHEET NUMBER: A-5

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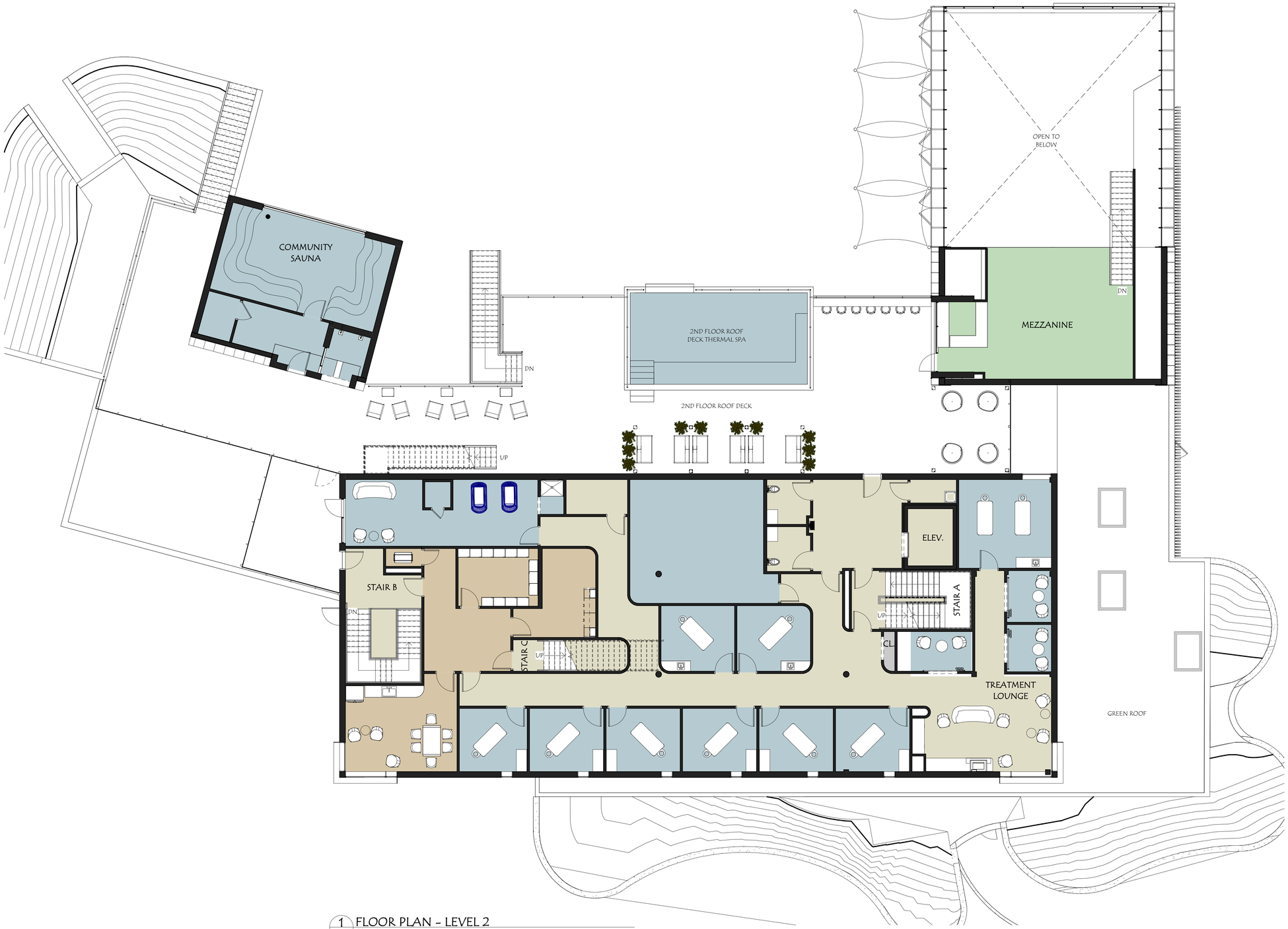

1 A-6 FLOOR PLAN - LEVEL 2
1/8" = 1'-0"

Wiemann Lamphere ARCHITECTS
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Suite Two
Colchester, VT 05446
802.655.5020
802.622.6567
wiemannlamphere.com

SILT BATHHOUSE

453 PINE ST
BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 1/8" = 1'-0"
PROJECT NO: 2021085
DRAWN BY: BH/KCD
CHECKED BY: KCD
SHEET TITLE: LEVEL 2 PLAN
SHEET NUMBER: A-6

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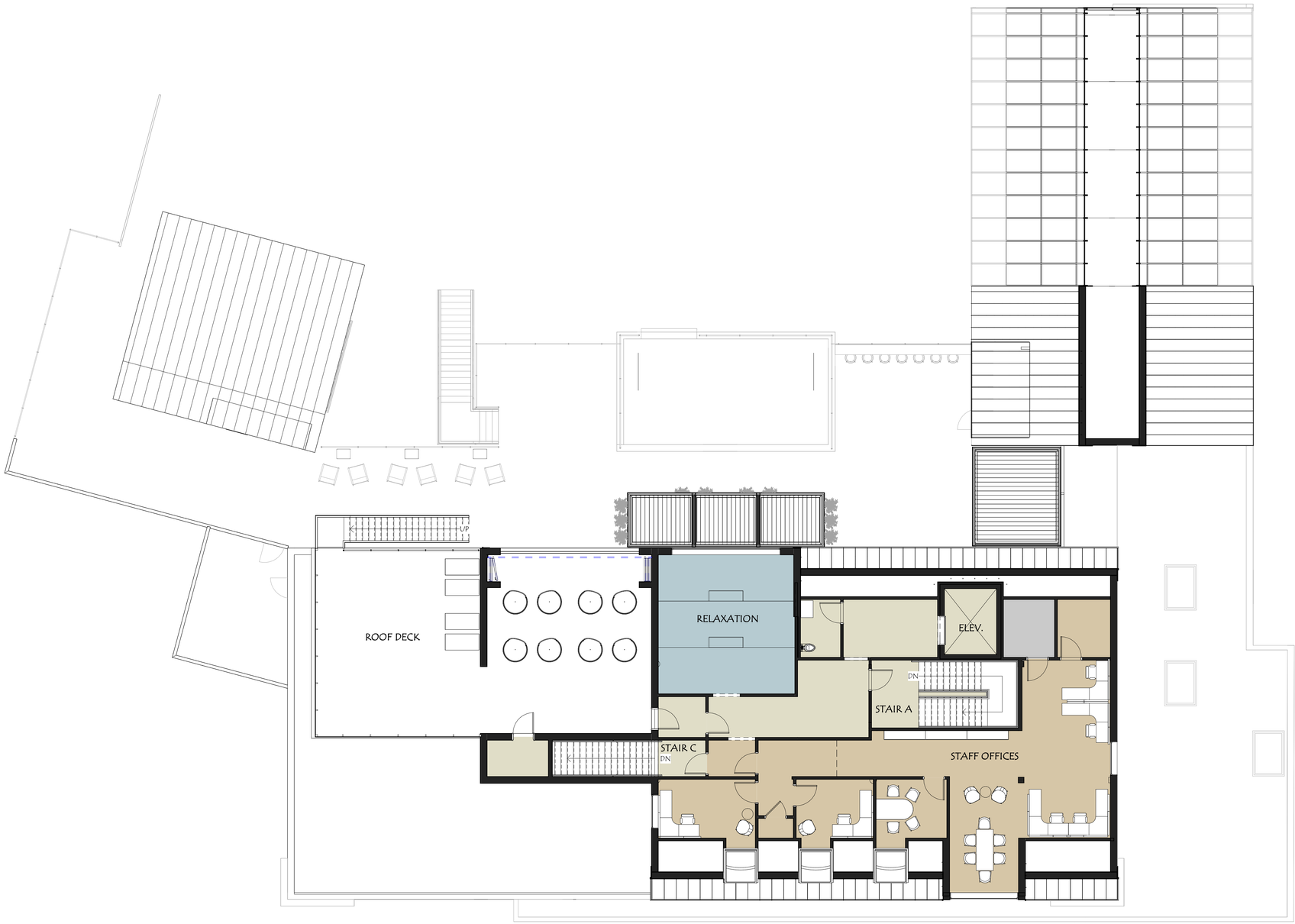

1 A-7 FLOOR PLAN – LEVEL 3
1/8" = 1'-0"

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SILT BATHHOUSE

453 PINE ST

BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023

SCALE: 1/8" = 1'-0"

PROJECT NO: 2021085

DRAWN BY: BH/KCD

CHECKED BY: KCD

SHEET TITLE: LEVEL 3 PLAN

SHEET NUMBER: A-7

PRINTED: 5/23/2023 8:28:53 AM FILENAME: C:\Users\kdesrochers\Documents\A2021085_823 SILT BATHHOUSE_KDesRochers.rvt





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COMMERCIAL BUILDING
453 PINE ST
BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE:
PROJECT NO: 2023011
DRAWN BY: JB
CHECKED BY: KCD

SHEET TITLE:
EXTERIOR PERSPECTIVE VIEWS

SHEET NUMBER:
A-8

PRINTED: 5/23/2023 9:55:45 AM FILENAME:C:\Users\kdesrochers\Documents\2023011_823_ARCH_KDesRochers.rvt

MATERIAL 1: INSULATED METAL PANEL, DARK FINISH



MATERIAL 1 ALT: THERMALLY MODIFIED WOOD SIDING, BLACK SANSIN FINISH



MATERIAL 2: CORTEN STEEL



MATERIAL 3: CORTEN SHADING DEVICE





1 A-9 EAST ELEVATION
3/32" = 1'-0"



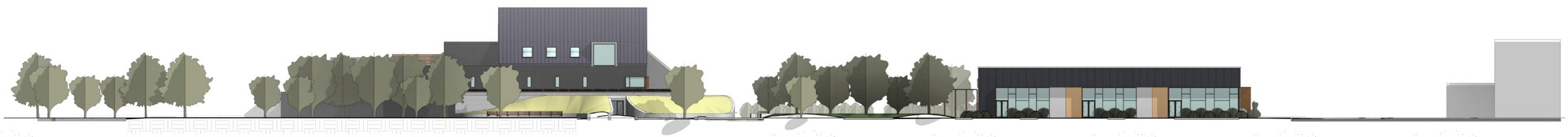
2 A-9 NORTH ELEVATION
3/32" = 1'-0"



3 A-9 WEST ELEVATION
3/32" = 1'-0"



4 A-9 SOUTH ELEVATION
3/32" = 1'-0"



PINE ST STREETSCAPE ELEVATION

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COMMERCIAL BUILDING
453 PINE ST
BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 3/32" = 1'-0"
PROJECT NO: 2023011
DRAWN BY: JPL
CHECKED BY: KCD
SHEET TITLE: EXTERIOR ELEVATIONS
SHEET NUMBER: A-9

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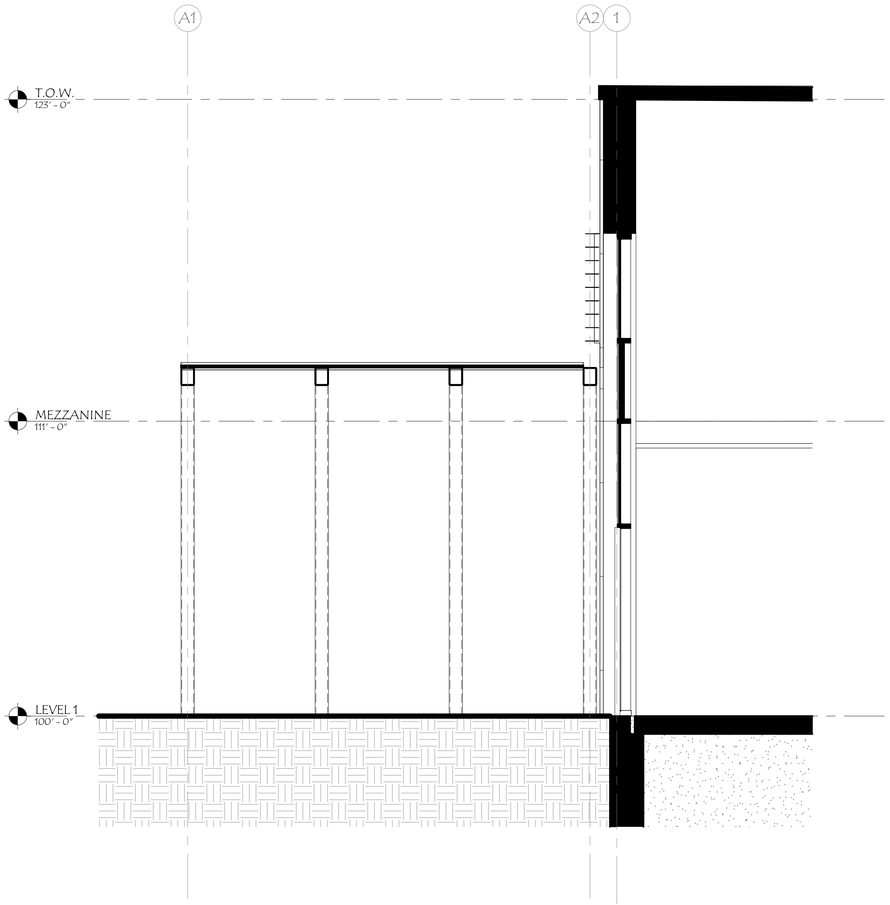
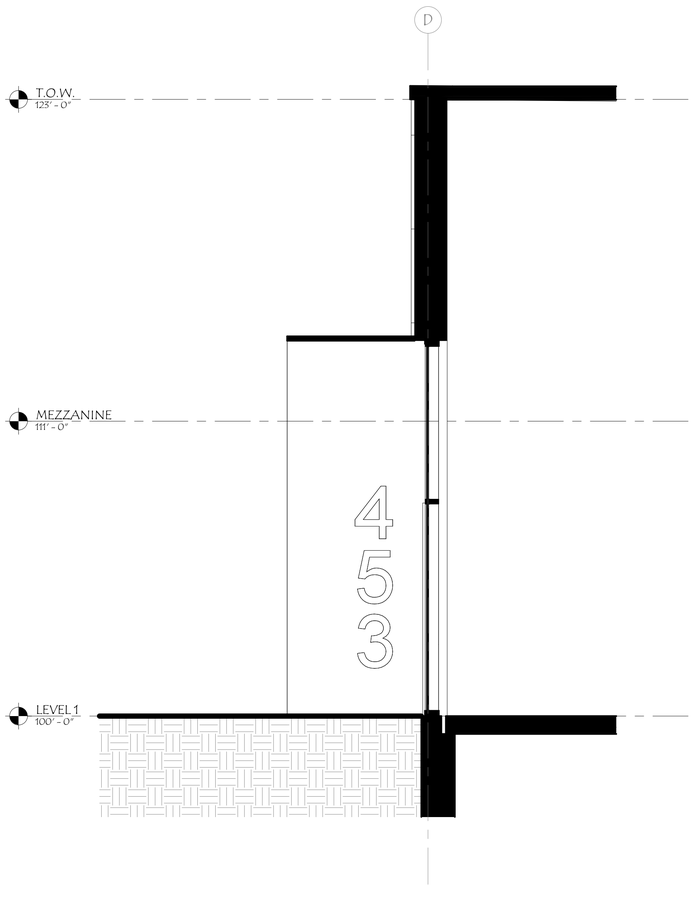


2 A-10 SIDE WALL CROSS-SECTION
3/8" = 1'-0"



1 A-10 FRONT WALL CROSS-SECTION
3/8" = 1'-0"

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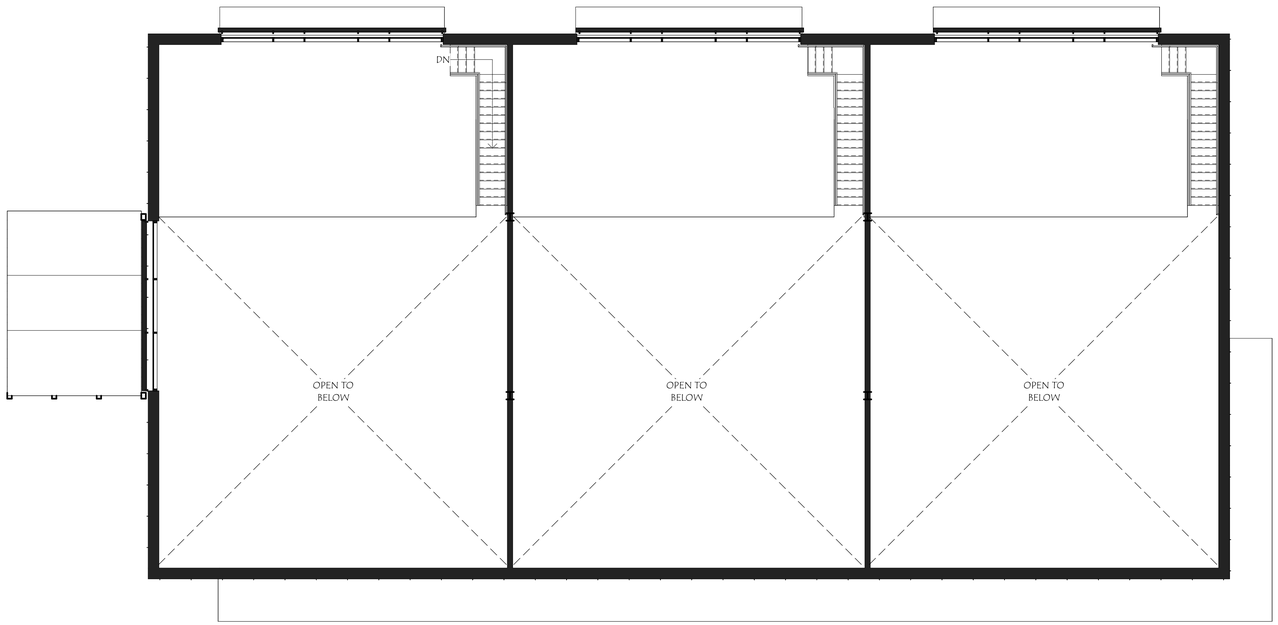
COMMERCIAL BUILDING
453 PINE ST
BURLINGTON VERMONT

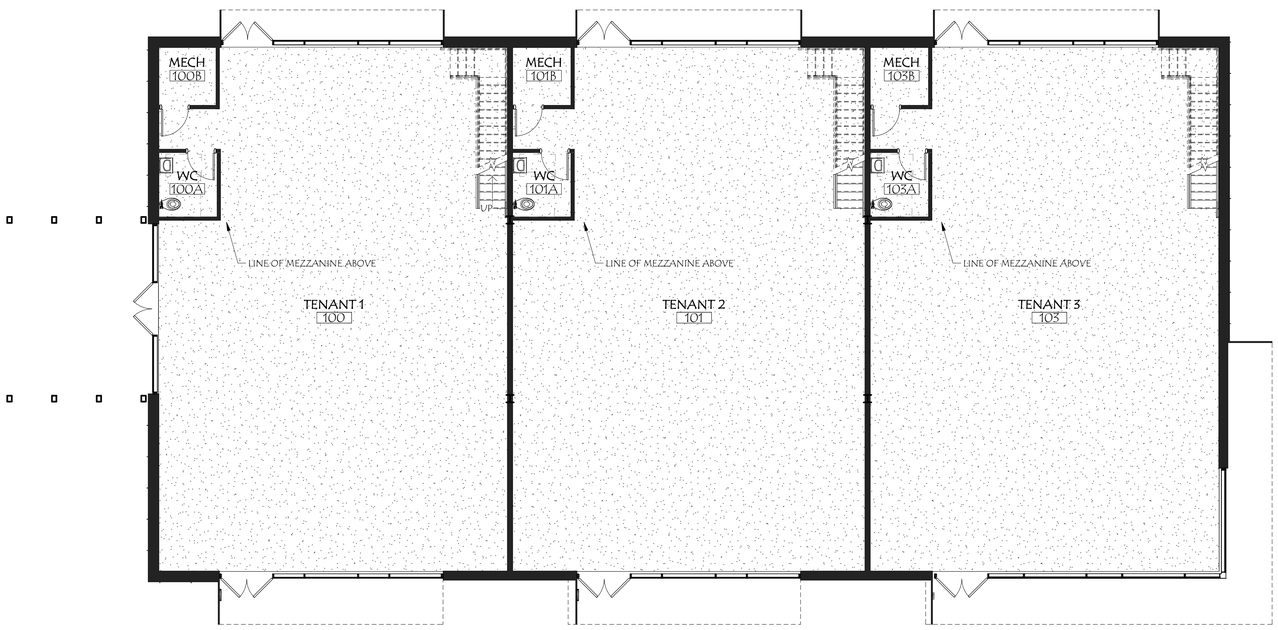
#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 3/8" = 1'-0"
PROJECT NO: 2023011
DRAWN BY: JPL
CHECKED BY: KCD
SHEET TITLE: ARCHITECTURAL WALL CROSS-SECTIONS
SHEET NUMBER: A-10

PRINTED: 5/23/2023 9:55:45 AM FILENAME: C:\Users\kdesroches\Documents\2023011 R23 ARCH KDesRoches.rvt



2 A-11 MEZZANINE PLAN
1/8" = 1'-0"



1 A-11 LEVEL 1 PLAN
1/8" = 1'-0"

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COMMERCIAL BUILDING
453 PINE ST
BURLINGTON VERMONT

#	DATE	REVISION DESCRIPTION

DATE: May 22, 2023
SCALE: 1/8" = 1'-0"
PROJECT NO: 2023011
DRAWN BY: JPL
CHECKED BY: KCD
SHEET TITLE: FLOOR PLANS
SHEET NUMBER: A-11

PRINTED: 5/23/2023 9:55:50 AM FILENAME: C:\Users\kdesroches\Documents\2023011_R23_ARCH_KDesRoches.rvt

453 Pine St – Burlington, VT
COA Level II Application Memo Responses & Major Impact Review Criteria
5/22/23

Article 3: Applications, Permits and Project Reviews

Part 5: Conditional Use and Major Impact

Sec. 3.5.6 Review Criteria

The application and supporting documentation submitted for proposed development involving Conditional Use and/or Major Impact Review, including the plans contained therein, shall indicate how the proposed use and associated development will comply with the review criteria specified below:

(a) Conditional Use Review Standards:
Approval shall be granted only if the DRB, after public notice and public hearing, determines that the proposed conditional use and associated development shall not result in an undue adverse effect on each of the following general standards:

1. Existing or planned public utilities, facilities or services are capable of supporting the proposed use in addition to the existing uses in the area;

From Mary O'Neil, Memorandum dated 12/6/22:

A letter of adequate water and sewer capacity will be required from Water Resources. A State Wastewater permit will be required as well. Technical Review identified other infrastructure needs; their comments are attached. The site is accessed by a public road (Pine Street); sewer and electrical service is available. Water Resources provided an extensive list of needs/concerns about the project at Technical Committee Review in June 2022, and within an email November 23rd. Those comments are included below.

2. The character of the area affected as defined by the purpose or purposes of the zoning district(s) within which the project is located, and specifically stated policies and standards of the municipal development plan;
From Plan BTV:

- *Burlington will preserve and foster its distinctive identity by creating new opportunities for mixed-use infill and redevelopment in the most densely developed areas consistent with the city's scale and urban form, while conserving and strengthening adjacent residential neighborhoods.* (p. 37, Plan BTV.)
- *…Leveraging the city's unique characteristics, economic advantages, and core industries to further strengthen its economy.* (p. 37, Plan BTV.)
- *Evaluate changes to the one-size-fits-all approach to land use policy within the South End Enterprise Zone, in order to preserve and expand the unique and varied character of the district as an arts, innovation, and industrial district.* (p. 42, Plan BTV.)

And from Plan BTV South End: (March 2019):

- *Continue to provide a platform for innovation and enterprise to take root and grow through creativity and collaboration.* (p. 64; PlanBTV South End.)

· *Strategies for a Creative & Vibrant Economy: evaluate possible changes to the Enterprise Zoning District that will reflect and enhance the experiences created by the built environment and types of activities within and around the district.* (p. 65, PlanBTV South End.)

From Mary O'Neil, Memorandum dated 12/6/22:

As noted, the office of City Planning is moving on amendment through the Planning Commission for significant changes, and a potential overlay district to be known as the South End Innovation District (SEID). This parcel is within the proposed overlay. Included in that purpose statement is:

The overlay prioritizes arts and employment uses within an amenity-rich, convenient urban residential neighborhood, while permitting in a limited fashion non-residential uses that are secondary to, but supportive of those primary objectives.

This project, as defined, falls within that intention.

3. The proposed use will not have nuisance impacts from noise, odor, dust, heat, and vibrations greater than typically generated by other permitted uses in the same zoning district;

From Mary O'Neil, Memorandum dated 12/6/22:

The only defined outdoor activities are saunas, hammocks, a botanical garden, a greenhouses and an outdoor patio associated with the bowling alley. None of the identified uses are likely to have nuisance impacts within this Enterprise zone.

The use of the 4,000 sf commercial building has been initially identified as general retail with a 4,000 sf footprint and the likelihood of 2 tenants. Its impacts are undetermined.

4. The transportation system is capable of supporting the proposed use in addition to the existing uses in the area. Evaluation factors include street designations and capacity; level of service and other performance measures; access to arterial roadways; connectivity; transit availability; parking and access; impacts on pedestrian, bicycle and transit circulation; safety for all modes; and adequate transportation demand management strategies;

From Mary O'Neil, Memorandum dated 12/6/22:

The chosen site is an empty parcel east of the Barge Canal, a federal Super Fund site. There are public sidewalks that run along the west side of Pine Street. This is a regular route of Green Mountain Transit. The parcel fronts Pine Street which is set to undergo major improvements associated with the Southern Connector/Champlain Parkway project. While the existing transportation infrastructure appears capable of supporting the proposed use, a traffic impact study may be required by DPW.

Additional Project Response:

The project's vehicular access is off the southern Maltex Drive and will be shared between the two properties. The project proposes (1) entry lane into the properties and (2) out. This is supported in the attached Traffic Impact Assessment. The Maltex Drive will be aligned with Howard Street during the

Southern Connector/Champlain Parkway work. At the northeast corner of the site there is a bus stop providing public transportation to the area. Pedestrians and bicyclists are accommodated on site with the City's shared use path to be constructed during the Southern Connector/Champlain Parkway work. There are adequate sidewalks proposed on site for safe pedestrian movement. The project includes multiple locations for bike parking which total 24 short-term and 4 long-term bicycle parking spaces (confirm number).

See Exhibit 4, Traffic Impact Assessment, by Roger Dickinson, PE, Trudell Consulting Engineers, and Exhibit 7 for DPW's written comments.

and,

5. The utilization of renewable energy resources;

From Mary O'Neil, Memorandum dated 12/6/22:

The plan is not yet finely tuned to understand what renewable energy resources might be employed. These details will emerge in a final application, should the project be encouraged through Sketch Plan Review.

Additional Project Response:

The project is currently seeking to employ geothermal energy on site for heating and cooling. The proposed building's roofs will be designed to be solar ready.

and,

6. Any standards or factors set forth in existing City bylaws and city and state ordinances;

From Mary O'Neil, Memorandum dated 12/6/22:

The applicants will need to present before the Neighborhood Planning Assembly (NPA) prior to application, as the project will introduce more than 10,000 sf of non-residential development. Conservation Board review is required, as the corners of the site dip into a National Resource buffer zone. That review is scheduled for December 5th. A State Wastewater permit will be required. Site disturbance will likely spur the need for an Erosion Prevention and Sediment Control Plan, as well as Stormwater review.

The applicant is obligated to secure any and all state and federal permits if the use and redevelopment occur.

The Stormwater Engineering program shared the following information:
It looks like the Applicant is aware of the Combined Sewer Offset Policy that will be an important factor for the Applicant to address moving forward.

Given the known contamination on site infiltrating treatment practices will not be available to the developers. Knowing this, the Stormwater Program will need to better understand how the site will manage the 1-yr, 24-hr storm even to ensure that the post-development peak flow hydrograph is equal to or less then the pre-development peak flow hydrograph. Essentially this means that the Applicant will need to ensure that the runoff leaving the site is no greater than current conditions following development.

While we don't yet know the total impervious proposed on site, it's safe to say that the value will be greater than 10,000 ft^2. Accordingly, the applicant will also need to document Treatment, Runoff reduction, and detention for 100% of the net new impervious surfaces (essentially all new impervious). What somewhat complicates this is the fact that runoff will likely both flow towards the street (which contributes to our combined system and flows to Main Plant) and back towards the Barge Canal (which would be considered a Lake Champlain Direct contribution). For flows to the combined sewer the CSOP will be applicable along with the 1-yr, 24-hr treatment requirement mentioned above. For the Lake Champlain direct flows we are less concerned about the peak hydrograph standard and more focused on water quality treatment as laid out in the Vermont Stormwater Manual.

Lastly, the Stormwater Program will look for documentation that the State/Feds overseeing the Pine Barge Canal Superfund Site are in support of any additional stormwater contributions to the Barge Canal. The State/Federal approval of any additional contributions will be a requirement for SW Program approval." No finding possible.

Additional Project Response:

The project team met with the Neighborhood Planning Assembly (NPA) initially on October 20, 2022 and had a follow-up meeting on May 18, 2023. See Exhibit 6 Affidavit Certificate confirming meeting date. The project team met with the Conservation Board on December 15th & will present again to the Board after permit application submission.

(b) Major Impact Review Standards:
Before a major impact development may receive approval, the DRB must be satisfied, based on documentation provided by appropriate city agencies, experts, interested parties and/or the applicant that the proposed development shall:

1. *Not result in undue water, air or noise pollution;*
   The outdoor activities at the bathhouse include saunas, hammocks, botanical gardens, relaxation space and outdoor pools. There is a small pedestrian plaza between the buildings. None of the proposed outdoor space will result in undue water, air or noise pollution.

2. *Have sufficient water available for its needs;*
   Refer to Exhibit 7.

3. *Not unreasonably burden the city's present or future water supply or distribution system;*
   Refer to Exhibit 7.

4. *Not cause unreasonable soil erosion or reduction in the capacity of the land to hold water so that a dangerous or unhealthy condition may result,*
   The project has been designed to mimic existing hydrology and hydrogeology. The proposed site layout includes linear bioretention cells capturing which capture stormwater as it flows off the site to the west and southwest. The bioretention cells will provide some infiltration based on the existing soils limited ability to infiltrate. The bioretention cells will be graded as level spreads so that during larger storms stormwater will continue to sheet flow across the site. An Erosion Prevention and Sediment Control (EPSC) Plan has been developed to limit soil erosion and sediment transport during construction.

5. *Not cause unreasonable congestion or unsafe conditions on highways, streets, waterways, railways, pedestrian pathways or other means of transportation, existing or proposed;*
   The project is located along the proposed Champlain Parkway which encourages alternative modes of travel. There is a bus stop on the northeast corner of the site and a shared use path will be constructed during the Champlain parkway work. A Traffic Impact Assessment was completed, please refer to Exhibit 4, Traffic Impact Assessment, by Roger Dickinson, PE, Trudell Consulting Engineers.

6. *Not cause an unreasonable burden on city's ability to provide educational services;*
   This project creates no burden on the city's educational services and due to this being a non-residential use, written input from the school department was not required.

7. *Not place an unreasonable burden on city's ability to provide municipal services;*
   Refer to Exhibit 7.

8. *Not have an undue adverse effect on rare, irreplaceable or significant natural areas, historic or archaeological sites, nor the scenic or natural beauty of the area or any part of the city;*
   The project will not have an adverse effect on rare, irreplaceable or significant natural areas, historic or archaeological sites, nor the scenic or natural beauty of the area. Refer to Exhibits 8A, 8B and 8C.

   Additionally, the project is working on a Letter of Intent with the City to donate the land at 0 & 501 Pine Street for conservation land allowing this project to enhance the long term protection of the significant natural areas surrounding the site.

9. *Not have an undue adverse effect on the city's present or future growth patterns nor on the city's fiscal ability to accommodate such growth, nor on the city's investment in public services and facilities;*
   The proposed development does not impact the City's future growth. The proposed development at 453 Pine Street is a low impact project making it an ideal for a site with significant limitations.

10. *Be in substantial conformance with the city's municipal development plan and all incorporated plans;*
    The site is located within the City's South End Art's District of which the proposed bathhouse use is an added flavor and amenity to a unique area.

11. *Not have an undue adverse impact on the present or projected housing needs of the city in terms of amount, type, affordability and location; and/or*
    Currently housing is not a permitted use in this zoning district therefore the project does not have an adverse impact on housing needs.

12. *Not have an undue adverse impact on the present or projected park and recreation needs of the city.*
    The project does not have an adverse impact on projected park and recreation needs as it will maintain its own site/landscaping and provide planned access points to the City's shared use

path. The project is also working on a Letter of Intent with the City to donate the land at 0 & 501 Pine Street for conservation land allowing this project to enhance long term protection of the significant natural areas surrounding the site.

(c) Conditions of Approval:
In addition to imposing conditions of approval necessary to satisfy the General Standards specified in (a) or (b) above, the DRB may also impose additional conditions of approval relative to any of the following:

1. Mitigation measures, including but not limited to screening, landscaping, where necessary to reduce noise and glare and to maintain the property in a character in keeping with the surrounding area.

From Mary O'Neil, Memorandum dated 12/6/22:

The Conceptual plan illustrates extensive plantings/trees around the site, with significant planned areas behind the bathhouse for outdoor activities relating to the use. The parking for the silt bathhouse is placed south/next to the structure, which will require some screening from the public street. Alternately, another location (west of the greenhouses?) is encouraged to minimize the visual impacts and to limit curb cuts. The rear (west) of the commercial building is largely parking. With additional screening or relocation of parking, no identified negative impacts are anticipated. **Affirmative finding as conditioned.**

2. Time limits for construction.

From Mary O'Neil, Memorandum dated 12/6/22:

A zoning permit has a three-year life. The project will be conditioned to be completed within that time frame, unless a phasing schedule is requested. **Affirmative finding as conditioned.**

3. Hours of operation and/or construction to reduce the impacts on surrounding properties.

From Mary O'Neil, Memorandum dated 12/6/22:

Construction activities are limited to M-F 7:30 AM to 5:30 PM. Typically Saturday construction is limited to interior work; however in the Enterprise Zone there are at present no residential uses that may be impacted. No construction is allowed on Sunday. **Affirmative finding as conditioned.**

4. That any future enlargement or alteration of the use return for review to the DRB to permit the specifying of new conditions;

From Mary O'Neil, Memorandum dated 12/6/22:

Any alteration or enlargement will be reviewed under the regulations in effect at the time of application. **Affirmative finding.**

and,
5. Such additional reasonable performance standards, conditions and safeguards, as it may deem necessary to implement the purposes of this chapter and the zoning regulations.

From Mary O'Neil, Memorandum dated 12/6/22:

Technical Review occurred June 2022. Review by the Conservation Board (December 5) and subsequent review by the Design Advisory Board and the Development Review Board will be scheduled which may define concerns not yet identified as the project advances. A scheduled NPA review is required prior to final application. **Affirmative finding as conditioned.**

Additional Project Response:

The project team met with the Neighborhood Planning Assembly (NPA) initially on October 20, 2022 and had a follow-up meeting May 18, 2023. See Exhibit 6 Affidavit Certificate.

Article 4: Zoning Maps and Districts

Section 4.4 3 Enterprise Districts

(a) Purpose

1. The Light Manufacturing (E-LM) district is the primary commercial/industrial center of Burlington, and is intended primarily to accommodate enterprises engaged in the manufacturing, processing, distribution, creating, repairing, renovating, painting, cleaning, or assembling of goods, merchandise, or equipment without potential conflicts from interspersed residential uses. Other accessory commercial uses are allowed to support a wide range of services and employment opportunities. This district is intended to ensure that sufficient land area is appropriately designated with the city to provide an adequate and diversified economic base that will facilitate high-density job creation and retention. This district is primarily intended to provide for industrial uses suitable for location in areas of proximity to residential development. Development is intended to respect interspersed historic industrial buildings, and reflect the industrial aesthetic of the district's past. Parking is intended to be hidden within, behind, or to the side of structures.

From Mary O'Neil, Memorandum dated 12/6/22:

The proposed health/wellness bathhouse (a use not clearly identified within Appendix A) was positively reviewed by the DRB as a Health Club under the earlier Sketch Plan Review. This application is based on that encouragement.

(b) Dimensional Standards and Density

Table 4.4.3 -1 Dimensional Standards and Density

Districts	Max. Intensity (floor area ratio[1])	Max. Lot Coverage[1]	Minimum Building Setbacks[1] (feet) Front	Side	Rear[3]	Max. Height[1] (feet)
Light Manufacturing	2.0 FAR	80%	5 min	0[2]	10%[2]	45'

453 Pine St	*Approx. building footprint is 55,000,*	*40%*	*Buildings are set back 35' from the property line*	*103' @ south,35' @ north*	*Lot depth varies, but development has avoided*	*Principal building height = 38'. Elevator*

	FAR is .26; < 2.0 limitation.		*due to the expansion of City ROW for a Shared Use path along Pine Street.*		*the westerly portion of the lot, meeting the required 10% rear setback.*	*shaft enclosure = 40'-7"*

2 – Structures shall be setback a minimum of 25-feet along any zoning district boundary line that abuts a residential zoning district. Lots of record existing as of September 9, 2015 that are split by enterprise and residential zones are exempt from this district boundary setback.

3 – Percentage of the lot depth.

From Mary O'Neil, Memorandum dated 12/6/22:

No finding possible.

(c) Permitted and Conditional Uses:
Health Clubs and General Merchandise/Retail ≥ 4,000 sf are Conditional uses in the E-LM. See Section 3.5.6 (a), above.

(d) District Specific Regulations

1. *Convenience Stores*

From Mary O'Neil, Memorandum dated 12/6/22:

At present the 4000 sf commercial building is proposed as General Merchandise/Retail. If the intent is to create a convenience store, additional standards apply. More information will be required.

2. *Drive throughs* (Not applicable.)

From Mary O'Neil, Memorandum dated 12/6/22:

No finding possible.

Additional Project Response:

The proposed Commercial building is now 7,200 sf footprint with three separate tenant spaces planned. A convenience store is not planned at this time. The tenants that will occupy the building are not yet known at this time. Individual building and zoning permit applications will be submitted at the time tenants/uses are identified in the future.

Section 4.5.4 Natural Resource Protection Overly (NR) District

453 Pine Street falls within the Natural Resource Protection Overlay District, and includes wetlands at both the northwest and southwest corners of the parcel. The Barge Canal, immediately west of this parcel is a Natural Resource Feature on Map 4.5.4-1. The project will be reviewed by the Conservation Board December 5, 2022.
Below are the District-Specific Regulations for the Wetland Conservation Zone:

Section 4.5.4 (d) Wetland Conservation Zone:

1. Additional Application Requirements

The following information shall be submitted in addition to the applicable requirements of Article 3 for any development involving a wetland or wetland buffer zone:

A. Boundary Determination: The boundaries of a wetland shall be determined in the field by a qualified professional with expertise in wetland delineation and surveyed by a licensed land surveyor or other qualified individual. The boundary between wetland and upland shall be delineated by the methodology set forth in the Vermont Wetland Rules. The identification and delineation of wetlands for a proposed project must be performed within a five-year period prior to submission and acceptance of a complete zoning application;

Arrowwood Environmental (AE) has completed an updated wetland delineation for 0 Pine and 453 Pine St as depicted in the attached resource maps. Ms. Tina Heath from the Vermont DEC Wetlands Office visited the site on 11/29/2022 to review and approve the delineation boundaries. The boundaries have been flagged and surveyed via submeter GPS.

B. A report addressing the project's impact on the wetland functions and values, and the measures that the applicant has incorporated into the project to avoid and minimize wetland impacts shall be prepared by a qualified professional with expertise in wetland delineation and evaluation;

AE will be preparing a report documenting their work and assessing any project impacts on the functions and values of the wetlands and overall natural area at the site and will be submitted as part of the DEC Wetlands Permit Application. See also Exhibit 9.

C. A site plan for a project that will impact a wetland or buffer zone shall include delineated wetland boundaries, buffer zone boundaries, erosion control measures, and all components of the proposed project, including, but not limited to all structures, driveways, parking areas, lawns, utilities, and the overall footprint of the construction area/zone of disturbance; and,

See Stone Environmental Inc. (SEI) Sheet C3 Existing Conditions Site Plan showing the Class II Wetland and associated buffers. SEI Sheet C4 shows the project components and SEI Sheet C6 shows wetland and buffer impacts and erosion control measures.

D. As part of their application, applicants must submit a complete stormwater management, erosion prevention and sediment control plan pursuant to the requirements of Sec 5.5.3, and successfully demonstrate how the project will prevent adverse impacts to surface water and groundwater quality before, during, or after construction. At a minimum, an applicant should

demonstrate how a project will meet the standards outlined in the latest edition of the Vermont Soil Erosion Handbook.

See SEI Sheets C4 and C8 for a complete stormwater management plan and SEI Sheets C3, C6, and C7 for an EPSC Plan.

2. Permitted Uses:

Except where otherwise noted herein, only the following uses are permitted within a wetland and its buffer zone subject to the requirements and limitations set forth below under Subpart 6.

A. Normal maintenance of existing lawns and maintained grounds including mowing, trimming of vegetation and the removal of dead or diseased vegetation around a residence, decorative landscaping and planting, vegetable and flower gardens, and the repair of existing private landscaping structures such as walkways and walls;

Normal maintenance is proposed.

B. "Accepted agricultural and silvicultural practices" as defined under 24 VSA Ch 117.

No agricultural and silvicultural practices proposed.

C. Normal maintenance of constructed wetlands and stormwater systems, provided that naturally occurring wetlands are not disturbed in conjunction with the maintenance;

The proposed stormwater management system is not located within any delineated Class II wetlands.

D. Normal maintenance of existing roads, rail lines, bridges, and culverts provided that disturbance to naturally occurring wetlands and shorelands is minimized in conjunction with such maintenance;

There is an existing access road to 0 Pine St (City Barge Canal Parcel) which is required to be maintained in place by the EPA ROD Institutional Controls.

E. Selective cutting of less than 25 percent of the trees six inches or more in diameter at breast height over any 10 year cycle; and,

Tree removal will be addressed under section 5.4.9 Brownfield Remediation and 5.5.4 Tree Removal (a)1.D. as part of an approval from DRB for more tree cutting as being a "regulated" activity per 4.F. below.

F. Recreational and educational activities such as fishing, walking, hiking, nature study, and bird watching.

There are no proposed recreational activities within the 50'-0" wetland buffer. However, there are limited recreational activities proposed within the 50'-0" to 100'-0" wetland conservation zone including a mowed walking path and hammock area that supports the Silt Bathhouse outdoor programming.

3. Prohibited Uses:

Except where noted herein, the following uses shall be prohibited within a wetland and its buffer zone.

A. The deposition or introduction of organic and inorganic chemicals, including pesticides, except when the application of pesticides is reviewed and approved by the BCB and DRB, and performed by an applicator certified by the Vermont Department of Agriculture for the sole purpose of controlling invasive species and subject to the requirements of the City's pesticide application ordinance (Burlington Code of Ordinances, Chapter 17, Section 9); and,

There are currently invasive species on the property that will need to be eradicated or controlled to support the development. The means and methods for control are under development considering City and State restrictions on the use of herbicides.

B. The off-road use of any motorized vehicles including ATVs or dirt bikes (the temporary use of motorized construction vehicles used to construct permitted or regulated activities in the wetland are specifically exempted from this prohibition) ;

None are proposed.

4. Regulated Uses:

Except where noted herein, all uses permitted or conditionally permitted in the respective underlying zoning district, including the list of activities below, may be approved within a wetland and its buffer zone after review and approval pursuant to the requirements and limitations set forth below under Subpart 6 below.

A. The construction of buildings or other structures, and roads, parking areas or other impervious surface;

There are a few permitted and regulated uses in Article 4.5.4(d) within the 50'-0" to 100'-0" wetlands conservation zone. These include a small impervious seating area adjacent to the saunas and (2) geodesic domes. There is a Phase 2 structure shown on the site plan, adjacent to the Private Event Building which would also extend into this zone but the Phase 2 would fall under a future separate permit if the Owner chooses to proceed with the Phase 2 structure.

B. Any form of drainage, dredging, excavation, or removal of material either directly or indirectly;

There are stormwater treatment areas within the 50' to 100' wetland's conservation zone which will require these actions to occur for construction of these items in addition to maintaining grades while providing adequate protection from contaminated soils.

C. Alteration or modification of natural drainage patterns, natural features and contours;

While site grading and certain modifications will occur to create the stormwater management systems, the intent is for post construction stormwater management systems to mimic natural drainage patterns.

D. Installation of docks, rip-rap or other shoreline stabilization features;

None proposed.

E. Installation of utility poles or utility service lines, underground pipes or cable conduits, and wells;

Aside for some already in place and yet to be installed ground monitoring wells, no other utility features except for stormwater management system components are envisioned to be located within the buffer.

F. Cutting of greater than 25 percent of the trees six inches or more in diameter at breast height over any 10 year cycle;

Tree removal will be addressed under section 5.4.9 Brownfield Remediation and 5.5.4 Tree Removal (a)1.D. as part of an approval from DRB for more tree cutting.

G. Construction, expansion or placement of any structure;

Refer to (d)4.A. above.

H. Construction or expansion of roads, rail lines parking areas, trails, and sidewalks;

Minimal walking paths are proposed at Silt and will be pervious surfaces.

I. Introduction of any form of pollution, including but not limited to the installation of a septic tank, the running of a sewer outfall, or the discharge of sewage treatment effluent or other liquid wastes into or so as to drain into a wetland;

None proposed.

J. The construction of a stormwater outfall as part of a stormwater management plan approved by the city engineer. In making determinations and decisions required herein, the city engineer shall consider the requirements of the most recent State of Vermont Stormwater Management Rules and Guidance document. The city engineer shall require the best practicable means be used to manage stormwater and prevent erosion and control sediment and the city engineer is hereby authorized to develop performance standards to ensure conformance with these state stormwater management rules; and,

There are stormwater treatment areas within the City's 50' to 100' wetland's conservation zone. The project post construction stormwater management system will be designed to meet the requirements of the state stormwater management rules and manual and City Ordinance Chapter 26. The underdrain of the bioretention systems will discharge to level spreaders located within the 50' buffer. This has been discussed with Tina Heath of the DEC wetlands division.

K. Application of pesticides performed by an applicator certified by the Vermont Department of Agriculture for the sole purpose of controlling invasive species and subject to the requirements of the City's pesticide application ordinance (Burlington Code of Ordinances, Chapter 17, Section 9). In no other cases shall pesticides be applied.

There are currently invasive species on the property that will need to be eradicated or controlled to support the development. The means and methods for control are under development considering City and State restrictions on the use of herbicides.

5. Prohibited activities in a vernal pool and buffer zone:

Except where noted herein, the following uses shall be prohibited within a vernal pool and its respective buffer.

A. Any activities which disturb the area within 100 feet of a vernal pool, including, but not limited to timber harvesting, disturbance of the understory vegetation, pesticide or herbicide application, the erection of fences or other barriers to amphibian dispersal, barriers and any other type of human activities that disturb the vegetation or water quality in the pool and buffer.

There are no vernal pools on or adjacent to the subject property.

6. Criteria for Review

In granting, denying, or conditioning any permit involving a wetland, vernal pool or respective buffer zone, the DRB, in consultation with the conservation board, will consider the project's impact on the functions and values of the wetland, and the measures that the applicant has incorporated into the project to avoid and minimize impacts. The DRB shall only approve a project having an impact on a wetland or wetland buffer zone if an applicant can demonstrate that any adverse impact is de minimus on the significant functions and values of the wetland including:

A. Water storage for floodwater and stormwater;

The project area, including the wetland buffer have the potential to provide water storage for floodwater although contiguity with Lake Champlain significantly diminishes this function. The control of stormwater will be addressed by design of a site specific Erosion Prevention and Sediment Control (EPSC) and Post-Construction Stormwater Management System to comply with City Ordinance Chapter 26, the State of Vermont Stormwater Management Rules and Manual as well as the EPA ROD Institutional Controls.

B. Erosion and sedimentation control through binding and stabilizing the soil or shoreline;

The project area, including wetland buffer, are not in close proximity to high velocity currents with the closest shoreline approximately 350' to the west.

C. Surface water and groundwater protection, including sediment and toxicant retention, nutrient retention and transformation, and groundwater discharge and recharge;

The wetland buffer provides water quality protection which the applicant intends to address by designing its Erosion Prevention and Sediment Control (EPSC) and Post-Construction Stormwater Management Systems to comply with City Ordinance Chapter 26, the State of Vermont Stormwater Management Rules and Guidance documents as well as the EPA ROD Institutional Controls. By doing so the project will result in no reduction in water quality to the wetland and will possibly provide an improvement to current runoff conditions.

D. Fisheries habitat;

There are no streams or open water within the project area. The closest open water with the potential to support fish is approximately 350' to the west. The wetland buffer in the project area does not provide, support, or protect fisheries habitat.

E. Wildlife habitat;

The project area, including wetland buffer from 50'-100', does not contain significant wildlife features due to the dominance of non-native invasive species and existing vegetation management. Refer to Exhibits 8A, 8B and 8C.

F. Examples of natural community types that are exemplary, rare, or make an important contribution to the natural heritage of Burlington and Vermont;

The project area is highly disturbed, dominated by non-native invasive species. The site, including the wetland buffer, is not an example of an exemplary or rare natural community type and does not contribute toward the overall natural heritage of Burlington.

G. Habitat for rare, threatened and endangered species;

Refer to Exhibits 8A, 8B and 8C.

H. Education and research in natural sciences;

The project area is highly disturbed, including the wetland buffer, and does not contain elements that contribute toward the study of natural sciences. The overall wetland provides an outdoor classroom for the study of impacts from the super fund site.

I. Recreational and economic benefits; and,

The project site, including the wetland buffer, does not provide opportunity for wetland dependent recreation and economic benefits. The development of 453 Pine St opens up the opportunity to create a conservation area at 0 Pine St with the donation of adjacent property 501 Pine St which will allow more public accessibility to the future conservation area.

J. Open space and aesthetics.

The project site, including the wetland buffer, does not possess special or unique aesthetic qualities due to the past disturbance and dominance by non-native invasive species. The site does provide open space in an urban landscape, however, this is not a wetland or wetland buffer function in this context. The development of 453 Pine St creates the opportunity for a conservation area at 0 Pine St with the donation of adjacent property 501 Pine St which will allow more public accessibility to the future conservation area.

In addition, the review of a project having involving a wetland or wetland buffer zone shall also be subject to the following requirements and limitations:

K. Any land disturbing activities (i.e., vegetation has been removed, or the landscape has been graded or filled resulting in bare soil surfaces) shall include a stormwater management, erosion prevention and sediment control plan pursuant to the requirements of Sec 5.5.3 to be reviewed by the conservation board and approved by the city engineer;

SEI Sheets C3, C6 and C7 detail the erosion prevention and sediment control measures for the project.

L. No new stormwater outfall shall directly discharge into surface water without approval and implementation of a stormwater management plan approved by the city engineer;

The new stormwater outfall will not directly discharge into the wetland. In addition, an outlet designed to spread out the stormwater and avoid concentrated flow is proposed.

M. No installation of docks, rip-rap or other shoreline stabilization features shall be installed without review approval by the city engineer;

None proposed.

N. Agricultural and silvicultural activities shall follow Best Management Practices for the Protection of Water Quality; and,

Not applicable.

O. Stormwater management, erosion, and sedimentation control plans shall be submitted for review by the conservation board who shall consult with the development review board and city engineer prior to issuance of a recommendation to the city engineer who shall render a final decision on such plans.

Reference C6 & C7 for Erosion Prevention & Sediment Control Plans and Details.

In making determinations and decisions required herein, the city engineer shall consider the requirements of the most recent State of Vermont Stormwater Management Rules and Guidance document. The city engineer shall require the best practicable means be used to manage stormwater and control erosion and sedimentation and the city engineer is hereby authorized to develop performance standards to ensure conformance with these state stormwater management rules.

From Mary O'Neil, Memorandum dated 12/6/22:

As noted, the project will be reviewed by the Conservation Board December 5, 2022. Any recommendations or conditions imposed by that body will be incorporated into future review.

Article 5: Citywide General Regulations
Section 5.2.1 Existing Small Lots.

From Mary O'Neil, Memorandum dated 12/6/22:

Not applicable.

Section 5.2.2 Required Frontage or Access

From Mary O'Neil, Memorandum dated 12/6/22:

The parcel has access onto Pine Street, an accepted city street.

Section 5.2.3 Lot Coverage Requirements

From Mary O'Neil, Memorandum dated 12/6/22:

See Table 4.4.3-1, above.

Section 5.2.4 Buildable Area Calculation

From Mary O'Neil, Memorandum dated 12/6/22:

E-LM is not subject to this regulation. Not applicable.

Section 5.2.5 Setbacks

From Mary O'Neil, Memorandum dated 12/6/22:

See Table 4.4.3-1, above.

Section 5.2.6 Building Height Limits

From Mary O'Neil, Memorandum dated 12/6/22:

See Table 4.4.3-1, above.

Section 5.2.7 Density and Intensity of Development Calculations

From Mary O'Neil, Memorandum dated 12/6/22:

See Table 4.4.3-1, above.

Part 3: Non Conformities
There are no identified non-conformities on this (vacant) parcel.

From Mary O'Neil, Memorandum dated 12/6/22:

Affirmative finding.

Section 5.4.8 Historic Buildings and Sites

From Mary O'Neil, Memorandum dated 12/6/22:

Not applicable.

Section 5.5.1 Nuisance Regulations

From Mary O'Neil, Memorandum dated 12/6/22:

Nothing in the proposal appears to constitute a nuisance under this criterion. **Affirmative finding.**

Section 5.5.2 Outdoor Lighting
Reference Exhibit 3.

Section 5.5.3 Stormwater and Erosion Control
See SEI Sheets C4 and C8 for a complete stormwater management plan and SEI Sheets C3, C6, and C7 for an EPSC Plan.

Article 6: Development Review Standards
Part 1: Land Division Design Standards
No subdivision proposed.

Part 2: Site Plan Design Standards
Sec. 6.2.2 Review Standards

(a) Protection of Important Natural Features:

From Mary O'Neil, Memorandum dated 12/6/22:

The west of the lot falls within a natural resource overlay and wetland buffers (state and local). The submitted site design shows extensive landscaping interspersed among pathways (south, bathhouse use) and around the parking areas (north, bowling alley.) West of this site is proposed conservation land and the barge canal. A fourth structure identified as "private event space" is illustrated within a city 100' wetland buffer zone, as well as other structures (3 saunas, a stormwater treatment area, and something south of the bathhouse staff parking area.) Stormwater systems are permitted uses within the Wetland conservation zone and its buffer. (Sec. 4.5.4 (d) 2. C.) The construction of buildings or other structures and parking areas, including any impervious surface (concrete slabs) are regulated uses.

Development on this SuperFund site will require specific and exacting restrictions to prevent exacerbation of contaminant spread and to work within DEC and/or federal guidelines. **Affirmative finding as conditioned.**

Additional Project Response:

There have been site plan revisions since the memorandum was written. With the removal of the Backside Bowl project, the Silt Bathhouse project shifted to the north, moving most landscaping, impervious surfaces and structures outside of the 50'-0" to 100'-0" wetlands conservation zone. Features that extend into this zone are permittable regulated uses in Article 4.5.4(d). These include a small impervious seating area adjacent to the saunas and (2) geodesic domes. There is a Phase 2 structure shown on the site plan, adjacent to the Private Event Building which would also extend into this zone but the Phase 2 would fall under a future separate permit if the Owner chooses to proceed with the Phase 2 structure.

(b) Topographical Alterations:

Reference drawing C4 for proposed grading for the project.

(c) Protection of Important Public Views:

From Mary O'Neil, Memorandum dated 12/6/22:
Not applicable.

(d) Protection of Important Cultural Resources:

From Mary O'Neil, Memorandum dated 12/6/22:

There are currently no structures on 453 Pine Street. The Barge Canal is noted within the Pine Street Industrial District, listed on the National Register in 2018. No part of this project has been identified to alter those characteristics and features that contribute to the Barge Canal's historic significance.
Affirmative finding.

(e) Supporting the Use of Renewable Energy Resources:
The project is currently seeking to employ geothermal energy on site for heating and cooling. The proposed building's roofs will be designed to be solar ready.

(f) Brownfield Sites:

From Mary O'Neil, Memorandum dated 12/6/22:

453 Pine Street is part of a Federal SuperFund site. The applicant has been long engaged with officials relative to their proposed project(s) and required actions to develop the site.
Any state or federal requirements imposed through Corrective Action or other remediation measures shall be incorporated into any permit conditions. **Affirmative finding as conditioned.**

Additional Project Response:

453 Pine St is listed as a Brownfield site and is not part of the Federal Superfund site.

(g) Provide for nature's events:
Special attention shall be accorded to stormwater runoff so that neighboring properties and/or the public stormwater drainage system are not adversely affected. All development and site disturbance shall follow applicable city and state erosion and stormwater management guidelines in accordance with the requirements of Art 5, Sec 5.5.3.
See SEI Sheets C4 and C8 for a complete stormwater management plan and SEI Sheets C3, C6, and C7 for an EPSC Plan. The project has been carefully designed to help ensure that the hydrology and hydrogeology does not dramatically change on this sensitive site.

Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.
Building entrances are covered to protect from weather. Portions of the sidewalk have proposed snowmelt systems. Several parking spaces are identified for snow storage. See SEI Sheet C5. For larger snow fall events, snow will be removed off-site.

(h) Building Location and Orientation:

The introduction of new buildings and additions shall maintain the existing development pattern and rhythm of structures along the existing streetscape. New buildings and additions should be aligned with the front façade of neighboring buildings to reinforce the existing "street edge" or where necessary, located in such a way that complements existing natural features and landscapes.

All principal buildings are positioned with frontage to Pine Street and are aligned with the Maltex Building to the north.

Buildings placed in mixed-use areas where high volume of pedestrian traffic are desired should seek to provide sufficient space (optimally 12-15 feet) between the curbline and the building face to facilitate the flow of pedestrian traffic. In such areas, architectural recesses and articulations at the street-level are particularly important, and can be used as an alternative to a complete building setback in order to maintain the existing street wall.

Along the eastern edge of 453 Pine Street there are pedestrian friendly spaces directly off the City's shared use path. A pedestrian plaza is proposed between the two buildings offering access and connection to both buildings.

Principal buildings shall have their main entrance facing and clearly identifiable from the public street.

The Commercial building has three clear entrances facing Pine Street. Silt Bathhouse includes an entrance facing Pine Street and is featured within an earthen berm. The earthen berm entrance is intended to be the beginning of the bathhouse experience, creating a sense of calm, mystery and excitement entering the facility.

(i) Vehicular Access:

The principal vehicular access point is through the re-aligned Maltex driveway to the north. A secondary access point is planned at the south for service & staff. Screening and clear signage will be provided so the principal entry is clearly defined and the secondary access is less defined. The secondary service/staff entry is imperative to the function of the bathhouse building as all the pool mechanical spaces are located on this side of the site which will require regular maintenance and service. EPA requires vehicular access to the barge canal site at 0 Pine St which is maintained at the southwest corner of the rear parking lot. Refer to Exhibit 5 for temporary construction access.

(j) Pedestrian Access:

With the Champlain Parkway work a new shared use path will run along the entire parcel creating pedestrian connection to the City. There are entrance plazas shown to each of the buildings with a larger pedestrian plaza between the buildings creating connection and access.

(k) Accessibility for the Handicapped:

Mary O'Neil, Memorandum dated 12/6/22.

ADA is under the jurisdiction of the building inspector. Early interaction and guidance with the offices of the building inspector is recommended. **Affirmative finding as conditioned.**

The project is being designed to 2010 ADA standards.

(l) Parking and Circulation:

Access to the site is proposed through a newly oriented shared drive from the Maltex site, re-arranged as part of the Parkway improvements along Pine Street. A secondary lot for service and staff is shown to the

south of the bathhouse, providing an additional 18 parking spaces. The primary parking lot shows 59 parking spaces creating a total of 78 new parking spaces. The maximum parking for a Health Club is 2 parking spaces per 1,000 sf. The Commercial building which will be General Merchandise/Retail have a maximum of 2 per 1,000 sf. Total calculated allowable based on building areas is 78.7 parking spaces. The areas included in this calculation are as follows:

- **Silt Bathhouse (Health Club)**
  - **Main building = 27,000 sf**
  - **Private Rental building = 1,000 sf**
  - **Sauna buildings = 550 sf**
  - **Geodesic domes = 2 @ 500 sf each = 1,000 sf**
    - **Total area = 29,550 sf/1,000 sf = 29.55 x 2 = 59.1 or 60 maximum parking spaces**
- **Commercial building (General Merchandise/Retail**
  - **First floor = 7,400 sf**
  - **Mezzanine level = 2,400 sf**
    - **Total area = 9,800 sf/1,000 sf = 9.8 x 2 = 19.6 or 20 maximum parking spaces**
- **60 + 20 = 80 parking spaces allowed**
- **77 total parking spaces proposed**

(m) Landscaping and Fences:

See Landscape drawings, L5.1 through L6.1. There will be a perimeter security and privacy fence for the Silt Bathhouse facility. All trash/recycling areas will be enclosed.

(n) Public Plazas and Open Space:

There are significant plazas and open space offered along Pine Street, including between Silt Bathhouse and the Commercial building as well as in the rear of the bathhouse where decks, patios and facilities for the bathhouse are provided.

(o) Outdoor Lighting:

Where exterior lighting is proposed the applicant shall meet the lighting performance standards as per Sec 5.5.2.

Refer to Exhibit 3.

(p) Integrate infrastructure into the design:

Exterior storage areas, machinery and equipment installations, service and loading areas, utility meters and structures, mailboxes, and similar accessory structures shall utilize setbacks, plantings, enclosures and other mitigation or screening methods to minimize their auditory and visual impact on the public street and neighboring properties to the extent practicable.

Utility and service enclosures and screening shall be coordinated with the design of the principal building, and should be grouped in a service court away from public view. On-site utilities shall be place underground whenever practicable. Trash and recycling bins and dumpsters shall be located, within preferably, or behind buildings, enclosed on all four (4) sides to prevent blowing trash, and screened from public view.

Any development involving the installation of machinery or equipment which emits heat, vapor, fumes, vibration, or noise shall minimize, insofar as practicable, any adverse impact on neighboring properties and the environment pursuant to the requirements of Article 5, Part 4 Performance Standards.

The project is currently exploring different mechanical systems. Any roof and ground mounted equipment will be screened. Electrical service to buildings are planned to be installed underground, unless the Corrective Action Plan advises otherwise. Dumpsters will be enclosed on all 4 sides.

Part 3: Architectural Design Standards

Sec. 6.3.2 Review Standards

(a) Relate development to its environment:

1. Massing, Height and Scale:

Silt Bathhouse is made up of two simple gable forms hugging the southwest outdoor programmed, landscape space. The building is three stories, one of which is within the attic roofline and incorporates large dormers. The first floor from Pine Street view is mainly encompassed by an earth berm which creates an unique entry to the bathhouse. The principle building height is 38'-0" and the highest flat roof is the elevator shaft roof at 40'-7." The building form steps down in height at it transitions to adjacent 501 Pine St, a wooded and undeveloped superfund site. The Commercial building is a simple, rectilinear one-story building with a flat roof. The building height is 23'-6." There is a proposed corten trellis structure to the south for indoor/outdoor connection to tenant space and for sun-shading.

2. Roofs and Rooflines.

The bathhouse roof is made up of 2 simple gable roofs with dormers and includes a few flat roofs and roof terraces. The greenhouse roof is proposed to be a glass structure. The flat roof above the berm entry is proposed to be a green roof. The commercial building is a one-story flat roof structure.

3. Building Openings

The Commercial building includes large storefront glazing on all 4-sides, with the majority facing Pine St. Silt Bathhouse due to its program requirements has minimal openings facing Pine St with majority of the openings to the West with views towards Lake Champlain & Adirondacks where programmatic elements take advantage of views.

(b) Protection of Important Architectural Resources:

Not applicable.

(c) Protection of Important Public Views:

Not applicable.

(e) Provide an active and inviting street edge:

The Commercial building provides an active & inviting street edge with large storefront openings and Pine Street facing entry plazas. Silt Bathhouse acts as a transition point between the urban streetscape of Pine St and the adjacent superfund lot, 501 Pine, which shall remain in its wooded state. Silt Bathhouse is inspired by Scandinavian Design Principles that include function, simple forms, natural light, sustainability and connection to nature. The simple form allows for a calm facade and a calm guest experience without visual clutter. The earthen berm at the entry connects to nature and emphasizes the ethos of the bathhouse focused on botanicals and extensive gardens. The dark cladding creates a sense of mystery and curiosity.

(e) Quality of materials:

All development shall maximize the use of highly durable building materials that extend the life cycle of the building, and reduce maintenance, waste, and environmental impacts. Such materials are particularly important in certain highly trafficked locations such as along major streets, sidewalks, loading areas, and driveways. Efforts to incorporate the use of recycled content materials and building materials and products that are extracted and/or manufactured within the region are highly encouraged.

See Exterior Building Elevations & Materials on A-2, A-3 and A-9. The project plans to use durable materials with low environmental impacts.

(f) Reduce energy utilization:

From Mary O'Neil, Memorandum dated 12/6/22.
All construction is required to meet the guidelines for Energy Efficient construction pursuant to the requirements of Article VI. Energy conservation, Section 8 of the City of Burlington Code of Ordinances. **Affirmative finding as conditioned.**

(g) Make advertising features complementary to the site:

From Mary O'Neil, Memorandum dated 12/6/22.
Any signage will require a separate permit.

(h) Integrate infrastructure into the building design:

From Mary O'Neil, Memorandum dated 12/6/22.
See Section 6.2.2. (p), above.

(i) Make spaces secure and safe:

From Mary O'Neil, Memorandum dated 12/6/22.
Development shall adhered to all applicable building and life safety code as defined by the building inspector. **Affirmative finding as conditioned.**

Article 7: Signs

From Mary O'Neil, Memorandum dated 12/6/22.
Any signage will require separate permitting. For three or more separate uses, a Master Sign Plan is encouraged. **Affirmative finding as conditioned.**

Article 8: Parking

Refer to Section 6.2.2.(l) above.

Items for additional consideration:

1. Impact Fees will be assessed based on the new building square footage based on use.

2. The application will be required to meet all requirement of Chapter 26: Burlington's Wastewater, Stormwater and Pollution control ordinance.

The project is designed to store wastewater during storm events to limit discharge to the combined sewer (CS) system while it is surcharging. The grinder pump stations will have enough capacity to store

wastewater during this event. In addition, the site has been designed to continue to drain from Pine Street westerly to avoid directing any stormwater flows from draining to the City's collection system.

3. The Stormwater Program will look for documentation that the State/Federal agencies overseeing the Pine Barge Canal Superfund Site are in support of any additional stormwater contributions to the Barge Canal. The State/Federal approval of any additional contributions will be a requirement for SW Program approval.

Since the post construction stormwater management system is designed to mimic existing hydrology and hydrogeology conditions there will not be additional stormwater discharged to the Barge Canal. This is being evaluated thoroughly through groundwater modeling and studies which are being conducted to ensure that the development and/or stormwater does not impact the Pine Barge Canal Superfund Site.

4. A full submission response to the requirements of Section 4.5.4. (d), Wetland Conservation Zone shall be required at final application. The boundaries of the wetland shall be determined in the field by a qualified professional with expertise in wetland delineation and surveyed by a licensed land surveyor or other qualified individual.

The wetlands have been delineated by Dori Barton, of Arrowwood Environmental and surveyed by Button Land Surveying. The wetland boundary and associated buffers are shown on the plans prepared by Stone Environmental, Inc.

5. A letter of sufficient water and sewer capacity will be required prior to issuance of the zoning permit. A State Wastewater permit will also be required; it is the applicants' responsibility to secure said permit.

See Exhibit 7.

6. Any state or federal requirements imposed through Corrective Action or other remediation measures shall be incorporated into any permit conditions.

7. ADA access is under the jurisdiction of the building official(s).

All Building will meet code requirements for ADA access.

8. Parking south of the Bathhouse, if retained, must be screened from view from the public right-of-way.

Parking will be screened from the public right-of-way, reference L5.1.

9. A plan for snow removal/storage shall be included with a final application, particularly to assure that emergency vehicle access remains unhindered.

Several parking spaces are identified to be used for snow storage. See Sheet C5. In addition, snow will be removed from the site for larger storms.

10. Principal buildings shall have their main entrance facing and clearly identifiable from the public street.

The design includes a main entrance facing the public street.

11. All exterior material shall be defined.

Reference A-2, A-3 & A-6.

12. Lighting information, including fixtures, locations, and illumination levels shall be submitted in a final application.

Reference Exhibit 3.

13. A traffic study will be required.

Reference Exhibit 4.

14. Confirmation shall be provided as to the height of the bathhouse, including the flat-roofed section.

Principle building height is 38'-0" and flat roof of the elevator shaft is 40'-7."

15. Parking shall be limited to 88 spaces per ZA 22-07 per the uses described.

Parking calculations have been revised based on revised site plan.

16. Signage will require separate permitting.

17. All construction is required to meet the guidelines for Energy Efficient construction pursuant to the requirements of Article VI. Energy conservation, Section 8 of the City of Burlington Code of Ordinances.

18. A landscaping plan shall be required. The Conservation Board may opine on the installation method of the perimeter fence and whether helical piles may induce contaminant migration.

19. All new electric service shall be undergrounded, unless the Corrective Action Plan advises otherwise.

20. Any conditions imposed by the Conservation Board shall be incorporated into a final decision.

21. All mechanical equipment, meters, utility connections and accessory structures shall be identified on the site plan and/or building elevations as appropriate. Screening may be required.

22. Standard Permit Conditions 1-15.

<u>453 Pine St – Burlington, VT</u>
COA Level II Application – Property Photos
5/22/23



1 – Site Aerial Photo

525 Hercules Drive I Suite Two I Colchester, VT 05446 I Phone: 802.655.5020 I Fax: 802.655.6567 I wiemannlamphere.com



2 – Site Aerial Photo looking Northwest



3 – Site Aerial Photo looking Southwest

525 Hercules Drive I Suite Two I Colchester, VT 05446 I Phone: 802.655.5020 I Fax: 802.655.6567 I wiemannlamphere.com



4 – Site Aerial Photo looking Southeast

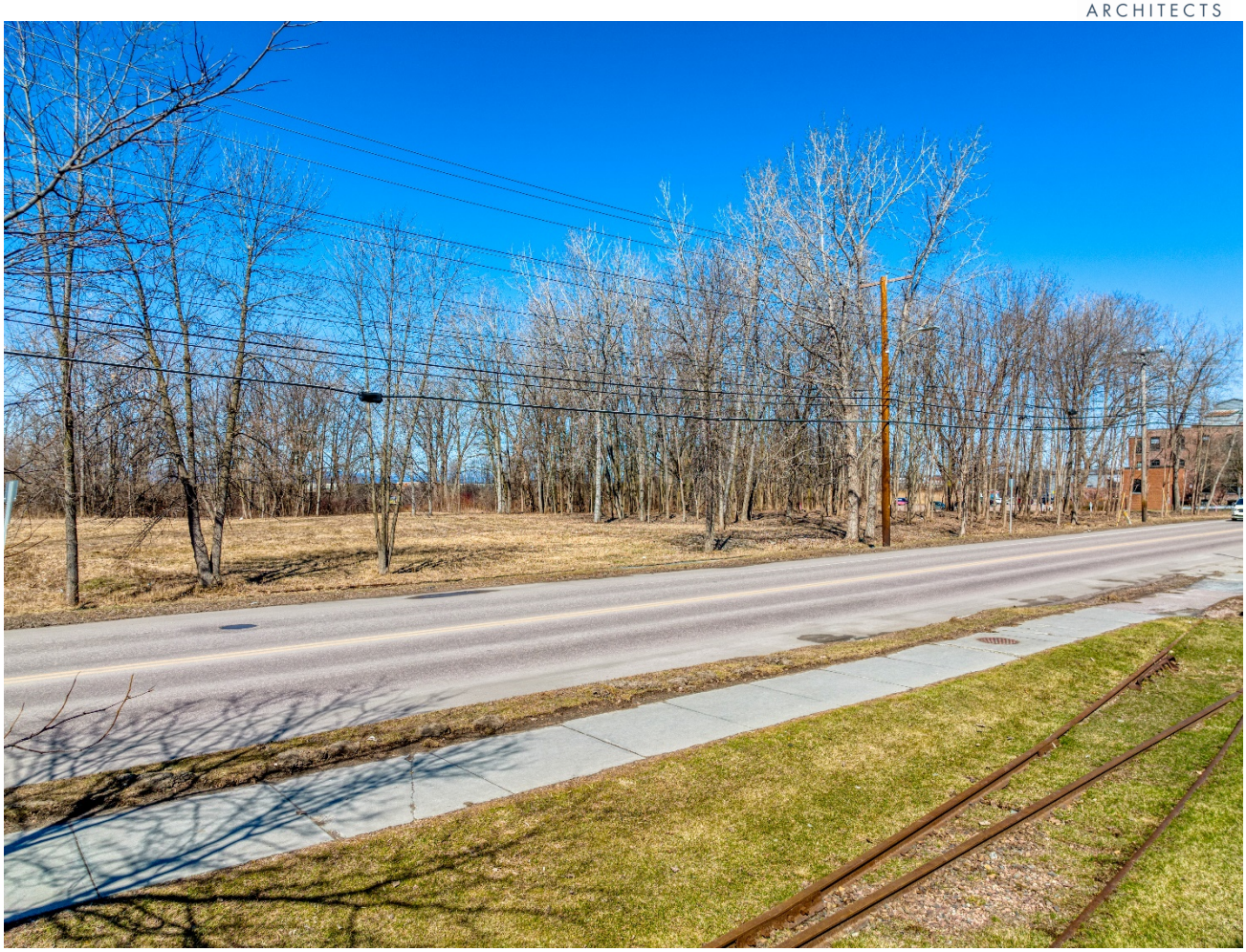
525 Hercules Drive I Suite Two I Colchester, VT 05446 I Phone: 802.655.5020 I Fax: 802.655.6567 I wiemannlamphere.com



5 – Site Aerial Photo looking Northeast



6 – Site Street Perspective Photo looking west from Dealer.com south entry drive



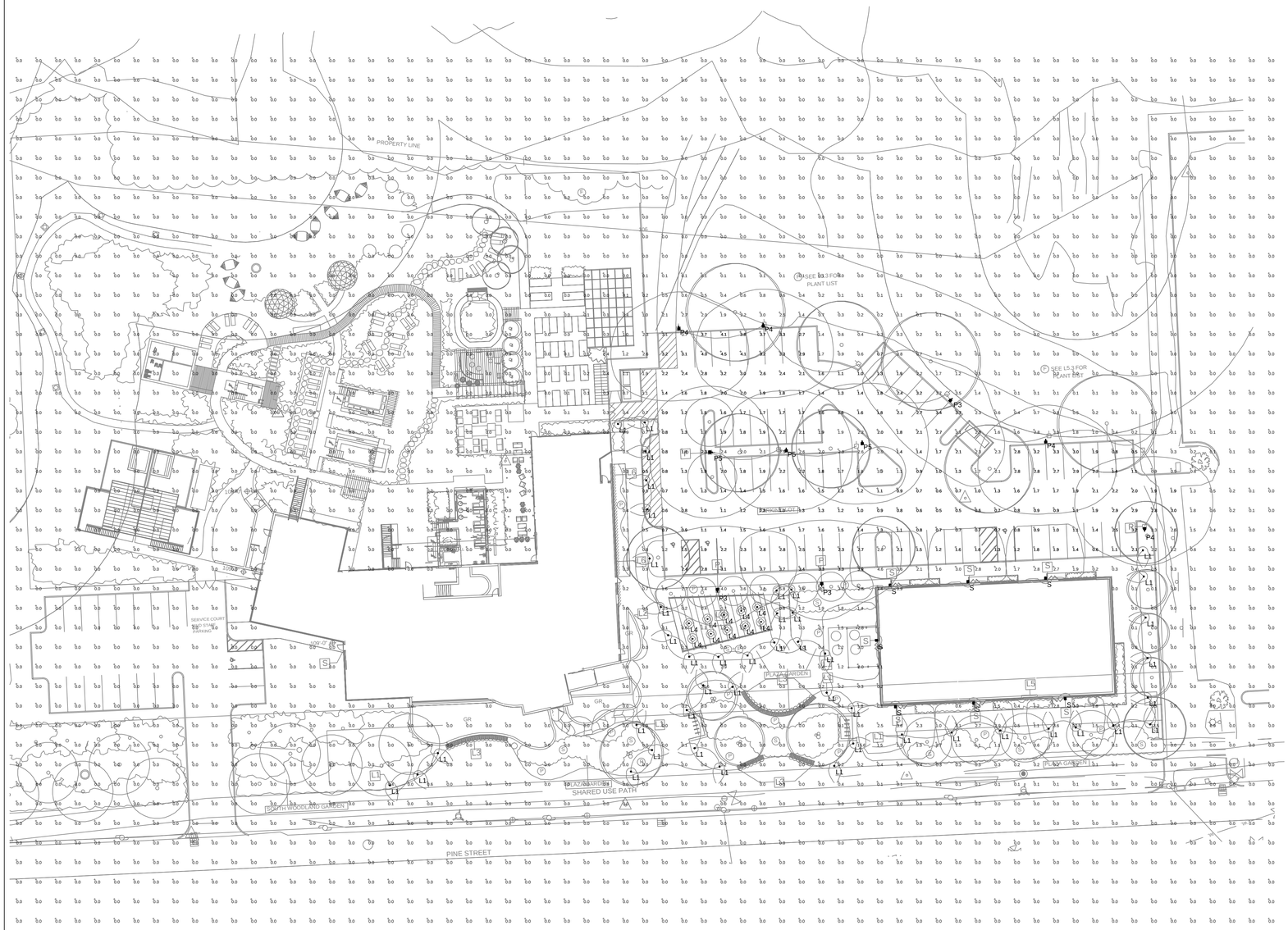
7 – Site Street Perspective Photo looking Northwest from east side of Pine St

525 Hercules Drive I Suite Two I Colchester, VT 05446 I Phone: 802.655.5020 I Fax: 802.655.6567 I wiemannlamphere.com



8 – Site Street Perspective Photo looking west from Dealer.com north entry drive

525 Hercules Drive I Suite Two I Colchester, VT 05446 I Phone: 802.655.5020 I Fax: 802.655.6567 I wiemannlamphere.com



JOB NAME: 453 PINE ST
APEX LIGHTING SOLUTIONS
WORKPLANE/CALC PLANE: AT FINISH GRADE
MOUNTING HEIGHT: SEE LUMINAIRE SCHEDULE
APPS: LED
SALES: TC
SPECIFIER: WIEMANN LAMPHERE ARCHITECTS

Luminaire Schedule							
Qty	Label	Arrangement	Lumens	Input Watts	LLF	BUG Rating	Description
45	L1	Single	240	8.8	0.900	B0-U0-G0	ZANEEN L9B232-30K
10	L4	Single	119	1	0.900	B0-U1-G0	MPL L01-2-W30H-W-C-0-FINISH / RECESSED IN CONCRETE TUNNEL CEILING @ 9FT AFG
3	P3	Single	6893	55.9	0.900	B2-U0-G2	USAL RZRM-PLED-III-M-24LED-700mA-30K-VOLT-1-FINISH / MOUNTED TO SNTS 154-11-1-FINISH
4	P4	Single	6841	55.9	0.900	B2-U0-G2	USAL RZRM-PLED-IV-24LED-700mA-30K-VOLT-1-FINISH / MOUNTED TO SNTS 154-11-1-FINISH
3	P5	Single	6844	55.9	0.900	B3-U0-G2	USAL RZRM-PLED-VSQ-W-24LED-700mA-30K-VOLT-1-FINISH / MOUNTED TO SNTS 154-11-1-FINISH
7	S	Single	2199	21.4	0.900	B0-U0-G1	USAL RZR-WM1-PLED-IV-FT-20LED-350mA-WW-VOLT-FINISH-HS-PLED / WALL MOUNTED @ 8FT AFG TO BOF

Calculation Summary						
Label	Grid Height	Avg	Max	Min	Avg/Min	Max/Min
CalcPts_1	0	0.24	25.4	0.0	N.A.	N.A.
PARKING LOT	0	1.89	13.4	0.5	3.78	26.80

GENERAL DISCLAIMER:

Calculations have been performed according to IES standards and good practice Some differences between measured values and calculated results may occur due to tolerances in calculation methods, testing procedures, component performance, measurement techniques and field conditions such as voltage and temperature variations. Input data used to generate the attached calculations such as room dimensions, reflectances, furniture and architectural elements significantly affect the lighting calculations. If the real environment conditions do not match the input data, differences will occur between measured values and calculated values.

* LLF Determined Using Current Published Lamp Data

NOTE TO REVIEWER:

Total Light Loss Factor (LLF) applied at time of design is determined by applying the Lamp Lumen Depreciation (LLD) from current lamp manufacturer's catalog, a Luminaire Dirt Depreciation Factor (LDD) based on IES recommended values and a Ballast Factor (BF) from current ballast specification sheets. Application of an incorrect Light Loss Factor (LLF) will result in forecasts of performance that will not accurately depict actual results.

For proper comparison of photometric layouts, it is essential that you insist all

APEX LIGHTING SOLUTIONS
20-30 BEAVER ROAD, WETHERSFIELD, CT 06109
TELEPHONE 860.632.8766 / WWW.APEXLTG.COM

PROJECT TITLE:
453 PINE ST

DRAWING TITLE:
SITE LIGHTING
PHOTOMETRIC CALCULATION

SCALE : 1"=30'-0"
DATE: 5/22/23
DRAWN BY: LED
SHEET:
SL-1

ZANEEN®

PROJECT	
TYPE	
SPECIFIER	
QUANTITY	
DATE	

STICK POST

L9B232-

base number | Color Temperature

1.To build a product code in our configurator select the specify button on the base model # product page
2. To build a manual product code on this datasheet choose from the options listed below in blue font and add the suffix to the base model #



GENERAL

Series: Stick
Brand: Platek
Division: Exterior
Mounting Type: Post
Mounting Location: Above Ground
Subcategory: Bollard

PHYSICAL

Shape: Rectangle
Length (mm): 90
Length (in): 3 9/16
Width (mm): 90
Width (in): 3 9/16
Height (mm): 550
Height (in): 21 5/8
Light Distribution: Direct
Weight (kg): 6.6
Weight (lbs): 14.55
Screws: No visible screws
Diffuser: PMMA
Fixture Finish: GRY
Fixture Material: Concrete

ELECTRICAL

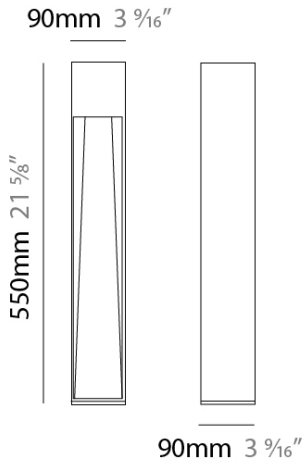
Input Wattage Range: 10 - 19 W
Lamp Type: LED
Input Wattage (W): 9
Total Output Wattage (W): 8.5
Dimming: Non-Dimming / Phase Dimming (120Vac only) / 0-10V Dimming
Driver Included: No
Driver Location: Remote
Driver Type: Constant Current - Universal
Input Voltage (V): 120 / 277
Constant Current (MA): 700

LED

Delivered Lumen Range: 100 - 499 lm
Color Temperature (°K): 3000 / 4000
Max. Delivered Lumen (lm): 305 / 315
Nominal Lumen (lm): 750 / 800
CRI: >80 CRI
Lamp Life (hrs): 60000

RATINGS AND CERTIFICATIONS

Certified By: Certified for North American Standards
IP rating: IP65
IK Rating: IK06



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Available for International specifications by adding 'INT' at the end of the existing Model #. For assistance on 'custom' specifications, contact zteam@zaneen.com.
In a constant effort to supply the best product, we reserve the right to change specifications or materials without notice. The most recent specification sheets are found at zaneen.com

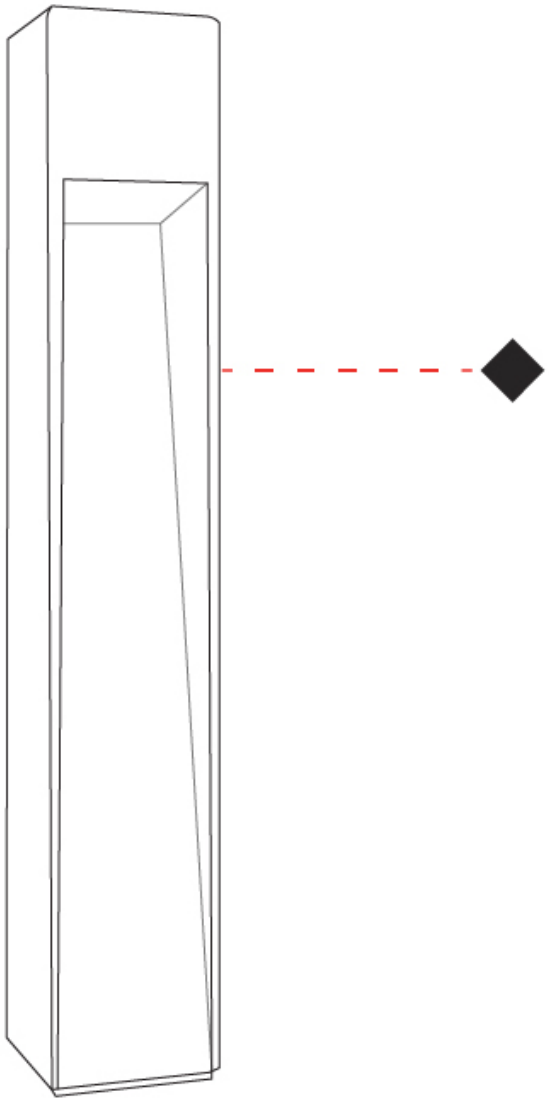
May 22, 2023, 5:17 pm

ZANEEN®

PROJECT	
TYPE	
SPECIFIER	
QUANTITY	
DATE	

STICK POST

L9B232-



E

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ZANEEN®

STICK POST
COLOR FINISH CHART

PROJECT	
TYPE	
SPECIFIER	
QUANTITY	
DATE	

Fixture Finish

Gray - GRY



Digital: Not all screens are calibrated the same, and therefore, colors will appear differently between screens.
Physical: When texture is involved, there will be variations in color, character and tone within a product series and between product families.

E

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ZANEEN®

STICK POST

PROJECT	
TYPE	
SPECIFIER	
QUANTITY	
DATE	

LEGEND

	floor-mounted		pivotable		special LED (upon request) RGB, RGBW, tunable, gold+, meat+, art+, fashion+
	wall and ceiling: recessed and surface mounted		rotating		warm dim / natural dimming LED
	ceiling-mounted and wall-mounted		illuminate tilted		rechargeable battery powered
	wall-mounted		color of suspension cable		fixture with natural vivid LED (upon request)
	omni-directional light distribution		length of suspension cable	CRI	color rendering index
	direct light distribution		reflector degree selection	°K	color temperature
	direct/indirect light distribution		super spot	LM	lumen (luminous flux)
	indirect light distribution		lens	LM/W	efficacy (lumens per watt)
	asymmetric light distribution		lens pack	UGR	Unified Glare Rating (UGR) range from 5-40
	aura light distribution		shine ring	316	marine grade (AISI 316 stainless steel)
	round wall or ceiling cut-out		integrated shine ring with diffuser		walk on
	square wall or ceiling cut-out		free individual colors 01-29		drive on
	the supplied jig specifies the cutout dimensions		individual colors: 00 (free of charge), 01-25 (extra charge)	DSC	Dark Sky Compliance
M	minimum distance (meters) lamp - object		luminaire part to be colored (F1)		Americans with Disabilities Act (less than 4" off the wall located between 27"-84" from floor)
	recessed depth		luminaire part to be colored (F2)		lamp protected against explosion
	ceiling thickness in mm		luminaire part to be colored (F3)		blown glass using traditional methods by master glass blower
	ceiling thickness selection		luminaire part to be colored (F4)		acoustic material
	dimmable DP (phase), DV (0-10V), DD (dali), DS (step-dim)		luminaire part to be colored (F5)		protection class I, protection insulation
	included or excluded LED driver/transformer/ control gear		color of 3-circuit adaptor		protection class II, protection insulation
	separately switchable		indirect diffuser		ETL Certified to UL and CSA Standards
	sensor	D	direct diffuser		UL Certified to UL and CSA Standards
	remote control		ball-proof (upon request)		CSA Certified to UL and CSA Standards
	available upon request		accessory		Certified for North American Standards

IP RATING

IP20	protected against ingress of solid bodies greater than 12.5mm (finger)
IP33	protected against ingress of solid bodies greater than 2.5mm protected against sprays of water up to 60 degrees from the vertical (rain)
IP40	protected against ingress of solid bodies greater than 1mm (wire) no protection against the ingress of moisture
IP43	protected against ingress of solid bodies greater than 1mm (wire) protected against sprays of water up to 60 degrees from the vertical (rain)
IP44	protected against ingress of solid bodies greater than 1mm (wire) protected against water splashed from all directions
IP54	protected against limited ingress of dust (wet rooms/covered outdoor areas) protected against water splashed from all directions
IP65	protected against ingress of dust protected against jets of water
IP66	protected against ingress of dust protected against powerful jets of water or heavy seas
IP67	protected against ingress of dust protected against immersion of water between 15cm - 1m for 30 minutes
IP68	protected against ingress of dust protected against immersion of water under pressure for long periods

IK RATING

IK01	protected against 0.14 joules impact (equivalent to 0.25kg mass dropped from 56mm above the surface)
IK02	protected against 0.2 joules impact (equivalent to 0.25kg mass dropped from 80mm above the surface)
IK03	protected against 0.35 joules impact (equivalent to 0.25kg mass dropped from 140mm above the surface)
IK04	protected against 0.5 joules impact (equivalent to 0.25kg mass dropped from 200mm above the surface)
IK05	protected against 0.7 joules impact (equivalent to 0.25kg mass dropped from 280mm above the surface)
IK06	protected against 1 joules impact (equivalent to 0.25kg mass dropped from 400mm above the surface)
IK07	protected against 2 joules impact (equivalent to 0.5kg mass dropped from 400mm above the surface)
IK08	protected against 5 joules impact (equivalent to 1.7kg mass dropped from 300mm above the surface)
IK09	protected against 10 joules impact (equivalent to 5.0kg mass dropped from 200mm above the surface)
IK10	protected against 20 joules impact (equivalent to 5.0kg mass dropped from 400mm above the surface)

L01

EXTERIOR | INTERIOR

In-grade | For ground, ceilings, walls, and stairs

- Wet, Damp, and Dry location





Ordering Information

Clear Form

Date : _____

Project : _____

Type : _____

Quantity : _____

Note : _____

Specifications

Luminaire | Example Code: L01-2-W30H-S-C-[ ]-0-MK3-S-S6

Product	Version	CCT & CRI	Beam Angle [1]	Lens	Accessories [3] (optional)	Internal Angle Bracket [4]	Mounting Kit [5] (optional)	Flange & Back Box [6]	Trim Finish [9]
L01									
	1 1W **2** 2W	**W22S** 2200K 80+ **W27H** 2700K 90+ **W30H** 3000K 90+ **W35H** 3500K 90+ **W41H** 4100K 90+	**E** elliptical 7°+36° **SS** super spot 8° **S** spot 12° **N** narrow flood 30° **F** flood 45° **W** wide flood 120°	**C** clear **F** frosted **A** anti-slip [2]	**LM** louver, matte anodized **LB** louver, black anodized **HM** hex louver, matte anodized **HB** hex louver, black anodized **AB** angled louver, black anodized **SB** straight louver, black anodized **QB** square louver, black anodized **RB** ring louver, black anodized	**0** no angle **15** 15° angle **X** custom	**MK1** vertical surface **MK3** in-ground	**Octagonal Aluminum Back Box with:** **S** standard flange depth: 3-1/2" (89mm) **P** paving stone flange depth: 5-1/2" (138mm) [7] **Pipe** [8]**:** **PIPE** 1-5/8" PVC pipe length: 11-13/16" (300mm) **NB** no back box or flange	**Aluminum Finishes:** **MA** matte clear anodized **BA** black anodized **BZ** bronze powder coated **Stainless Steel Finishes:** **S6** stainless steel 316 **BT0** black stainless steel **Other Materials:** **ABZ** antique bronze **ABR** antique brass **PBR** polished brass

System Components (Ordered Separately)

Remote Driver : _____

Control System : _____

On/Off | Dimming ELV or 0-10 dimming
Other options (consult factory) TRIAC/MLV, DMX, DALI, Casambi, PoE

Important Notes

Specification

1. *See Light Distribution section for illustration of different combinations of beam angles and angle bracket. Elliptical and Super Spot beam angles are only available with clear lens, and are not available with louver accessories or angle brackets.*
2. *Anti-slip is only available with Clear lens. Refer to Appendix or MP Lighting website for images and details.*
3. *Louvers will be below the glass cover. Only available when there is no Internal Angle Bracket.*
4. *Internal angle bracket is factory set, and cannot be field adjusted. 5° increments to maximum of 20° without accessories. Not applicable for super spot or elliptical options.*
5. *Mounting kit is ordered separately. Please consult factory.*
6. *For components included, refer to Luminaire Construction section. See pg.3 for back box and flange options.*
7. *Paving stone flange is also recommended for a better cement/concrete flow.*
8. *Factory set length of 11-13/16" (300mm). Visit PIPE-C for details.*
9. *Different finish options are only applicable to trim ring and not for LED module housing. Refer to Appendix or MP Lighting website for complete look of luminaire with different trim finish options.*

Warranty Notes & Disclaimer

Malfunction and damage to product due to incompatible dimming system or misuse will not be covered under warranty. Consult MP Lighting for recommended drivers. If the fixture has an option to be installed with a dimming control system, consult a dimming system manufacturer with minimum load before installing. MP Lighting reserves the right, at its sole discretion, at any time and without notice, to make design changes to any of our products. Consult MP Lighting website for most updated documentation.

L01

EXTERIOR | INTERIOR
In-grade | For ground, ceilings, walls, and stairs

- Wet, Damp, and Dry location





Performance

Wattage	Forward Current	Power Consumption Budget per fixture (including driver)	LED output (Source)	Fixture Output (Delivered)
1W	350mA	1.3W	110 lm	27-63 lm
2W	700mA	2.6W	220 lm	49-119 lm

Application

Environment	Wet / Damp / Dry Location approved. IP 68.
Drive Over Rating	9,700 lbs (4,400 kg)
Mounting	**Recessed:** Designed to be cast into earth, gravel, or concrete or inserted into paving stones or pavers. Included backbox, flange and level for direct burial or casting applications. **MK1 mounting kit (optional):** Recommended for easy installation on vertical surfaces (e.g. stair risers, walls), and downward-facing surfaces (e.g. ceilings, soffits). See "Mounting Options & Dimensions, " or visit MK1 **MK3 mounting kit (optional):** Recommended for thicker concrete slab and paving stone in-ground installation. Custom rectangular electrical box option is available for stair riser&wall installation. See "Mounting Options & Dimensions, " or visit MK3

Electrical

Power Supplies	Remote LED drivers (120-277V AC input, **constant current output**): Fixtures to be wired in series.
Control	**On/off control | Dimming:** ELV or 0-10V dimming with appropriate drivers **Other options (consult factory):** TRIAC/MLV, DMX, DALI, Casambi, Power over Ethernet

Luminaire Construction

LED Light Source	**W22S =** CCT: 2200K, CRI (Ra): 80+, Colour Consistency: 3SDCM **W27H =** CCT: 2700K, CRI (Ra): 90+, Colour Consistency: 2SDCM **W30H =** CCT: 3000K, CRI (Ra): 90+, Colour Consistency: 2SDCM **W35H =** CCT: 3500K, CRI (Ra): 90+, Colour Consistency: 2SDCM **W41H =** CCT: 4100K, CRI (Ra): 90+, Colour Consistency: 3SDCM
Weight	1.8 lbs (0.816 kg). Typical Aluminum Insert & Back Box only.
Material	**Fixture:** machined marine-grade aluminum, machined brass or machined stainless steel (316) with tempered glass
Supplied with	**Standard installation housing:** Comes with an octagonal back box, a flange/pipe, an integral leveling device, a plastic cap, gel filled wire nuts, and silicone grease. **Cable:** 6" (152mm) factory-installed wire lead
Warranty & LED Life	5 years limited warranty. Estimated useful life of LED is 50,000 hours.

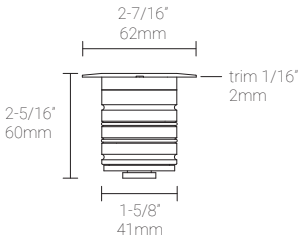
Ordered Separately

System Components	**Power supplies:** remote driver Please consult factory or visit Recommended Drivers for available driver options. **Mounting kits:** MK1 or MK3 (custom length rebar in MK3 supplied by contractors) **Single Gang Boxes:** see Pg.3-5 Mounting Options & Dimensions.

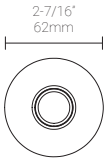
Mounting Options & Dimensions

LED Insert Dimensions

Fixture



Top View



3D View

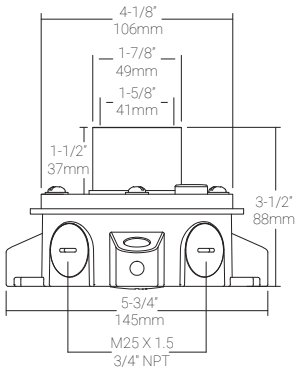


Beam

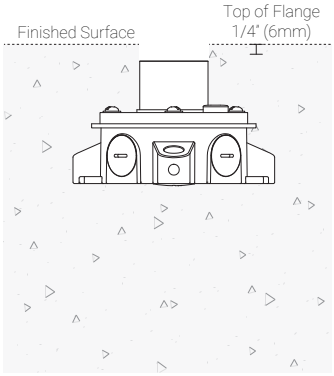


In-ground Installation | Shown with MP Lighting Back Box & Standard Flange (Order Code: EBX-OCT1-CSMA)

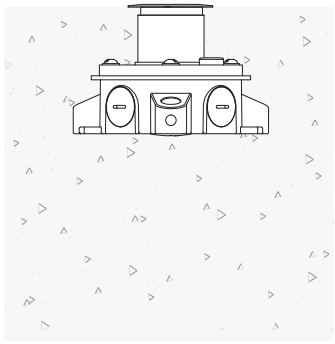
Box with Standard Flange



Box with Standard Flange:
During Concrete Installation

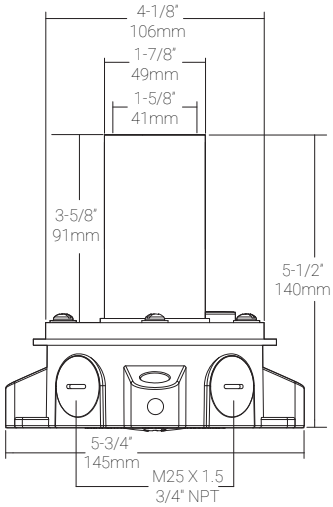


Box with Standard Flange:
Complete Concrete Installation

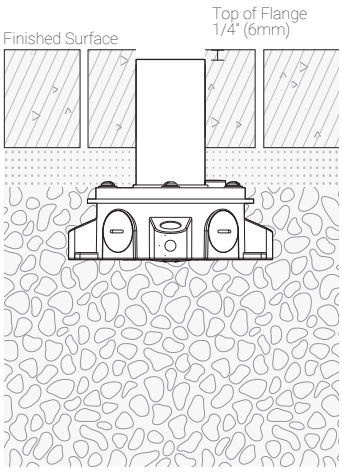


In-ground Installation | Shown with MP Lighting Back Box & Paving Stone Flange (Order Code: EBX-OCT1-CPMA)

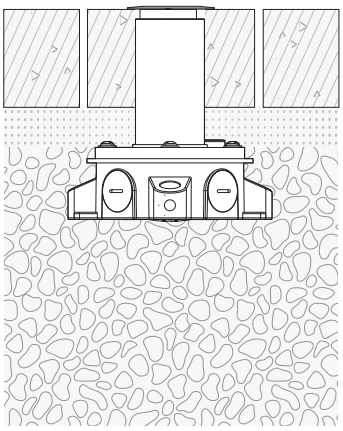
Box with Paving Stone Flange:



Box with Paving Stone Flange:
During Paving Stone Installation



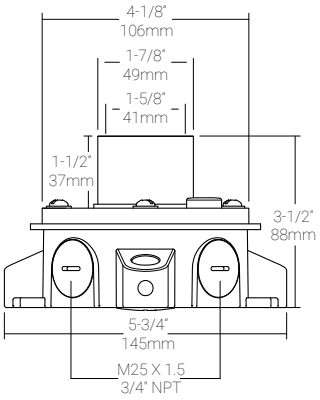
Box with Paving Stone Flange:
Complete Paving Stone Installation



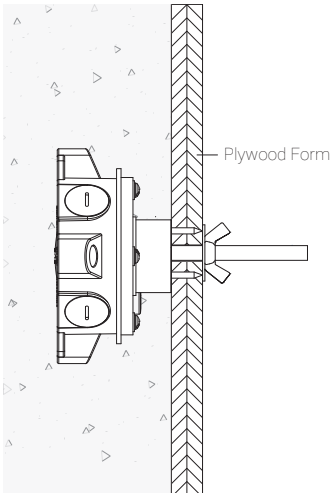
Mounting Kits

MK1(MK1-OCT1-C**) : Ceiling, Wall, and Stair Riser Installation | Shown with MP Lighting Back Box (**Order Code: EBX-OCT1-CSMA**)**

Box with Standard Flange

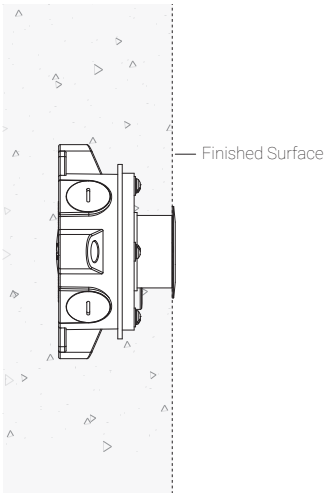


Box with Standard Flange & MK1: During Installation



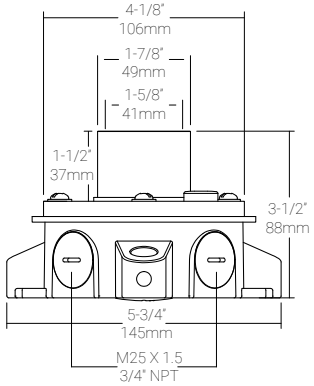
6" (152mm) threaded rod is supplied. Thread size: 3/8"-16

Box with Standard Flange: Complete Installation

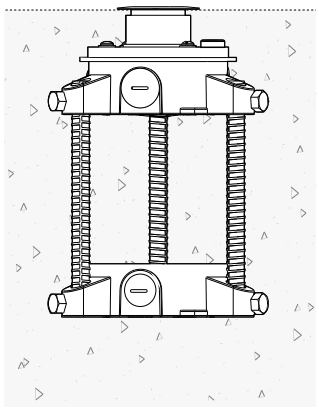


MK3: In-ground Installation | Shown with MP Lighting Back Box (Order Code: EBX-OCT1-CSMA or EBX-OCT1-CPMA **)**

Back Box (EBX-OCT1-CSMA)

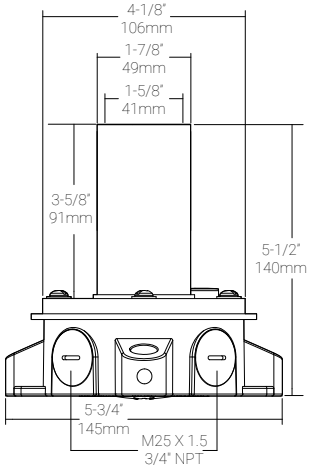


MK3 with Standard Flange and Back Box

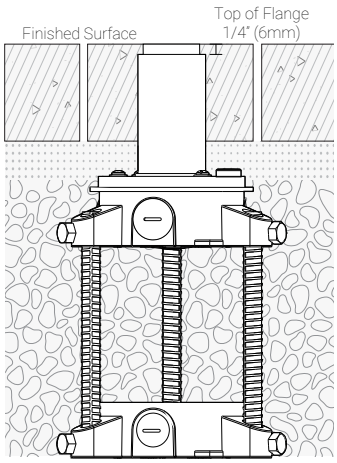


Rebar supplied by others.
Recommended size: Ø1/2"

Back Box (EBX-OCT1-CPMA)



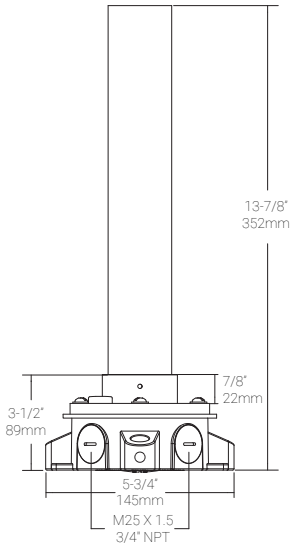
MK3 with Paving Stone Flange and Back Box

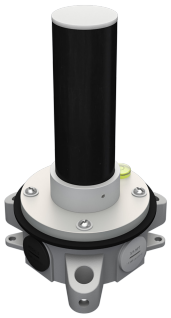


Rebar supplied by others.
Recommended size: Ø1/2"

EBX-OCT1-CPIPE

PIPE (PIPE-C) **: In-ground/Landscape Installation | Shown with MP Lighting Back Box** (Order Code: EBX-OCT1-CPIPE)

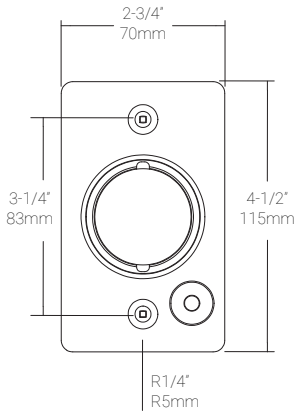


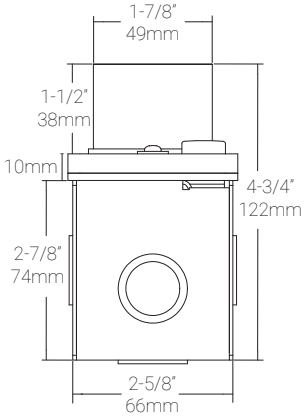


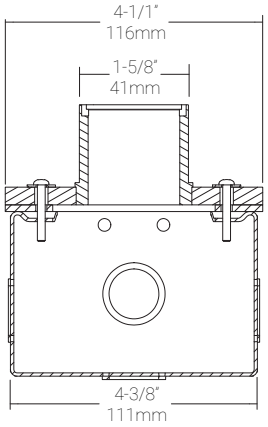
Rectangular Back Box for Wall Installation | shown with standard flange

1. *For wall Installation, custom rectangular electrical boxes are available as alternative options.*

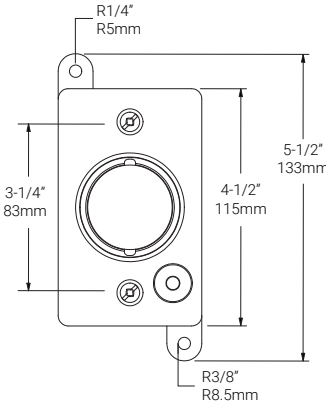
MP Lighting Single Gang Back Box | Order Code: EBX-SGB1-CSMA

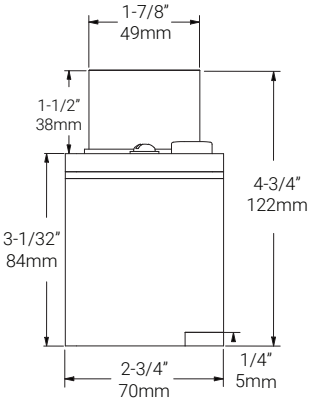


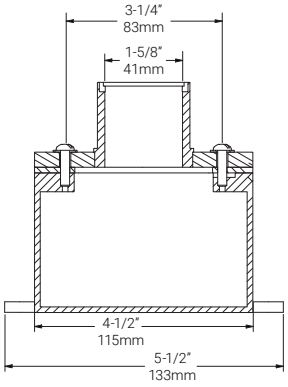




Scepter FD Back box | Order Code: EBX-SFD-CSMA

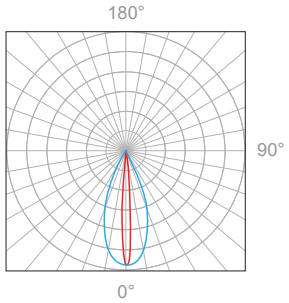




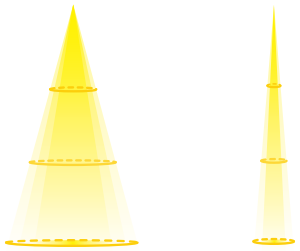


1W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 7° + 36°

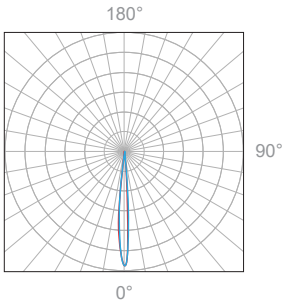


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	92.9fc	1.0ft	0.30m	0.2ft	0.06m
3.0ft	0.91m	23.2fc	2.0ft	0.61m	0.4ft	0.12m
4.5ft	1.37m	10.3fc	2.9ft	0.88m	0.5ft	0.15m
6.0ft	1.83m	5.81fc	3.9ft	1.18m	0.7ft	0.21m
7.5ft	2.29m	3.72fc	4.9ft	1.49m	0.9ft	0.27m
9.0ft	2.74m	2.58fc	5.9ft	1.79m	1.0ft	0.30m

Delivered Lumen: 27 lm
Vertical Beam Spread: 36.1°
Horizontal Beam Spread: 6.7°

Polar Candela Distribution



Beam Width: 8°

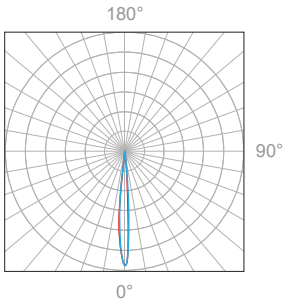


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	537fc	0.2ft	0.06m	0.2ft	0.06m
3.0ft	0.91m	134fc	0.4ft	0.12m	0.5ft	0.15m
4.5ft	1.37m	59.6fc	0.6ft	0.18m	0.7ft	0.21m
6.0ft	1.83m	33.5fc	0.8ft	0.24m	0.9ft	0.27m
7.5ft	2.29m	21.5fc	1.1ft	0.33m	1.2ft	0.36m
9.0ft	2.74m	14.9fc	1.3ft	0.39m	1.4ft	0.42m

Delivered Lumen: 46.2 lm
Vertical Beam Spread: 8.1°
Horizontal Beam Spread: 8.8°

Polar Candela Distribution



Beam Width: 12°

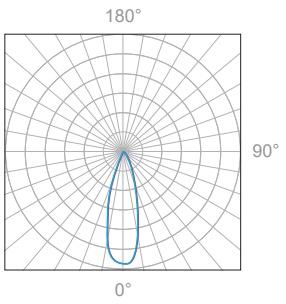


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	424fc	0.3ft	0.09m	0.3ft	0.09m
3.0ft	0.91m	140fc	0.6ft	0.18m	0.6ft	0.18m
4.5ft	1.37m	62fc	0.9ft	0.27m	0.9ft	0.27m
6.0ft	1.83m	35fc	1.3ft	0.39m	1.3ft	0.39m
7.5ft	2.29m	23fc	1.6ft	0.48m	1.6ft	0.48m
9.0ft	2.74m	16fc	1.9ft	0.58m	1.9ft	0.58m

Delivered Lumen: 63.4 lm
Vertical Beam Spread: 12°
Horizontal Beam Spread: 12°

Polar Candela Distribution



Beam Width: 30°



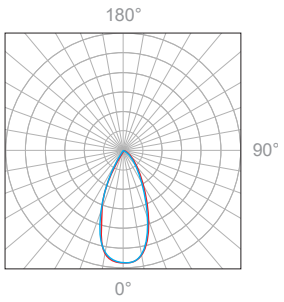
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	82.3fc	0.8ft	0.24m	0.8ft	0.24m
3.0ft	0.91m	20.6fc	1.6ft	0.49m	1.6ft	0.49m
4.5ft	1.37m	9.14fc	2.4ft	0.73m	2.4ft	0.73m
6.0ft	1.83m	5.14fc	3.2ft	0.98m	3.2ft	0.98m
7.5ft	2.29m	3.29fc	4.0ft	1.22m	4.0ft	1.22m
9.0ft	2.74m	2.29fc	4.7ft	1.43m	4.7ft	1.43m

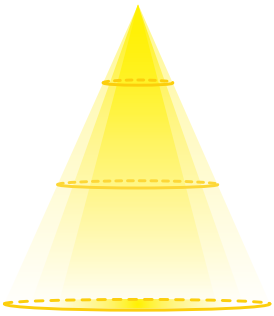
Delivered Lumen: 65.8 lm
Vertical Beam Spread: 29.5°
Horizontal Beam Spread: 29.5°

1W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 45°

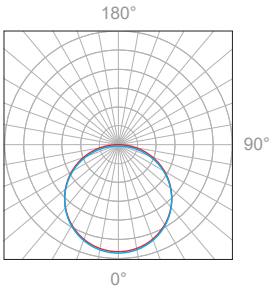


Illuminance at a Distance

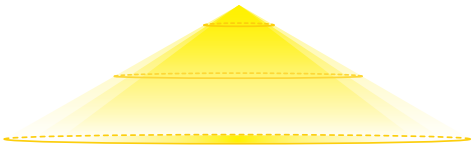
Distance		Center Beam fc	Beam Width			
3.0ft	0.91m	12.1fc	2.6ft	0.79m	2.5ft	0.76m
6.0ft	1.83m	3.04fc	5.1ft	1.55m	5.1ft	1.55m
9.0ft	2.74m	1.35fc	7.7ft	2.34m	7.6ft	2.31m
12.0ft	3.65m	0.76fc	10.2ft	3.10m	10.1ft	3.07m
15.0ft	4.57m	0.49fc	12.8ft	3.90m	12.6ft	3.84m
18.0ft	5.48m	0.34fc	15.4ft	4.69m	15.2ft	4.63m

Delivered Lumen: 77.7 lm
Vertical Beam Spread : 46.2°
Horizontal Beam Spread : 45.7°

Polar Candela Distribution



Beam Width: 120°



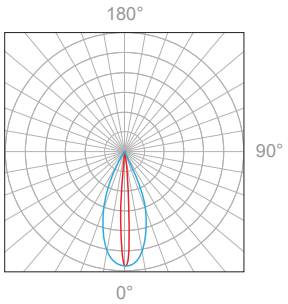
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	11.3fc	4.1ft	1.25m	4.1ft	1.25m
3.0ft	0.91m	2.82fc	8.1ft	2.46m	8.1ft	2.46m
4.5ft	1.37m	1.26fc	12.2ft	3.71m	12.2ft	3.71m
6.0ft	1.83m	0.71fc	16.3ft	4.96m	16.3ft	4.96m
7.5ft	2.29m	0.45fc	20.3ft	6.18m	20.3ft	6.18m
9.0ft	2.74m	0.31fc	24.4ft	7.43m	24.4ft	7.43m

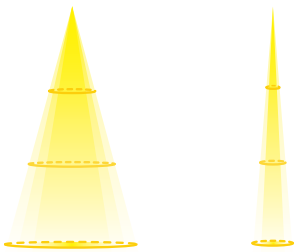
Delivered Lumen: 63 lm
Vertical Beam Spread : 107.1°
Horizontal Beam Spread : 107.1°

2W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 7° + 36°

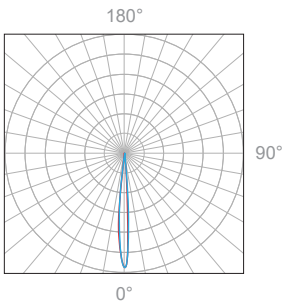


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	165fc	1.0ft	0.30m	0.2ft	0.06m
3.0ft	0.91m	41.3fc	2.0ft	0.61m	0.4ft	0.12m
4.5ft	1.37m	18.3fc	2.9ft	0.88m	0.5ft	0.15m
6.0ft	1.83m	10.3fc	3.9ft	1.18m	0.7ft	0.21m
7.5ft	2.29m	6.60fc	4.9ft	1.49m	0.9ft	0.27m
9.0ft	2.74m	4.59fc	5.9ft	1.79m	1.1ft	0.33m

Delivered Lumen: 49 lm
Vertical Beam Spread: 36.3°
Horizontal Beam Spread: 6.8°

Polar Candela Distribution



Beam Width: 8°



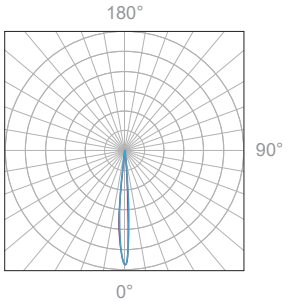
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	1,015fc	0.2ft	0.06m	0.2ft	0.06m
3.0ft	0.91m	254fc	0.4ft	0.12m	0.4ft	0.12m
4.5ft	1.37m	113fc	0.7ft	0.21m	0.6ft	0.18m
6.0ft	1.83m	63.4fc	0.9ft	0.27m	0.9ft	0.27m
7.5ft	2.29m	40.6fc	1.1ft	0.33m	1.1ft	0.33m
9.0ft	2.74m	28.2fc	1.3ft	0.39m	1.3ft	0.39m

Delivered Lumen: 61.3 lm
Vertical Beam Spread: 8.5°
Horizontal Beam Spread: 8.2°

2W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 12°

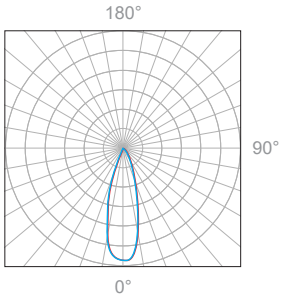


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	774fc	0.3ft	0.09m	0.3ft	0.09m
3.0ft	0.91m	194fc	0.6ft	0.18m	0.6ft	0.18m
4.5ft	1.37m	86fc	0.9ft	0.27m	0.9ft	0.27m
6.0ft	1.83m	48.4fc	1.3ft	0.39m	1.3ft	0.39m
7.5ft	2.29m	31fc	1.6ft	0.48m	1.6ft	0.48m
9.0ft	2.74m	21.5fc	1.9ft	0.58m	1.9ft	0.58m

Delivered Lumen: 116.8 lm
Vertical Beam Spread: 12°
Horizontal Beam Spread: 12°

Polar Candela Distribution



Beam Width: 30°

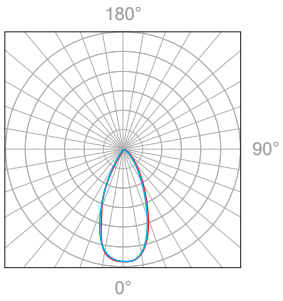


Illuminance at a Distance

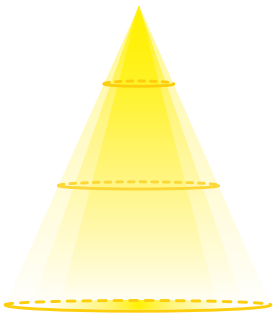
Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	152fc	0.8ft	0.24m	0.8ft	0.24m
3.0ft	0.91m	38fc	1.6ft	0.48m	1.6ft	0.48m
4.5ft	1.37m	16.9fc	2.4ft	0.73m	2.4ft	0.73m
6.0ft	1.83m	9.49fc	3.2ft	0.97m	3.2ft	0.97m
7.5ft	2.29m	6.07fc	4.0ft	1.22m	4.0ft	1.22m
9.0ft	2.74m	4.22fc	4.7ft	1.43m	4.7ft	1.43m

Delivered Lumen: 121 lm
Vertical Beam Spread: 29.5°
Horizontal Beam Spread: 29.5°

Polar Candela Distribution



Beam Width: 45°

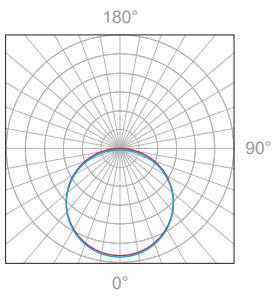


Illuminance at a Distance

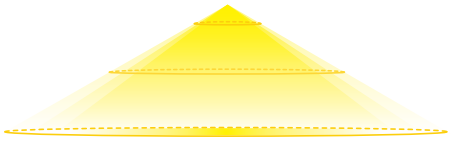
Distance		Center Beam fc	Beam Width			
3.0ft	0.91m	21.8fc	2.6ft	0.79m	2.6ft	0.79m
6.0ft	1.83m	5.45fc	5.2ft	1.58m	5.1ft	1.55m
9.0ft	2.74m	2.42fc	7.7ft	2.34m	7.7ft	2.34m
12.0ft	3.65m	1.36fc	10.3ft	3.13m	10.2ft	3.10m
15.0ft	4.57m	0.87fc	12.9ft	3.93m	12.8ft	3.90m
18.0ft	5.48m	0.61fc	15.5ft	4.72m	15.3ft	4.66m

Delivered Lumen: 139.1 lm
Vertical Beam Spread : 46.5°
Horizontal Beam Spread : 46.1°

Polar Candela Distribution



Beam Width: 120°



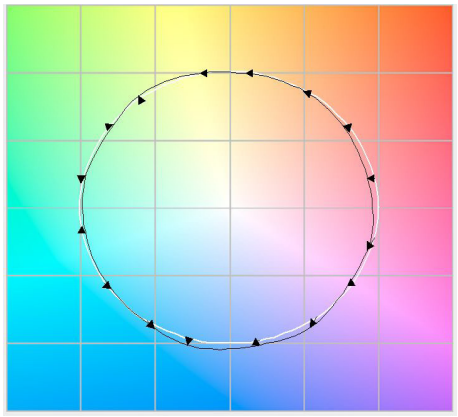
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	21.3fc	4.1ft	1.25m	4.1ft	1.25m
3.0ft	0.91m	5.33fc	8.1ft	2.46m	8.1ft	2.46m
4.5ft	1.37m	2.37fc	12.2ft	3.71m	12.2ft	3.71m
6.0ft	1.83m	1.33fc	16.3ft	4.96m	16.3ft	4.96m
7.5ft	2.29m	0.85fc	20.3ft	6.18m	20.3ft	6.18m
9.0ft	2.74m	0.59fc	24.4ft	7.43m	24.4ft	7.43m

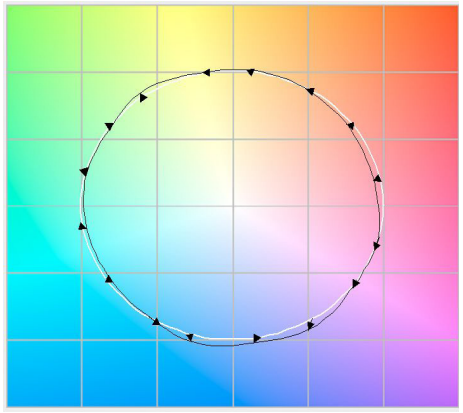
Delivered Lumen: 119 lm
Vertical Beam Spread : 107.1°
Horizontal Beam Spread : 107.1°

TM30 Report

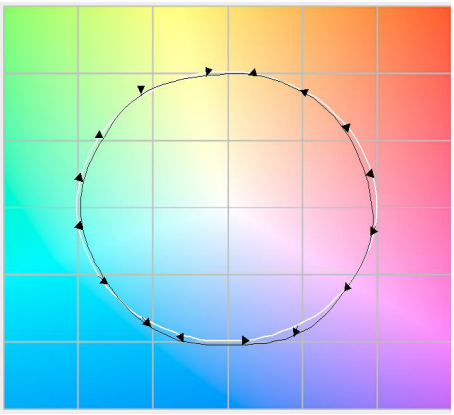
2700K, 90+CRI



3000K, 90+CRI

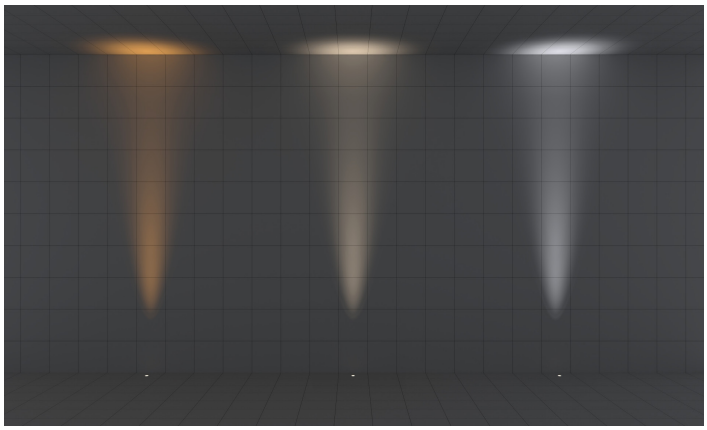


3500K, 90+CRI

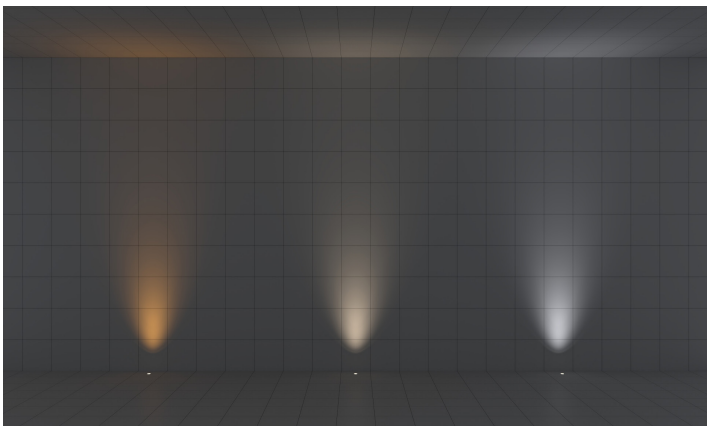


Colour Temperature Comparison | 2200K, 2700K, 3000K

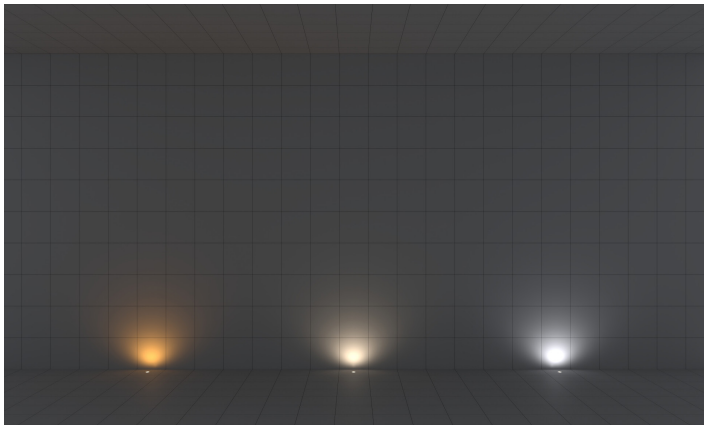
12° | 6" (152mm) Gap | 10ft Wall



30° | 6" (152mm) Gap | 10ft Wall

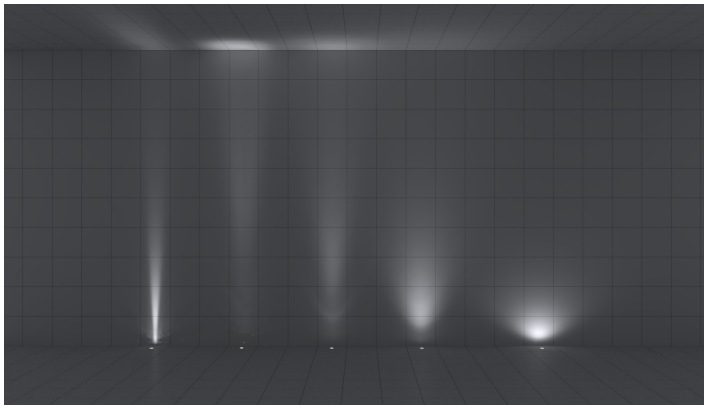


120° | 6" (152mm) Gap | 10ft Wall



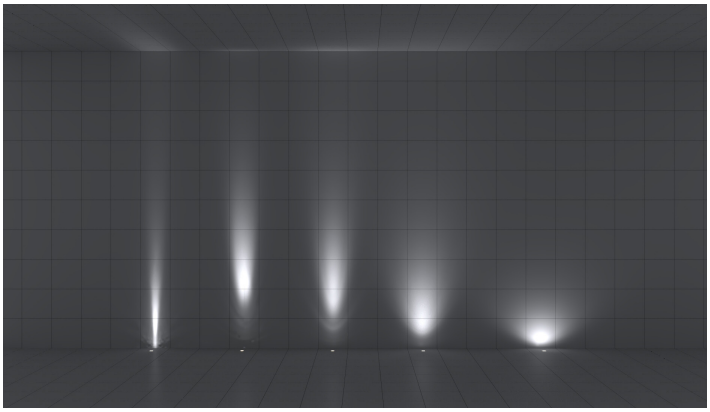
Light Distribution | 10ft Wall | Fixtures installed 6" (152mm) away from the wall

L01 | 1W | 0° angle bracket | 10ft wall | Clear Lens | 3000K



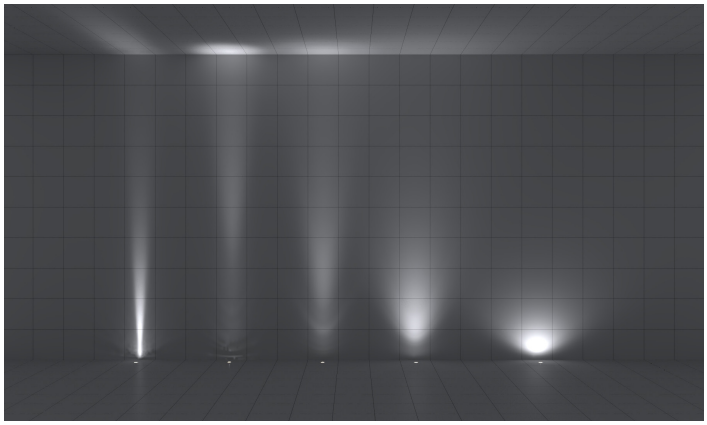
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 1W | 10° angle bracket | 10ft wall | Clear Lens | 3000K



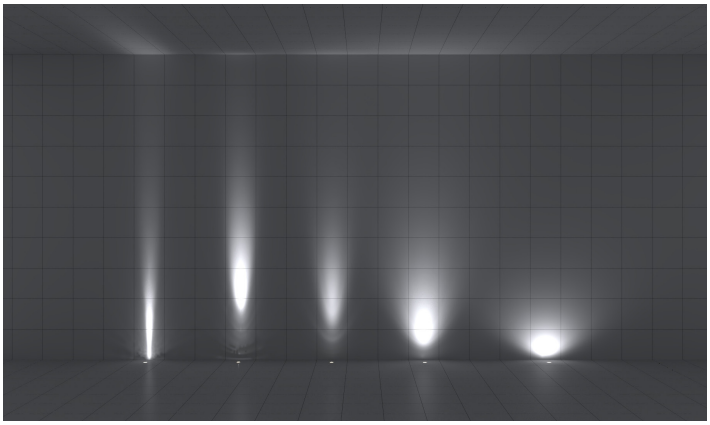
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 0° angle bracket | 10ft wall | Clear Lens | 3000K



From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 10° angle bracket | 10ft wall | Clear Lens | 3000K

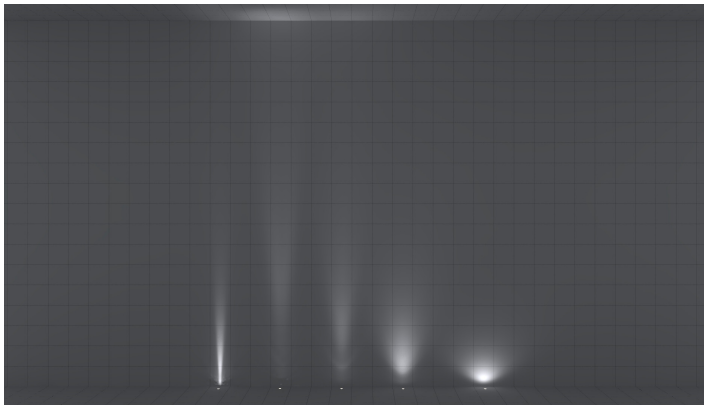


From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

** Images will appear darker when printed.*

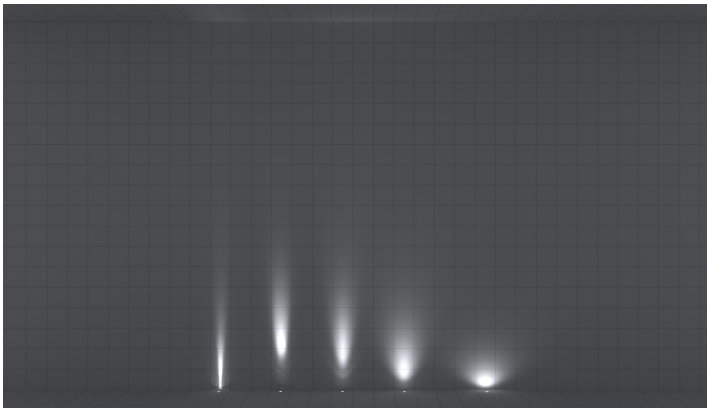
Light Distribution | 18ft Wall | Fixtures installed 6" (152mm) away from the wall

L01 | 1W | 0° angle bracket | 18ft wall | Clear Lens | 3000K



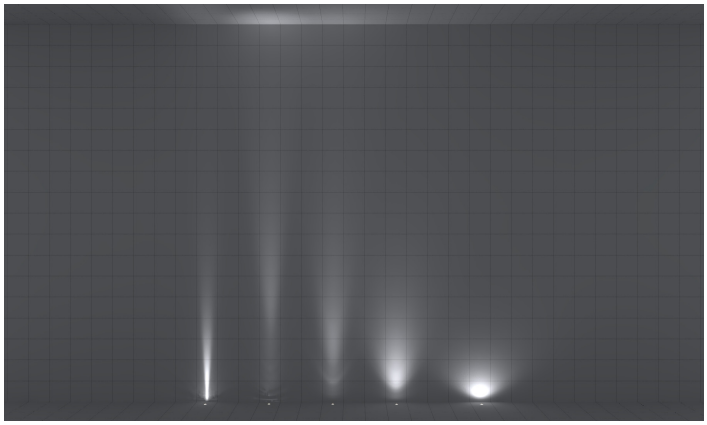
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 1W | 10° angle bracket | 18ft wall | Clear Lens | 3000K



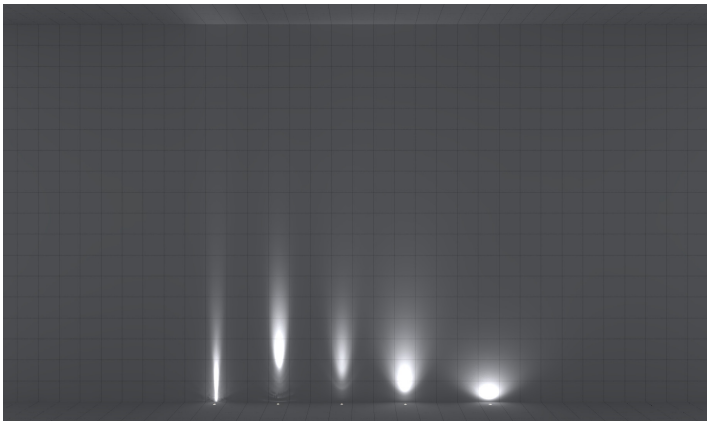
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 0° angle bracket | 18ft wall | Clear Lens | 3000K



From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 10° angle bracket | 18ft wall | Clear Lens | 3000K



From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

Appendix

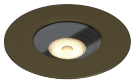
Aluminum Finishes



MA matte clear anodized with anti-slip lens



BA black anodized



BZ bronze

Stainless Steel Finishes

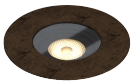


S6 stainless steel 316

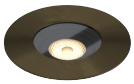


BT0 black stainless steel

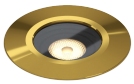
Other Materials



ABZ antique bronze



ABR antique brass



PBR polished brass

Accessories



LM louver, matte clear anodized



LB louver, black anodized



HM hex louver, matte clear anodized



HB hex louver, black anodized



AB angled louver, black anodized



SB straight louver, black anodized

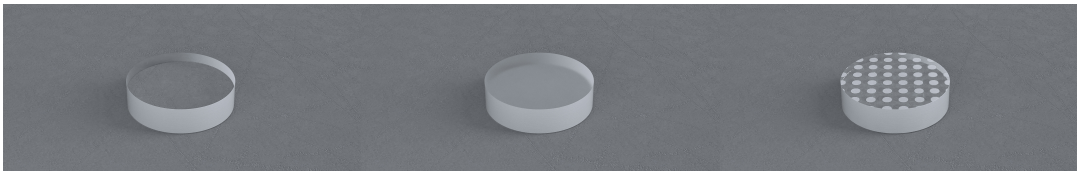


QB square louver, black anodized



RB ring louver, black anodized

Lens Options



C clear lens

F frosted

A anti-slip

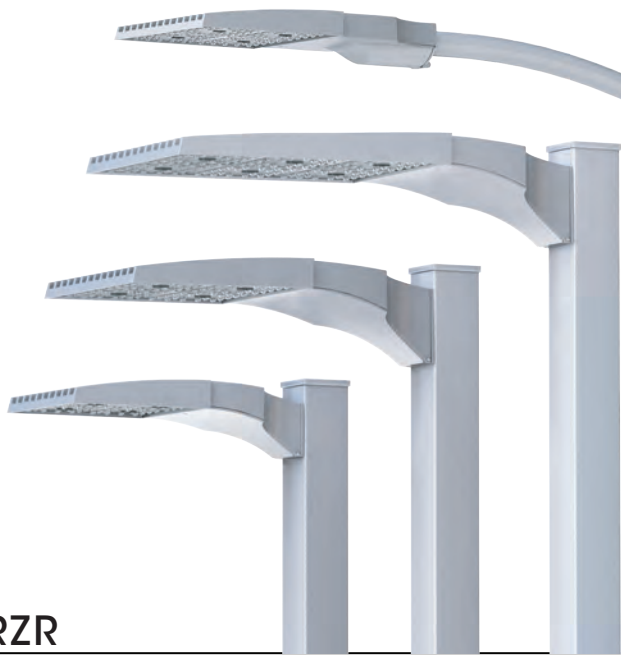
PROJECT NAME:

PROJECT TYPE:

AREA & ROADWAY LIGHTING

RAZAR SERIES - LED

LOW PROFILE AREA LUMINAIRE



RZR

(**MODELS**: RZRM, RZR, RZR-G & RZR-MAF*) PATENT PENDING

Optical Housing
Heavy cast, low copper aluminum assembly (A356 alloy, <.2% copper) minimum wall thickness .188". LED Module mounting area is machined to within a 0.002" surface flatness variance for maximum surface contact and thermal conductivity from the LED modules to the radiating fins. Passive radiating fins above the LED Optics provide superior thermal management and long LED life.The optical and electrical compartments are integrated with the support arm to create one assembly. Cast and hinged driver compartment cover allows access to the drivers and wiring.

Electrical Housing w/ Integrated Arm
Heavy cast low copper aluminum (A356 alloy; <0.2% copper) assembly with integral cooling ribs surrounding the electrical compartment and a flat surface on the top of the arm to accommodate a photocell receptacle. Solid barrier wall separates optical and electrical compartments. The optical compartment and electrical compartment with the integrated support arm combine to create one assembly. Minimum wall thickness is .188". Cast and hinged driver assembly cover is integrated with wiring compartment cover.

PLED™ Optics
Emitters (LED's) are arrayed on a metal core PCB panel with each emitter located on a copper thermal transfer pad and enclosed by an LED refractor. LED optics completely seal each individual emitter to meet an IP66 rating. In asymmetric distributions, a micro-reflector inside the refractor re-directs the house side emitter output towards the street side and functions as a house side shielding element. Refractors are injection molded H12 acrylic. Each LED refractor is sealed to the PCB over an emitter and all refractors are retained by an aluminum frame. Any one Panel, or group of Panels in a luminaire, have the same optical pattern. LED refractors produce standard site/area distributions. Panels are field replaceable and field rotatable in 90° increments.

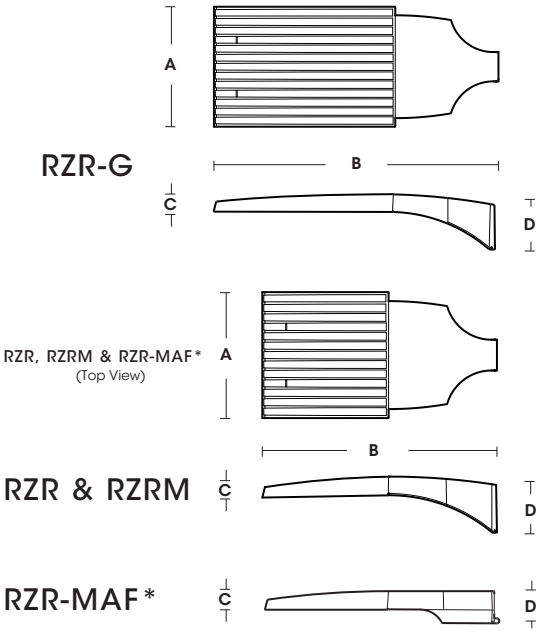
LED Driver(s)
Constant current electronic with a power factor of >.90 and a minimum operating temperature of -40°F/-40°C. Driver(s) is/are UL and cUL recognized and mounted directly against the Electrical Housing to facilitate thermal transfer, held down by universal clamps to facilitate easy removal. In-line terminal blocks facilitate wiring between the driver and optical arrays. Drivers accept an input of 120-277V, 50/60Hz or 347V-480V, 50,60Hz. (0 - 10V dimmable driver is standard. Driver has a minimum of 3KV internal surge protection. Luminaire supplied with 20KV surge protector for field accessible installation.)

LED Emitters
High output LED's are utilized with drive currents ranging from 350mA to 1050mA. 70CRI Minimum. LED's are available in standard Neutral White (4000K), or optional Cool White (5000K) or Warm White (3000K). Consult Factory for other LED options.

Amber LED's
TRA (True Amber) LED's utilize material that emits light in the amber spectral bandwidth only without the use of phosphors.

Finish
Electrostatically applied TGIC Polyester Powder Coat on substrate prepared with 20 PSI power wash at 140°F. Four step media blast and iron phosphate pretreatment for protection and paint adhesion. 400°F bake for maximum hardness and durability.

Mast Arm Fitter/Electrical Housing
Replaces standard Electrical Housing. Fits standard 2 3/8" O.D. horizontal tenon. Two (2) straps with two (2) bolts each encircle the lower half of the tenon. Upper half of the tenon rests on self-centering steps that position the angle of the luminaire at 0°, +1.5°, +1.5 or +3° up from the horizontal. All hardware is stainless steel.



FIXTURE	A	B	C	D
RZR-G	15" 381mm	36.5" 927mm	3" 76mm	7" 187mm
RZR	14.75" 375mm	28.25" 718mm	2.75" 70mm	6.5" 165mm
RZRM	11.5" 292mm	22" 559mm	2.5" 64mm	5.25" 133mm
RZR-MAF	15" 381mm	28.25" 724mm	2.5" 64mm	4" 102mm

U.L. Listed for Wet Location

2022158

U.S. Pole Company Inc
An Employee Owned Company
660 West Avenue O, Palmdale, CA 93551
Phone (661) 233-2000 www.usaltg.com

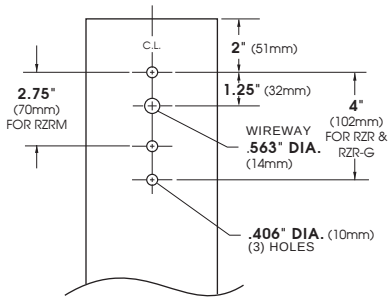
MADE IN THE USA

U.S. ARCHITECTURAL LIGHTING

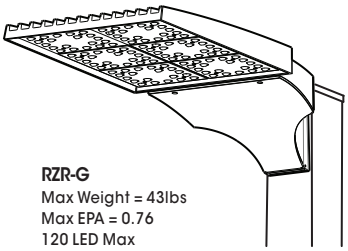
RZR SERIES - LED

SPECIFICATIONS

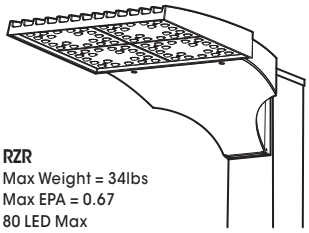
POLE DRILLING TEMPLATE



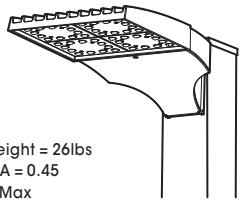
EPA & WEIGHT



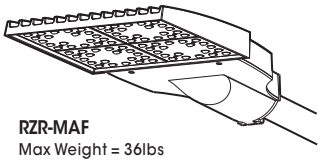
RZR-G
Max Weight = 43lbs
Max EPA = 0.76
120 LED Max



RZR
Max Weight = 34lbs
Max EPA = 0.67
80 LED Max

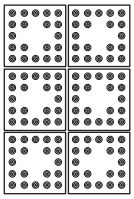


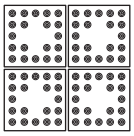
RZRM
Max Weight = 26lbs
Max EPA = 0.45
48 LED Max

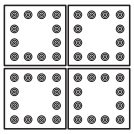


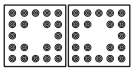
RZR-MAF
Max Weight = 36lbs
Max EPA = 0.56
80 LED Max

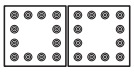
PLED™ MODULES


120 LED Module


80 LED Module


48 LED Module


40 LED Module

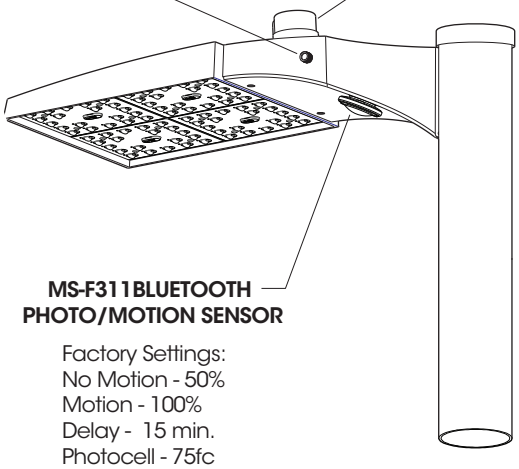

24 LED Module

ORDERING INFORMATION

Spec/Order Example: RZR/PLED-IV/80LED-700mA/CW/277/RAL-8019-S

Luminaire	Optics	LED Mode	Voltage	Mounting	Finish	Options
Luminaire	**Optics**	**LED**	**Voltage**	**Mounting**	**Finish**	**Options**
☐ **RZR-G**	PLED™ Distribution Type ☐ Type II **PLED-II** ☐ Type II Front Row **PLED-II-FR** ☐ Type III Median Illuminator **PLED-II-MIL** ☐ Type III Med. **PLED-III** ☐ Type III Wide **PLED-III-W** ☐ Type IV **PLED-IV** ☐ Type IV **PLED-IV-FT** ☐ Type V Narrow **PLED-VSQ-N** ☐ Type V Med. **PLED-V-SQ-M** ☐ Type V Wide **PLED-V-SQ-W**	# of LEDs **RZR-G** ☐ 120LED ☐ 80LED **RZR/RZR-MAF** ☐ 80LED ☐ 40LED **RZRM** ☐ 48LED ☐ 24LED Drive Current ☐ **1050mA**[1] ☐ **875mA**[1] ☐ **700mA**[1] ☐ **525mA** ☐ **350mA** Color Temp - CCT ☐ **27K** (2700K) ☐ **30K** (3000K) ☐ **40K** (4000K) ☐ **50K** (5000K) ☐ **TRA** True Amber[2] Consult Factory for Other LED Color, CCT, & CRI Options **NOTES:** 1 - 700mA and 1050mA not for use with TRA LED's 2 - Available in 350mA & 525mA drive currents only Consult Factory for Other Drive Currents	☐ **120** ☐ **208** ☐ **240** ☐ **277** ☐ **347** ☐ **480**	Arm Mount ☐ **1** ☐ **2-180** ☐ **2-90** ☐ **3-90** ☐ **3-120** ☐ **4-90** Wall Mount ☐ **WM** WM - Wall Mount provided with mounting bracket and cover.	Standard Textured Finish ☐ Black **RAL-9005-T** ☐ White **RAL-9003-T** ☐ Grey **RAL-7004-T** ☐ Dark Bronze **RAL-8019-T** ☐ Green **RAL-6005-T** Premium Finishes ☐ Rust ☐ Patina Copper **PC** For smooth finish replace suffix "T" with suffix "S" (Example: RAL-9500-S) Consult factor for custom colors	☐ Internal House Side Shield inc. LED Count (Example: HS-PLED/48) **HS-PLED** ☐ External Glare Shield 4 Sided **EGS4** ☐ External Glare Shield 3 Sided Rear Wedge **EGS3W** ☐ Round Pole Adapter **RPA** ☐ Twist Lock Receptable Only **TPR** ☐ 7-Pin Twist Lock Receptable Only **TPR7** ☐ High-Low Dimming for Switch by Others/Select Levels 50/100 or 25/100 (Example: HLSW/25) **HLSW** ☐ Twist Lock Photocell + Voltage (Example: TPC347V) **TPC+V** ☐ Photo Cell + Voltage (Example: PC120V) **PC+V** ☐ Single Fuse (120V, 277V) **SF** ☐ Double Fuse (208V, 240V) **DF** ☐ Blue-Tooth Programmable Photo/Motion Sensor (Factory - Motion 50/100; Photo 75fc) **MS-F311**
☐ **RZR** ☐ **RZR-MAF**						
☐ **RZRM**						

OPTIONS



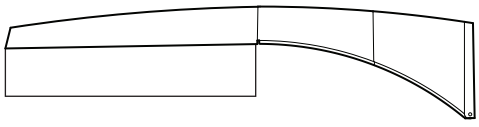
Factory Settings:
No Motion - 50%
Motion - 100%
Delay - 15 min.
Photocell - 75fc

Sensors can be Field Programmed With Bluetooth App

High Low Dimming For Switches (HLSW)
The HLSW is a Small Electronic Switch which Provides High Low Dimming Control Through the LED Driver's 0-10V Control. Switching is Done by Adding a Seconday AC Switched Hot Trigger Line to the HLSW in Addition to the Normal AC Power Line. When the Secondary Trigger Line is Powered, the Fixture will go to 100% Dimming. With no Power to the Trigger, the Fixture will operate at 50% or 25% Dimming. Switches for the Trigger Line can be a Normal AC Switch/Breaker or Timed Switch/Breaker.

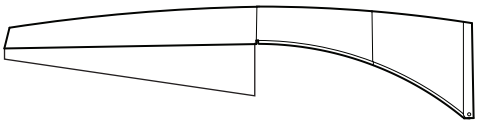
Wireless and Other Fixture Controls
Contact Factory for Wireless and Other Fixture Controls and Recomendations. Most Controls Can be Integrated and Factory Installed.

EXTERNAL GLARE SHIELDS



EGS4 - 4 Sided Shield

Minimum Cutoff = 12°
Average Cutoff = 23°

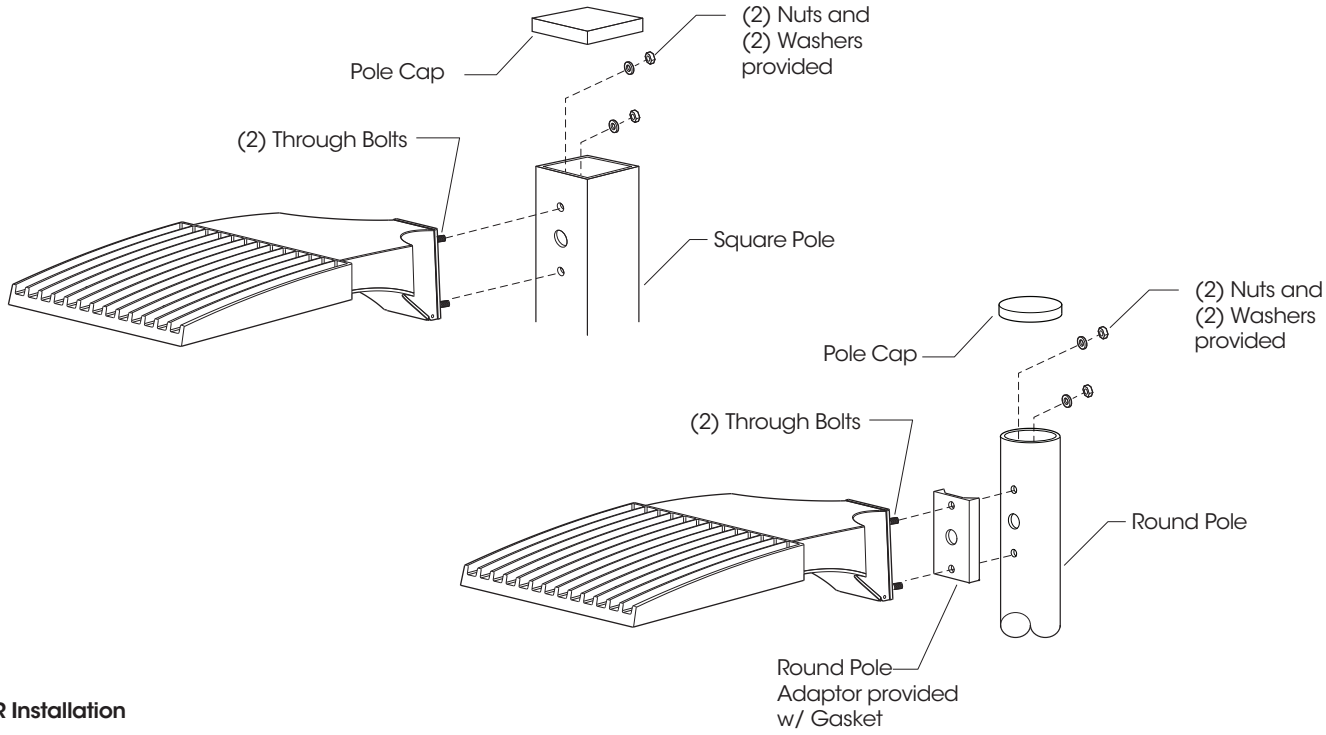


EGS3W - 3 Sided Shield

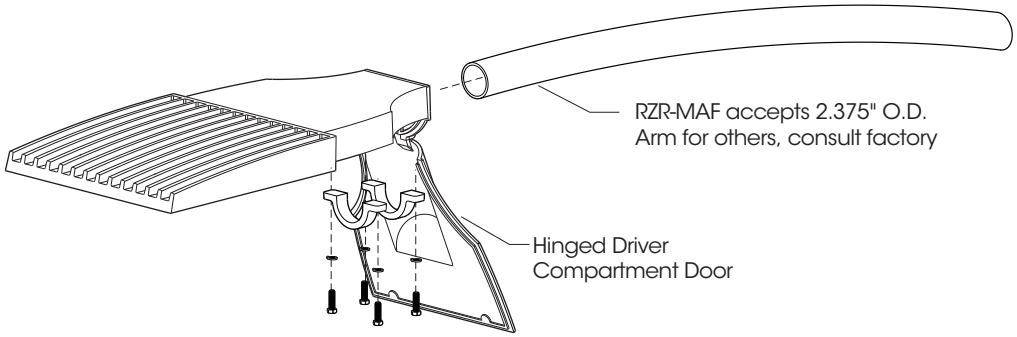
Minimum Rear Cutoff = 12°
Average Rear Cutoff = 23°
Minimum Side Cutoff = 4°
Average Side Cutoff = 16°

Glare Shields are rotatable on RZR and RZRM. Consult factory for custom applications.

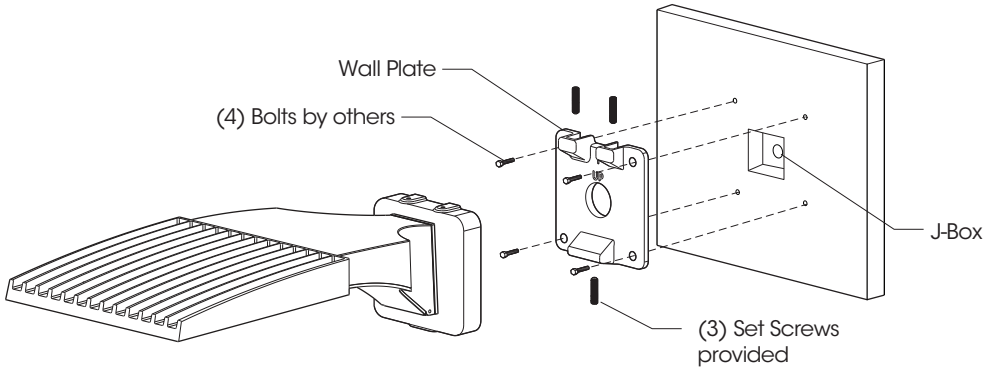
INSTALLATION DETAIL



RZR Installation



RZR-MAF Installation



RZR-WM Installation

RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LM-80 LUMEN MAINTENANCE

LED Life / Operating Hours	Lumen Depreciation	Lumen Depreciation Scale Factor
60,000 (10x Test Time Calculated)	L94	0.94x
100,000 (Theoretical Calculated)	L92	0.92x
150,000 (Theoretical Calcualted)	L89	0.89x

Lumen Depreciation Calculations Done in Accordance With IESNA TM-21 & LM-80 (25°C Ambient)
TM-21 6x Test Time Dicatates that L94 > 60,000 Hours.

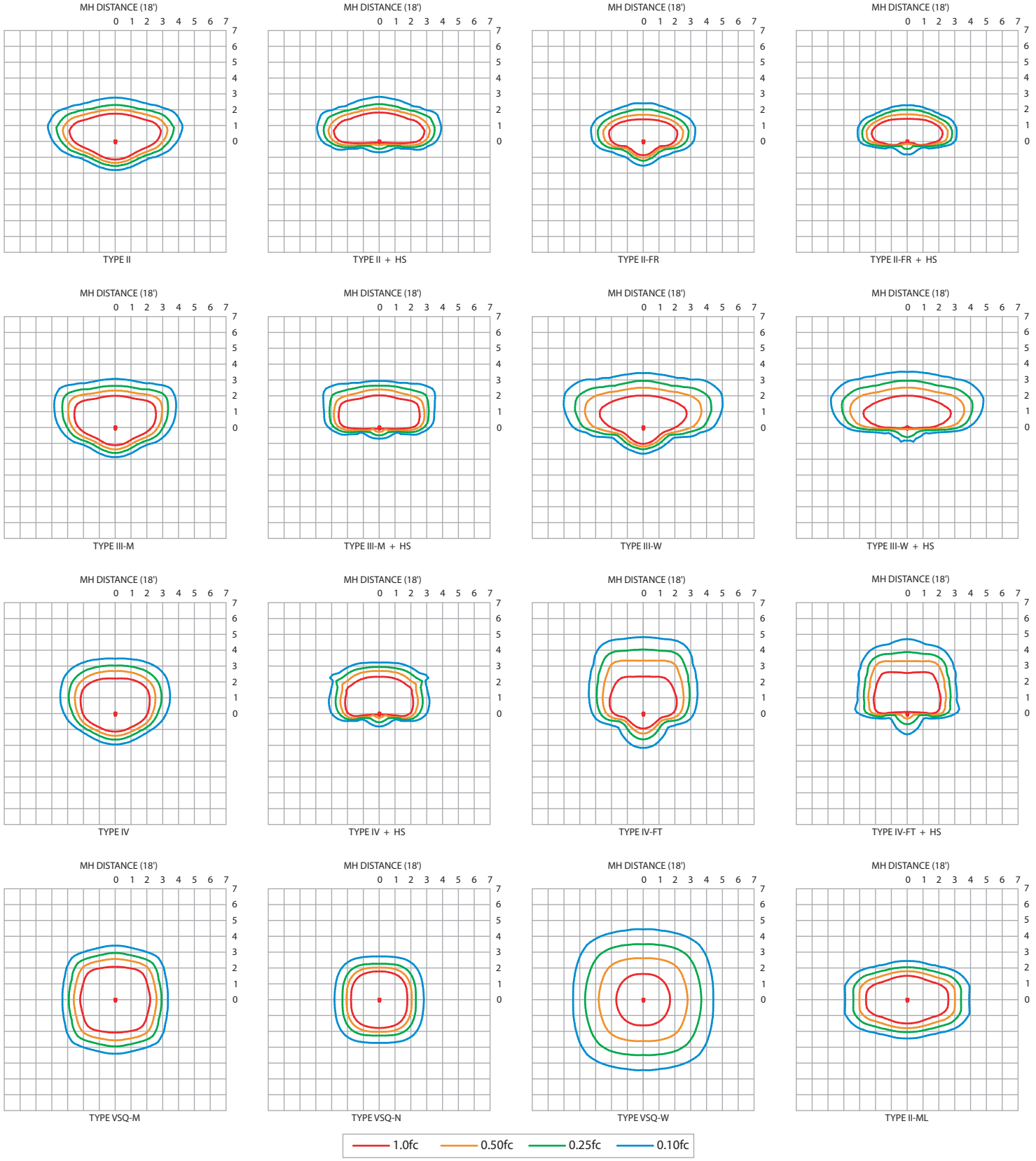
ELECTRICAL DATA GUIDE - AMPERAGE CHARTS

# of LEDs	mA	System Watts	120V	208V	277V	347V	480V
24	350	28	0.24	0.14	0.10	0.08	0.06
24	525	42	0.35	0.20	0.15	0.12	0.09
24	700	56	0.47	0.27	0.20	0.16	0.12
24	875	68	0.57	0.33	0.24	0.20	0.14
24	1050	82	0.68	0.39	0.30	0.24	0.17
48	350	53	0.44	0.25	0.19	0.15	0.11
48	525	79	0.66	0.38	0.29	0.23	0.16
48	700	105	0.88	0.51	0.38	0.30	0.22
48	875	132	1.10	0.63	0.48	0.38	0.27
48	1050	160	1.33	0.77	0.58	0.46	0.33
40	350	43	0.36	0.21	0.15	0.12	0.09
40	525	65	0.54	0.31	0.23	0.19	0.13
40	700	87	0.72	0.42	0.31	0.25	0.18
40	875	108	0.90	0.52	0.39	0.31	0.23
40	1050	128	1.07	0.62	0.46	0.37	0.27
80	350	85	0.71	0.41	0.31	0.25	0.18
80	525	129	1.08	0.62	0.47	0.37	0.27
80	700	174	1.45	0.83	0.63	0.50	0.36
80	875	216	1.80	1.04	0.78	0.62	0.45
80	1050	256	2.14	1.23	0.93	0.74	0.53
120	350	130	1.08	0.63	0.47	0.37	0.27
120	525	192	1.60	0.92	0.69	0.55	0.40
120	700	260	2.17	1.25	0.94	0.75	0.54
120	875	329	2.74	1.58	1.19	0.95	0.69
120	1050	398	3.32	1.91	1.44	1.15	0.83

RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - ISOFOOTCANDLE PLOTS

RZRM-PLED-48LED-700mA-40K - 18' Pole Height



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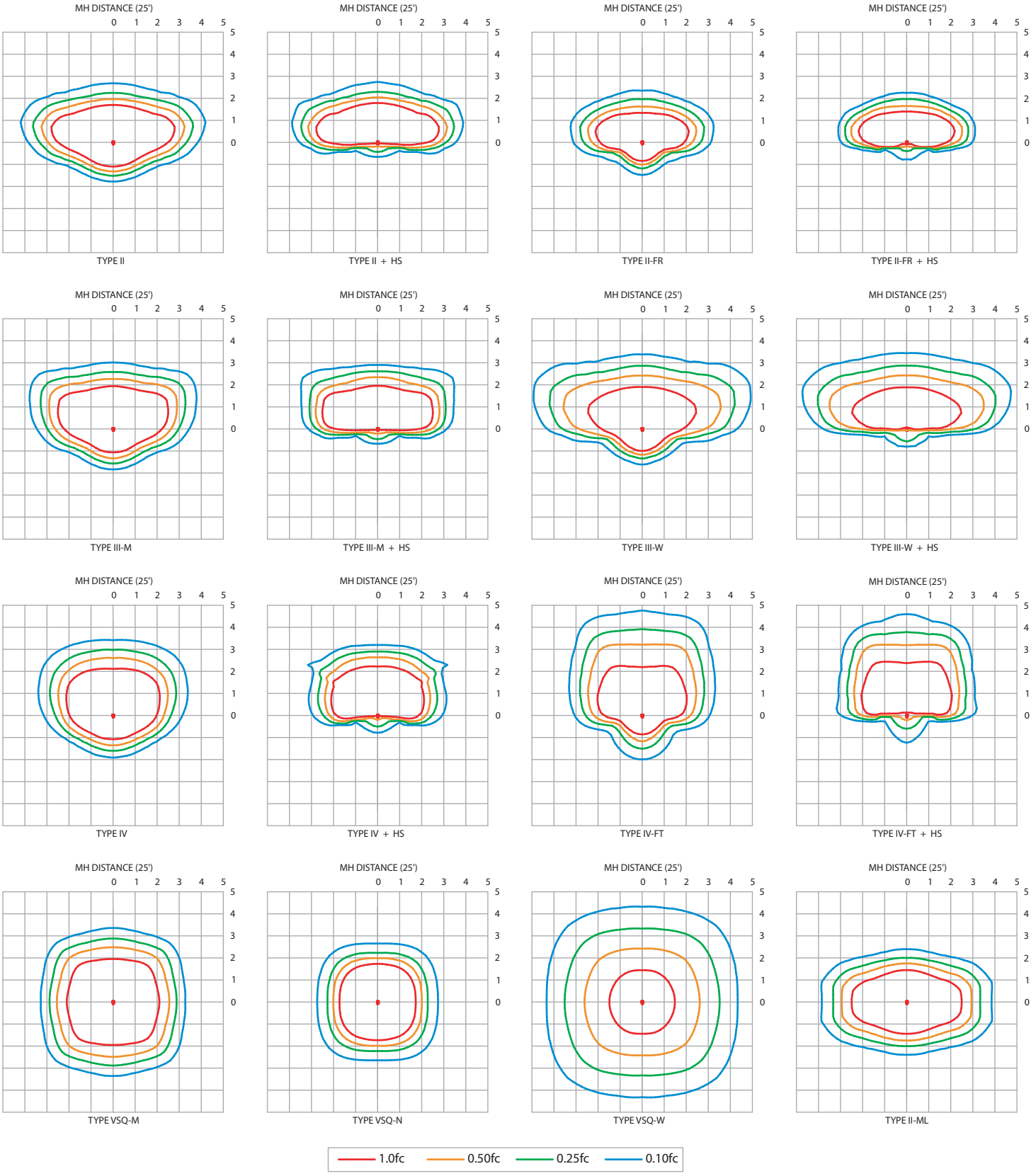
RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - ISOFOOTCANDLE PLOTS

RZR-PLED-80LED-700mA-40K - 25' Pole Height



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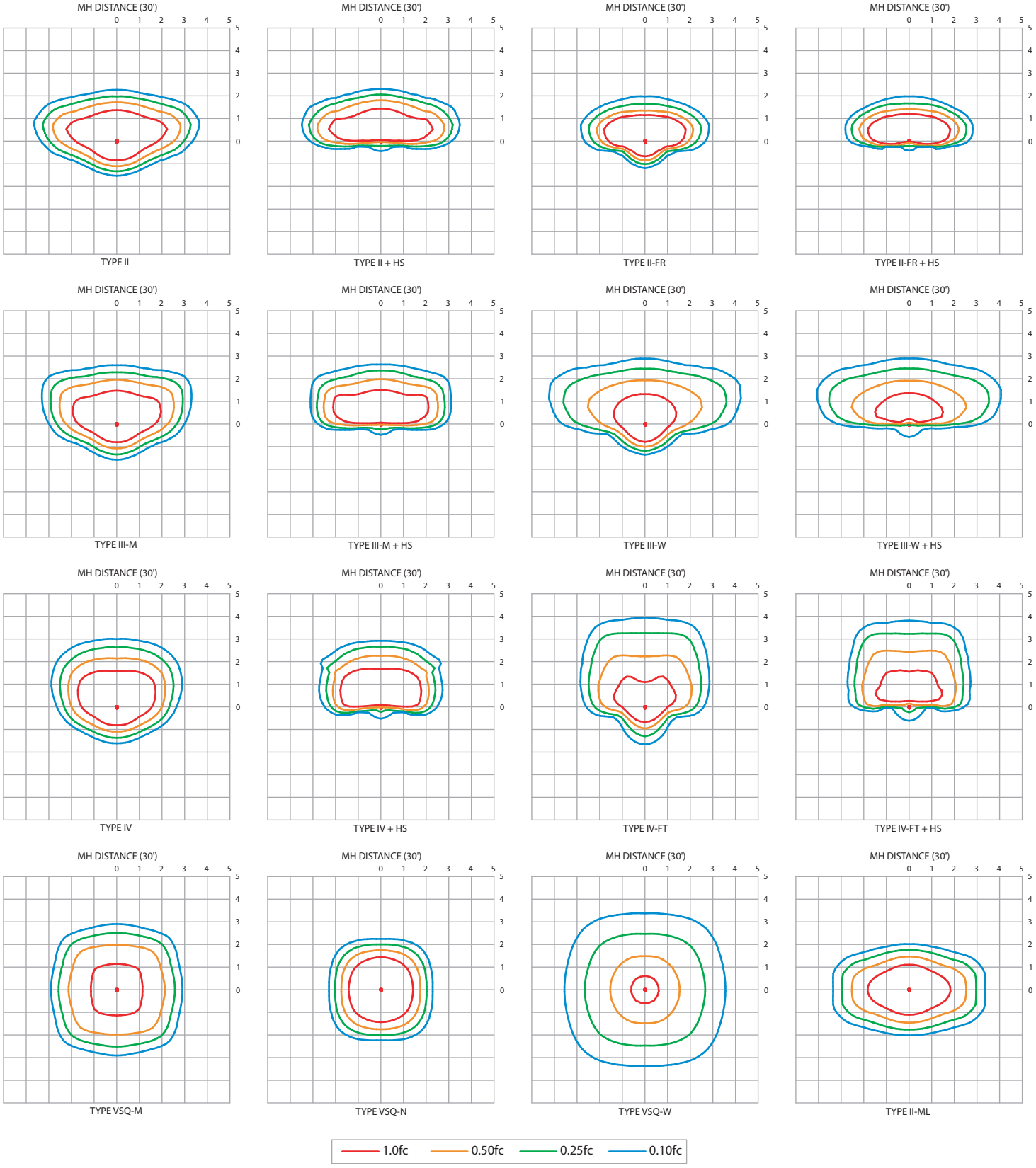
RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - ISOFOOTCANDLE PLOTS

RZRG-PLED-120LED-700mA-40K 30' Pole Height



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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRM-PLED)

RZR-M-PLED																			
LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
24	350	28.2	II	3436	122	B1-U0-G1	3709	132	B1-U0-G1	3904	138	B1-U0-G1	4100	145	B1-U0-G1	20.0	1363	68	B1-U0-G1
			II-FR	3459	123	B1-U0-G1	3734	132	B1-U0-G1	3930	139	B1-U0-G1	4127	146	B1-U0-G1		1372	69	B1-U0-G0
			II-ML	3436	122	B2-U0-G2	3709	132	B2-U0-G2	3905	138	B2-U0-G2	4100	145	B2-U0-G2		1363	68	B1-U0-G1
			III-M	3496	124	B1-U0-G1	3775	134	B1-U0-G1	3973	141	B1-U0-G1	4172	148	B1-U0-G1		1387	69	B1-U0-G0
			III-W	3246	115	B1-U0-G1	3505	124	B1-U0-G1	3689	131	B1-U0-G1	3873	137	B1-U0-G1		1289	64	B0-U0-G1
			IV	3469	123	B1-U0-G1	3746	133	B1-U0-G1	3943	140	B1-U0-G1	4140	147	B1-U0-G1		1377	69	B1-U0-G1
			IV-FT	3161	112	B1-U0-G1	3412	121	B1-U0-G1	3592	127	B1-U0-G1	3771	134	B1-U0-G1		1254	63	B0-U0-G1
			VSQ-N	3627	129	B2-U0-G0	3915	139	B2-U0-G0	4121	146	B2-U0-G0	4327	153	B2-U0-G1		1439	72	B1-U0-G0
			VSQ-M	3556	126	B2-U0-G1	3838	136	B2-U0-G1	4041	143	B2-U0-G1	4242	150	B3-U0-G1		1410	71	B1-U0-G0
			VSQ-W	3471	123	B3-U0-G1	3748	133	B3-U0-G1	3945	140	B3-U0-G1	4142	147	B3-U0-G1		1377	69	B1-U0-G1
			II-HS	2513	89	B0-U0-G1	2713	96	B0-U0-G1	2856	101	B0-U0-G1	2998	106	B0-U0-G1		997	50	B0-U0-G0
			II-FR-HS	2556	91	B0-U0-G0	2759	98	B0-U0-G0	2905	103	B0-U0-G0	3050	108	B0-U0-G0		1014	51	B0-U0-G0
			III-M-HS	2543	90	B0-U0-G1	2745	97	B0-U0-G1	2889	102	B0-U0-G1	3034	108	B0-U0-G1		1008	50	B0-U0-G0
			III-W-HS	2488	88	B0-U0-G1	2686	95	B0-U0-G1	2827	100	B0-U0-G1	2969	105	B0-U0-G1		987	49	B0-U0-G1
			IV-HS	2626	93	B0-U0-G1	2835	101	B0-U0-G1	2984	106	B0-U0-G1	3133	111	B0-U0-G1		1042	52	B0-U0-G0
			IV-FT-HS	2481	88	B0-U0-G1	2679	95	B0-U0-G1	2820	100	B0-U0-G1	2961	105	B0-U0-G1		985	49	B0-U0-G1
24	525	41.5	II	4908	118	B1-U0-G1	5298	128	B1-U0-G1	5577	134	B1-U0-G1	5856	141	B2-U0-G1	31.0	1586	51	B1-U0-G1
			II-FR	4941	119	B1-U0-G1	5334	129	B1-U0-G1	5614	135	B2-U0-G1	5895	142	B2-U0-G1		1598	52	B1-U0-G0
			II-ML	4908	118	B2-U0-G2	5299	128	B2-U0-G2	5578	134	B2-U0-G2	5856	141	B3-U0-G3		1587	51	B1-U0-G1
			III-M	4994	120	B1-U0-G1	5392	130	B1-U0-G1	5675	137	B1-U0-G1	5959	144	B1-U0-G2		1615	52	B1-U0-G0
			III-W	4637	112	B1-U0-G2	5005	121	B1-U0-G2	5269	127	B1-U0-G2	5533	133	B1-U0-G2		1500	48	B0-U0-G1
			IV	4956	119	B1-U0-G1	5350	129	B1-U0-G1	5632	136	B1-U0-G1	5913	142	B1-U0-G2		1602	52	B1-U0-G1
			IV-FT	4515	109	B1-U0-G2	4875	117	B1-U0-G2	5131	124	B1-U0-G2	5388	130	B1-U0-G2		1460	47	B0-U0-G1
			VSQ-N	5180	125	B2-U0-G1	5592	135	B2-U0-G1	5886	142	B2-U0-G1	6181	149	B2-U0-G1		1676	54	B1-U0-G0
			VSQ-M	5080	122	B3-U0-G1	5484	132	B3-U0-G1	5772	139	B3-U0-G1	6061	146	B3-U0-G1		1643	53	B1-U0-G0
			VSQ-W	4959	119	B3-U0-G2	5353	129	B3-U0-G2	5635	136	B3-U0-G2	5917	143	B3-U0-G2		1603	52	B1-U0-G1
			II-HS	3589	86	B0-U0-G1	3875	93	B0-U0-G1	4079	98	B0-U0-G1	4282	103	B0-U0-G1		1161	37	B0-U0-G0
			II-FR-HS	3652	88	B0-U0-G1	3942	95	B0-U0-G1	4150	100	B0-U0-G1	4357	105	B0-U0-G1		1181	38	B0-U0-G0
			III-M-HS	3631	88	B0-U0-G1	3920	94	B0-U0-G1	4127	99	B0-U0-G1	4333	104	B0-U0-G2		1174	38	B0-U0-G0
			III-W-HS	3555	86	B0-U0-G2	3838	92	B0-U0-G2	4040	97	B0-U0-G2	4242	102	B0-U0-G2		1150	37	B0-U0-G1
			IV-HS	3751	90	B0-U0-G1	4050	98	B0-U0-G1	4263	103	B0-U0-G1	4476	108	B0-U0-G1		1213	39	B0-U0-G0
			IV-FT-HS	3545	85	B0-U0-G2	3827	92	B0-U0-G2	4029	97	B0-U0-G2	4230	102	B0-U0-G2		1146	37	B0-U0-G1
24	700	55.9	II	6275	112	B2-U0-G1	6774	121	B2-U0-G2	7130	128	B2-U0-G2	7487	134	B2-U0-G2	N/A	N/A		
			II-FR	6317	113	B2-U0-G1	6819	122	B2-U0-G1	7178	128	B2-U0-G1	7537	135	B2-U0-G1				
			II-ML	6275	112	B3-U0-G3	6774	121	B3-U0-G3	7130	128	B3-U0-G3	7487	134	B3-U0-G3				
			III-M	6385	114	B2-U0-G2	6893	123	B2-U0-G2	7256	130	B2-U0-G2	7618	136	B2-U0-G2				
			III-W	5928	106	B1-U0-G2	6399	114	B1-U0-G2	6736	121	B1-U0-G2	7073	127	B1-U0-G2				
			IV	6337	113	B2-U0-G2	6841	122	B2-U0-G2	7201	129	B2-U0-G2	7561	135	B2-U0-G2				
			IV-FT	5772	103	B1-U0-G2	6231	111	B1-U0-G2	6559	117	B1-U0-G2	6887	123	B1-U0-G2				
			VSQ-N	6624	118	B2-U0-G1	7151	128	B2-U0-G1	7527	135	B2-U0-G1	7903	141	B3-U0-G1				
			VSQ-M	6494	116	B3-U0-G1	7011	125	B3-U0-G1	7380	132	B3-U0-G1	7749	139	B3-U0-G2				
			VSQ-W	6340	113	B3-U0-G2	6844	122	B3-U0-G2	7204	129	B3-U0-G2	7565	135	B3-U0-G2				
			II-HS	4589	82	B1-U0-G1	4954	89	B1-U0-G2	5215	93	B1-U0-G2	5475	98	B1-U0-G2				
			II-FR-HS	4668	84	B0-U0-G1	5040	90	B0-U0-G1	5305	95	B0-U0-G1	5570	100	B0-U0-G1				
			III-M-HS	4643	83	B0-U0-G2	5012	90	B0-U0-G2	5276	94	B0-U0-G2	5539	99	B0-U0-G2				
			III-W-HS	4544	81	B0-U0-G2	4906	88	B0-U0-G2	5164	92	B0-U0-G2	5422	97	B0-U0-G2				
			IV-HS	4796	86	B0-U0-G2	5177	93	B0-U0-G2	5450	97	B0-U0-G2	5722	102	B0-U0-G2				
			IV-FT-HS	4532	81	B0-U0-G2	4893	88	B0-U0-G2	5150	92	B0-U0-G2	5408	97	B0-U0-G2				
24	875	67.8	II	7406	109	B2-U0-G2	7995	118	B2-U0-G2	8416	124	B2-U0-G2	8837	130	B2-U0-G2	N/A	N/A		
			II-FR	7456	110	B2-U0-G1	8049	119	B2-U0-G1	8473	125	B2-U0-G1	8896	131	B2-U0-G1				
			II-ML	7406	109	B3-U0-G3	7995	118	B3-U0-G3	8416	124	B3-U0-G3	8837	130	B3-U0-G3				
			III-M	7536	111	B2-U0-G2	8135	120	B2-U0-G2	8563	126	B2-U0-G2	8992	133	B2-U0-G2				
			III-W	6997	103	B1-U0-G2	7553	111	B1-U0-G2	7951	117	B2-U0-G2	8348	123	B2-U0-G2				
			IV	7479	110	B2-U0-G2	8073	119	B2-U0-G2	8498	125	B2-U0-G2	8923	132	B2-U0-G2				
			IV-FT	6813	100	B1-U0-G2	7355	108	B2-U0-G2	7742	114	B2-U0-G2	8129	120	B2-U0-G2				
			VSQ-N	7817	115	B2-U0-G1	8439	124	B3-U0-G1	8883	131	B3-U0-G1	9327	138	B3-U0-G1				
			VSQ-M	7665	113	B3-U0-G2	8275	122	B3-U0-G2	8711	128	B3-U0-G2	9146	135	B3-U0-G2				
			VSQ-W	7482	110	B3-U0-G2	8078	119	B3-U0-G2	8503	125	B4-U0-G2	8928	132	B4-U0-G2				
			II-HS	5417	80	B1-U0-G2	5847	86	B1-U0-G2	6155	91	B1-U0-G2	6463	95	B1-U0-G2				
			II-FR-HS	5510	81	B0-U0-G1	5948	88	B1-U0-G1	6261	92	B1-U0-G1	6574	97	B1-U0-G1				
			III-M-HS	5480	81	B0-U0-G2	5916	87	B0-U0-G2	6227	92	B0-U0-G2	6538	96	B0-U0-G2				
			III-W-HS	5363	79	B0-U0-G2	5790	85	B0-U0-G2	6095	90	B0-U0-G2	6399	94	B0-U0-G2				
			IV-HS	5660	83	B0-U0-G2	6110	90	B0-U0-G2	6432	95	B0-U0-G2	6753	100	B0-U0-G2				
			IV-FT-HS	5349	79	B0-U0-G2	5775	85	B0-U0-G2	6078	90	B0-U0-G2	6382	94	B0-U0-G2				
24	1050	82.0	II	8513	104	B2-U0-G2	9190	112	B2-U0-G2	9674	118	B2-U0-G2	10157	124	B2-U0-G2	N/A	N/A		
			II-FR	8570	105	B2-U0-G1	9252	113	B2-U0-G1	9739	119	B2-U0-G1	10225	125	B2-U0-G1				
			II-ML	8513	104	B3-U0-G3	9190	112	B3-U0-G3	9674	118	B3-U0-G3	10157	124	B3-U0-G3				
			III-M	8662	106	B2-U0-G2	9351	114	B2-U0-G2	9843	120	B2-U0-G2	10335	126	B2-U0-G2				
			III-W	8042	98	B2-U0-G2	8682	106	B2-U0-G2	9139	111	B2-U0-G3	9595	117	B2-U0-G3				
			IV	8596	105	B2-U0-G2	9280	113	B2-U0-G2	9768	119	B2-U0-G2	10256	125	B2-U0-G2				
			IV-FT	7831	95	B2-U0-G2	8454	103	B2-U0-G2	8899	109	B2-U0-G3	9344	114	B2-U0-G3				
			VSQ-N	8985	110	B3-U0-G1	9700	118	B3-U0-G1	10210	125	B3-U0-G1	10721	131	B3-U0-G1				
			VSQ-M	8811	107	B3-U0-G2	9512	116	B3-U0-G2	10012	122	B3-U0-G2	10513	128	B3-U0-G2				
			VSQ-W	8601	105	B4-U0-G2	9285	113	B4-U0-G2	9773	119	B4-U0-G3	10262	125	B4-U0-G3				
			II-HS	6226	76	B1-U0-G2	6721	82	B1-U0-G2	7075	86	B1-U0-G2	7429	91	B1-U0-G2				
			II-FR-HS	6333	77	B1-U0-G1	6837	83	B1-U0-G1	7197	88	B1-U0-G1	7557	92	B1-U0-G1				
			III-M-HS	6299	77	B0-U0-G2	6799	83	B0-U0-G2	7158	87	B0-U0-G2	7515	92	B1-U0-G2				
			III-W-HS	6165	75	B0-U0-G2	6655	81	B0-U0-G2	7005	85	B0-U0-G2	7356	90	B0-U0-G2				
			IV-HS	6506	79	B0-U0-G2	7023	86	B0-U0-G2	7393	90	B1-U0-G2	7762	95	B1-U0-G2				
			IV-FT-HS	6148	75	B0-U0-G2	6637	81	B0-U0-G2	6986	85	B1-U0-G3	7336	89	B1-U0-G3				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRM-PLED)

RZR-M-PLED

LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
48	350	52.5	II	6836	130	B2-U0-G2	7380	141	B2-U0-G2	7769	148	B2-U0-G2	8157	155	B2-U0-G2	41.0	2713	66	B1-U0-G1
			II-FR	6882	131	B2-U0-G1	7430	142	B2-U0-G1	7821	149	B2-U0-G1	8212	156	B2-U0-G1		2731	67	B1-U0-G1
			II-ML	6837	130	B3-U0-G3	7380	141	B3-U0-G3	7769	148	B3-U0-G3	8157	155	B3-U0-G3		2713	66	B1-U0-G1
			III-M	6956	132	B2-U0-G2	7509	143	B2-U0-G2	7905	151	B2-U0-G2	8300	158	B2-U0-G2		2760	67	B1-U0-G1
			III-W	6459	123	B1-U0-G2	6972	133	B1-U0-G2	7339	140	B1-U0-G2	7706	147	B1-U0-G2		2563	63	B1-U0-G1
			IV	6903	131	B2-U0-G2	7453	142	B2-U0-G2	7845	149	B2-U0-G2	8237	157	B2-U0-G2		2740	67	B1-U0-G1
			IV-FT	6289	120	B1-U0-G2	6789	129	B1-U0-G2	7146	136	B1-U0-G2	7503	143	B2-U0-G2		2496	61	B1-U0-G1
			VSQ-N	7216	137	B2-U0-G1	7790	148	B2-U0-G1	8200	156	B3-U0-G1	8610	164	B3-U0-G1		2864	70	B1-U0-G0
			VSQ-M	7076	135	B3-U0-G1	7639	146	B3-U0-G2	8041	153	B3-U0-G2	8443	161	B3-U0-G2		2808	68	B2-U0-G1
			VSQ-W	6907	132	B3-U0-G2	7456	142	B3-U0-G2	7849	150	B3-U0-G2	8242	157	B3-U0-G2		2741	67	B2-U0-G1
			II-HS	5000	95	B1-U0-G2	5398	103	B1-U0-G2	5682	108	B1-U0-G2	5966	114	B1-U0-G2		1984	48	B0-U0-G1
			II-FR-HS	5087	97	B0-U0-G1	5491	105	B0-U0-G1	5780	110	B1-U0-G1	6069	116	B1-U0-G1		2018	49	B0-U0-G0
			III-M-HS	5059	96	B0-U0-G2	5461	104	B0-U0-G2	5748	109	B0-U0-G2	6036	115	B0-U0-G2		2007	49	B0-U0-G1
			III-W-HS	4952	94	B0-U0-G2	5345	102	B0-U0-G2	5627	107	B0-U0-G2	5908	113	B0-U0-G2		1965	48	B0-U0-G1
			IV-HS	5224	100	B0-U0-G2	5640	107	B0-U0-G2	5937	113	B0-U0-G2	6234	119	B0-U0-G2		2074	51	B0-U0-G1
			IV-FT-HS	4938	94	B0-U0-G2	5330	102	B0-U0-G2	5611	107	B0-U0-G2	5892	112	B0-U0-G2		1960	48	B0-U0-G1
48	525	79.0	II	9720	123	B2-U0-G2	10493	133	B2-U0-G2	11046	140	B2-U0-G2	11598	147	B2-U0-G2	62.0	3143	51	B1-U0-G1
			II-FR	9785	124	B2-U0-G1	10564	134	B2-U0-G1	11120	141	B2-U0-G1	11676	148	B3-U0-G1		3164	51	B1-U0-G1
			II-ML	9720	123	B3-U0-G3	10494	133	B3-U0-G3	11046	140	B3-U0-G3	11598	147	B3-U0-G3		3143	51	B2-U0-G2
			III-M	9891	125	B2-U0-G2	10677	135	B2-U0-G2	11240	142	B2-U0-G2	11801	149	B2-U0-G2		3198	52	B1-U0-G1
			III-W	9183	116	B2-U0-G3	9914	125	B2-U0-G3	10436	132	B2-U0-G3	10958	139	B2-U0-G3		2969	48	B1-U0-G1
			IV	9816	124	B2-U0-G2	10597	134	B2-U0-G2	11155	141	B2-U0-G2	11712	148	B2-U0-G2		3174	51	B1-U0-G1
			IV-FT	8942	113	B2-U0-G2	9653	122	B2-U0-G3	10161	129	B2-U0-G3	10669	135	B2-U0-G3		2892	47	B1-U0-G1
			VSQ-N	10260	130	B3-U0-G1	11075	140	B3-U0-G1	11659	148	B3-U0-G1	12242	155	B3-U0-G1		3317	54	B2-U0-G0
			VSQ-M	10060	127	B3-U0-G2	10861	137	B4-U0-G2	11432	145	B4-U0-G2	12004	152	B4-U0-G2		3253	52	B2-U0-G1
			VSQ-W	9821	124	B4-U0-G3	10602	134	B4-U0-G3	11160	141	B4-U0-G3	11718	148	B4-U0-G3		3175	51	B2-U0-G1
			II-HS	7110	90	B1-U0-G2	7675	97	B1-U0-G2	8079	102	B1-U0-G2	8483	107	B1-U0-G2		2298	37	B0-U0-G1
			II-FR-HS	7231	92	B1-U0-G1	7806	99	B1-U0-G1	8217	104	B1-U0-G1	8628	109	B1-U0-G1		2339	38	B0-U0-G0
			III-M-HS	7192	91	B0-U0-G2	7764	98	B1-U0-G2	8173	103	B1-U0-G2	8581	109	B1-U0-G2		2325	38	B0-U0-G1
			III-W-HS	7040	89	B0-U0-G2	7600	96	B0-U0-G2	8000	101	B1-U0-G2	8400	106	B1-U0-G2		2276	37	B0-U0-G1
			IV-HS	7429	94	B1-U0-G2	8020	102	B1-U0-G2	8442	107	B1-U0-G2	8864	112	B1-U0-G2		2402	39	B0-U0-G1
			IV-FT-HS	7020	89	B1-U0-G3	7579	96	B1-U0-G3	7978	101	B1-U0-G3	8377	106	B1-U0-G3		2270	37	B0-U0-G1
48	700	105.1	II	12226	116	B2-U0-G2	13199	126	B2-U0-G2	13894	132	B2-U0-G2	14588	139	B3-U0-G2	N/A	N/A		
			II-FR	12308	117	B3-U0-G1	13287	126	B3-U0-G1	13986	133	B3-U0-G1	14686	140	B3-U0-G1				
			II-ML	12227	116	B3-U0-G3	13200	126	B3-U0-G3	13894	132	B3-U0-G3	14589	139	B4-U0-G4				
			III-M	12440	118	B2-U0-G2	13430	128	B2-U0-G2	14137	135	B2-U0-G2	14843	141	B2-U0-G2				
			III-W	11550	110	B2-U0-G3	12468	119	B2-U0-G3	13125	125	B2-U0-G3	13781	131	B2-U0-G3				
			IV	12346	117	B2-U0-G2	13329	127	B2-U0-G2	14030	133	B2-U0-G2	14731	140	B2-U0-G2				
			IV-FT	11247	107	B2-U0-G3	12141	116	B2-U0-G3	12780	122	B2-U0-G3	13419	128	B2-U0-G3				
			VSQ-N	12904	123	B3-U0-G1	13931	133	B3-U0-G1	14663	140	B3-U0-G1	15397	146	B3-U0-G1				
			VSQ-M	12654	120	B4-U0-G2	13660	130	B4-U0-G2	14379	137	B4-U0-G2	15099	144	B4-U0-G2				
			VSQ-W	12352	118	B4-U0-G3	13334	127	B4-U0-G3	14036	134	B4-U0-G3	14738	140	B4-U0-G3				
			II-HS	8942	85	B1-U0-G2	9653	92	B1-U0-G2	10161	97	B1-U0-G2	10669	102	B1-U0-G2				
			II-FR-HS	9095	87	B1-U0-G1	9819	93	B1-U0-G1	10336	98	B1-U0-G1	10852	103	B1-U0-G1				
			III-M-HS	9045	86	B1-U0-G2	9765	93	B1-U0-G2	10279	98	B1-U0-G2	10793	103	B1-U0-G2				
			III-W-HS	8854	84	B1-U0-G2	9558	91	B1-U0-G3	10062	96	B1-U0-G3	10565	101	B1-U0-G3				
			IV-HS	9344	89	B1-U0-G2	10087	96	B1-U0-G2	10618	101	B1-U0-G2	11149	106	B1-U0-G2				
			IV-FT-HS	8831	84	B1-U0-G3	9533	91	B1-U0-G3	10035	95	B1-U0-G3	10537	100	B1-U0-G3				
48	875	131.8	II	14829	113	B3-U0-G2	16008	121	B3-U0-G3	16851	128	B3-U0-G3	17693	134	B3-U0-G3	N/A	N/A		
			II-FR	14928	113	B3-U0-G2	16115	122	B3-U0-G2	16964	129	B3-U0-G2	17812	135	B3-U0-G2				
			II-ML	14829	113	B4-U0-G4	16009	121	B4-U0-G4	16851	128	B4-U0-G4	17694	134	B4-U0-G4				
			III-M	15088	114	B2-U0-G2	16288	124	B3-U0-G3	17145	130	B3-U0-G3	18003	137	B3-U0-G3				
			III-W	14009	106	B2-U0-G3	15123	115	B2-U0-G3	15919	121	B3-U0-G3	16715	127	B3-U0-G3				
			IV	14975	114	B2-U0-G2	16166	123	B3-U0-G2	17017	129	B3-U0-G3	17867	136	B3-U0-G3				
			IV-FT	13641	103	B2-U0-G3	14726	112	B3-U0-G3	15501	118	B3-U0-G3	16276	123	B3-U0-G3				
			VSQ-N	15652	119	B3-U0-G1	16897	128	B4-U0-G2	17786	135	B4-U0-G2	18675	142	B4-U0-G2				
			VSQ-M	15348	116	B4-U0-G2	16568	126	B4-U0-G2	17440	132	B4-U0-G2	18312	139	B4-U0-G2				
			VSQ-W	14981	114	B4-U0-G3	16173	123	B4-U0-G3	17024	129	B5-U0-G3	17876	136	B5-U0-G3				
			II-HS	10845	82	B1-U0-G2	11707	89	B1-U0-G2	12324	94	B1-U0-G2	12940	98	B1-U0-G2				
			II-FR-HS	11032	84	B1-U0-G1	11909	90	B1-U0-G2	12536	95	B1-U0-G2	13162	100	B1-U0-G2				
			III-M-HS	10971	83	B1-U0-G2	11844	90	B1-U0-G3	12467	95	B1-U0-G3	13091	99	B1-U0-G3				
			III-W-HS	10739	81	B1-U0-G3	11594	88	B1-U0-G3	12204	93	B1-U0-G3	12814	97	B1-U0-G3				
			IV-HS	11333	86	B1-U0-G2	12234	93	B1-U0-G2	12878	98	B1-U0-G3	13522	103	B1-U0-G3				
			IV-FT-HS	10711	81	B1-U0-G3	11562	88	B1-U0-G3	12171	92	B1-U0-G3	12779	97	B1-U0-G3				
48	1050	159.6	II	17044	107	B3-U0-G3	18400	115	B3-U0-G3	19369	121	B3-U0-G3	20337	127	B3-U0-G3	N/A	N/A		
			II-FR	17159	108	B3-U0-G2	18523	116	B3-U0-G2	19498	122	B3-U0-G2	20473	128	B3-U0-G2				
			II-ML	17045	107	B4-U0-G4	18401	115	B4-U0-G4	19369	121	B4-U0-G4	20338	127	B4-U0-G4				
			III-M	17342	109	B3-U0-G3	18722	117	B3-U0-G3	19707	123	B3-U0-G3	20692	130	B3-U0-G3				
			III-W	16102	101	B3-U0-G3	17383	109	B3-U0-G3	18298	115	B3-U0-G3	19213	120	B3-U0-G4				
			IV	17212	108	B3-U0-G3	18582	116	B3-U0-G3	19559	123	B3-U0-G3	20537	129	B3-U0-G3				
			IV-FT	15680	98	B3-U0-G3	16927	106	B3-U0-G3	17818	112	B3-U0-G3	18708	117	B3-U0-G4				
			VSQ-N	17990	113	B4-U0-G2	19421	122	B4-U0-G2	20443	128	B4-U0-G2	21466	134	B4-U0-G2				
			VSQ-M	17641	111	B4-U0-G2	19044	119	B4-U0-G2	20046	126	B4-U0-G2	21048	132	B4-U0-G2				
			VSQ-W	17220	108	B5-U0-G3	18590	116	B5-U0-G3	19568	123	B5-U0-G3	20546	129	B5-U0-G3				
			II-HS	12465	78	B1-U0-G2	13457	84	B1-U0-G3	14165	89	B1-U0-G3	14873	93	B1-U0-G3				
			II-FR-HS	12680	79	B1-U0-G2	13688	86	B1-U0-G2	14409	90	B1-U0-G2	15129	95	B1-U0-G2				
			III-M-HS	12611	79	B1-U0-G3	13614	85	B1-U0-G3	14330	90	B1-U0-G3	15047	94	B1-U0-G3				
			III-W-HS	12344	77	B1-U0-G3	13326	83	B1-U0-G3	14027	88	B1-U0-G3	14728	92	B1-U0-G4				
			IV-HS	13026	82	B1-U0-G3	14062	88	B1-U0-G3	14802	93	B1-U0-G3	15542	97	B1-U0-G3				
			IV-FT-HS	12311	77	B1-U0-G3	13290	83	B1-U0-G3	13989	88	B1-U0-G4	14689	92	B1-U0-G4				

IES File downloads for this product can be found at www.usaltg.com/downloads/asr.html

RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZR-PLED)

RZR-PLED																			
LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
40	350	42.7	II	5819	136	B2-U0-G1	6281	147	B2-U0-G1	6612	155	B2-U0-G2	6943	163	B2-U0-G2	33.0	2309	70	B1-U0-G1
			II-FR	5858	137	B2-U0-G1	6324	148	B2-U0-G1	6657	156	B2-U0-G1	6990	164	B2-U0-G1		2325	70	B1-U0-G0
			II-ML	5819	136	B3-U0-G3	6282	147	B3-U0-G3	6612	155	B3-U0-G3	6943	163	B3-U0-G3		2309	70	B1-U0-G1
			III-M	5921	139	B1-U0-G2	6392	150	B2-U0-G2	6728	158	B2-U0-G2	7065	165	B2-U0-G2		2349	71	B1-U0-G1
			III-W	5497	129	B1-U0-G2	5935	139	B1-U0-G2	6247	146	B1-U0-G2	6559	154	B1-U0-G2		2182	66	B1-U0-G1
			IV	5876	138	B1-U0-G2	6344	149	B2-U0-G2	6677	156	B2-U0-G2	7011	164	B2-U0-G2		2332	71	B1-U0-G1
			IV-FT	5353	125	B1-U0-G2	5778	135	B1-U0-G2	6083	142	B1-U0-G2	6387	150	B1-U0-G2		2124	64	B1-U0-G1
			VSQ-N	6141	144	B2-U0-G1	6630	155	B2-U0-G1	6979	163	B2-U0-G1	7328	172	B2-U0-G1		2438	74	B1-U0-G0
			VSQ-M	6023	141	B3-U0-G1	6502	152	B3-U0-G1	6844	160	B3-U0-G1	7186	168	B3-U0-G1		2390	72	B2-U0-G1
			VSQ-W	5879	138	B3-U0-G2	6346	149	B3-U0-G2	6680	156	B3-U0-G2	7015	164	B3-U0-G2		2333	71	B2-U0-G1
			II-HS	4256	100	B0-U0-G1	4594	108	B1-U0-G1	4836	113	B1-U0-G2	5077	119	B1-U0-G2		1689	51	B0-U0-G0
			II-FR-HS	4329	101	B0-U0-G1	4673	109	B0-U0-G1	4919	115	B0-U0-G1	5165	121	B0-U0-G1		1718	52	B0-U0-G0
			III-M-HS	4305	101	B0-U0-G2	4647	109	B0-U0-G2	4892	115	B0-U0-G2	5137	120	B0-U0-G2		1708	52	B0-U0-G1
			III-W-HS	4214	99	B0-U0-G2	4550	107	B0-U0-G2	4789	112	B0-U0-G2	5028	118	B0-U0-G2		1673	51	B0-U0-G1
			IV-HS	4447	104	B0-U0-G1	4801	112	B0-U0-G2	5054	118	B0-U0-G2	5306	124	B0-U0-G2		1764	53	B0-U0-G1
			IV-FT-HS	4203	98	B0-U0-G2	4537	106	B0-U0-G2	4776	112	B0-U0-G2	5015	117	B0-U0-G2		1668	51	B0-U0-G1
40	525	64.7	II	8396	130	B2-U0-G2	9064	140	B2-U0-G2	9541	147	B2-U0-G2	10017	155	B2-U0-G2	51.0	2715	53	B1-U0-G1
			II-FR	8452	131	B2-U0-G1	9125	141	B2-U0-G1	9605	148	B2-U0-G1	10085	156	B2-U0-G1		2733	54	B1-U0-G1
			II-ML	8396	130	B3-U0-G3	9064	140	B3-U0-G3	9541	147	B3-U0-G3	10018	155	B3-U0-G3		2715	53	B1-U0-G1
			III-M	8543	132	B2-U0-G2	9223	143	B2-U0-G2	9708	150	B2-U0-G2	10194	158	B2-U0-G2		2762	54	B1-U0-G1
			III-W	7932	123	B2-U0-G2	8563	132	B2-U0-G2	9013	139	B2-U0-G3	9464	146	B2-U0-G3		2565	50	B1-U0-G1
			IV	8478	131	B2-U0-G2	9152	141	B2-U0-G2	9634	149	B2-U0-G2	10116	156	B2-U0-G2		2742	54	B1-U0-G1
			IV-FT	7724	119	B2-U0-G3	8338	129	B2-U0-G3	8777	136	B2-U0-G3	9216	142	B2-U0-G3		2497	49	B1-U0-G1
			VSQ-N	8861	137	B3-U0-G1	9566	148	B3-U0-G1	10070	156	B3-U0-G1	10574	163	B3-U0-G1		2866	56	B1-U0-G0
			VSQ-M	8690	134	B3-U0-G2	9381	145	B3-U0-G2	9875	153	B3-U0-G2	10369	160	B3-U0-G2		2809	55	B2-U0-G1
			VSQ-W	8483	131	B4-U0-G2	9157	142	B4-U0-G2	9640	149	B4-U0-G3	10122	156	B4-U0-G3		2743	54	B2-U0-G1
			II-HS	6141	95	B1-U0-G2	6629	102	B1-U0-G2	6978	108	B1-U0-G2	7327	113	B1-U0-G2		1985	39	B0-U0-G1
			II-FR-HS	6246	97	B1-U0-G1	6743	104	B1-U0-G1	7098	110	B1-U0-G1	7453	115	B1-U0-G1		2020	40	B0-U0-G0
			III-M-HS	6212	96	B0-U0-G2	6706	104	B0-U0-G2	7060	109	B0-U0-G2	7412	115	B0-U0-G2		2009	39	B0-U0-G1
			III-W-HS	6081	94	B0-U0-G2	6564	101	B0-U0-G2	6910	107	B0-U0-G2	7255	112	B0-U0-G2		1966	39	B0-U0-G1
			IV-HS	6417	99	B0-U0-G2	6927	107	B0-U0-G2	7292	113	B0-U0-G2	7656	118	B1-U0-G2		2075	41	B0-U0-G1
			IV-FT-HS	6064	94	B0-U0-G2	6546	101	B0-U0-G2	6891	107	B1-U0-G2	7235	112	B1-U0-G3		1960	38	B0-U0-G1
40	700	86.8	II	10669	123	B2-U0-G2	11518	133	B2-U0-G2	12124	140	B2-U0-G2	12730	147	B2-U0-G2	N/A	N/A		
			II-FR	10740	124	B2-U0-G1	11594	134	B3-U0-G1	12205	141	B3-U0-G1	12815	148	B3-U0-G1				
			II-ML	10669	123	B3-U0-G3	11518	133	B3-U0-G3	12124	140	B3-U0-G3	12731	147	B3-U0-G3				
			III-M	10856	125	B2-U0-G2	11719	135	B2-U0-G2	12336	142	B2-U0-G2	12953	149	B2-U0-G2				
			III-W	10079	116	B2-U0-G3	10880	125	B2-U0-G3	11453	132	B2-U0-G3	12026	139	B2-U0-G3				
			IV	10774	124	B2-U0-G2	11630	134	B2-U0-G2	12243	141	B2-U0-G2	12855	148	B2-U0-G2				
			IV-FT	9814	113	B2-U0-G3	10595	122	B2-U0-G3	11153	128	B2-U0-G3	11710	135	B2-U0-G3				
			VSQ-N	11260	130	B3-U0-G1	12156	140	B3-U0-G1	12796	147	B3-U0-G1	13435	155	B3-U0-G1				
			VSQ-M	11042	127	B4-U0-G2	11920	137	B4-U0-G2	12548	145	B4-U0-G2	13175	152	B4-U0-G2				
			VSQ-W	10778	124	B4-U0-G3	11636	134	B4-U0-G3	12248	141	B4-U0-G3	12860	148	B4-U0-G3				
			II-HS	7803	90	B1-U0-G2	8423	97	B1-U0-G2	8866	102	B1-U0-G2	9310	107	B1-U0-G2				
			II-FR-HS	7937	91	B1-U0-G1	8568	99	B1-U0-G1	9019	104	B1-U0-G1	9470	109	B1-U0-G1				
			III-M-HS	7893	91	B1-U0-G2	8521	98	B1-U0-G2	8970	103	B1-U0-G2	9418	109	B1-U0-G2				
			III-W-HS	7726	89	B0-U0-G2	8341	96	B1-U0-G2	8780	101	B1-U0-G2	9218	106	B1-U0-G2				
			IV-HS	8153	94	B1-U0-G2	8802	101	B1-U0-G2	9265	107	B1-U0-G2	9728	112	B1-U0-G2				
			IV-FT-HS	7705	89	B1-U0-G3	8318	96	B1-U0-G3	8756	101	B1-U0-G3	9194	106	B1-U0-G3				
40	875	108.0	II	12366	114	B2-U0-G2	13349	124	B2-U0-G2	14052	130	B2-U0-G2	14754	137	B3-U0-G2	N/A	N/A		
			II-FR	12448	115	B3-U0-G1	13439	124	B3-U0-G1	14146	131	B3-U0-G1	14853	138	B3-U0-G2				
			II-ML	12366	115	B3-U0-G3	13349	124	B3-U0-G3	14052	130	B3-U0-G3	14755	137	B4-U0-G4				
			III-M	12581	116	B2-U0-G2	13582	126	B2-U0-G2	14297	132	B2-U0-G2	15012	139	B2-U0-G2				
			III-W	11682	108	B2-U0-G3	12611	117	B2-U0-G3	13275	123	B2-U0-G3	13939	129	B2-U0-G3				
			IV	12487	116	B2-U0-G2	13480	125	B2-U0-G2	14189	131	B2-U0-G2	14899	138	B2-U0-G2				
			IV-FT	11375	105	B2-U0-G3	12280	114	B2-U0-G3	12926	120	B2-U0-G3	13573	126	B2-U0-G3				
			VSQ-N	13051	121	B3-U0-G1	14089	130	B3-U0-G1	14830	137	B3-U0-G1	15572	144	B3-U0-G1				
			VSQ-M	12798	118	B4-U0-G2	13816	128	B4-U0-G2	14543	135	B4-U0-G2	15270	141	B4-U0-G2				
			VSQ-W	12492	116	B4-U0-G3	13486	125	B4-U0-G3	14196	131	B4-U0-G3	14905	138	B4-U0-G3				
			II-HS	9044	84	B1-U0-G2	9763	90	B1-U0-G2	10277	95	B1-U0-G2	10791	100	B1-U0-G2				
			II-FR-HS	9199	85	B1-U0-G1	9930	92	B1-U0-G1	10453	97	B1-U0-G1	10976	102	B1-U0-G1				
			III-M-HS	9149	85	B1-U0-G2	9876	91	B1-U0-G2	10396	96	B1-U0-G2	10916	101	B1-U0-G2				
			III-W-HS	8955	83	B1-U0-G2	9667	90	B1-U0-G3	10176	94	B1-U0-G3	10685	99	B1-U0-G3				
			IV-HS	9450	87	B1-U0-G2	10201	94	B1-U0-G2	10738	99	B1-U0-G2	11275	104	B1-U0-G2				
			IV-FT-HS	8931	83	B1-U0-G3	9641	89	B1-U0-G3	10149	94	B1-U0-G3	10656	99	B1-U0-G3				
40	1050	128.2	II	14213	111	B2-U0-G2	15344	120	B3-U0-G2	16151	126	B3-U0-G3	16959	132	B3-U0-G3	N/A	N/A		
			II-FR	14308	112	B3-U0-G1	15446	120	B3-U0-G2	16259	127	B3-U0-G2	17072	133	B3-U0-G2				
			II-ML	14214	111	B3-U0-G3	15344	120	B4-U0-G4	16152	126	B4-U0-G4	16959	132	B4-U0-G4				
			III-M	14461	113	B2-U0-G2	15612	122	B3-U0-G2	16433	128	B3-U0-G3	17255	135	B3-U0-G3				
			III-W	13427	105	B2-U0-G3	14495	113	B2-U0-G3	15258	119	B2-U0-G3	16021	125	B3-U0-G3				
			IV	14352	112	B2-U0-G2	15494	121	B3-U0-G2	16309	127	B3-U0-G3	17125	134	B3-U0-G3				
			IV-FT	13075	102	B2-U0-G3	14115	110	B2-U0-G3	14858	116	B3-U0-G3	15601	122	B3-U0-G3				
			VSQ-N	15001	117	B3-U0-G1	16194	126	B4-U0-G1	17046	133	B4-U0-G2	17899	140	B4-U0-G2				
			VSQ-M	14710	115	B4-U0-G2	15880	124	B4-U0-G2	16716	130	B4-U0-G2	17552	137	B4-U0-G2				
			VSQ-W	14359	112	B4-U0-G3	15501	121	B4-U0-G3	16317	127	B4-U0-G3	17132	134	B5-U0-G3				
			II-HS	10395	81	B1-U0-G2	11222	88	B1-U0-G2	11813	92	B1-U0-G2	12403	97	B1-U0-G2				
			II-FR-HS	10573	82	B1-U0-G1	11414	89	B1-U0-G2	12015	94	B1-U0-G2	12616	98	B1-U0-G2				
			III-M-HS	10516	82	B1-U0-G2	11352	89	B1-U0-G2	11949	93	B1-U0-G3	12547	98	B1-U0-G3				
			III-W-HS	10293	80	B1-U0-G3	11112	87	B1-U0-G3	11696	91	B1-U0-G3	12281	96	B1-U0-G3				
			IV-HS	10862	85	B1-U0-G2	11726	91	B1-U0-G2	12343	96	B1-U0-G2	12960	101	B1-U0-G3				
			IV-FT-HS	10266	80	B1-U0-G3	11082	86	B1-U0-G3	11665	91	B1-U0-G3	12248	96	B1-U0-G3				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZR-PLED)

RZR-PLED																			
LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
80	350	85.4	II	11277	132	B2-U0-G2	12174	143	B2-U0-G2	12814	150	B2-U0-G2	13455	158	B2-U0-G2	67.0	4475	67	B1-U0-G1
			II-FR	11352	133	B3-U0-G1	12256	144	B3-U0-G1	12901	151	B3-U0-G1	13546	159	B3-U0-G1		4504	67	B1-U0-G1
			II-ML	11277	132	B3-U0-G3	12175	143	B3-U0-G3	12815	150	B3-U0-G3	13456	158	B3-U0-G3		4475	67	B2-U0-G2
			III-M	11474	134	B2-U0-G2	12387	145	B2-U0-G2	13039	153	B2-U0-G2	13691	160	B2-U0-G2		4553	68	B1-U0-G1
			III-W	10654	125	B2-U0-G3	11501	135	B2-U0-G3	12106	142	B2-U0-G3	12712	149	B2-U0-G3		4228	63	B1-U0-G2
			IV	11388	133	B2-U0-G2	12294	144	B2-U0-G2	12941	152	B2-U0-G2	13588	159	B2-U0-G2		4518	67	B1-U0-G1
			IV-FT	10374	121	B2-U0-G3	11199	131	B2-U0-G3	11788	138	B2-U0-G3	12377	145	B2-U0-G3		4117	61	B1-U0-G1
			VSQ-N	11902	139	B3-U0-G1	12849	150	B3-U0-G1	13525	158	B3-U0-G1	14202	166	B3-U0-G1		4723	70	B2-U0-G1
			VSQ-M	11671	137	B4-U0-G2	12600	148	B4-U0-G2	13263	155	B4-U0-G2	13927	163	B4-U0-G2		4631	69	B3-U0-G1
			VSQ-W	11392	133	B4-U0-G3	12299	144	B4-U0-G3	12946	152	B4-U0-G3	13593	159	B4-U0-G3		4520	67	B3-U0-G2
			II-HS	8247	97	B1-U0-G2	8903	104	B1-U0-G2	9372	110	B1-U0-G2	9840	115	B1-U0-G2		3273	49	B0-U0-G1
			II-FR-HS	8389	98	B1-U0-G1	9056	106	B1-U0-G1	9533	112	B1-U0-G1	10009	117	B1-U0-G1		3329	50	B0-U0-G1
			III-M-HS	8344	98	B1-U0-G2	9007	105	B1-U0-G2	9482	111	B1-U0-G2	9956	117	B1-U0-G2		3311	49	B0-U0-G1
			III-W-HS	8167	96	B1-U0-G2	8817	103	B1-U0-G2	9281	109	B1-U0-G2	9745	114	B1-U0-G3		3240	48	B0-U0-G1
			IV-HS	8618	101	B1-U0-G2	9304	109	B1-U0-G2	9793	115	B1-U0-G2	10283	120	B1-U0-G2		3420	51	B0-U0-G1
			IV-FT-HS	8144	95	B1-U0-G3	8792	103	B1-U0-G3	9255	108	B1-U0-G3	9718	114	B1-U0-G3		3232	48	B0-U0-G2
80	525	129.4	II	16239	125	B3-U0-G3	17531	135	B3-U0-G3	18454	143	B3-U0-G3	19377	150	B3-U0-G3	101.0	5251	52	B1-U0-G1
			II-FR	16348	126	B3-U0-G2	17648	136	B3-U0-G2	18577	144	B3-U0-G2	19506	151	B3-U0-G2		5286	52	B1-U0-G1
			II-ML	16240	126	B4-U0-G4	17532	135	B4-U0-G4	18454	143	B4-U0-G4	19377	150	B4-U0-G4		5251	52	B2-U0-G2
			III-M	16523	128	B3-U0-G3	17837	138	B3-U0-G3	18776	145	B3-U0-G3	19715	152	B3-U0-G3		5343	53	B1-U0-G2
			III-W	15341	119	B2-U0-G3	16562	128	B3-U0-G3	17433	135	B3-U0-G3	18305	141	B3-U0-G3		4961	49	B1-U0-G2
			IV	16398	127	B3-U0-G3	17703	137	B3-U0-G3	18635	144	B3-U0-G3	19566	151	B3-U0-G3		5302	52	B1-U0-G1
			IV-FT	14938	115	B3-U0-G3	16127	125	B3-U0-G4	16976	131	B3-U0-G4	17824	138	B3-U0-G4		4830	48	B1-U0-G2
			VSQ-N	17140	132	B4-U0-G2	18504	143	B4-U0-G2	19477	151	B4-U0-G2	20451	158	B4-U0-G2		5542	55	B2-U0-G1
			VSQ-M	16807	130	B4-U0-G2	18144	140	B4-U0-G2	19099	148	B4-U0-G2	20053	155	B4-U0-G2		5434	54	B3-U0-G1
			VSQ-W	16406	127	B4-U0-G3	17711	137	B5-U0-G3	18643	144	B5-U0-G3	19575	151	B5-U0-G3		5304	53	B3-U0-G2
			II-HS	11877	92	B1-U0-G2	12821	99	B1-U0-G2	13496	104	B1-U0-G3	14171	110	B1-U0-G3		3841	38	B0-U0-G1
			II-FR-HS	12081	93	B1-U0-G2	13042	101	B1-U0-G2	13728	106	B1-U0-G2	14414	111	B1-U0-G2		3906	39	B0-U0-G1
			III-M-HS	12016	93	B1-U0-G3	12971	100	B1-U0-G3	13654	106	B1-U0-G3	14337	111	B1-U0-G3		3885	38	B0-U0-G1
			III-W-HS	11760	91	B1-U0-G3	12696	98	B1-U0-G3	13364	103	B1-U0-G3	14032	108	B1-U0-G3		3803	38	B0-U0-G2
			IV-HS	12411	96	B1-U0-G2	13398	104	B1-U0-G3	14103	109	B1-U0-G3	14808	114	B1-U0-G3		4013	40	B0-U0-G1
			IV-FT-HS	11729	91	B1-U0-G3	12662	98	B1-U0-G3	13328	103	B1-U0-G3	13995	108	B1-U0-G4		3792	38	B0-U0-G2
80	700	173.6	II	20595	119	B3-U0-G3	22232	128	B3-U0-G3	23403	135	B3-U0-G3	24573	142	B3-U0-G3	N/A	N/A		
			II-FR	20732	119	B3-U0-G2	22381	129	B3-U0-G2	23559	136	B3-U0-G2	24736	142	B3-U0-G2				
			II-ML	20595	119	B4-U0-G4	22233	128	B4-U0-G4	23403	135	B4-U0-G4	24573	142	B4-U0-G4				
			III-M	20954	121	B3-U0-G3	22621	130	B3-U0-G3	23812	137	B3-U0-G4	25003	144	B3-U0-G4				
			III-W	19456	112	B3-U0-G4	21003	121	B3-U0-G4	22109	127	B3-U0-G4	23214	134	B3-U0-G4				
			IV	20797	120	B3-U0-G3	22451	129	B3-U0-G3	23633	136	B3-U0-G3	24814	143	B3-U0-G4				
			IV-FT	18945	109	B3-U0-G4	20452	118	B3-U0-G4	21528	124	B3-U0-G4	22604	130	B3-U0-G4				
			VSQ-N	21737	125	B4-U0-G2	23466	135	B4-U0-G2	24701	142	B4-U0-G2	25936	149	B4-U0-G2				
			VSQ-M	21314	123	B5-U0-G3	23010	133	B5-U0-G3	24221	140	B5-U0-G3	25432	146	B5-U0-G3				
			VSQ-W	20806	120	B5-U0-G3	22461	129	B5-U0-G4	23643	136	B5-U0-G4	24825	143	B5-U0-G4				
			II-HS	15062	87	B1-U0-G3	16260	94	B1-U0-G3	17115	99	B1-U0-G3	17971	104	B1-U0-G3				
			II-FR-HS	15321	88	B1-U0-G2	16539	95	B1-U0-G2	17410	100	B1-U0-G2	18280	105	B1-U0-G2				
			III-M-HS	15238	88	B1-U0-G3	16450	95	B1-U0-G3	17315	100	B1-U0-G3	18181	105	B1-U0-G4				
			III-W-HS	14915	86	B1-U0-G4	16101	93	B1-U0-G4	16948	98	B1-U0-G4	17796	103	B1-U0-G4				
			IV-HS	15739	91	B1-U0-G3	16991	98	B1-U0-G3	17885	103	B1-U0-G3	18780	108	B1-U0-G3				
			IV-FT-HS	14874	86	B1-U0-G4	16058	92	B1-U0-G4	16903	97	B1-U0-G4	17748	102	B1-U0-G4				
80	875	215.9	II	23798	110	B3-U0-G3	25691	119	B3-U0-G3	27043	125	B3-U0-G4	28395	132	B3-U0-G4	N/A	N/A		
			II-FR	23957	111	B3-U0-G2	25862	120	B3-U0-G2	27223	126	B3-U0-G2	28585	132	B4-U0-G2				
			II-ML	23799	110	B4-U0-G4	25692	119	B4-U0-G4	27044	125	B4-U0-G4	28396	132	B4-U0-G4				
			III-M	24214	112	B3-U0-G4	26140	121	B3-U0-G4	27516	127	B3-U0-G4	28892	134	B3-U0-G4				
			III-W	22482	104	B3-U0-G4	24270	112	B3-U0-G4	25548	118	B3-U0-G4	26825	124	B3-U0-G4				
			IV	24032	111	B3-U0-G3	25943	120	B3-U0-G4	27309	126	B3-U0-G4	28674	133	B3-U0-G4				
			IV-FT	21892	101	B3-U0-G4	23634	109	B3-U0-G5	24877	115	B3-U0-G5	26121	121	B3-U0-G5				
			VSQ-N	25118	116	B4-U0-G2	27116	126	B5-U0-G2	28543	132	B5-U0-G2	29970	139	B5-U0-G2				
			VSQ-M	24630	114	B5-U0-G3	26589	123	B5-U0-G3	27988	130	B5-U0-G3	29387	136	B5-U0-G3				
			VSQ-W	24042	111	B5-U0-G4	25954	120	B5-U0-G4	27321	127	B5-U0-G4	28686	133	B5-U0-G4				
			II-HS	17405	81	B1-U0-G3	18789	87	B1-U0-G3	19778	92	B1-U0-G4	20766	96	B2-U0-G4				
			II-FR-HS	17704	82	B1-U0-G2	19112	89	B1-U0-G2	20118	93	B1-U0-G2	21124	98	B1-U0-G2				
			III-M-HS	17608	82	B1-U0-G4	19008	88	B1-U0-G4	20009	93	B1-U0-G4	21009	97	B1-U0-G4				
			III-W-HS	17234	80	B1-U0-G4	18605	86	B1-U0-G4	19584	91	B1-U0-G4	20564	95	B1-U0-G4				
			IV-HS	18187	84	B1-U0-G3	19634	91	B1-U0-G4	20667	96	B1-U0-G4	21701	101	B1-U0-G4				
			IV-FT-HS	17188	80	B1-U0-G4	18555	86	B1-U0-G4	19532	90	B1-U0-G4	20509	95	B1-U0-G4				
80	1050	256.4	II	27354	107	B3-U0-G4	29530	115	B4-U0-G4	31084	121	B4-U0-G4	32638	127	B4-U0-G4	N/A	N/A		
			II-FR	27536	107	B3-U0-G2	29727	116	B4-U0-G2	31291	122	B4-U0-G2	32856	128	B4-U0-G2				
			II-ML	27355	107	B4-U0-G4	29531	115	B5-U0-G5	31085	121	B5-U0-G5	32639	127	B5-U0-G5				
			III-M	27832	109	B3-U0-G4	30046	117	B3-U0-G4	31627	123	B4-U0-G4	33209	130	B4-U0-G4				
			III-W	25841	101	B3-U0-G4	27897	109	B3-U0-G4	29365	115	B3-U0-G5	30834	120	B3-U0-G5				
			IV	27622	108	B3-U0-G4	29820	116	B3-U0-G4	31389	122	B4-U0-G4	32959	129	B4-U0-G4				
			IV-FT	25163	98	B3-U0-G5	27165	106	B3-U0-G5	28595	112	B3-U0-G5	30024	117	B3-U0-G5				
			VSQ-N	28871	113	B5-U0-G2	31168	122	B5-U0-G2	32808	128	B5-U0-G2	34448	134	B5-U0-G2				
			VSQ-M	28310	110	B5-U0-G3	30561	119	B5-U0-G3	32170	125	B5-U0-G4	33779	132	B5-U0-G4				
			VSQ-W	27634	108	B5-U0-G4	29833	116	B5-U0-G4	31403	122	B5-U0-G5	32973	129	B5-U0-G5				
			II-HS	20005	78	B1-U0-G4	21596	84	B2-U0-G4	22733	89	B2-U0-G4	23870	93	B2-U0-G4				
			II-FR-HS	20349	79	B1-U0-G2	21968	86	B1-U0-G2	23124	90	B1-U0-G2	24280	95	B1-U0-G2				
			III-M-HS	20239	79	B1-U0-G4	21848	85	B1-U0-G4	22998	90	B1-U0-G4	24148	94	B1-U0-G4				
			III-W-HS	19809	77	B1-U0-G4	21385	83	B1-U0-G4	22511	88	B1-U0-G4	23636	92	B1-U0-G5				
			IV-HS	20905	82	B1-U0-G4	22568	88	B1-U0-G4	23756	93	B1-U0-G4	24943	97	B1-U0-G4				
			IV-FT-HS	19756	77	B1-U0-G4	21328	83	B1-U0-G4	22451	88	B1-U0-G5	23573	92	B1-U0-G5				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRG-PLED)

RZR-G-PLED

LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
80	350	87.0	II	11409	131	B2-U0-G2	12317	142	B2-U0-G2	12965	149	B2-U0-G2	13613	156	B2-U0-G2	67.0	4528	68	B1-U0-G1
			II-FR	11485	132	B3-U0-G1	12398	143	B3-U0-G1	13051	150	B3-U0-G1	13703	158	B3-U0-G1		4558	68	B1-U0-G1
			II-ML	11409	131	B3-U0-G3	12317	142	B3-U0-G3	12965	149	B3-U0-G3	13613	156	B3-U0-G3		4528	68	B2-U0-G2
			III-M	11608	133	B2-U0-G2	12531	144	B2-U0-G2	13191	152	B2-U0-G2	13850	159	B2-U0-G2		4553	68	B1-U0-G1
			III-W	10778	124	B2-U0-G3	11635	134	B2-U0-G3	12248	141	B2-U0-G3	12860	148	B2-U0-G3		4276	64	B1-U0-G2
			IV	11520	132	B2-U0-G2	12437	143	B2-U0-G2	13091	150	B2-U0-G2	13746	158	B2-U0-G2		4572	68	B1-U0-G1
			IV-FT	10494	121	B2-U0-G3	11330	130	B2-U0-G3	11926	137	B2-U0-G3	12522	144	B2-U0-G3		4165	62	B1-U0-G1
			VSQ-N	12041	138	B3-U0-G1	12999	149	B3-U0-G1	13683	157	B3-U0-G1	14367	165	B3-U0-G1		4779	71	B2-U0-G1
			VSQ-M	11808	136	B4-U0-G2	12747	147	B4-U0-G2	13418	154	B4-U0-G2	14089	162	B4-U0-G2		4686	70	B3-U0-G1
			VSQ-W	11526	132	B4-U0-G3	12443	143	B4-U0-G3	13097	151	B4-U0-G3	13752	158	B4-U0-G3		4574	68	B3-U0-G2
			II-HS	8464	97	B1-U0-G2	9138	105	B1-U0-G2	9618	111	B1-U0-G2	10099	116	B1-U0-G2		3359	50	B0-U0-G1
			II-FR-HS	8609	99	B1-U0-G1	9294	107	B1-U0-G1	9783	112	B1-U0-G1	10274	118	B1-U0-G1		3417	51	B0-U0-G1
			III-M-HS	8563	98	B1-U0-G2	9244	106	B1-U0-G2	9731	112	B1-U0-G2	10217	117	B1-U0-G2		3398	51	B0-U0-G1
			III-W-HS	8382	96	B1-U0-G2	9048	104	B1-U0-G2	9525	109	B1-U0-G3	10001	115	B1-U0-G3		3326	50	B0-U0-G1
			IV-HS	8845	102	B1-U0-G2	9548	110	B1-U0-G2	10051	116	B1-U0-G2	10553	121	B1-U0-G2		3510	52	B0-U0-G1
			IV-FT-HS	8359	96	B1-U0-G3	9024	104	B1-U0-G3	9499	109	B1-U0-G3	9974	115	B1-U0-G3		3317	50	B0-U0-G2
80	525	129.0	II	16394	127	B3-U0-G3	17698	137	B3-U0-G3	18629	144	B3-U0-G3	19560	152	B3-U0-G3	101.0	5301	52	B1-U0-G1
			II-FR	16503	128	B3-U0-G2	17816	138	B3-U0-G2	18753	145	B3-U0-G2	19691	153	B3-U0-G2		5336	53	B1-U0-G1
			II-ML	16394	127	B4-U0-G4	17698	137	B4-U0-G4	18630	144	B4-U0-G4	19561	152	B4-U0-G4		5302	52	B2-U0-G2
			III-M	16680	129	B3-U0-G3	14740	114	B2-U0-G2	18955	147	B3-U0-G3	19902	154	B3-U0-G3		5343	53	B1-U0-G2
			III-W	15488	120	B2-U0-G3	16720	130	B3-U0-G3	17600	136	B3-U0-G3	18479	143	B3-U0-G4		5008	50	B1-U0-G2
			IV	16555	128	B3-U0-G3	17871	139	B3-U0-G3	18812	146	B3-U0-G3	19753	153	B3-U0-G3		5353	53	B1-U0-G1
			IV-FT	15081	117	B3-U0-G3	16280	126	B3-U0-G3	17137	133	B3-U0-G3	17994	139	B3-U0-G3		4877	48	B1-U0-G2
			VSQ-N	17303	134	B4-U0-G2	18679	145	B4-U0-G2	19663	152	B4-U0-G2	20646	160	B4-U0-G2		5595	55	B2-U0-G1
			VSQ-M	16967	132	B4-U0-G2	18317	142	B4-U0-G2	19281	149	B4-U0-G2	20245	157	B4-U0-G2		5486	54	B3-U0-G1
			VSQ-W	16562	128	B4-U0-G3	17880	139	B5-U0-G3	18821	146	B5-U0-G3	19762	153	B5-U0-G3		5355	53	B3-U0-G2
			II-HS	12089	94	B1-U0-G2	13052	101	B1-U0-G3	13738	106	B1-U0-G3	14425	112	B1-U0-G3		3909	39	B0-U0-G1
			II-FR-HS	12298	95	B1-U0-G2	13276	103	B1-U0-G2	13975	108	B1-U0-G2	14674	114	B1-U0-G2		3977	39	B0-U0-G1
			III-M-HS	12231	95	B1-U0-G3	13204	102	B1-U0-G3	13899	108	B1-U0-G3	14594	113	B1-U0-G3		3954	39	B0-U0-G1
			III-W-HS	11971	93	B1-U0-G3	12924	100	B1-U0-G3	13604	105	B1-U0-G3	14284	111	B1-U0-G3		3871	38	B0-U0-G2
			IV-HS	12633	98	B1-U0-G2	13638	106	B1-U0-G3	14356	111	B1-U0-G3	15074	117	B1-U0-G3		4085	40	B0-U0-G1
			IV-FT-HS	11940	93	B1-U0-G3	12889	100	B1-U0-G3	13568	105	B1-U0-G3	14246	110	B1-U0-G4		3861	38	B0-U0-G2
80	700	174.0	II	20914	120	B3-U0-G3	22578	130	B3-U0-G3	23766	137	B3-U0-G3	24955	143	B3-U0-G3	N/A	N/A		
			II-FR	21054	121	B3-U0-G2	22729	131	B3-U0-G2	23924	137	B3-U0-G2	25121	144	B3-U0-G2				
			II-ML	20915	120	B4-U0-G4	22579	130	B4-U0-G4	23767	137	B4-U0-G4	24955	143	B4-U0-G4				
			III-M	21280	122	B3-U0-G3	22972	132	B3-U0-G3	24182	139	B3-U0-G4	25391	146	B3-U0-G4				
			III-W	19759	114	B3-U0-G4	21330	123	B3-U0-G4	22453	129	B3-U0-G4	23575	135	B3-U0-G4				
			IV	21120	121	B3-U0-G3	22800	131	B3-U0-G3	24000	138	B3-U0-G3	25200	145	B3-U0-G4				
			IV-FT	19239	111	B3-U0-G4	20770	119	B3-U0-G4	21862	126	B3-U0-G4	22956	132	B3-U0-G4				
			VSQ-N	22074	127	B4-U0-G2	23831	137	B4-U0-G2	25084	144	B4-U0-G2	26339	151	B4-U0-G2				
			VSQ-M	21646	124	B5-U0-G3	23367	134	B5-U0-G3	24598	141	B5-U0-G3	25827	148	B5-U0-G3				
			VSQ-W	21129	121	B5-U0-G4	22810	131	B5-U0-G4	24010	138	B5-U0-G4	25212	145	B5-U0-G4				
			II-HS	15363	88	B1-U0-G3	16586	95	B1-U0-G3	17458	100	B1-U0-G3	18332	105	B1-U0-G3				
			II-FR-HS	15628	90	B1-U0-G2	16872	97	B1-U0-G2	17759	102	B1-U0-G2	18647	107	B1-U0-G2				
			III-M-HS	15542	89	B1-U0-G3	16778	96	B1-U0-G3	17662	102	B1-U0-G4	18545	107	B1-U0-G4				
			III-W-HS	15213	87	B1-U0-G4	16423	94	B1-U0-G4	17288	99	B1-U0-G4	18152	104	B1-U0-G4				
			IV-HS	16055	92	B1-U0-G3	17331	100	B1-U0-G3	18244	105	B1-U0-G3	19155	110	B1-U0-G3				
			IV-FT-HS	15172	87	B1-U0-G4	16380	94	B1-U0-G4	17242	99	B1-U0-G4	18104	104	B1-U0-G4				
80	875	219.7	II	25063	114	B3-U0-G3	27057	123	B3-U0-G4	28481	130	B3-U0-G4	29905	136	B4-U0-G4	N/A	N/A		
			II-FR	25230	115	B3-U0-G2	27237	124	B3-U0-G2	28670	130	B4-U0-G2	30104	137	B4-U0-G2				
			II-ML	25064	114	B4-U0-G4	27057	123	B4-U0-G4	28481	130	B4-U0-G4	29906	136	B5-U0-G5				
			III-M	25501	116	B3-U0-G4	27529	125	B3-U0-G4	28978	132	B3-U0-G4	30427	138	B3-U0-G4				
			III-W	23677	108	B3-U0-G4	25560	116	B3-U0-G4	26906	122	B3-U0-G4	28251	129	B3-U0-G4				
			IV	25309	115	B3-U0-G4	27322	124	B3-U0-G4	28760	131	B3-U0-G4	30198	137	B3-U0-G4				
			IV-FT	23056	105	B3-U0-G4	24889	113	B3-U0-G4	26200	119	B3-U0-G4	27509	125	B3-U0-G4				
			VSQ-N	26453	120	B4-U0-G2	28557	130	B5-U0-G2	30060	137	B5-U0-G2	31563	144	B5-U0-G2				
			VSQ-M	25939	118	B5-U0-G3	28002	127	B5-U0-G3	29476	134	B5-U0-G3	30950	141	B5-U0-G3				
			VSQ-W	25320	115	B5-U0-G4	27335	124	B5-U0-G4	28773	131	B5-U0-G4	30212	138	B5-U0-G4				
			II-HS	18330	83	B1-U0-G3	19788	90	B1-U0-G4	20830	95	B2-U0-G4	21871	100	B2-U0-G4				
			II-FR-HS	18645	85	B1-U0-G2	20128	92	B1-U0-G2	21188	96	B1-U0-G2	22247	101	B1-U0-G2				
			III-M-HS	18543	84	B1-U0-G4	20018	91	B1-U0-G4	21072	96	B1-U0-G4	22125	101	B1-U0-G4				
			III-W-HS	18151	83	B1-U0-G4	19594	89	B1-U0-G4	20626	94	B1-U0-G4	21657	99	B1-U0-G4				
			IV-HS	19154	87	B1-U0-G3	20677	94	B1-U0-G4	21766	99	B1-U0-G4	22854	104	B1-U0-G4				
			IV-FT-HS	18102	82	B1-U0-G4	19541	89	B1-U0-G4	20571	94	B1-U0-G4	21599	98	B1-U0-G4				
80	1050	266.0	II	28808	108	B4-U0-G4	31099	117	B4-U0-G4	32736	123	B4-U0-G4	34373	129	B4-U0-G4	N/A	N/A		
			II-FR	29000	109	B4-U0-G2	31306	118	B4-U0-G2	32954	124	B4-U0-G2	34602	130	B4-U0-G2				
			II-ML	28809	108	B5-U0-G5	31100	117	B5-U0-G5	32737	123	B5-U0-G5	34374	129	B5-U0-G5				
			III-M	29311	110	B3-U0-G4	31643	119	B4-U0-G4	33308	125	B4-U0-G4	34974	131	B4-U0-G4				
			III-W	27215	102	B3-U0-G4	29380	110	B3-U0-G5	30926	116	B3-U0-G5	32473	122	B3-U0-G5				
			IV	29091	109	B3-U0-G4	31404	118	B4-U0-G4	33058	124	B4-U0-G4	34710	130	B4-U0-G4				
			IV-FT	26501	100	B3-U0-G4	28608	108	B3-U0-G4	30114	113	B3-U0-G5	31620	119	B3-U0-G5				
			VSQ-N	30405	114	B5-U0-G2	32824	123	B5-U0-G2	34551	130	B5-U0-G2	36279	136	B5-U0-G2				
			VSQ-M	29815	112	B5-U0-G3	32186	121	B5-U0-G4	33880	127	B5-U0-G4	35575	134	B5-U0-G4				
			VSQ-W	29104	109	B5-U0-G4	31419	118	B5-U0-G5	33073	124	B5-U0-G5	34726	131	B5-U0-G5				
			II-HS	21069	79	B2-U0-G4	22745	86	B2-U0-G4	23942	90	B2-U0-G4	25139	95	B2-U0-G4				
			II-FR-HS	21432	81	B1-U0-G2	23136	87	B1-U0-G2	24354	92	B1-U0-G2	25571	96	B2-U0-G2				
			III-M-HS	21314	80	B1-U0-G4	23009	87	B1-U0-G4	24220	91	B1-U0-G4	25431	96	B1-U0-G4				
			III-W-HS	20862	78	B1-U0-G4	22521	85	B1-U0-G4	23708	89	B1-U0-G5	24893	94	B1-U0-G5				
			IV-HS	22016	83	B1-U0-G4	23766	89	B1-U0-G4	25018	94	B1-U0-G4	26268	99	B1-U0-G4				
			IV-FT-HS	20807	78	B1-U0-G4	22461	84	B1-U0-G5	23644	89	B1-U0-G5	24826	93	B1-U0-G5				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRG-PLED)

RZR-G-PLED

LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
120	350	130.0	II	16889	130	B3-U0-G3	18233	140	B3-U0-G3	19192	148	B3-U0-G3	20152	155	B3-U0-G3	100.0	6702	67	B2-U0-G2
			II-FR	17001	131	B3-U0-G2	18354	141	B3-U0-G2	19320	149	B3-U0-G2	20286	156	B3-U0-G2		6747	67	B2-U0-G1
			II-ML	16890	130	B4-U0-G4	18233	140	B4-U0-G4	19193	148	B4-U0-G4	20152	155	B4-U0-G4		6703	67	B3-U0-G3
			III-M	17184	132	B3-U0-G3	18552	143	B3-U0-G3	19527	150	B3-U0-G3	20504	158	B3-U0-G3		6818	68	B2-U0-G2
			III-W	15956	123	B3-U0-G3	17224	132	B3-U0-G3	18131	139	B3-U0-G3	19037	146	B3-U0-G4		6331	63	B1-U0-G2
			IV	17055	131	B3-U0-G3	18411	142	B3-U0-G3	19381	149	B3-U0-G3	20349	157	B3-U0-G3		6768	68	B2-U0-G2
			IV-FT	15537	120	B3-U0-G3	16772	129	B3-U0-G3	17655	136	B3-U0-G3	18538	143	B3-U0-G4		6165	62	B1-U0-G2
			VSQ-N	17825	137	B4-U0-G2	19243	148	B4-U0-G2	20256	156	B4-U0-G2	21269	164	B4-U0-G2		7073	71	B2-U0-G1
			VSQ-M	17480	134	B4-U0-G2	18870	145	B4-U0-G2	19863	153	B4-U0-G2	20857	160	B4-U0-G2		6936	69	B3-U0-G1
			VSQ-W	17062	131	B5-U0-G3	18420	142	B5-U0-G3	19389	149	B5-U0-G3	20358	157	B5-U0-G3		6771	68	B3-U0-G2
			II-HS	12352	95	B1-U0-G2	13334	103	B1-U0-G3	14036	108	B1-U0-G3	14738	113	B1-U0-G3		4901	49	B1-U0-G2
			II-FR-HS	12564	97	B1-U0-G2	13564	104	B1-U0-G2	14277	110	B1-U0-G2	14992	115	B1-U0-G2		4986	50	B0-U0-G1
			III-M-HS	12496	96	B1-U0-G3	13490	104	B1-U0-G3	14199	109	B1-U0-G3	14910	115	B1-U0-G3		4959	50	B0-U0-G2
			III-W-HS	12231	94	B1-U0-G3	13204	102	B1-U0-G3	13899	107	B1-U0-G3	14594	112	B1-U0-G3		4853	49	B0-U0-G2
			IV-HS	12907	99	B1-U0-G3	13934	107	B1-U0-G3	14667	113	B1-U0-G3	15400	118	B1-U0-G3		5122	51	B0-U0-G2
			IV-FT-HS	12198	94	B1-U0-G3	13168	101	B1-U0-G3	13862	107	B1-U0-G4	14555	112	B1-U0-G4		4840	48	B0-U0-G2
120	525	192.0	II	24123	126	B3-U0-G3	26042	136	B3-U0-G3	27413	143	B3-U0-G4	28783	150	B4-U0-G4	152.0	7800	51	B2-U0-G2
			II-FR	24284	126	B3-U0-G2	26216	137	B3-U0-G2	27596	144	B3-U0-G2	28975	151	B4-U0-G2		7853	52	B2-U0-G1
			II-ML	24124	126	B4-U0-G4	26042	136	B4-U0-G4	27414	143	B4-U0-G4	28784	150	B5-U0-G5		7800	51	B3-U0-G3
			III-M	24545	128	B3-U0-G4	26498	138	B3-U0-G4	27892	145	B3-U0-G4	29287	153	B3-U0-G4		7937	52	B2-U0-G2
			III-W	22789	119	B3-U0-G4	24603	128	B3-U0-G4	25897	135	B3-U0-G4	27192	142	B3-U0-G4		7368	48	B1-U0-G2
			IV	24360	127	B3-U0-G4	26298	137	B3-U0-G4	27682	144	B3-U0-G4	29066	151	B3-U0-G4		7876	52	B2-U0-G2
			IV-FT	22191	116	B3-U0-G4	23956	125	B3-U0-G4	25217	131	B3-U0-G4	26478	138	B3-U0-G4		7176	47	B1-U0-G2
			VSQ-N	25461	133	B4-U0-G2	27486	143	B5-U0-G2	28933	151	B5-U0-G2	30379	158	B5-U0-G2		8233	54	B3-U0-G1
			VSQ-M	24967	130	B5-U0-G3	26952	140	B5-U0-G3	28371	148	B5-U0-G3	29789	155	B5-U0-G3		8073	53	B3-U0-G2
			VSQ-W	24371	127	B5-U0-G4	26309	137	B5-U0-G4	27695	144	B5-U0-G4	29079	151	B5-U0-G4		7881	52	B3-U0-G2
			II-HS	17642	92	B1-U0-G3	19046	99	B1-U0-G3	20048	104	B1-U0-G4	21050	110	B2-U0-G4		5704	38	B1-U0-G2
			II-FR-HS	17946	93	B1-U0-G2	19373	101	B1-U0-G2	20393	106	B1-U0-G2	21413	112	B1-U0-G2		5803	38	B1-U0-G1
			III-M-HS	17848	93	B1-U0-G4	19268	100	B1-U0-G4	20282	106	B1-U0-G4	21296	111	B1-U0-G4		5772	38	B0-U0-G2
			III-W-HS	17470	91	B1-U0-G4	18860	98	B1-U0-G4	19852	103	B1-U0-G4	20844	109	B1-U0-G4		5649	37	B0-U0-G2
			IV-HS	18435	96	B1-U0-G3	19902	104	B1-U0-G4	20949	109	B1-U0-G4	21997	115	B1-U0-G4		5961	39	B0-U0-G2
			IV-FT-HS	17423	91	B1-U0-G4	18809	98	B1-U0-G4	19799	103	B1-U0-G4	20789	108	B1-U0-G4		5633	37	B0-U0-G2
120	700	260.0	II	30656	118	B4-U0-G4	33094	127	B4-U0-G4	34836	134	B4-U0-G4	36578	141	B4-U0-G4	N/A	N/A		
			II-FR	30860	119	B4-U0-G2	33315	128	B4-U0-G2	35068	135	B4-U0-G2	36822	142	B4-U0-G2				
			II-ML	30657	118	B5-U0-G5	33095	127	B5-U0-G5	34837	134	B5-U0-G5	36579	141	B5-U0-G5				
			III-M	31191	120	B4-U0-G4	33673	130	B4-U0-G4	35445	136	B4-U0-G4	37217	143	B4-U0-G4				
			III-W	28960	111	B3-U0-G4	31265	120	B3-U0-G5	32909	127	B3-U0-G5	34555	133	B3-U0-G5				
			IV	30956	119	B4-U0-G4	33418	129	B4-U0-G4	35177	135	B4-U0-G4	36936	142	B4-U0-G4				
			IV-FT	28200	108	B3-U0-G4	30444	117	B3-U0-G5	32046	123	B3-U0-G5	33648	129	B3-U0-G5				
			VSQ-N	32356	124	B5-U0-G2	34929	134	B5-U0-G2	36768	141	B5-U0-G2	38606	148	B5-U0-G2				
			VSQ-M	31727	122	B5-U0-G4	34250	132	B5-U0-G4	36054	139	B5-U0-G4	37856	146	B5-U0-G4				
			VSQ-W	30971	119	B5-U0-G4	33434	129	B5-U0-G5	35194	135	B5-U0-G5	36953	142	B5-U0-G5				
			II-HS	22420	86	B2-U0-G4	24203	93	B2-U0-G4	25478	98	B2-U0-G4	26751	103	B2-U0-G4				
			II-FR-HS	22806	88	B1-U0-G2	24619	95	B1-U0-G2	25916	100	B2-U0-G2	27212	105	B2-U0-G2				
			III-M-HS	22682	87	B1-U0-G4	24485	94	B1-U0-G4	25774	99	B1-U0-G4	27063	104	B1-U0-G4				
			III-W-HS	22201	85	B1-U0-G4	23967	92	B1-U0-G5	25228	97	B1-U0-G5	26489	102	B1-U0-G5				
			IV-HS	23428	90	B1-U0-G4	25291	97	B1-U0-G4	26622	102	B1-U0-G4	27953	108	B1-U0-G4				
			IV-FT-HS	22141	85	B1-U0-G5	23902	92	B1-U0-G5	25160	97	B1-U0-G5	26418	102	B1-U0-G5				
120	875	329.0	II	36574	111	B4-U0-G4	39483	120	B4-U0-G4	41561	126	B4-U0-G4	43639	133	B4-U0-G5	N/A	N/A		
			II-FR	36818	112	B4-U0-G2	39746	121	B4-U0-G2	41838	127	B4-U0-G3	43930	134	B4-U0-G3				
			II-ML	36575	111	B5-U0-G5	39485	120	B5-U0-G5	41562	126	B5-U0-G5	43640	133	B5-U0-G5				
			III-M	37213	113	B4-U0-G4	40174	122	B4-U0-G5	42288	129	B4-U0-G5	44402	135	B4-U0-G5				
			III-W	34552	105	B3-U0-G5	37300	113	B3-U0-G5	39263	119	B4-U0-G5	41226	125	B4-U0-G5				
			IV	36932	112	B4-U0-G4	39870	121	B4-U0-G5	41969	128	B4-U0-G5	44067	134	B4-U0-G5				
			IV-FT	33644	102	B3-U0-G5	36321	110	B3-U0-G5	38232	116	B4-U0-G5	40144	122	B4-U0-G5				
			VSQ-N	38602	117	B5-U0-G2	41673	127	B5-U0-G2	43866	133	B5-U0-G2	46060	140	B5-U0-G2				
			VSQ-M	37852	115	B5-U0-G4	40863	124	B5-U0-G4	43014	131	B5-U0-G4	45165	137	B5-U0-G4				
			VSQ-W	36950	112	B5-U0-G5	39888	121	B5-U0-G5	41988	128	B5-U0-G5	44088	134	B5-U0-G5				
			II-HS	26748	81	B2-U0-G4	28876	88	B2-U0-G4	30395	92	B2-U0-G4	31916	97	B2-U0-G5				
			II-FR-HS	27209	83	B2-U0-G2	29373	89	B2-U0-G2	30919	94	B2-U0-G2	32465	99	B2-U0-G3				
			III-M-HS	27060	82	B1-U0-G4	29213	89	B1-U0-G5	30750	93	B1-U0-G5	32287	98	B1-U0-G5				
			III-W-HS	26487	81	B1-U0-G5	28593	87	B1-U0-G5	30098	91	B1-U0-G5	31603	96	B1-U0-G5				
			IV-HS	27951	85	B1-U0-G4	30174	92	B1-U0-G4	31762	97	B1-U0-G5	33350	101	B1-U0-G5				
			IV-FT-HS	26416	80	B1-U0-G5	28517	87	B1-U0-G5	30018	91	B1-U0-G5	31519	96	B2-U0-G5				
120	1050	398.0	II	42039	106	B4-U0-G5	45383	114	B4-U0-G5	47771	120	B4-U0-G5	50160	126	B5-U0-G5	N/A	N/A		
			II-FR	42319	106	B4-U0-G3	45685	115	B4-U0-G3	48089	121	B4-U0-G3	50494	127	B4-U0-G3				
			II-ML	42040	106	B5-U0-G5	45384	114	B5-U0-G5	47773	120	B5-U0-G5	50161	126	B5-U0-G5				
			III-M	42774	107	B4-U0-G5	46177	116	B4-U0-G5	48606	122	B4-U0-G5	51037	128	B4-U0-G5				
			III-W	39714	100	B4-U0-G5	42873	108	B4-U0-G5	45130	113	B4-U0-G5	47387	119	B4-U0-G5				
			IV	42451	107	B4-U0-G5	45828	115	B4-U0-G5	48240	121	B4-U0-G5	50652	127	B4-U0-G5				
			IV-FT	38671	97	B4-U0-G5	41748	105	B4-U0-G5	43945	110	B4-U0-G5	46143	116	B4-U0-G5				
			VSQ-N	44370	111	B5-U0-G2	47899	120	B5-U0-G3	50421	127	B5-U0-G3	52942	133	B5-U0-G3				
			VSQ-M	43508	109	B5-U0-G4	46969	118	B5-U0-G4	49441	124	B5-U0-G4	51914	130	B5-U0-G5				
			VSQ-W	42471	107	B5-U0-G5	45849	115	B5-U0-G5	48262	121	B5-U0-G5	50676	127	B5-U0-G5				
			II-HS	30745	77	B2-U0-G4	33191	83	B2-U0-G5	34938	88	B2-U0-G5	36685	92	B2-U0-G5				
			II-FR-HS	31274	79	B2-U0-G3	33761	85	B2-U0-G3	35539	89	B2-U0-G3	37315	94	B2-U0-G3				
			III-M-HS	31104	78	B1-U0-G5	33578	84	B1-U0-G5	35345	89	B2-U0-G5	37112	93	B2-U0-G5				
			III-W-HS	30444	76	B1-U0-G5	32866	83	B1-U0-G5	34596	87	B1-U0-G5	36325	91	B2-U0-G5				
			IV-HS	32127	81	B1-U0-G5	34683	87	B2-U0-G5	36508	92	B2-U0-G5	38333	96	B2-U0-G5				
			IV-FT-HS	30363	76	B1-U0-G5	32777	82	B2-U0-G5	34504	87	B2-U0-G5	36229	91	B2-U0-G5				

IES File downloads for this product can be found at www.usaltg.com/downloads/asr.html

L01

EXTERIOR | INTERIOR

In-grade | For ground, ceilings, walls, and stairs

- Wet, Damp, and Dry location





Ordering Information

Clear Form

Date : _____

Project : _____

Type : _____

Quantity : _____

Note : _____

Specifications

Luminaire | Example Code: L01-2-W30H-S-C-[ ]-0-MK3-S-S6

Product	Version	CCT & CRI	Beam Angle [1]	Lens	Accessories [3] (optional)	Internal Angle Bracket [4]	Mounting Kit [5] (optional)	Flange & Back Box [6]	Trim Finish [9]
L01									
	1 1W **2** 2W	**W22S** 2200K 80+ **W27H** 2700K 90+ **W30H** 3000K 90+ **W35H** 3500K 90+ **W41H** 4100K 90+	**E** elliptical 7°+36° **SS** super spot 8° **S** spot 12° **N** narrow flood 30° **F** flood 45° **W** wide flood 120°	**C** clear **F** frosted **A** anti-slip [2]	**LM** louver, matte anodized **LB** louver, black anodized **HM** hex louver, matte anodized **HB** hex louver, black anodized **AB** angled louver, black anodized **SB** straight louver, black anodized **QB** square louver, black anodized **RB** ring louver, black anodized	**0** no angle **15** 15° angle **X** custom	**MK1** vertical surface **MK3** in-ground	**Octagonal Aluminum Back Box with:** **S** standard flange depth: 3-1/2" (89mm) **P** paving stone flange depth: 5-1/2" (138mm) [7] **Pipe** [8]**:** **PIPE** 1-5/8" PVC pipe length: 11-13/16" (300mm) **NB** no back box or flange	**Aluminum Finishes:** **MA** matte clear anodized **BA** black anodized **BZ** bronze powder coated **Stainless Steel Finishes:** **S6** stainless steel 316 **BT0** black stainless steel **Other Materials:** **ABZ** antique bronze **ABR** antique brass **PBR** polished brass

System Components (Ordered Separately)

Remote Driver : _____

Control System : _____

On/Off | Dimming ELV or 0-10 dimming
Other options (consult factory) TRIAC/MLV, DMX, DALI, Casambi, PoE

Important Notes

Specification

1. *See Light Distribution section for illustration of different combinations of beam angles and angle bracket. Elliptical and Super Spot beam angles are only available with clear lens, and are not available with louver accessories or angle brackets.*
2. *Anti-slip is only available with Clear lens. Refer to Appendix or MP Lighting website for images and details.*
3. *Louvers will be below the glass cover. Only available when there is no Internal Angle Bracket.*
4. *Internal angle bracket is factory set, and cannot be field adjusted. 5° increments to maximum of 20° without accessories. Not applicable for super spot or elliptical options.*
5. *Mounting kit is ordered separately. Please consult factory.*
6. *For components included, refer to Luminaire Construction section. See pg.3 for back box and flange options.*
7. *Paving stone flange is also recommended for a better cement/concrete flow.*
8. *Factory set length of 11-13/16" (300mm). Visit PIPE-C for details.*
9. *Different finish options are only applicable to trim ring and not for LED module housing. Refer to Appendix or MP Lighting website for complete look of luminaire with different trim finish options.*

Warranty Notes & Disclaimer

Malfunction and damage to product due to incompatible dimming system or misuse will not be covered under warranty. Consult MP Lighting for recommended drivers. If the fixture has an option to be installed with a dimming control system, consult a dimming system manufacturer with minimum load before installing. MP Lighting reserves the right, at its sole discretion, at any time and without notice, to make design changes to any of our products. Consult MP Lighting website for most updated documentation.

L01

EXTERIOR | INTERIOR
In-grade | For ground, ceilings, walls, and stairs

- Wet, Damp, and Dry location





Performance

Wattage	Forward Current	Power Consumption Budget per fixture (including driver)	LED output (Source)	Fixture Output (Delivered)
1W	350mA	1.3W	110 lm	27-63 lm
2W	700mA	2.6W	220 lm	49-119 lm

Application

Environment	Wet / Damp / Dry Location approved. IP 68.
Drive Over Rating	9,700 lbs (4,400 kg)
Mounting	**Recessed:** Designed to be cast into earth, gravel, or concrete or inserted into paving stones or pavers. Included backbox, flange and level for direct burial or casting applications. **MK1 mounting kit (optional):** Recommended for easy installation on vertical surfaces (e.g. stair risers, walls), and downward-facing surfaces (e.g. ceilings, soffits). See "Mounting Options & Dimensions, " or visit MK1 **MK3 mounting kit (optional):** Recommended for thicker concrete slab and paving stone in-ground installation. Custom rectangular electrical box option is available for stair riser&wall installation. See "Mounting Options & Dimensions, " or visit MK3

Electrical

Power Supplies	Remote LED drivers (120-277V AC input, **constant current output**): Fixtures to be wired in series.
Control	**On/off control | Dimming:** ELV or 0-10V dimming with appropriate drivers **Other options (consult factory):** TRIAC/MLV, DMX, DALI, Casambi, Power over Ethernet

Luminaire Construction

LED Light Source	**W22S =** CCT: 2200K, CRI (Ra): 80+, Colour Consistency: 3SDCM **W27H =** CCT: 2700K, CRI (Ra): 90+, Colour Consistency: 2SDCM **W30H =** CCT: 3000K, CRI (Ra): 90+, Colour Consistency: 2SDCM **W35H =** CCT: 3500K, CRI (Ra): 90+, Colour Consistency: 2SDCM **W41H =** CCT: 4100K, CRI (Ra): 90+, Colour Consistency: 3SDCM
Weight	1.8 lbs (0.816 kg). Typical Aluminum Insert & Back Box only.
Material	**Fixture:** machined marine-grade aluminum, machined brass or machined stainless steel (316) with tempered glass
Supplied with	**Standard installation housing:** Comes with an octagonal back box, a flange/pipe, an integral leveling device, a plastic cap, gel filled wire nuts, and silicone grease. **Cable:** 6" (152mm) factory-installed wire lead
Warranty & LED Life	5 years limited warranty. Estimated useful life of LED is 50,000 hours.

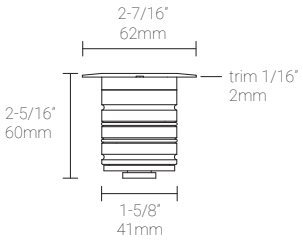
Ordered Separately

System Components	**Power supplies:** remote driver Please consult factory or visit Recommended Drivers for available driver options. **Mounting kits:** MK1 or MK3 (custom length rebar in MK3 supplied by contractors) **Single Gang Boxes:** see Pg.3-5 Mounting Options & Dimensions.

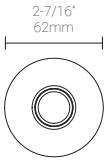
Mounting Options & Dimensions

LED Insert Dimensions

Fixture



Top View



3D View

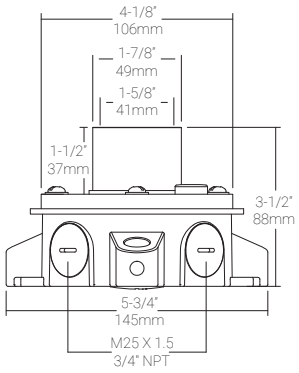


Beam

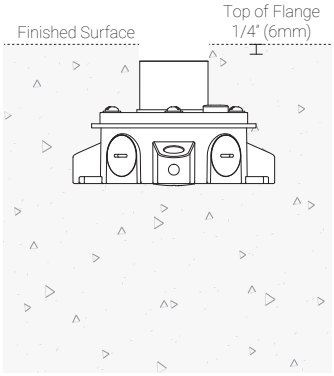


In-ground Installation | Shown with MP Lighting Back Box & Standard Flange (Order Code: EBX-OCT1-CSMA)

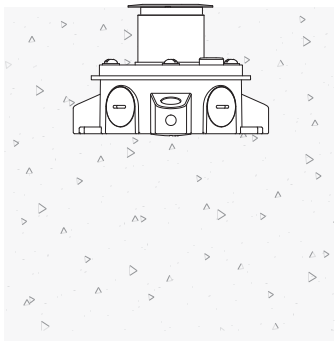
Box with Standard Flange



Box with Standard Flange:
During Concrete Installation

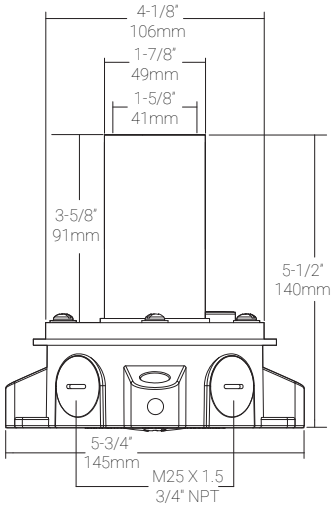


Box with Standard Flange:
Complete Concrete Installation

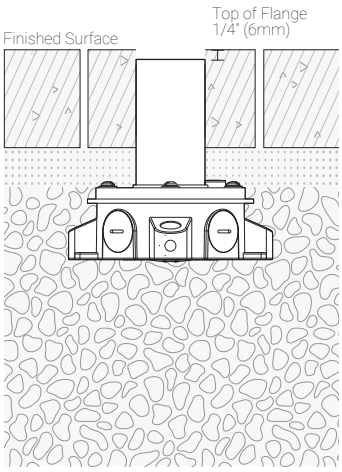


In-ground Installation | Shown with MP Lighting Back Box & Paving Stone Flange (Order Code: EBX-OCT1-CPMA)

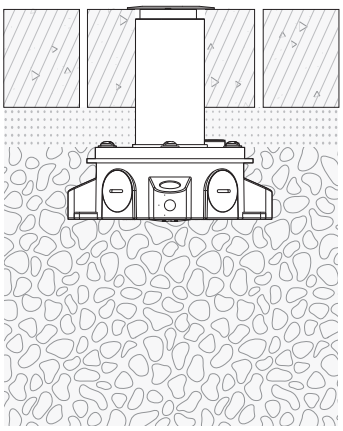
Box with Paving Stone Flange:



Box with Paving Stone Flange:
During Paving Stone Installation



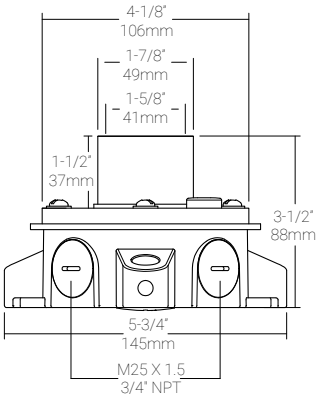
Box with Paving Stone Flange:
Complete Paving Stone Installation



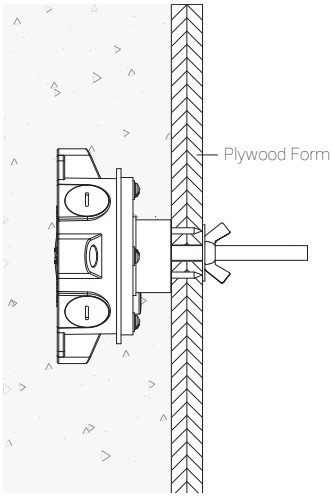
Mounting Kits

MK1(MK1-OCT1-C**) : Ceiling, Wall, and Stair Riser Installation | Shown with MP Lighting Back Box (**Order Code: EBX-OCT1-CSMA**)**

Box with Standard Flange

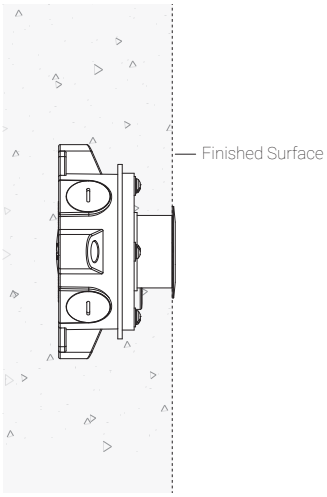


Box with Standard Flange & MK1: During Installation



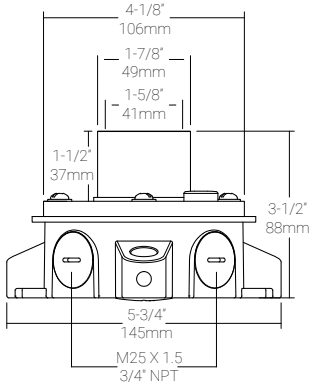
6" (152mm) threaded rod is supplied. Thread size: 3/8"-16

Box with Standard Flange: Complete Installation

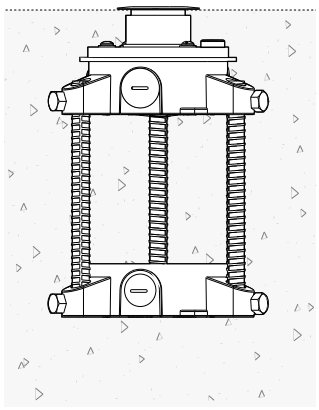


MK3: In-ground Installation | Shown with MP Lighting Back Box (Order Code: EBX-OCT1-CSMA or EBX-OCT1-CPMA **)**

Back Box (EBX-OCT1-CSMA)

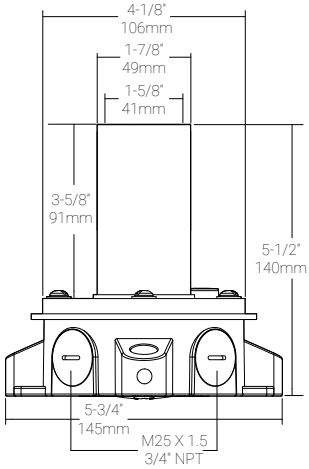


MK3 with Standard Flange and Back Box

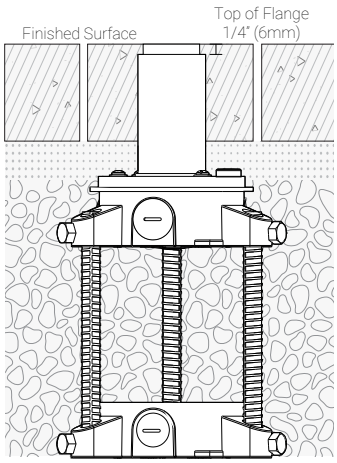


Rebar supplied by others.
Recommended size: Ø1/2"

Back Box (EBX-OCT1-CPMA)



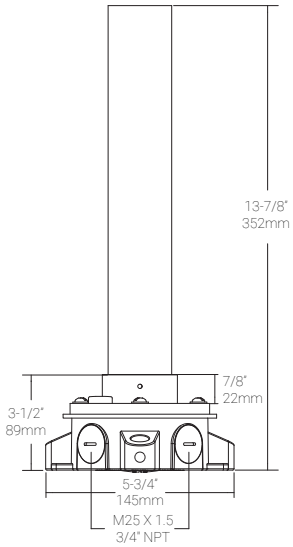
MK3 with Paving Stone Flange and Back Box

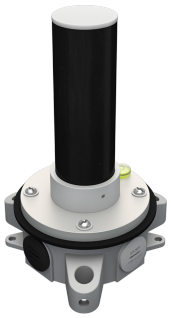


Rebar supplied by others.
Recommended size: Ø1/2"

EBX-OCT1-CPIPE

PIPE (PIPE-C) **: In-ground/Landscape Installation | Shown with MP Lighting Back Box** (Order Code: EBX-OCT1-CPIPE)

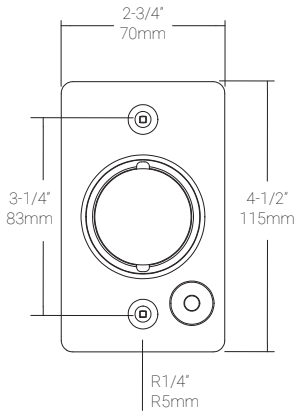


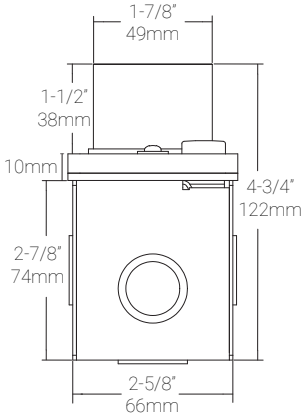


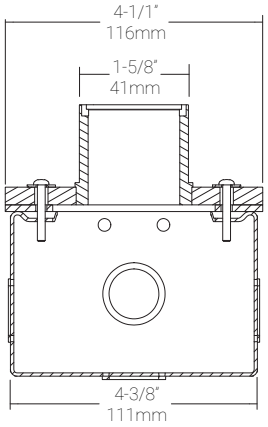
Rectangular Back Box for Wall Installation | shown with standard flange

1. *For wall Installation, custom rectangular electrical boxes are available as alternative options.*

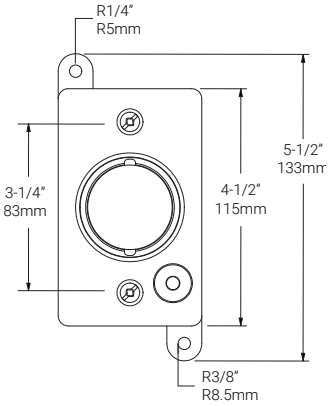
MP Lighting Single Gang Back Box | Order Code: EBX-SGB1-CSMA

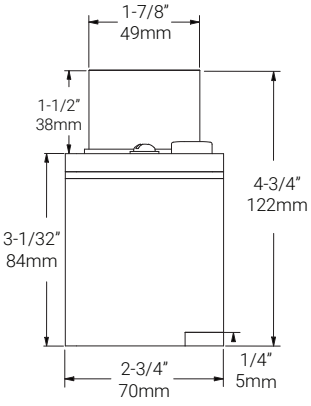


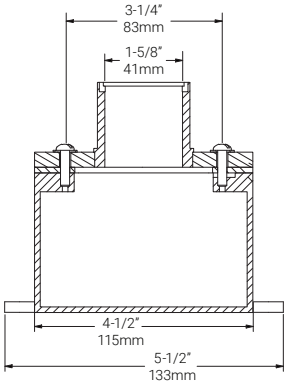




Scepter FD Back box | Order Code: EBX-SFD-CSMA

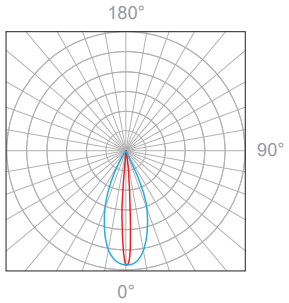




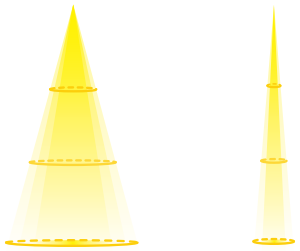


1W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 7° + 36°

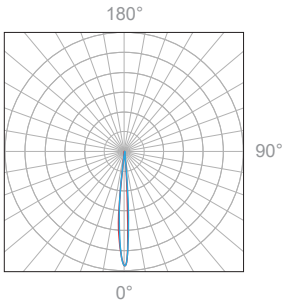


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	92.9fc	1.0ft	0.30m	0.2ft	0.06m
3.0ft	0.91m	23.2fc	2.0ft	0.61m	0.4ft	0.12m
4.5ft	1.37m	10.3fc	2.9ft	0.88m	0.5ft	0.15m
6.0ft	1.83m	5.81fc	3.9ft	1.18m	0.7ft	0.21m
7.5ft	2.29m	3.72fc	4.9ft	1.49m	0.9ft	0.27m
9.0ft	2.74m	2.58fc	5.9ft	1.79m	1.0ft	0.30m

Delivered Lumen: 27 lm
Vertical Beam Spread: 36.1°
Horizontal Beam Spread: 6.7°

Polar Candela Distribution



Beam Width: 8°

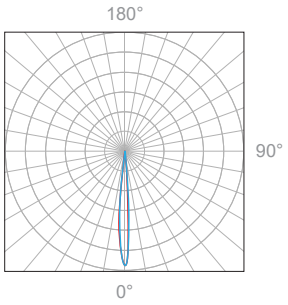


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	537fc	0.2ft	0.06m	0.2ft	0.06m
3.0ft	0.91m	134fc	0.4ft	0.12m	0.5ft	0.15m
4.5ft	1.37m	59.6fc	0.6ft	0.18m	0.7ft	0.21m
6.0ft	1.83m	33.5fc	0.8ft	0.24m	0.9ft	0.27m
7.5ft	2.29m	21.5fc	1.1ft	0.33m	1.2ft	0.36m
9.0ft	2.74m	14.9fc	1.3ft	0.39m	1.4ft	0.42m

Delivered Lumen: 46.2 lm
Vertical Beam Spread: 8.1°
Horizontal Beam Spread: 8.8°

Polar Candela Distribution



Beam Width: 12°

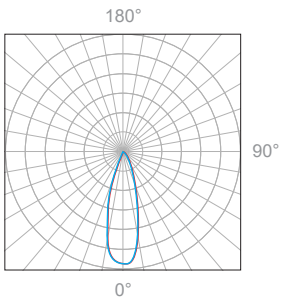


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	424fc	0.3ft	0.09m	0.3ft	0.09m
3.0ft	0.91m	140fc	0.6ft	0.18m	0.6ft	0.18m
4.5ft	1.37m	62fc	0.9ft	0.27m	0.9ft	0.27m
6.0ft	1.83m	35fc	1.3ft	0.39m	1.3ft	0.39m
7.5ft	2.29m	23fc	1.6ft	0.48m	1.6ft	0.48m
9.0ft	2.74m	16fc	1.9ft	0.58m	1.9ft	0.58m

Delivered Lumen: 63.4 lm
Vertical Beam Spread: 12°
Horizontal Beam Spread: 12°

Polar Candela Distribution



Beam Width: 30°



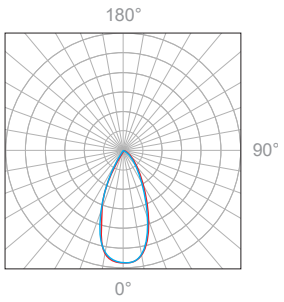
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	82.3fc	0.8ft	0.24m	0.8ft	0.24m
3.0ft	0.91m	20.6fc	1.6ft	0.49m	1.6ft	0.49m
4.5ft	1.37m	9.14fc	2.4ft	0.73m	2.4ft	0.73m
6.0ft	1.83m	5.14fc	3.2ft	0.98m	3.2ft	0.98m
7.5ft	2.29m	3.29fc	4.0ft	1.22m	4.0ft	1.22m
9.0ft	2.74m	2.29fc	4.7ft	1.43m	4.7ft	1.43m

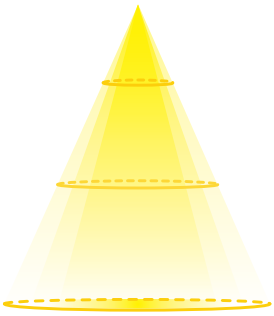
Delivered Lumen: 65.8 lm
Vertical Beam Spread: 29.5°
Horizontal Beam Spread: 29.5°

1W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 45°

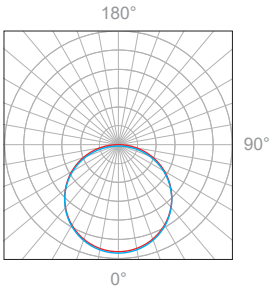


Illuminance at a Distance

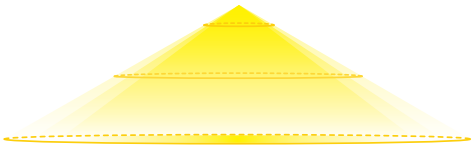
Distance		Center Beam fc	Beam Width			
3.0ft	0.91m	12.1fc	2.6ft	0.79m	2.5ft	0.76m
6.0ft	1.83m	3.04fc	5.1ft	1.55m	5.1ft	1.55m
9.0ft	2.74m	1.35fc	7.7ft	2.34m	7.6ft	2.31m
12.0ft	3.65m	0.76fc	10.2ft	3.10m	10.1ft	3.07m
15.0ft	4.57m	0.49fc	12.8ft	3.90m	12.6ft	3.84m
18.0ft	5.48m	0.34fc	15.4ft	4.69m	15.2ft	4.63m

Delivered Lumen: 77.7 lm
Vertical Beam Spread : 46.2°
Horizontal Beam Spread : 45.7°

Polar Candela Distribution



Beam Width: 120°



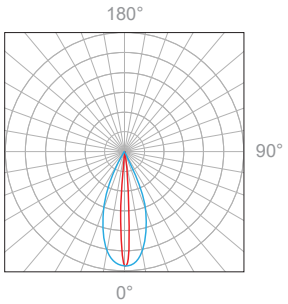
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	11.3fc	4.1ft	1.25m	4.1ft	1.25m
3.0ft	0.91m	2.82fc	8.1ft	2.46m	8.1ft	2.46m
4.5ft	1.37m	1.26fc	12.2ft	3.71m	12.2ft	3.71m
6.0ft	1.83m	0.71fc	16.3ft	4.96m	16.3ft	4.96m
7.5ft	2.29m	0.45fc	20.3ft	6.18m	20.3ft	6.18m
9.0ft	2.74m	0.31fc	24.4ft	7.43m	24.4ft	7.43m

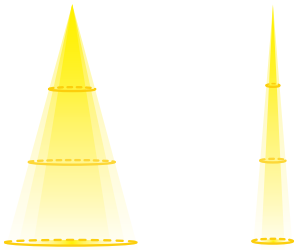
Delivered Lumen: 63 lm
Vertical Beam Spread : 107.1°
Horizontal Beam Spread : 107.1°

2W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 7° + 36°

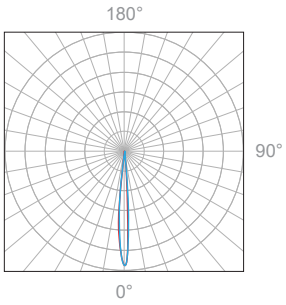


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	165fc	1.0ft	0.30m	0.2ft	0.06m
3.0ft	0.91m	41.3fc	2.0ft	0.61m	0.4ft	0.12m
4.5ft	1.37m	18.3fc	2.9ft	0.88m	0.5ft	0.15m
6.0ft	1.83m	10.3fc	3.9ft	1.18m	0.7ft	0.21m
7.5ft	2.29m	6.60fc	4.9ft	1.49m	0.9ft	0.27m
9.0ft	2.74m	4.59fc	5.9ft	1.79m	1.1ft	0.33m

Delivered Lumen: 49 lm
Vertical Beam Spread: 36.3°
Horizontal Beam Spread: 6.8°

Polar Candela Distribution



Beam Width: 8°



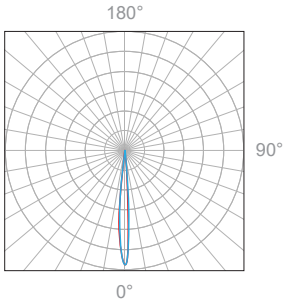
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	1,015fc	0.2ft	0.06m	0.2ft	0.06m
3.0ft	0.91m	254fc	0.4ft	0.12m	0.4ft	0.12m
4.5ft	1.37m	113fc	0.7ft	0.21m	0.6ft	0.18m
6.0ft	1.83m	63.4fc	0.9ft	0.27m	0.9ft	0.27m
7.5ft	2.29m	40.6fc	1.1ft	0.33m	1.1ft	0.33m
9.0ft	2.74m	28.2fc	1.3ft	0.39m	1.3ft	0.39m

Delivered Lumen: 61.3 lm
Vertical Beam Spread: 8.5°
Horizontal Beam Spread: 8.2°

2W, 3000K, 90+ CRI

Polar Candela Distribution



Beam Width: 12°

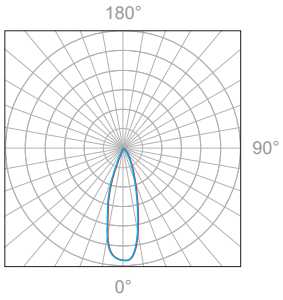


Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	774fc	0.3ft	0.09m	0.3ft	0.09m
3.0ft	0.91m	194fc	0.6ft	0.18m	0.6ft	0.18m
4.5ft	1.37m	86fc	0.9ft	0.27m	0.9ft	0.27m
6.0ft	1.83m	48.4fc	1.3ft	0.39m	1.3ft	0.39m
7.5ft	2.29m	31fc	1.6ft	0.48m	1.6ft	0.48m
9.0ft	2.74m	21.5fc	1.9ft	0.58m	1.9ft	0.58m

Delivered Lumen: 116.8 lm
Vertical Beam Spread: 12°
Horizontal Beam Spread: 12°

Polar Candela Distribution



Beam Width: 30°

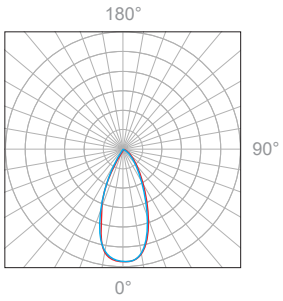


Illuminance at a Distance

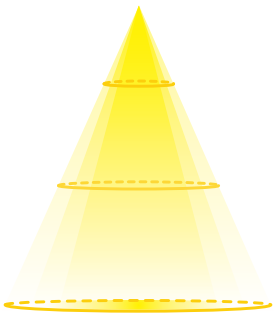
Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	152fc	0.8ft	0.24m	0.8ft	0.24m
3.0ft	0.91m	38fc	1.6ft	0.48m	1.6ft	0.48m
4.5ft	1.37m	16.9fc	2.4ft	0.73m	2.4ft	0.73m
6.0ft	1.83m	9.49fc	3.2ft	0.97m	3.2ft	0.97m
7.5ft	2.29m	6.07fc	4.0ft	1.22m	4.0ft	1.22m
9.0ft	2.74m	4.22fc	4.7ft	1.43m	4.7ft	1.43m

Delivered Lumen: 121 lm
Vertical Beam Spread: 29.5°
Horizontal Beam Spread: 29.5°

Polar Candela Distribution



Beam Width: 45°

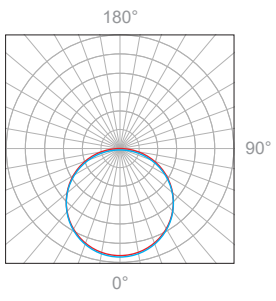


Illuminance at a Distance

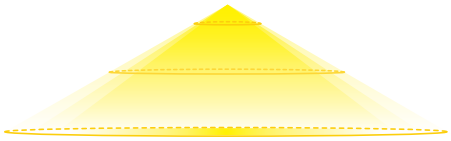
Distance		Center Beam fc	Beam Width			
3.0ft	0.91m	21.8fc	2.6ft	0.79m	2.6ft	0.79m
6.0ft	1.83m	5.45fc	5.2ft	1.58m	5.1ft	1.55m
9.0ft	2.74m	2.42fc	7.7ft	2.34m	7.7ft	2.34m
12.0ft	3.65m	1.36fc	10.3ft	3.13m	10.2ft	3.10m
15.0ft	4.57m	0.87fc	12.9ft	3.93m	12.8ft	3.90m
18.0ft	5.48m	0.61fc	15.5ft	4.72m	15.3ft	4.66m

Delivered Lumen: 139.1 lm
Vertical Beam Spread : 46.5°
Horizontal Beam Spread : 46.1°

Polar Candela Distribution



Beam Width: 120°



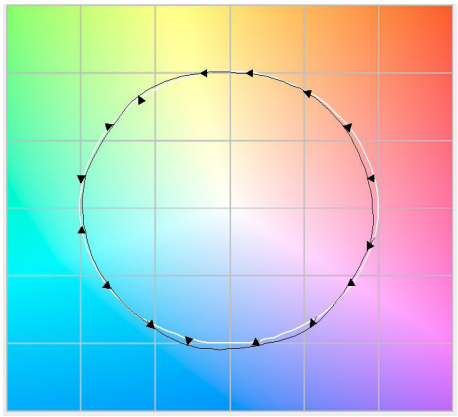
Illuminance at a Distance

Distance		Center Beam fc	Beam Width			
1.5ft	0.46m	21.3fc	4.1ft	1.25m	4.1ft	1.25m
3.0ft	0.91m	5.33fc	8.1ft	2.46m	8.1ft	2.46m
4.5ft	1.37m	2.37fc	12.2ft	3.71m	12.2ft	3.71m
6.0ft	1.83m	1.33fc	16.3ft	4.96m	16.3ft	4.96m
7.5ft	2.29m	0.85fc	20.3ft	6.18m	20.3ft	6.18m
9.0ft	2.74m	0.59fc	24.4ft	7.43m	24.4ft	7.43m

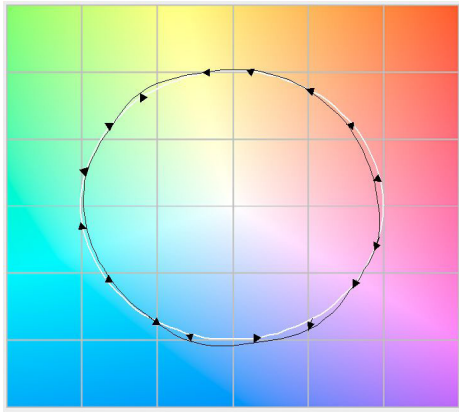
Delivered Lumen: 119 lm
Vertical Beam Spread : 107.1°
Horizontal Beam Spread : 107.1°

TM30 Report

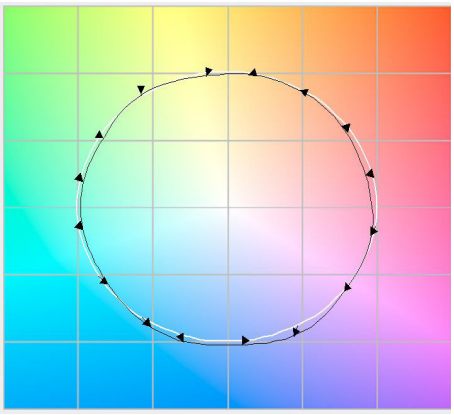
2700K, 90+CRI



3000K, 90+CRI

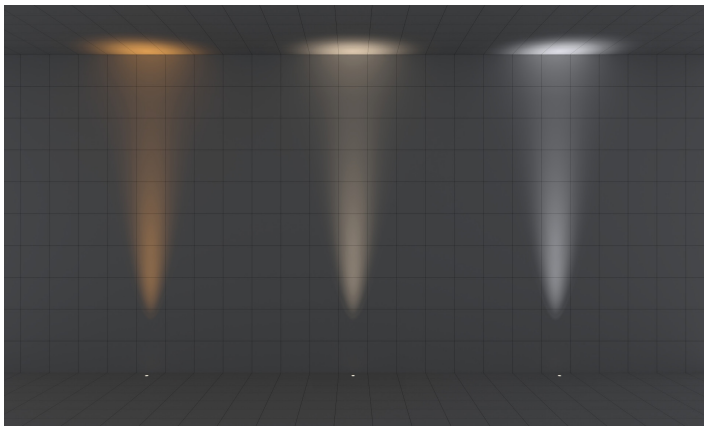


3500K, 90+CRI

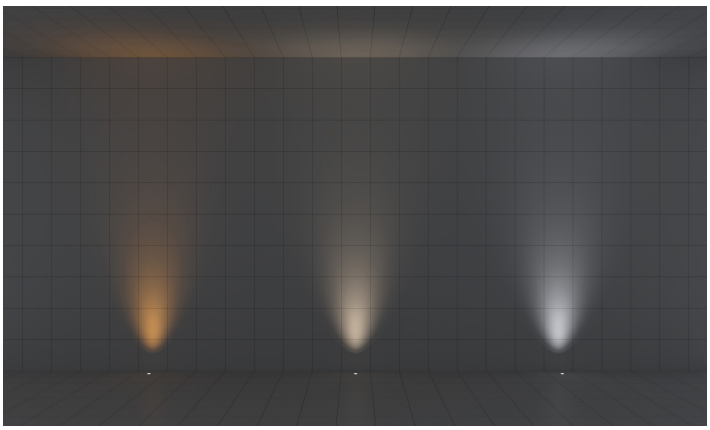


Colour Temperature Comparison | 2200K, 2700K, 3000K

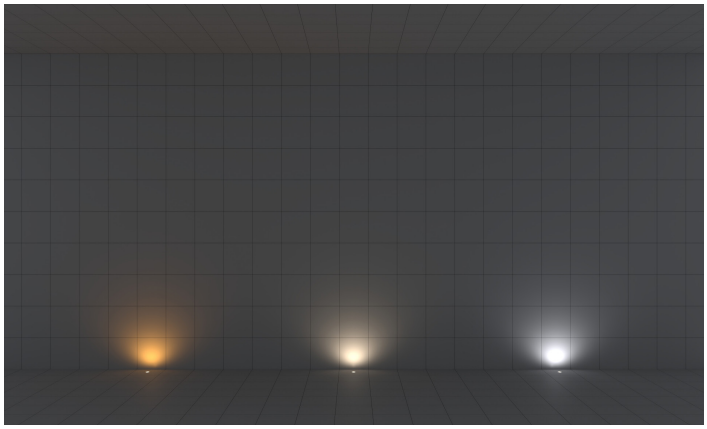
12° | 6" (152mm) Gap | 10ft Wall



30° | 6" (152mm) Gap | 10ft Wall

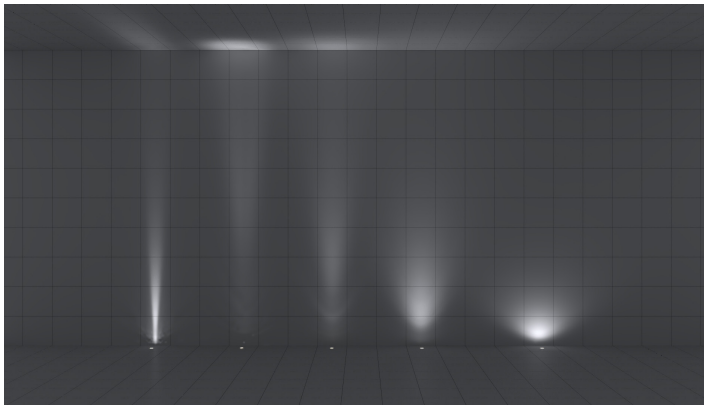


120° | 6" (152mm) Gap | 10ft Wall



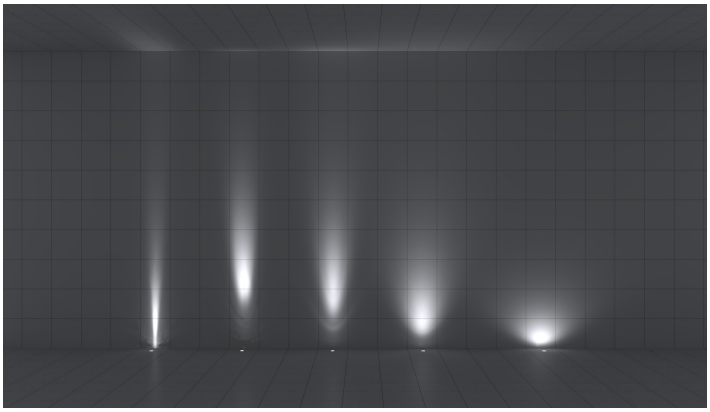
Light Distribution | 10ft Wall | Fixtures installed 6" (152mm) away from the wall

L01 | 1W | 0° angle bracket | 10ft wall | Clear Lens | 3000K



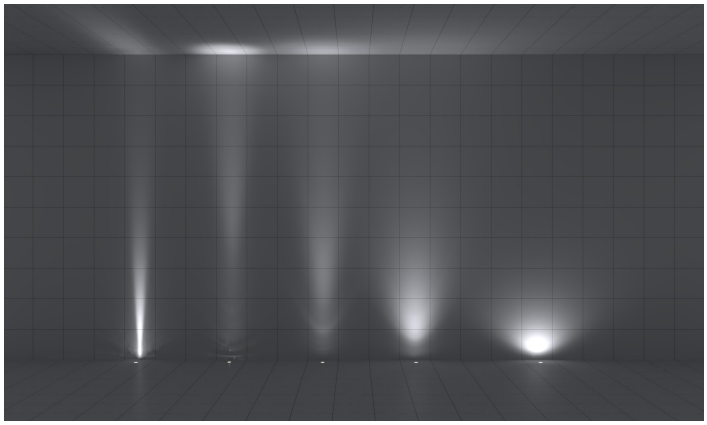
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 1W | 10° angle bracket | 10ft wall | Clear Lens | 3000K



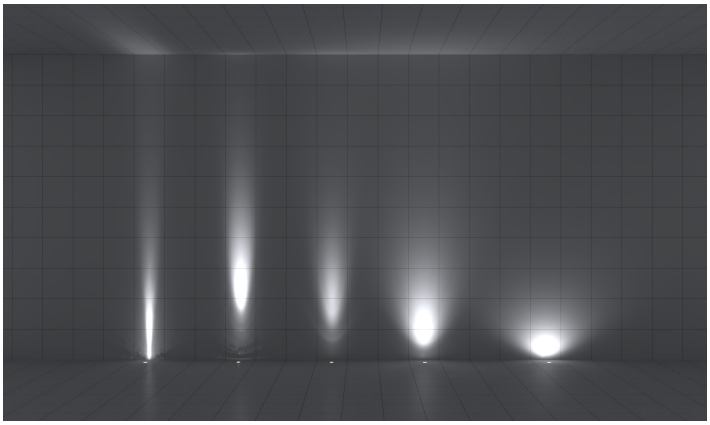
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 0° angle bracket | 10ft wall | Clear Lens | 3000K



From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 10° angle bracket | 10ft wall | Clear Lens | 3000K

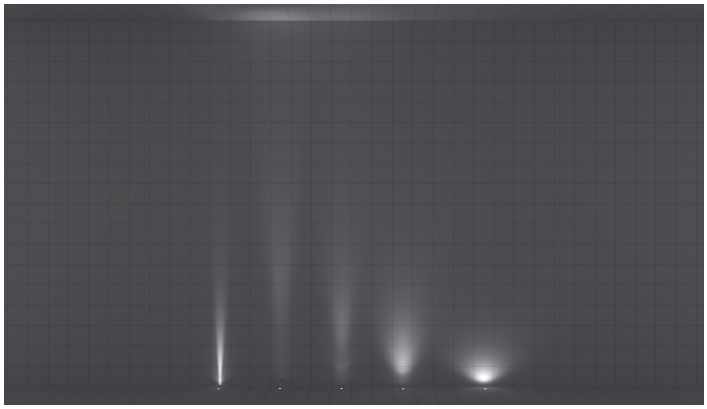


From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

** Images will appear darker when printed.*

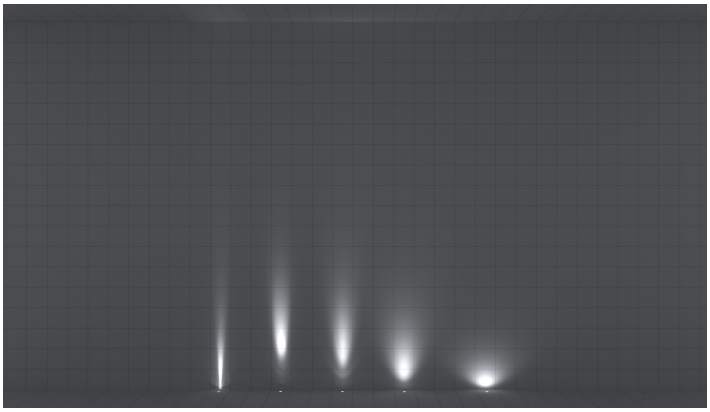
Light Distribution | 18ft Wall | Fixtures installed 6" (152mm) away from the wall

L01 | 1W | 0° angle bracket | 18ft wall | Clear Lens | 3000K



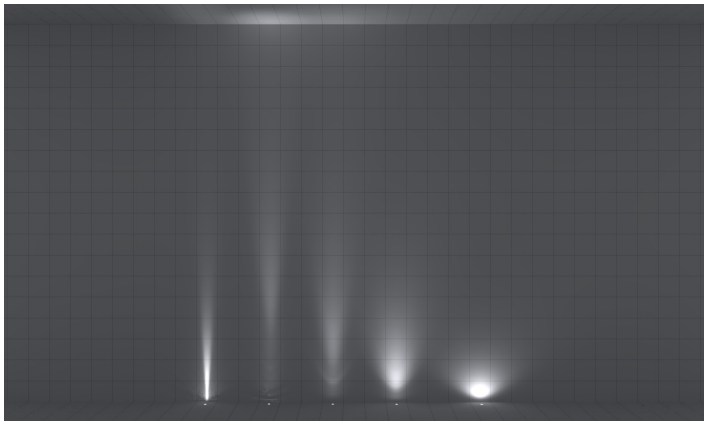
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 1W | 10° angle bracket | 18ft wall | Clear Lens | 3000K



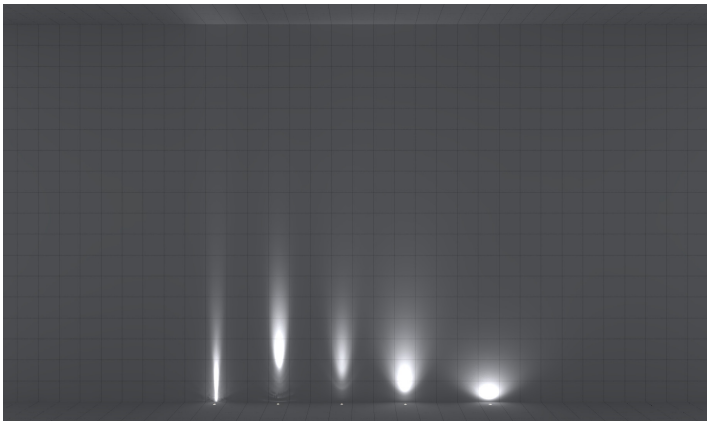
From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 0° angle bracket | 18ft wall | Clear Lens | 3000K



From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

L01 | 2W | 10° angle bracket | 18ft wall | Clear Lens | 3000K



From left to right:
E elliptical 7°+ 36°
SS super spot 8°
S spot 12°
N narrow flood 30°
W wide flood 120°

Appendix

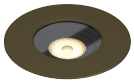
Aluminum Finishes



MA matte clear anodized with anti-slip lens



BA black anodized



BZ bronze

Stainless Steel Finishes

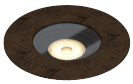


S6 stainless steel 316

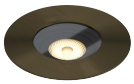


BT0 black stainless steel

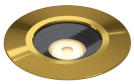
Other Materials



ABZ antique bronze



ABR antique brass



PBR polished brass

Accessories



LM louver, matte clear anodized



LB louver, black anodized



HM hex louver, matte clear anodized



HB hex louver, black anodized



AB angled louver, black anodized



SB straight louver, black anodized

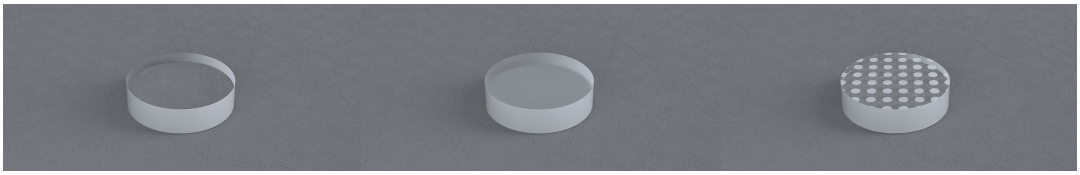


QB square louver, black anodized



RB ring louver, black anodized

Lens Options



C clear lens

F frosted

A anti-slip

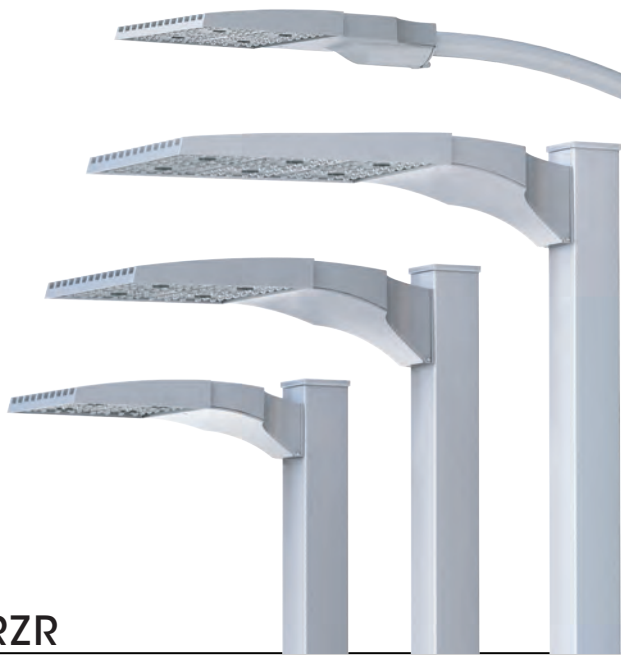
PROJECT NAME:

PROJECT TYPE:

AREA & ROADWAY LIGHTING

RAZAR SERIES - LED

LOW PROFILE AREA LUMINAIRE



RZR

(**MODELS**: RZRM, RZR, RZR-G & RZR-MAF*) PATENT PENDING

Optical Housing
Heavy cast, low copper aluminum assembly (A356 alloy, <.2% copper) minimum wall thickness .188". LED Module mounting area is machined to within a 0.002" surface flatness variance for maximum surface contact and thermal conductivity from the LED modules to the radiating fins. Passive radiating fins above the LED Optics provide superior thermal management and long LED life.The optical and electrical compartments are integrated with the support arm to create one assembly. Cast and hinged driver compartment cover allows access to the drivers and wiring.

Electrical Housing w/ Integrated Arm
Heavy cast low copper aluminum (A356 alloy; <0.2% copper) assembly with integral cooling ribs surrounding the electrical compartment and a flat surface on the top of the arm to accommodate a photocell receptacle. Solid barrier wall separates optical and electrical compartments. The optical compartment and electrical compartment with the integrated support arm combine to create one assembly. Minimum wall thickness is .188". Cast and hinged driver assembly cover is integrated with wiring compartment cover.

PLED™ Optics
Emitters (LED's) are arrayed on a metal core PCB panel with each emitter located on a copper thermal transfer pad and enclosed by an LED refractor. LED optics completely seal each individual emitter to meet an IP66 rating. In asymmetric distributions, a micro-reflector inside the refractor re-directs the house side emitter output towards the street side and functions as a house side shielding element. Refractors are injection molded H12 acrylic. Each LED refractor is sealed to the PCB over an emitter and all refractors are retained by an aluminum frame. Any one Panel, or group of Panels in a luminaire, have the same optical pattern. LED refractors produce standard site/area distributions. Panels are field replaceable and field rotatable in 90° increments.

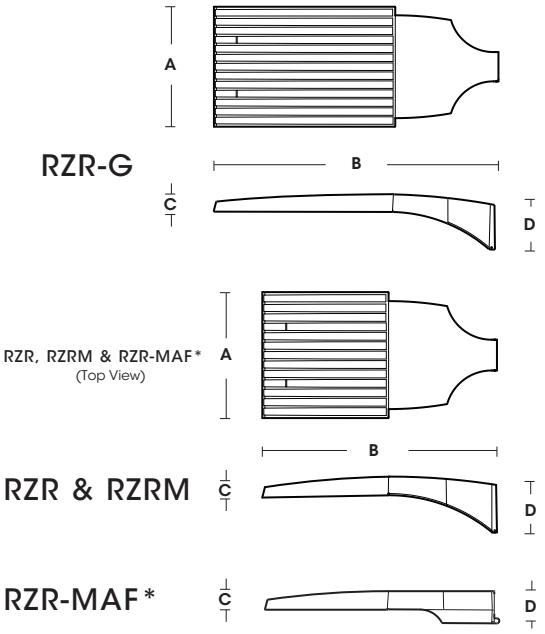
LED Driver(s)
Constant current electronic with a power factor of >.90 and a minimum operating temperature of -40°F/-40°C. Driver(s) is/are UL and cUL recognized and mounted directly against the Electrical Housing to facilitate thermal transfer, held down by universal clamps to facilitate easy removal. In-line terminal blocks facilitate wiring between the driver and optical arrays. Drivers accept an input of 120-277V, 50/60Hz or 347V-480V, 50,60Hz. (0 - 10V dimmable driver is standard. Driver has a minimum of 3KV internal surge protection. Luminaire supplied with 20KV surge protector for field accessible installation.)

LED Emitters
High output LED's are utilized with drive currents ranging from 350mA to 1050mA. 70CRI Minimum. LED's are available in standard Neutral White (4000K), or optional Cool White (5000K) or Warm White (3000K). Consult Factory for other LED options.

Amber LED's
TRA (True Amber) LED's utilize material that emits light in the amber spectral bandwidth only without the use of phosphors.

Finish
Electrostatically applied TGIC Polyester Powder Coat on substrate prepared with 20 PSI power wash at 140°F. Four step media blast and iron phosphate pretreatment for protection and paint adhesion. 400°F bake for maximum hardness and durability.

Mast Arm Fitter/Electrical Housing
Replaces standard Electrical Housing. Fits standard 2 3/8" O.D. horizontal tenon. Two (2) straps with two (2) bolts each encircle the lower half of the tenon. Upper half of the tenon rests on self-centering steps that position the angle of the luminaire at 0°, +1.5°, +1.5 or +3° up from the horizontal. All hardware is stainless steel.



FIXTURE	A	B	C	D
RZR-G	15" 381mm	36.5" 927mm	3" 76mm	7" 187mm
RZR	14.75" 375mm	28.25" 718mm	2.75" 70mm	6.5" 165mm
RZRM	11.5" 292mm	22" 559mm	2.5" 64mm	5.25" 133mm
RZR-MAF	15" 381mm	28.25" 724mm	2.5" 64mm	4" 102mm

U.L. Listed for Wet Location

2022158

U.S. Pole Company Inc
An Employee Owned Company
660 West Avenue O, Palmdale, CA 93551
Phone (661) 233-2000 www.usaltg.com

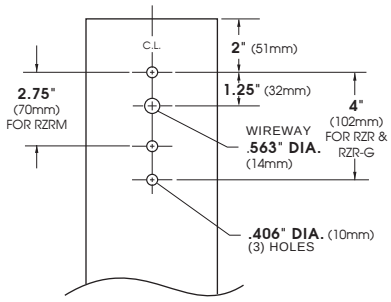
MADE IN THE USA

U.S. ARCHITECTURAL LIGHTING

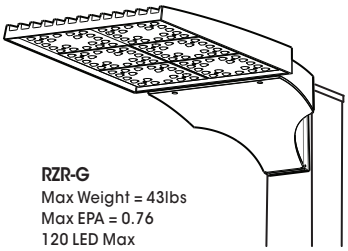
RZR SERIES - LED

SPECIFICATIONS

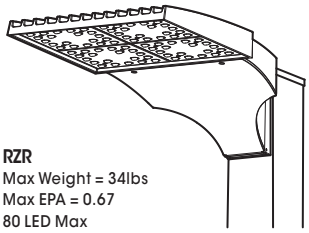
POLE DRILLING TEMPLATE



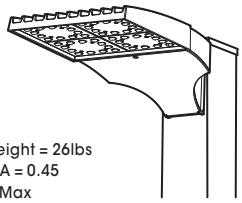
EPA & WEIGHT



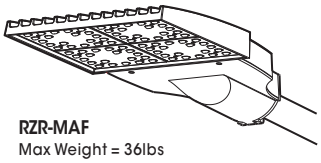
RZR-G
Max Weight = 43lbs
Max EPA = 0.76
120 LED Max



RZR
Max Weight = 34lbs
Max EPA = 0.67
80 LED Max

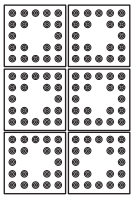


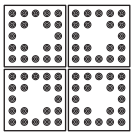
RZRM
Max Weight = 26lbs
Max EPA = 0.45
48 LED Max

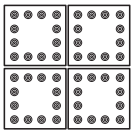


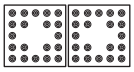
RZR-MAF
Max Weight = 36lbs
Max EPA = 0.56
80 LED Max

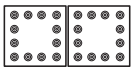
PLED™ MODULES


120 LED Module


80 LED Module


48 LED Module


40 LED Module

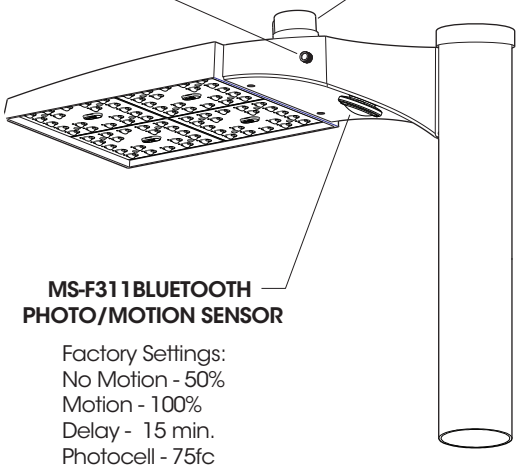

24 LED Module

ORDERING INFORMATION

Spec/Order Example: RZR/PLED-IV/80LED-700mA/CW/277/RAL-8019-S

Luminaire	Optics	LED Mode	Voltage	Mounting	Finish	Options
Luminaire	**Optics**	**LED**	**Voltage**	**Mounting**	**Finish**	**Options**
☐ **RZR-G**	PLED™ Distribution Type ☐ Type II **PLED-II** ☐ Type II Front Row **PLED-II-FR** ☐ Type III Median Illuminator **PLED-II-MIL** ☐ Type III Med. **PLED-III** ☐ Type III Wide **PLED-III-W** ☐ Type IV **PLED-IV** ☐ Type IV **PLED-IV-FT** ☐ Type V Narrow **PLED-VSQ-N** ☐ Type V Med. **PLED-V-SQ-M** ☐ Type V Wide **PLED-V-SQ-W**	# of LEDs **RZR-G** ☐ 120LED ☐ 80LED **RZR/RZR-MAF** ☐ 80LED ☐ 40LED **RZRM** ☐ 48LED ☐ 24LED Drive Current ☐ **1050mA**[1] ☐ **875mA**[1] ☐ **700mA**[1] ☐ **525mA** ☐ **350mA** Color Temp - CCT ☐ **27K** (2700K) ☐ **30K** (3000K) ☐ **40K** (4000K) ☐ **50K** (5000K) ☐ **TRA** True Amber[2] Consult Factory for Other LED Color, CCT, & CRI Options **NOTES:** 1 - 700mA and 1050mA not for use with TRA LED's 2 - Available in 350mA & 525mA drive currents only Consult Factory for Other Drive Currents	☐ **120** ☐ **208** ☐ **240** ☐ **277** ☐ **347** ☐ **480**	Arm Mount ☐ **1** ☐ **2-180** ☐ **2-90** ☐ **3-90** ☐ **3-120** ☐ **4-90** Wall Mount ☐ **WM** WM - Wall Mount provided with mounting bracket and cover.	Standard Textured Finish ☐ Black **RAL-9005-T** ☐ White **RAL-9003-T** ☐ Grey **RAL-7004-T** ☐ Dark Bronze **RAL-8019-T** ☐ Green **RAL-6005-T** Premium Finishes ☐ Rust ☐ Patina Copper **PC** For smooth finish replace suffix "T" with suffix "S" (Example: RAL-9500-S) Consult factor for custom colors	☐ Internal House Side Shield inc. LED Count (Example: HS-PLED/48) **HS-PLED** ☐ External Glare Shield 4 Sided **EGS4** ☐ External Glare Shield 3 Sided Rear Wedge **EGS3W** ☐ Round Pole Adapter **RPA** ☐ Twist Lock Receptable Only **TPR** ☐ 7-Pin Twist Lock Receptable Only **TPR7** ☐ High-Low Dimming for Switch by Others/Select Levels 50/100 or 25/100 (Example: HLSW/25) **HLSW** ☐ Twist Lock Photocell + Voltage (Example: TPC347V) **TPC+V** ☐ Photo Cell + Voltage (Example: PC120V) **PC+V** ☐ Single Fuse (120V, 277V) **SF** ☐ Double Fuse (208V, 240V) **DF** ☐ Blue-Tooth Programmable Photo/Motion Sensor (Factory - Motion 50/100; Photo 75fc) **MS-F311**
☐ **RZR** ☐ **RZR-MAF**						
☐ **RZRM**						

OPTIONS



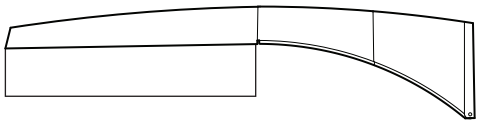
Factory Settings:
No Motion - 50%
Motion - 100%
Delay - 15 min.
Photocell - 75fc

Sensors can be Field Programmed With Bluetooth App

High Low Dimming For Switches (HLSW)
The HLSW is a Small Electronic Switch which Provides High Low Dimming Control Through the LED Driver's 0-10V Control. Switching is Done by Adding a Seconday AC Switched Hot Trigger Line to the HLSW in Addition to the Normal AC Power Line. When the Secondary Trigger Line is Powered, the Fixture will go to 100% Dimming. With no Power to the Trigger, the Fixture will operate at 50% or 25% Dimming. Switches for the Trigger Line can be a Normal AC Switch/Breaker or Timed Switch/Breaker.

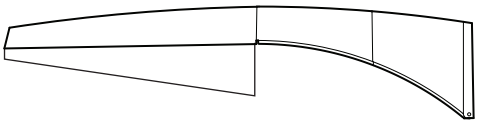
Wireless and Other Fixture Controls
Contact Factory for Wireless and Other Fixture Controls and Recomendations. Most Controls Can be Integrated and Factory Installed.

EXTERNAL GLARE SHIELDS



EGS4 - 4 Sided Shield

Minimum Cutoff = 12°
Average Cutoff = 23°

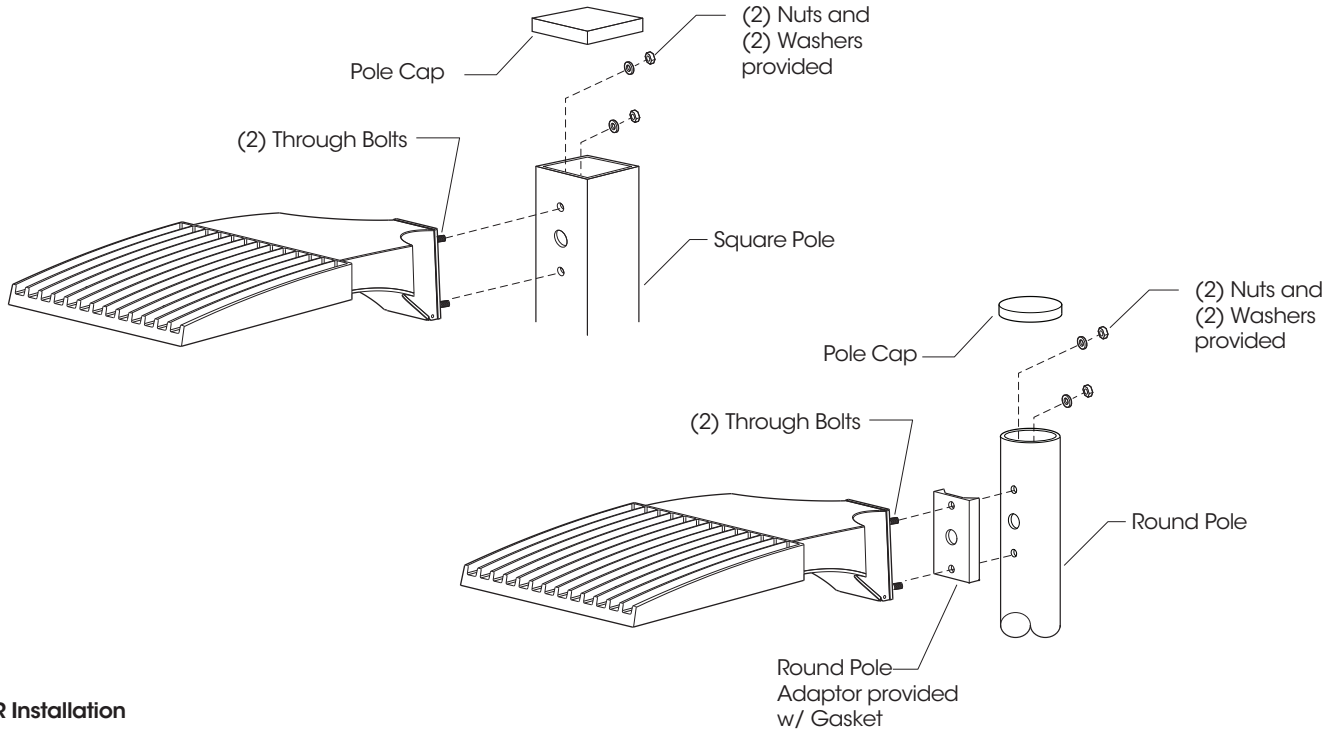


EGS3W - 3 Sided Shield

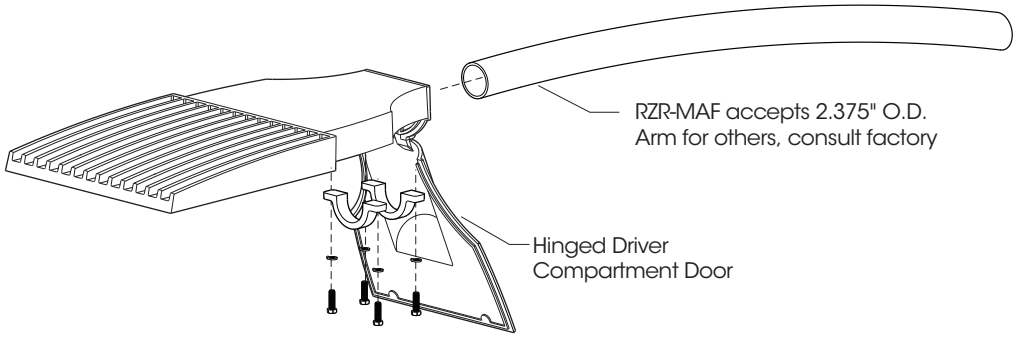
Minimum Rear Cutoff = 12°
Average Rear Cutoff = 23°
Minimum Side Cutoff = 4°
Average Side Cutoff = 16°

Glare Shields are rotatable on RZR and RZRM. Consult factory for custom applications.

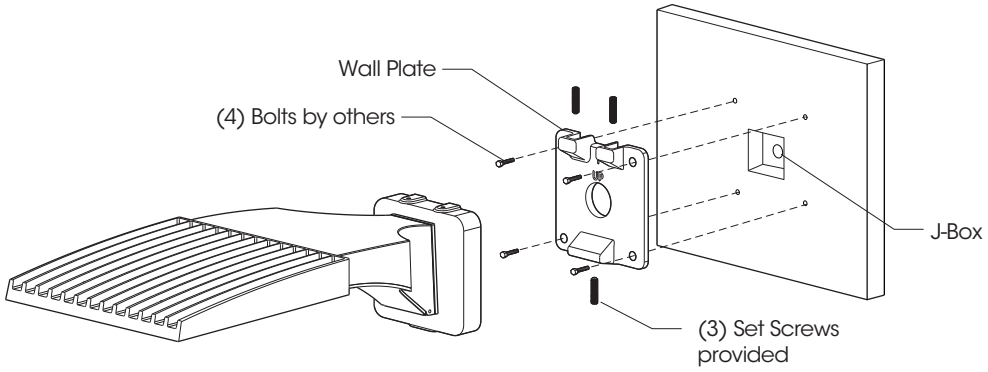
INSTALLATION DETAIL



RZR Installation



RZR-MAF Installation



RZR-WM Installation

RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LM-80 LUMEN MAINTENANCE

LED Life / Operating Hours	Lumen Depreciation	Lumen Depreciation Scale Factor
60,000 (10x Test Time Calculated)	L94	0.94x
100,000 (Theoretical Calculated)	L92	0.92x
150,000 (Theoretical Calcualted)	L89	0.89x

Lumen Depreciation Calculations Done in Accordance With IESNA TM-21 & LM-80 (25°C Ambient)
TM-21 6x Test Time Dicatates that L94 > 60,000 Hours.

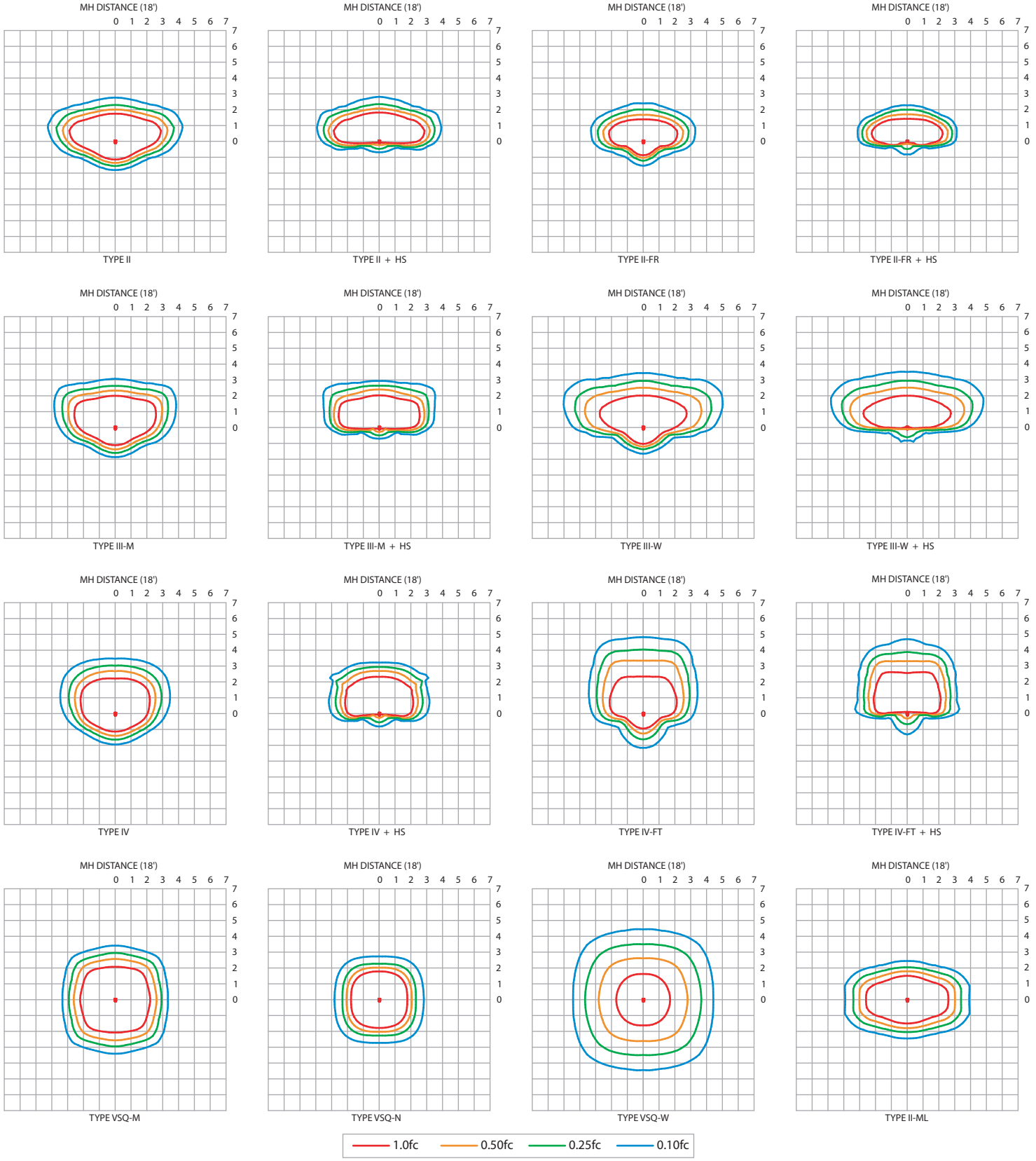
ELECTRICAL DATA GUIDE - AMPERAGE CHARTS

# of LEDs	mA	System Watts	120V	208V	277V	347V	480V
24	350	28	0.24	0.14	0.10	0.08	0.06
24	525	42	0.35	0.20	0.15	0.12	0.09
24	700	56	0.47	0.27	0.20	0.16	0.12
24	875	68	0.57	0.33	0.24	0.20	0.14
24	1050	82	0.68	0.39	0.30	0.24	0.17
48	350	53	0.44	0.25	0.19	0.15	0.11
48	525	79	0.66	0.38	0.29	0.23	0.16
48	700	105	0.88	0.51	0.38	0.30	0.22
48	875	132	1.10	0.63	0.48	0.38	0.27
48	1050	160	1.33	0.77	0.58	0.46	0.33
40	350	43	0.36	0.21	0.15	0.12	0.09
40	525	65	0.54	0.31	0.23	0.19	0.13
40	700	87	0.72	0.42	0.31	0.25	0.18
40	875	108	0.90	0.52	0.39	0.31	0.23
40	1050	128	1.07	0.62	0.46	0.37	0.27
80	350	85	0.71	0.41	0.31	0.25	0.18
80	525	129	1.08	0.62	0.47	0.37	0.27
80	700	174	1.45	0.83	0.63	0.50	0.36
80	875	216	1.80	1.04	0.78	0.62	0.45
80	1050	256	2.14	1.23	0.93	0.74	0.53
120	350	130	1.08	0.63	0.47	0.37	0.27
120	525	192	1.60	0.92	0.69	0.55	0.40
120	700	260	2.17	1.25	0.94	0.75	0.54
120	875	329	2.74	1.58	1.19	0.95	0.69
120	1050	398	3.32	1.91	1.44	1.15	0.83

RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - ISOFOOTCANDLE PLOTS

RZRM-PLED-48LED-700mA-40K - 18' Pole Height



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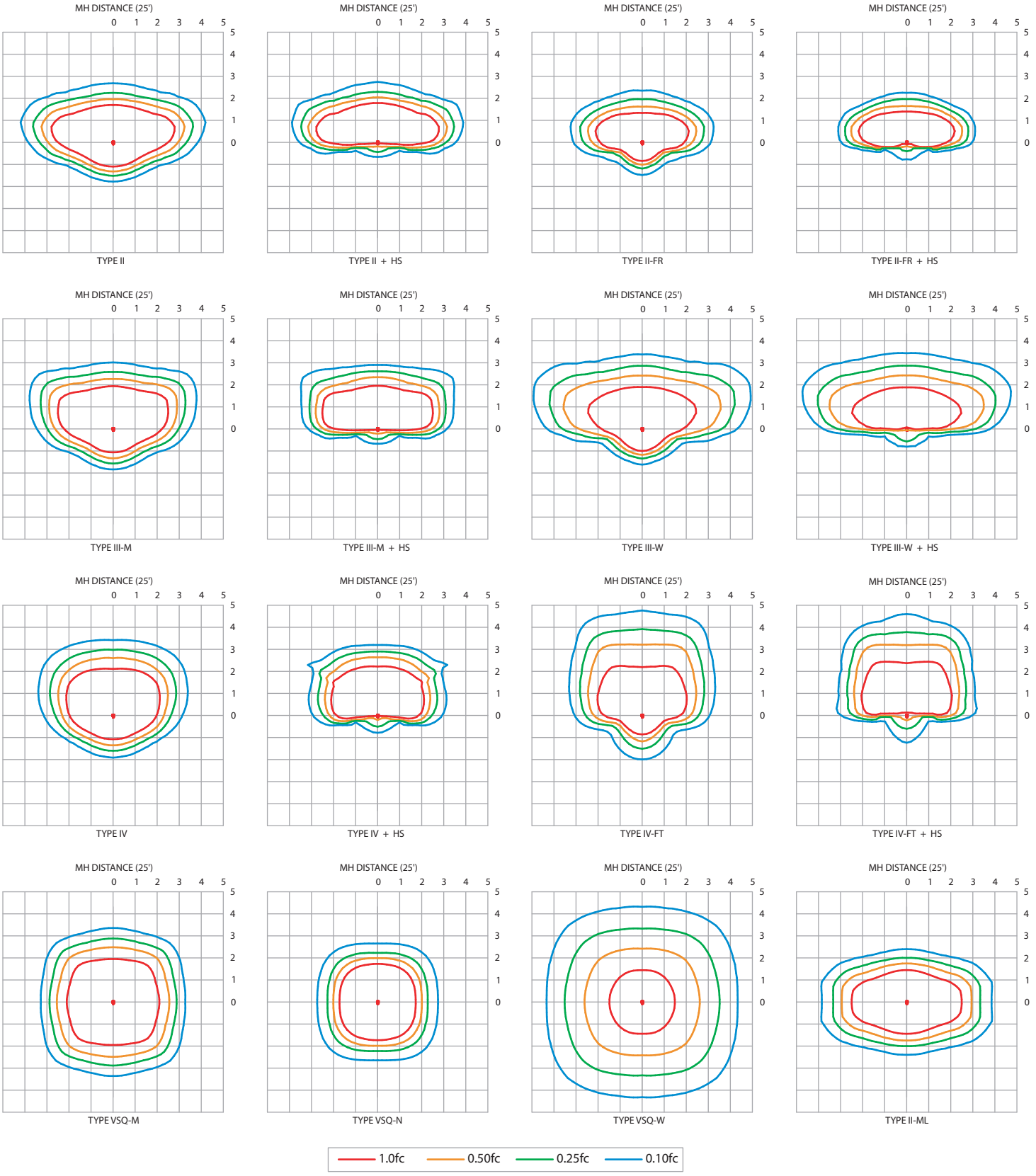
RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - ISOFOOTCANDLE PLOTS

RZR-PLED-80LED-700mA-40K - 25' Pole Height



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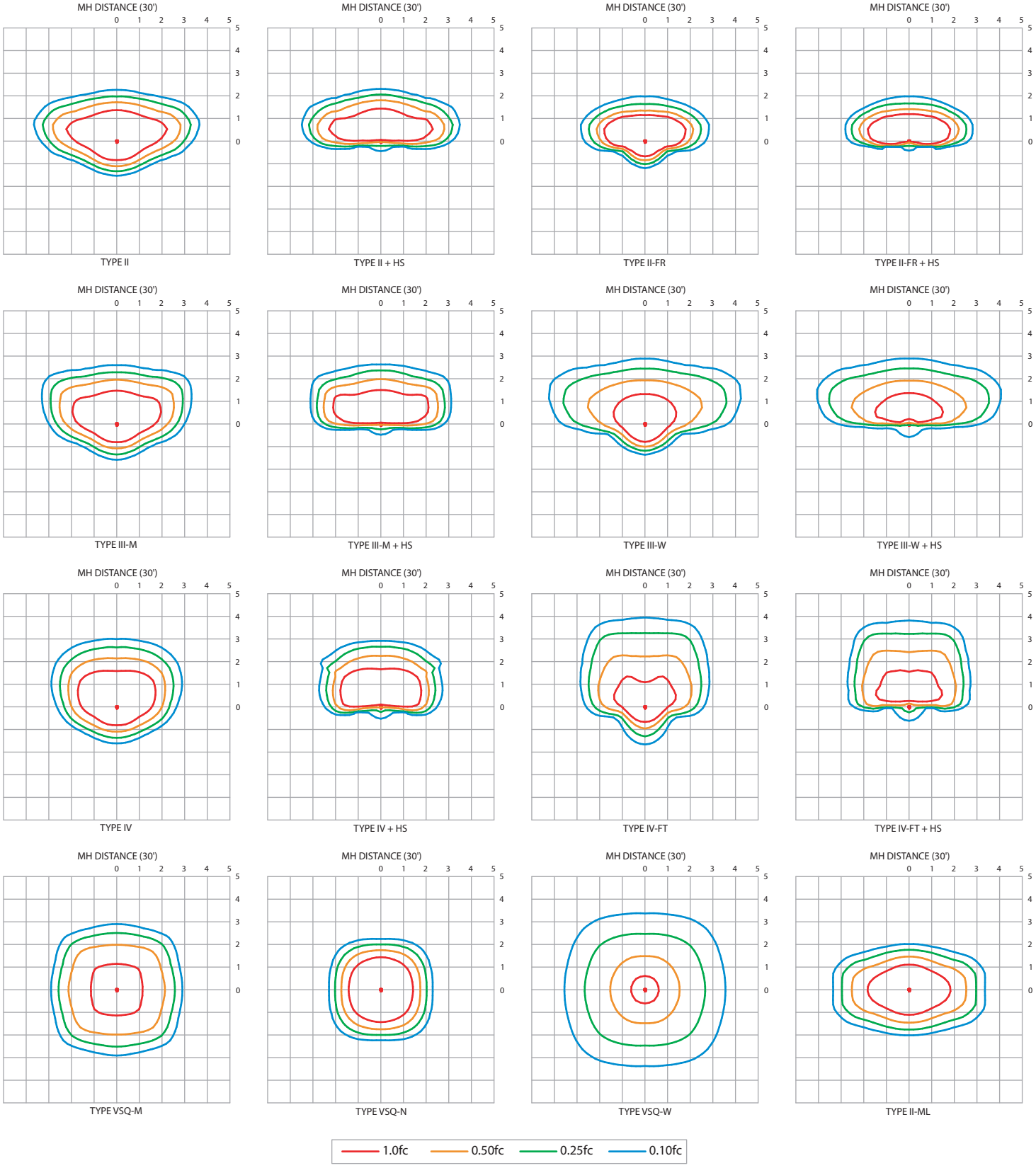
RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - ISOFOOTCANDLE PLOTS

RZRG-PLED-120LED-700mA-40K 30' Pole Height



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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRM-PLED)

RZR-M-PLED																			
LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
24	350	28.2	II	3436	122	B1-U0-G1	3709	132	B1-U0-G1	3904	138	B1-U0-G1	4100	145	B1-U0-G1	20.0	1363	68	B1-U0-G1
			II-FR	3459	123	B1-U0-G1	3734	132	B1-U0-G1	3930	139	B1-U0-G1	4127	146	B1-U0-G1		1372	69	B1-U0-G0
			II-ML	3436	122	B2-U0-G2	3709	132	B2-U0-G2	3905	138	B2-U0-G2	4100	145	B2-U0-G2		1363	68	B1-U0-G1
			III-M	3496	124	B1-U0-G1	3775	134	B1-U0-G1	3973	141	B1-U0-G1	4172	148	B1-U0-G1		1387	69	B1-U0-G0
			III-W	3246	115	B1-U0-G1	3505	124	B1-U0-G1	3689	131	B1-U0-G1	3873	137	B1-U0-G1		1289	64	B0-U0-G1
			IV	3469	123	B1-U0-G1	3746	133	B1-U0-G1	3943	140	B1-U0-G1	4140	147	B1-U0-G1		1377	69	B1-U0-G1
			IV-FT	3161	112	B1-U0-G1	3412	121	B1-U0-G1	3592	127	B1-U0-G1	3771	134	B1-U0-G1		1254	63	B0-U0-G1
			VSQ-N	3627	129	B2-U0-G0	3915	139	B2-U0-G0	4121	146	B2-U0-G0	4327	153	B2-U0-G1		1439	72	B1-U0-G0
			VSQ-M	3556	126	B2-U0-G1	3838	136	B2-U0-G1	4041	143	B2-U0-G1	4242	150	B3-U0-G1		1410	71	B1-U0-G0
			VSQ-W	3471	123	B3-U0-G1	3748	133	B3-U0-G1	3945	140	B3-U0-G1	4142	147	B3-U0-G1		1377	69	B1-U0-G1
			II-HS	2513	89	B0-U0-G1	2713	96	B0-U0-G1	2856	101	B0-U0-G1	2998	106	B0-U0-G1		997	50	B0-U0-G0
			II-FR-HS	2556	91	B0-U0-G0	2759	98	B0-U0-G0	2905	103	B0-U0-G0	3050	108	B0-U0-G0		1014	51	B0-U0-G0
			III-M-HS	2543	90	B0-U0-G1	2745	97	B0-U0-G1	2889	102	B0-U0-G1	3034	108	B0-U0-G1		1008	50	B0-U0-G0
			III-W-HS	2488	88	B0-U0-G1	2686	95	B0-U0-G1	2827	100	B0-U0-G1	2969	105	B0-U0-G1		987	49	B0-U0-G1
			IV-HS	2626	93	B0-U0-G1	2835	101	B0-U0-G1	2984	106	B0-U0-G1	3133	111	B0-U0-G1		1042	52	B0-U0-G0
			IV-FT-HS	2481	88	B0-U0-G1	2679	95	B0-U0-G1	2820	100	B0-U0-G1	2961	105	B0-U0-G1		985	49	B0-U0-G1
24	525	41.5	II	4908	118	B1-U0-G1	5298	128	B1-U0-G1	5577	134	B1-U0-G1	5856	141	B2-U0-G1	31.0	1586	51	B1-U0-G1
			II-FR	4941	119	B1-U0-G1	5334	129	B1-U0-G1	5614	135	B2-U0-G1	5895	142	B2-U0-G1		1598	52	B1-U0-G0
			II-ML	4908	118	B2-U0-G2	5299	128	B2-U0-G2	5578	134	B2-U0-G2	5856	141	B3-U0-G3		1587	51	B1-U0-G1
			III-M	4994	120	B1-U0-G1	5392	130	B1-U0-G1	5675	137	B1-U0-G1	5959	144	B1-U0-G2		1615	52	B1-U0-G0
			III-W	4637	112	B1-U0-G2	5005	121	B1-U0-G2	5269	127	B1-U0-G2	5533	133	B1-U0-G2		1500	48	B0-U0-G1
			IV	4956	119	B1-U0-G1	5350	129	B1-U0-G1	5632	136	B1-U0-G1	5913	142	B1-U0-G2		1602	52	B1-U0-G1
			IV-FT	4515	109	B1-U0-G2	4875	117	B1-U0-G2	5131	124	B1-U0-G2	5388	130	B1-U0-G2		1460	47	B0-U0-G1
			VSQ-N	5180	125	B2-U0-G1	5592	135	B2-U0-G1	5886	142	B2-U0-G1	6181	149	B2-U0-G1		1676	54	B1-U0-G0
			VSQ-M	5080	122	B3-U0-G1	5484	132	B3-U0-G1	5772	139	B3-U0-G1	6061	146	B3-U0-G1		1643	53	B1-U0-G0
			VSQ-W	4959	119	B3-U0-G2	5353	129	B3-U0-G2	5635	136	B3-U0-G2	5917	143	B3-U0-G2		1603	52	B1-U0-G1
			II-HS	3589	86	B0-U0-G1	3875	93	B0-U0-G1	4079	98	B0-U0-G1	4282	103	B0-U0-G1		1161	37	B0-U0-G0
			II-FR-HS	3652	88	B0-U0-G1	3942	95	B0-U0-G1	4150	100	B0-U0-G1	4357	105	B0-U0-G1		1181	38	B0-U0-G0
			III-M-HS	3631	88	B0-U0-G1	3920	94	B0-U0-G1	4127	99	B0-U0-G1	4333	104	B0-U0-G2		1174	38	B0-U0-G0
			III-W-HS	3555	86	B0-U0-G2	3838	92	B0-U0-G2	4040	97	B0-U0-G2	4242	102	B0-U0-G2		1150	37	B0-U0-G1
			IV-HS	3751	90	B0-U0-G1	4050	98	B0-U0-G1	4263	103	B0-U0-G1	4476	108	B0-U0-G1		1213	39	B0-U0-G0
			IV-FT-HS	3545	85	B0-U0-G2	3827	92	B0-U0-G2	4029	97	B0-U0-G2	4230	102	B0-U0-G2		1146	37	B0-U0-G1
24	700	55.9	II	6275	112	B2-U0-G1	6774	121	B2-U0-G2	7130	128	B2-U0-G2	7487	134	B2-U0-G2	N/A	N/A		
			II-FR	6317	113	B2-U0-G1	6819	122	B2-U0-G1	7178	128	B2-U0-G1	7537	135	B2-U0-G1				
			II-ML	6275	112	B3-U0-G3	6774	121	B3-U0-G3	7130	128	B3-U0-G3	7487	134	B3-U0-G3				
			III-M	6385	114	B2-U0-G2	6893	123	B2-U0-G2	7256	130	B2-U0-G2	7618	136	B2-U0-G2				
			III-W	5928	106	B1-U0-G2	6399	114	B1-U0-G2	6736	121	B1-U0-G2	7073	127	B1-U0-G2				
			IV	6337	113	B2-U0-G2	6841	122	B2-U0-G2	7201	129	B2-U0-G2	7561	135	B2-U0-G2				
			IV-FT	5772	103	B1-U0-G2	6231	111	B1-U0-G2	6559	117	B1-U0-G2	6887	123	B1-U0-G2				
			VSQ-N	6624	118	B2-U0-G1	7151	128	B2-U0-G1	7527	135	B2-U0-G1	7903	141	B3-U0-G1				
			VSQ-M	6494	116	B3-U0-G1	7011	125	B3-U0-G1	7380	132	B3-U0-G1	7749	139	B3-U0-G2				
			VSQ-W	6340	113	B3-U0-G2	6844	122	B3-U0-G2	7204	129	B3-U0-G2	7565	135	B3-U0-G2				
			II-HS	4589	82	B1-U0-G1	4954	89	B1-U0-G2	5215	93	B1-U0-G2	5475	98	B1-U0-G2				
			II-FR-HS	4668	84	B0-U0-G1	5040	90	B0-U0-G1	5305	95	B0-U0-G1	5570	100	B0-U0-G1				
			III-M-HS	4643	83	B0-U0-G2	5012	90	B0-U0-G2	5276	94	B0-U0-G2	5539	99	B0-U0-G2				
			III-W-HS	4544	81	B0-U0-G2	4906	88	B0-U0-G2	5164	92	B0-U0-G2	5422	97	B0-U0-G2				
			IV-HS	4796	86	B0-U0-G2	5177	93	B0-U0-G2	5450	97	B0-U0-G2	5722	102	B0-U0-G2				
			IV-FT-HS	4532	81	B0-U0-G2	4893	88	B0-U0-G2	5150	92	B0-U0-G2	5408	97	B0-U0-G2				
24	875	67.8	II	7406	109	B2-U0-G2	7995	118	B2-U0-G2	8416	124	B2-U0-G2	8837	130	B2-U0-G2	N/A	N/A		
			II-FR	7456	110	B2-U0-G1	8049	119	B2-U0-G1	8473	125	B2-U0-G1	8896	131	B2-U0-G1				
			II-ML	7406	109	B3-U0-G3	7995	118	B3-U0-G3	8416	124	B3-U0-G3	8837	130	B3-U0-G3				
			III-M	7536	111	B2-U0-G2	8135	120	B2-U0-G2	8563	126	B2-U0-G2	8992	133	B2-U0-G2				
			III-W	6997	103	B1-U0-G2	7553	111	B1-U0-G2	7951	117	B2-U0-G2	8348	123	B2-U0-G2				
			IV	7479	110	B2-U0-G2	8073	119	B2-U0-G2	8498	125	B2-U0-G2	8923	132	B2-U0-G2				
			IV-FT	6813	100	B1-U0-G2	7355	108	B2-U0-G2	7742	114	B2-U0-G2	8129	120	B2-U0-G2				
			VSQ-N	7817	115	B2-U0-G1	8439	124	B3-U0-G1	8883	131	B3-U0-G1	9327	138	B3-U0-G1				
			VSQ-M	7665	113	B3-U0-G2	8275	122	B3-U0-G2	8711	128	B3-U0-G2	9146	135	B3-U0-G2				
			VSQ-W	7482	110	B3-U0-G2	8078	119	B3-U0-G2	8503	125	B4-U0-G2	8928	132	B4-U0-G2				
			II-HS	5417	80	B1-U0-G2	5847	86	B1-U0-G2	6155	91	B1-U0-G2	6463	95	B1-U0-G2				
			II-FR-HS	5510	81	B0-U0-G1	5948	88	B1-U0-G1	6261	92	B1-U0-G1	6574	97	B1-U0-G1				
			III-M-HS	5480	81	B0-U0-G2	5916	87	B0-U0-G2	6227	92	B0-U0-G2	6538	96	B0-U0-G2				
			III-W-HS	5363	79	B0-U0-G2	5790	85	B0-U0-G2	6095	90	B0-U0-G2	6399	94	B0-U0-G2				
			IV-HS	5660	83	B0-U0-G2	6110	90	B0-U0-G2	6432	95	B0-U0-G2	6753	100	B0-U0-G2				
			IV-FT-HS	5349	79	B0-U0-G2	5775	85	B0-U0-G2	6078	90	B0-U0-G2	6382	94	B0-U0-G2				
24	1050	82.0	II	8513	104	B2-U0-G2	9190	112	B2-U0-G2	9674	118	B2-U0-G2	10157	124	B2-U0-G2	N/A	N/A		
			II-FR	8570	105	B2-U0-G1	9252	113	B2-U0-G1	9739	119	B2-U0-G1	10225	125	B2-U0-G1				
			II-ML	8513	104	B3-U0-G3	9190	112	B3-U0-G3	9674	118	B3-U0-G3	10157	124	B3-U0-G3				
			III-M	8662	106	B2-U0-G2	9351	114	B2-U0-G2	9843	120	B2-U0-G2	10335	126	B2-U0-G2				
			III-W	8042	98	B2-U0-G2	8682	106	B2-U0-G2	9139	111	B2-U0-G3	9595	117	B2-U0-G3				
			IV	8596	105	B2-U0-G2	9280	113	B2-U0-G2	9768	119	B2-U0-G2	10256	125	B2-U0-G2				
			IV-FT	7831	95	B2-U0-G2	8454	103	B2-U0-G2	8899	109	B2-U0-G3	9344	114	B2-U0-G3				
			VSQ-N	8985	110	B3-U0-G1	9700	118	B3-U0-G1	10210	125	B3-U0-G1	10721	131	B3-U0-G1				
			VSQ-M	8811	107	B3-U0-G2	9512	116	B3-U0-G2	10012	122	B3-U0-G2	10513	128	B3-U0-G2				
			VSQ-W	8601	105	B4-U0-G2	9285	113	B4-U0-G2	9773	119	B4-U0-G3	10262	125	B4-U0-G3				
			II-HS	6226	76	B1-U0-G2	6721	82	B1-U0-G2	7075	86	B1-U0-G2	7429	91	B1-U0-G2				
			II-FR-HS	6333	77	B1-U0-G1	6837	83	B1-U0-G1	7197	88	B1-U0-G1	7557	92	B1-U0-G1				
			III-M-HS	6299	77	B0-U0-G2	6799	83	B0-U0-G2	7158	87	B0-U0-G2	7515	92	B1-U0-G2				
			III-W-HS	6165	75	B0-U0-G2	6655	81	B0-U0-G2	7005	85	B0-U0-G2	7356	90	B0-U0-G2				
			IV-HS	6506	79	B0-U0-G2	7023	86	B0-U0-G2	7393	90	B1-U0-G2	7762	95	B1-U0-G2				
			IV-FT-HS	6148	75	B0-U0-G2	6637	81	B0-U0-G2	6986	85	B1-U0-G3	7336	89	B1-U0-G3				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRM-PLED)

RZR-M-PLED

LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
48	350	52.5	II	6836	130	B2-U0-G2	7380	141	B2-U0-G2	7769	148	B2-U0-G2	8157	155	B2-U0-G2	41.0	2713	66	B1-U0-G1
			II-FR	6882	131	B2-U0-G1	7430	142	B2-U0-G1	7821	149	B2-U0-G1	8212	156	B2-U0-G1		2731	67	B1-U0-G1
			II-ML	6837	130	B3-U0-G3	7380	141	B3-U0-G3	7769	148	B3-U0-G3	8157	155	B3-U0-G3		2713	66	B1-U0-G1
			III-M	6956	132	B2-U0-G2	7509	143	B2-U0-G2	7905	151	B2-U0-G2	8300	158	B2-U0-G2		2760	67	B1-U0-G1
			III-W	6459	123	B1-U0-G2	6972	133	B1-U0-G2	7339	140	B1-U0-G2	7706	147	B1-U0-G2		2563	63	B1-U0-G1
			IV	6903	131	B2-U0-G2	7453	142	B2-U0-G2	7845	149	B2-U0-G2	8237	157	B2-U0-G2		2740	67	B1-U0-G1
			IV-FT	6289	120	B1-U0-G2	6789	129	B1-U0-G2	7146	136	B1-U0-G2	7503	143	B2-U0-G2		2496	61	B1-U0-G1
			VSQ-N	7216	137	B2-U0-G1	7790	148	B2-U0-G1	8200	156	B3-U0-G1	8610	164	B3-U0-G1		2864	70	B1-U0-G0
			VSQ-M	7076	135	B3-U0-G1	7639	146	B3-U0-G2	8041	153	B3-U0-G2	8443	161	B3-U0-G2		2808	68	B2-U0-G1
			VSQ-W	6907	132	B3-U0-G2	7456	142	B3-U0-G2	7849	150	B3-U0-G2	8242	157	B3-U0-G2		2741	67	B2-U0-G1
			II-HS	5000	95	B1-U0-G2	5398	103	B1-U0-G2	5682	108	B1-U0-G2	5966	114	B1-U0-G2		1984	48	B0-U0-G1
			II-FR-HS	5087	97	B0-U0-G1	5491	105	B0-U0-G1	5780	110	B1-U0-G1	6069	116	B1-U0-G1		2018	49	B0-U0-G0
			III-M-HS	5059	96	B0-U0-G2	5461	104	B0-U0-G2	5748	109	B0-U0-G2	6036	115	B0-U0-G2		2007	49	B0-U0-G1
			III-W-HS	4952	94	B0-U0-G2	5345	102	B0-U0-G2	5627	107	B0-U0-G2	5908	113	B0-U0-G2		1965	48	B0-U0-G1
			IV-HS	5224	100	B0-U0-G2	5640	107	B0-U0-G2	5937	113	B0-U0-G2	6234	119	B0-U0-G2		2074	51	B0-U0-G1
			IV-FT-HS	4938	94	B0-U0-G2	5330	102	B0-U0-G2	5611	107	B0-U0-G2	5892	112	B0-U0-G2		1960	48	B0-U0-G1
48	525	79.0	II	9720	123	B2-U0-G2	10493	133	B2-U0-G2	11046	140	B2-U0-G2	11598	147	B2-U0-G2	62.0	3143	51	B1-U0-G1
			II-FR	9785	124	B2-U0-G1	10564	134	B2-U0-G1	11120	141	B2-U0-G1	11676	148	B3-U0-G1		3164	51	B1-U0-G1
			II-ML	9720	123	B3-U0-G3	10494	133	B3-U0-G3	11046	140	B3-U0-G3	11598	147	B3-U0-G3		3143	51	B2-U0-G2
			III-M	9891	125	B2-U0-G2	10677	135	B2-U0-G2	11240	142	B2-U0-G2	11801	149	B2-U0-G2		3198	52	B1-U0-G1
			III-W	9183	116	B2-U0-G3	9914	125	B2-U0-G3	10436	132	B2-U0-G3	10958	139	B2-U0-G3		2969	48	B1-U0-G1
			IV	9816	124	B2-U0-G2	10597	134	B2-U0-G2	11155	141	B2-U0-G2	11712	148	B2-U0-G2		3174	51	B1-U0-G1
			IV-FT	8942	113	B2-U0-G2	9653	122	B2-U0-G3	10161	129	B2-U0-G3	10669	135	B2-U0-G3		2892	47	B1-U0-G1
			VSQ-N	10260	130	B3-U0-G1	11075	140	B3-U0-G1	11659	148	B3-U0-G1	12242	155	B3-U0-G1		3317	54	B2-U0-G0
			VSQ-M	10060	127	B3-U0-G2	10861	137	B4-U0-G2	11432	145	B4-U0-G2	12004	152	B4-U0-G2		3253	52	B2-U0-G1
			VSQ-W	9821	124	B4-U0-G3	10602	134	B4-U0-G3	11160	141	B4-U0-G3	11718	148	B4-U0-G3		3175	51	B2-U0-G1
			II-HS	7110	90	B1-U0-G2	7675	97	B1-U0-G2	8079	102	B1-U0-G2	8483	107	B1-U0-G2		2298	37	B0-U0-G1
			II-FR-HS	7231	92	B1-U0-G1	7806	99	B1-U0-G1	8217	104	B1-U0-G1	8628	109	B1-U0-G1		2339	38	B0-U0-G0
			III-M-HS	7192	91	B0-U0-G2	7764	98	B1-U0-G2	8173	103	B1-U0-G2	8581	109	B1-U0-G2		2325	38	B0-U0-G1
			III-W-HS	7040	89	B0-U0-G2	7600	96	B0-U0-G2	8000	101	B1-U0-G2	8400	106	B1-U0-G2		2276	37	B0-U0-G1
			IV-HS	7429	94	B1-U0-G2	8020	102	B1-U0-G2	8442	107	B1-U0-G2	8864	112	B1-U0-G2		2402	39	B0-U0-G1
			IV-FT-HS	7020	89	B1-U0-G3	7579	96	B1-U0-G3	7978	101	B1-U0-G3	8377	106	B1-U0-G3		2270	37	B0-U0-G1
48	700	105.1	II	12226	116	B2-U0-G2	13199	126	B2-U0-G2	13894	132	B2-U0-G2	14588	139	B3-U0-G2	N/A	N/A		
			II-FR	12308	117	B3-U0-G1	13287	126	B3-U0-G1	13986	133	B3-U0-G1	14686	140	B3-U0-G1				
			II-ML	12227	116	B3-U0-G3	13200	126	B3-U0-G3	13894	132	B3-U0-G3	14589	139	B4-U0-G4				
			III-M	12440	118	B2-U0-G2	13430	128	B2-U0-G2	14137	135	B2-U0-G2	14843	141	B2-U0-G2				
			III-W	11550	110	B2-U0-G3	12468	119	B2-U0-G3	13125	125	B2-U0-G3	13781	131	B2-U0-G3				
			IV	12346	117	B2-U0-G2	13329	127	B2-U0-G2	14030	133	B2-U0-G2	14731	140	B2-U0-G2				
			IV-FT	11247	107	B2-U0-G3	12141	116	B2-U0-G3	12780	122	B2-U0-G3	13419	128	B2-U0-G3				
			VSQ-N	12904	123	B3-U0-G1	13931	133	B3-U0-G1	14663	140	B3-U0-G1	15397	146	B3-U0-G1				
			VSQ-M	12654	120	B4-U0-G2	13660	130	B4-U0-G2	14379	137	B4-U0-G2	15099	144	B4-U0-G2				
			VSQ-W	12352	118	B4-U0-G3	13334	127	B4-U0-G3	14036	134	B4-U0-G3	14738	140	B4-U0-G3				
			II-HS	8942	85	B1-U0-G2	9653	92	B1-U0-G2	10161	97	B1-U0-G2	10669	102	B1-U0-G2				
			II-FR-HS	9095	87	B1-U0-G1	9819	93	B1-U0-G1	10336	98	B1-U0-G1	10852	103	B1-U0-G1				
			III-M-HS	9045	86	B1-U0-G2	9765	93	B1-U0-G2	10279	98	B1-U0-G2	10793	103	B1-U0-G2				
			III-W-HS	8854	84	B1-U0-G2	9558	91	B1-U0-G3	10062	96	B1-U0-G3	10565	101	B1-U0-G3				
			IV-HS	9344	89	B1-U0-G2	10087	96	B1-U0-G2	10618	101	B1-U0-G2	11149	106	B1-U0-G2				
			IV-FT-HS	8831	84	B1-U0-G3	9533	91	B1-U0-G3	10035	95	B1-U0-G3	10537	100	B1-U0-G3				
48	875	131.8	II	14829	113	B3-U0-G2	16008	121	B3-U0-G3	16851	128	B3-U0-G3	17693	134	B3-U0-G3	N/A	N/A		
			II-FR	14928	113	B3-U0-G2	16115	122	B3-U0-G2	16964	129	B3-U0-G2	17812	135	B3-U0-G2				
			II-ML	14829	113	B4-U0-G4	16009	121	B4-U0-G4	16851	128	B4-U0-G4	17694	134	B4-U0-G4				
			III-M	15088	114	B2-U0-G2	16288	124	B3-U0-G3	17145	130	B3-U0-G3	18003	137	B3-U0-G3				
			III-W	14009	106	B2-U0-G3	15123	115	B2-U0-G3	15919	121	B3-U0-G3	16715	127	B3-U0-G3				
			IV	14975	114	B2-U0-G2	16166	123	B3-U0-G2	17017	129	B3-U0-G3	17867	136	B3-U0-G3				
			IV-FT	13641	103	B2-U0-G3	14726	112	B3-U0-G3	15501	118	B3-U0-G3	16276	123	B3-U0-G3				
			VSQ-N	15652	119	B3-U0-G1	16897	128	B4-U0-G2	17786	135	B4-U0-G2	18675	142	B4-U0-G2				
			VSQ-M	15348	116	B4-U0-G2	16568	126	B4-U0-G2	17440	132	B4-U0-G2	18312	139	B4-U0-G2				
			VSQ-W	14981	114	B4-U0-G3	16173	123	B4-U0-G3	17024	129	B5-U0-G3	17876	136	B5-U0-G3				
			II-HS	10845	82	B1-U0-G2	11707	89	B1-U0-G2	12324	94	B1-U0-G2	12940	98	B1-U0-G2				
			II-FR-HS	11032	84	B1-U0-G1	11909	90	B1-U0-G2	12536	95	B1-U0-G2	13162	100	B1-U0-G2				
			III-M-HS	10971	83	B1-U0-G2	11844	90	B1-U0-G3	12467	95	B1-U0-G3	13091	99	B1-U0-G3				
			III-W-HS	10739	81	B1-U0-G3	11594	88	B1-U0-G3	12204	93	B1-U0-G3	12814	97	B1-U0-G3				
			IV-HS	11333	86	B1-U0-G2	12234	93	B1-U0-G2	12878	98	B1-U0-G3	13522	103	B1-U0-G3				
			IV-FT-HS	10711	81	B1-U0-G3	11562	88	B1-U0-G3	12171	92	B1-U0-G3	12779	97	B1-U0-G3				
48	1050	159.6	II	17044	107	B3-U0-G3	18400	115	B3-U0-G3	19369	121	B3-U0-G3	20337	127	B3-U0-G3	N/A	N/A		
			II-FR	17159	108	B3-U0-G2	18523	116	B3-U0-G2	19498	122	B3-U0-G2	20473	128	B3-U0-G2				
			II-ML	17045	107	B4-U0-G4	18401	115	B4-U0-G4	19369	121	B4-U0-G4	20338	127	B4-U0-G4				
			III-M	17342	109	B3-U0-G3	18722	117	B3-U0-G3	19707	123	B3-U0-G3	20692	130	B3-U0-G3				
			III-W	16102	101	B3-U0-G3	17383	109	B3-U0-G3	18298	115	B3-U0-G3	19213	120	B3-U0-G4				
			IV	17212	108	B3-U0-G3	18582	116	B3-U0-G3	19559	123	B3-U0-G3	20537	129	B3-U0-G3				
			IV-FT	15680	98	B3-U0-G3	16927	106	B3-U0-G3	17818	112	B3-U0-G3	18708	117	B3-U0-G4				
			VSQ-N	17990	113	B4-U0-G2	19421	122	B4-U0-G2	20443	128	B4-U0-G2	21466	134	B4-U0-G2				
			VSQ-M	17641	111	B4-U0-G2	19044	119	B4-U0-G2	20046	126	B4-U0-G2	21048	132	B4-U0-G2				
			VSQ-W	17220	108	B5-U0-G3	18590	116	B5-U0-G3	19568	123	B5-U0-G3	20546	129	B5-U0-G3				
			II-HS	12465	78	B1-U0-G2	13457	84	B1-U0-G3	14165	89	B1-U0-G3	14873	93	B1-U0-G3				
			II-FR-HS	12680	79	B1-U0-G2	13688	86	B1-U0-G2	14409	90	B1-U0-G2	15129	95	B1-U0-G2				
			III-M-HS	12611	79	B1-U0-G3	13614	85	B1-U0-G3	14330	90	B1-U0-G3	15047	94	B1-U0-G3				
			III-W-HS	12344	77	B1-U0-G3	13326	83	B1-U0-G3	14027	88	B1-U0-G3	14728	92	B1-U0-G4				
			IV-HS	13026	82	B1-U0-G3	14062	88	B1-U0-G3	14802	93	B1-U0-G3	15542	97	B1-U0-G3				
			IV-FT-HS	12311	77	B1-U0-G3	13290	83	B1-U0-G3	13989	88	B1-U0-G4	14689	92	B1-U0-G4				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZR-PLED)

RZR-PLED																			
LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
40	350	42.7	II	5819	136	B2-U0-G1	6281	147	B2-U0-G1	6612	155	B2-U0-G2	6943	163	B2-U0-G2	33.0	2309	70	B1-U0-G1
			II-FR	5858	137	B2-U0-G1	6324	148	B2-U0-G1	6657	156	B2-U0-G1	6990	164	B2-U0-G1		2325	70	B1-U0-G0
			II-ML	5819	136	B3-U0-G3	6282	147	B3-U0-G3	6612	155	B3-U0-G3	6943	163	B3-U0-G3		2309	70	B1-U0-G1
			III-M	5921	139	B1-U0-G2	6392	150	B2-U0-G2	6728	158	B2-U0-G2	7065	165	B2-U0-G2		2349	71	B1-U0-G1
			III-W	5497	129	B1-U0-G2	5935	139	B1-U0-G2	6247	146	B1-U0-G2	6559	154	B1-U0-G2		2182	66	B1-U0-G1
			IV	5876	138	B1-U0-G2	6344	149	B2-U0-G2	6677	156	B2-U0-G2	7011	164	B2-U0-G2		2332	71	B1-U0-G1
			IV-FT	5353	125	B1-U0-G2	5778	135	B1-U0-G2	6083	142	B1-U0-G2	6387	150	B1-U0-G2		2124	64	B1-U0-G1
			VSQ-N	6141	144	B2-U0-G1	6630	155	B2-U0-G1	6979	163	B2-U0-G1	7328	172	B2-U0-G1		2438	74	B1-U0-G0
			VSQ-M	6023	141	B3-U0-G1	6502	152	B3-U0-G1	6844	160	B3-U0-G1	7186	168	B3-U0-G1		2390	72	B2-U0-G1
			VSQ-W	5879	138	B3-U0-G2	6346	149	B3-U0-G2	6680	156	B3-U0-G2	7015	164	B3-U0-G2		2333	71	B2-U0-G1
			II-HS	4256	100	B0-U0-G1	4594	108	B1-U0-G1	4836	113	B1-U0-G2	5077	119	B1-U0-G2		1689	51	B0-U0-G0
			II-FR-HS	4329	101	B0-U0-G1	4673	109	B0-U0-G1	4919	115	B0-U0-G1	5165	121	B0-U0-G1		1718	52	B0-U0-G0
			III-M-HS	4305	101	B0-U0-G2	4647	109	B0-U0-G2	4892	115	B0-U0-G2	5137	120	B0-U0-G2		1708	52	B0-U0-G1
			III-W-HS	4214	99	B0-U0-G2	4550	107	B0-U0-G2	4789	112	B0-U0-G2	5028	118	B0-U0-G2		1673	51	B0-U0-G1
			IV-HS	4447	104	B0-U0-G1	4801	112	B0-U0-G2	5054	118	B0-U0-G2	5306	124	B0-U0-G2		1764	53	B0-U0-G1
			IV-FT-HS	4203	98	B0-U0-G2	4537	106	B0-U0-G2	4776	112	B0-U0-G2	5015	117	B0-U0-G2		1668	51	B0-U0-G1
40	525	64.7	II	8396	130	B2-U0-G2	9064	140	B2-U0-G2	9541	147	B2-U0-G2	10017	155	B2-U0-G2	51.0	2715	53	B1-U0-G1
			II-FR	8452	131	B2-U0-G1	9125	141	B2-U0-G1	9605	148	B2-U0-G1	10085	156	B2-U0-G1		2733	54	B1-U0-G1
			II-ML	8396	130	B3-U0-G3	9064	140	B3-U0-G3	9541	147	B3-U0-G3	10018	155	B3-U0-G3		2715	53	B1-U0-G1
			III-M	8543	132	B2-U0-G2	9223	143	B2-U0-G2	9708	150	B2-U0-G2	10194	158	B2-U0-G2		2762	54	B1-U0-G1
			III-W	7932	123	B2-U0-G2	8563	132	B2-U0-G2	9013	139	B2-U0-G3	9464	146	B2-U0-G3		2565	50	B1-U0-G1
			IV	8478	131	B2-U0-G2	9152	141	B2-U0-G2	9634	149	B2-U0-G2	10116	156	B2-U0-G2		2742	54	B1-U0-G1
			IV-FT	7724	119	B2-U0-G3	8338	129	B2-U0-G3	8777	136	B2-U0-G3	9216	142	B2-U0-G3		2497	49	B1-U0-G1
			VSQ-N	8861	137	B3-U0-G1	9566	148	B3-U0-G1	10070	156	B3-U0-G1	10574	163	B3-U0-G1		2866	56	B1-U0-G0
			VSQ-M	8690	134	B3-U0-G2	9381	145	B3-U0-G2	9875	153	B3-U0-G2	10369	160	B3-U0-G2		2809	55	B2-U0-G1
			VSQ-W	8483	131	B4-U0-G2	9157	142	B4-U0-G2	9640	149	B4-U0-G3	10122	156	B4-U0-G3		2743	54	B2-U0-G1
			II-HS	6141	95	B1-U0-G2	6629	102	B1-U0-G2	6978	108	B1-U0-G2	7327	113	B1-U0-G2		1985	39	B0-U0-G1
			II-FR-HS	6246	97	B1-U0-G1	6743	104	B1-U0-G1	7098	110	B1-U0-G1	7453	115	B1-U0-G1		2020	40	B0-U0-G0
			III-M-HS	6212	96	B0-U0-G2	6706	104	B0-U0-G2	7060	109	B0-U0-G2	7412	115	B0-U0-G2		2009	39	B0-U0-G1
			III-W-HS	6081	94	B0-U0-G2	6564	101	B0-U0-G2	6910	107	B0-U0-G2	7255	112	B0-U0-G2		1966	39	B0-U0-G1
			IV-HS	6417	99	B0-U0-G2	6927	107	B0-U0-G2	7292	113	B0-U0-G2	7656	118	B1-U0-G2		2075	41	B0-U0-G1
			IV-FT-HS	6064	94	B0-U0-G2	6546	101	B0-U0-G2	6891	107	B1-U0-G2	7235	112	B1-U0-G3		1960	38	B0-U0-G1
40	700	86.8	II	10669	123	B2-U0-G2	11518	133	B2-U0-G2	12124	140	B2-U0-G2	12730	147	B2-U0-G2	N/A	N/A		
			II-FR	10740	124	B2-U0-G1	11594	134	B3-U0-G1	12205	141	B3-U0-G1	12815	148	B3-U0-G1				
			II-ML	10669	123	B3-U0-G3	11518	133	B3-U0-G3	12124	140	B3-U0-G3	12731	147	B3-U0-G3				
			III-M	10856	125	B2-U0-G2	11719	135	B2-U0-G2	12336	142	B2-U0-G2	12953	149	B2-U0-G2				
			III-W	10079	116	B2-U0-G3	10880	125	B2-U0-G3	11453	132	B2-U0-G3	12026	139	B2-U0-G3				
			IV	10774	124	B2-U0-G2	11630	134	B2-U0-G2	12243	141	B2-U0-G2	12855	148	B2-U0-G2				
			IV-FT	9814	113	B2-U0-G3	10595	122	B2-U0-G3	11153	128	B2-U0-G3	11710	135	B2-U0-G3				
			VSQ-N	11260	130	B3-U0-G1	12156	140	B3-U0-G1	12796	147	B3-U0-G1	13435	155	B3-U0-G1				
			VSQ-M	11042	127	B4-U0-G2	11920	137	B4-U0-G2	12548	145	B4-U0-G2	13175	152	B4-U0-G2				
			VSQ-W	10778	124	B4-U0-G3	11636	134	B4-U0-G3	12248	141	B4-U0-G3	12860	148	B4-U0-G3				
			II-HS	7803	90	B1-U0-G2	8423	97	B1-U0-G2	8866	102	B1-U0-G2	9310	107	B1-U0-G2				
			II-FR-HS	7937	91	B1-U0-G1	8568	99	B1-U0-G1	9019	104	B1-U0-G1	9470	109	B1-U0-G1				
			III-M-HS	7893	91	B1-U0-G2	8521	98	B1-U0-G2	8970	103	B1-U0-G2	9418	109	B1-U0-G2				
			III-W-HS	7726	89	B0-U0-G2	8341	96	B1-U0-G2	8780	101	B1-U0-G2	9218	106	B1-U0-G2				
			IV-HS	8153	94	B1-U0-G2	8802	101	B1-U0-G2	9265	107	B1-U0-G2	9728	112	B1-U0-G2				
			IV-FT-HS	7705	89	B1-U0-G3	8318	96	B1-U0-G3	8756	101	B1-U0-G3	9194	106	B1-U0-G3				
40	875	108.0	II	12366	114	B2-U0-G2	13349	124	B2-U0-G2	14052	130	B2-U0-G2	14754	137	B3-U0-G2	N/A	N/A		
			II-FR	12448	115	B3-U0-G1	13439	124	B3-U0-G1	14146	131	B3-U0-G1	14853	138	B3-U0-G2				
			II-ML	12366	115	B3-U0-G3	13349	124	B3-U0-G3	14052	130	B3-U0-G3	14755	137	B4-U0-G4				
			III-M	12581	116	B2-U0-G2	13582	126	B2-U0-G2	14297	132	B2-U0-G2	15012	139	B2-U0-G2				
			III-W	11682	108	B2-U0-G3	12611	117	B2-U0-G3	13275	123	B2-U0-G3	13939	129	B2-U0-G3				
			IV	12487	116	B2-U0-G2	13480	125	B2-U0-G2	14189	131	B2-U0-G2	14899	138	B2-U0-G2				
			IV-FT	11375	105	B2-U0-G3	12280	114	B2-U0-G3	12926	120	B2-U0-G3	13573	126	B2-U0-G3				
			VSQ-N	13051	121	B3-U0-G1	14089	130	B3-U0-G1	14830	137	B3-U0-G1	15572	144	B3-U0-G1				
			VSQ-M	12798	118	B4-U0-G2	13816	128	B4-U0-G2	14543	135	B4-U0-G2	15270	141	B4-U0-G2				
			VSQ-W	12492	116	B4-U0-G3	13486	125	B4-U0-G3	14196	131	B4-U0-G3	14905	138	B4-U0-G3				
			II-HS	9044	84	B1-U0-G2	9763	90	B1-U0-G2	10277	95	B1-U0-G2	10791	100	B1-U0-G2				
			II-FR-HS	9199	85	B1-U0-G1	9930	92	B1-U0-G1	10453	97	B1-U0-G1	10976	102	B1-U0-G1				
			III-M-HS	9149	85	B1-U0-G2	9876	91	B1-U0-G2	10396	96	B1-U0-G2	10916	101	B1-U0-G2				
			III-W-HS	8955	83	B1-U0-G2	9667	90	B1-U0-G3	10176	94	B1-U0-G3	10685	99	B1-U0-G3				
			IV-HS	9450	87	B1-U0-G2	10201	94	B1-U0-G2	10738	99	B1-U0-G2	11275	104	B1-U0-G2				
			IV-FT-HS	8931	83	B1-U0-G3	9641	89	B1-U0-G3	10149	94	B1-U0-G3	10656	99	B1-U0-G3				
40	1050	128.2	II	14213	111	B2-U0-G2	15344	120	B3-U0-G2	16151	126	B3-U0-G3	16959	132	B3-U0-G3	N/A	N/A		
			II-FR	14308	112	B3-U0-G1	15446	120	B3-U0-G2	16259	127	B3-U0-G2	17072	133	B3-U0-G2				
			II-ML	14214	111	B3-U0-G3	15344	120	B4-U0-G4	16152	126	B4-U0-G4	16959	132	B4-U0-G4				
			III-M	14461	113	B2-U0-G2	15612	122	B3-U0-G2	16433	128	B3-U0-G3	17255	135	B3-U0-G3				
			III-W	13427	105	B2-U0-G3	14495	113	B2-U0-G3	15258	119	B2-U0-G3	16021	125	B3-U0-G3				
			IV	14352	112	B2-U0-G2	15494	121	B3-U0-G2	16309	127	B3-U0-G3	17125	134	B3-U0-G3				
			IV-FT	13075	102	B2-U0-G3	14115	110	B2-U0-G3	14858	116	B3-U0-G3	15601	122	B3-U0-G3				
			VSQ-N	15001	117	B3-U0-G1	16194	126	B4-U0-G1	17046	133	B4-U0-G2	17899	140	B4-U0-G2				
			VSQ-M	14710	115	B4-U0-G2	15880	124	B4-U0-G2	16716	130	B4-U0-G2	17552	137	B4-U0-G2				
			VSQ-W	14359	112	B4-U0-G3	15501	121	B4-U0-G3	16317	127	B4-U0-G3	17132	134	B5-U0-G3				
			II-HS	10395	81	B1-U0-G2	11222	88	B1-U0-G2	11813	92	B1-U0-G2	12403	97	B1-U0-G2				
			II-FR-HS	10573	82	B1-U0-G1	11414	89	B1-U0-G2	12015	94	B1-U0-G2	12616	98	B1-U0-G2				
			III-M-HS	10516	82	B1-U0-G2	11352	89	B1-U0-G2	11949	93	B1-U0-G3	12547	98	B1-U0-G3				
			III-W-HS	10293	80	B1-U0-G3	11112	87	B1-U0-G3	11696	91	B1-U0-G3	12281	96	B1-U0-G3				
			IV-HS	10862	85	B1-U0-G2	11726	91	B1-U0-G2	12343	96	B1-U0-G2	12960	101	B1-U0-G3				
			IV-FT-HS	10266	80	B1-U0-G3	11082	86	B1-U0-G3	11665	91	B1-U0-G3	12248	96	B1-U0-G3				

IES File downloads for this product can be found at www.usaltg.com/downloads/asr.html

RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZR-PLED)

RZR-PLED																			
LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
80	350	85.4	II	11277	132	B2-U0-G2	12174	143	B2-U0-G2	12814	150	B2-U0-G2	13455	158	B2-U0-G2	67.0	4475	67	B1-U0-G1
			II-FR	11352	133	B3-U0-G1	12256	144	B3-U0-G1	12901	151	B3-U0-G1	13546	159	B3-U0-G1		4504	67	B1-U0-G1
			II-ML	11277	132	B3-U0-G3	12175	143	B3-U0-G3	12815	150	B3-U0-G3	13456	158	B3-U0-G3		4475	67	B2-U0-G2
			III-M	11474	134	B2-U0-G2	12387	145	B2-U0-G2	13039	153	B2-U0-G2	13691	160	B2-U0-G2		4553	68	B1-U0-G1
			III-W	10654	125	B2-U0-G3	11501	135	B2-U0-G3	12106	142	B2-U0-G3	12712	149	B2-U0-G3		4228	63	B1-U0-G2
			IV	11388	133	B2-U0-G2	12294	144	B2-U0-G2	12941	152	B2-U0-G2	13588	159	B2-U0-G2		4518	67	B1-U0-G1
			IV-FT	10374	121	B2-U0-G3	11199	131	B2-U0-G3	11788	138	B2-U0-G3	12377	145	B2-U0-G3		4117	61	B1-U0-G1
			VSQ-N	11902	139	B3-U0-G1	12849	150	B3-U0-G1	13525	158	B3-U0-G1	14202	166	B3-U0-G1		4723	70	B2-U0-G1
			VSQ-M	11671	137	B4-U0-G2	12600	148	B4-U0-G2	13263	155	B4-U0-G2	13927	163	B4-U0-G2		4631	69	B3-U0-G1
			VSQ-W	11392	133	B4-U0-G3	12299	144	B4-U0-G3	12946	152	B4-U0-G3	13593	159	B4-U0-G3		4520	67	B3-U0-G2
			II-HS	8247	97	B1-U0-G2	8903	104	B1-U0-G2	9372	110	B1-U0-G2	9840	115	B1-U0-G2		3273	49	B0-U0-G1
			II-FR-HS	8389	98	B1-U0-G1	9056	106	B1-U0-G1	9533	112	B1-U0-G1	10009	117	B1-U0-G1		3329	50	B0-U0-G1
			III-M-HS	8344	98	B1-U0-G2	9007	105	B1-U0-G2	9482	111	B1-U0-G2	9956	117	B1-U0-G2		3311	49	B0-U0-G1
			III-W-HS	8167	96	B1-U0-G2	8817	103	B1-U0-G2	9281	109	B1-U0-G2	9745	114	B1-U0-G3		3240	48	B0-U0-G1
			IV-HS	8618	101	B1-U0-G2	9304	109	B1-U0-G2	9793	115	B1-U0-G2	10283	120	B1-U0-G2		3420	51	B0-U0-G1
			IV-FT-HS	8144	95	B1-U0-G3	8792	103	B1-U0-G3	9255	108	B1-U0-G3	9718	114	B1-U0-G3		3232	48	B0-U0-G2
80	525	129.4	II	16239	125	B3-U0-G3	17531	135	B3-U0-G3	18454	143	B3-U0-G3	19377	150	B3-U0-G3	101.0	5251	52	B1-U0-G1
			II-FR	16348	126	B3-U0-G2	17648	136	B3-U0-G2	18577	144	B3-U0-G2	19506	151	B3-U0-G2		5286	52	B1-U0-G1
			II-ML	16240	126	B4-U0-G4	17532	135	B4-U0-G4	18454	143	B4-U0-G4	19377	150	B4-U0-G4		5251	52	B2-U0-G2
			III-M	16523	128	B3-U0-G3	17837	138	B3-U0-G3	18776	145	B3-U0-G3	19715	152	B3-U0-G3		5343	53	B1-U0-G2
			III-W	15341	119	B2-U0-G3	16562	128	B3-U0-G3	17433	135	B3-U0-G3	18305	141	B3-U0-G3		4961	49	B1-U0-G2
			IV	16398	127	B3-U0-G3	17703	137	B3-U0-G3	18635	144	B3-U0-G3	19566	151	B3-U0-G3		5302	52	B1-U0-G1
			IV-FT	14938	115	B3-U0-G3	16127	125	B3-U0-G4	16976	131	B3-U0-G4	17824	138	B3-U0-G4		4830	48	B1-U0-G2
			VSQ-N	17140	132	B4-U0-G2	18504	143	B4-U0-G2	19477	151	B4-U0-G2	20451	158	B4-U0-G2		5542	55	B2-U0-G1
			VSQ-M	16807	130	B4-U0-G2	18144	140	B4-U0-G2	19099	148	B4-U0-G2	20053	155	B4-U0-G2		5434	54	B3-U0-G1
			VSQ-W	16406	127	B4-U0-G3	17711	137	B5-U0-G3	18643	144	B5-U0-G3	19575	151	B5-U0-G3		5304	53	B3-U0-G2
			II-HS	11877	92	B1-U0-G2	12821	99	B1-U0-G2	13496	104	B1-U0-G3	14171	110	B1-U0-G3		3841	38	B0-U0-G1
			II-FR-HS	12081	93	B1-U0-G2	13042	101	B1-U0-G2	13728	106	B1-U0-G2	14414	111	B1-U0-G2		3906	39	B0-U0-G1
			III-M-HS	12016	93	B1-U0-G3	12971	100	B1-U0-G3	13654	106	B1-U0-G3	14337	111	B1-U0-G3		3885	38	B0-U0-G1
			III-W-HS	11760	91	B1-U0-G3	12696	98	B1-U0-G3	13364	103	B1-U0-G3	14032	108	B1-U0-G3		3803	38	B0-U0-G2
			IV-HS	12411	96	B1-U0-G2	13398	104	B1-U0-G3	14103	109	B1-U0-G3	14808	114	B1-U0-G3		4013	40	B0-U0-G1
			IV-FT-HS	11729	91	B1-U0-G3	12662	98	B1-U0-G3	13328	103	B1-U0-G3	13995	108	B1-U0-G4		3792	38	B0-U0-G2
80	700	173.6	II	20595	119	B3-U0-G3	22232	128	B3-U0-G3	23403	135	B3-U0-G3	24573	142	B3-U0-G3	N/A	N/A		
			II-FR	20732	119	B3-U0-G2	22381	129	B3-U0-G2	23559	136	B3-U0-G2	24736	142	B3-U0-G2				
			II-ML	20595	119	B4-U0-G4	22233	128	B4-U0-G4	23403	135	B4-U0-G4	24573	142	B4-U0-G4				
			III-M	20954	121	B3-U0-G3	22621	130	B3-U0-G3	23812	137	B3-U0-G4	25003	144	B3-U0-G4				
			III-W	19456	112	B3-U0-G4	21003	121	B3-U0-G4	22109	127	B3-U0-G4	23214	134	B3-U0-G4				
			IV	20797	120	B3-U0-G3	22451	129	B3-U0-G3	23633	136	B3-U0-G3	24814	143	B3-U0-G4				
			IV-FT	18945	109	B3-U0-G4	20452	118	B3-U0-G4	21528	124	B3-U0-G4	22604	130	B3-U0-G4				
			VSQ-N	21737	125	B4-U0-G2	23466	135	B4-U0-G2	24701	142	B4-U0-G2	25936	149	B4-U0-G2				
			VSQ-M	21314	123	B5-U0-G3	23010	133	B5-U0-G3	24221	140	B5-U0-G3	25432	146	B5-U0-G3				
			VSQ-W	20806	120	B5-U0-G3	22461	129	B5-U0-G4	23643	136	B5-U0-G4	24825	143	B5-U0-G4				
			II-HS	15062	87	B1-U0-G3	16260	94	B1-U0-G3	17115	99	B1-U0-G3	17971	104	B1-U0-G3				
			II-FR-HS	15321	88	B1-U0-G2	16539	95	B1-U0-G2	17410	100	B1-U0-G2	18280	105	B1-U0-G2				
			III-M-HS	15238	88	B1-U0-G3	16450	95	B1-U0-G3	17315	100	B1-U0-G3	18181	105	B1-U0-G4				
			III-W-HS	14915	86	B1-U0-G4	16101	93	B1-U0-G4	16948	98	B1-U0-G4	17796	103	B1-U0-G4				
			IV-HS	15739	91	B1-U0-G3	16991	98	B1-U0-G3	17885	103	B1-U0-G3	18780	108	B1-U0-G3				
			IV-FT-HS	14874	86	B1-U0-G4	16058	92	B1-U0-G4	16903	97	B1-U0-G4	17748	102	B1-U0-G4				
80	875	215.9	II	23798	110	B3-U0-G3	25691	119	B3-U0-G3	27043	125	B3-U0-G4	28395	132	B3-U0-G4	N/A	N/A		
			II-FR	23957	111	B3-U0-G2	25862	120	B3-U0-G2	27223	126	B3-U0-G2	28585	132	B4-U0-G2				
			II-ML	23799	110	B4-U0-G4	25692	119	B4-U0-G4	27044	125	B4-U0-G4	28396	132	B4-U0-G4				
			III-M	24214	112	B3-U0-G4	26140	121	B3-U0-G4	27516	127	B3-U0-G4	28892	134	B3-U0-G4				
			III-W	22482	104	B3-U0-G4	24270	112	B3-U0-G4	25548	118	B3-U0-G4	26825	124	B3-U0-G4				
			IV	24032	111	B3-U0-G3	25943	120	B3-U0-G4	27309	126	B3-U0-G4	28674	133	B3-U0-G4				
			IV-FT	21892	101	B3-U0-G4	23634	109	B3-U0-G5	24877	115	B3-U0-G5	26121	121	B3-U0-G5				
			VSQ-N	25118	116	B4-U0-G2	27116	126	B5-U0-G2	28543	132	B5-U0-G2	29970	139	B5-U0-G2				
			VSQ-M	24630	114	B5-U0-G3	26589	123	B5-U0-G3	27988	130	B5-U0-G3	29387	136	B5-U0-G3				
			VSQ-W	24042	111	B5-U0-G4	25954	120	B5-U0-G4	27321	127	B5-U0-G4	28686	133	B5-U0-G4				
			II-HS	17405	81	B1-U0-G3	18789	87	B1-U0-G3	19778	92	B1-U0-G4	20766	96	B2-U0-G4				
			II-FR-HS	17704	82	B1-U0-G2	19112	89	B1-U0-G2	20118	93	B1-U0-G2	21124	98	B1-U0-G2				
			III-M-HS	17608	82	B1-U0-G4	19008	88	B1-U0-G4	20009	93	B1-U0-G4	21009	97	B1-U0-G4				
			III-W-HS	17234	80	B1-U0-G4	18605	86	B1-U0-G4	19584	91	B1-U0-G4	20564	95	B1-U0-G4				
			IV-HS	18187	84	B1-U0-G3	19634	91	B1-U0-G4	20667	96	B1-U0-G4	21701	101	B1-U0-G4				
			IV-FT-HS	17188	80	B1-U0-G4	18555	86	B1-U0-G4	19532	90	B1-U0-G4	20509	95	B1-U0-G4				
80	1050	256.4	II	27354	107	B3-U0-G4	29530	115	B4-U0-G4	31084	121	B4-U0-G4	32638	127	B4-U0-G4	N/A	N/A		
			II-FR	27536	107	B3-U0-G2	29727	116	B4-U0-G2	31291	122	B4-U0-G2	32856	128	B4-U0-G2				
			II-ML	27355	107	B4-U0-G4	29531	115	B5-U0-G5	31085	121	B5-U0-G5	32639	127	B5-U0-G5				
			III-M	27832	109	B3-U0-G4	30046	117	B3-U0-G4	31627	123	B4-U0-G4	33209	130	B4-U0-G4				
			III-W	25841	101	B3-U0-G4	27897	109	B3-U0-G4	29365	115	B3-U0-G5	30834	120	B3-U0-G5				
			IV	27622	108	B3-U0-G4	29820	116	B3-U0-G4	31389	122	B4-U0-G4	32959	129	B4-U0-G4				
			IV-FT	25163	98	B3-U0-G5	27165	106	B3-U0-G5	28595	112	B3-U0-G5	30024	117	B3-U0-G5				
			VSQ-N	28871	113	B5-U0-G2	31168	122	B5-U0-G2	32808	128	B5-U0-G2	34448	134	B5-U0-G2				
			VSQ-M	28310	110	B5-U0-G3	30561	119	B5-U0-G3	32170	125	B5-U0-G4	33779	132	B5-U0-G4				
			VSQ-W	27634	108	B5-U0-G4	29833	116	B5-U0-G4	31403	122	B5-U0-G5	32973	129	B5-U0-G5				
			II-HS	20005	78	B1-U0-G4	21596	84	B2-U0-G4	22733	89	B2-U0-G4	23870	93	B2-U0-G4				
			II-FR-HS	20349	79	B1-U0-G2	21968	86	B1-U0-G2	23124	90	B1-U0-G2	24280	95	B1-U0-G2				
			III-M-HS	20239	79	B1-U0-G4	21848	85	B1-U0-G4	22998	90	B1-U0-G4	24148	94	B1-U0-G4				
			III-W-HS	19809	77	B1-U0-G4	21385	83	B1-U0-G4	22511	88	B1-U0-G4	23636	92	B1-U0-G5				
			IV-HS	20905	82	B1-U0-G4	22568	88	B1-U0-G4	23756	93	B1-U0-G4	24943	97	B1-U0-G4				
			IV-FT-HS	19756	77	B1-U0-G4	21328	83	B1-U0-G4	22451	88	B1-U0-G5	23573	92	B1-U0-G5				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRG-PLED)

RZR-G-PLED

LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
80	350	87.0	II	11409	131	B2-U0-G2	12317	142	B2-U0-G2	12965	149	B2-U0-G2	13613	156	B2-U0-G2	67.0	4528	68	B1-U0-G1
			II-FR	11485	132	B3-U0-G1	12398	143	B3-U0-G1	13051	150	B3-U0-G1	13703	158	B3-U0-G1		4558	68	B1-U0-G1
			II-ML	11409	131	B3-U0-G3	12317	142	B3-U0-G3	12965	149	B3-U0-G3	13613	156	B3-U0-G3		4528	68	B2-U0-G2
			III-M	11608	133	B2-U0-G2	12531	144	B2-U0-G2	13191	152	B2-U0-G2	13850	159	B2-U0-G2		4553	68	B1-U0-G1
			III-W	10778	124	B2-U0-G3	11635	134	B2-U0-G3	12248	141	B2-U0-G3	12860	148	B2-U0-G3		4276	64	B1-U0-G2
			IV	11520	132	B2-U0-G2	12437	143	B2-U0-G2	13091	150	B2-U0-G2	13746	158	B2-U0-G2		4572	68	B1-U0-G1
			IV-FT	10494	121	B2-U0-G3	11330	130	B2-U0-G3	11926	137	B2-U0-G3	12522	144	B2-U0-G3		4165	62	B1-U0-G1
			VSQ-N	12041	138	B3-U0-G1	12999	149	B3-U0-G1	13683	157	B3-U0-G1	14367	165	B3-U0-G1		4779	71	B2-U0-G1
			VSQ-M	11808	136	B4-U0-G2	12747	147	B4-U0-G2	13418	154	B4-U0-G2	14089	162	B4-U0-G2		4686	70	B3-U0-G1
			VSQ-W	11526	132	B4-U0-G3	12443	143	B4-U0-G3	13097	151	B4-U0-G3	13752	158	B4-U0-G3		4574	68	B3-U0-G2
			II-HS	8464	97	B1-U0-G2	9138	105	B1-U0-G2	9618	111	B1-U0-G2	10099	116	B1-U0-G2		3359	50	B0-U0-G1
			II-FR-HS	8609	99	B1-U0-G1	9294	107	B1-U0-G1	9783	112	B1-U0-G1	10274	118	B1-U0-G1		3417	51	B0-U0-G1
			III-M-HS	8563	98	B1-U0-G2	9244	106	B1-U0-G2	9731	112	B1-U0-G2	10217	117	B1-U0-G2		3398	51	B0-U0-G1
			III-W-HS	8382	96	B1-U0-G2	9048	104	B1-U0-G2	9525	109	B1-U0-G3	10001	115	B1-U0-G3		3326	50	B0-U0-G1
			IV-HS	8845	102	B1-U0-G2	9548	110	B1-U0-G2	10051	116	B1-U0-G2	10553	121	B1-U0-G2		3510	52	B0-U0-G1
			IV-FT-HS	8359	96	B1-U0-G3	9024	104	B1-U0-G3	9499	109	B1-U0-G3	9974	115	B1-U0-G3		3317	50	B0-U0-G2
80	525	129.0	II	16394	127	B3-U0-G3	17698	137	B3-U0-G3	18629	144	B3-U0-G3	19560	152	B3-U0-G3	101.0	5301	52	B1-U0-G1
			II-FR	16503	128	B3-U0-G2	17816	138	B3-U0-G2	18753	145	B3-U0-G2	19691	153	B3-U0-G2		5336	53	B1-U0-G1
			II-ML	16394	127	B4-U0-G4	17698	137	B4-U0-G4	18630	144	B4-U0-G4	19561	152	B4-U0-G4		5302	52	B2-U0-G2
			III-M	16680	129	B3-U0-G3	14740	114	B2-U0-G2	18955	147	B3-U0-G3	19902	154	B3-U0-G3		5343	53	B1-U0-G2
			III-W	15488	120	B2-U0-G3	16720	130	B3-U0-G3	17600	136	B3-U0-G3	18479	143	B3-U0-G4		5008	50	B1-U0-G2
			IV	16555	128	B3-U0-G3	17871	139	B3-U0-G3	18812	146	B3-U0-G3	19753	153	B3-U0-G3		5353	53	B1-U0-G1
			IV-FT	15081	117	B3-U0-G3	16280	126	B3-U0-G3	17137	133	B3-U0-G3	17994	139	B3-U0-G3		4877	48	B1-U0-G2
			VSQ-N	17303	134	B4-U0-G2	18679	145	B4-U0-G2	19663	152	B4-U0-G2	20646	160	B4-U0-G2		5595	55	B2-U0-G1
			VSQ-M	16967	132	B4-U0-G2	18317	142	B4-U0-G2	19281	149	B4-U0-G2	20245	157	B4-U0-G2		5486	54	B3-U0-G1
			VSQ-W	16562	128	B4-U0-G3	17880	139	B5-U0-G3	18821	146	B5-U0-G3	19762	153	B5-U0-G3		5355	53	B3-U0-G2
			II-HS	12089	94	B1-U0-G2	13052	101	B1-U0-G3	13738	106	B1-U0-G3	14425	112	B1-U0-G3		3909	39	B0-U0-G1
			II-FR-HS	12298	95	B1-U0-G2	13276	103	B1-U0-G2	13975	108	B1-U0-G2	14674	114	B1-U0-G2		3977	39	B0-U0-G1
			III-M-HS	12231	95	B1-U0-G3	13204	102	B1-U0-G3	13899	108	B1-U0-G3	14594	113	B1-U0-G3		3954	39	B0-U0-G1
			III-W-HS	11971	93	B1-U0-G3	12924	100	B1-U0-G3	13604	105	B1-U0-G3	14284	111	B1-U0-G3		3871	38	B0-U0-G2
			IV-HS	12633	98	B1-U0-G2	13638	106	B1-U0-G3	14356	111	B1-U0-G3	15074	117	B1-U0-G3		4085	40	B0-U0-G1
			IV-FT-HS	11940	93	B1-U0-G3	12889	100	B1-U0-G3	13568	105	B1-U0-G3	14246	110	B1-U0-G4		3861	38	B0-U0-G2
80	700	174.0	II	20914	120	B3-U0-G3	22578	130	B3-U0-G3	23766	137	B3-U0-G3	24955	143	B3-U0-G3	N/A	N/A		
			II-FR	21054	121	B3-U0-G2	22729	131	B3-U0-G2	23924	137	B3-U0-G2	25121	144	B3-U0-G2				
			II-ML	20915	120	B4-U0-G4	22579	130	B4-U0-G4	23767	137	B4-U0-G4	24955	143	B4-U0-G4				
			III-M	21280	122	B3-U0-G3	22972	132	B3-U0-G3	24182	139	B3-U0-G4	25391	146	B3-U0-G4				
			III-W	19759	114	B3-U0-G4	21330	123	B3-U0-G4	22453	129	B3-U0-G4	23575	135	B3-U0-G4				
			IV	21120	121	B3-U0-G3	22800	131	B3-U0-G3	24000	138	B3-U0-G3	25200	145	B3-U0-G4				
			IV-FT	19239	111	B3-U0-G4	20770	119	B3-U0-G4	21862	126	B3-U0-G4	22956	132	B3-U0-G4				
			VSQ-N	22074	127	B4-U0-G2	23831	137	B4-U0-G2	25084	144	B4-U0-G2	26339	151	B4-U0-G2				
			VSQ-M	21646	124	B5-U0-G3	23367	134	B5-U0-G3	24598	141	B5-U0-G3	25827	148	B5-U0-G3				
			VSQ-W	21129	121	B5-U0-G4	22810	131	B5-U0-G4	24010	138	B5-U0-G4	25212	145	B5-U0-G4				
			II-HS	15363	88	B1-U0-G3	16586	95	B1-U0-G3	17458	100	B1-U0-G3	18332	105	B1-U0-G3				
			II-FR-HS	15628	90	B1-U0-G2	16872	97	B1-U0-G2	17759	102	B1-U0-G2	18647	107	B1-U0-G2				
			III-M-HS	15542	89	B1-U0-G3	16778	96	B1-U0-G3	17662	102	B1-U0-G4	18545	107	B1-U0-G4				
			III-W-HS	15213	87	B1-U0-G4	16423	94	B1-U0-G4	17288	99	B1-U0-G4	18152	104	B1-U0-G4				
			IV-HS	16055	92	B1-U0-G3	17331	100	B1-U0-G3	18244	105	B1-U0-G3	19155	110	B1-U0-G3				
			IV-FT-HS	15172	87	B1-U0-G4	16380	94	B1-U0-G4	17242	99	B1-U0-G4	18104	104	B1-U0-G4				
80	875	219.7	II	25063	114	B3-U0-G3	27057	123	B3-U0-G4	28481	130	B3-U0-G4	29905	136	B4-U0-G4	N/A	N/A		
			II-FR	25230	115	B3-U0-G2	27237	124	B3-U0-G2	28670	130	B4-U0-G2	30104	137	B4-U0-G2				
			II-ML	25064	114	B4-U0-G4	27057	123	B4-U0-G4	28481	130	B4-U0-G4	29906	136	B5-U0-G5				
			III-M	25501	116	B3-U0-G4	27529	125	B3-U0-G4	28978	132	B3-U0-G4	30427	138	B3-U0-G4				
			III-W	23677	108	B3-U0-G4	25560	116	B3-U0-G4	26906	122	B3-U0-G4	28251	129	B3-U0-G4				
			IV	25309	115	B3-U0-G4	27322	124	B3-U0-G4	28760	131	B3-U0-G4	30198	137	B3-U0-G4				
			IV-FT	23056	105	B3-U0-G4	24889	113	B3-U0-G4	26200	119	B3-U0-G4	27509	125	B3-U0-G4				
			VSQ-N	26453	120	B4-U0-G2	28557	130	B5-U0-G2	30060	137	B5-U0-G2	31563	144	B5-U0-G2				
			VSQ-M	25939	118	B5-U0-G3	28002	127	B5-U0-G3	29476	134	B5-U0-G3	30950	141	B5-U0-G3				
			VSQ-W	25320	115	B5-U0-G4	27335	124	B5-U0-G4	28773	131	B5-U0-G4	30212	138	B5-U0-G4				
			II-HS	18330	83	B1-U0-G3	19788	90	B1-U0-G4	20830	95	B2-U0-G4	21871	100	B2-U0-G4				
			II-FR-HS	18645	85	B1-U0-G2	20128	92	B1-U0-G2	21188	96	B1-U0-G2	22247	101	B1-U0-G2				
			III-M-HS	18543	84	B1-U0-G4	20018	91	B1-U0-G4	21072	96	B1-U0-G4	22125	101	B1-U0-G4				
			III-W-HS	18151	83	B1-U0-G4	19594	89	B1-U0-G4	20626	94	B1-U0-G4	21657	99	B1-U0-G4				
			IV-HS	19154	87	B1-U0-G3	20677	94	B1-U0-G4	21766	99	B1-U0-G4	22854	104	B1-U0-G4				
			IV-FT-HS	18102	82	B1-U0-G4	19541	89	B1-U0-G4	20571	94	B1-U0-G4	21599	98	B1-U0-G4				
80	1050	266.0	II	28808	108	B4-U0-G4	31099	117	B4-U0-G4	32736	123	B4-U0-G4	34373	129	B4-U0-G4	N/A	N/A		
			II-FR	29000	109	B4-U0-G2	31306	118	B4-U0-G2	32954	124	B4-U0-G2	34602	130	B4-U0-G2				
			II-ML	28809	108	B5-U0-G5	31100	117	B5-U0-G5	32737	123	B5-U0-G5	34374	129	B5-U0-G5				
			III-M	29311	110	B3-U0-G4	31643	119	B4-U0-G4	33308	125	B4-U0-G4	34974	131	B4-U0-G4				
			III-W	27215	102	B3-U0-G4	29380	110	B3-U0-G5	30926	116	B3-U0-G5	32473	122	B3-U0-G5				
			IV	29091	109	B3-U0-G4	31404	118	B4-U0-G4	33058	124	B4-U0-G4	34710	130	B4-U0-G4				
			IV-FT	26501	100	B3-U0-G4	28608	108	B3-U0-G4	30114	113	B3-U0-G5	31620	119	B3-U0-G5				
			VSQ-N	30405	114	B5-U0-G2	32824	123	B5-U0-G2	34551	130	B5-U0-G2	36279	136	B5-U0-G2				
			VSQ-M	29815	112	B5-U0-G3	32186	121	B5-U0-G4	33880	127	B5-U0-G4	35575	134	B5-U0-G4				
			VSQ-W	29104	109	B5-U0-G4	31419	118	B5-U0-G5	33073	124	B5-U0-G5	34726	131	B5-U0-G5				
			II-HS	21069	79	B2-U0-G4	22745	86	B2-U0-G4	23942	90	B2-U0-G4	25139	95	B2-U0-G4				
			II-FR-HS	21432	81	B1-U0-G2	23136	87	B1-U0-G2	24354	92	B1-U0-G2	25571	96	B2-U0-G2				
			III-M-HS	21314	80	B1-U0-G4	23009	87	B1-U0-G4	24220	91	B1-U0-G4	25431	96	B1-U0-G4				
			III-W-HS	20862	78	B1-U0-G4	22521	85	B1-U0-G4	23708	89	B1-U0-G5	24893	94	B1-U0-G5				
			IV-HS	22016	83	B1-U0-G4	23766	89	B1-U0-G4	25018	94	B1-U0-G4	26268	99	B1-U0-G4				
			IV-FT-HS	20807	78	B1-U0-G4	22461	84	B1-U0-G5	23644	89	B1-U0-G5	24826	93	B1-U0-G5				

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RZR SERIES - LED

PHOTOMETRIC DATA GUIDE - LUMEN TABLES (RZRG-PLED)

RZR-G-PLED

LED Count	Drive Current (mA)	System Watts	Dist'n Type	27K (2700K - 70CRI)			30K (3000K - 70CRI)			40K (4000K - 70CRI)			50K (5000K - 70CRI)			System Watts	TRA (590nm)		
				LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING	LUMENS	LPW	BUG RATING		LUMENS	LPW	BUG RATING
120	350	130.0	II	16889	130	B3-U0-G3	18233	140	B3-U0-G3	19192	148	B3-U0-G3	20152	155	B3-U0-G3	100.0	6702	67	B2-U0-G2
			II-FR	17001	131	B3-U0-G2	18354	141	B3-U0-G2	19320	149	B3-U0-G2	20286	156	B3-U0-G2		6747	67	B2-U0-G1
			II-ML	16890	130	B4-U0-G4	18233	140	B4-U0-G4	19193	148	B4-U0-G4	20152	155	B4-U0-G4		6703	67	B3-U0-G3
			III-M	17184	132	B3-U0-G3	18552	143	B3-U0-G3	19527	150	B3-U0-G3	20504	158	B3-U0-G3		6818	68	B2-U0-G2
			III-W	15956	123	B3-U0-G3	17224	132	B3-U0-G3	18131	139	B3-U0-G3	19037	146	B3-U0-G4		6331	63	B1-U0-G2
			IV	17055	131	B3-U0-G3	18411	142	B3-U0-G3	19381	149	B3-U0-G3	20349	157	B3-U0-G3		6768	68	B2-U0-G2
			IV-FT	15537	120	B3-U0-G3	16772	129	B3-U0-G3	17655	136	B3-U0-G3	18538	143	B3-U0-G4		6165	62	B1-U0-G2
			VSQ-N	17825	137	B4-U0-G2	19243	148	B4-U0-G2	20256	156	B4-U0-G2	21269	164	B4-U0-G2		7073	71	B2-U0-G1
			VSQ-M	17480	134	B4-U0-G2	18870	145	B4-U0-G2	19863	153	B4-U0-G2	20857	160	B4-U0-G2		6936	69	B3-U0-G1
			VSQ-W	17062	131	B5-U0-G3	18420	142	B5-U0-G3	19389	149	B5-U0-G3	20358	157	B5-U0-G3		6771	68	B3-U0-G2
			II-HS	12352	95	B1-U0-G2	13334	103	B1-U0-G3	14036	108	B1-U0-G3	14738	113	B1-U0-G3		4901	49	B1-U0-G2
			II-FR-HS	12564	97	B1-U0-G2	13564	104	B1-U0-G2	14277	110	B1-U0-G2	14992	115	B1-U0-G2		4986	50	B0-U0-G1
			III-M-HS	12496	96	B1-U0-G3	13490	104	B1-U0-G3	14199	109	B1-U0-G3	14910	115	B1-U0-G3		4959	50	B0-U0-G2
			III-W-HS	12231	94	B1-U0-G3	13204	102	B1-U0-G3	13899	107	B1-U0-G3	14594	112	B1-U0-G3		4853	49	B0-U0-G2
			IV-HS	12907	99	B1-U0-G3	13934	107	B1-U0-G3	14667	113	B1-U0-G3	15400	118	B1-U0-G3		5122	51	B0-U0-G2
			IV-FT-HS	12198	94	B1-U0-G3	13168	101	B1-U0-G3	13862	107	B1-U0-G4	14555	112	B1-U0-G4		4840	48	B0-U0-G2
120	525	192.0	II	24123	126	B3-U0-G3	26042	136	B3-U0-G3	27413	143	B3-U0-G4	28783	150	B4-U0-G4	152.0	7800	51	B2-U0-G2
			II-FR	24284	126	B3-U0-G2	26216	137	B3-U0-G2	27596	144	B3-U0-G2	28975	151	B4-U0-G2		7853	52	B2-U0-G1
			II-ML	24124	126	B4-U0-G4	26042	136	B4-U0-G4	27414	143	B4-U0-G4	28784	150	B5-U0-G5		7800	51	B3-U0-G3
			III-M	24545	128	B3-U0-G4	26498	138	B3-U0-G4	27892	145	B3-U0-G4	29287	153	B3-U0-G4		7937	52	B2-U0-G2
			III-W	22789	119	B3-U0-G4	24603	128	B3-U0-G4	25897	135	B3-U0-G4	27192	142	B3-U0-G4		7368	48	B1-U0-G2
			IV	24360	127	B3-U0-G4	26298	137	B3-U0-G4	27682	144	B3-U0-G4	29066	151	B3-U0-G4		7876	52	B2-U0-G2
			IV-FT	22191	116	B3-U0-G4	23956	125	B3-U0-G4	25217	131	B3-U0-G4	26478	138	B3-U0-G4		7176	47	B1-U0-G2
			VSQ-N	25461	133	B4-U0-G2	27486	143	B5-U0-G2	28933	151	B5-U0-G2	30379	158	B5-U0-G2		8233	54	B3-U0-G1
			VSQ-M	24967	130	B5-U0-G3	26952	140	B5-U0-G3	28371	148	B5-U0-G3	29789	155	B5-U0-G3		8073	53	B3-U0-G2
			VSQ-W	24371	127	B5-U0-G4	26309	137	B5-U0-G4	27695	144	B5-U0-G4	29079	151	B5-U0-G4		7881	52	B3-U0-G2
			II-HS	17642	92	B1-U0-G3	19046	99	B1-U0-G3	20048	104	B1-U0-G4	21050	110	B2-U0-G4		5704	38	B1-U0-G2
			II-FR-HS	17946	93	B1-U0-G2	19373	101	B1-U0-G2	20393	106	B1-U0-G2	21413	112	B1-U0-G2		5803	38	B1-U0-G1
			III-M-HS	17848	93	B1-U0-G4	19268	100	B1-U0-G4	20282	106	B1-U0-G4	21296	111	B1-U0-G4		5772	38	B0-U0-G2
			III-W-HS	17470	91	B1-U0-G4	18860	98	B1-U0-G4	19852	103	B1-U0-G4	20844	109	B1-U0-G4		5649	37	B0-U0-G2
			IV-HS	18435	96	B1-U0-G3	19902	104	B1-U0-G4	20949	109	B1-U0-G4	21997	115	B1-U0-G4		5961	39	B0-U0-G2
			IV-FT-HS	17423	91	B1-U0-G4	18809	98	B1-U0-G4	19799	103	B1-U0-G4	20789	108	B1-U0-G4		5633	37	B0-U0-G2
120	700	260.0	II	30656	118	B4-U0-G4	33094	127	B4-U0-G4	34836	134	B4-U0-G4	36578	141	B4-U0-G4	N/A	N/A		
			II-FR	30860	119	B4-U0-G2	33315	128	B4-U0-G2	35068	135	B4-U0-G2	36822	142	B4-U0-G2				
			II-ML	30657	118	B5-U0-G5	33095	127	B5-U0-G5	34837	134	B5-U0-G5	36579	141	B5-U0-G5				
			III-M	31191	120	B4-U0-G4	33673	130	B4-U0-G4	35445	136	B4-U0-G4	37217	143	B4-U0-G4				
			III-W	28960	111	B3-U0-G4	31265	120	B3-U0-G5	32909	127	B3-U0-G5	34555	133	B3-U0-G5				
			IV	30956	119	B4-U0-G4	33418	129	B4-U0-G4	35177	135	B4-U0-G4	36936	142	B4-U0-G4				
			IV-FT	28200	108	B3-U0-G4	30444	117	B3-U0-G5	32046	123	B3-U0-G5	33648	129	B3-U0-G5				
			VSQ-N	32356	124	B5-U0-G2	34929	134	B5-U0-G2	36768	141	B5-U0-G2	38606	148	B5-U0-G2				
			VSQ-M	31727	122	B5-U0-G4	34250	132	B5-U0-G4	36054	139	B5-U0-G4	37856	146	B5-U0-G4				
			VSQ-W	30971	119	B5-U0-G4	33434	129	B5-U0-G5	35194	135	B5-U0-G5	36953	142	B5-U0-G5				
			II-HS	22420	86	B2-U0-G4	24203	93	B2-U0-G4	25478	98	B2-U0-G4	26751	103	B2-U0-G4				
			II-FR-HS	22806	88	B1-U0-G2	24619	95	B1-U0-G2	25916	100	B2-U0-G2	27212	105	B2-U0-G2				
			III-M-HS	22682	87	B1-U0-G4	24485	94	B1-U0-G4	25774	99	B1-U0-G4	27063	104	B1-U0-G4				
			III-W-HS	22201	85	B1-U0-G4	23967	92	B1-U0-G5	25228	97	B1-U0-G5	26489	102	B1-U0-G5				
			IV-HS	23428	90	B1-U0-G4	25291	97	B1-U0-G4	26622	102	B1-U0-G4	27953	108	B1-U0-G4				
			IV-FT-HS	22141	85	B1-U0-G5	23902	92	B1-U0-G5	25160	97	B1-U0-G5	26418	102	B1-U0-G5				
120	875	329.0	II	36574	111	B4-U0-G4	39483	120	B4-U0-G4	41561	126	B4-U0-G4	43639	133	B4-U0-G5	N/A	N/A		
			II-FR	36818	112	B4-U0-G2	39746	121	B4-U0-G2	41838	127	B4-U0-G3	43930	134	B4-U0-G3				
			II-ML	36575	111	B5-U0-G5	39485	120	B5-U0-G5	41562	126	B5-U0-G5	43640	133	B5-U0-G5				
			III-M	37213	113	B4-U0-G4	40174	122	B4-U0-G5	42288	129	B4-U0-G5	44402	135	B4-U0-G5				
			III-W	34552	105	B3-U0-G5	37300	113	B3-U0-G5	39263	119	B4-U0-G5	41226	125	B4-U0-G5				
			IV	36932	112	B4-U0-G4	39870	121	B4-U0-G5	41969	128	B4-U0-G5	44067	134	B4-U0-G5				
			IV-FT	33644	102	B3-U0-G5	36321	110	B3-U0-G5	38232	116	B4-U0-G5	40144	122	B4-U0-G5				
			VSQ-N	38602	117	B5-U0-G2	41673	127	B5-U0-G2	43866	133	B5-U0-G2	46060	140	B5-U0-G2				
			VSQ-M	37852	115	B5-U0-G4	40863	124	B5-U0-G4	43014	131	B5-U0-G4	45165	137	B5-U0-G4				
			VSQ-W	36950	112	B5-U0-G5	39888	121	B5-U0-G5	41988	128	B5-U0-G5	44088	134	B5-U0-G5				
			II-HS	26748	81	B2-U0-G4	28876	88	B2-U0-G4	30395	92	B2-U0-G4	31916	97	B2-U0-G5				
			II-FR-HS	27209	83	B2-U0-G2	29373	89	B2-U0-G2	30919	94	B2-U0-G2	32465	99	B2-U0-G3				
			III-M-HS	27060	82	B1-U0-G4	29213	89	B1-U0-G5	30750	93	B1-U0-G5	32287	98	B1-U0-G5				
			III-W-HS	26487	81	B1-U0-G5	28593	87	B1-U0-G5	30098	91	B1-U0-G5	31603	96	B1-U0-G5				
			IV-HS	27951	85	B1-U0-G4	30174	92	B1-U0-G4	31762	97	B1-U0-G5	33350	101	B1-U0-G5				
			IV-FT-HS	26416	80	B1-U0-G5	28517	87	B1-U0-G5	30018	91	B1-U0-G5	31519	96	B2-U0-G5				
120	1050	398.0	II	42039	106	B4-U0-G5	45383	114	B4-U0-G5	47771	120	B4-U0-G5	50160	126	B5-U0-G5	N/A	N/A		
			II-FR	42319	106	B4-U0-G3	45685	115	B4-U0-G3	48089	121	B4-U0-G3	50494	127	B4-U0-G3				
			II-ML	42040	106	B5-U0-G5	45384	114	B5-U0-G5	47773	120	B5-U0-G5	50161	126	B5-U0-G5				
			III-M	42774	107	B4-U0-G5	46177	116	B4-U0-G5	48606	122	B4-U0-G5	51037	128	B4-U0-G5				
			III-W	39714	100	B4-U0-G5	42873	108	B4-U0-G5	45130	113	B4-U0-G5	47387	119	B4-U0-G5				
			IV	42451	107	B4-U0-G5	45828	115	B4-U0-G5	48240	121	B4-U0-G5	50652	127	B4-U0-G5				
			IV-FT	38671	97	B4-U0-G5	41748	105	B4-U0-G5	43945	110	B4-U0-G5	46143	116	B4-U0-G5				
			VSQ-N	44370	111	B5-U0-G2	47899	120	B5-U0-G3	50421	127	B5-U0-G3	52942	133	B5-U0-G3				
			VSQ-M	43508	109	B5-U0-G4	46969	118	B5-U0-G4	49441	124	B5-U0-G4	51914	130	B5-U0-G5				
			VSQ-W	42471	107	B5-U0-G5	45849	115	B5-U0-G5	48262	121	B5-U0-G5	50676	127	B5-U0-G5				
			II-HS	30745	77	B2-U0-G4	33191	83	B2-U0-G5	34938	88	B2-U0-G5	36685	92	B2-U0-G5				
			II-FR-HS	31274	79	B2-U0-G3	33761	85	B2-U0-G3	35539	89	B2-U0-G3	37315	94	B2-U0-G3				
			III-M-HS	31104	78	B1-U0-G5	33578	84	B1-U0-G5	35345	89	B2-U0-G5	37112	93	B2-U0-G5				
			III-W-HS	30444	76	B1-U0-G5	32866	83	B1-U0-G5	34596	87	B1-U0-G5	36325	91	B2-U0-G5				
			IV-HS	32127	81	B1-U0-G5	34683	87	B2-U0-G5	36508	92	B2-U0-G5	38333	96	B2-U0-G5				
			IV-FT-HS	30363	76	B1-U0-G5	32777	82	B2-U0-G5	34504	87	B2-U0-G5	36229	91	B2-U0-G5				

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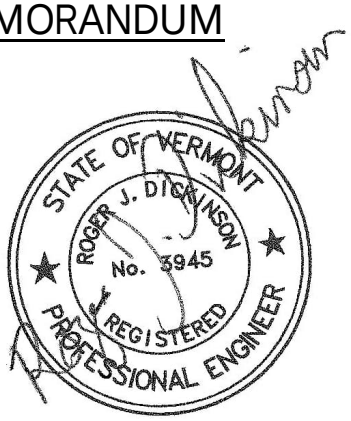
TECHNICAL MEMORANDUM

Project: 453 Pine Street, Burlington
Date: March 24, 2023
By: Roger Dickinson, PE
Subject: Traffic Impact Assessment



Introduction

The 453 Pine development (the "Project") proposes to redevelop the property at 453 Pine St in Burlington with a one-story 7,305 sf commercial building and a three-story 24,000 sf spa / health & fitness facility.

The primary access to the Project will be via a private driveway located opposite Howard St. This driveway presently serves the former Maltex Building located at 431 Pine St. A second service access will be located ±560' south on Pine St. New sidewalks will also connect to the City's existing sidewalk and shared-use path network.

This traffic impact assessment (TIA) examines existing and future traffic congestion conditions on the adjacent highway network in the vicinity of this Project, and analyzes the probable impacts that this Project will have on those conditions. The results of the requested analyses are presented in the following sections.

Adjacent Street Network

Pine St in the vicinity of the Project is a two-lane two-way urban street. Sidewalks are provided on both sides of Pine St, however there is gap across the Project's frontage on the west side over which there are presently sections of an old sidewalk and a dirt path. Additionally, an on-street bike lane presently exists on the west side of Pine St for southbound bicyclists. The Howard St intersection is stop-signed controlled on the Howard St approach. There is also a crosswalk and rectangular rapid flashing beacons (RRFB) to facilitate pedestrian travel crossing Pine St on the south side of the Howard St intersection.

Pine St and its intersections north of Lakeside Ave will be rebuilt and upgraded as part of the Champlain Parkway construction presently underway. The anticipated completion date of that work is 2024. When completed, Pine St will remain a two-lane two-way street, with on-street parallel parking on the east side, an off-street shared-use path along the west side, and a sidewalk along the east side. The Pine St / Howard St intersections will also be reconstructed as a raised intersection with crosswalks and RRFB's crossing Pine Street on both the north and south approaches. Lastly, the existing private driveway to the Maltex Building (which is presently offset to the north from Howard St) will be relocated to line up directly opposite Howard St.

Background Traffic Volumes

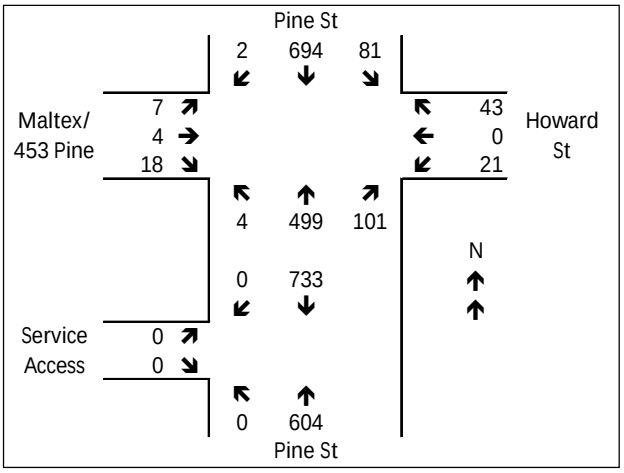
Background traffic volumes on Pine St were obtained from the traffic projections contained in the LSFSEIS[1] prepared for the Champlain Parkway, and from a Vermont Agency of Transportation (VTrans) turning movement count performed at the Pine St/Howard St intersection on June 25, 2014. Additional traffic volume data for Pine St was also obtained from a VTrans automatic traffic recorder count performed in June 2014 at Station D444, located between Howard St and Locust St.

The observed pm peak hour volumes from the above turning movement count were adjusted to estimated design hour volumes (DHV) for years 2024 (estimated project completion) and 2029 (project completion + 5 years). A DHV adjustment factor of +5.0% and background traffic growth factors of 1.5% (to 2024) and 4.0% (to 2029) were used. The resulting pm peak hour two-way traffic volumes on Pine St south of Howard St equal 1,255 vph (observed 2014 pm peak hour), 1,337 vph (2024 DHV) and 1,371 vph (2029 DHV).

Future completion of the final segments of the Champlain Parkway (including the I-189 - Home Ave and Kilburn St - Main St segments, the "full" Champlain Parkway) in 2027 are projected to add 235 vph to future Pine St pm peak hour traffic volumes (LSFSEIS pg 7-5). This will increase the projected 2029 DHV to 1,606 vph.

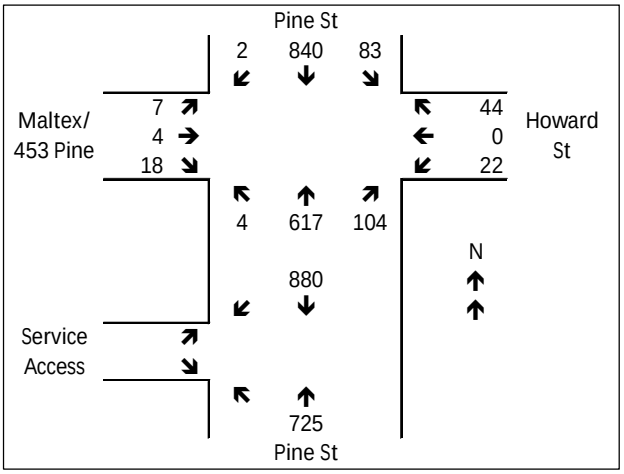
The resulting projected 2024 and 2029 background design hour volumes (representing the No-Build analysis scenarios) are shown in Figures 1 and 2, respectively.

Figure 1 - 2024 No-Build PM DHV
(without I-189 Champlain Parkway Connection)



[1] *Burlington, Vermont Project MEGC-M5000(1) Southern Connector/Champlain Parkway Project, Chittenden County, Vermont, Limited Scope Final Supplemental Environmental Impact Statement*, Federal Highway Administration, June 2020

Figure 2 - 2029 No-Build PM DHV
(with I-189 Champlain Parkway Connection)



Project-Generated Traffic

Anticipated peak hour trips for this Project were calculated using trip generation rates compiled by the Institute of Transportation Engineers (ITE) in *Trip Generation*[2] for the proposed land-uses. The resulting estimated trips were then adjusted using VTrans TDM guidance.[3] With this Project being located in a mixed-use area having Walk/Bike and Transit Scores of 87 (very walkable and bikeable) and 42 (some transit), respectively, its peak hour trips can be reduced by 20%. Table 1 summarizes the resulting estimated weekday peak hour trip generation of this Project.

Table 1 - Weekday Peak Hour Trip Generation

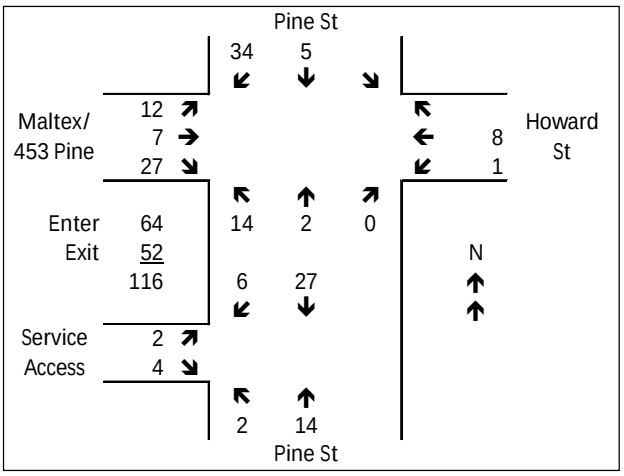
ITE Land-Use Category	Size	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
#492 – Health/Fitness Club	24,000 sf	16	15	31	55	41	96
#814 – Variety Store (Comm. Bldg.)	7,305 sf	12	10	22	25	24	49
Total Trips		28	25	53	80	65	145
20% TDM Credit		-6	-5	-11	-16	-13	-29
Total External Vehicle Trips		22	20	42	64	52	116

[2] *Trip Generation*, Institute of Transportation Engineers, 11th Edition

[3] *Travel Demand Management (TDM) Guidance*, Vermont Agency of Transportation, February 2016 (Mixed Use/Moderate Transit area with a Walk Score => 60)

The directional distributions of peak hour project-generated trips were estimated using existing traffic patterns at the Pine St / Howard St intersection. The resulting directional distribution of pm peak hour project-generated trips is shown in Figure 3.

Figure 3 - Project-Generated PM Peak Hour Trip Distribution



Combining the project-generated trips with the No-Build volumes provides the 2024 and 2029 Build design hour volumes shown in Figures 4 and 5.

Figure 4 - 2024 Build PM DHV
(without I-189 Champlain Parkway Connection)

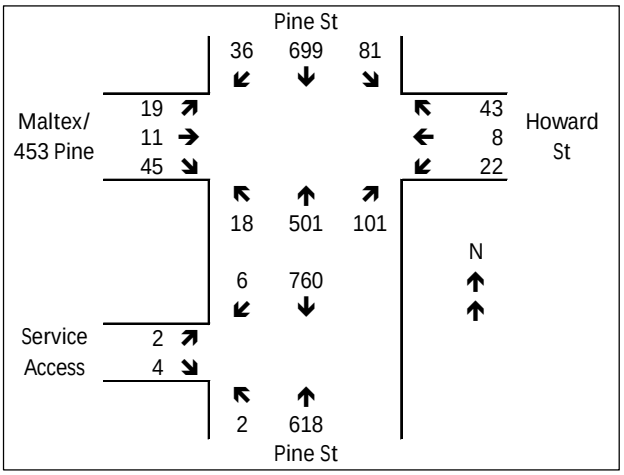
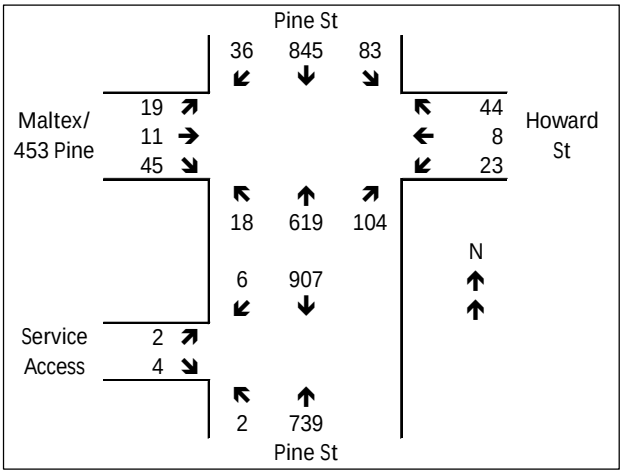


Figure 5 - 2029 Build PM DHV
(with I-189 Champlain Parkway Connection)



Traffic Congestion

Levels of service (LOS) at intersections are determined by the average control delay; measured in seconds per vehicle. The methodology for analyzing LOS is established by the *Highway Capacity Manual* (*HCM*).[4] Table 2 summarizes the LOS delay thresholds for intersections.

Table 2 - Unsignalized Intersection
Level of Service Criteria

LOS	Avg. Delay*	LOS	Avg. Delay*
A	≤10	D	≤35
B	≤15	E	≤50
C	≤25	F	>50

* seconds per vehicle

In Vermont, VTrans' level of service policy[5] sets LOS D as the desired design standard for two-way stop controlled (unsignalized) intersections having greater than 100 vph approach volume on a single-lane side street approach or greater than 150 vph approach volume on a two-lane side street approach. There is no level of service standard for unsignalized intersections with lower than the above indicated side street volume thresholds. Future traffic volumes exiting Howard St and the Maltex driveway will be less than the thresholds for side street approaches, both with and without this Project. VTrans' LOS D traffic congestion design standard therefore does not apply at this location.

[4] *Highway Capacity Manual*, Transportation Research Board, 6th Edition
[5] Vermont Agency of Transportation Highway Design "Level of Service" Policy, May 31, 2007

Table 3 presents the results of intersection capacity analyses performed at the Pine St / Howard St intersection. All analyses were performed using *Synchro v.11* software. Detailed analysis reports are enclosed in Appendix A.

Table 3 - Intersection Levels of Service

	2024 PM No-Build			2024 PM Build		
Intersection / Approach	LOS	Delay	V/C	LOS	Delay	V/C
Pine St / Howard St						
Maltex Driveway EB	D	27.6	0.15	F	71.2	0.36
Maltex Driveway EB RT	-	-	-	B	14.4	0.11
Howard St WB	D	29.4	0.30	E	47.0	0.46
Pine St NB	A	0.1	0.00	A	0.3	0.02
Pine St SB	A	0.9	0.08	A	0.9	0.08
	2029 PM No-Build			2029 PM Build		
Intersection / Approach	LOS	Delay	V/C	LOS	Delay	V/C
Pine St / Howard St						
Maltex Driveway EB	E	44.5	0.25	F	>100	0.60
Maltex Driveway EB RT	-	-	-	C	16.6	0.13
Howard St WB	F	55.1	0.48	F	>100	0.77
Pine St NB	A	0.1	0.01	A	0.2	0.02
Pine St SB	A	0.9	0.09	A	0.8	0.09

The results of the intersection capacity analyses results indicate that traffic exiting the Maltex Driveway and the Howard St side street approaches will experience very long delays and poor levels of service during future pm peak hour traffic conditions.

A large majority of the traffic exiting Maltex Driveway turns right onto Pine St; both presently and proposed. With a single exit lane, those vehicles will otherwise be blocked by other exiting vehicles waiting to make a left-turn or to cross Pine St. To reduce the delays which would otherwise be experienced by that movement, the two "Build" intersection capacity analyses in Table 3 include a second right-turn exit lane. Such a lane is possible due to the Maltex Driveway being reconstructed as part of the Champlain Parkway construction to provide a 32 ft wide approach width, and can be accomplished by striping two 10 ft wide exit lanes plus one 12 ft wide enter lane on the Maltex Driveway approach. If wider (11 ft wide) exit lanes are desired, the Maltex Driveway approach would need to be widened to 34 ft.

TDM Strategies & Multi-Modal Connections

Travel demand management (TDM) strategies and encouraging the use of alternative travel modes are effective tools in mitigating future traffic congestion. Recognizing this, the City of Burlington has adopted TDM standards in its Comprehensive Development Ordinance. The Ordinance requires implementing specific strategies, including, but not limited to:

- Outreach and education to employees and customers.
- Designating a Transportation Coordinator.

- Offering free car share memberships and GMT Transit passes (see below) to employees for the first two years, and discounted at 50% thereafter.
- Membership in a Transportation Management Association is an acceptable alternative to the above two items.
- Implementing a parking management plan.
- Providing priority parking spaces for bicycles, scooters, motorcycles and carpool vehicles.

The Champlain Parkway improvements described earlier, which are presently under construction, were designed to encourage walkability and bikeability together with using alternative travel modes along the Pine St corridor. Regarding the latter, Green Mountain Transit provides local transit service along Pine Street at 30-minute headways between 6:30 am and 6:30 pm on weekdays and Saturday. Late evening transit service operates on weekdays and Saturday at greater headways. Transit service is also provided on Sundays between 8:00 am and 6:00 pm at 60-minute headways. Existing bus stops are located at the Pine St / Howard St intersection in both the northbound and southbound directions.

Conclusions

While the above results indicate that Pine St north of Lakeside Ave will experience traffic congestion during peak periods in the future, such conditions are not unexpected on a heavily traveled street located in a densely developed urban area. The Champlain Parkway improvements and application of TDM strategies will be important factors in encouraging the use of alternative travel modes and maintaining safe traffic conditions for all users along the Pine St corridor.

APPENDIX A

Intersection Capacity Analyses

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	4	18	21	0	43	4	499	101	81	694	2
Future Vol, veh/h	7	4	18	21	0	43	4	499	101	81	694	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	4	18	21	0	43	4	499	101	81	694	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1436	1465	695	1426	1416	550	696	0	0	600	0	0
Stage 1	857	857	-	558	558	-	-	-	-	-	-	-
Stage 2	579	608	-	868	858	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	111	128	442	113	137	535	900	-	-	977	-	-
Stage 1	352	374	-	514	512	-	-	-	-	-	-	-
Stage 2	501	486	-	347	374	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	91	110	442	94	118	535	900	-	-	977	-	-
Mov Cap-2 Maneuver	91	110	-	94	118	-	-	-	-	-	-	-
Stage 1	350	324	-	510	508	-	-	-	-	-	-	-
Stage 2	458	483	-	284	324	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.6	29.4	0.1	0.9
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	900	-	-	188	211	977	-	-
HCM Lane V/C Ratio	0.004	-	-	0.154	0.303	0.083	-	-
HCM Control Delay (s)	9	0	-	27.6	29.4	9	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	1.3	0.3	-	-

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	4	18	22	0	44	4	617	104	83	840	2
Future Vol, veh/h	8	4	18	22	0	44	4	617	104	83	840	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	4	18	22	0	44	4	617	104	83	840	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1706	1736	841	1695	1685	669	842	0	0	721	0	0
Stage 1	1007	1007	-	677	677	-	-	-	-	-	-	-
Stage 2	699	729	-	1018	1008	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	72	87	365	73	94	458	794	-	-	881	-	-
Stage 1	290	319	-	443	452	-	-	-	-	-	-	-
Stage 2	430	428	-	286	318	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	56	71	365	57	77	458	794	-	-	881	-	-
Mov Cap-2 Maneuver	56	71	-	57	77	-	-	-	-	-	-	-
Stage 1	287	263	-	439	448	-	-	-	-	-	-	-
Stage 2	385	424	-	220	262	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	44.5	55.1	0.1	0.9
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	794	-	-	121	137	881	-	-
HCM Lane V/C Ratio	0.005	-	-	0.248	0.482	0.094	-	-
HCM Control Delay (s)	9.6	0	-	44.5	55.1	9.5	0	-
HCM Lane LOS	A	A	-	E	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1	2.6	0.3	-	-

Intersection												
Int Delay, s/veh	4.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	11	45	22	8	43	18	501	101	81	699	36
Future Vol, veh/h	19	11	45	22	8	43	18	501	101	81	699	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	11	45	22	8	43	18	501	101	81	699	36

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1492	1517	717	1495	1485	552	735	0	0	602	0	0
Stage 1	879	879	-	588	588	-	-	-	-	-	-	-
Stage 2	613	638	-	907	897	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	102	119	430	101	125	533	870	-	-	975	-	-
Stage 1	342	365	-	495	496	-	-	-	-	-	-	-
Stage 2	480	471	-	330	358	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	77	99	430	72	104	533	870	-	-	975	-	-
Mov Cap-2 Maneuver	77	99	-	72	104	-	-	-	-	-	-	-
Stage 1	331	314	-	479	480	-	-	-	-	-	-	-
Stage 2	420	456	-	245	308	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.1	47	0.3	0.9
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	870	-	-	84	430	158	975	-	-
HCM Lane V/C Ratio	0.021	-	-	0.357	0.105	0.462	0.083	-	-
HCM Control Delay (s)	9.2	0	-	71.2	14.4	47	9	0	-
HCM Lane LOS	A	A	-	F	B	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.6	0.3	2.4	0.3	-	-

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	4	2	618	760	6
Future Vol, veh/h	2	4	2	618	760	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	4	2	618	760	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1385	763	766	0	-	0
Stage 1	763	-	-	-	-	-
Stage 2	622	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	158	404	847	-	-	-
Stage 1	460	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	157	404	847	-	-	-
Mov Cap-2 Maneuver	157	-	-	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	535	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	847	-	265	-	-
HCM Lane V/C Ratio	0.002	-	0.023	-	-
HCM Control Delay (s)	9.3	0	18.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	11	45	23	8	44	18	619	104	83	845	36
Future Vol, veh/h	19	11	45	23	8	44	18	619	104	83	845	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	11	45	23	8	44	18	619	104	83	845	36

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1762	1788	863	1764	1754	671	881	0	0	723	0	0
Stage 1	1029	1029	-	707	707	-	-	-	-	-	-	-
Stage 2	733	759	-	1057	1047	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	66	81	354	66	85	456	767	-	-	879	-	-
Stage 1	282	311	-	426	438	-	-	-	-	-	-	-
Stage 2	412	415	-	272	305	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	45	63	354	42	66	456	767	-	-	879	-	-
Mov Cap-2 Maneuver	45	63	-	42	66	-	-	-	-	-	-	-
Stage 1	271	253	-	409	420	-	-	-	-	-	-	-
Stage 2	351	398	-	185	248	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	78.9	139.1	0.2	0.8
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	767	-	-	50	354	98	879	-	-
HCM Lane V/C Ratio	0.023	-	-	0.6	0.127	0.765	0.094	-	-
HCM Control Delay (s)	9.8	0	-	172.4	16.6	139.1	9.5	0	-
HCM Lane LOS	A	A	-	F	C	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	3.4	0.4	6.3	0.3	-	-

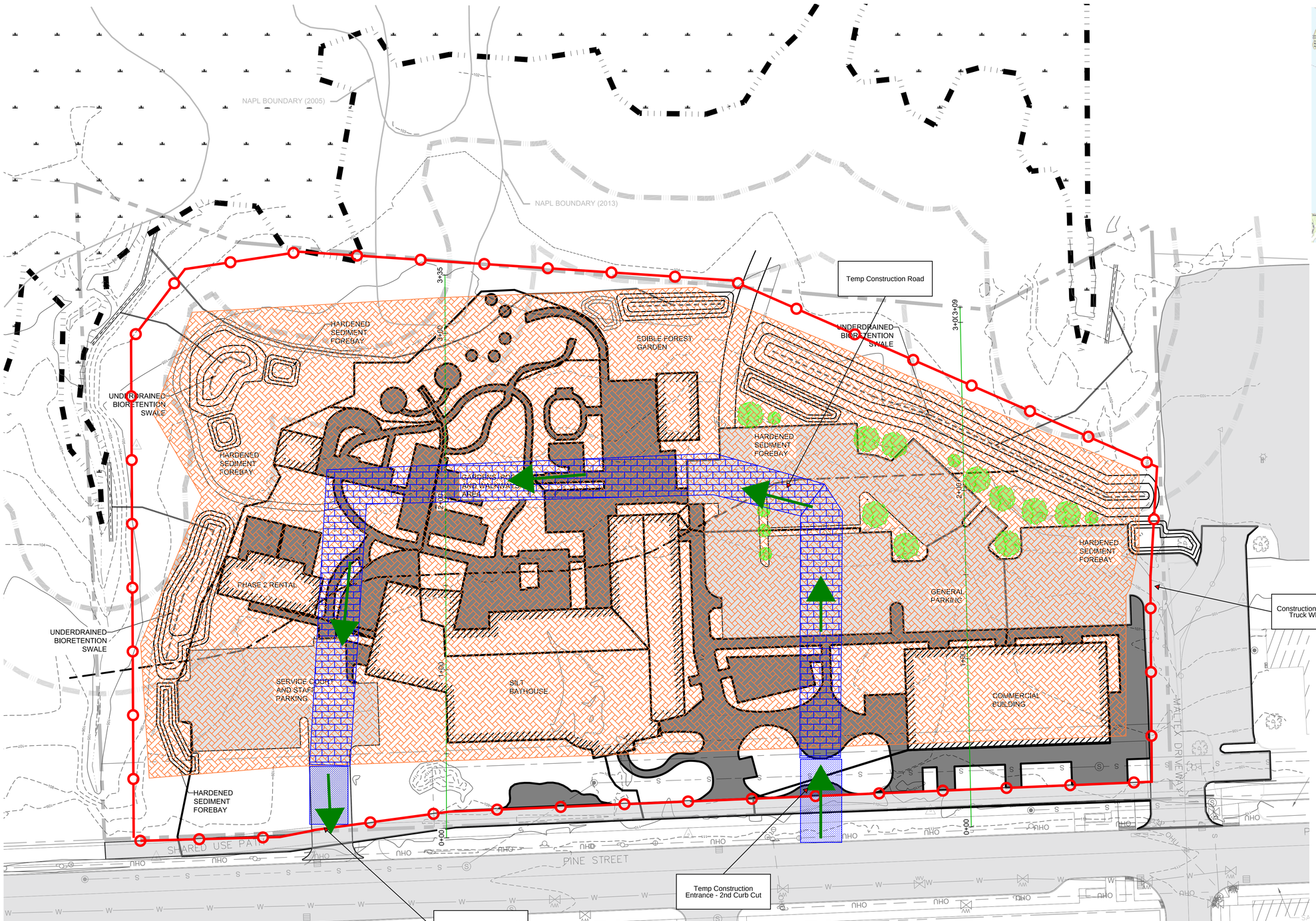
Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	4	2	739	907	6
Future Vol, veh/h	2	4	2	739	907	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	4	2	739	907	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1653	910	913	0	-	0
Stage 1	910	-	-	-	-	-
Stage 2	743	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	108	333	746	-	-	-
Stage 1	393	-	-	-	-	-
Stage 2	470	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	107	333	746	-	-	-
Mov Cap-2 Maneuver	107	-	-	-	-	-
Stage 1	391	-	-	-	-	-
Stage 2	470	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	746	-	195	-	-
HCM Lane V/C Ratio	0.003	-	0.031	-	-
HCM Control Delay (s)	9.8	0	24	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-





PROJECT LOCATION

1" = 2000'

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- EDGE OF ROAD/PATH
- PARCEL BOUNDARIES
- FENCE
- EXISTING STORMWATER SYSTEM
- WATER LINE
- SEWER LINE
- OVERHEAD UTILITY
- EXISTING DITCH
- TREELINE
- 2022 WETLAND DELINEATION
- 2022 50' WETLAND BUFFER
- 2022 100' WETLAND BUFFER
- 2014 WETLAND DELINEATION
- 2014 50' WETLAND BUFFER
- VCGI WETLAND DELINEATION
- BUILDING HATCH
- STONE HATCH
- EXISTING STORMWATER CATCHBASIN
- SANITARY MANHOLE
- TRAVERSE POINT
- WATER VALVE
- GAS VALVE
- HYDRANT
- UTILITY POLE
- GUY POLE
- LIGHT POST
- IRON ROD FOUND
- WELL
- BALLARD

Area of Soil Remediation

Temporary Construction Road

DRAWING CREDITS

DRAWN ON: 10/24/2022
DRAWN BY: BAM
CHECKED ON: 10/24/2022
CHECKED BY: PCL
PROJECT NO: 20221060

REVISIONS

#	DATE	DRWN	CHK'D	APP'D	DESCRIPTION

DRAWING SCALE

30 0 30 60 120 ft
6 0 15 30 m
1 inch = 30 feet
(1 : 360)

STONE ENVIRONMENTAL
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

453 PINE STREET

CONCEPTUAL SITE PLAN

BURLINGTON VERMONT

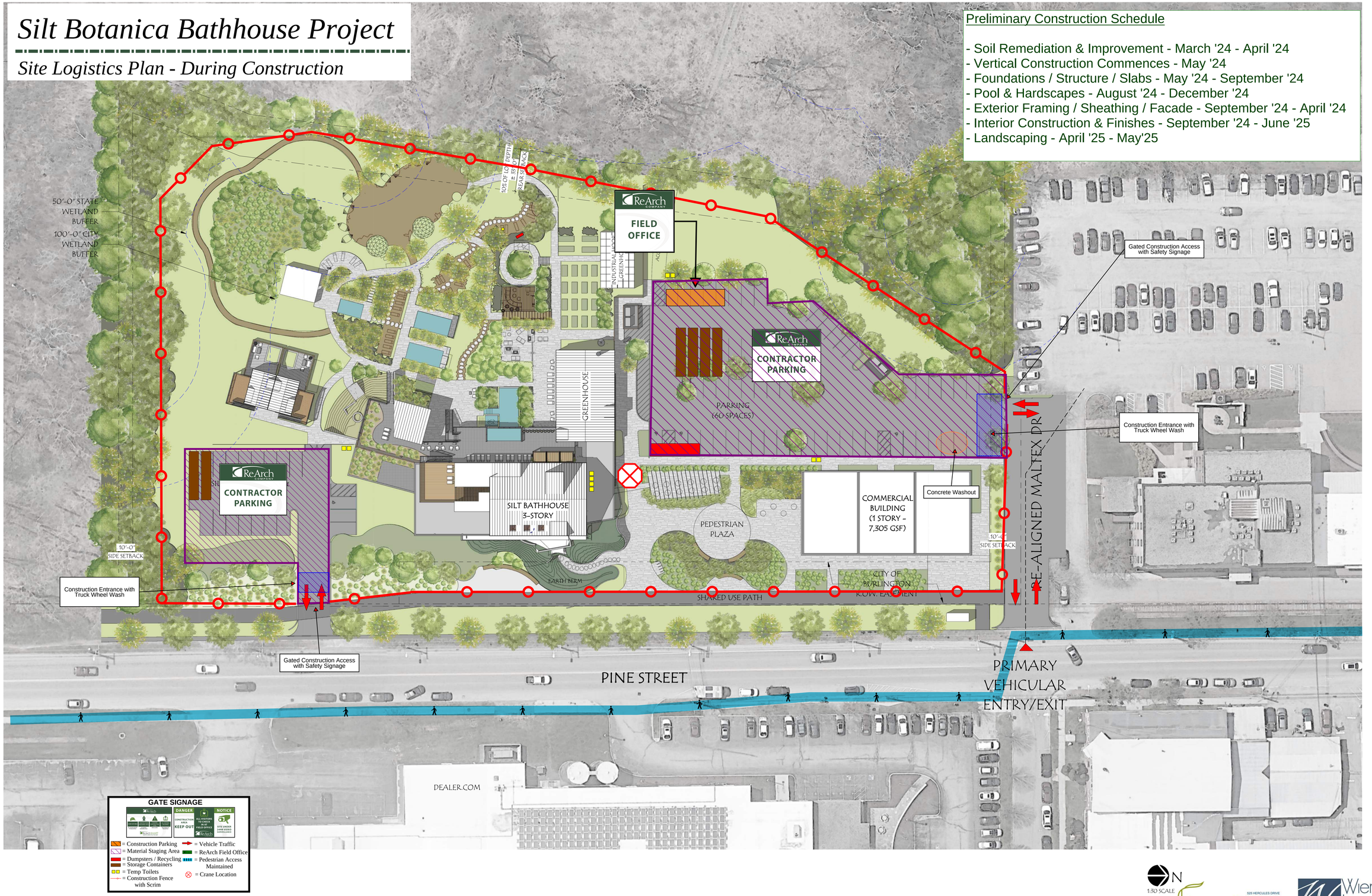
SHEET NO. 1A

Silt Botanica Bathhouse Project

Site Logistics Plan - During Construction

Preliminary Construction Schedule

- Soil Remediation & Improvement - March '24 - April '24
- Vertical Construction Commences - May '24
- Foundations / Structure / Slabs - May '24 - September '24
- Pool & Hardscapes - August '24 - December '24
- Exterior Framing / Sheathing / Facade - September '24 - April '24
- Interior Construction & Finishes - September '24 - June '25
- Landscaping - April '25 - May'25



N
1:30 SCALE

453 PINE

453 PINE ST, BURLINGTON, VT

CONCEPTUAL SITE PLAN

Knauf LANDSCAPE ARCHITECTURE
525 HERCULES DRIVE
SUITE 2B
COLCHESTER, VT 05446
802.522.0676
CYNTHIA@CYNTHIAKNAUF.COM
CYNTHIAKNAUF.COM

Wiemann Lamphere ARCHITECTS

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Ownership of Instruments of Service
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HUNTINGTON,VT 05462
(802 434-7276 FAX: (802) 329-2259

MEMORANDUM

To: Daniel Voisin, Stone Environmental Date: May 24, 2023

From: Dori Barton

Re: 453 Pine Street, Burlington, Vermont: RTE Plant Survey

The RTE species review involved both a remote review of available digital maps for the Project area as well as a field survey. AE reviewed digital orthophotography, the NRCS Soil Survey, the 2011 Bedrock Geologic Map of Vermont and the Wildlife Natural Heritage Inventory (NHI) Rare, Threatened and Endangered Species digital database. A plant survey was conducted throughout the Project area on August 31, 2022, by Michael Lew-Smith. No rare, threatened or endangered plant species were identified during the site survey. A plant species list for the survey is attached. The Project will have no impact on RTE plant species.

ARROWWOOD ENVIRONMENTAL

Rare, Threatened and Endangered Plant Inventory

Report Date: 12/8/2022

Project Name Pine Street Barge Canal

Botanist Michael Lew-Smith

Survey Date 8/31/2022

Description Early successional disturbed forest and wetland

Plant List

*note: plants with no listed S-Ranks are considered common in Vermont.

Plant Name	Common Name	S-Rank*	T/E	Plant Family
Atriplex patula	spearscale			Amaranthaceae
Rhus typhina	staghorn sumac			Anacardiaceae
Toxicodendron rydbergii	creeping poison-ivy			Anacardiaceae
Anthriscus sylvestris	wild chervil			Apiaceae
Daucus carota	Queen Anne's lace			Apiaceae
Ambrosia artemisiifolia	common ragweed			Asteraceae
Arctium lappa	great burdock			Asteraceae
Artemisia vulgaris	common mugwort			Asteraceae
Bidens vulgata	tall beggar's-ticks			Asteraceae
Cichorium intybus	chicory			Asteraceae
Cirsium arvense	Canada thistle			Asteraceae
Erechtites hieraciifolius	pilewort			Asteraceae
Erigeron canadensis	horseweed			Asteraceae
Erigeron strigosus	daisy fleabane			Asteraceae
Euthamia graminifolia	grass-leaved goldenrod			Asteraceae
Eutrochium maculatum	common Joe-Pye weed			Asteraceae
Helianthus giganteus	giant sunflower			Asteraceae
Solidago canadensis	Canada goldenrod			Asteraceae
Solidago gigantea	large goldenrod			Asteraceae
Solidago rugosa	rough-leaved goldenrod			Asteraceae
Sonchus arvensis	sow thistle			Asteraceae
Sonchus oleraceus	common sow thistle			Asteraceae
Symphyotrichum cordifolium	heart-leaved aster			Asteraceae
Symphyotrichum lanceolatum	lance-leaved aster			Asteraceae
Symphyotrichum lateriflorum	calico aster			Asteraceae
Symphyotrichum novae-angliae	New England aster			Asteraceae
Tanacetum vulgare	tansy			Asteraceae
Taraxacum officinale	common dandelion			Asteraceae
Impatiens capensis	common jewelweed			Balsaminaceae
Betula papyrifera	paper birch			Betulaceae

ARROWWOOD ENVIRONMENTAL

Rare, Threatened and Endangered Plant Inventory

Report Date: 12/8/2022

Plant Name	Common Name	S-Rank*	T/E	Plant Family
Betula populifolia	gray birch			Betulaceae
Alliaria petiolata	garlic mustard			Brassicaceae
Butomus umbellatus	flowering rush			Butomaceae
Celtis occidentalis	hackberry			Cannabaceae
Lonicera tatarica	Tartarian honeysuckle			Caprifoliaceae
Valeriana officinalis	garden heliotrope			Caprifoliaceae
Silene vulgaris	common bladder campion			Caryophyllaceae
Celastrus orbiculatus	Oriental bittersweet			Celastraceae
Cornus racemosa	gray dogwood			Cornaceae
Cornus sericea	red-osier dogwood			Cornaceae
Juniperus virginiana	eastern red cedar			Cupressaceae
Carex gracillima	slender sedge			Cyperaceae
Carex cf laxiflora	loose-flowered sedge			Cyperaceae
Carex normalis	tall straw sedge			Cyperaceae
Cyperus strigosus	galingale			Cyperaceae
Equisetum arvense	field horsetail			Equisetaceae
Desmodium canadense	Canada tick-trefoil			Fabaceae
Lotus corniculatus	bird's-foot trefoil			Fabaceae
Medicago sativa	alfalfa			Fabaceae
Robinia pseudo-acacia	common locust			Fabaceae
Trifolium pratense	red clover			Fabaceae
Trifolium repens	white clover			Fabaceae
Vicia cracca	cow vetch			Fabaceae
Hypericum perforatum	common St. John's-wort			Hypericaceae
Juncus effusus	soft rush			Juncaceae
Glechoma hederacea	gill-over-the-ground			Lamiaceae
Lycopus americanus	American water-horehound			Lamiaceae
Monarda fistulosa	wild bergamot			Lamiaceae
Lythrum salicaria	purple loosestrife			Lythraceae
Fraxinus americana	white ash			Oleaceae
Fraxinus pennsylvanica	green red ash			Oleaceae
Circaea canadensis	tall enchanter's nightshade			Onagraceae
Epilobium ciliatum	ciliate willow-herb			Onagraceae
Oenothera biennis	common evening primrose			Onagraceae
Oenothera oakesiana	Oakes' evening primrose			Onagraceae
Onoclea sensibilis	sensitive fern			Onocleaceae
Agalinis tenuifolia	slender purple gerardia			Orobanchaceae

ARROWWOOD ENVIRONMENTAL

Rare, Threatened and Endangered Plant Inventory

Report Date: 12/8/2022

Plant Name	Common Name	S-Rank*	T/E	Plant Family
Oxalis stricta	tall yellow wood-sorrel			Oxalidaceae
Linaria vulgaris	butter-and-eggs			Plantaginaceae
Plantago major	plantain			Plantaginaceae
Agrostis capillaris	colonial bent			Poaceae
Agrostis perennans	autumn bent			Poaceae
Dactylis glomerata	orchard grass			Poaceae
Digitaria ischaemum	smooth crabgrass			Poaceae
Echinochloa crus-galli	barnyard grass			Poaceae
Elymus repens	witch grass			Poaceae
Elymus virginicus	Virginia wild rye			Poaceae
Festuca trachyphylla	hard fescue			Poaceae
Muhlenbergia mexicana	wirestem muhly			Poaceae
Panicum capillare	old witch-grass			Poaceae
Panicum dichotomiflorum	smooth witch grass			Poaceae
Panicum virgatum	tall switchgrass	S3		Poaceae
Phalaris arundinacea	reed canary grass			Poaceae
Phragmites australis	common reed			Poaceae
Poa compressa	Canada bluegrass			Poaceae
Poa palustris	fowl meadow grass			Poaceae
Poa pratensis	Kentucky bluegrass			Poaceae
Setaria viridis	green foxtail			Poaceae
Sphenopholis intermedia	slender wedge grass			Poaceae
Fallopia japonica	Japanese knotweed			Polygonaceae
Persicaria maculosa	lady's-thumb			Polygonaceae
Persicaria virginiana	jumpseed			Polygonaceae
Polygonum aviculare	dooryard knotweed			Polygonaceae
Rumex altissimus	tall dock			Polygonaceae
Rumex crispus	curly dock			Polygonaceae
Lysimachia nummularia	moneywort			Primulaceae
Ranunculus recurvatus	hooked crowfoot			Ranunculaceae
Frangula alnus	glossy buckthorn			Rhamnaceae
Rhamnus cathartica	buckthorn			Rhamnaceae
Agrimonia striata	roadside agrimony			Rosaceae
Geum canadense	white avens			Rosaceae
Malus pumila	wild apple			Rosaceae
Potentilla argentea	silvery cinquefoil			Rosaceae
Prunus serotina	black cherry			Rosaceae

ARROWWOOD ENVIRONMENTAL

Rare, Threatened and Endangered Plant Inventory

Report Date: 12/8/2022

Plant Name	Common Name	S-Rank*	T/E	Plant Family
Prunus virginiana	choke cherry			Rosaceae
Rubus idaeus	red raspberry			Rosaceae
Galium mollugo	common bedstraw			Rubiaceae
Zanthoxylum americanum	prickly ash			Rutaceae
Populus deltoides	eastern cottonwood			Salicaceae
Salix discolor	pussy willow			Salicaceae
Acer negundo	box-elder			Sapindaceae
Acer saccharum	sugar maple			Sapindaceae
Verbascum thapsus	common mullein			Scrophulariaceae
Solanum dulcamara	bittersweet nightshade			Solanaceae
Solanum sp.	solanum			Solanaceae
Ulmus rubra	slippery elm			Ulmaceae
Boehmeria cylindrica	false nettle			Urticaceae
Verbena urticifolia	white vervain			Verbenaceae
Viburnum nudum	wild raisin			Viburnaceae
Viburnum opulus	guelder-rose			Viburnaceae
Parthenocissus quinquefolia	woodbine			Vitaceae
Vitis riparia	riverbank grape			Vitaceae

ARROWWOOD ENVIRONMENTAL
950 BERT WHITE ROAD
HUNTINGTON,VT 05462
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MEMORANDUM

To: Daniel Voisin, Stone Environmental Date: May 25, 2023

From: Dori Barton

Re: 453 Pine Street, Burlington, Vermont: Wildlife Habitat Assessment

The wildlife habitat assessment involved both a remote review of available digital maps for the Project area and a field inventory component. A remote review of available digital databases was conducted to identify and map necessary wildlife habitat (including State of Vermont Deeryard data layer, USGS Topographic map, "VT HYDRODEM" elevation data, and State of Vermont Bear Habitat data layers) in the Project area. The field inventory component involved evaluating vegetation natural communities and recording observations of wildlife signs or sightings during field surveys. Site assessments were conducted in August 2022 to assess wildlife habitat elements.

1. **White-tailed Deer Wintering Habitats**

There are no mapped VT Fish and Wildlife Department white-tailed deer (*Odocoileus virginianus*) winter habitats in the Project area. Field investigation confirmed the absence of deer wintering habitat areas in the Project area.

2. **Black Bear Habitat**

There is no bear habitat identified by the Vermont Fish and Wildlife Department within the Project area and no observations of bear use or feeding (including bear claw scarring, bear dens, scat) were made during the field inventories of the forests and wetland within the Project area. No potential black bear spring feeding wetlands were identified.

3. **Grassland Bird Habitat**

The Vermont Fish and Wildlife Department considers grassland bird habitat to be easily identifiable, concentrated and essential for the reproductive success and survival of a suite of birds. Grasslands used by many species of grassland birds consist of large expanses (minimum of 22 acres with a core breeding/nesting area of ~11 acres) of native grasses with little or no woody

vegetation. The open meadow area of the Project site is not of sufficient size or vegetative composition to provide suitable habitat for grassland bird species.

4. Vernal Pools

The Vermont Department of Fish and Wildlife considers intact well-functioning breeding pools that are interconnected to intact upland forest necessary wildlife habitat for pool-breeding amphibians. Field investigation confirmed the absence of vernal pools in or adjacent to the Project area.

In summary, based on both a review of available databases and field assessment there are no significant or necessary wildlife habitat elements present within the Project area.

ARROWWOOD ENVIRONMENTAL
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MEMORANDUM

To: Daniel Voisin, Stone Environmental Date: May 23, 2023

From: Dori Barton

Re: 453 Pine Street, Burlington, Vermont: Bat Acoustic Surveys

The Northern Long-eared Bat (MYSE) became a federally listed endangered species in March of 2023. Vermont Fish and Wildlife Department has issued guidance that project clearing constituting greater than 1% of the total forested area within a 1 mile radius of a project triggers review for habitat loss of this species. The proposed Project involves greater than 1% clearing of the total forested area within a 1 mile radius. Land use activities impacting greater than 1% of the forested acreage within the 1 mile radius can avoid restrictions and conservation measures if acoustic surveys are conducted and results demonstrate probable absence of MYSE on the project site. (Vermont Fish and Wildlife Department, 2017)

Bat acoustic surveys were conducted for the Vermont Department of Transportation (Vtrans) for the Champlain Parkway Project in May and June of 2019. One of the survey locations was at the project site on Pine Street and Vtrans has authorized the use of the survey results. The survey was conducted by Allan Thompson of Northern Stewards the survey report and is attached to this memo.

The conclusion of the survey was that the presence of MYSE is considered to be not probable and therefore no further surveys are necessary (Thompson, 2019). Communication with Alyssa Bennett from the Vermont Department of Fish and Wildlife on April 10, 2023, confirmed that probable absence of Northern Long-eared Bat in acoustic surveys meets the State guidance for assessing impacts from tree cutting activities.

References

Allan Thompson, Northern Stewards. Bat Acoustic Surveys for Vermont Department of Transportation Champlain Parkway Project. Burlington, VT. June 2019

Vermont Department of Fish and Wildlife. Regulatory Review Guidance for Protecting Northern Long-eared Bats and Their Habitats. February 2017.

Bat Acoustic Surveys
For Vermont Department of Transportation
Champlain Parkway Project
Burlington, VT

Submitted June 2019
by Allan Thompson CWB®

Of Northern Stewards
224 Michigan Ave
Waterbury VT 05676
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Summary

Bat acoustic surveys were conducted at the proposed Champlain Parkway road project in Burlington VT. This survey was conducted prior to road construction in May and June 2019. Two detectors recorded 35 detector nights, some of which were cold, wet nights recording 9069 bat passes. Through automated species classification, and following USFWS's summer survey guidance, the following species presence is considered probable for at least one site/night: the big brown (*Eptesicus fuscus* or Epfu), red (*Lasiurus borealis or LABO),* hoary (*Lasiurus cinereous* or LACI), silver-haired (*Lasionycteris noctivagans* or LANO), eastern small footed (*Myotis leibii* or MYLE), little brown (*M.lucifugus* or MYLU) and the northern long-eared (*M. septentrionalis* or MYSE). All 681 high frequency files were manually vetted for those four site nights where the northern long-eared bat is considered probable, including any files classified through automated classification as northern long-eared bat whether recorded during those four site nights or not. Manual vetting disagreed with all of the automated classifications of the northern long-eared bat, resulting in none of the 681 files being manually classified as northern long eared. Most files considered by automated programs as northern long-eared bats were manually vetted as belonging to the big brown bat. In fewer cases, little brown, red and only a few files received more ambiguous classifications such as Myotis (belonging to the genus Myotis) or Noid, where no classification is possible usually due to poor quality. The Indiana bat was considered absent for this analysis. Therefore, in accordance with Step 7of the USFWS Summer Survey Guidelines, no further surveys are needed for MSYE or MYSO. Manual vetting did confirm the presence of little brown and eastern small footed bats.

Table of Contents

Project and Site Description 1
Survey Methods 2
Detectors 2
Acoustic Survey Sites and Detector Locations 3
Detector Location Map 5
Analysis Process 8
Automated Acoustic Analysis (Phase 2, steps 5 and 6) 8
Coarse Analysis (Phase 2 step 5) 9
Quantitative Analysis (steps 5 and 6) Conclusions 10
Step 7; Qualitative Analysis 13
Manual ID of bat files 13
Manual ID of Myotis Spp 14
Qualtitative Analysis Conclusions 19
Conclusion 21
Literature Cited 21
Appendix A: Screen shots Myotis reference files; MYSE 23
Figure 8: Vetted reference MYSE call 23
Appendix A: Screen shots Myotis reference files; MYLE 24
Figure 9: Vetted MYLE reference call 24
Appendix B: Screen shots of files considered MYLE byManual Vetting 25
Figure 10: PAS_SM 4_DET8_VTRN_BURL_BELEC-20190610_023220.wav 25
Appendix C: Screen shots of files considered MYLU by KaPro 26
Figure 11: PAS_SM4_DET7_VTRN_BURL_HWRD-20190609_212416.wav. 26
Appendix D: Screen shots of files considered MYSE by KaPro 27
Figure 12: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_005856.wav. 27
Figure 13: PAS_SM4_DET7_VTRN_BURL_HWRD-20190610_012244.wav. 28
Figure 14: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_214036.wav. 29
Figure 15: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_214042.wav. 30
Figure 16: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_221320.wav. 31
Figure 17: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_221346.wav. 32
Figure 18: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_231910.wav. 33
Figure 19: PAS_SM4_DET7_VTRN_BURL_HWRD-20190609_211352.wav 34
Figure 20: PAS_SM4_DET7_VTRN_BURL_HWRD-20190610_012244.wav. 35
Figure 21: PAS_SM4_DET8_VTRN_BURL_BELEC-20190601_215124.wav 36
Figure 22: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013142.wav 37

Figure 23: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013142.wav 38
Figure 24: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013314.wav 39
Figure 25: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013718.wav 40
Figure 26: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_022818.wav 41
Figure 27: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_023534.wav 42
Figure 28: PAS_SM4_DET8_VTRN_BURL_BELEC-20190607_212222.wav 43
Figure 29: PAS_SM4_DET8_VTRN_BURL_BELEC-20190607_221514.wav 44
Figure 30: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230544.wav 45
Figure 31: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230558.wav 46
Figure 32: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230900.wav 47
Figure 33: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_235744.wav 48
Allan Thompson Resume 49

Table 1: list of Vermont bat species referenced within this report and their abbreviations. 1
Table 2: Site and Detector Descriptions 2
Table 3: Survey Conditions by Survey Night 5
Table 4: Detector Details 7
Table 5: Number of files recorded per site 9
Table 6: KaPro Coarse Analysis 9
Table 7 Kaleidoscope Pro Acoustic Nightly MLE output 11
Table 8 Kaleidoscope Pro Acoustic Nightly file output. 12
Table 9 Kaleidoscope Pro Acoustic Nightly MLE output for those nights with MLE's <0.05 for target high frequency species and the total number of high frequency files per nights 13
Table 10: Features helpful to distinguish from and between species 15
Table 10: Manual Species ID and Rationale 16
Table 11: Number of high frequency files manually classified for the four site-nights. 19
Table 12: Acoustic Analysis Programs Used 22

Project and Site Description

The Champlain Parkway is a road project planned to extend from VT I87 to Pine street in Burlington, VT. This project involves improving existing road infrastructure; widening roads, or creating new roads either through small forest patches or over non-forested conditions. The linear road project is measured roughly at 1.50 miles in length. Throughout the length of this road section, bat habitat is considered potentially present, existing only along portions. Road side shade trees exist along the entire distance though these trees are not typically used for roosting locations for tree-roosting bats. A 0.20 mile section of forest is found adjacent to and of west of Pine street between Locust and Howard Ave. Another section east of Pine street, 0.01 miles (94') in length is found just opposite Lakeside Ave intersection with Pine street. It is assumed that some amount of trees along these edges will be impacted, but the extent is unknown to the surveyor. New sections or roads will be impacted forests. These road sections constitute the majority of impacts to bats and bat habitat and is found between Lakeside Ave and Flynn Ave in Burlington, VT measuring to 0.20 miles in length. The impact to forests here is linear and totals no more than 0.60 miles.

As a result, acoustic surveys were initiated during summer 2019. This acoustic survey is intended to determine which species of bats are present on site and using the area. Acoustic surveys use microphones to record bats as they fly passed a microphone emitting ultrasonic calls for echolocation. These recordings can be identified to species and used to determine which species are present and may be using the property for roosting, in addition to foraging or traveling. Bats observed during acoustic surveys require further work to identify specific roosts.

Table 1 lists the bat species considered potentially present and potentially using the site for the travel, foraging or roosting resources present within the <0.60 mile site. Bats presumed to be present in the town of Burlington include the big brown, red, hoary, silver-haired, eastern small footed, little brown, northern-long eared, and tri-colored. The Indiana bat has not been observed in Burlington during the winter or summer and is therefore not considered in this analysis.

Table 1: list of Vermont bat species referenced within this report and their abbreviations.

Common Name	Scientific Name	Abbreviated Name	State Listing	Federal listing
Little brown	*Myotis lucifugus*	MYLU	E	
Eastern small-footed	*Myotis leibii*	MYLE	T	
Northern long-eared	*Myotis septentrionalis*	MYSE	E	T
Tri-colored	*Perimyotis subflavus*	PESU	E	
Hoary	*Lasiurus cinereous*	LACI		
Silver-haired	*Lasionycteris noctivagans*	LANO		
Big brown	*Eptesicus fuscus*	Epfu		
Red	*Lasiurus borealis*	LABO		

Survey Methods

The USFWS guidance requires that 1 detector be used for at least 2 calendar nights for each 0.60 miles of suitable habitat. Because suitable habitat is small and separated, I elected to use two detectors.

Detectors

Detectors used for this survey are two Wildlife Acoustics SM4 ultrasonic bat detectors each equipped with an SMM-U1 omni-directional microphone. The microphone was calibrated using Wildlife Acoustics Ultrasonic Calibrator tool on 5/10/2019 to find it working properly (-30kHz and -32kHz) and the SM4 uses firmware R.1.2.2. The microphones were held in a mount at the end of a 20' tall pole to anchor the microphone in place, attached to cables and exposed to the environment, without attachments.

The following SM4 settings were used: High pass frequency was set to Off. The Gain setting is set to AUTO. Files were recorded in .wav format using a sample rate of up to 384kHz. The frequency minimum is 16kHz and the frequency maximum is 192kHz. The duration minimum is 1.5 seconds long and there is no duration maximum. Trigger level was set to Auto and the Trigger window is set to 3.0 seconds with trigger max set to 5.0 seconds.

Detectors were placed in suitable habitat along or in proximity to proposed road locations to observe bats as the travel or forage within forested habitats along the proposed road location. Detectors were programmed to start 30 minutes before Sunset and stop recording an hour after sunrise each survey night. Surveys were conducted between the nights of 5/20/2019 and 6/9/2019 (Table 2). Detectors were collected the morning of 6/11/2019. Equipment was found to be working intermittently with batteries and microphone shortages causing delays in data collection. Overall, the two detectors were active for 4 nights for a total of 8 detector nights.

Table 2: Site and Detector Descriptions

Detector Number	Detector type	Detector location/ID	Site	Survey Date Range	Time Start	Survey Stop	Time Stop	Detector Nights	Equipment Conditions*
7	Wildlife Acoustics Sm4	HWRD	VTRN_BURL	5/20/2019 -6/9/2019	Sunset (-30 min)	6/9/2019	Sunrise (+1 hour)	21	Good
8	Wildlife Acoustics Sm4	BELEC		5/27/2019 -6/1/2019 and 6/3/2019-6/9/2019		6/9/2019		13	Intermittent

* as determined by Calibrator to test mics and record log showing files recorded. Calibration test was performed 5/10/2019

Acoustic Survey Sites and Detector Locations

Site HWRD

An SM4 acoustic bat detector with Northern Stewards ID# 7 was placed in a hardwood forest patch 350′ north of Flynn Ave. and 400′ east of the train tracks. The site was on poorly-drained soil upslope of a brook. The microphone was situated at the edge of a 30′x 30′ clearing, 40′ from the parking lot of Select Design and the Howard Center. Quaking aspen, green ash, and dogwood surrounded the clearing. Seedlings, low shrubs, goldenrod, grasses, and ferns grew in the open patch of habitat. The omni-directional microphone was placed at the end of a 20′ pole, facing southeast and angled down slightly to shed water. The microphone placed here was intended to observe bats travelling to and from the brook and forest edge.



Figure 1: Quaking aspen with SM4 detector at base, parking lot in background.



Figure 2: Looking northeast. 20' tall microphone pole at the edge of the clearing.



Figure 3: Looking northwest at the forest edge. Microphone pole in center with Select Design in background.

Site BELEC

An SM4 acoustic bat detector was at the edge of a field in the Pine Street Barge Canal Superfund Site 400′ west of Pine St. and 700′ north of Electric Ave. Here, a patch of green ash and black locust transitioned to an open habitat with phragmites, goldenrod, and low grasses. The detector was placed at the edge of the forest, 15′ east of a wide trail leading into the trees towards an encampment. The Smm-u1 microphone was placed atop a 20′ pole, facing north. The microphone was placed here intending to capture bats traveling along the forest's edge.



Figure 4 SM4 detector at base of green ash tree, looking south.



Figure 5 Looking southeast towards the forested patch with microphone pole in left.



Figure 6 Looking west towards trail into forested patch.

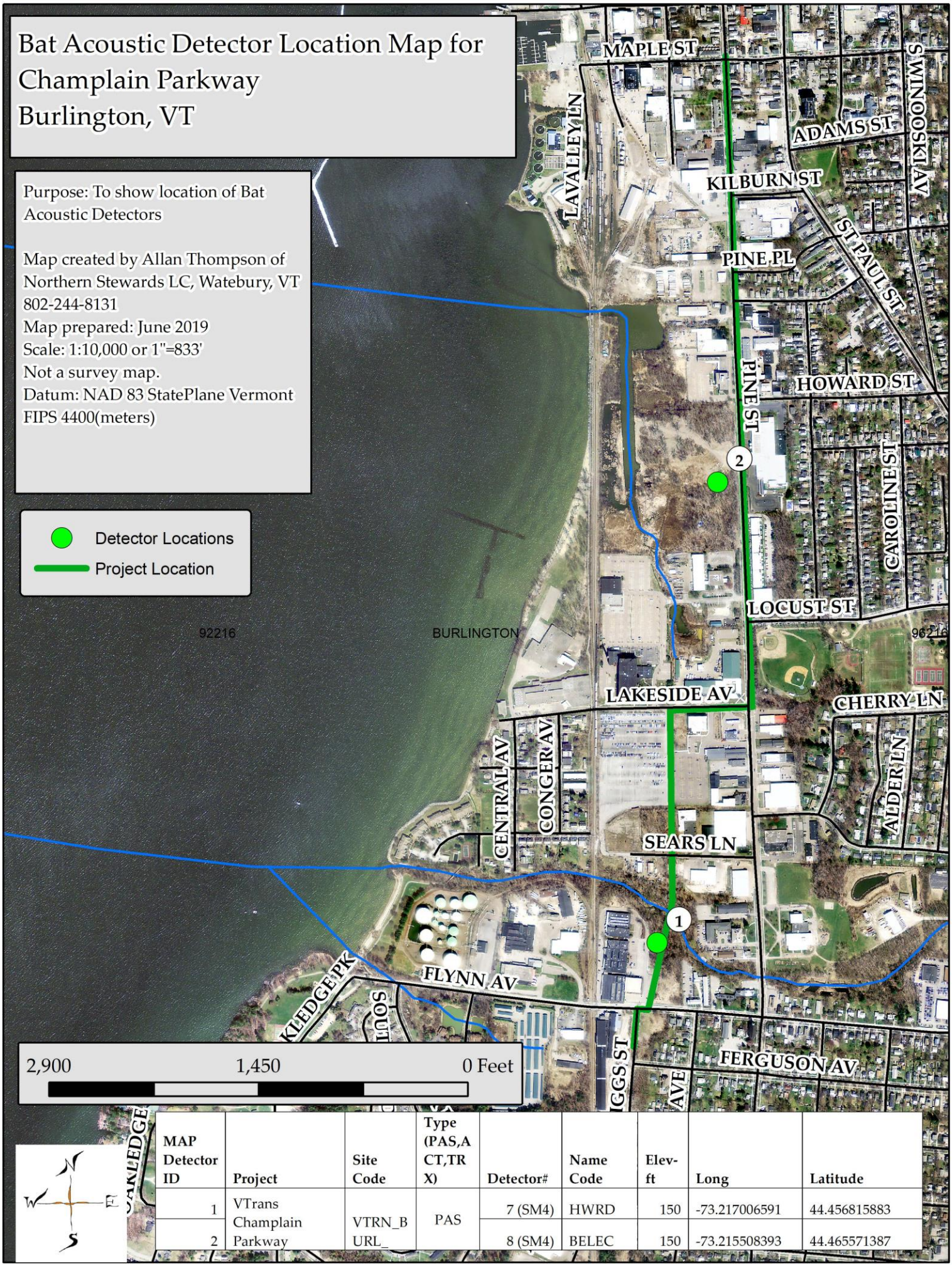


Figure 7: Looking south into the forested patch from the field and path, microphone in left.

Bat Acoustic Detector Location Map for Champlain Parkway Burlington, VT

Purpose: To show location of Bat Acoustic Detectors

Map created by Allan Thompson of Northern Stewards LC, Watebury, VT
802-244-8131
Map prepared: June 2019
Scale: 1:10,000 or 1"=833'
Not a survey map.
Datum: NAD 83 StatePlane Vermont FIPS 4400(meters)



MAP Detector ID	Project	Site Code	Type (PAS,ACT,TRX)	Detector#	Name Code	Elev-ft	Long	Latitude
1	VTrans Champlain Parkway	VTRN_BURL_	PAS	7 (SM4)	HWRD	150	-73.217006591	44.456815883
2				8 (SM4)	BELEC	150	-73.215508393	44.465571387

(Shading indicates weather conditions that may reduce call quality or bat activity).						
Number of Detectors	Survey Night	Sunrise	Sunset	Low Temp (F)	Rain (in)	Wind Speed Max/Average (MPH)
		From US Naval Observatory: Bennington		From NOAA Daily Climate Summary: Bennington		
1	5/20	n/a	8:16 PM	54	0.15*	22/11.5
1	5/21	5:17 AM	8:17 PM	47	0.01	31/14.1
1	5/22	5:16 AM	8:18 PM	45	T	20/7.7
1	5/23	5:16 AM	8:19 PM	53	0.08*	21/11.0*
1	5/24	5:15 AM	8:20 PM	48	0.6	25/9.9
1	5/25	5:14 AM	8:21 PM	44	0.92	22/9.1
1	5/26	5:13 AM	8:22 PM	58	0.08	18/9.9
2	5/27	5:12 AM	8:23 PM	47*	0	16/7.0
2	5/28	5:12 AM	8:24 PM	46	0.49	10/4.0
2	5/29	5:11 AM	8:25 PM	47	0	10/4.0
2	5/30	5:11 AM	8:26 PM	48	0	20/9.8
2	5/31	5:10 AM	8:27 PM	50	0.02*	20/7.1
2	6/1	5:09 AM	8:27 PM	47	0.02	12/3.9
1	6/2	5:09 AM	8:28 PM	56	0.57*	22/8.9
2	6/3	5:08 AM	8:29 PM	46	T	22/8.1
2	6/4	5:08 AM	8:30 PM	43	0.05	24/7.4
2	6/5	5:08 AM	8:30 PM	51	0.80*	9/3.8
2	6/6	5:07 AM	8:31 PM	53	0.10*	16/6.8
2	6/7	5:07 AM	8:32 PM	48	0.00	17/4.2
2	6/8	5:07 AM	8:32 PM	50	0.00	15/5.6
2	6/9	5:06 AM	8:33 PM	49	0.00	15/6.2
2	6/10	5:06AM	N/A	64	0.04	16/9.3
*WeatherUnderground hourly reporting shows weather conditions for first 5 hours of surveying to be suitable.						

Survey conditions (Table 3) were challenging through the survey period. Cold nights, rain and wind required multiple survey nights to occur in order to collect data during optimal weather conditions. During the 21 calendar nights of the survey period seven nights provided temperatures >50°F, little to no rain during the first 5 hours of the survey night, or little to no winds (<9mph).

Table 4: Detector Details						
Site Name	Detector Number	Detector Manufacturer	Detector Type	Microphone	Attachments	Suitable Survey nights
HWRD	7	Wildlife Acoustics	SM4	SMM-U1 with no filter	None	7
BELEC	8	Wildlife Acoustics	SM4	SMM-U1 with no filter	None	5
				Survey Nights with suitable weather conditions		12

Analysis Process

This survey was completed by Allan Thompson of Northern Stewards during May and June 2019 in accordance with USFWS 2019 Range Wide Indiana Bat Summer Survey Guidelines Phase 2, Step 5-7. The following report summarizes the results of the Automated Acoustic Analyses in accordance with Step 6 of Phase 2 utilizing Kaleidoscope Pro, a USFWS approved acoustic bat ID program and Step 7 of Phase 2; qualitative analysis of probable high-frequency call data from that site/night where target species is considered likely by the automated acoustic program. This report targets MYLU, MYLE, and PESU for qualitative analysis in addition to MYSE. MYSO was presumed absent for this analysis.

Automated Acoustic Analysis (Phase 2, steps 5 and 6)

Detectors were recording for a total of 34 detector nights. Detectors were retrieved and data was downloaded, backed up, scrubbed (non-bat files removed), labeled and analyzed.

File scrubbing: Sonobat's Batch Scrubber 5.7 is used to sift through files and remove non-bat files. Only high quality files are accepted and files <20kHz are excluded from analysis. Scrubbed files are removed from analysis and placed into subfolder labeled "scrubbed folder".

File naming

Sonobat's Batch Attributer 6.5 is used to name files and attribute file details. Files are attributed and placed in Attributed folder. Original files are kept in Raw data folders. Files were named by Northern Stewards using the following formula: 3 digit Survey type_3-4 digit detector model_2-4digit surveyors detector code_4-digit project code_4digit-site code_4-5 digit-sitecode_date_time.wav

Example:

PAS_SM4_DET7_VTRN_BURL_HWRD-20180702_040827.wav
PAS_SM4_DET8_VTRN_BURL_BELEC-20180703_023124.wav

Where:

- Detector Code = SM4_DET7= Wildlife Acoustics Detector SM4 with a microphone SMM-u1 and surveyors detector code, DET7
- Detector Code = SM4_DET8= Wildlife Acoustics Detector SM4 with a microphone SMM-u1 and surveyors detector code, DET8
- Project Code =VTRN_BURL = Vermont Department of Transportation Champlain Parkway acoustic surveys in Burlington, Vermont.
- Site Code_Location Code = HWRD = Forested patch adjacent to the Howard Center on Flynn Ave.
- Site Code_Location Code = BELEC = Forested patch on the Pine Street Barge Canal Superfund Site, north of Burlington Electric.

Table 5: Number of files recorded per site

Site	Location	Number of Files Scrubbed	Number of Files Analyzed	Total
Champlain Parkway	HWRD	3466	**1536**	5002
	BELEC	2897	**7770**	10667
Total		6363	**9306**	15669

Coarse Analysis (Phase 2 step 5)

All 9306 files were analyzed using Wildlife Acoustics' Kaleidoscope Pro (KaPro) 5.1.0 ("0", neutral setting). This program analyzed the files, provided species identification where possible, and among other things, a characteristic frequency or Fc. Bats in the genus *Myotis* are distinguished from other bats by having an Fc of 35kHz or greater. This coarse filter can be used to filter for bat files that are considered low frequency (LowF) bats or bats with an Fc below 35 kHz. Big Brown, hoary, silver-haired, and sometimes red bats (variable Fc) are considered LowF bats. Tri-colored, sometimes the red (variable Fc), and all bats in the genus *Myotis* which includes the northern long-eared, little brown, Indiana, eastern small-footed and tri-colored bats are all considered high frequency (HiF) bats.

Of the 9306 files analyzed, 9069 files (97%) are considered to be created by bats. Of the 9069 bat files, 2278 files (34%) were considered to be HiF with an Fc greater than or equal to 35kHz (Table 6).

Table 6: KaPro Coarse Analysis			
Frequency Clad	**Total Number of files**	**HWRD**	**BELEC**
HiF	2278	828	1450
LoF	6791	586	6205
Bats	9069	1414	7655
Noise	237	122	115
Total	9306	1536	7770

Once it was determined that high frequency bats are present, all files were analyzed using KaPro version 5.1.0's auto classifier ("0", neutral setting) in accordance with USFWS Phase 2, step 6. **Table 7** and **Error! Reference source not found.** show results of this acoustic analysis. Eight species were considered for analysis; MYLU (little brown), MYSE (northern long-eared), MYLE (eastern

small-footed), LABO (red), LANO (silver-haired),Epfu (big brown), and LACI (hoary), and PESU (tri-colored bat). The Indiana bat (MYSO) was considered absent and not included in this analysis.

Quantitative Analysis (steps 5 and 6) Conclusions

Kaleidoscope Pro identified 9069 of the 9306 files as bat passes (some files considered noise by Kaleidoscope Pro) and classified 7766 or 85% of those bat passes to species.

Step 5 coarse filter analysis resulted in positive confirmation of HiF and Myotid calls. Results from Step 6, (Table 7) automated classification using Kaleidoscope Pro' site/night level Maximum Likelihood Estimate (MLE) indicate the following species are present by having an MLE <0.05: big brown, (Epfu), red (LABO), hoary (LACI), silver-haired (LANO), eastern small-footed (MYLE), little brown (MYLU) and northern long –eared (MYSE) bat for at least one site-night. Specifically, Step 6 resulted in the presence of MYSE being considered probable. As a result of MYSE's presence being considered probable, qualitative analysis, Step 7 of the USFWS guidance, was completed.

Table 7 Kaleidoscope Pro Acoustic Nightly MLE output
(Shaded cells are those with MLE values <0.05 and correspond to species considered by Kaleidoscope to be present).

Date	EPFU	LABO	LACI	LANO	MYLE	MYLU	MYSE	PESU
20190520	0.1241969	1	1	1	1	0.0015936	1	1
20190521	0.1267355	1	1	1	1	0	0.270741	1
20190522	0.0001888	0.481989	0.901523	0.017237	1	0	0.6764517	1
20190523	0.3202193	0.119484	0.104306	0.190435	1	0.0000212	1	1
20190524	0.2469837	0.671431	1	0.031559	1	0.0000001	1	1
20190525	0.5863602	1	1	0.076479	1	1	1	1
20190526	0	0.985567	0.011835	0.590162	1	0	1	0.557794
20190527	0.0000038	1	1	1	1	0	1	0.291725
20190528	0	0.037411	1	0.692404	1	0	0.6212291	0.50187
20190529	0	1	0.002248	1	1	0	1	1
20190530	0	0.517843	1	1	1	0	1	1
20190531	0	1	1	1	1	0	1	1
20190601	0	1	1	1	0	0	0.0000005	0.20391
20190602	0	0.951348	1	0.976454	1	0	1	1
20190603	0	1	1	1	1	0	0.5265648	1
20190604	0	1	1	1	1	0	0.5020457	1
20190605	0	0.387237	1	1	1	0	1	1
20190606	0	0.59223	0.403663	0.519652	1	0	1	1
20190607	0	0.330554	0.028875	1	1	0	0.0000002	1
20190608	0	0.236689	0.186796	1	1	0	0.0000267	1
20190609	0	0.650368	0.770833	1	1	0	0	1

Epfu= *Eptesicus fuscus, LANO = Lasionycteris noctivagans, LABO= Lasiurus borealis, LACI = Lasiurus cinereous MYLE= Myotis leibii, MYLU= Myotis, lucifugus, MYSE =Myotis septentrionalis, PESU= Perimyotis subflavus.*

<1 values represent species that were detected at the site/night. Values of <.05 suggests presence

1 values represent species that is not considered present

Table 8 Kaleidoscope Pro Acoustic Nightly file output.
Values indicate number of files classified to that species. (Shaded cells are those with MLE values <0.05 and correspond to species considered by Kaleidoscope to be present).

Date	All	% of total bat files per night.	EPFU	LABO	LACI	LANO	MYLE	MYLU	MYSE	PESU	NOID	NOISE
20190520	4	0.04%	1					3			0	2
20190521	14	0.15%	1					11	1		1	2
20190522	70	0.76%	8	3	1	6		35	1		16	8
20190523	20	0.22%	2	2	2	3		7			4	1
20190524	28	0.30%	2	1		3		9			13	4
20190525	6	0.07%	1			2					3	1
20190526	142	1.54%	16	3	5	5		74		1	38	13
20190527	52	0.56%	6	1				35		1	9	4
20190528	121	1.31%	46	5	2	8		31	1	1	27	3
20190529	177	1.92%	81	1	12	11		33			39	14
20190530	1745	18.93%	804	27	33	66		583		2	230	20
20190531	766	8.31%	508	3	13	23		103	1		115	7
20190601	811	8.80%	512	4	17	41	1	122	11	2	101	17
20190602	376	4.08%	270	2	4	35		42			23	8
20190603	158	1.71%	49	2	2	3		79	2		21	9
20190604	690	7.49%	518		7	21		78	2		64	14
20190605	79	0.86%	31	3				31			14	4
20190606	623	6.76%	418	4	24	62		60			55	17
20190607	504	5.47%	258	5	22	4		61	9		145	30
20190608	401	4.35%	224	4	16	17		38	6		96	16
20190609	2282	24.76%	1685	8	81	50		148	21		289	43
Total	9217	98.39%	5467	81	278	370	1	1599	55	7	1359	6452
Percent of total files per species totals			59.31%	0.88%	3.02%	4.01%	0.01%	17.35%	0.60%	0.08%	0.00%	

Epfu= *Eptesicus fuscus, LANO = Lasionycteris noctivagans, LABO= Lasiurus borealis, LACI = Lasiurus cinereous MYLE= Myotis leibii, MYLU= Myotis, lucifugus, MYSE =Myotis septentrionalis, PESU= Perimyotis subflavus.* Blank cells indicate that no files were classified to a particular species for that night. Blank cells indicate that no files were classified to a particular species for that night.

Step 7; Qualitative Analysis

In accordance with Step 7 of the USFWS summer survey guidance, Qualitative analysis for all high frequency files for those site-nights where MLE's for target species are <0.05. MYSE has an MLE of <0.05 for four site-nights. These site nights also have MLE's of <0.05 for MYLU and one of these nights has an MLE of <0.05 for MYLE. As a result the 681 files considered high frequency for those site nights are manually vetted.

Table 9 Kaleidoscope Pro Acoustic Nightly MLE output for those nights with MLE's <0.05 for target high frequency species and the total number of high frequency files per nights

Date	Number of High frequency files	MLE		
		MYLE	MYLU	MYSE
20190601	185	0	0	0.0000005
20190607	132	1	0	0.0000002
20190608	105	1	0	0.0000267
20190609	259	1	0	0
Total	681			

<1 values represent species that were detected at the site/night. Values of <.05 suggests presence. A value of 1 indicates that that species was not observed.

Manual ID of bat files.

Four acoustic file criteria are generally required to generate a manual ID for a given file. 1) Long call sequence with at least 6 clear pulses that share similar characteristics. A long call sequence will ensure you are considering many pulses and that you can determine behavior. 2) The bat should be exhibiting typical search behavior, that is, bat pulses are consistent throughout the sequence. This includes the absence of other bats. It is generally accepted that bats that fly in the "open" and are searching, exhibit consistent and reliable call characteristics for which species ID's can be generated. However, search behavior typically refers to consistent pulses within a call sequence recorded in a relatively open condition that is absent of clutter. Calls emitted in these open conditions are most easily identified to species. Identifying a bat call sequence that includes pulses which exhibit a variety of characteristics are avoided. 3) The presence of harmonics (only observed in Sonobat) will prove that a high frequency is the true high frequency for a given pulse and not an aberration of noise or echoes or a quiet or attenuated call. 4) Low noise to signal ratios. A good call will have a clear pulse pattern, without noise (visible as blue dots in Sonobat) that clouds call patterns. Noises are generated from ambient and environmental noises, echoes or recording equipment.

Manual ID of Myotis Spp. *(*Table 10*)*
Not all bat calls include distinguishing features and sometimes distinguishing features are not recorded. The presence or absence of these features can be a function of the recording environment, a subject's behavior, recording parameters or equipment. When they are absent, classifying species with high probability is impossible, especially distinguishing between *Myotis* spp. Myotis species are distinguished from other bats in the northeast by an fc greater than 40 kHz and by having a prominent tail in their call. MYLE and MYSE both can have long tails with low-lower frequencies.

MYLU/MYSO can be distinguished from other *Myotis* spp by having a lowest slope of <3kHz/ms or having a call duration of >7ms. MYLU will have high frequencies that, with a harmonic (harmonic only visible in Sonobat), are generally <80kHz.

MYSE can be distinguished from other *Myotis* spp in part by having a high Fc (>48Khz), high high frequencies (>110kHz), high FreqMaxPwr (>75kHz), Steep SlopeAtFC (>13kHz/ms), or steep and near linear total slopes (>22kHz/ms). These do not indicate limits, or ranges of frequencies or slopes. For example, and especially in high amounts of clutter, MYLU/MYSO can exceed 100kHz and have slopes that resemble MYSE. In addition, MYLE can reach high frequencies as high as 115kHz. As a result, features still overlap greatly. Because of this overlap, for a call to be adequate for positive identification of a MYSE, characteristics should appear on a majority of pulses within a call sequence and occur without overlap with other species.

MYLE can be distinguished from other *Myotis* spp by calls that demonstrate all of the following characteristics: high high frequencies, steep slopes and overall a smooth curve with no inflection. MYLE calls tend to have high frequencies below 100kHz, but can reach as high as 115kHz. These higher frequency calls can overlap greatly with MYSE. In cases where they do, that is, have high frequencies between 100 kHz and 115 kHz and have steep slopes, MYSE can be distinguished by having a linear or near linear slope from high frequency to low frequency. MYLE can have this same steep, near linear upper slope and can be distinguished from MYSE by having a gentle curve between the upper and lower slopes with a slope@fc most often below 12kHz/ms (a distinguishable MYSE slope@fc is generally > 13kHz/ms) and as low as 0.0 kHz/ms (flat). The slope@fc varies greatly within both MYSE and MYLE and the steeper, more linear or vertical a slope is, the more unreliable a characteristic frequency, therefore the slope@Fc, can be. However, this smooth, gentle curve with no inflection is distinctive of MYLE, but lacking this curve is not distinctive of MYSE. If a call exhibits a high high frequency (100kHz-115kHz) with a steep, near linear upper slope and has an inflection with a distinct knee, it can be very difficult to determine between MYLE or MYSE. MYLU may reach a high frequency of 100kHz-105kHz and may produce steep linear slopes but these characteristics are usually recorded under very cluttered environments (mine entrance or dense forest canopy).

Approach and feeding vs. MYSE

Lastly, feeding buzzes, recordings made in highly cluttered environments, or bats on approach to an object may exhibit near linear pulses with high-high frequencies. These pulses may appear to satisfy MYSE call characteristics but almost always have preceding or subsequent pulses that are dramatically different. These sequences are often incorrectly have an automated classification of MYSE or MYLE and require manually vetting to consider an entire sequence. Species such as Epfu and LABO can often exhibit near linear pulses with an Fc > 35kHz but still have a high high frequency <65kHz.

Table 10: Features helpful to distinguish from and between species

Blank spaces are features that do not help distinguish from or between species

Variable	MYLU	MYSE	MYSE from MYLU	MYSE from MYLE	MYLE	MYLE from MYLU	MYLE from MYSE
Call Duration	**>7ms**						
Fc		>48kHz	>48kHz	>48kHz	>45kHz	>45kHz	
HiFreq	<90kHz with harmonics	**>115kHz**, generally >100kHz	>100kHz	>110kHz	**<115kHz, generally >100kHz**	>90kHz	<115kHz, with harmonics
FreqMaxPwr		>71kHz	>73kHz	>71kHz			
Slope@fc	<10kHz, generally **<5kHz.ms**	**>20kHz/ms** generally >13kHz/ms	>5kHz/ms	>12kHz/ms	<12kHz/ms		
Total Slope	<12kHz/ms	**>22kHz/ms**	>12kHz/ms	>22kHz/ms	<22kHz/ms	>12kHz	
Other characteristics	Generally long call, with modest slopes	**Slope staying linear, sometimes appearing vertical**, sometimes with toes down to 25-32 kHz			**Smooth, no inflection. Starting out nearly linear or vertical (steep upper slope then flattening out<10kHz for lower slope**) Not always smooth.		

Bold text = features, that are characteristic of species and can be helpful for ID. These characteristics are not necessarily typical or average characteristics but are used to distinguish between species.

Variable	Definition
Call Duration	Duration of the call (milliseconds).
Fc	Characteristic frequency of the call. Determined by finding the point in the final 40% of the call having the lowest slope or exhibiting the end of the main trend of the body of the call (kHz).
HiFreq	Highest apparent frequency of the call, most helpful when harmonics are present
FreqMaxPwr	The frequency that the call is the loudest
Slope@fc	The slope of the call at the Fc or characteristic frequency
Total Slope	Total slope of the call, calculated from the difference in frequency and time from the point of highest frequency to the point of the characteristic frequency.
Inflection	Inflection or knee is an abrupt point at which slope changes from steep to flatter.

Table 11: Manual Species ID and Rationale				
File Name	Figure Reference	KaPro	Manual Classification	Rationale
PAS_SM4_DET8_VTRN_BURL_BELEC-20190610_023220.wav	Figure 10	NOID	MYLE	This file is good quality with many clear pulses and harmonics. Pulses are consistent. High frequencies are between 90-101kHz with slopes steep. Upper slopes >30kHz/msec with total slopes ~20kHz/msec. Lower slopes are flatter at 9kHz/msec. Transitions between upper and lower slopes are gentle and lack a distinct knee. Durations are short, <4msec and generally <3.5msec. This file does not , nor does any files, include definitive conditions to warrant a manual classification. However taking each characteristic in the context with eachother, this file is manually classified as MYLE. 8 other files received similar classification.
PAS_SM4_DET7_VTRN_BURL_HWRD-20190609_212416.wav	Figure 11	MYOLUC	MYLU	This file is good quality with many clear pulses and harmonics. Pulses are consistent. High frequencies are between 70-80kHz with slopes moderate. Upper slopes 15-18kHz/msec with total slopes ~5kHz/msec. Slopes @Fc <2kHz/msec if not flat. Transitions between upper and lower slopes have a distinct knee. Durations are long 6-8msec. This file is classified as MYLU.
PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_005856.wav	Figure 12	MYOSEP	EPFU	These files are good quality with many pulses. Some noise and echoes are present but generally clear. Pulses are slightly variable within a sequence suggesting non-search behavior with pulses exhibiting LoF characteristics. Harmonics are present with high frequencies that do not exceed 80kHz. Slopes are near linear but variable and not exceptionally steep, <18kHz/msec. Low frequencies are low, 25-35kHz and Fc is between 35-36kHz. These files generally lack Myotis characteristics and share similar characteristics with Epfu. KaPro is using the linear slope conditions for its classification but generally ignoring other characteristics. These files resemble Epfu in a cluttered environment, or on approach. Files classified as Epfu.
PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_005908.wav	Figure 13	MYOSEP	EPFU	
PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_214036.wav	Figure 14	MYOSEP	EPFU	
PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_214042.wav	Figure 15	MYOSEP	EPFU	
PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_221320.wav	Figure 16	MYOSEP	EPFU	
PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_221346.wav	Figure 17	MYOSEP	EPFU	
PAS_SM4_DET7_VTR	Figure 18	MYOSEP	EPFU	

N_BURL_HWRD-20190608_231910.wav				
PAS_SM4_DET7_VTRN_BURL_HWRD-20190609_211352.wav	Figure 19	MYOSEP	EPFU	
PAS_SM4_DET7_VTRN_BURL_HWRD-20190610_012244.wav	Figure 20	MYOSEP	EPFU	
PAS_SM4_DET8_VTRN_BURL_BELEC-20190601_215124.wav	Figure 21	MYOSEP	EPFU	
PAS_SM4_DET8_VTRN_BURL_BELEC-20190601_215808.wav	Figure 22	MYOSEP	EPFU	
PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013142.wav	Figure 23	MYOSEP	Myotis	This file is moderate to poor quality with few clear pulses. Harmonics are absent with high frequencies that do not exceed 75kHz. Distinct toes are present on a few pulses suggesting Myotis. Otherwise difficult to classify. Classified as Myotis.
PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013314.wav	Figure 24	MYOSEP	Mylu	This file is good quality with many, clear pulses. Harmonics are absent with high frequencies that do not exceed75kHz. curvilinear with distinct knees. Early pulses may appear quiet and resemble Myse, but higher quality pulses are clearly not myse. Durations are short 3-5msec but slopes are low, total <9kHz/msec and @fc<3kHz/msec. Classified as MYLU.
PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013718.wav	Figure 25	MYOSEP	Myotis	This file is moderate to poor quality with few clear pulses. Harmonics are absent with high frequencies that do not exceed 70kHz. Distinct toes are present on a few pulses suggesting Myotis. Otherwise difficult to classify. Classified as Myotis.
PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_022818.wav	Figure 26	MYOSEP	Unknown	This file is poor quality with no clear pulses. Harmonics are lacking. Toes may be present but noise is present and difficult to identify. Quiet pulses. Resembles Myotis but overall lacking enough information for classification. Classified as Unknown.
PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_023534.wav	Figure 27	MYOSEP	Myotis	This file is moderate to poor quality with few clear pulses. Harmonics are absent with high frequencies that do not exceed 80kHz. Distinct toes are present on a few pulses suggesting Myotis. Pulses are quiet and lack enough information. Another bat or insect may be present as well. Otherwise difficult to classify. Classified as Myotis.
PAS_SM4_DET8_VTRN_BURL_BELEC-20190607_212222.wav	Figure 28	MYOSEP	Epfu	These files are good quality with many pulses. Some noise and echoes are present but generally clear. Pulses are slightly variable within a sequence suggesting non-search behavior with pulses exhibiting LoF characteristics. Harmonics are present with high frequencies that do not exceed 80kHz. Slopes are near
PAS_SM4_DET8_VTRN_BURL_BELEC-20190607_221514.wav	Figure 29	MYOSEP	Epfu	

PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230544.wav	Figure 30	MYOSEP	Epfu	linear but variable and not exceptionally steep, <18kHz/msec. Low frequencies are low, 25-35kHz and Fc is between 35-36kHz. These files generally lack Myotis characteristics and share similar characteristics with Epfu. KaPro is using the linear slope conditions for its classification but generally ignoring other characteristics. These files resemble Epfu in a cluttered environment, or on approach. Files classified as Epfu.
PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230558.wav	Figure 31	MYOSEP	Epfu	
PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230900.wav	Figure 32	MYOSEP	Epfu	
PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_235744.wav	Figure 33	MYOSEP	Unknown	This files is good quality with many clear pulses. Pulses are slightly variable within a sequence suggesting non-search behavior with pulses exhibiting LoF characteristics. Harmonics are present with high frequencies that do not exceed 80kHz. Slopes are near linear but variable and not exceptionally steep, <18kHz/msec. Pulses generally lack Myotis characteristics and share similar characteristics with Labo or Epfu. KaPro is using the linear slope conditions for its classification but generally ignoring other characteristics. This file resembles Epfu in a cluttered environment but variability and high Fc suggest possible Labo. File classified as Unknown.

Qualtitative Analysis Conclusions

A total of 681 high frequency files (Fc greater than or equal to 35kHz) were manually classified accounting for site nights June 1st, June 7th, 8th and 9th 2019. The following summarizes findings.

Table 12: Number of high frequency files manually classified for the four site-nights.

Species	Manual Classification	KaPro Classification
Epfu	145	11
LABO	5	20
LACI	0	0
LANO	0	0
MYLE	9	1
MYLU	283	367
MYSE	0	22
PESU	0	2
MYOTIS	138	0
NOID	101	258
NOISE	0	0
Total	681	681

MYSE

KaPro identified 22 files as MYSE. These files were manually vetted and decidedly not belonging to MYSE. These files, for the most part are not even considered belonging to the genus Myotis. These files are for the most part belonging to EPFU. EPFU, in cluttered environments or on approach will exhibit linear calls at times, steep and resemble that cause KaPro to classify as MYSE. But these files were characteristically low frequency, often having an Fc of 35kHz, just barely reaching the High frequency threshold. At no time did these files have high frequencies that exceeded 85kHz and most did not exceed 70kHz. Other classifications of these files included MYOTIS, LABO, MYLU or NOID.

A total of 55 files were classified as MYSE throughout the entire survey period. Files not associated with the four site nights were also manually vetted as not belonging to MYSE but instead, classified as EPFU, LABO, Myotis or NOID. Similarly, these files did not share the characteristics representative of MYSE and Manual Vetting disagrees with the conclusion that MYSE is present.

MYLU

KaPro identified 367 files as MYLU. Manual vetting resulted in 283 files classified as MYLU, agreeing with KaPro in most cases. Other manual classifications included Myotis, NOID or LABO. But overall, Manual vetting agrees with the conclusion that MYLU is present.

KaPro classified a total of 1583 of the 9306 files as belonging to MYLU. These files represent 17% of the recorded files during the survey period, suggesting either a healthy MYLU population or a close population. Relative to each microphone, MYLU represented 32% of the recorded files classified as MYLU by KaPro at the HWRD site compared to 14% at the BELEC site. Similarly, the HWRD site is considered interior forest and closer proximity to quality roost sites.

MYLE

KaPro identified one file as MYLE and this file is the sole file it based its probable presence conclusion (MLE<0.05). Manual vetting disagreed with this files classification, but did classify a total of 9 of the 681 files as MYLE. Files classified manually as MYLE were classified by KaPro as NOID, EPFU, or MYLU. These files exhibited high frequencies of 90-110kHz, steep upper slopes with gentle transition to lower frequencies (lacking a knee). These files lack the linear, vertical nature of MYSE calls, and the high upper frequencies and the distinct knee more deserving of a MYSE classification.

Entire Dataset

KaPro classifications of all files per site.

Species	HWRD	*Percentage of species per site total*	BELEC	*Percentage of species per site total*
EPFU	361	23.50%	5080	65.38%
LABO	30	1.95%	48	0.62%
LACI	37	2.41%	204	2.63%
LANO	41	2.67%	319	4.11%
MYLE	0	0.00%	1	0.01%
MYLU	503	32.75%	1080	13.90%
MYSE	23	1.50%	32	0.41%
PESU	2	0.13%	5	0.06%
MYOTIS	0	0.00%	0	0.00%
NOID	417	27.15%	886	11.40%
NOISE	122	7.94%	115	1.48%
Total	1536	100.00%	7770	100.00%

The majority of the bat calls were recorded at the BELEC site. The BELEC site is larger and a better foraging landscape, especially for larger bats. The HWRD site is considered more cluttered and in closer proximity to buildings suitable for bats roosting in buildings. The BELEC site recorded more EPFU files (65% compared to 24% at the HWRD site) and fewer MYLU files (14% compared to 33% at the HWRD site). EPFU files are variable and the majority exhibited characteristic call structure. That is, low frequencies, long durations, and low high frequencies. However some of these call structures exhibited steeper calls, higher frequencies and near-linear slopes but not vertical and limited bandwidth and within a lower bandwidth range (30kHz-70kHz) These calls can be and were (by KaPro) confused with MYSE, LABO and PESU. They are differentiated by Myotis by having, generally by having an Fc that is still close to 35kHz, and lacking toes, and generally long durations. Usually linear calls produced by Myotis calls are steep, near vertical and short in duration (<3msec). These EPFU calls are >3msec. With steep, linear calls of Myotis, we'd expect to see higher frequencies and greater bandwidth (40-100kHz) and still be <3msec.

Conclusion

After 35 detector nights, quantitative analysis of acoustic files (Phase 2 step 6) the following species presence were considered probable: EPFU, LABO, LACI, LANO, MYLE, MYLU and MYSE. During qualitative analysis (Phase 2 step 7), of high frequency bats, the following bats were confirmed for probable presence; EPFU, LABO, MYLE and MYLU. Additionally, manual vetting of all files classified by KaPro as MYSE disagree with KaPro's classification. Specifically, following the USFWS guidelines, Phase 2, step 7, the presence of MYSE is considered to be not probable and MYSO is assumed absent and therefore no further surveys are required.

Literature Cited

Broders HG, Findlay CS, Zheng L (2004) Effects of clutter on echolocation call structure of Myotis septentrionalis and M. lucifugus. Journal of Mammology 85(2):273-281.

Table 13: Acoustic Analysis Programs Used								
Progam	Version	Determine High Frequency (FC >35kHz)	Qualitative Analysis	Generate Auto ID's	Generate Site/night MLE's	MLE's reported	MLE's considered	Purpose
Sonobat	4.2.2	No	Yes	Yes	No	No	No	To manually view files
Kaleidoscope Pro	5.1.0 (VT region, neutral setting)	Yes	No	Yes	Yes	Yes	Yes	To produce automated classification, associated reports and call characteristics
Sonobat Batch Auto Scrubber and auto attributer	5.5	No	No	NO	NO	NO	NO	To "scrub" non-bat files out of the dataset and to rename files to site specific names. Adds metadata to file.

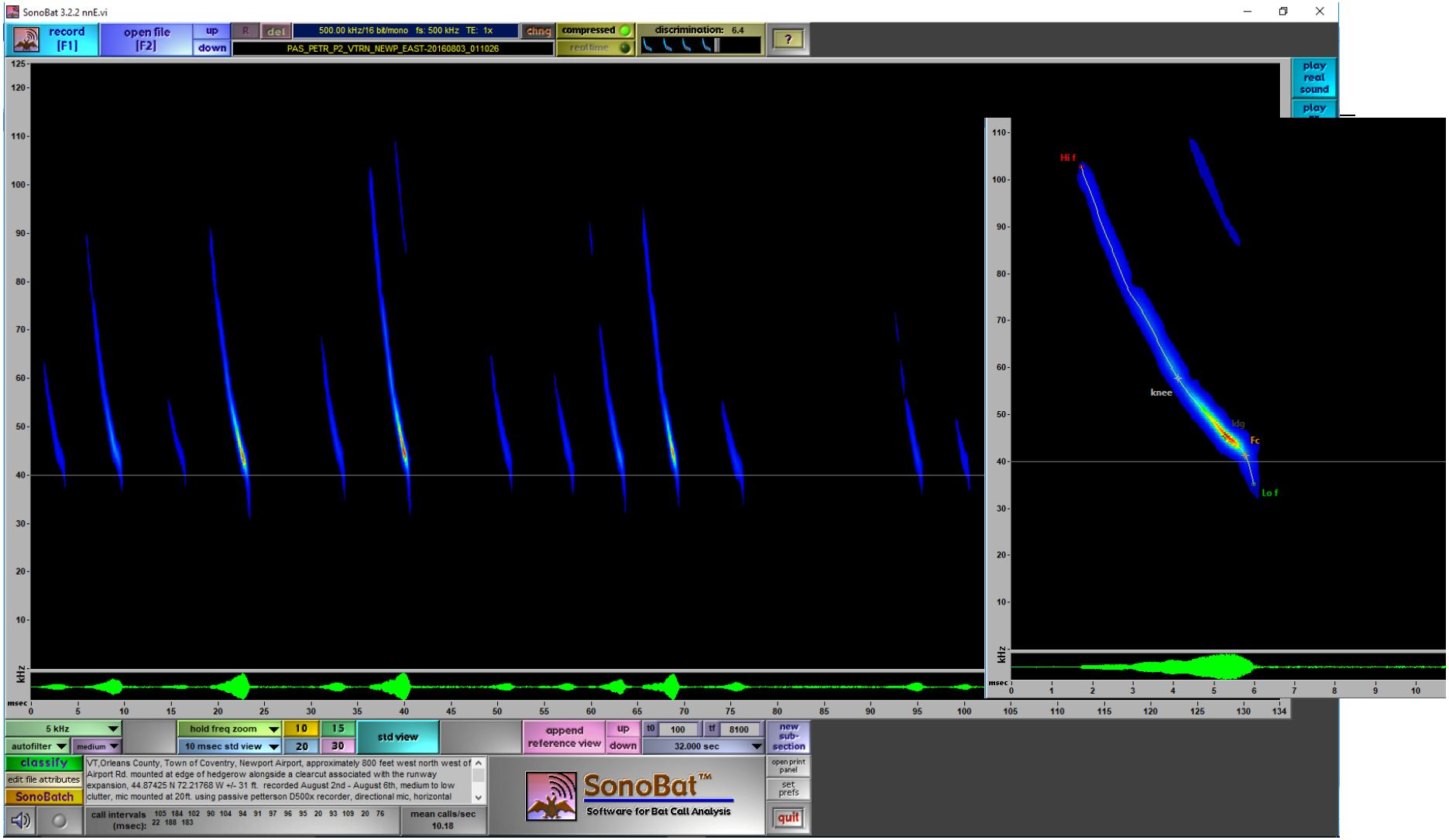


Figure 8: Vetted reference MYSE call **collected by Northern Stewards, Newport, VT. Notice long sequence, low noise, consistent call characteristics, and harmonics. High frequencies at roughly 110kHz with steep, nearly linear slopes.**

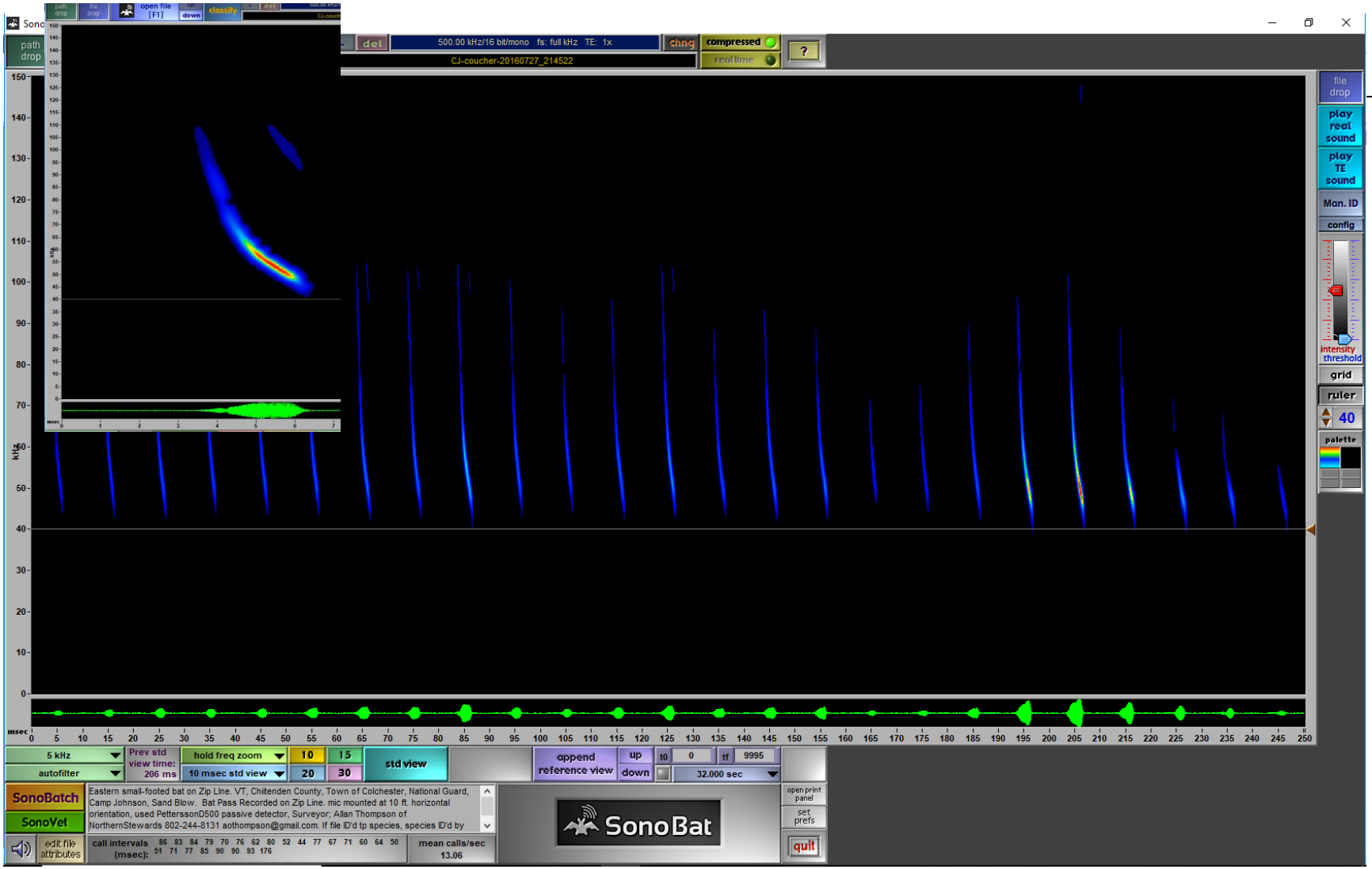


Figure 9: Vetted MYLE reference call **Notice high frequency >100kHz with harmonics, steep upper slope with gentle transition to lower frequencies. High Fc, with toes.**

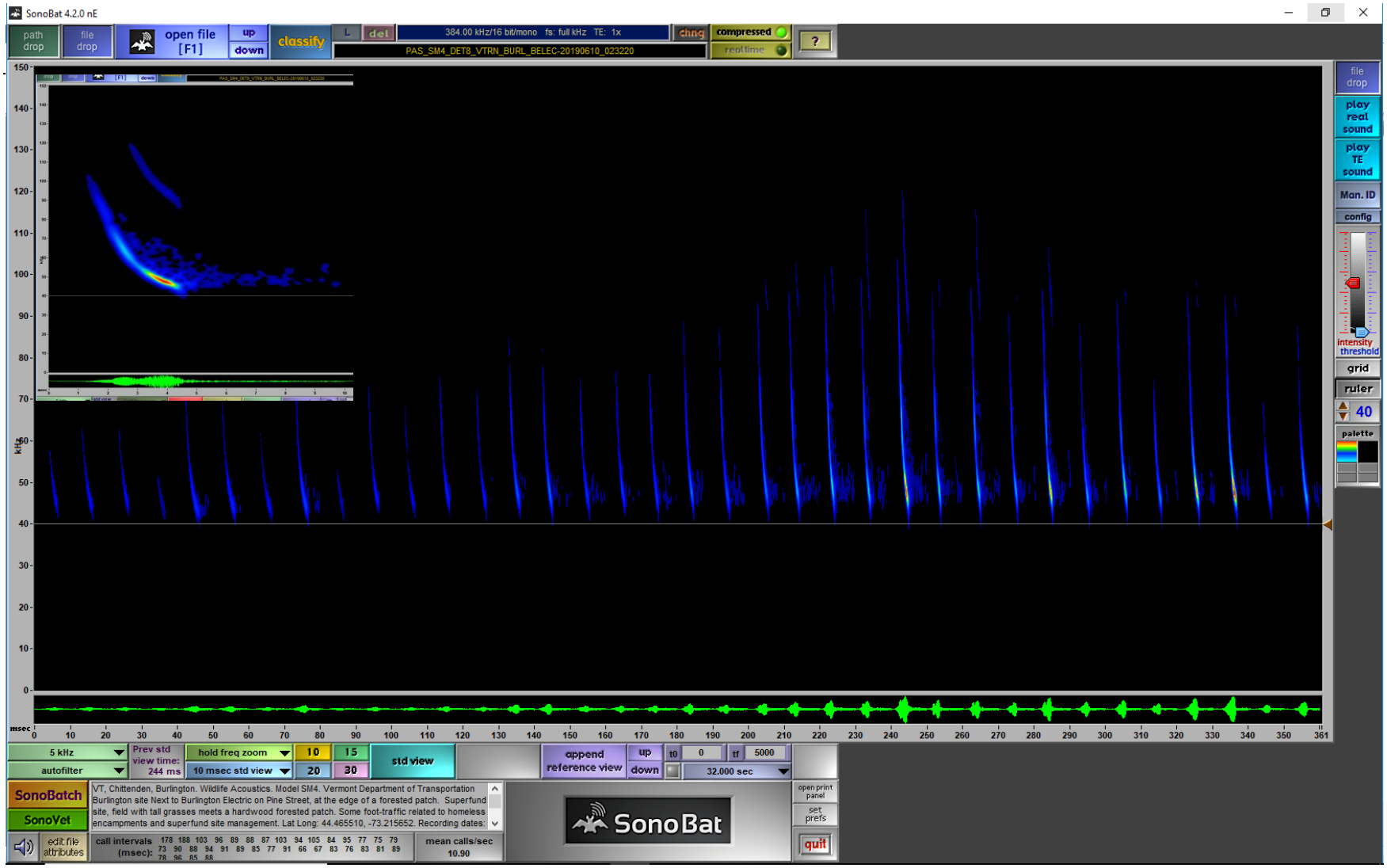


Figure 10: PAS_SM 4_DET8_VTRN_BURL_BELEC-20190610_023220.wav. Notice ruler at 40kHz, High Fc with consistent structure and steep upper slopes with gentle curve, lacking distinct knee to lower frequencies. Classified as MYLE

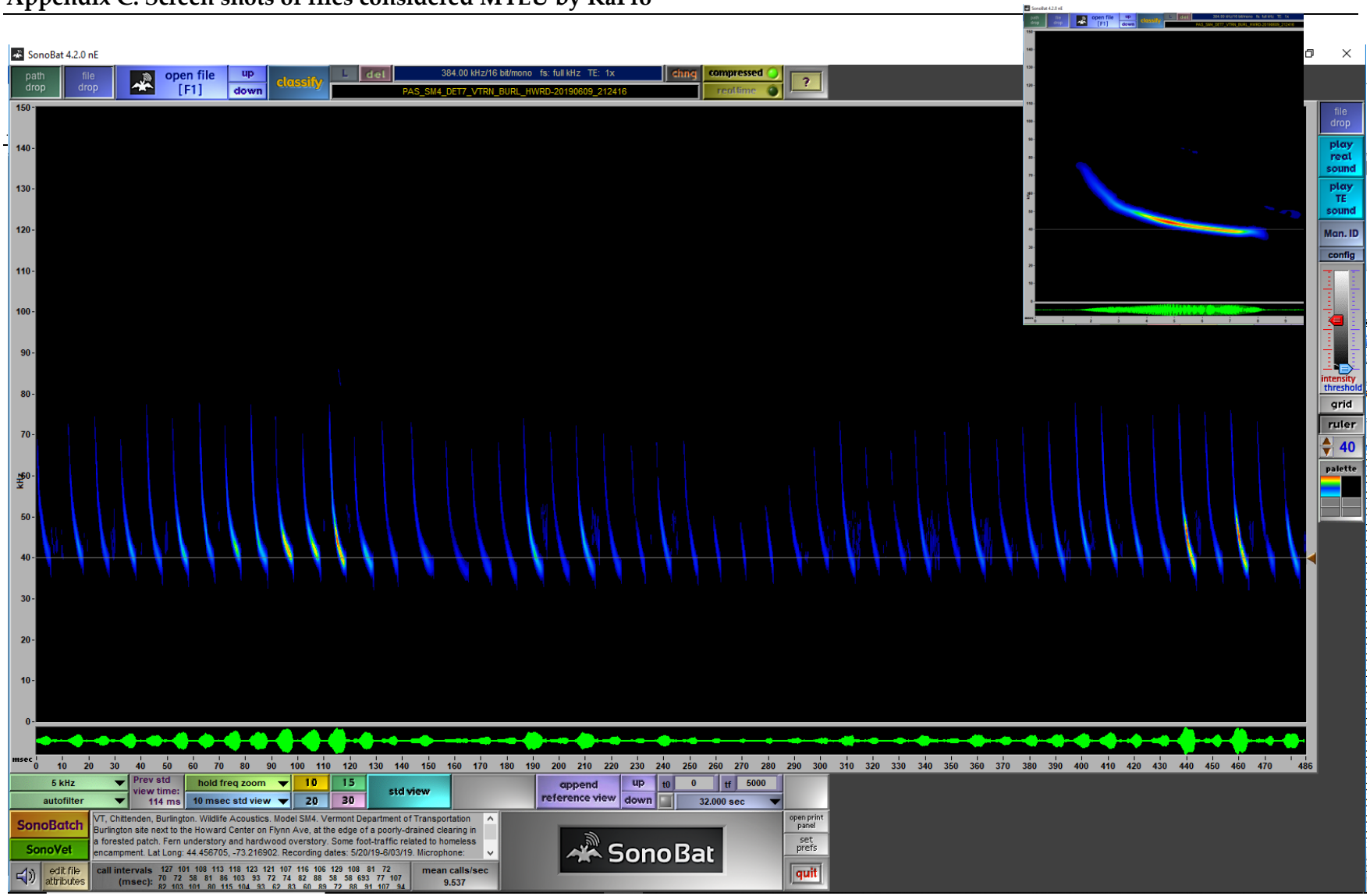


Figure 11: PAS_SM4_DET7_VTRN_BURL_HWRD-20190609_212416.wav. Ruler at 40kHz. Low high frequencies with harmonics, long call duration, low Fc, distinct toes Classified as MYLU.

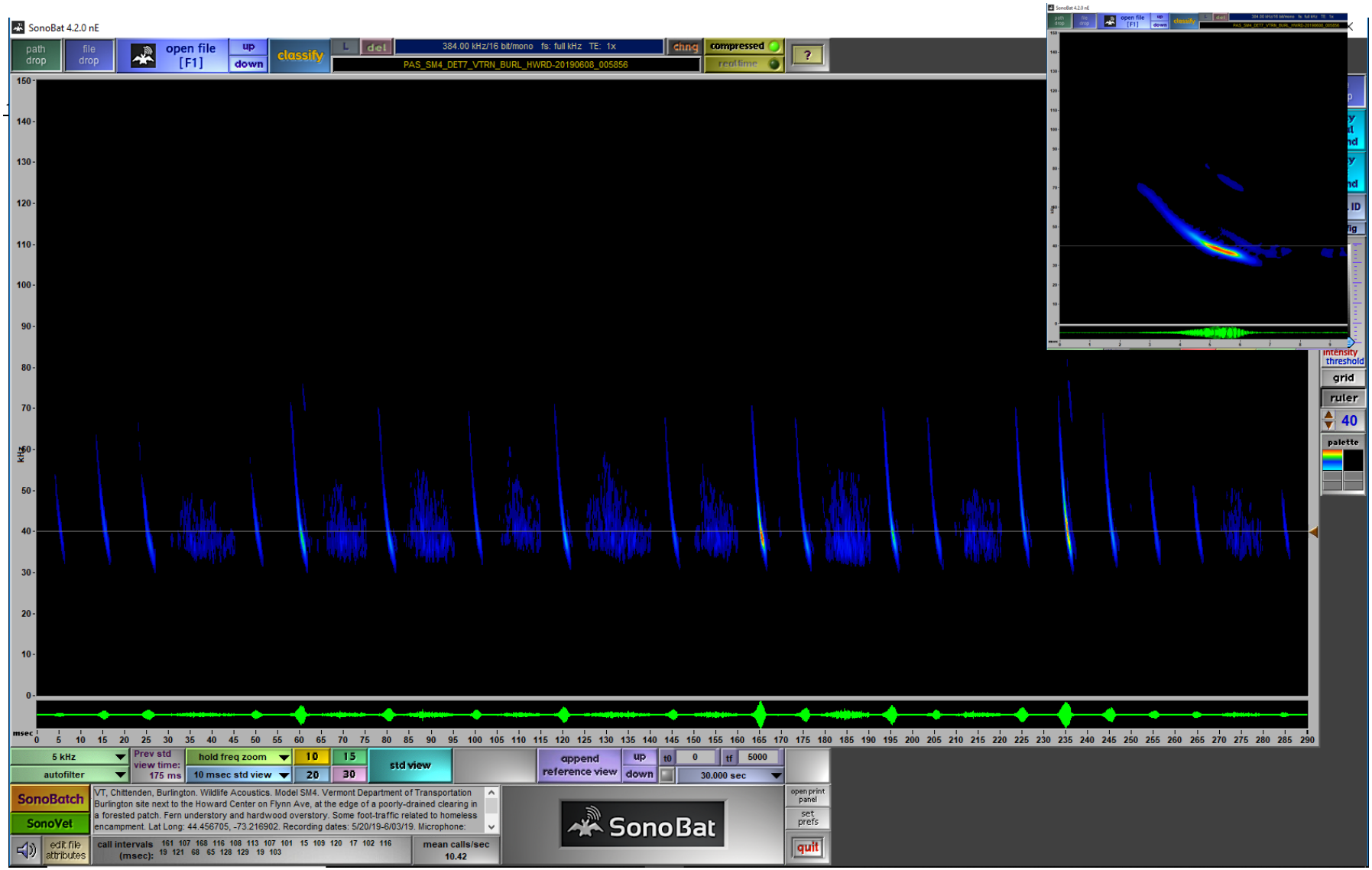


Figure 12: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_005856.wav. Ruler at 40kHz. Notice lack of clear toes, slight resemblance to Myotis calls, but with low frequencies and Fc. Inset shown at 10msec. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

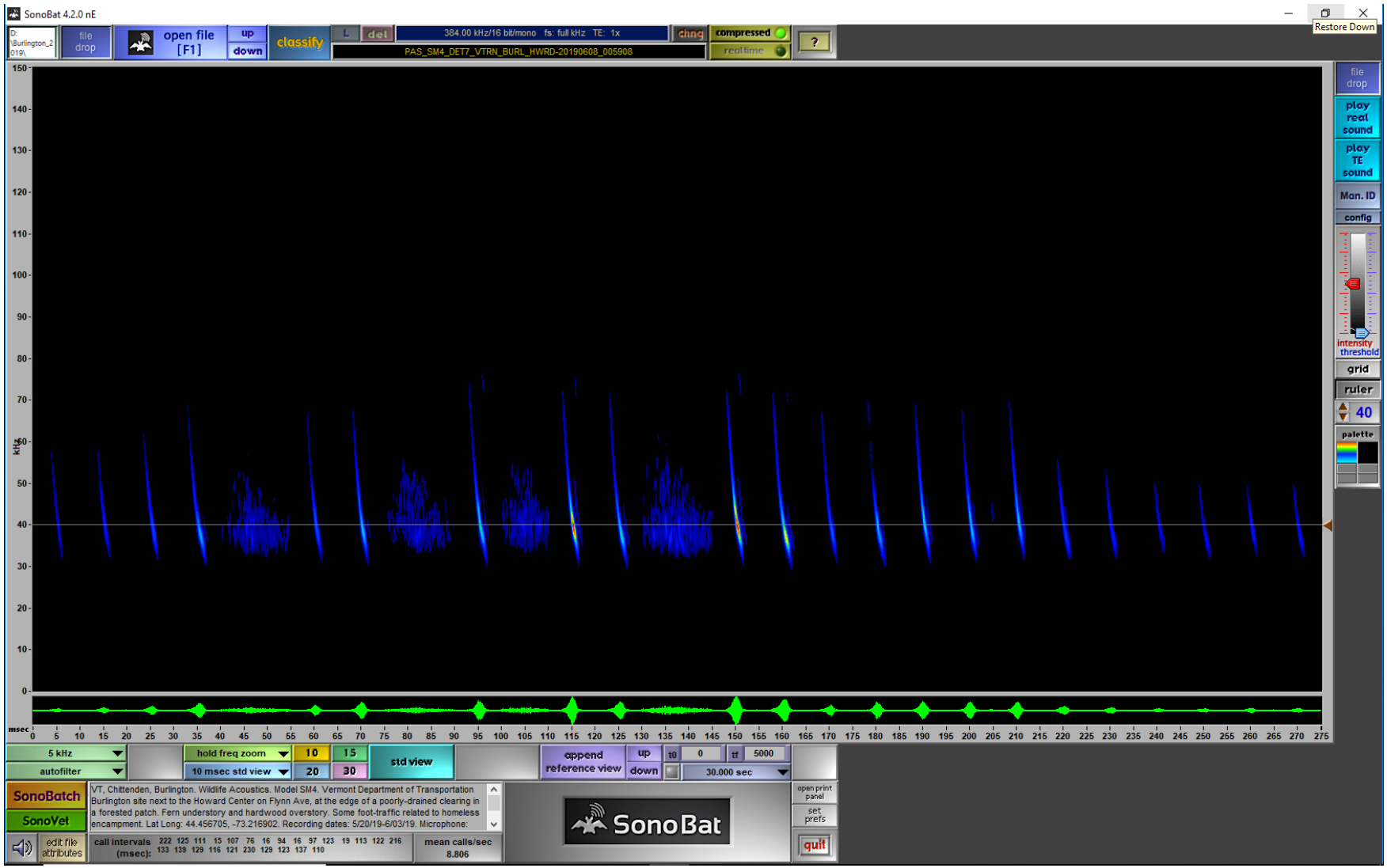


Figure 13: PAS_SM4_DET7_VTRN_BURL_HWRD-20190610_012244.wav. Ruler at 40kHz. Notice indistinct toes. Harmonics with low high frequencies, low Fc and Low low frequencies. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

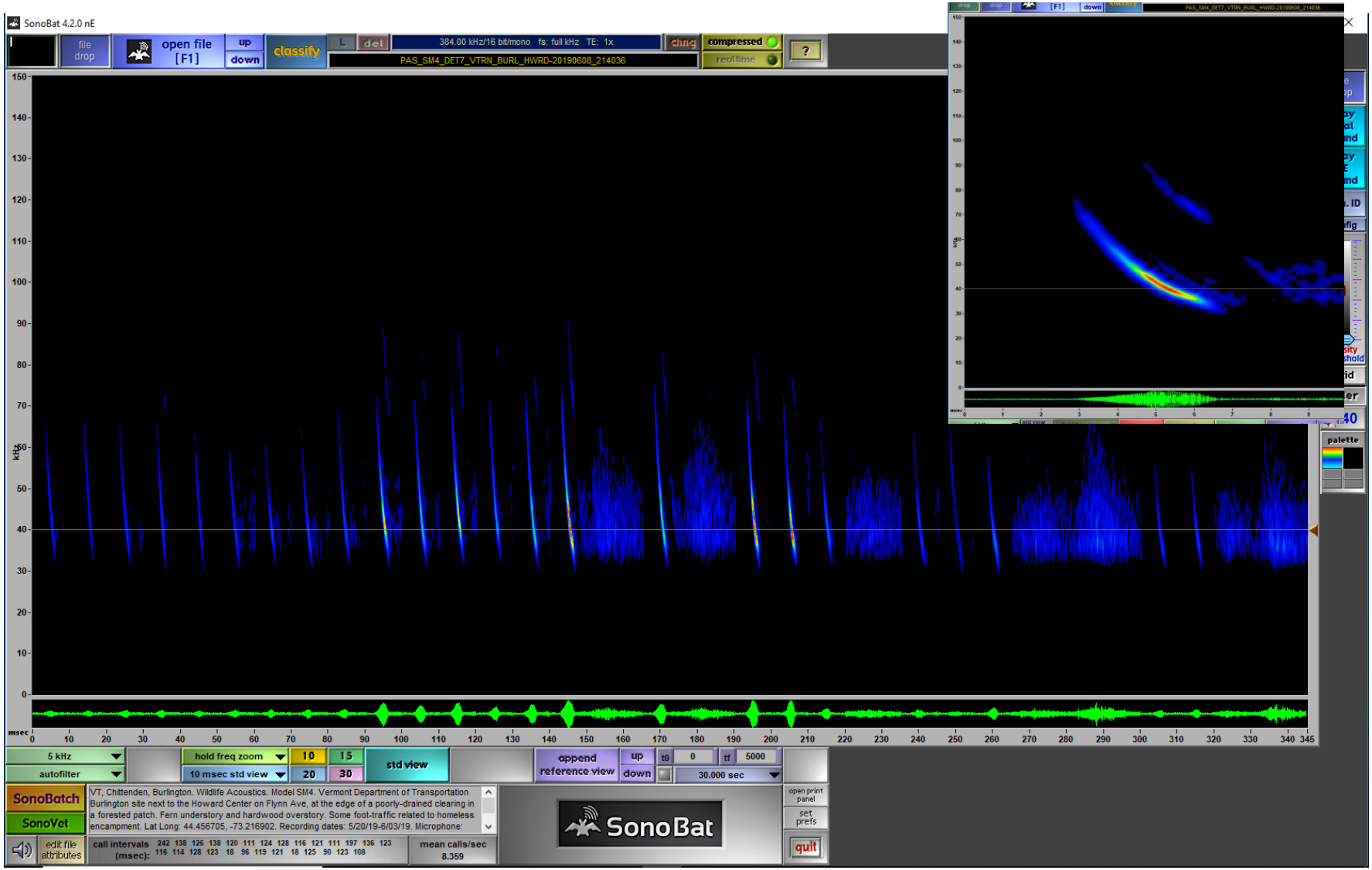


Figure 14: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_214036.wav. Ruler at 40kHz. Notice lack of clear toes. Inset shown at 10msec. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

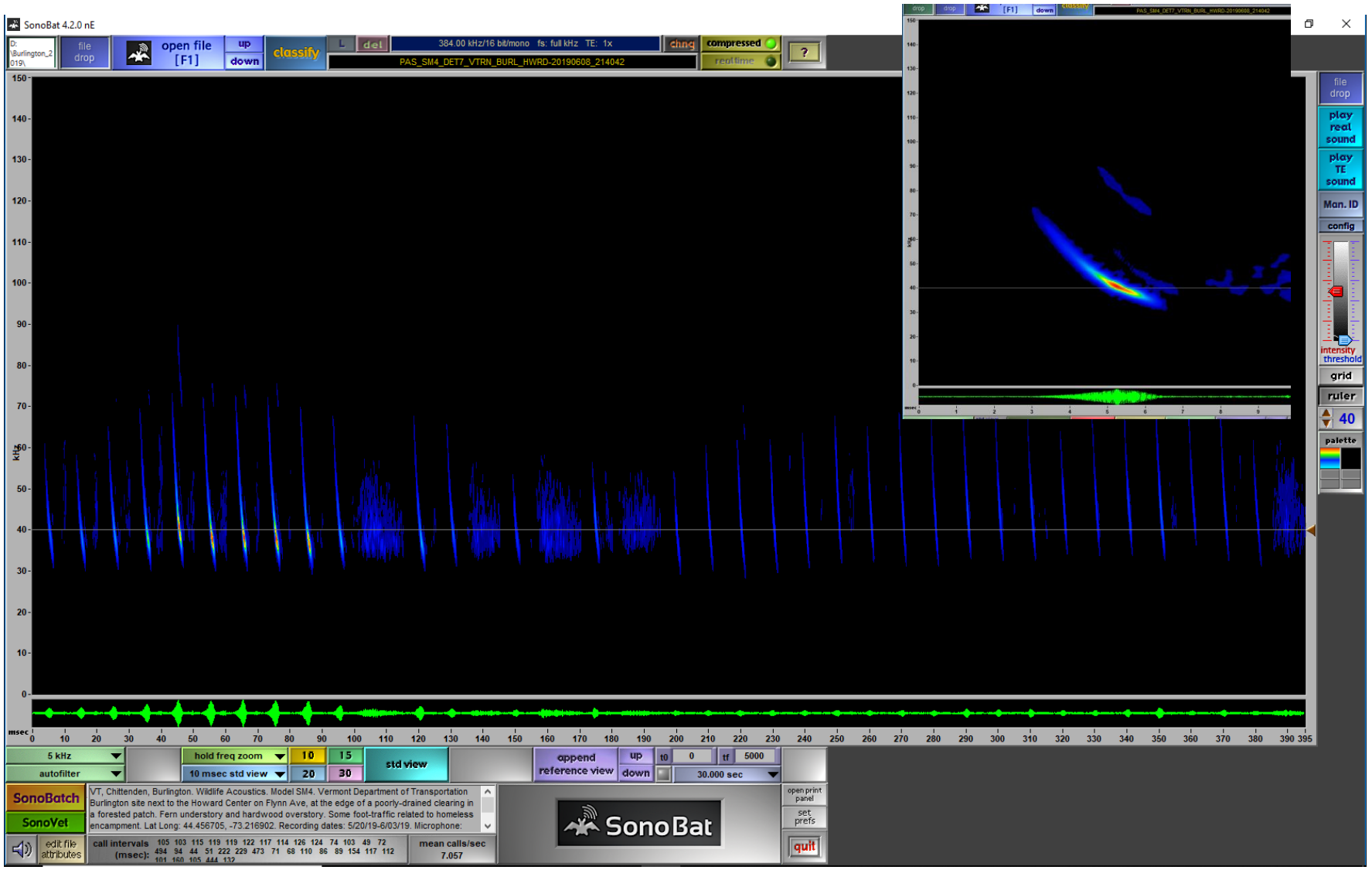


Figure 15: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_214042.wav. Ruler at 40kHz. Notice lack of distinct toes. Later pulses considered approach or feeding. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

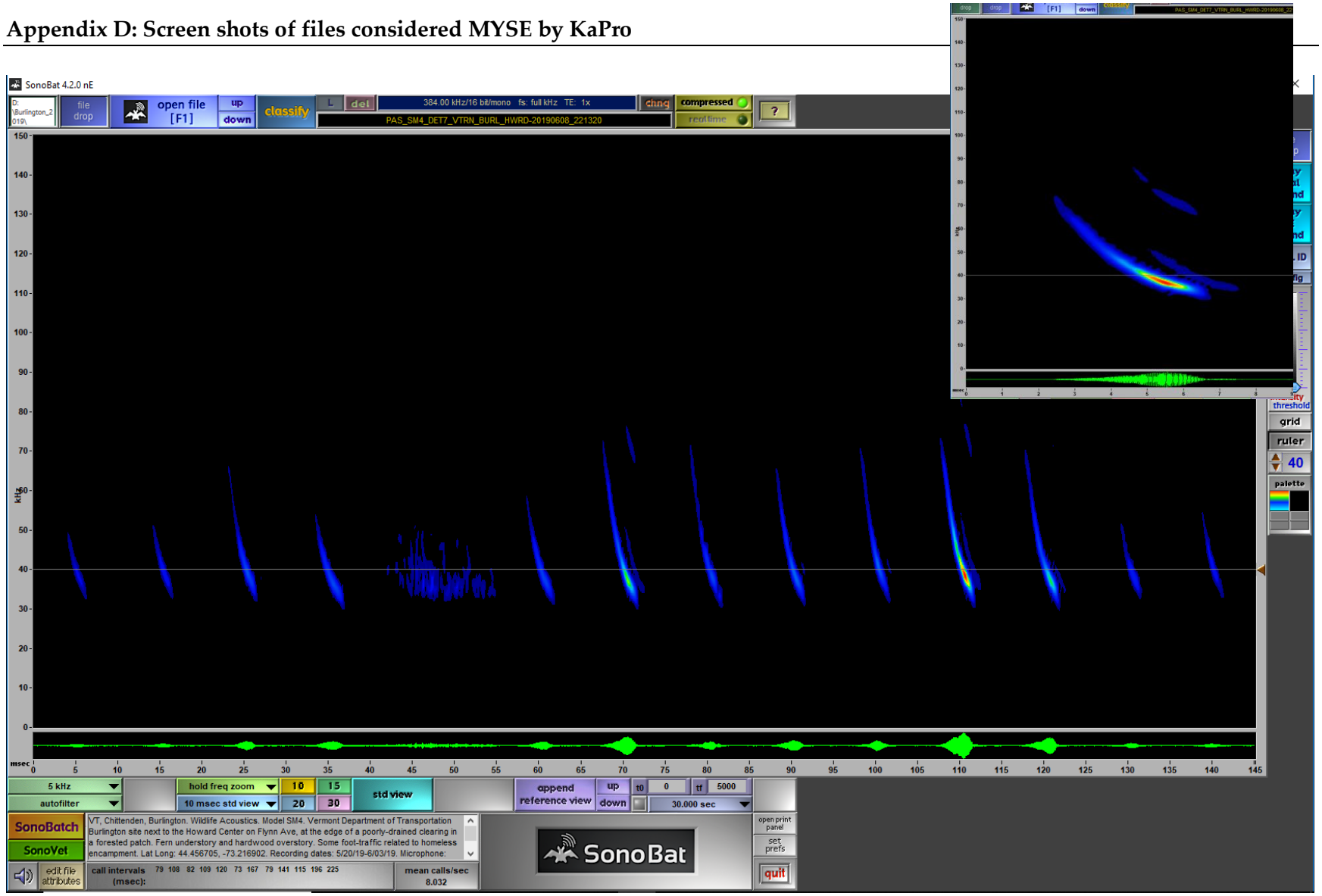


Figure 16: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_221320.wav. Ruler at 40kHz. Slight inconsistencies between pulses. Lack of distinct toes. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

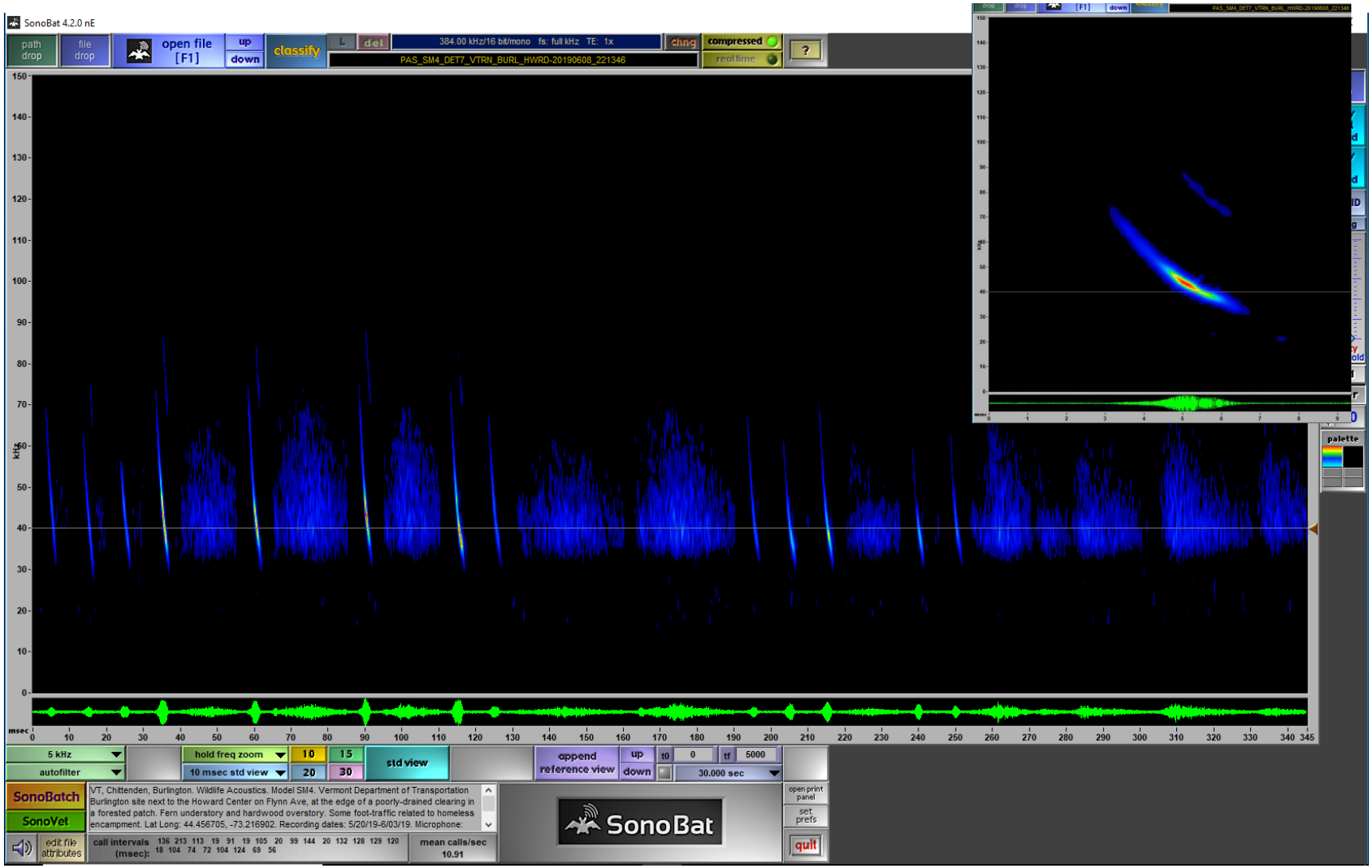


Figure 17: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_221346.wav. Ruler at 40kHz. Ruler at 40kHz. Slight inconsistencies between pulses. Lack of distinct toes. Some noise with echoes. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

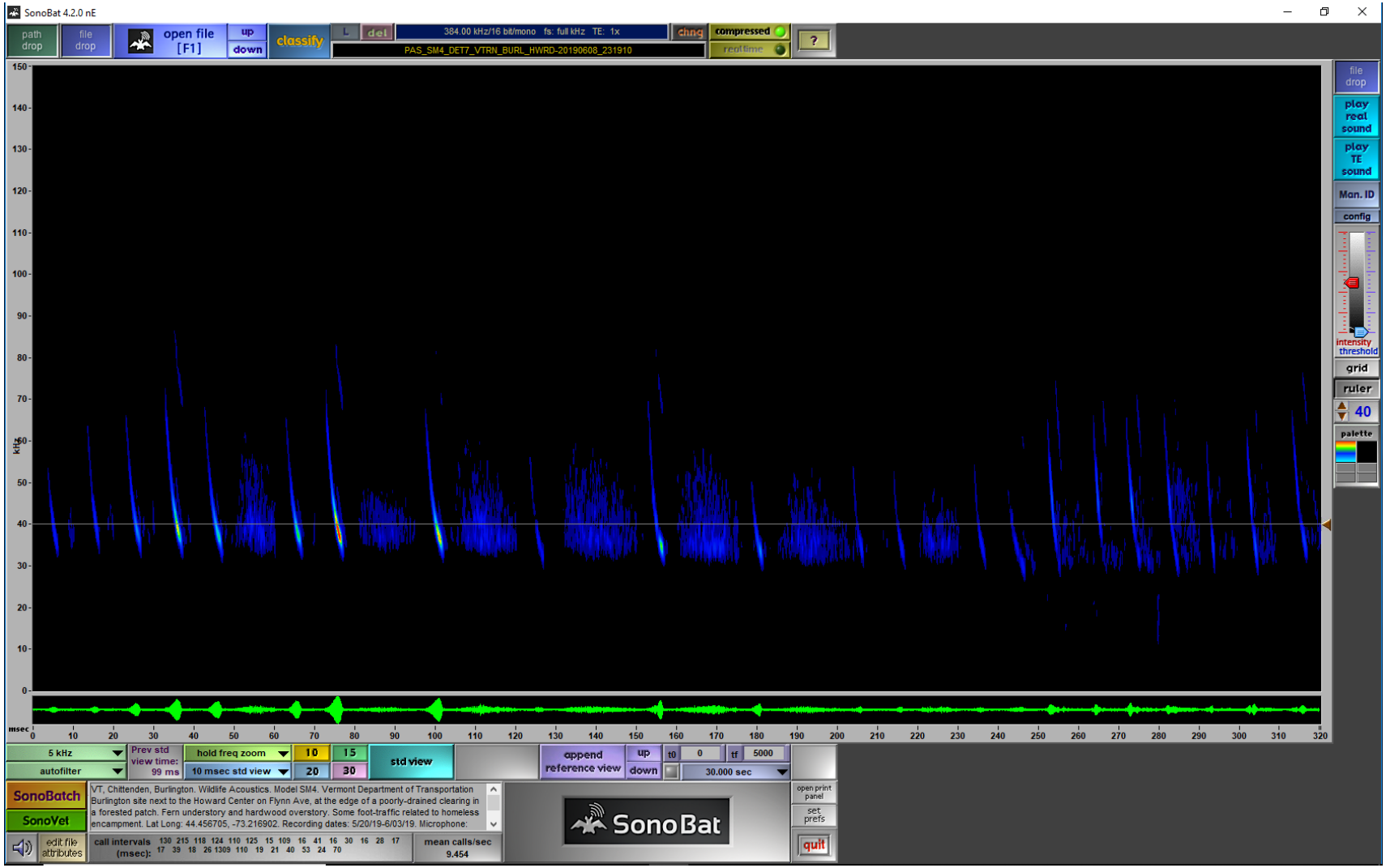


Figure 18: PAS_SM4_DET7_VTRN_BURL_HWRD-20190608_231910.wav. Ruler at 40kHz. Slight inconsistencies between pulses. Lack of distinct toes. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

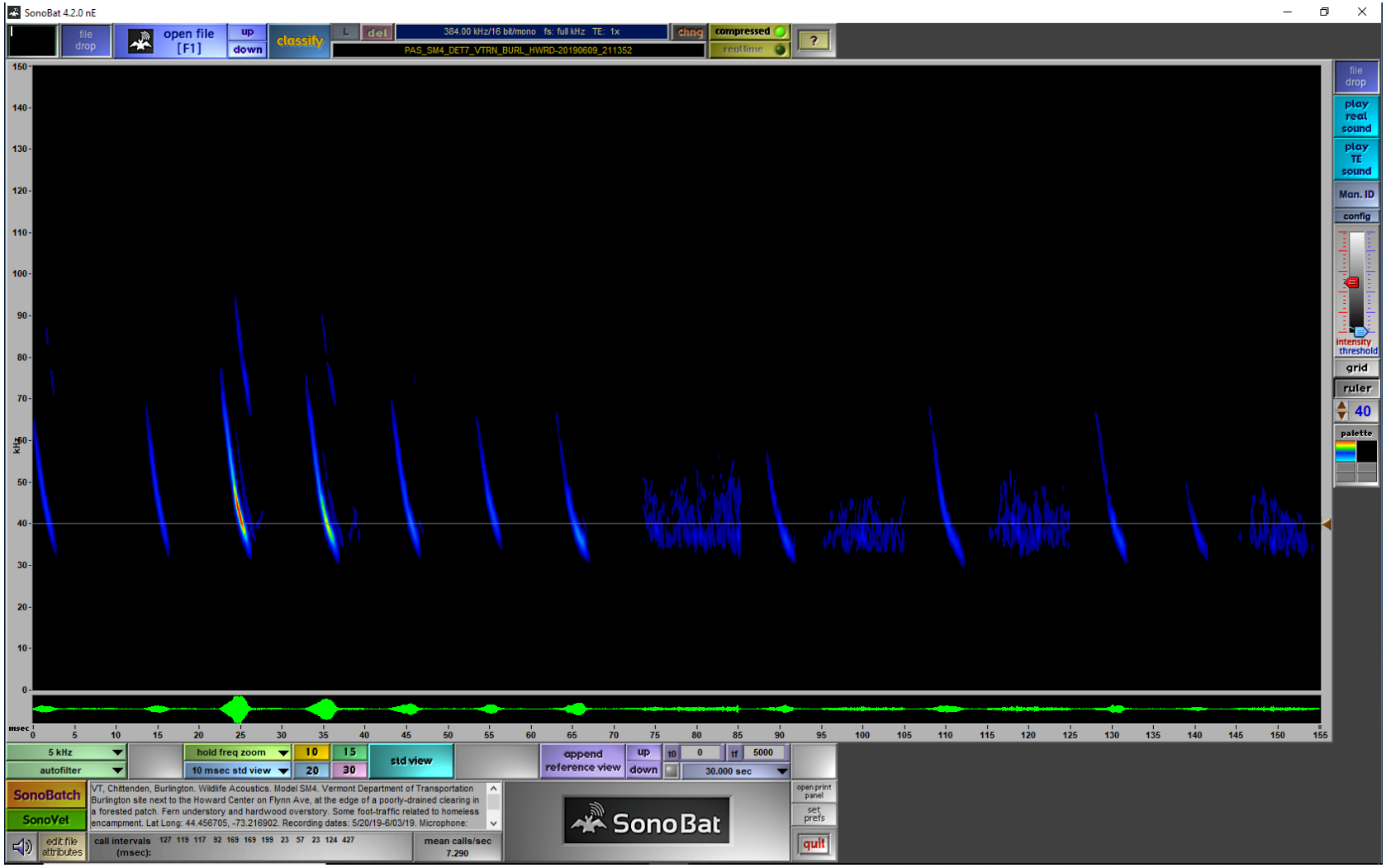


Figure 19: PAS_SM4_DET7_VTRN_BURL_HWRD-20190609_211352.wav. Ruler at 40kHz. Slight inconsistencies between pulses. Lack of distinct toes. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

Appendix D: Screen shots of files considered MYSE by KaPro

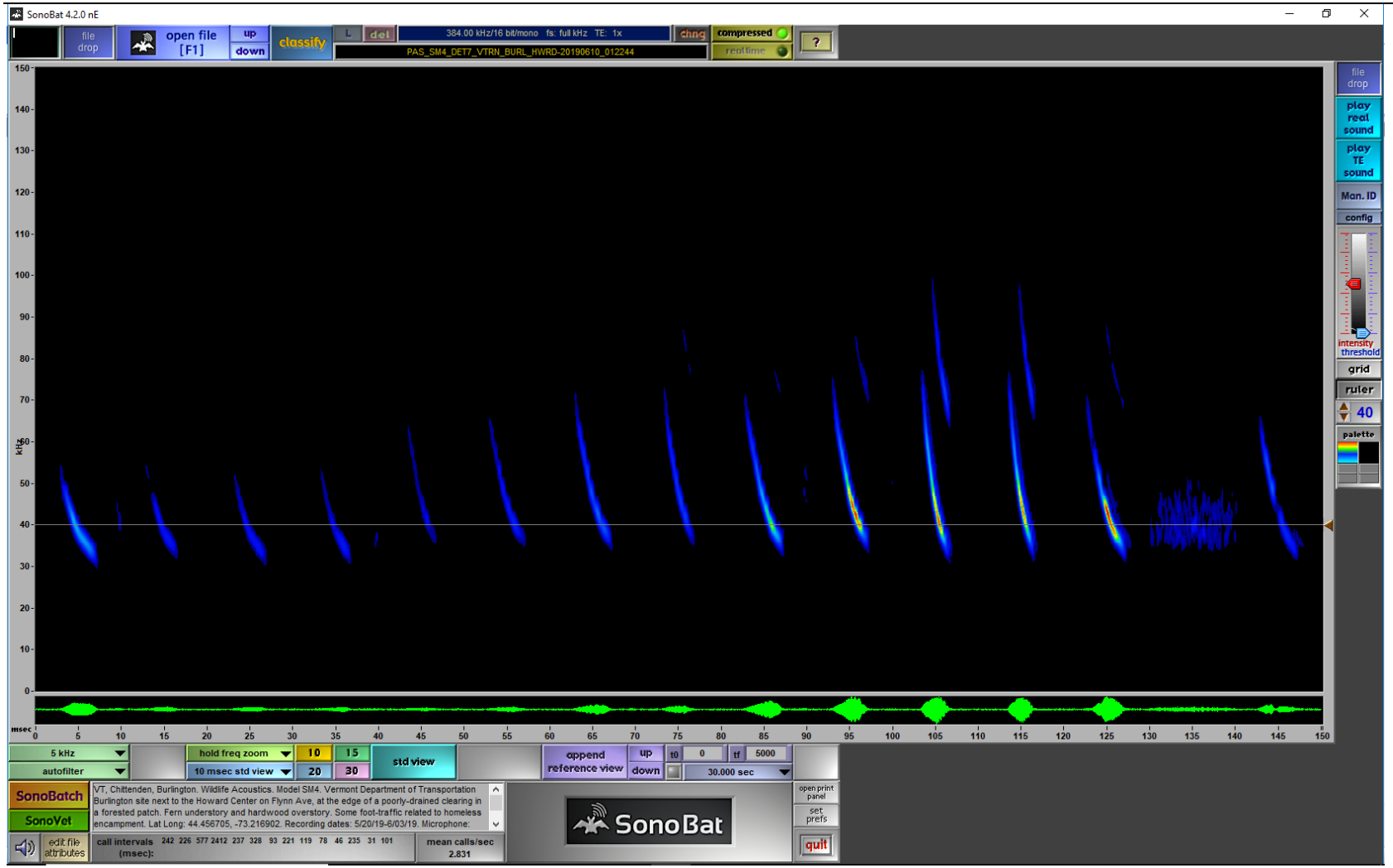


Figure 20: PAS_SM4_DET7_VTRN_BURL_HWRD-20190610_012244.wav. Ruler at 40kHz. Notice lack of clear toes. Some inconsistencies between pulses, shift to higher Fc's, low-high frequencies and low low frequencies. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

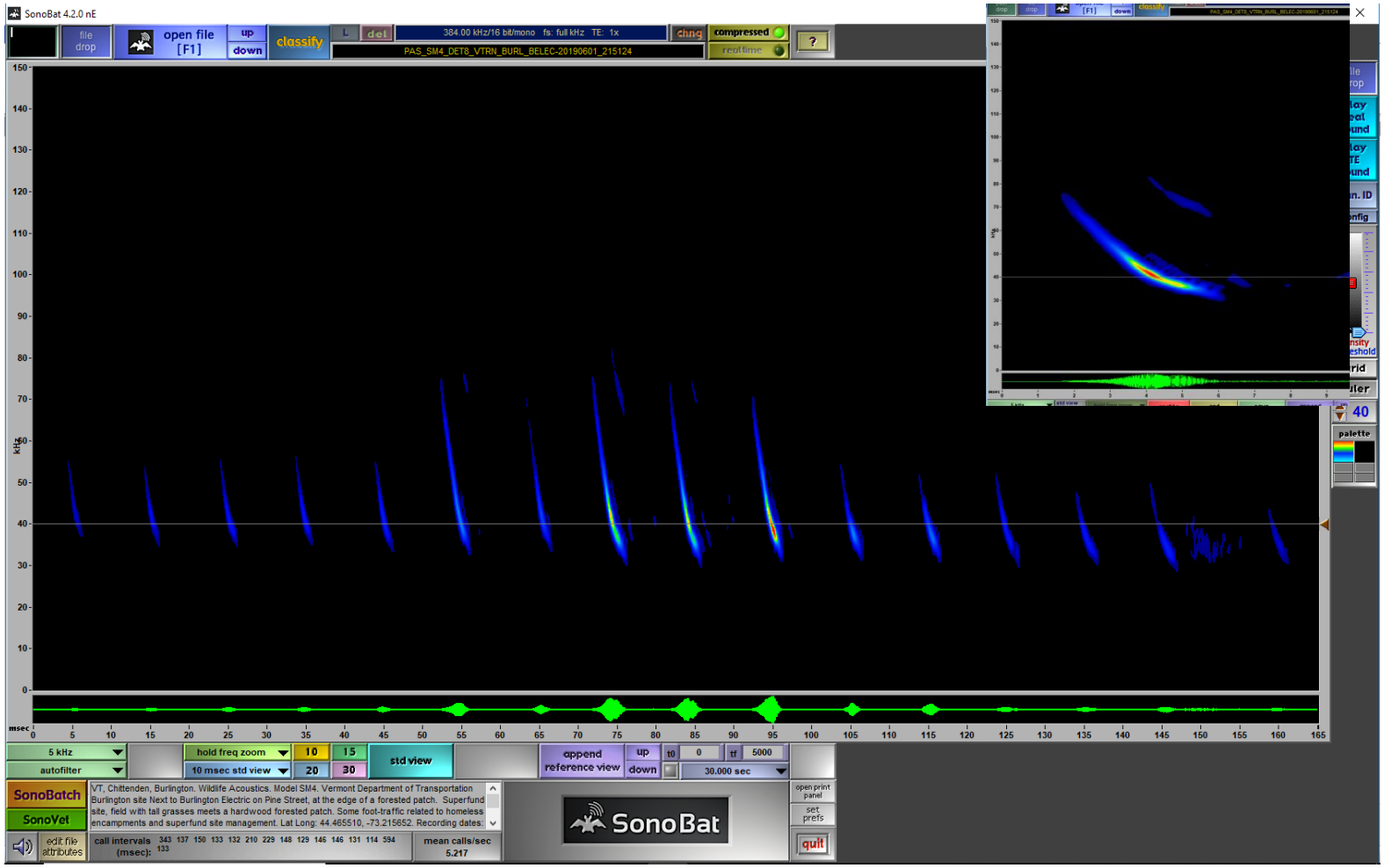


Figure 21: PAS_SM4_DET8_VTRN_BURL_BELEC-20190601_215124.wav. Ruler at 40kHz. Notice lack of distinct toes, harmonics, and steep pulses. Inconsistent pulses and overlapping characteristics with general decline in Fc. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

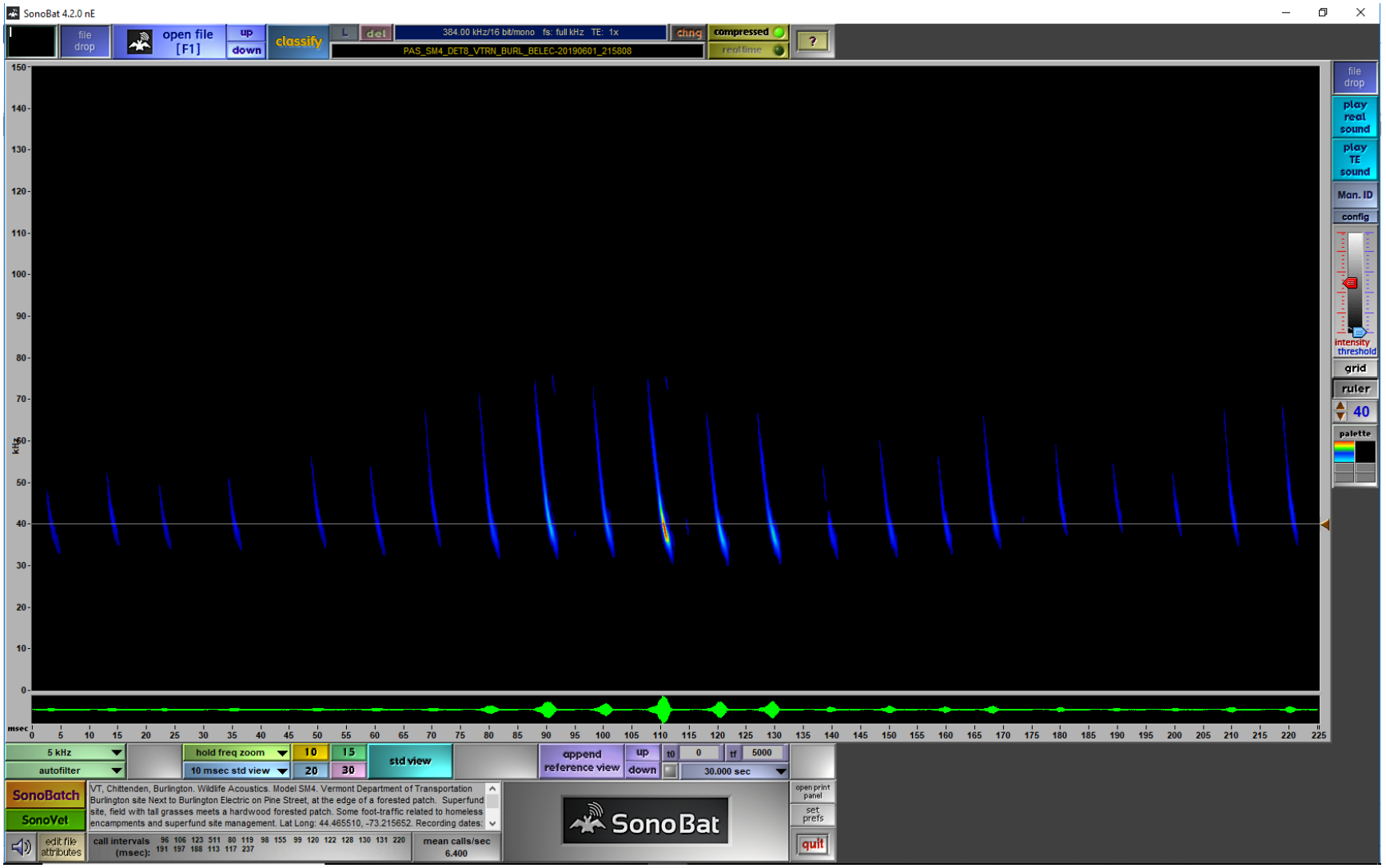


Figure 22: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013142.wav. Ruler at 40kHz. Notice lack of distinct toes, harmonics, and steep pulses. Variable Fc. Non typical Epfu in cluttered environment. Classified as EPFU.

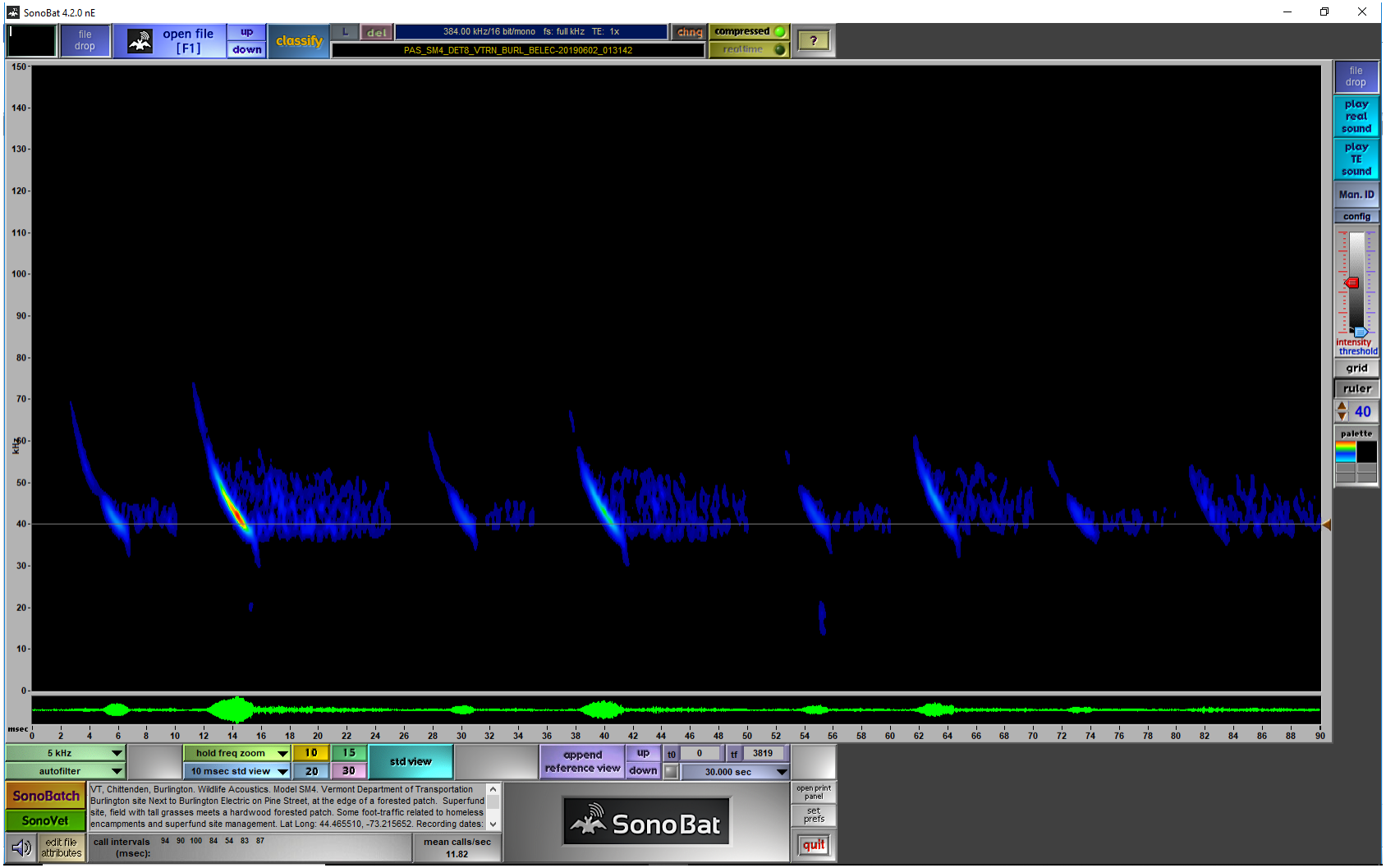


Figure 23: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013142.wav. Ruler at 40kHz. Notice toes, lack of harmonics, noise and low number of pulses. Overall, low quality but classified as Myotis

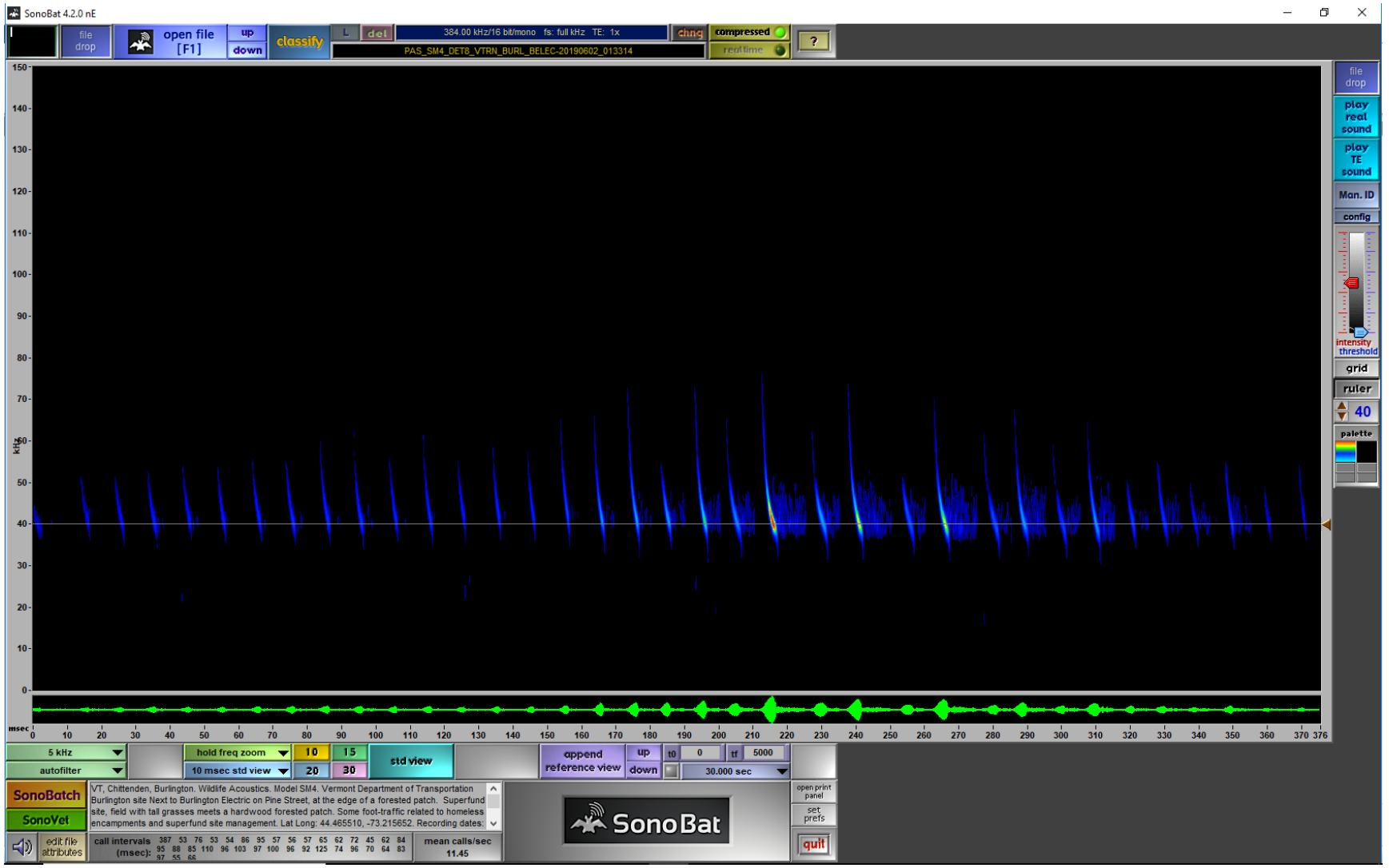


Figure 24: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013314.wav. Ruler at 40kHz. Notice toes, low high frequencies (no harmonics) and moderate slopes all with consistent pulse structure. Classified as MYLU

Appendix D: Screen shots of files considered MYSE by KaPro

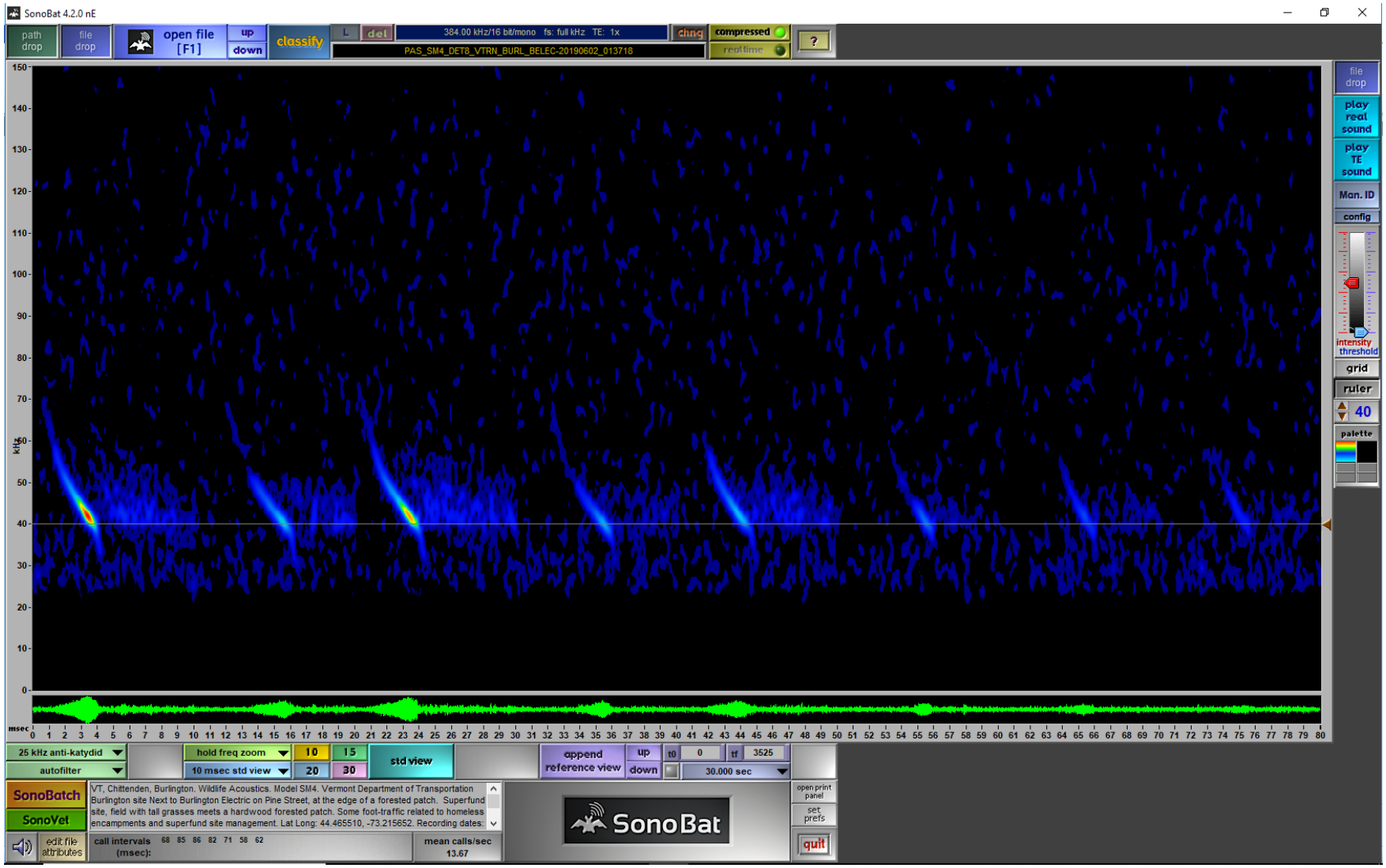


Figure 25: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_013718.wav. Ruler at 40kHz. Notice toes, low high frequencies (no harmonics) and moderate slopes all with consistent pulse structure but with few pulses quality low. Classified as MYOTIS.

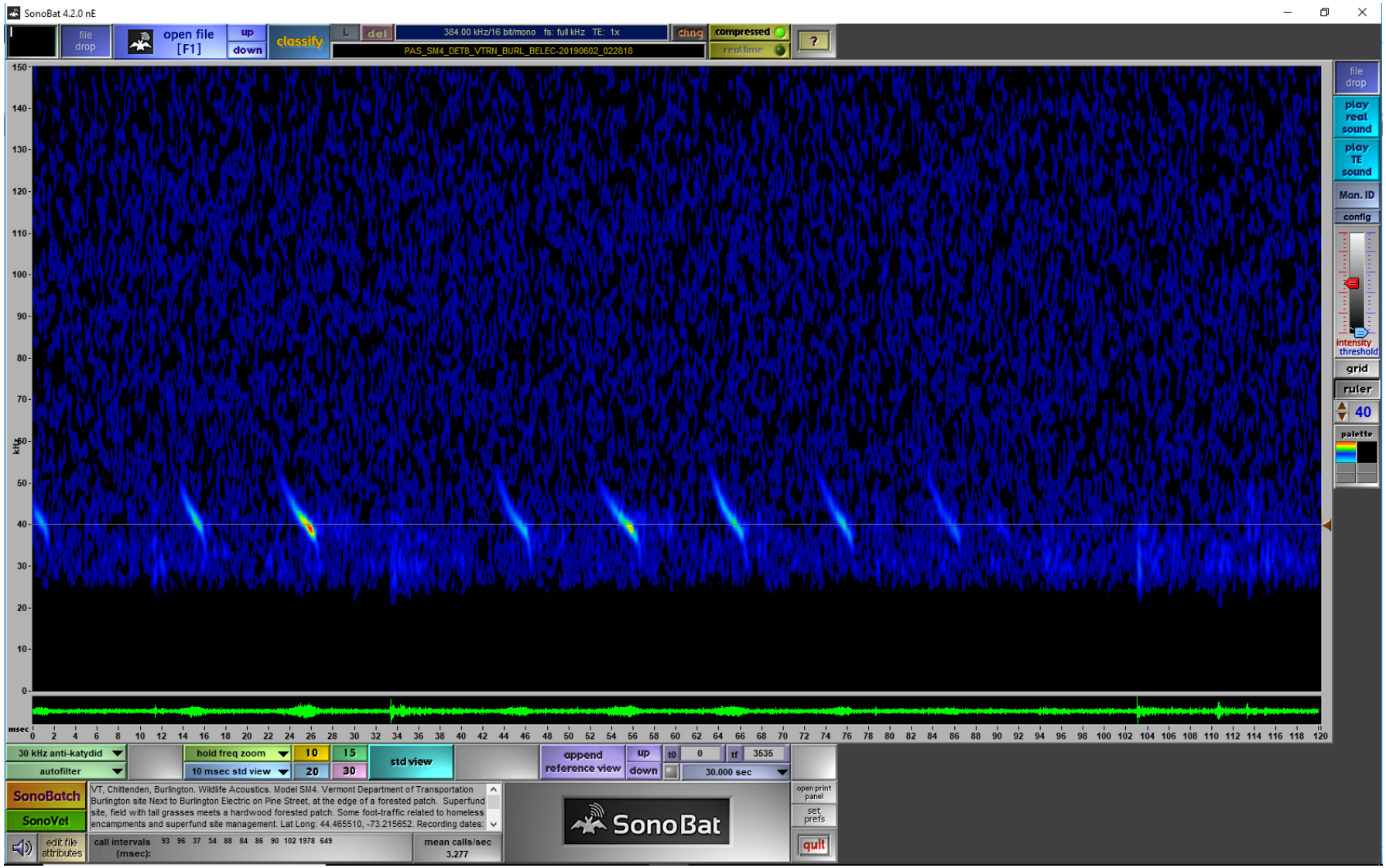


Figure 26: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_022818.wav. Ruler at 40kHz. Notice toes but with few, poor quality pulses and lacking consistent pulse structure. Classified as Unknown.

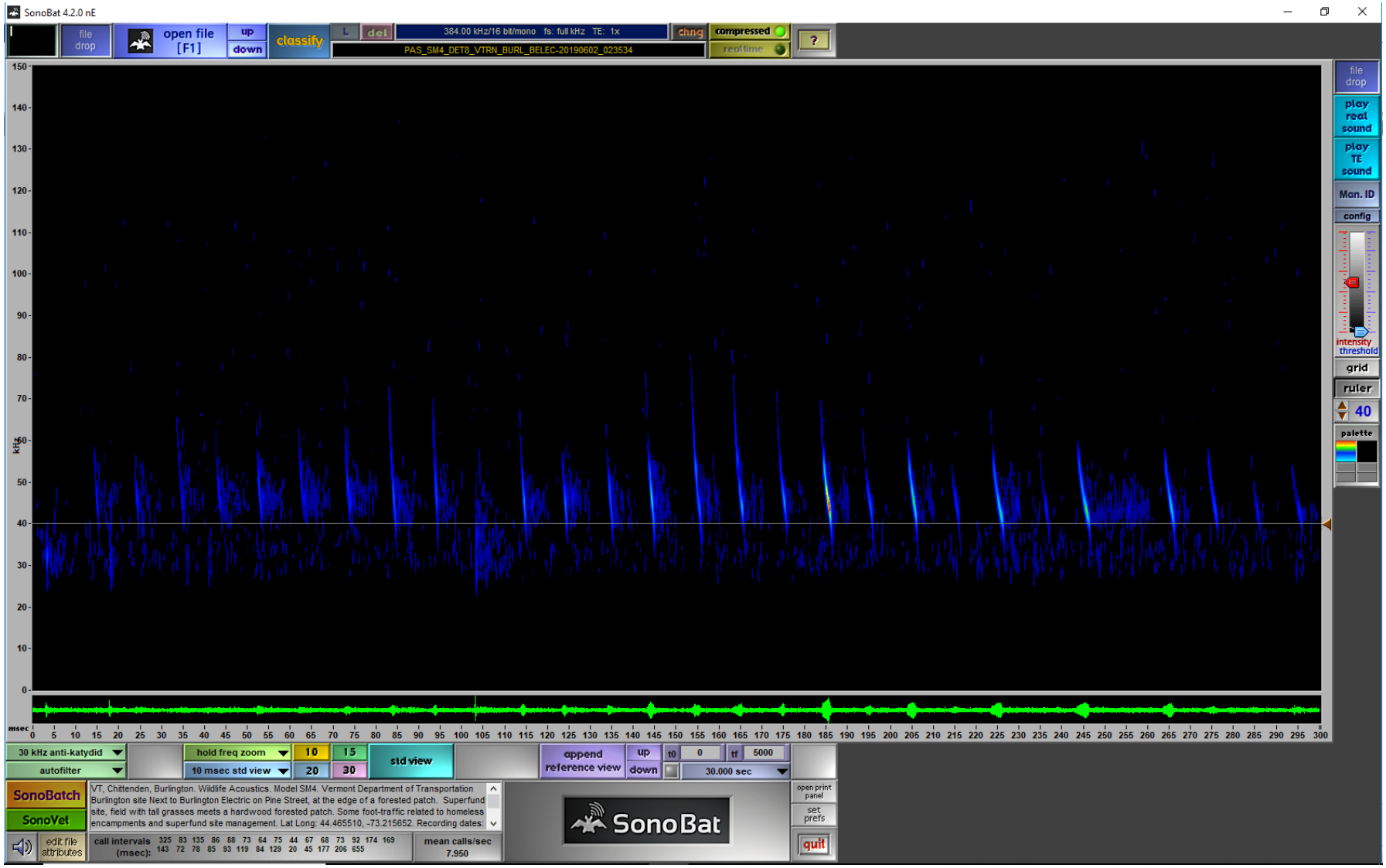


Figure 27: PAS_SM4_DET8_VTRN_BURL_BELEC-20190602_023534.wav. Ruler at 40kHz. Notice toes, quiet pulses with no harmonics. Slopes are moderate with moderate noise. Quality is generally poor lacking enough information. Classified as Myotis.

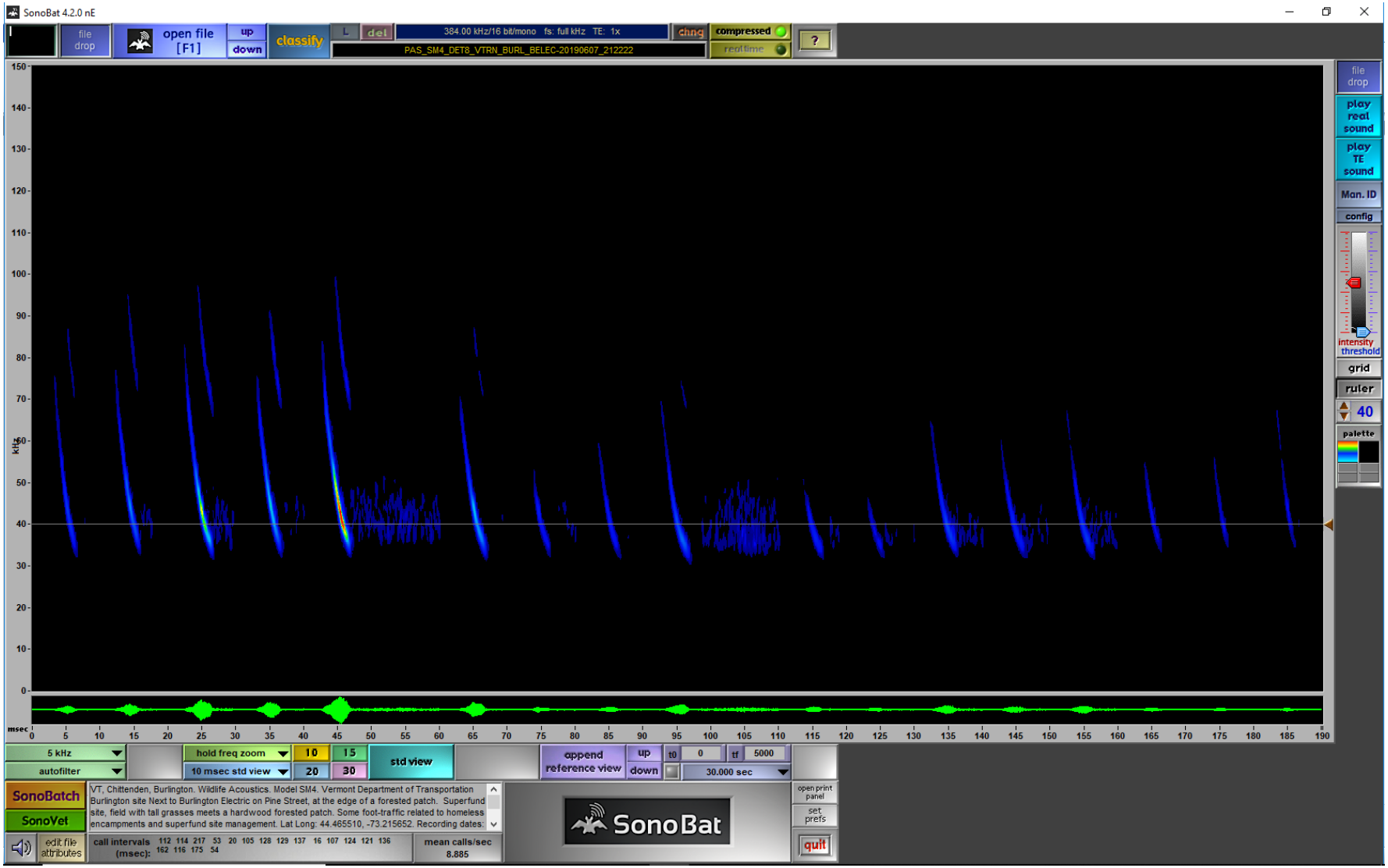


Figure 28: PAS_SM4_DET8_VTRN_BURL_BELEC-20190607_212222.wav. Ruler at 40kHz. Slightly inconsistent pulses with variable Fc, lack of distinct toes and low high frequencies. Resembles non typical Epfu in cluttered environment. Classified as EPFU.

Appendix D: Screen shots of files considered MYSE by KaPro

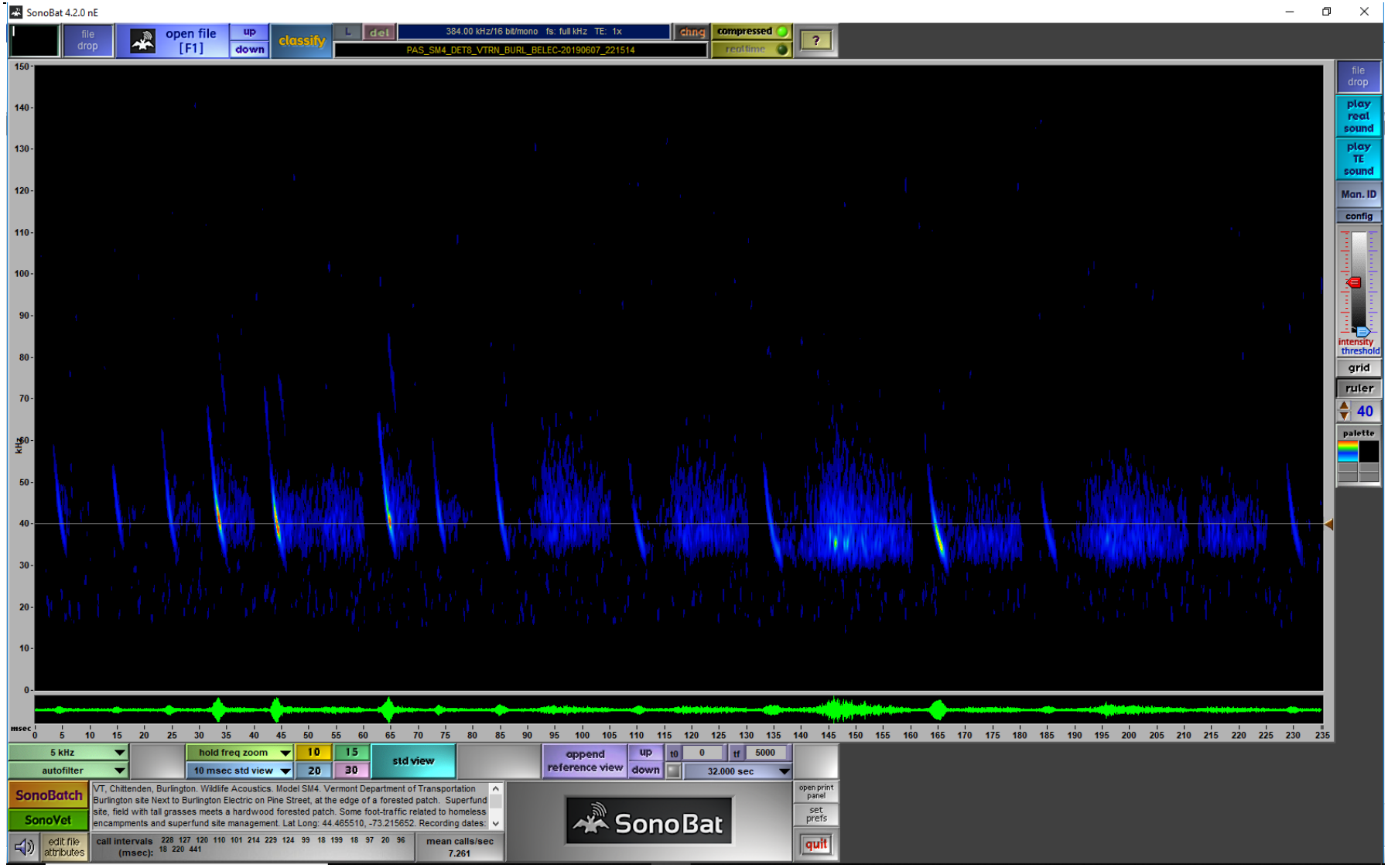


Figure 29: PAS_SM4_DET8_VTRN_BURL_BELEC-20190607_221514.wav. Ruler at 40kHz. Notice lack of distinct toes and some noise. Harmonics present with low high frequencies. Variable Fc. Non typical Epfu in cluttered environment. Classified as EPFU.

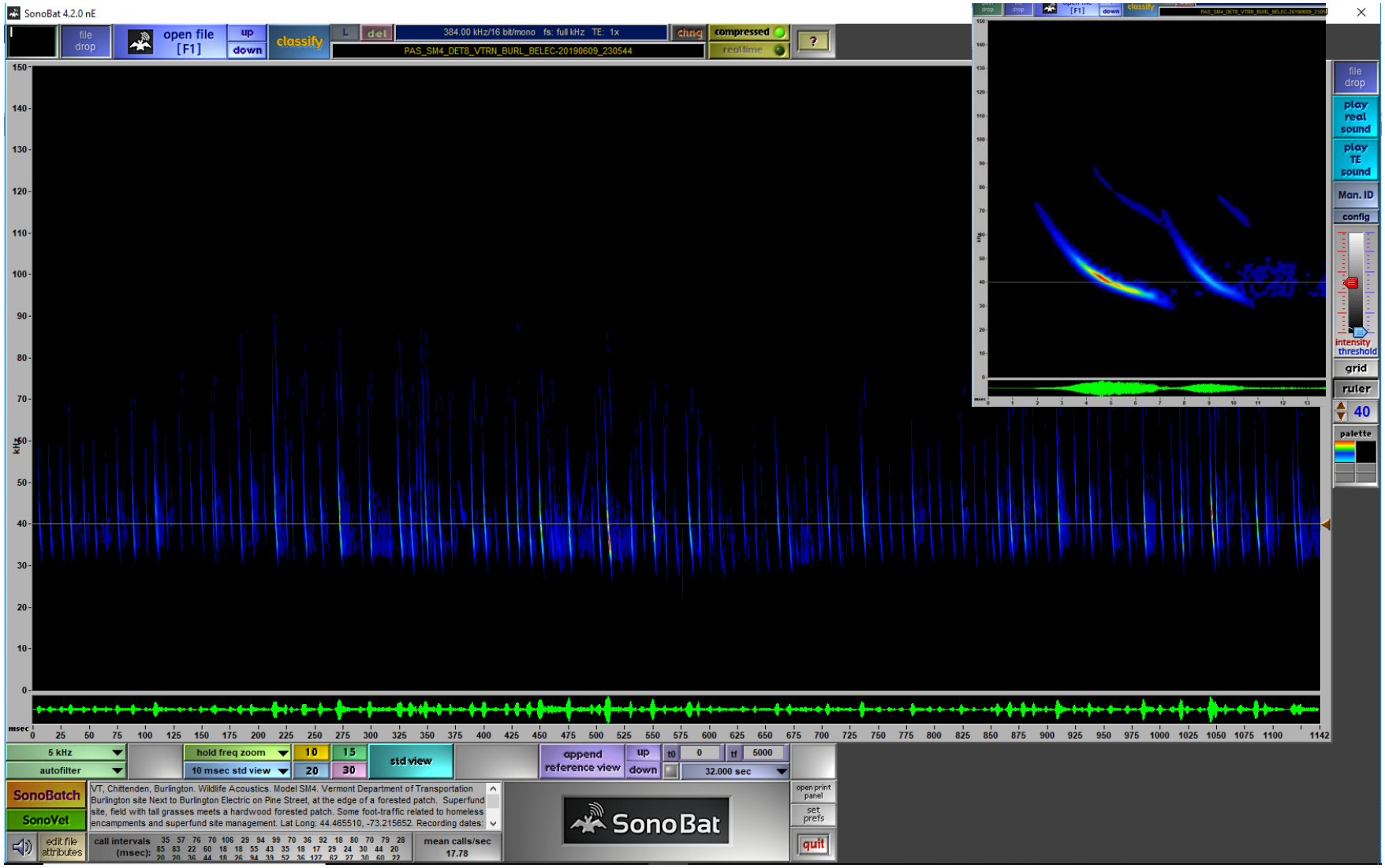


Figure 30: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230544.wav. Ruler at 40kHz. Notice more than one bat. Inset shows both bats. Notice lack of distinct toes. Likely non typical Epfu in cluttered environment, but because of the multiple bats, classified as Unknown

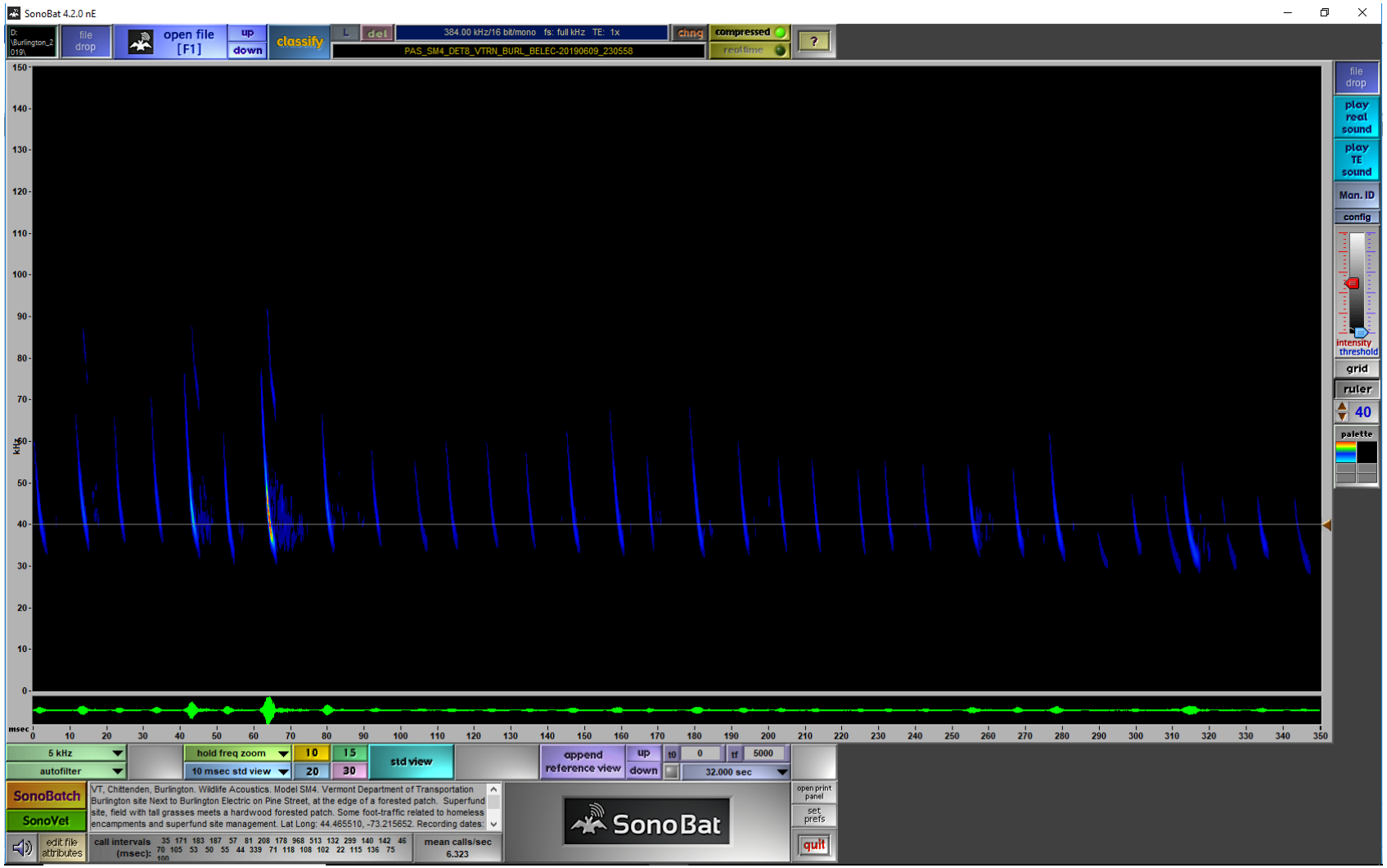


Figure 31: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230558.wav. Ruler at 40kHz. Notice lack of distinct toes, variable Fc with lower frequencies in latter pulses. Low high frequencies with harmonics. Non typical Epfu in cluttered environment. Classified as EPFU.

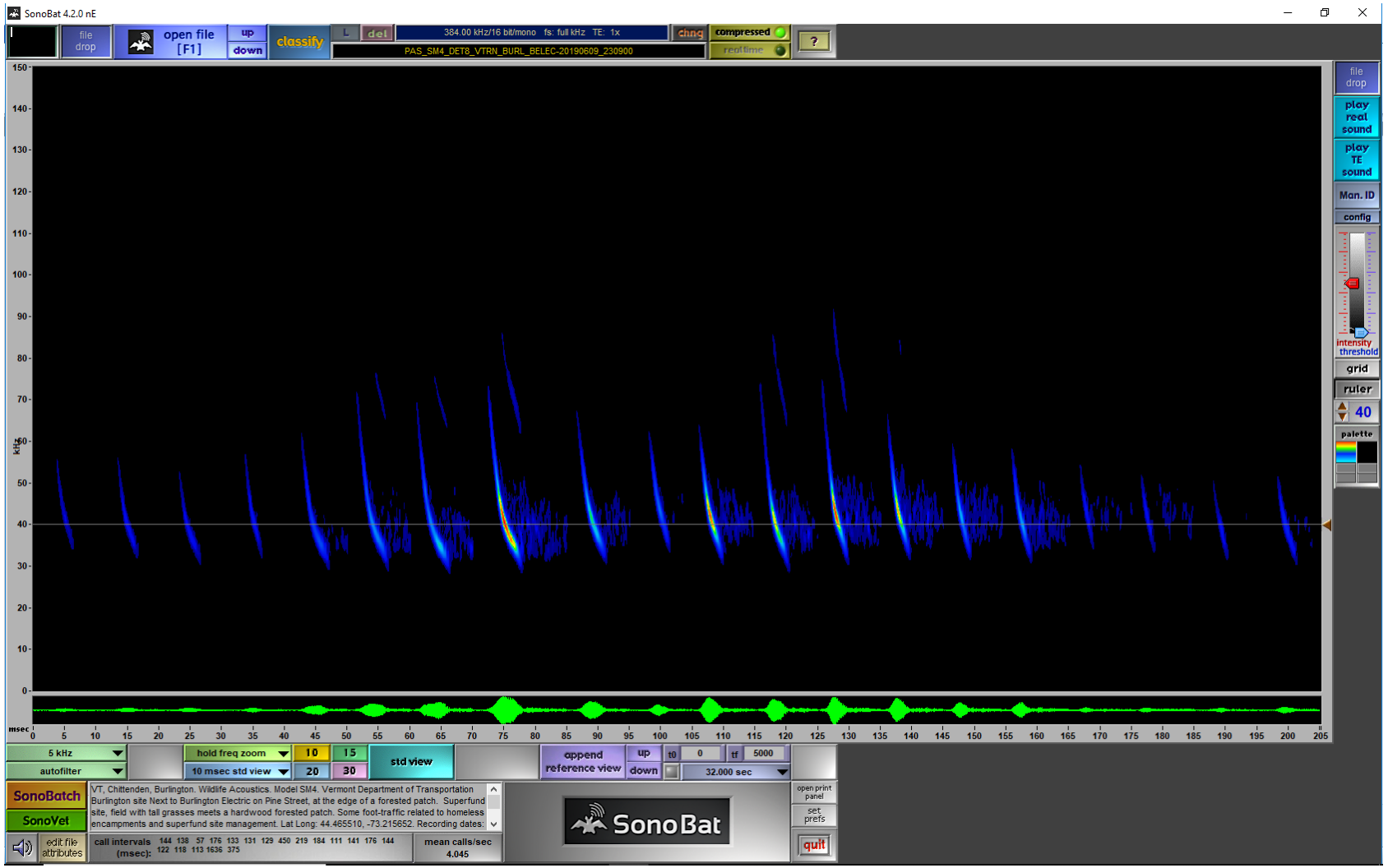


Figure 32: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_230900.wav. Ruler at 40kHz. Notice lack of distinct toes with variable Fc and pulse structure. High frequencies low, with harmonics. Non typical Epfu in cluttered environment. Classified as EPFU.

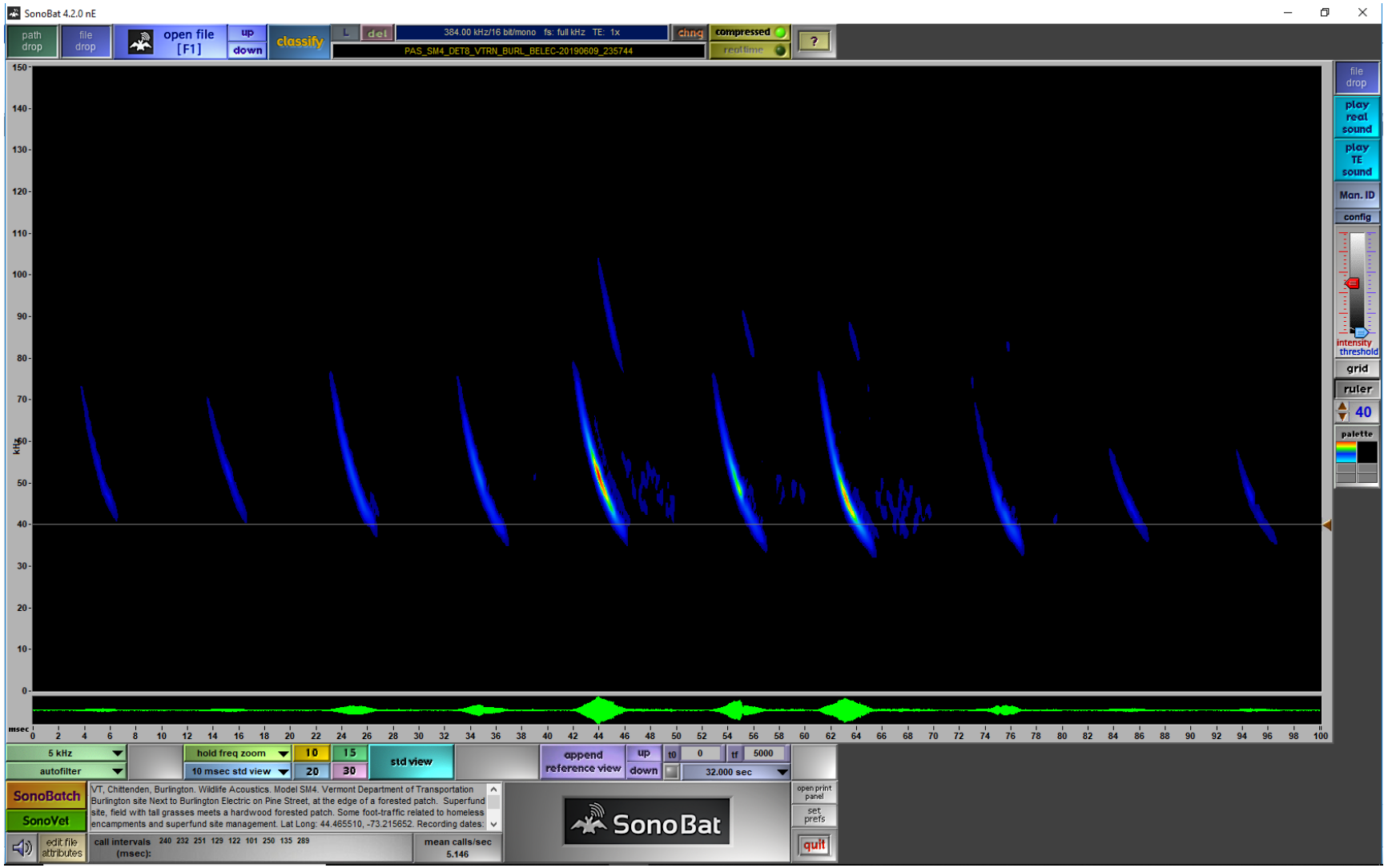


Figure 33: PAS_SM4_DET8_VTRN_BURL_BELEC-20190609_235744.wav. Ruler at 40kHz. Notice lack of distinct toes, low high frequencies. Resembles Epfu and labo in cluttered environments, overlaps slightly with Myotis calls. Classified as unknown.

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Allan Thompson Resume

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EDUCATION

University of Montana. Missoula, Montana. May, 2004.
B.S. Wildlife Biology, School of Forestry and Conservation.

CERTIFICATION AND LICENSURE

- Licensed Forester VT# 148. 0122028
- Certified Wildlife Biologist® March 2012-Present
- Licensed Forester NH #446 May 2012- Present
- Certified Pesticide applicator(VT) January 2012-Present
- Accredited Consulting Forester (VWA) July 2012-present

RELATED WORK EXPERIENCE

Wildlife Biologist and Forester, Owner, January 2007-present
Northern Stewards LC, Waterbury, VT

- Forest and wildlife planning on over 20,000 acres
- Designing and overseeing all timber and habitat management operations
- Wildlife monitoring using track and camera surveys
- Habitat assessments and inventories
- Clients include private, State and municipal landowners and/or managers
- Wildlife inventories on lands throughout VT Specifically;
  - Bat surveys as a Qualified Bat Biologist since 2007
  - Bird surveys
  - Amphibian and reptile surveys

Environmental Assistant, May- November 2006.
Vermont Dept. Fish and Wildlife. Rutland, VT.

- Assist in all aspects of Indiana bat (*Myotis sodalis*) surveys. Conduct capture, acoustic, roost tree, and hibernacula surveys. Managed and analyzed data, and prepared reports.

Wildlife Assistant, Field Seasons 2005 -2007.
Keeping Track Inc. Huntington, VT

- Assist classes teaching stewardship of wildlife habitat as taught by Susan C. Morse.

Assistant for project studying roads and wildlife, April-November 2005.
University of Massachusetts. Bennington, VT.

- Organized and conducted small mammal and amphibian, and reptile surveys.
- Developed and tested track beds, track plates, and cameras to observe wildlife use of underpass.

Amphibian and Reptile Mark/Recapture Field Crew Member, Summer 2003 and 2004 into Winter 2005.
University of Montana. Missoula, MT.

- Herpetile research and sampling in primitive study sites.
- Undergraduate thesis; *Garter Snake Population Dynamics and Diet in Two Watersheds with Differing Amphibian Abundance*.

Vermont Fish and Wildlife Department
Regulatory Review Guidance for Protecting Northern Long-eared Bats and Their Habitats
February 2017

Purpose

This guidance is specific to land use activities subject to environmental review (e.g., Act 250, Section 248) that result in permanent alterations to habitats used by northern long-eared bats (*Myotis septentrionalis*), hereinafter referenced as MYSE. Forest management guidance, including woodchip plant harvests under the Public Service Board, is provided under separate documents. This is a working document, which may be revised as new information becomes available to best guide decision-making.

The purposes of the guidance are to:

1. Reduce the likelihood of take or harm of MYSE to the level where the land use activity is not likely to adversely affect the species.
2. Maintain suitable hibernating, roosting, and foraging habitat to support continued use of *known, occupied sites* for MYSE.

Considerations

1. Current MYSE population levels in Vermont are unknown, but survey data since 2010 indicate that MYSE populations are approximately less than 10% of what they were prior to White-nose Syndrome (WNS). This alone limits the likelihood of take by any land use activity in Vermont. As a result, the focus of the guidelines is primarily on known, occupied habitats.
2. A 1% rule is recommended to further decrease the likelihood of take to what may be viewed as a "discountable effect". The assumption is that removal of less than or equal to 1% of the *existing forested area (including both suitable and unsuitable forested habitat) within each Special Management Zone* (SMZ) represents a 99% chance that the activity will not fell or clear any trees with roosting MYSE bats. Projects meeting such thresholds are considered to have a discountable effect and need not take any special precautions to avoid take. Projects impacting more than the 1% rule must adequately reduce the likelihood of take through seasonal restrictions on land clearing activities and/or the implementation of potential roost tree retention practices.
3. The guidance is more restrictive at known, occupied hibernacula and summer habitats due to evidence of presence of MYSE and the value of consistency with the USFWS 4(d) rule. At such sites, the guidelines are intended to both limit potential take of MYSE and maintain suitable habitat conditions. At sites lacking any information on the presence or absence of MYSE, the presence of MYSE is still assumed, albeit at a lower likelihood,

and as such the guidelines focus strictly on reducing the likelihood of take by applying more limited seasonal restrictions when the bats, if present, would be most abundant.

4. The measures offered primarily focus on avoiding take of roosting bats during the summer season when they are active throughout the landscape. In addition, the measures address forestland conversion during the winter season that results in large acreages of unsuitable habitat where a potential maternity colony may exist. While no direct take of MYSE would occur in such situations, the elimination of most, if not all of a colony's roost trees would likely result in indirect take by impacting their survival and productivity.
5. The guidance applies only to land use activities within suitable MYSE roosting habitat. While more research is needed to identify the specific variables associated with unsuitable habitat, for the purposes of this guidance, unsuitable roosting habitat for MYSE includes:
    - Forest stands with all tree diameters less than 4 inches DBH.
    - Forest stands predominantly (i.e., 90%) composed of spruce-fir
    - Forest stands with less than 50% canopy closure
    - Individual trees isolated by more than 100 feet from forest habitat
6. Project impacts exceeding the limits of forested habitat conversion may be required to adopt additional mitigation measures that ultimately benefit MYSE conservation. Such measures may include conservation easements, forest management agreements, or critical research.
7. Finally, terms frequently used in this document are defined below to clarify the extent of their meaning relative to this guidance document:

Land Use Activity: Activities associated with the clearing or cutting of standing trees subject to environmental review (e.g., Act 250, Section 248) that result in permanent alterations to habitats for northern long-eared bats.

Potential Roost Trees (PRT): Potential roost trees include all trees greater than 4 inches in diameter that exhibit cavities, cracks or crevices, or exfoliating bark located at least 10 feet in height from the ground. While research demonstrates the use of such features even on live trees by roosting MYSE, it is understood that the majority of roosts used by the species are dead and dying trees and that no visual survey method will be able to effectively identify all potential roost trees.

Special Management Zones (SMZ): Special management zones are the areas surrounding either known, occupied sites (e.g., hibernacula, known summer habitat) or land use activity sites, within which specified conservation measures are expected to avoid take of MYSE.

Known, Occupied Hibernacula

Definition: Both historic and/or current documentation of one or more MYSE is considered a known, occupied hibernaculum. It must be noted that MYSE are particularly difficult to observe during hibernation due to their preference for roosting in cracks and crevices in cave/mine walls. Therefore, this species may be underestimated or go undetected during some winter hibernacula surveys. In addition, MYSE bats visit and swarm at multiple hibernacula during the fall, making the forested area directly surrounding hibernacula important for species conservation.

Population Status: There are currently 25 known, occupied hibernacula in Vermont with documentation of hibernating northern long-eared bats.

Special Management Zones: The literature suggests that the majority of the roost trees used during the fall swarming period are located within 1.6 miles of the hibernaculum entrance. Given the very low abundance of MYSE within each hibernaculum, it is recommended that the impacts of land use activities be evaluated at distance thresholds for two zones with radii of 0.25 miles and 1.0 miles from the cave/mine entrance.[2]

- Special Management Zone 1: This zone is within a 0.25-mile radius of the cave/mine entrance and is designed to maintain the physical and environmental integrity of the hibernacula as well as sufficient roosting habitat. This distance is identical to the USFWS 4(d) rule under which no tree cutting activities are exempt from the take provisions of the Endangered Species Act. *Any tree cutting within this zone must first contact the USFWS to assure that the following conservation measures will result in no adverse effect on the species:*
    - No activities that will impair the integrity of the hibernacula are allowed. Tree clearing, road construction, or buildings are not allowed directly adjacent to hibernacula entrances.
    - Land use activities impacting *less than 1% of the existing forested acreage* (i.e., 1.25 acres in a completely forested landscape) within the SMZ are allowed, provided all tree cutting is prohibited during the period April 15 – October 31, when bats are active and concentrated in the forested area around hibernacula. [1] Tree clearing may occur during the period April 15 – August 15 if acoustic surveys demonstrate probable absence of MYSE during that period (see Appendix A VFWD Guidelines for Acoustic Surveys for Endangered Bats).
    - Land use activities impacting *greater than 1% of the existing forested acreage* within the SMZ will be reviewed to reduce the impact on the known, occupied hibernaculum habitat and include:
        - Seasonal restrictions so that all tree clearing is prohibited during the period April 15 – October 31, when bats are either active or concentrated in the forested area around hibernacula. [1]

        - Potential roost tree retention guidelines (see VFWD Potential Roost Tree Retention Guidelines for Endangered Bats) must be applied by a forester or biologist trained in potential roost tree identification on the remainder of the project lands to provide for future roost trees (see Appendix B Survey Methods for Potential Roost Trees for Endangered Bats).[3,6]
        - Limit tree clearing to 2% of the contiguous forested acreage (i.e., 2.5 acres in a completely forested landscape). Projects requiring tree clearing beyond 2% will require additional mitigation measures.
    - Conversion and fragmentation of the forest canopy must be minimized to maintain bat migration and movement within the Special Management Zone 1.

- Special Management Zone 2: This zone is between 0.25 and 1.0-mile radius from the cave/mine entrance and is designed to maintain suitable roosting and foraging habitat during the swarm and emergence periods. While 1.0 mile is less than the 1.6-mile radius documented for all roosts used by MYSE, the limited number of MYSE at known, occupied hibernacula in Vermont allow for a smaller radius for Zone 2.[2]
    - Land use activities impacting *less than 1% of the existing forested acreage* (i.e., 20 acres in a completely forested landscape) within the SMZ are allowed, provided to avoid take, all tree clearing is prohibited during the period April 15 – October 31, when bats are active and concentrated in the forested area around hibernacula.[1] Because of the limited acreage involved, projects may allow for such seasonal restrictions to be waived upon completion of a survey for potential roost trees by a trained forester or biologist that identifies, marks, and retains <u>all</u> potential roost trees. Tree cutting during the period April 15 – August 15 may also occur if acoustic surveys demonstrate probable absence of MYSE during that period.
    - Land use activities impacting *greater than 1% of the existing forested acreage* within the SMZ will be reviewed to reduce the impact on the known, occupied hibernaculum habitat and may include the following measures (e.g., potential roost tree retention guidelines) to mitigate for such impacts: [3,6]
        - Apply seasonal restrictions so that all tree cutting is prohibited during the period April 15 – October 31, when bats are either active or concentrated in the forested area around hibernacula. [1] Tree cutting during the period April 15 – August 15 may occur if acoustic surveys demonstrate an absence of MYSE during that period.
        - Potential roost tree retention guidelines (see VFWD Potential Roost Tree Retention Guidelines for Endangered Bats) must be applied on the remainder of the project lands.[3,6]

        - Limit tree clearing to 2% of the forested acreage (i.e., 40 acres in a completely forested landscape) within the SMZ. Clearing beyond 2% of the forested habitat requires additional mitigation.
    - Fragmentation of the forest canopy must be minimized to maintain bat migration and movement within the Special Management Zone.

Known, Occupied Summer Habitat

Definition: Known, occupied summer habitat consists of:

- Known, occupied maternity roost trees used by adult females or juveniles. The USFWS 4(d) rule applies only to known, occupied maternity roost trees and a 150-foot buffer.
- Documented reproductive adult female MYSE captured during the maternity season (May 1 – August 15) are considered confirmation of a maternity colony. Locations of such animals documented since 2010 are considered known, occupied MYSE maternity colonies as well. Whenever possible, radio telemetry is used on captured reproductive females to determine the exact locations of the maternity colony's roost trees and the size of the maternity colony.
- Captured MYSE regardless of sex or age are considered known, occupied summer habitat, but without any evidence of a maternity colony.
- Locations documenting MYSE acoustic calls are considered known occupied summer habitat, but without any evidence of a maternity colony.

Documentation of known, occupied summer habitat is valid for 5 years, after which acoustic and/or mist-net surveys may be conducted that confirm or deny their presence within the Special Management Zone. Verifying the status of known, occupied summer habitat may require more intensive survey efforts than required by USFWS guidelines for determining presence/probable absence.

Population Status: There are 71 known locations with historic presence of adult female MYSE captured during the summer months in Vermont. Since 2010, after the full population effects of WNS in Vermont, MYSE have been difficult to capture through a very limited survey effort. Only 13 adult female MYSE have been observed at nine sites statewide between 2010 and 2016. In only two of those instances have bats been telemetered successfully to identify maternity roost sites. In addition, there are several locations at which multiple acoustic MYSE calls have been detected since 2010.

Special Management Zones: Scientific literature suggests that the roost trees used by MYSE are more concentrated in area than other species such as Indiana bats. Given the mean distance between roosts for a single bat approximates 0.42 miles and research showing maximum distances ranged from 1.2 to 2.4 miles apart, it is recommended that the impacts of land use activities be evaluated at distance thresholds for two zones with radii of 0.25 and 1.0 miles from the location of the known maternity colony roost trees, the capture site (if no roost trees are known), or the location of acoustic detections.

- Special Management Zone 1: This zone is within a 0.25-mile radius of the known, occupied summer habitat and is designed to be more sensitive to the increased likelihood that additional roost trees are proximate to the known sites.
    - The removal of any known, occupied roost trees and any trees within 150 feet are prohibited. The 150-foot buffer is a result of the final USFWS 4(d) rule.
    - Land use activities *less than 1% of the existing forested acreage* (i.e., 1.25 acres in a completely forested landscape) within the SMZ are allowed, provided all tree cutting is prohibited during the period April 15 – September 30.
    - Where no known maternity colony exists (i.e., only male MYSE have been captured or acoustic calls have been documented), because of the limited acreage involved, forest management activities may allow for such seasonal restrictions to be waived upon completion of a survey for potential roost trees by a trained forester or biologist that identifies, marks, and retains all potential roost trees.
    - Land use activities impacting *greater than 1% of the existing forested acreage* within the SMZ will be reviewed to reduce the impact on the known, occupied summer habitat and may include the following measures:
        - Prohibit tree clearing during the period April 15 – September 30.[4]
        - Limit tree clearing to 2% of the forested acreage (i.e., 2.5 acres in a completely forested landscape) within the SMZ.
        - Apply potential roost tree retention guidelines (see VFWD Potential Roost Tree Retention Guidelines for Endangered Bats) on the remainder of the project lands.[3,6]
    - Fragmentation of the forest canopy should be minimized to maintain bat migration and movement within the Special Management Zone.

- Special Management Zone 2: This zone is between 0.25 and 1.0-mile radius from the known, occupied summer habitat and is designed to maintain suitable roosting and foraging habitat during the maternity season.
    - Land use activities impacting *less than 1% of the existing forested acreage* (i.e., 20 acres in a completely forested landscape) within the SMZ will be allowed, provided all tree cutting is prohibited during the period April 15 – September 30. [4] Because of the limited acreage involved, projects may allow for such seasonal restrictions to be waived upon completion of a survey for potential roost trees by a trained forester or biologist that identifies, marks, and retains all potential roost trees.
    - Land use activities impacting *greater than 1% of the existing contiguous forested acreage* within the SMZ will be reviewed to reduce the impact on the known, occupied summer habitat and may include the following measures:
        - Prohibit tree clearing during the period April 15 – September 30.[4]

        - Limit tree clearing to 2% of the contiguous forested acreage (i.e., 40 acres in a completely forested landscape) within the SMZ.
        - Apply potential roost tree retention guidelines (see VFWD Potential Roost Tree Retention Guidelines for Endangered Bats) on the remainder of the project lands.[3,6]
    - Fragmentation of the forest canopy must be avoided or minimized to maintain bat migration and movement within the Special Management Zone.

Potential Summer Habitat

Definition: This encompasses the remainder of the state where no known, occupied summer habitat or hibernacula exist (see definitions above). While no known occurrences have been documented in this region since 2010, historical inventory data indicates that all of the state serves as suitable habitat for the northern long-eared bat.

Population Status: Until such time that Vermont can compile significant additional acoustic and capture data on the statewide distribution and abundance of MYSE, one should assume that the presence of maternity colonies on the summer landscape is less than 10% of pre-WNS numbers. Following this logic, every project has less than a 10% chance of impacting a maternity colony compared to before the impacts of WNS. However, without data to the contrary or knowledge of the exact whereabouts of all remaining bats, the presence of MYSE on project sites should be assumed if the purpose is to avoid take of the species. Projects outside known, occupied range may conduct acoustic surveys to demonstrate the probable absence of MYSE and, as a result, avoid all restrictions provided below.

Special Management Zone: Given the mean distance between roosts for a single bat approximates 0.42 miles and research showing maximum distances ranged from 1.2 to 2.4 miles apart, a radius of 1.0 miles from the potential maternity colony should be sufficient to include most of the roost trees used by a colony should it be present.

Based on a project's impacts to habitat within a 1.0-mile radius surrounding the center of the project area*:*

- Land use activities impacting *less than 1% of the existing forested acreage* within a 1.0-mile radius of the land use activity (i.e., 20 acres in a completely forested landscape) will be allowed without any conservation measures necessary.
- Land use activities impacting *greater than 1% of the forested acreage* within the SMZ can avoid all restrictions if acoustic surveys are conducted during the months of June and July and results demonstrate probable absence of MYSE on the project site. (see Appendix A VFWD Guidelines for Acoustic Surveys for Endangered Bats).
- Land use activities impacting *greater than 1% of the existing forested acreage* within a 1.0-mile radius of the land use activity (i.e., 20 acres in a completely forested landscape) will be reviewed to reduce the impact on potential maternity colony habitat and may include the following measures:
    - Prohibit tree clearing during the period April 15 – August 31[5]
    - Apply potential roost tree retention guidelines (see VFWD Potential Roost Tree Retention Guidelines for Endangered Bats) on the remainder of the project lands.[3,6]

        - Limit forest conversion to 2% of the forested acreage (i.e., 40 acres in a completely forested landscape). [7]
    - Land use activities impacting more than 2% of the forested acreage (i.e., 40 acres in a completely forested landscape) within the SMZ must conduct acoustic surveys to determine the presence or probable absence of MYSE. (see Appendix A VFWD Guidelines for Acoustic Surveys for Endangered Bats). Without such surveys, any project that impacts more than 2% of the forested habitat will be evaluated for its overall impact on a potential maternity colony, requiring no less than a prohibition on the clearing of trees at least during the period of April 15 – August 31 and additional mitigation, depending on the acreage of the habitat impacted.

1 August 15 is considered the period when maternity colonies begin to break up and MYSE numbers at fall swarm surveys increase dramatically. The literature also supports MYSE presence at fall swarm sites dropping off considerably by mid-October. Data from Whittaker (1993) shows this timeline and recent Vermont fall swarm captures demonstrate female MYSE bats are present at hibernacula by August 29.

[2] Since 2010, the highest number of MYSE observed at any single hibernaculum in Vermont was three. This figure equates to a pro-rated density of one MYSE for every 670 acres within a SMZ of a radius of 1.0 mile. Even if the observed numbers were a small percentage of the actual, the likelihood of take is low enough so that a 1.0-mile radius sufficiently protects the bats roosting within it. SMZ size designed to capture nearly all of the possible roost trees (1.6-mile radius) is best addressed under the guidance for potential maternity colony habitat.

[3] Studies have shown as high as 65% of the roost trees used by MYSE were cavity trees. Assuming all cavity trees are identifiable, snag retention guidelines, when applied, may reduce the likelihood of take by that proportion. Hence, even a land use activity impacting 2% of the forested habitat has a 98.65% of not taking any roosting bats.

[4] Because evidence exists for the presence of adult female MYSE, seasonal restrictions on clearing trees should encompass the entire period of time when bats may be present. The April period assumes some female bats migrate directly to their maternity sites and fall swarming data suggests that all MYSE have arrived at the hibernacula by early October.

[5] Because evidence does not exist for the presence of MYSE, seasonal restrictions of April 15 – August 31 is intended to cover the period when MYSE are most concentrated in maternity colonies.

6 Potential roost trees include all trees exhibiting any number and degree of cavities, crevices, or exfoliating bark.

7 The single year 40-acre limit on acreage below 60% canopy closure assures that any possible maternity colony on site will not have greater than 25% of its roost trees removed, a figure at which research suggests the colony will remain intact (Silvis 2015). The 40-acre patch size limit is also approximately 25% of 180 acres, the largest reported mean concentration of maternity roost trees.

Appendix A

Conducting and Reporting on Presence/Probable Absence Surveys for Northern Long-Eared Bats
Vermont Fish and Wildlife Department
February 2017

Projects occurring in potential northern long-eared bat range, or in known, occupied summer habitat with occurrence data that is more than 10 years old may require presence/probable absence surveys. Surveys should follow the methods outlined below and any questions should be directed to Alyssa Bennett, Small Mammals Biologist, at Alyssa.bennett@vermont.gov

Field Survey Methods:

At a minimum, the Vermont Fish and Wildlife Department (VFWD) will require the latest acoustic methods approved by the US Fish and Wildlife Service for presence/probable absence surveys for Indiana bats (USFWS Range-Wide Indiana Bat Summer Survey Guidelines), which was extended to include northern long-eared bats following their federal listing as threatened under the Endangered Species Act in 2015. **The only exception is that the acoustic monitoring must be conducted between June 1 and July 31 in Vermont.**

The monitoring must be conducted by a consultant adequately trained in bat acoustic monitoring and call analyses. Prior to conducting the monitoring, the contractor should provide the VFWD with an acoustic monitoring plan that includes:

- The project plan with a map of the proposed tree trimming/removal area and the proposed acoustic survey locations
- The consultant's training and experience in conducting such surveys
- The equipment and analysis methods to be used for the survey

Reporting Results:

Survey results should be reported to the VFWD within 60 days of the completion of the survey and/or with sufficient time to allow the VFWD to review the results and determine whether further surveys need to be conducted before habitat-altering activities take place. Acoustic survey presence/probable absence results will be valid for up to five years after the survey was conducted, as significant population increases and recolonization into vacant habitat is not expected to occur quickly for the northern long-eared bat.

Under the Vermont Endangered Species Act and the Federal Endangered Species Act, threatened and endangered species' exact location information is protected. Therefore, specific locations where the northern long-eared bat or any other state and/or federally listed species has been

demonstrated to occur should be used for planning purposes only and not shared outside the VT Agency of Natural Resources unless a specific information request or data sharing agreement has been granted. However, known, occupied hibernacula and known, occupied summer habitat locations are mapped with a red, 1-mile radius and are updated periodically with new survey data on the Vermont Agency of Natural Resources (VANR) Atlas. These locations will show up when the "Rare Threatened Endangered Species" layer of the "Fish and Wildlife" tab is selected and visible.

Resources:

VANR Atlas: http://anrmaps.vermont.gov/websites/anra/

Specific element occurrence reports appearing on the Atlas are available through the **Vermont Natural Heritage Inventory** by contacting Jodi Shippee at Jodi.shippee@vermont.gov or Everett Marshall at Everett.Marshall@vermont.gov

USFWS. 2016. Range-Wide Indiana Bat Summer Survey Guidelines 2016. Available and updated at: http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html

APPENDIX B

Survey Methods for Potential Roost Trees for Endangered Bats
Vermont Fish and Wildlife Department
February 2017

Surveys for potential roost trees of Vermont state endangered bats should be conducted by personnel trained and experienced in the identification of potential roost trees used by Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*).

1. Determine if the project area is within the range of the Indiana bat and/or northern long-eared bat. ***Please note that based on historic and current data, northern long-eared bat range in Vermont is state-wide, but this distribution information may change in the future with continued data collection.***

2. Determine if the project contains suitable roosting habitat for Indiana bats (based on the U.S. Fish and Wildlife Service Range-Wide Indiana Bat Summer Survey Guidelines) and/or northern long-eared bats (based the Vermont Fish and Wildlife Department Regulatory Review Guidance for Protecting Northern Long-Eared Bats and Their Habitats).

3. Complete (100%) survey of the forested portion of the project area to be significantly altered or converted to non-forested habitat.

4. Each tree 4 inches diameter at breast height (DBH) or greater must be individually assessed using potential roost tree criteria. If the project does not pose a concern for impacts to northern long-eared bats based on distance from known summer or winter colonies and/or amount of tree clearing but is within Indiana bat range, only trees 12 inches DBH or greater must be assessed.

5. Potential roost tree criteria:
    - Cavity tree exhibiting any form of decay or excavation by primary producers (e.g., woodpeckers) that provides access to the interior of the bole
    - Cracks or crevices into which bats may roost, including black locust bark furrows
    - Peeling or exfoliating bark on the bole or branches
    - Live shagbark hickory or black locust
    - Total tree height must exceed 10 feet

6. Record data on all potential roost trees:
    - Tree species

- Roosting features: cavity, crack, crevice, or exfoliating bark
- Percentage of bark remaining
- Percentage of crown remaining
- Diameter at Breast Height
- GPS Location

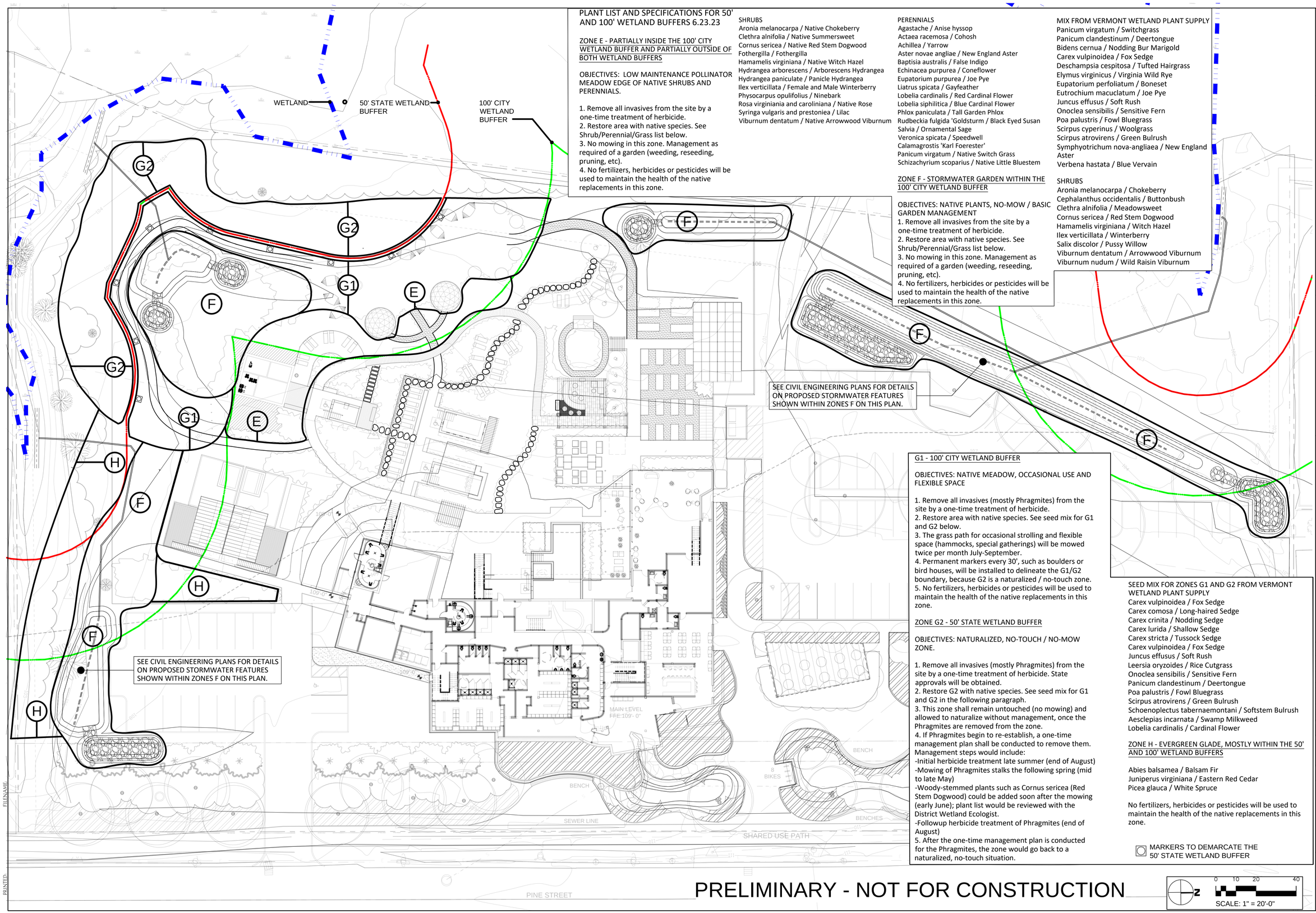
7. Submit a written report which confirms the surveyor's name and training/experience conducting such surveys, methods used, results, and a map of the location of each potential roost tree to Alyssa.bennett@vermont.gov

Habitat Type		Conservation Measure	Land Use Guideline	USFWS Federal Nexus
Known, Occupied Hibernacula	**Special Management Zone 1 (128 Acres)**	Special Management Zone (SMZ)	0.25 mile radius from cave/mine entrance	0.25 mile radius from cave/mine entrance
		Prohibited Activities	Impact integrity of hibernaculum; Forest conversions > 2% of forested habitat	Impact integrity of hibernaculum; Any tree cutting
		No conservation measures necessary	Habitat Not Suitable[1]	
		Forest conversion < 1% of forested habitat[2]	Seasonal Restrictions: No tree harvesting April 15 – October 31	
		Forest conversion > 1% of forested habitat[2]	Seasonal Restrictions: No tree harvesting April 15 – October 31	
			Apply potential roost tree retention guidelines on project area	
			Minimize habitat and canopy fragmentation	
	Special Management Zone 2 (2010 Acres)	Special Management Zone (SMZ)	1.0 mile radius from cave/mine entrance	
		Prohibited Activities	Impact integrity of hibernaculum; Forest conversions > 2% of forested habitat[3]	
		No conservation measures necessary	Habitat Not Suitable[1]	
		Forest conversion < 1% of forested habitat[4]	Seasonal Restrictions: No tree harvesting April 15 – October 31[5]	
		Forest conversion > 1% of forested habitat[4]	Seasonal Restrictions: No tree harvesting April 15 – October 31	
			Apply potential roost tree retention guidelines on project area	
			Minimize habitat and canopy fragmentation	

Habitat Type		Conservation Measure	Land Use Guideline	USFWS Federal Nexus
Known, Occupied Summer Habitat	**Special Management Zone 1 (128 Acres)**	Special Management Zone (SMZ)	0.25 mile radius from roost trees, colony location	150 feet radius from known occupied roost trees
		Prohibited Activities	Harvest of known, occupied roost trees; Forest conversions > 2% of forested habitat[3]	Harvest of known, occupied roost trees or any trees within 150 feet June 1 – July 31
		No conservation measures necessary	Habitat Not Suitable[1]	
		Forest conversion < 1% of forested habitat[4]	Seasonal Restrictions: No tree harvesting April 15 – September 30	
		Forest conversion > 1% of forested habitat[4]	Seasonal Restrictions: No tree harvesting April 15 – September 30	
			Apply potential roost tree retention guidelines on project area	
			Minimize habitat and canopy fragmentation	
	Special Management Zone 2 (2010 Acres)	Special Management Zone (SMZ)	1.0 mile radius from roost trees, colony location	150 feet radius from known occupied roost trees
		Prohibited Activities	Harvest of known, occupied roost trees; Forest conversions > 2% of forested habitat[3]	Harvest of known, occupied roost trees or any trees within 150 feet June 1 – July 31
		No conservation measures necessary	Habitat Not Suitable[1]	
		Forest conversion < 1% of forested habitat[4]	Seasonal Restrictions: No tree harvesting April 15 – September 30[5]	
		Forest conversion > 1% of forested habitat[4]	Seasonal Restrictions: No tree harvesting April 15 – September 30	
			Apply potential roost tree retention guidelines on project area	
			Minimize habitat and canopy fragmentation	

Habitat Type		Conservation Measure	Land Use Guideline	USFWS Federal Nexus
Potential Summer Habitat	**Special Management Zone (2010 Acres)**	Special Management Zone (SMZ)	1.0 mile radius around project site	
		No conservation measures necessary	Habitat Not Suitable; Forest conversion < 1% of forested habitat[4]; Acoustic surveys demonstrate probable absence	Habitat Not Suitable; Acoustic surveys demonstrate probable absence
		Forest conversion > 1% of forested habitat[4]	Seasonal Restrictions: No tree harvesting April 15 – August 31	
			Forest conversion limited to < 2% of forested habitat[3]	
		Forest conversion > 2% of forested habitat[3]	May be required to demonstrate probable absence[6] OR additional mitigation measures are taken	
			Seasonal Restrictions: No tree harvesting April 15 – August 31 OR Demonstrate no probable presence	

[1] Habitat suitability includes tree diameters, tree species, canopy closure, and habitat isolation
[2] 1% of the 0.25 mile radius Special Management Zone equates to 1.25 acres in a completely forested Special Management Zone
[3] 2% of the 1.0 mile radius Special Management Zone equates to 40 acres in a completely forested Special Management Zone
[4] 1% of the 1.0 mile radius Special Management Zone equates to 20 acres in a completely forested Special Management Zone
[5] Seasonal restrictions may be waived upon completion of a survey for potential roost trees by a trained consultant that identifies, marks, and retains all potential roost trees
[6] Project impacts exceeding 2% of forested habitat may be required to demonstrate probable absence of MYSE due to the large size of the impact



PLANT LIST AND SPECIFICATIONS FOR 50' AND 100' WETLAND BUFFERS 6.23.23

ZONE E - PARTIALLY INSIDE THE 100' CITY WETLAND BUFFER AND PARTIALLY OUTSIDE OF BOTH WETLAND BUFFERS

OBJECTIVES: LOW MAINTENANCE POLLINATOR MEADOW EDGE OF NATIVE SHRUBS AND PERENNIALS.

1. Remove all invasives from the site by a one-time treatment of herbicide.
2. Restore area with native species. See Shrub/Perennial/Grass list below.
3. No mowing in this zone. Management as required of a garden (weeding, reseeding, pruning, etc).
4. No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

SHRUBS
Aronia melanocarpa / Native Chokeberry
Clethra alnifolia / Native Summersweet
Cornus sericea / Native Red Stem Dogwood
Fothergilla / Fothergilla
Hamamelis virginiana / Native Witch Hazel
Hydrangea arborescens / Arborescens Hydrangea
Hydrangea paniculate / Panicle Hydrangea
Ilex verticillata / Female and Male Winterberry
Physocarpus opulifolius / Ninebark
Rosa virginiania and caroliniana / Native Rose
Syringa vulgaris and prestoniea / Lilac
Viburnum dentatum / Native Arrowwood Viburnum

PERENNIALS
Agastache / Anise hyssop
Actaea racemosa / Cohosh
Achillea / Yarrow
Aster novae angliae / New England Aster
Baptisia australis / False Indigo
Echinacea purpurea / Coneflower
Eupatorium purpurea / Joe Pye
Liatrus spicata / Gayfeather
Lobelia cardinalis / Red Cardinal Flower
Lobelia siphilitica / Blue Cardinal Flower
Phlox paniculata / Tall Garden Phlox
Rudbeckia fulgida 'Goldsturm / Black Eyed Susan
Salvia / Ornamental Sage
Veronica spicata / Speedwell
Calamagrostis 'Karl Foerester'
Panicum virgatum / Native Switch Grass
Schizachyrium scoparius / Native Little Bluestem

ZONE F - STORMWATER GARDEN WITHIN THE 100' CITY WETLAND BUFFER

OBJECTIVES: NATIVE PLANTS, NO-MOW / BASIC GARDEN MANAGEMENT
1. Remove all invasives from the site by a one-time treatment of herbicide.
2. Restore area with native species. See Shrub/Perennial/Grass list below.
3. No mowing in this zone. Management as required of a garden (weeding, reseeding, pruning, etc).
4. No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

MIX FROM VERMONT WETLAND PLANT SUPPLY
Panicum virgatum / Switchgrass
Panicum clandestinum / Deertongue
Bidens cernua / Nodding Bur Marigold
Carex vulpinoidea / Fox Sedge
Deschampsia cespitosa / Tufted Hairgrass
Elymus virginicus / Virginia Wild Rye
Eupatorium perfoliatum / Boneset
Eutrochium macuclatum / Joe Pye
Juncus effusus / Soft Rush
Onoclea sensibilis / Sensitive Fern
Poa palustris / Fowl Bluegrass
Scirpus cyperinus / Woolgrass
Scirpus atrovirens / Green Bulrush
Symphyotrichum nova-angliaea / New England Aster
Verbena hastata / Blue Vervain

SHRUBS
Aronia melanocarpa / Chokeberry
Cephalanthus occidentalis / Buttonbush
Clethra alnifolia / Meadowsweet
Cornus sericea / Red Stem Dogwood
Hamamelis virginiana / Witch Hazel
Ilex verticillata / Winterberry
Salix discolor / Pussy Willow
Viburnum dentatum / Arrowwood Viburnum
Viburnum nudum / Wild Raisin Viburnum

G1 - 100' CITY WETLAND BUFFER

OBJECTIVES: NATIVE MEADOW, OCCASIONAL USE AND FLEXIBLE SPACE

1. Remove all invasives (mostly Phragmites) from the site by a one-time treatment of herbicide.
2. Restore area with native species. See seed mix for G1 and G2 below.
3. The grass path for occasional strolling and flexible space (hammocks, special gatherings) will be mowed twice per month July-September.
4. Permanent markers every 30', such as boulders or bird houses, will be installed to delineate the G1/G2 boundary, because G2 is a naturalized / no-touch zone.
5. No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

ZONE G2 - 50' STATE WETLAND BUFFER

OBJECTIVES: NATURALIZED, NO-TOUCH / NO-MOW ZONE.

1. Remove all invasives (mostly Phragmites) from the site by a one-time treatment of herbicide. State approvals will be obtained.
2. Restore G2 with native species. See seed mix for G1 and G2 in the following paragraph.
3. This zone shall remain untouched (no mowing) and allowed to naturalize without management, once the Phragmites are removed from the zone.
4. If Phragmites begin to re-establish, a one-time management plan shall be conducted to remove them. Management steps would include:
-Initial herbicide treatment late summer (end of August)
-Mowing of Phragmites stalks the following spring (mid to late May)
-Woody-stemmed plants such as Cornus sericea (Red Stem Dogwood) could be added soon after the mowing (early June); plant list would be reviewed with the District Wetland Ecologist.
-Followup herbicide treatment of Phragmites (end of August)
5. After the one-time management plan is conducted for the Phragmites, the zone would go back to a naturalized, no-touch situation.

SEED MIX FOR ZONES G1 AND G2 FROM VERMONT WETLAND PLANT SUPPLY
Carex vulpinoidea / Fox Sedge
Carex comosa / Long-haired Sedge
Carex crinita / Nodding Sedge
Carex lurida / Shallow Sedge
Carex stricta / Tussock Sedge
Carex vulpinoidea / Fox Sedge
Juncus effusus / Soft Rush
Leersia oryzoides / Rice Cutgrass
Onoclea sensibilis / Sensitive Fern
Panicum clandestinum / Deertongue
Poa palustris / Fowl Bluegrass
Scirpus atrovirens / Green Bulrush
Schoenoplectus tabernaemontani / Softstem Bulrush
Aesclepias incarnata / Swamp Milkweed
Lobelia cardinalis / Cardinal Flower

ZONE H - EVERGREEN GLADE, MOSTLY WITHIN THE 50' AND 100' WETLAND BUFFERS

Abies balsamea / Balsam Fir
Juniperus virginiana / Eastern Red Cedar
Picea glauca / White Spruce

No fertilizers, herbicides or pesticides will be used to maintain the health of the native replacements in this zone.

MARKERS TO DEMARCATE THE 50' STATE WETLAND BUFFER

PRELIMINARY - NOT FOR CONSTRUCTION

SCALE: 1" = 20'-0"

Wiemann Lamphere ARCHITECTS
525 Hercules Drive
Suite Two
Colchester, VT 05446
802.655.5020
802.622.6567
wiemannlamphere.com

HARDY STRUCTURAL ENGINEERING
875 Roosevelt Hwy, Ste. 130, Colchester, VT 05446 | PH: 802.655.0755 | www.hardyhe.com

LN CONSULTING
Vermont: 208 Flynn Avenue #2J, Burlington, VT 05401, (802) 655-0753, Fax (802) 655-7628
Massachusetts: 32 Masonic St., Unit E, Northampton, MA 01060, (413) 776-9560, lnconsulting.com

design for leisure — One Union Studio

Knauf LANDSCAPE ARCHITECTURE
529 HERCULES DRIVE, SUITE 2B, COLCHESTER, VT 05446, 802.310.9078, CHRIS@KNAUFLA.COM

Silt Bathhouse
Wetland Buffer Planting Plan
Burlington Vermont

#	DATE	REVISION DESCRIPTION

DATE: July 13, 2023
PLAN NORTH
SCALE: As Indicated
PROJECT NO:
DRAWN BY: FRC
CHECKED BY: CK
SHEET TITLE:

SHEET NUMBER: L5.3

FILENAME:
PRINTED:

2023 – 2028
Joint Institutional Parking Management Plan

Burlington Development Review Board

June 6th, 2023

Process

CATMA presents JIPMP to Planning Commission

Planning Commission recommends JIPMP to DRB

CATMA presents to DRB

DRB Approval

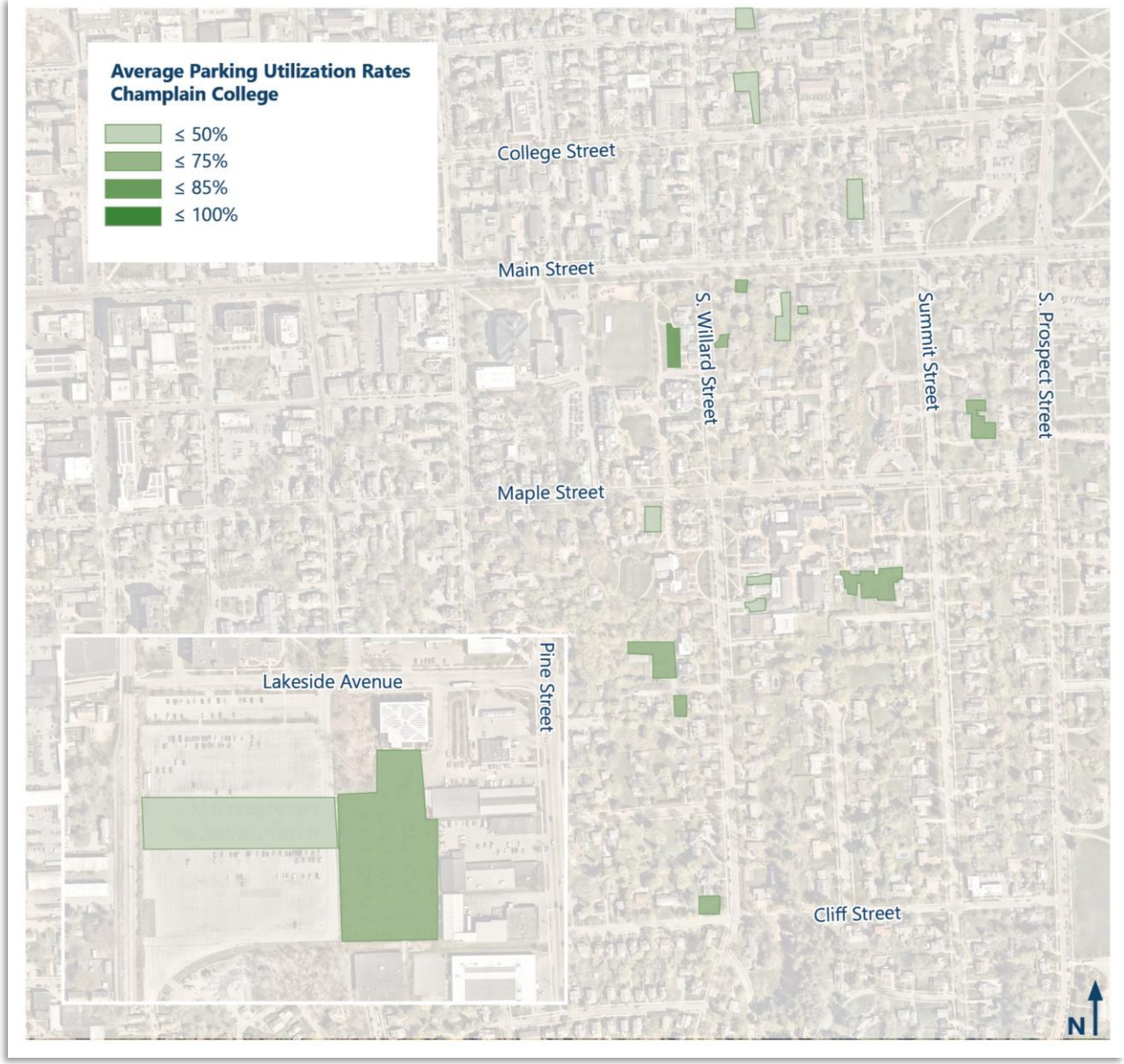


Key Areas of Discussion ★

- Peak Parking Demand Margin of Error (UVM)
- Future Parking Projected Deficit (Champlain College)
- TDM Strategy Efficacy
- Event Parking Management (UVM)

Institutional Lot Counts

- Standardized lot count procedure since Fall 2019
- Each institution conducts quarterly counts on the same dates at the same times for consistency
- Data informs utilization trends



Employee & Student Transportation Surveys

- CATMA Survey Conducted in October of 2022
- Weighted survey data to represent populations

Table A-1. Overview of CATMA's 2022 Transportation Survey solicitation and responses.

	Launch Date	Population Total	Solicitation Total	Total Responses	Response Rate	Margin of Error
	Student Survey					
Champlain	10/4/2022	1,736	1,781	416	24%	4%
UVM	10/4/2022	14,088	1,000	★ 189	19%	7%
	Employee Survey					
Champlain	10/4/2022	612	944	175	19%	6%
UVM	10/4/2022	4,254	1,000	★ 304	30%	5%
UVMMC	10/4/2022	6,371	8,572	2,279	27%	2%

Peak Parking Demand Estimates

- Employees / Off-Campus Students

$$Parking\ Demand_t = \frac{Drive\ Alone_t + {}^1/_2\, Carpool_t}{All\ Users}$$ ★

- On-Campus Students

$$Parking\ Demand_t = \frac{Own\ Vehicle}{All\ Users}$$

Table A-2. Summary of peak parking demand on each campus as identified by the 2022 CATMA Employee and Student Transportation Surveys.

Champlain College	Thursday	12:00 PM – 2:00 PM
UVM	Wednesday	2:00 PM – 4:00 PM
UVM Medical Center	Monday	2:00 PM – 4:00 PM

Executive Summary

Table 1 Current Institutional Parking Demand Summary

	Champlain College	UVM	UVM Medical Center
Current Conditions			
Potential Users[1]	2,348	17,540	9,427
Peak Parking Demand Survey	741	4,943	2,145
Peak Parking Utilization Counts	427	3,508	1,941
Total Parking Supply	642	4,865	2,500
Net Spaces Peak Demand	-99	-78	355
Net Spaces Peak Utilization	215	1,357	559

1. Potential users include students and employees for Champlain College and UVM and employees and patients at UVMMC.

Table 2 Future Institutional Parking Demand Summary

	Champlain College	UVM	UVM Medical Center
Future Conditions			
Potential Users	2,990	17,820	9,427
Total Peak Parking Demand	992	4,988	2,145
Total Parking Supply	642	5,503	2,500
Net Spaces Peak Demand	★ -350	515	355

Executive Summary

	Champlain College	UVM	UVM Medical Center
Current Conditions			
Peak Parking Demand Survey	741	4,943	2,145
Demand Margin of Error	+/- 89	★ +/- 1,046	+/- 122
Peak Parking Utilization Counts	427	3,508	1,941
Utilization Margin of Error	+/- 31	+/- 217	+/- 65

Collective TDM Strategies











- CATMA TDM Strategies (programs, incentives, services)
- CarShare Vermont Campus Program
- Transit Subsidies
- Electric Assist Bikeshare System
- Shared Parking (UVM & UVMMC)
- Off-site Parking & Shuttles
- Telework Policies

TDM Strategy Efficacy











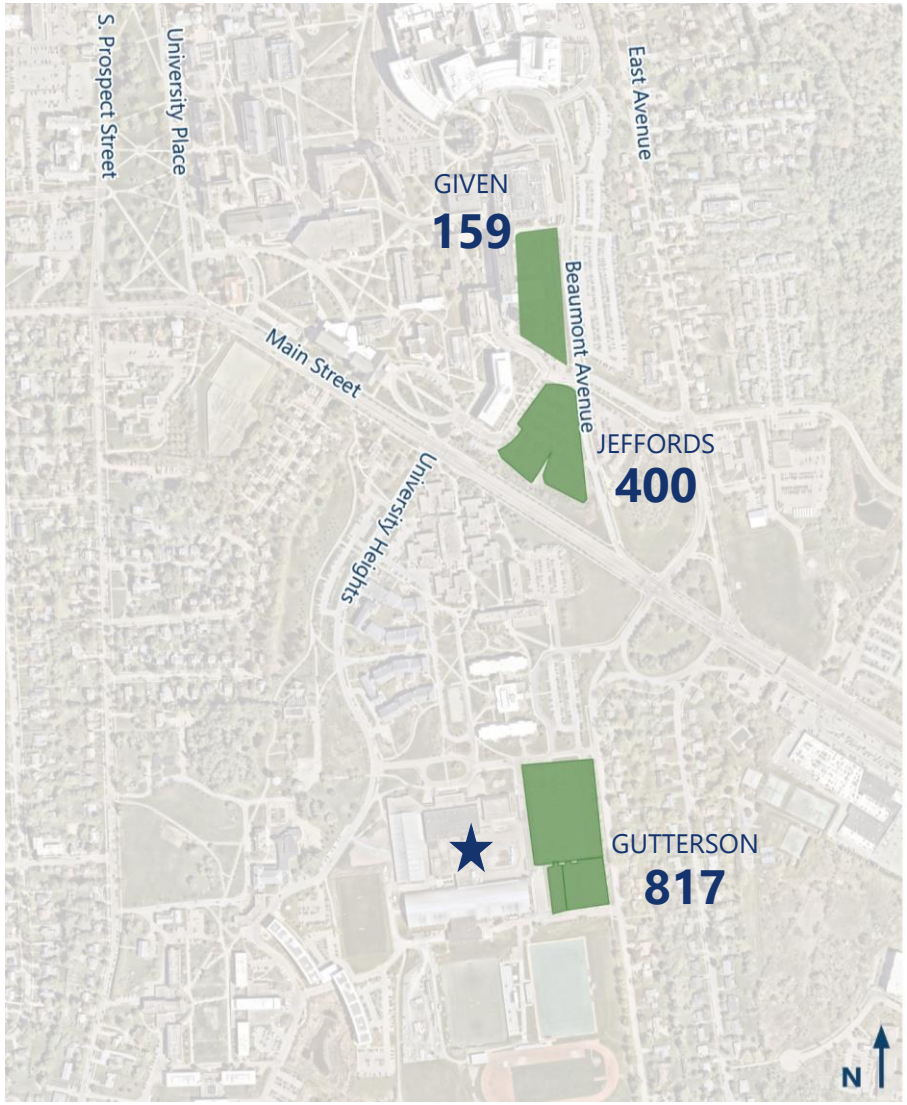
- Researched Efficacy
  - CarShare | +1 CarShare vehicle → 15 vehicles removed[1]
  - Electric Assist Bikeshare System | 10% reduction in SOV[2]
- Improved Use Data from Partners
  - Green Mountain Transit
  - CarShare Vermont
- Updated Survey Questions
- Burlington TDM Study



[1] CarShare Vermont
[2] McQueen, Michael, John MacArthur, and Christopher Cherry, PhD. 2019. "The E-Bike Potential: Estimating the Effect of E-bikes on Person Miles Travelled and Greenhouse Gas Emissions." Portland State University and University of Tennessee, Knoxville. Link.

UVM | Event Parking Management ★

- Highest demand events on evenings and weekends leverage shared parking
- Gutterson Lot <30% full at start of event
- Since 2020, only one event filled Gutterson Lot and diverted parking to Jeffords Lot
- Since 2013, only one event required use of Given Lot



Conclusions & Moving Forward

Approval of 5-year Joint Institutional Parking Management Plan

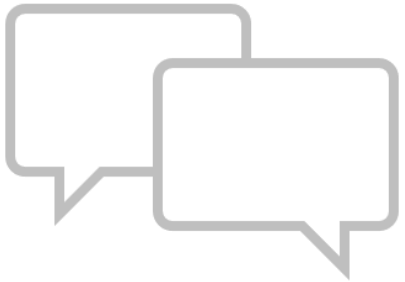
Conduct Employee & Student Transportation Survey in Fall 2023

- Ongoing coordination with UVM partners on future survey

Annual Updates

- updated employment & enrollment
- parking utilization numbers
- TDM highlights and efficacy
- project updates
- updated survey data and trends
- demonstrated parking supply and demand balance





Questions?

Thank You!

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Josh Katz

josh@catmavt.org

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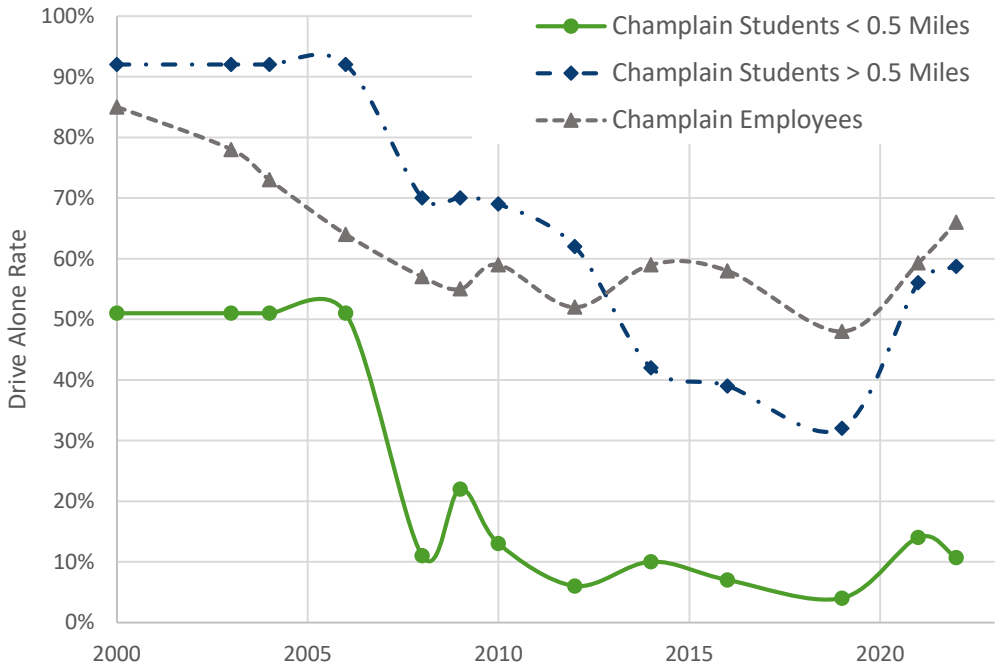
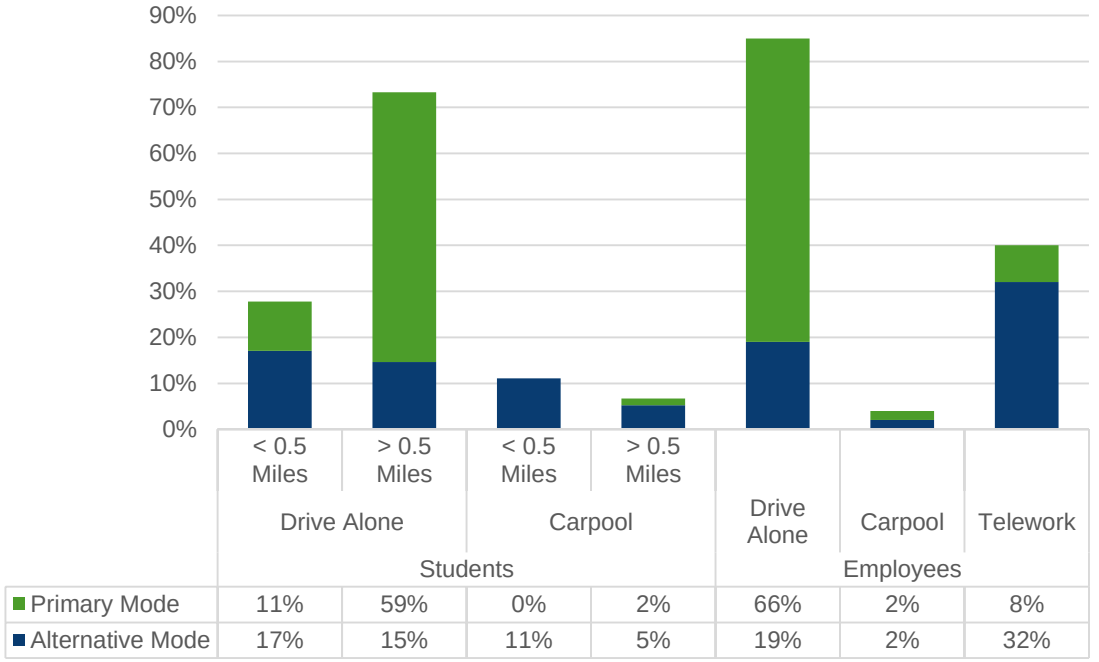
Institutional Summaries

CHAMPLAIN COLLEGE | The University of Vermont | THE University of Vermont MEDICAL CENTER

Champlain College | Current Conditions

Figure 1 Champlain College Drive Alone Trends & Mode Split





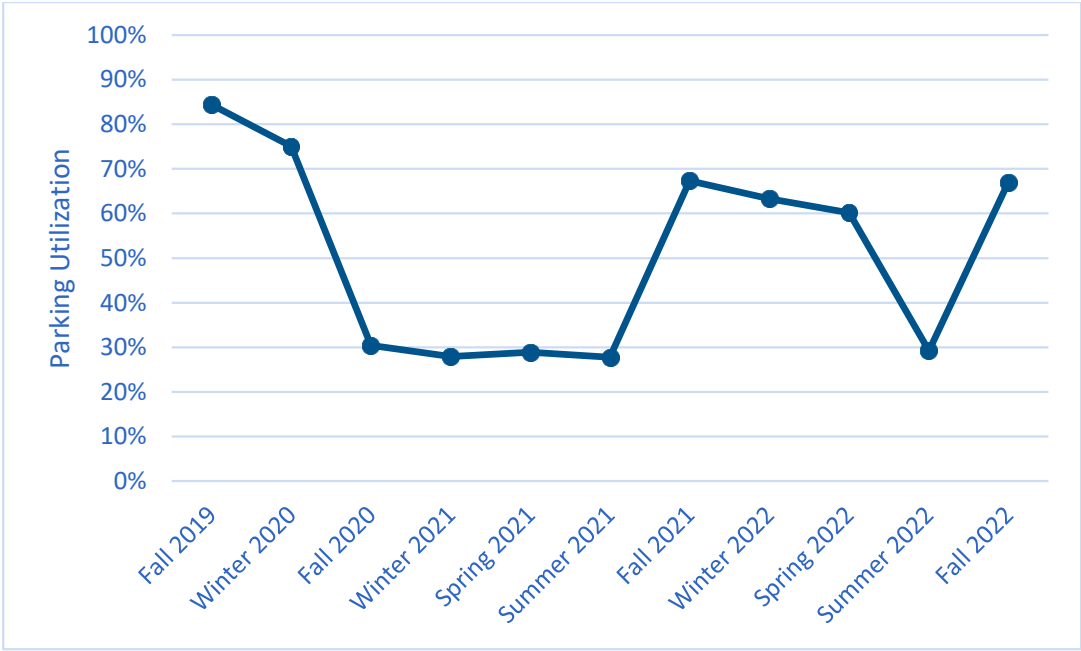
	< 0.5 Miles	> 0.5 Miles	< 0.5 Miles	> 0.5 Miles	Drive Alone	Carpool	Telework
	Drive Alone		Carpool		Drive Alone	Carpool	Telework
	Students				Employees		
Primary Mode	11%	59%	0%	2%	66%	2%	8%
Alternative Mode	17%	15%	11%	5%	19%	2%	32%

Champlain College | Current Conditions

Table 7 Champlain College Current Parking Demand

Champlain College			
User Group	**Number of Potential Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Employees	612	58.0%	355
On-Campus Students	1418	18.9%	269
Off-Campus Students	318	29.9%	96
Visitors			15
Fleet[2]			6
Peak Parking Demand			
Demand Based on Survey[3]			**741**
Utilization Based on Counts[4]			**427**
Parking Supply			
Total Spaces[5]			**642**
Net Spaces			
Peak Demand			**-99**
Peak Utilization			**+215**

Figure 5 Champlain College Parking Utilization Trends



Champlain College | Future Conditions

Table 6 Anticipated Champlain College Building Development Program

Project Name	Change in Building Area (gsf)	Associated Change in Parking (spaces)	Estimated Completion
Foster Hall Addition	3,500	0	2026
New ITS Building	31,500	0	2026
Career Center Addition	4,000	0	2025
Conversion of Building to Res Hall	N/A	0	2024

Table 8 Champlain College Future Parking Demand 2028

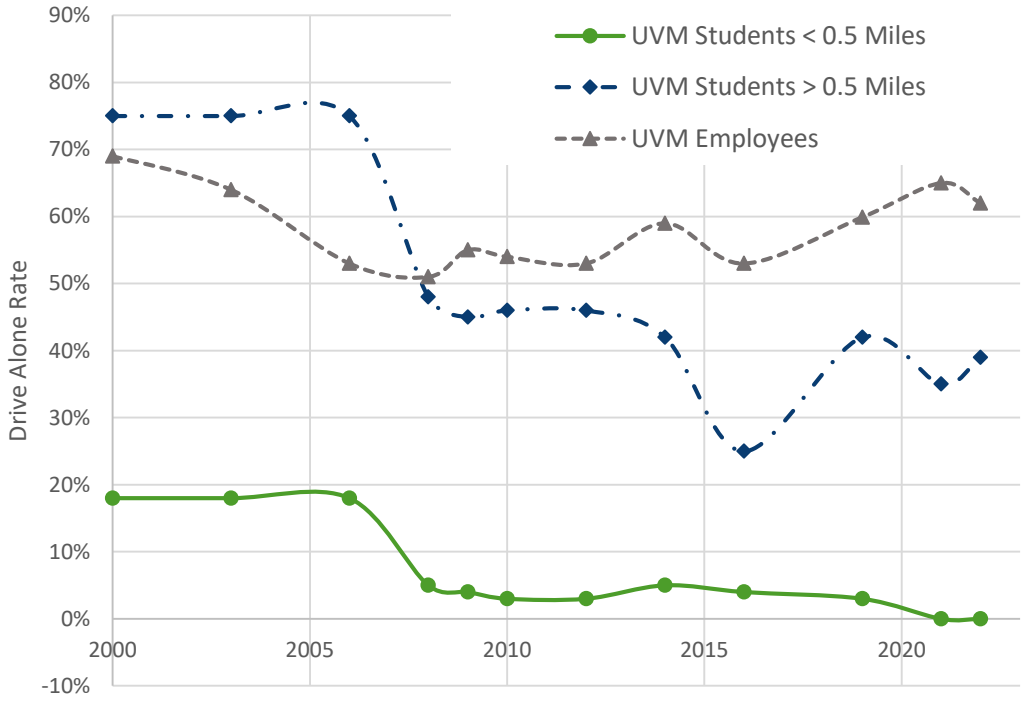
Champlain College			
User Group	**Number of Potential Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Employees	830	58.0%	482
On-Campus Students	1448	18.9%	275
Off-Campus Students	712	29.9%	214
Visitors			15
Fleet[2]			6
Peak Parking Demand			
Future Demand Based on Survey			**992**
Parking Supply			
Total Spaces[3]			**642**
Net Spaces			
Peak Demand			**-350**

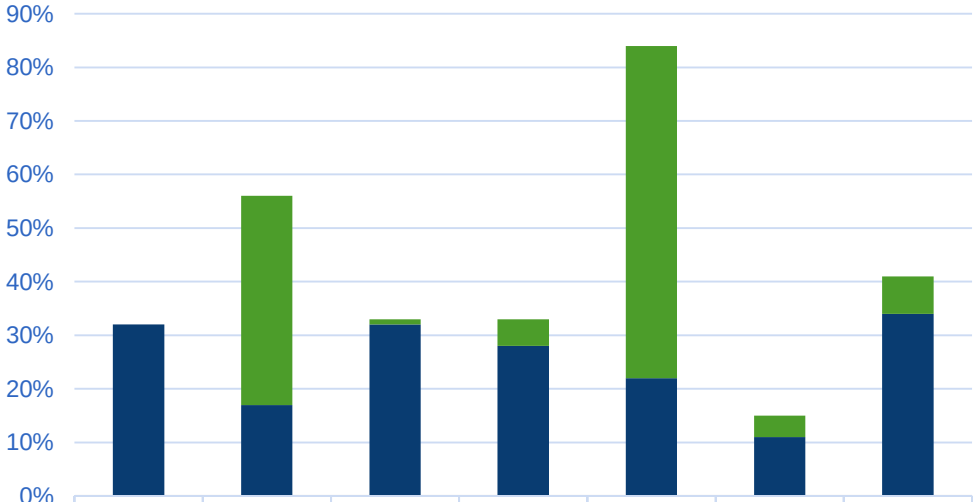
Champlain College | Highlights of TDM

- New Interim Workplace Flexibility People Center effective in 2o22
- Sustainability Action Plan completed in 2013
- Active Transportation Plans effective in 2015
- Parking Policies effective in 2017
- Sustain Champlain Campaign

UVM | Current Conditions

Figure 2 University of Vermont Drive Alone Trends & Mode Split





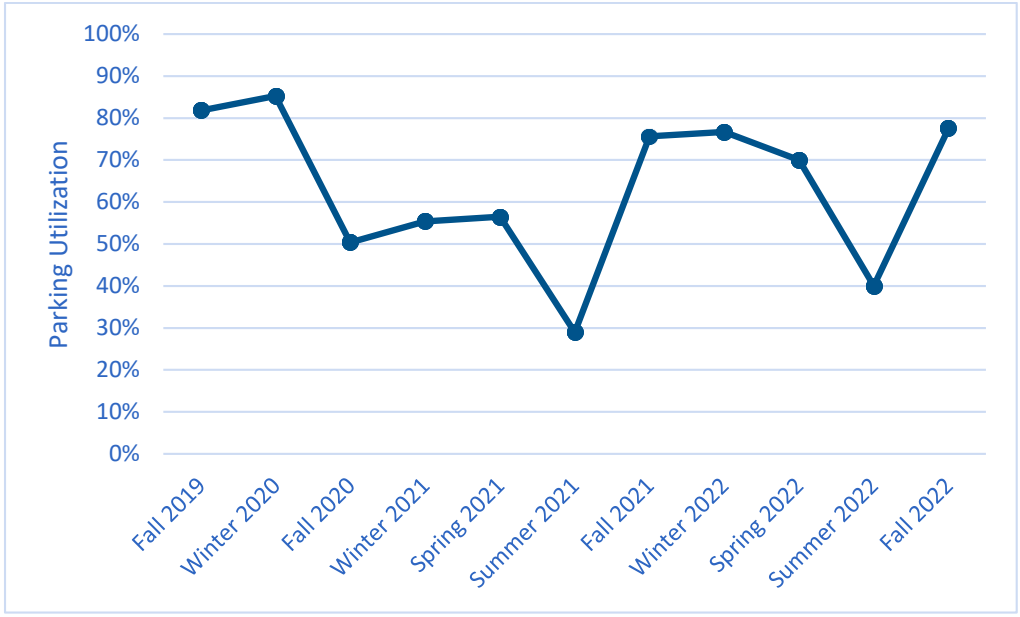
	< 0.5 Miles	> 0.5 Miles	< 0.5 Miles	> 0.5 Miles	Drive Alone	Carpool	Telework
	Drive Alone		Carpool				
	Students				Employees		
Primary Mode	0%	39%	1%	5%	62%	4%	7%
Alternative Mode	32%	17%	32%	28%	22%	11%	34%

UVM | Current Conditions

Table 12 University of Vermont Current Parking Demand

University of Vermont			
User Group	**Number of Potential Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Employees[2]	4,024	55.4%	2,228
On-Campus Students	5,775	16.8%	971
Off-Campus Students[3]	7,741	17.8%	1,376
Visitors			185
Fleet[4]			183
Peak Parking Demand			
Demand Based on Survey[5]			**4,943**
Utilization Based on Counts[6]			**3,508**
Parking Supply			
Total UVM Managed			**4,865**
Total UVM + Ground-Lease Spaces[7]			**5,244**
Net Spaces			
Peak Demand in UVM Managed Spaces			**-78**
Peak Demand in UVM + Ground-Lease Spaces			**+301**
Peak Utilization in UVM Managed Spaces			**+1,357**

Figure 7 University of Vermont Parking Utilization Trends



UVM | Future Conditions

Table 11 UVM Campus Building Program Data (completed and future)

Project Name	Included in Previous JIPMP	Change in Building Area (gsf)	Associated Change in Parking (spaces)	Estimated Completion
Music Building Recital Hall Addition	Yes	3942	3	Completed
Jeffords East Lower Lot	Yes		67	
University Heights Road (Southwick)	Yes		5	
Pomeroy Barn & 172 South Prospect Buildings	Yes	-6067	-3	
New Research Facility for COM (Firestone)	Yes	75,000	-121	
Bioresearch Complex Parking	Yes		153	2023
Hills	No	6408	1	
Centennial Compound	No		40	
ADA Code Compliance	Yes		-20	2024
284 East Avenue	No		30	
Waterman	No	3000	-10	
Votey Lot	Yes		-10	
Torrey Hall Addition	Yes	2860	-6	
Future Student Housing[3]	No	100000	0	2025
Future Additional Parking to Accommodate New Housing	No		200	
Colchester Research Facility Lot 1 Parking[2]	Yes		200	
University Road (East Ave to Compound)	Yes		15	
Interfaith Center Parking Lot	Yes		30	
Future Student Housing[3]	No	150000	-25	2026
Future Additional Parking to Accommodate New Housing	No		200	
Villa	No	12618	-7	
Future Compound Expansion	No		66	
Virtue Field Phase 3	Yes	5000	0	2027
Blundell Parking	Yes		5	
Tarrant (Multi-Purpose) Event Center Building	Yes	119099	0	
Miscellaneous Parking Adjustments[1]	Yes		25	Unknown
Coolidge Hall Building	Yes	-30510	0	
351 Pine Street	Yes		-200	
Fleming Museum Parking	Yes			Not moving forward at this time
Outing Club Relocation	Yes	13250		
Southwick Hall Parking	Yes			
Future Structured Parking	Yes			
Colchester Ave/Dewey Buildings	Yes	-82622		
Back 5 & Cottages (Trinity Campus) Buildings	Yes	-64907		

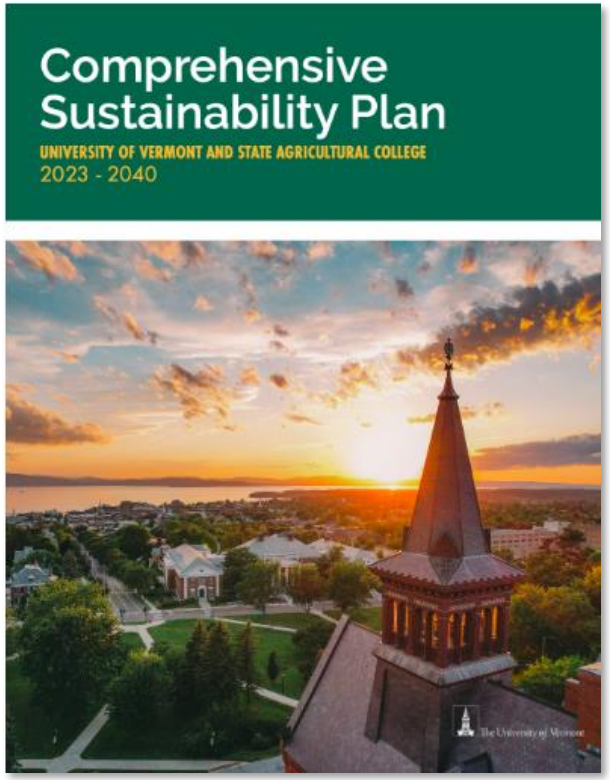
UVM | Future Conditions

Table 13 University of Vermont Future Parking Demand 2028

University of Vermont			
User Group	**Number of Potential Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Employees[2]	4,020	55.4%	2,226
On-Campus Students	6,375	16.8%	1,073
Off-Campus Students[3]	7,425	17.8%	1,321
Visitors			185
Fleet[4]			183
Peak Parking Demand			
Demand Based on Survey			**4,988**
Total Parking Supply			
Total UVM Managed			**5,503**
Total UVM + Ground-Lease Spaces			**5,882**
Net Spaces			
Peak Demand in UVM Managed Spaces			**+515**
Peak Demand in UVM + Ground-Lease Spaces			**+894**

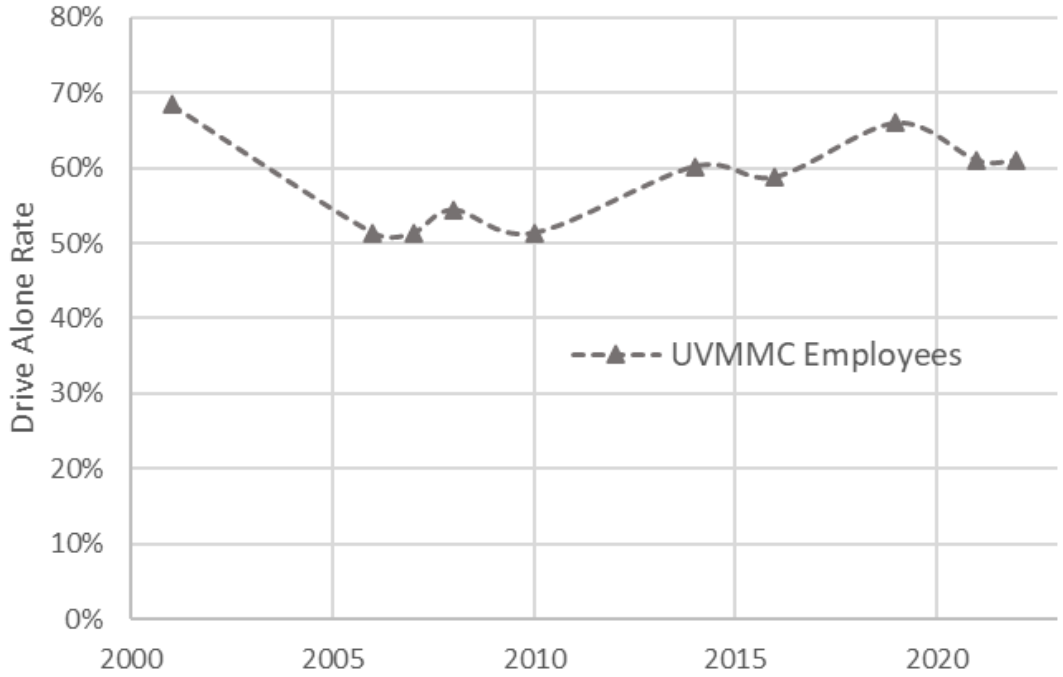
UVM | Highlights of TDM

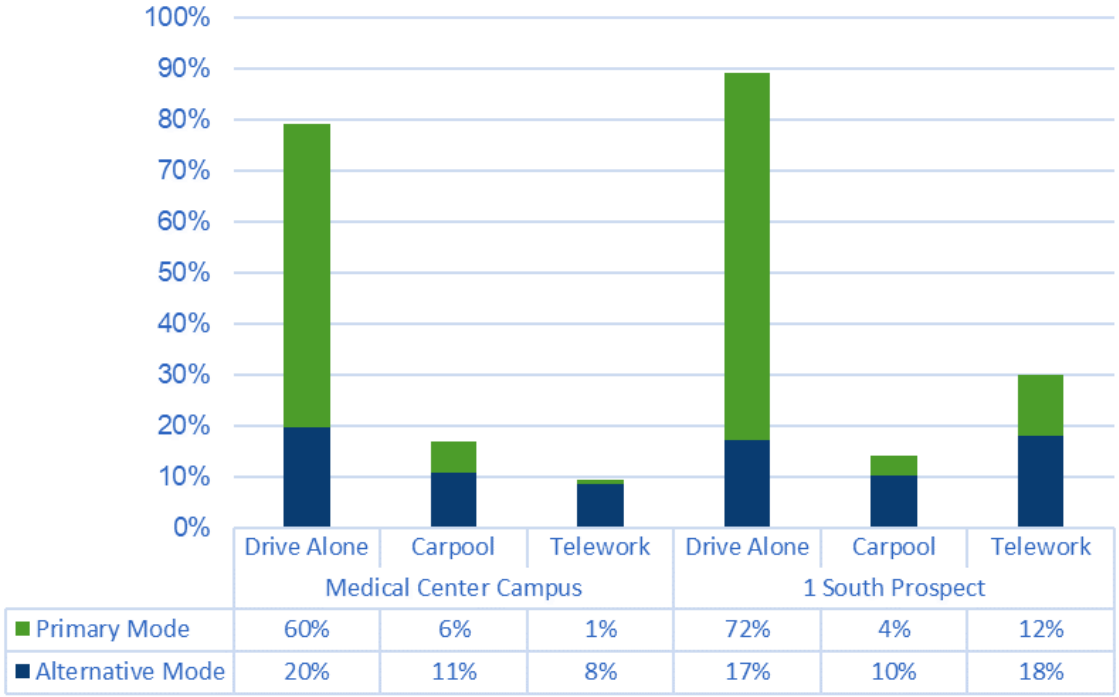
- New Telework Procedures went into effect in 2o21
- UVMoves Active Transportation Plan 2017
- Facilities Sustainability Plan 2021
- Green Fleet Vehicle Procurement Procedures 2019
- Comprehensive Sustainability Plan released last week
  - Reduce conventional SOV commutes from 2019 baseline



UVMMC | Current Conditions

Figure 3 University of Vermont Medical Center Drive Alone Trends & Mode Split





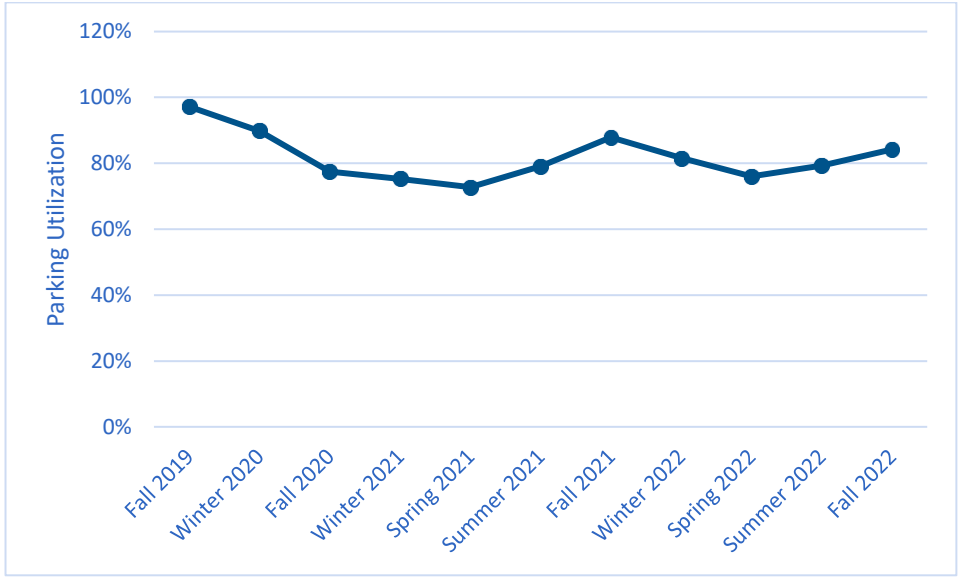
	Medical Center Campus			1 South Prospect		
	Drive Alone	Carpool	Telework	Drive Alone	Carpool	Telework
Primary Mode	60%	6%	1%	72%	4%	12%
Alternative Mode	20%	11%	8%	17%	10%	18%

UVMMC | Current Conditions

Table 14 University of Vermont Medical Center Current Parking Demand

UVM Medical Center			
User Group	**Number of Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Medical Center Campus			
Employees	5725	13.7%	785
Out-Patients[4]	2388		**700**
In-Patients[4]			**75**
Visitors[2]			**250**
Fleet			**11**
Subtotal			*1,821*
1 South Prospect			
Employees[3]	646	11.7%	75
Out-Patients[4]	563		**230**
Fleet			**10**
Subtotal			*315*
Other			
Employees	104	8.3%	9
Subtotal			*9*
Peak Parking Demand Based on Survey[5]			**2,145**
Peak Parking Utilization Based on Counts[6]			**1,941**
Total Parking Supply			**2,500**
Net Spaces Peak Demand			**+355**
Net Spaces Peak Utilization			**+559**

Figure 10 University of Vermont Medical Center Parking Utilization Trends



UVMMC | Future Conditions

Table 15 University of Vermont Medical Center Future Parking Demand 2028

UVM Medical Center			
User Group	**Number of Users**	**Peak Parking Demand[1]**	
		% of Users	**Spaces**
Medical Center Campus			
Employees	5725	13.7%	785
Out-Patients[4]	2388		**700**
In-Patients[4]			**75**
Visitors[2]			**250**
Fleet			**11**
Subtotal			*1821*
1 South Prospect			
Employees[3]	646	11.7%	75
Out-Patients[4]	563		**230**
Fleet			**10**
Subtotal			*315*
Other			
Employees	104	8.3%	9
Subtotal			*9*
Peak Parking Demand Based on Survey			**2,145**
Total Parking Supply			**2,500**
Net Spaces Peak Demand			**+355**

UVMMC | TDM Highlights

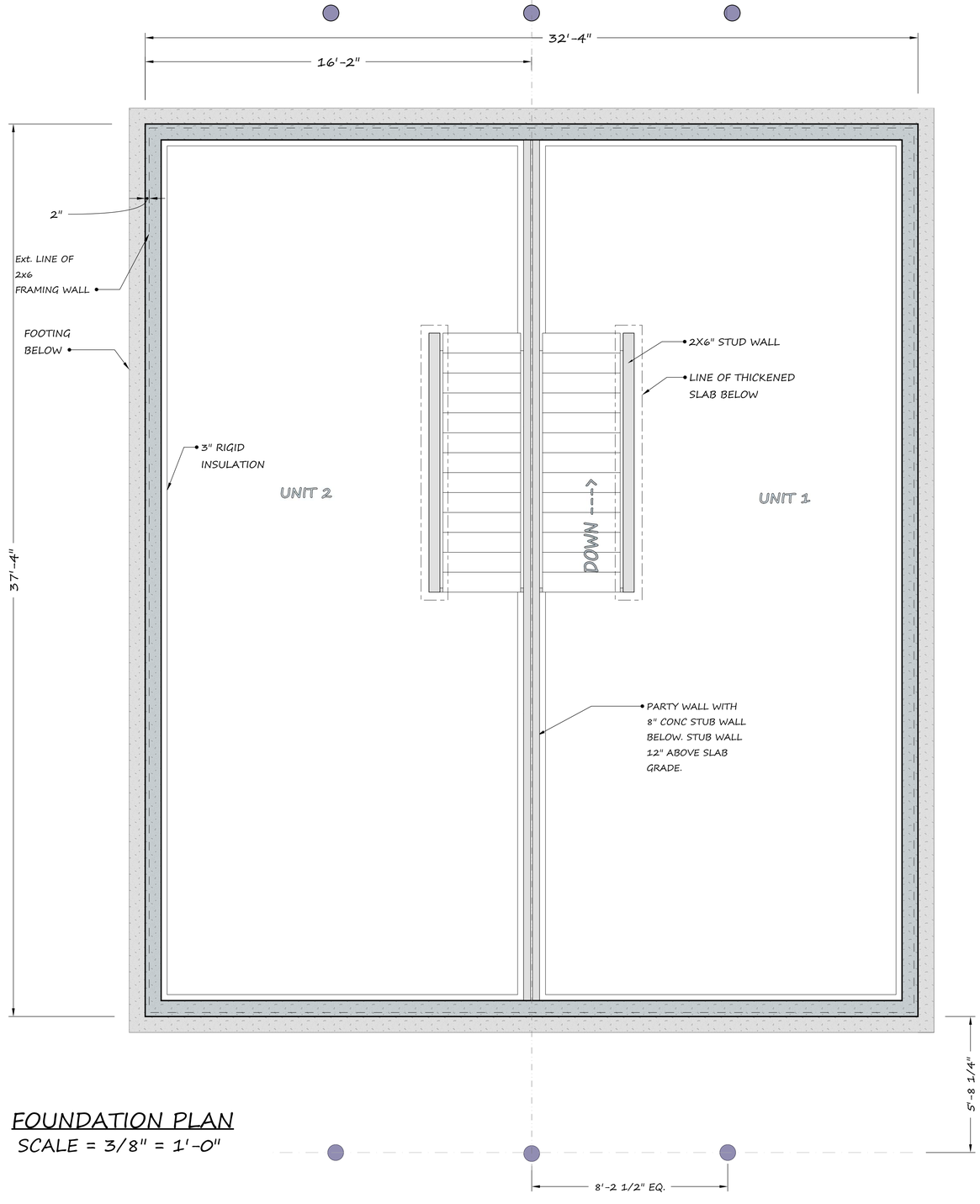
- New Telework Procedures went into effect in 2o21
- Mature Carpooling Program with Policy Update in 2022
- Updated Parking Policy effective in 2020
- Active Transportation Plan 2015



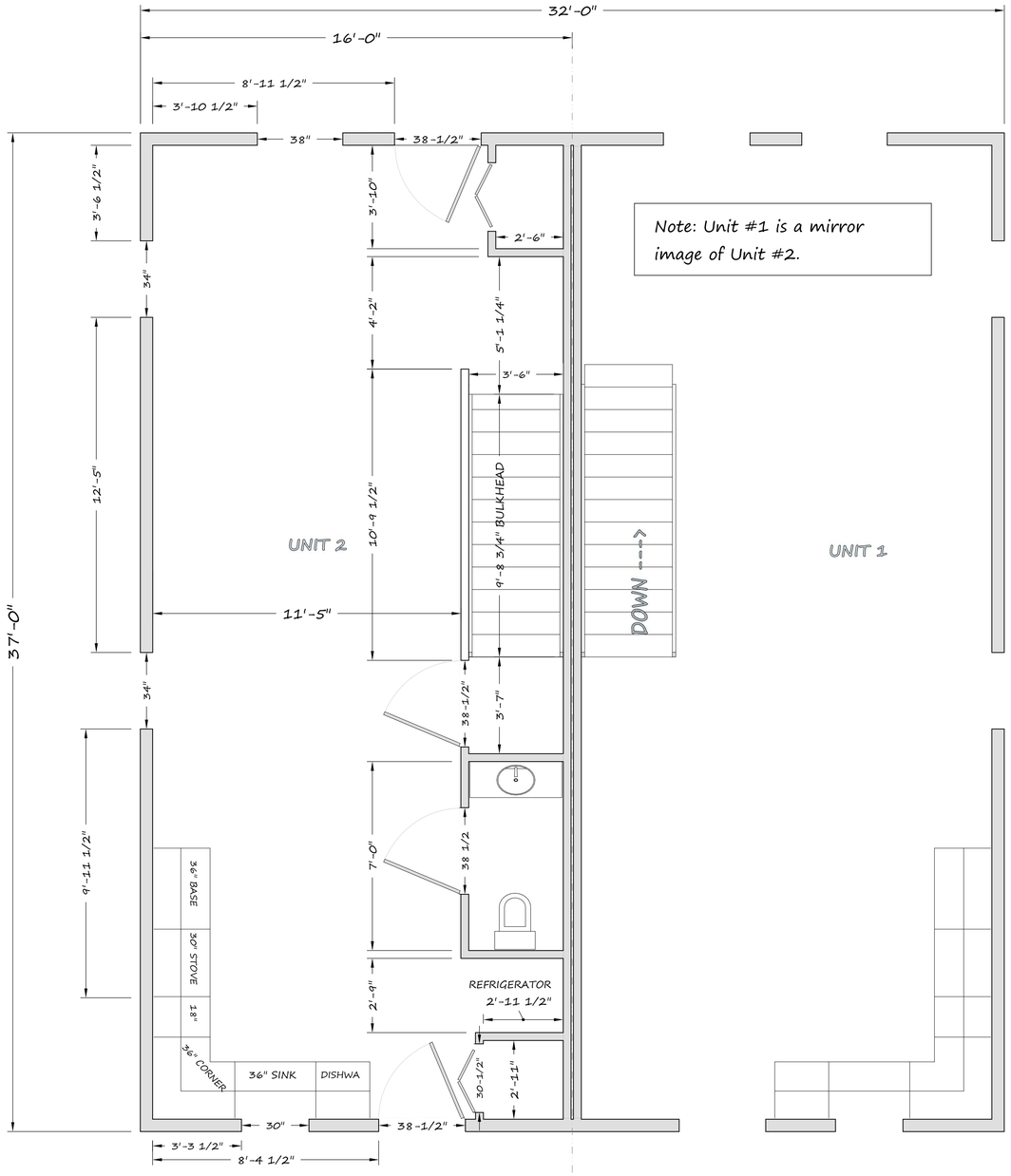
Green Mountain Habitat for Humanity®

483 MANHATTAN DRIVE
BURLINGTON, VERMONT

Author: FJS	Project Name: HFH - 483 MANHATTAN DRIVE SKETCH #19	Last Modified: July 4, 2023	Title Page	Page No:



FOUNDATION PLAN
SCALE = 3/8" = 1'-0"

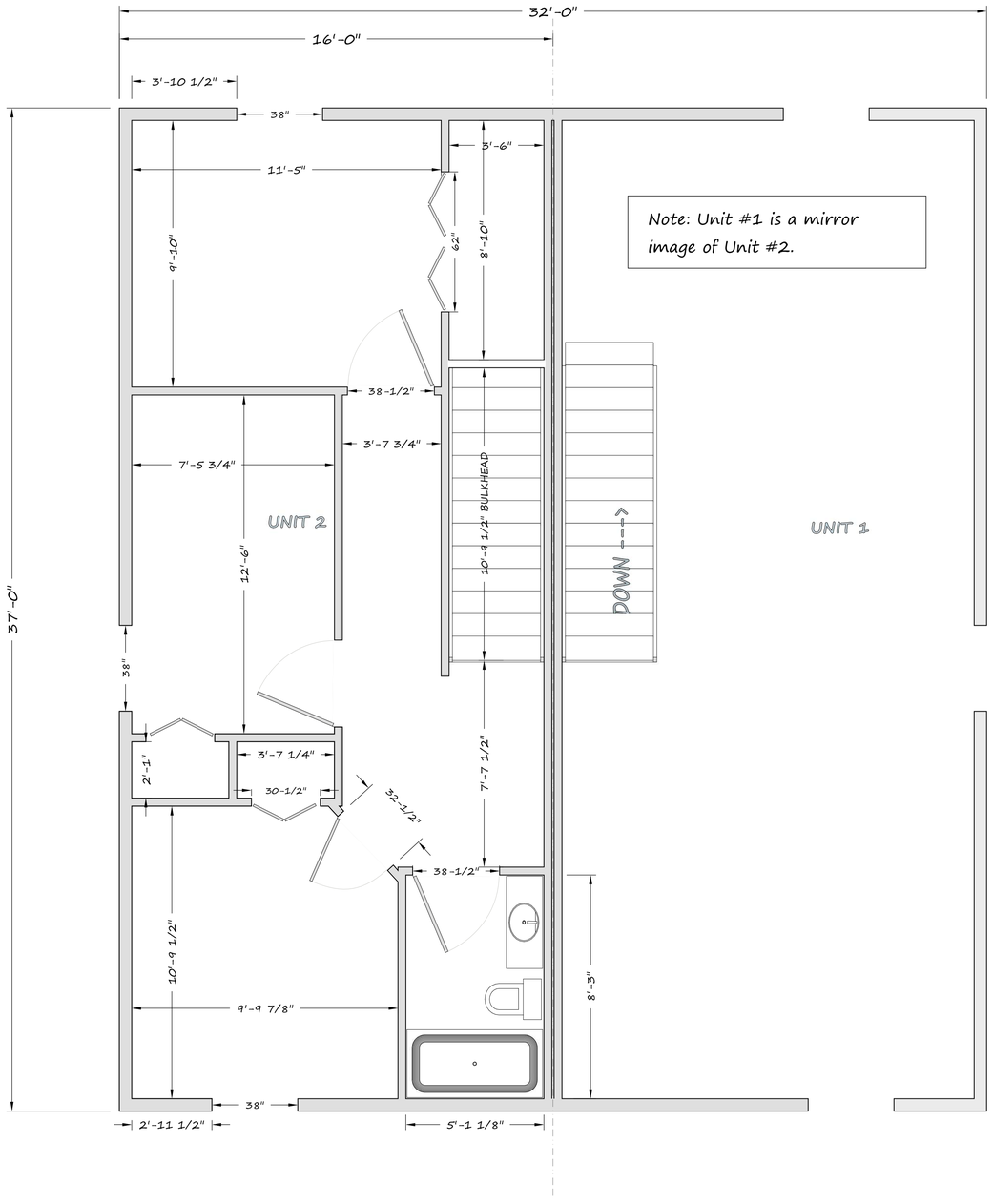


Note: Unit #1 is a mirror image of Unit #2.

MAIN FLOOR PLAN
SCALE = 3/8" = 1'-0"

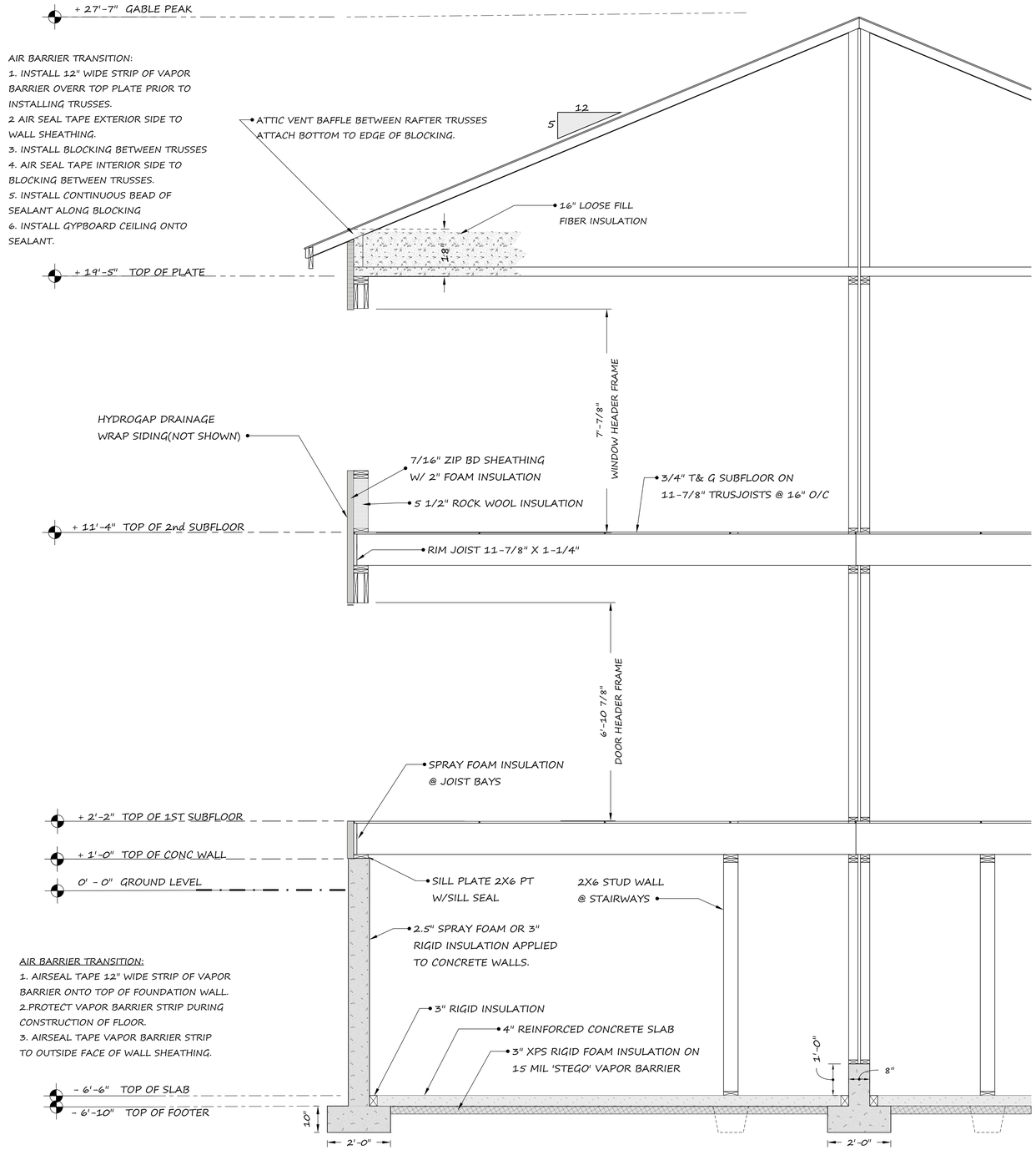
HFH MANHATTAN DRIVE FLOOR PLAN FRAMING DIMENSIONS

Author: FJS	Project Name: HFH – 483 MANHATTAN DRIVE SKETCH #19	Last Modified: July 4, 2023	Basement & 1st Floor Plan Views	Page No: 1



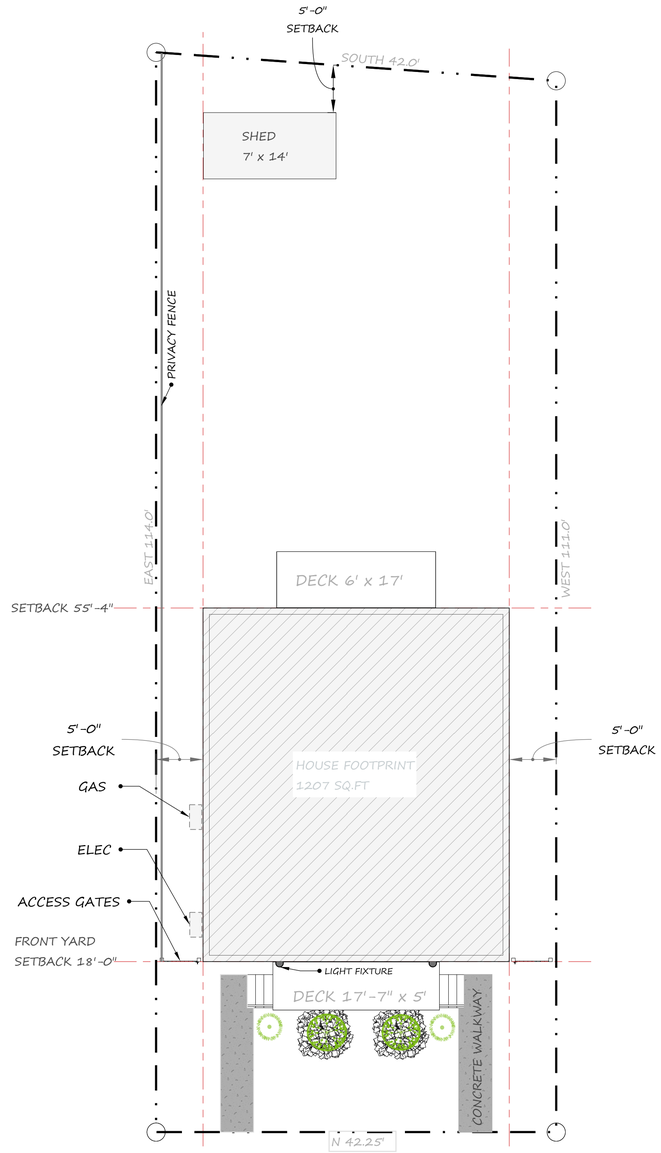
SECOND FLOOR PLAN

SCALE = 3/8" = 1'-0"



TYPICAL EXTERIOR WALL SECTION

SCALE: 1/2" = 1'-0"



ZONING ALALYSIS
1/8" = 1'-0"

ZONING ANALYSIS FOR NEW CONSTRUCTION
483 MANHATTAN DRIVE, BURLINGTON, VT

ZONING CALCULATIONS

ZONING RM (MEDIUM DENSITY RESIDENTIAL)
ARTICLE 4,3,5 40% LOT COVERAGE ALLOWED
FRONT SETBACK AVERAGE 2 ADJACENT LOTS +/- 5'-0"

LOT SIZE
42.0' x 112.4'
4,721 SQ.FT

HOUSE FOOTPRINT	1207 SQ.FT	
TOTAL	1207 SQ.FT	
LOT COVERAGE	1207 / 4721 = %25.5 LOT COVERAGE	
DECKS	190 SQ.FT	2x
SHED	98 SQ.FT	
WALK-WAYS	117 SQ.FT	2x
TOTAL	1612 SQ.FT	
	1612 / 4721 = %34.1 LOT COVERAGE	



NORTH / BACK ELEVATION



SOUTH / FRONT ELEVATION



EAST ELEVATION

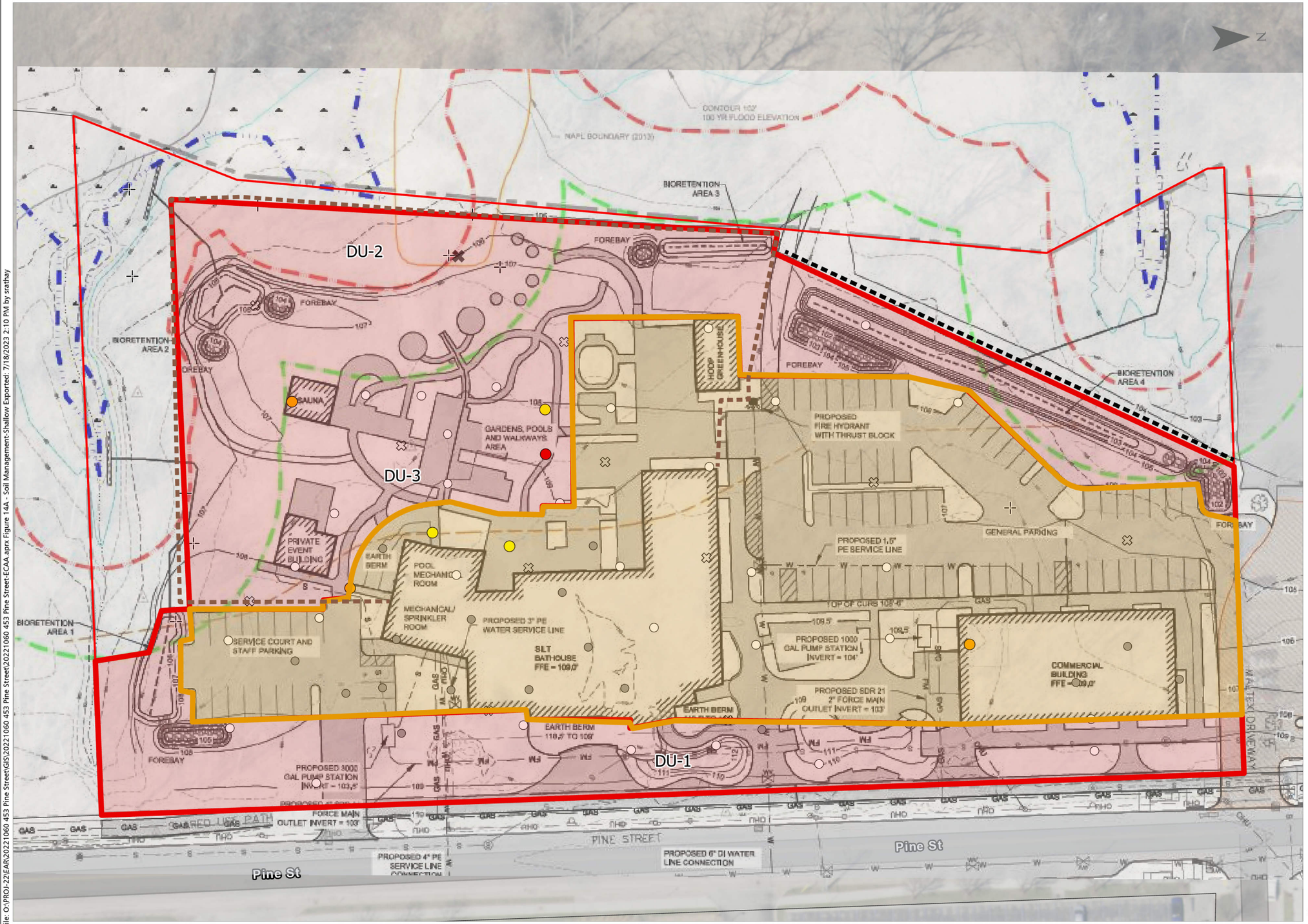


WEST ELEVATION



SOUTH ELEVATION ENLARGED / TRIM DETAILS

SCALE: 3/4" = 1'-0"





LEGEND

- 453 Pine Street Property Boundary
- Parcel Boundary

Approx. Limits of Fence

- Privacy Fence
- Fence (Type Undetermined)

FormerInvestigationLocations

Historical Investigation Locations

- Boring, ECS 2005
- Targost, Stone 2013
- Geotechnical Boring, WSE

2022 Sample Locations - Stone Environmental

mg/Kg

- >0.07; <0.58
- >0.58; <1.54
- >1.54
- Non-Detect
- Not Analyzed

Soil Management Areas; Excavation Depths (ft)

- Surface Development Soils,1.0'
- Urban Soils; 0.5'

Source: Esri World Imagery, VCGI

File: O:\PROJ-22\EAR\20221060 453 Pine Street\GIS\20221060 453 Pine Street-ECAA aprx Figure 14A - Soil Management-Shallow Exported: 7/18/2023 2:10 PM by srathay

DRAWING CREDITS

Drawn On: 7/17/23
Drawn By: LBR
Checked On: 7/21/23
Checked By: DTV
Project No.: 20221060

REVISIONS

#	Date	Drwn	Chk'd	App'd	Description

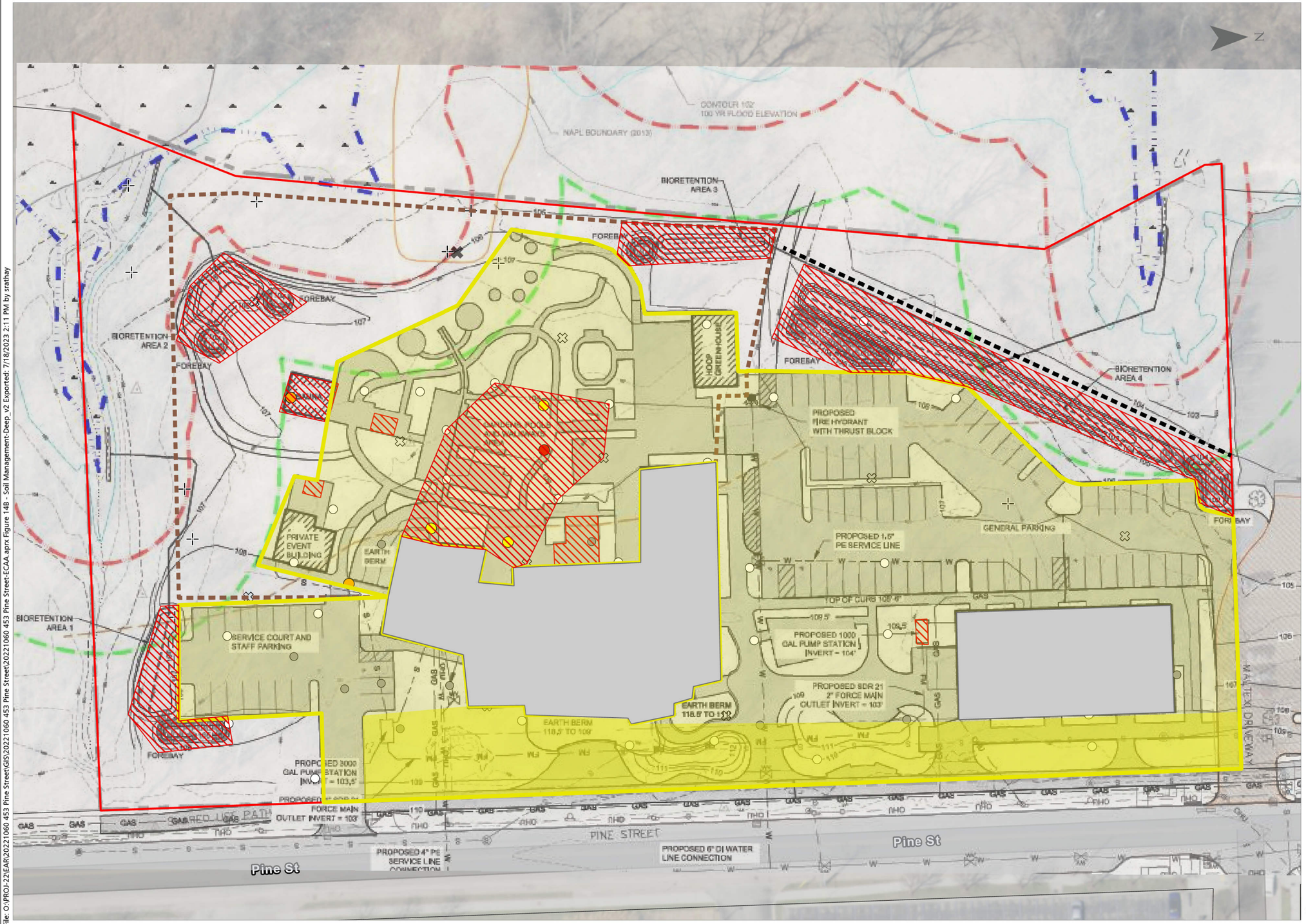
DRAWING SCALE

0 50 100
Feet

STONE ENVIRONMENTAL

SOIL MANAGEMENT AREAS-SURFACE SOILS
ECAA
453 PINE STREET
BURLINGTON VERMONT

FIGURE NO 14A



LEGEND

- 453 Pine Street Property Boundary
- Parcel Boundary

Historical Investigation Locations

- Boring, ECS 2005
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2022 Sample Locations - Stone Environmental

mg/Kg

- >0.07; <0.58
- >0.58; <1.54
- >1.54
- Non-Detect
- Not Analyzed

Approx. Limits of Fence

- Privacy Fence
- Fence (Type Undetermined)

Soil Management Areas; Excavation Depths (ft)

- Building Footprint
- Deep Development Soils
- Uncontaminated Soils below 0.5'
- Uncontaminated Soils below 1'

Notes: Excavation depths of subsurface soils vary by Site improvement. Soils within building footprints will be management by Weston & Sampson in accordance with their 2023 Geotechnical Engineering Report.

Source: Esri World Imagery, VCGI

File: O:\PROJ-22\EAR\20221060 453 Pine Street\GIS\20221060 453 Pine Street\20221060 453 Pine Street-ECAA.aprx Figure 14B - Soil Management-Deep_v2 Exported: 7/18/2023 2:11 PM by srathay

DRAWING CREDITS

Drawn On: 7/17/23
Drawn By: LBR
Checked On: 7/21/23
Checked By: DTV
Project No.: 20221060

REVISIONS

#	Date	Drwn	Chk'd	App'd	Description

DRAWING SCALE

0 50 100
Feet

STONE ENVIRONMENTAL

SOIL MANAGEMENT AREAS-SUBSURFACE SOILS
ECAA
453 PINE STREET
BURLINGTON VERMONT

FIGURE NO 14B

Burlington Development Review Board
Department of Permitting & Inspections
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Burlington, VT 05401
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Telephone: (802) 865-7188
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BURLINGTON DEVELOPMENT REVIEW BOARD
Tuesday, July 18, 2023, 5:00 PM
AMENDED AGENDA

Remote Meeting

Zoom: https://us02web.zoom.us/j/83225696227?pwd=SGQ0bTdnS000Wkc3c2J4WWw1dzMxUT09
Webinar ID: 832 2569 6227
Passcode: 969186
Telephone: US +1 929 205 6099 or +1 301 715 8592 or +1 312 626 6799 or +1 669 900 6833 or +1 253 215 8782 or +1 346 248 7799

I. Agenda
II. Communications
III. Minutes
IV. Consent

1. **ZP-23-30; 483 Manhattan Drive (RM, Ward 2C) Green Mountain Habitat for Humanity / Chris Lane**
   Demolition of existing structure for the construction of a new duplex. (Project Manager, Garret King)

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3. **Joint Institutional Parking Management Plan**
   Continued review of proposed 2023-2028 Plan. (Project Manager, Scott Gustin)

VI. Certificate of Appropriateness

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   Amendment to ZP-22-546 for the reconstruction of the Burlington High School and Technical Center. (Project Manager, Mary O'Neil)

VII. Other Business

1. **Reorganizational Meeting**
   Nomination and election of Chair, Vice Chair, committee members.

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Printed on 100% Recycled Paper

VIII. Adjournment

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TECHNICAL MEMORANDUM

Project: 453 Pine Mixed-Use Development, Burlington
Date: July 12, 2023
From: Roger Dickinson, PE, PTOE
Subject: Transportation Demand Management (TDM) Plan

Background

The 453 Pine mixed-use development (the "Project") proposes to redevelop the property at 453 Pine St in Burlington with a one-story 9,860 sf commercial building and a three-story 30,000 sf spa / health & fitness facility (Silt Bathhouse).

The primary access to the Project will be via a shared driveway located opposite Howard St. This shared driveway will also access the Maltex Building located at 431 Pine St. A second access for the proposed service court will be located ±560' south on Pine St. New sidewalks will also connect the parking areas with the new buildings and with the City's existing sidewalk and shared-use path network along Pine St.

On-site parking will be provided for employees and patrons of the proposed land-uses at 453 Pine. The general parking area consists of 59 spaces, three of which will be reserved for handicap parking. An additional 18 spaces, including one handicap parking space, will be located in the service court for service vehicles and staff parking. The 77 parking spaces satisfies the requirement for not having more than 80 parking spaces. Lastly, on-site bicycle racks having a capacity of 24 bicycles will be provided.

The City of Burlington requires a TDM plan for zoning applications for all developments over 15,000 square feet located within the Shared Use Parking District, including developments within the MultiModal Mixed-Use Parking District. This Project is in the latter district. This TDM plan is meant to satisfy this requirement.

Adjacent Street Network

Pine St in the vicinity of the Project is a two-lane two-way urban street. Sidewalks exist on both sides of Pine St, however there is gap across the Project's frontage on the west side over which there are presently sections of an old sidewalk and a dirt path. Additionally, an on-street bike lane presently exists on the west side of Pine St for southbound bicyclists. The Howard St intersection is stop-signed controlled on the Howard St approach. There is also a crosswalk and rectangular rapid flashing beacons (RRFB) to facilitate pedestrian travel crossing Pine St on the south side of the Howard St intersection.

Pine St and its intersections north of Lakeside Ave are presently being reconstructed and upgraded as part of the Champlain Parkway construction. The anticipated completion date of that work is 2024. When completed, Pine St will remain a two-lane two-way street, with on-street parallel parking and a sidewalk on the east side, and an off-street shared-use path on the west side. The Pine St / Howard St intersection will also be reconstructed to be a raised intersection with crosswalks and RRFB's crossing Pine Street on both the north and south approaches. Lastly, the existing private driveway to the Maltex Building (which is presently offset to the north of Howard St) will be relocated to create the new shared driveway which will line up directly opposite Howard St.

TDM Plan Objectives

The purpose of this Transportation Demand Management (TDM) is to support the City of Burlington's objectives of:

- Reducing parking demand;
- Reducing car ownership;
- Reducing vehicle miles traveled (VMT), single occupant vehicle usage and congestion; and
- Increasing transit use and non-motorized travel.

Current Policies

453 Pine will provide on-site vehicular and bicycle parking in accordance with current City standards.

453 Pine Enterprises LLC will retain ownership of both the Bathhouse and the commercial building, and will provide property management services for their tenants.

The Bathhouse is estimated to have ±40 employees, who will likely be split into two shifts during a typical weekday time period. The Bathhouse's hours are anticipated to be 9 am to 9 pm, with peak weekday use extending from mid-afternoon into the early evening hours., with peak weekday use extending from mid-afternoon into the early evening hours.

The commercial building is estimated to have 20-40 employees, depending on the mix of commercial, retail and office uses which ultimately occupy that building. The weekday peak parking demand of the commercial building is expected to occur between 9 am and 5 pm.

Local Context

Two GMT bus stops are also located at the intersection of Pine and Howard Streets (one in each direction). A small pedestrian plaza and sitting bench is located in the southeast corner of the intersection. GMT's Pine St (#5) route runs at 30-minute intervals between approximately 6:30 am - 11:30 pm Monday through Saturday, and at 60-minute intervals between 8 am -– 6 pm on Sunday.

As noted earlier, an existing shared-use path crosses 453 Pine's frontage on the west side

of Pine St. This shared-use path is being reconstructed as part of the Champlain Parkway construction presently underway. This shared use path provides connectivity to downtown Burlington as well as other bike network infrastructure.

The existing sidewalk on the east side of Pine St will be similarly reconstructed. New bus shelters will also be constructed at the existing bus stops at the Pine St / Howard St intersection. These improvements, together with converting the Pine St / Howard St intersection to a raised intersection with crosswalks and RRFB's for pedestrians crossing Pine Street on both the north and south approaches, will encourage multi-modal use, improve pedestrian safety and provide non-motorized access to 453 Pine.

The available parking at 453 Pine is expected to be highly utilized, which will also serve to encourage multiple occupant vehicle travel during peak periods.

453 Pine is located within the current service area for UBER and Lyft, as well as within the area served by the CATMA, a non-profit transportation management association serving Chittenden County. 453 Pine is also in the operating zone served by Car Share Vermont, with the closest regular parking space is located at Curtis Lumber, roughly 0.3 miles distant. CATMA also recently teamed with Bird to start an E-Bike share program in the Burlington area. Information regarding bike share locations in the vicinity of this Project is not yet available, however.

Planned Measures

Based on a review of the 453 Pine's operations and its local context, the following measures are planned for each of the program elements, should the proposed redevelopment project move forward:

Outreach & Education

453 Pine Enterprises LLC will serve as the Transportation Coordinator and will coordinate the distribution of informational and educational materials regarding available TDM strategies with tenants and their employees. The Transportation Coordinator will also survey employees annually about how they get to work and conduct an annual parking utilization study.

TDM Strategies

453 Pine will implement the following TDM strategies:

1. Join the Chittenden Area Transportation Management Association (CATMA).
2. Provide access to Vermont's Carpool Matching platform and other carpooling resources and incentives through its membership with CATMA.
3. Provide access to reduced-price transit passes through its membership with CATMA.

Parking Management

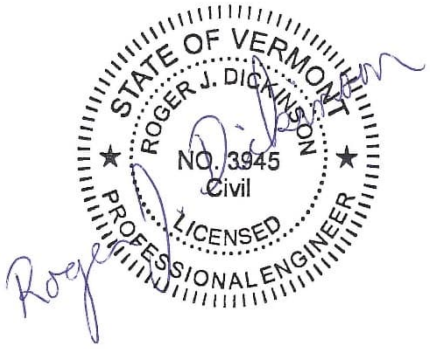
453 Pine will conduct parking utilization studies at least annually for a period of 7 years from receipt of its Certificate of Occupancy for the expansion.

TDM Agreement

The Transportation Coordinator will sign a commitment to the following:

- Ongoing implementation of the TDM Plan as set forth above;
- Acknowledge that 453 Pine does not have a claim to the ongoing availability of nearby on-street public parking, and that, as is the case with other on-street public parking, the City retains the right to charge for, restrict, or remove such on-street parking at any time;
- Acknowledge that failure to maintain transportation demand management for the required time period(s) is a violation of City ordinance; and
- To notify any subsequent owners and tenants in writing of their obligations under this section as part of any purchase and sale and/or lease agreements.

Note: Elements of this plan are subject to change as long as they remain in conformance with City of Burlington requirements.



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Vacant, (Alternate)

BURLINGTON DEVELOPMENT REVIEW BOARD
Tuesday, July 18, 2023, 5:00 PM
AMENDED AGENDA

Remote Meeting

Zoom: https://us02web.zoom.us/j/83225696227?pwd=SGQ0bTdnS000Wkc3c2J4WWw1dzMxUT09
Webinar ID: 832 2569 6227
Passcode: 969186
Telephone: US +1 929 205 6099 or +1 301 715 8592 or +1 312 626 6799 or +1 669 900 6833 or +1 253 215 8782 or +1 346 248 7799

I. Agenda
II. Communications
III. Minutes
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1. **ZP-23-30; 483 Manhattan Drive (RM, Ward 2C) Green Mountain Habitat for Humanity / Chris Lane**
   Demolition of existing structure for the construction of a new duplex. (Project Manager, Garret King)

   Approved

V. Public Hearing

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   Amendment to ZP-22-546 for the reconstruction of the Burlington High School and Technical Center. (Project Manager, Mary O'Neil)

   Approved

VII. Other Business

1. **Reorganizational Meeting**
   Nomination and election of Chair, Vice Chair, committee members.

   Board Chair: AJ LaRosa

   Board Vice Chair: Caitlin Halpert

   Ordinance Committee Member: Caitlin Halpert

   Long Range Planning Committee Member: Evan Gould

VIII. Adjournment

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Evan Gould, (Alternate)
Vacant, (Alternate)

BURLINGTON DEVELOPMENT REVIEW BOARD
Tuesday, July 18, 2023, 5:00 PM
MINUTES

Remote Meeting

Board Members Present: All members were remote. AJ LaRosa, Caitlin Halpert, Sean McKenzie, Brad Rabinowitz, Chase Taylor, and Evan Gould

Board Members Absent: Geoff Hand

Staff Members Present: All members were remote. Scott Gustin, Mary O'Neil, Garret King, and Joseph Cava

I. Agenda
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1. **ZP-23-30; 483 Manhattan Drive (RM, Ward 2C) Green Mountain Habitat for Humanity / Chris Lane**
Demolition of existing structure for the construction of a new duplex. (Project Manager, Garret King)

AJ LaRosa: Is the applicant present?

Scott Gustin: I am not seeing any members of the audience raising their hands. This is still a consent item, so if there are no questions or audience participation, then all we need is a motion.

AJ LaRosa: Motioned to approve and adopt staff recommendations, Evan Gould 2nd. Vote 6-0. Motion carried.

V. Public Hearing

1. **ZP-23-253; 453 Pine Street (E-LM, Ward 5S) Derrick Davis / Kelley DesRoches**
Major impact/conditional use review for construction of 30,000 square foot health club (spa/bathhouse) and 12,400 square foot retail/commercial buildings with associated site improvements. (Project Manager, Mary O'Neil)
Kelley DesRoches, Daniel Voisin, Peter Lazorchak, Andy Simon, Ruby Perry, and Catherine Bock: Sworn in.

Kelley DesRoches: I am the architect representing the developers, but I can walk you through the updated changes on the site plan. The bowling alley has been eliminated from the project plans. This allows us to move the bathhouse to the north and reduce the previously proposed amount of parking. The initial proposal for this project's parking lot was to create a three-lane entrance/exit utilizing the Maltex building's existing access, but two lanes will remain as recommended by DPW. A TDM plan

had not been submitted yet. Parking utilization studies will be completed annually in partnership with agencies like CATMA. The shared use path proposed along Pine Street in response to the Champlain Parkway project benefits this project. The proposed building materials compliment the site and include interconnected gable forms in the berm, which is atypical from the traditional commercial storefront.

AJ LaRosa: I appreciate that the entrance is greatly improved with functional usability. Is there site lighting proposed?

Kelley DesRoches: Pole lighting is proposed in the parking lot abutting the Maltex building's parking lot. The remaining lighting will be integrated with the landscaping. In our meeting with the Conservation Board, the proposed use is permitted in accordance with wetland buffers and plantings to compliment this.

AJ LaRosa: Any questions from members of the board?

Daniel Voisin: I'd like to recap that this location's brownfield are caused by the Pine Street Barge Canal's superfund site. We need to be aware that the development does not affect the remediation efforts to clean up the site. There is surface flow contamination that was infilled during the late 1800s. The fill contains contaminants, but the surface soil contains the highest levels of contaminants, which is attributed to burning fossil soils along Pine Street during the peak boom of industrial development in Burlington. The clay in the soil is also contaminated so for every ton of fil that is brought in; contaminated soil needs to be removed. If we do not mitigate this through corrective action alternatives, then the contaminants will spread into the canal and be dispersed into Lake Champlain. Site management practices constrain development to the center of the site with urban soil management rather than shipping soil to the landfill at Coventry. There is also clean fill along the Pine Street Corridor. We estimate that there will be 1200 cubic yards of contaminated soil disturbed with half being repurposed in the urban development zone. The building foundations will be a ground improvement venture using clay and aggregate with concrete columns to support the buildings.

Peter Lazorchak: This is a very sensitive site, so we had to be considerate with stormwater implementation for this site. Using bio retention cells, we can retain as much of the stormwater as possible while redistributing into the wetland buffer. These bio retention cells are located around the southern and northwestern property borders.

Brad Rabinowitz: I thought the goal was to avoid redistributing water to the wetlands.

Peter Lazorchak: We have evaluated this and it will be safe.

Sean McKenzie: I wanted to check to make sure key corrective action is accounting for underground utilities.

Daniel Voisin: This drawing is conceptual with surface structure to divert water away from the site.

AJ LaRosa: Can we talk about traffic?

Kelley DesRoches: We do not have Roger Dickinson on the line, who could address this better.

AJ LaRosa: According to the report, the area around Howard Street would intersect the third lane of the Maltex building's parking lot, if it were still proposed. I would like to hear more about these impacts to Howard Street.

Kelley DesRoches: In speaking with DPW, it is recommended that we not include the third lane.

Peter Lazorchak: The third lane would create conflict with pedestrian, bicycle, and vehicular traffic in response to the creation of the shared use path.

AJ LaRosa: I have questions about the overall use of the facility. Specifically, the private rental building on the plans is crossed out.

Kelley DesRoches: We are still including a portion of the private rental building, but this is being considered for future development and expansion of the site in response to cost restrictions.

AJ LaRosa: Are the greenhouses for growing vegetables?

Kelley DesRoches: One of the greenhouses will be for growing vegetables, but the other greenhouses will be for multi-use function spaces.

Brad Rabinowitz: Is there a sound barrier to alleviate the noise impact of private events?

Kelley DesRoches: No, the front of the property along Pine Street is meant to act as a sound barrier.

Chase Taylor: Can you expand on the proposed fencing for the property?

Kelley DesRoches: The outlined perimeter fencing is meant for safety and security. It will be a solid security fence.

Daniel Voislin: We are not envisioning the use of chain link fencing, but we do have safety in mind for the soils that are not being removed.

Brad Rabinowitz: I do not see any signage proposed.

Kelley DesRoches: This will be a later application.

Evan Gould: What do you see for occupancy of this site?

Kelley DesRoches: The bathhouses have a combined occupancy for 150 individuals.

Evan Gould: I am guessing that the bike racks proposed are open-air racks.

Kelley DesRoches: Yes, budgetary constraints are keeping us open minded to consider enclosed bike racks in the future.

Brad Rabinowitz: I appreciate the curvy design that blends with the landscape.

AJ LaRosa: Any more questions before opening this up to the audience. Scott, can you give us a general figure for who wishes to speak.

Scott Gustin: I see three hands raised.

Andy Simon: I have many questions about impacts of this project on wildlife conservation associated with the Barge Canal site. I want to thank the project team and developers for their commitment to conservation as part of this development. I would like to point out that the highly disturbed land is attributed to the economic activity of industry that have shaped Burlington into what it is today. I live two blocks away from this development and I see issues in the staff report that have not been addressed. Specifically, conflicts with the impacted use of the shared use path and other traffic. The flooding that occurred last week throughout Vermont has shown the impacts of

climate change. I also want to mention the impacts to surrounding residential neighborhoods including Jackson Terrace Apartments across the street from this project. The Barge Canal itself is a significant natural feature home to many species of birds and amphibians and has been left alone since 1998 because of the significant features. The DRB needs to carefully evaluate their decision to ensure the appropriateness of this project.

Kelley DesRoches: The Champlain Parkway design was in transition before this project, but this wil be considered as part of the long-term impacts.

Ruby Perry: Can you let the public know what the security issue was that canceled the in-person meeting?

AJ LaRosa: I had reason to believe that a member of the public posed a danger to meeting attendees and the proceedings of this board.

Ruby Perry: I am not questioning your decisions, but I am experiencing alarm at this revelation. The impacts of the floods during this past week have been horrendous, and climate issues are now a forefront crisis. Does the stormwater design project the calculations in response to climate extremes including flooding?

AJ LaRosa: Can you please address your questions to the board and not the applicant team?

Ruby Perry: I would like to point out that the Burlington High School was recently demolished which contained a high level of contamination. The Pine Street Barge Canal superfund site includes 56 different types of contaminants. There are 24 acres surrounding the four-acre parcel where development is proposed. I want reassurances that the flow of water will be evaluated in a five-year plan to address stormwater management. The aim is to avoid contaminating the lake, but what type of monitoring can be expected to protect the lake? Along the perimeter, there is a growing trend of unhoused people living amongst the superfund area and this should be evaluated.

AJ LaRosa: I do not understand the question.

Ruby Perry: This is being treated as vacant land, but it is currently being used as a home for unhoused individuals. What will the ongoing monitoring look like to address the reality of this site? To those with decision-making authority, local residents are fighting the expansion of contaminated soils being brought to Coventry where the contaminants drain into the Black River which goes into Lake Memphremagog.

Peter Lazorchak: Our stormwater plans are within conformity of local ordinances and State 9050 permitting. The water going through these bio retention cells is cleaner that what's currently being discharged.

AJ LaRosa: Is this site in a flood plain with future risk to stormwater management caused by development?

Peter Lazorchak: No, we are looking at all sorts of factors, but there is no impact because it improve the quality of the site.

Daniel Voisin: To address monitoring, we have moved the site north which improves this, but there will be several levels of monitoring as development occurs. The design of the site prevents the spread of contamination.

Scott Gustin: There is another hand raised in the audience feed.

Catherine Bock: Many of my questions have already been answered, but this development does have a profound impact on the homeless population in this area. Contaminants from the gasification plant have spread several feet into the surface soil, so I do not understand how removing a few feet resolves the contamination.

Daniel Voisin: The areas of greatest contamination are on the outskirts of 453 Pine Street, and I would like to clarify that the homeless population using this site are already exposed to the contaminants.

Brad Rabinowitz: Doesn't DPW weigh in on applications like these, or is it superseded by the DRB's review?

Mary O'Neil: DPW's review will be listed as a condition of approval for this project.

AJ LaRosa: With that, I will close the hearing on this item.

2. **ZP-23-222; 10-12 Oak Street (RM, Ward 2C) Harold & Juliet Moran / Anna Thelemarck**
Establish dwelling unit within the garage and reconfigure driveway. PUD for 2nd detached dwelling unit. (Project Manager, Garret King)
Anna Thelemarck: Sworn in.

AJ LaRosa: This was marked for consent agenda, but the public hearing has already commenced. Is there any questions you had on the staff report and conditions?

Anna Thelemarck: I messaged our concerns through the permitting portal.

AJ LaRosa: Garret, do you see these concerns?

Garret King: Yes, and I responded through the portal.

Anna Thelemarck: I uploaded a further response to staff report. Our changes include lighting and a pathway to the sidewalk in response to recommendations in the staff report.

AJ LaRosa: Motioned to approve and adopt staff recommendations, Caitlin Halpert 2nd, Vote 6-0. Motion carried.

3. **Joint Institutional Parking Management Plan**
Continued review of proposed 2023-2028 Plan. (Project Manager, Scott Gustin)
Karen Sentoff, Sharon Bushor, and Sandy Thibault: Sworn in.

AJ LaRosa: Can you please let us know what you changed or updated from the previous hearing?

Karen Sentoff: We added the metrics recommended from the previous DRB meeting to track TDM data.

AJ LaRosa: I appreciate that, any questions from the board?

Sharon Bushor: The TDM matrix and its effectiveness are impacted by services that will be moved from UVM Medical's main campus to Tilley Drive. This will create a vacuum. How will the matrix be useful for institutions figuring out the effectiveness of TDM strategies in light of these changes? I feel this complicated plan falls short with a partnership between the City and these impacted entities. Thank you.

Karen Sentoff: CATMA is working with UVM to ensure due diligence to capture data on key issues like the ones mentioned by Sharon Bushor.

Evan Gould: It looks like the bus share is organized by the order of magnitude when compared between the multiple institutions and survey data.

Karen Sentoff: The UVM metrics are based upon ridership and the number of discounted passes provided by that institution.

Sandy Thibault: I would like to remind everyone that UVM has hired professional to evaluate the TDM matrix during variable peak times.

AJ LaRosa: Hearing no additional comments or questions, we will close the hearing on this item.

VI. Certificate of Appropriateness

1. **ZP-23-276; 52 Institute Road (RCO-RG, Ward 4N) City School Department / Joe Weith**
   Amendment to ZP-22-546 for the reconstruction of the Burlington High School and Technical Center. (Project Manager, Mary O'Neil)
   Joe Weith: Sworn in.

   AJ LaRosa: This item is recommended for consent. Does anyone disagree with this?

   Brad Rabinowitz: It is odd to have such a large project under the consent agenda.

   AJ LaRosa: I will swear in the applicant and interested parties.

   Brad Rabinowitz: I think it is important for this to be a public hearing item so any participants can provide feedback.

   Joe Weith: The proposed changes are relatively minor and do not change the intent of this project. We have revised the grading around the north parking lot to reduce the amount of blasting that would have occurred to reduce the existing ledge. There are also improved sidewalks for ADA accessibility with slight increases to the proposed buildings.

   AJ LaRosa: I appreciate you updating the board regarding the proposed changes. Are there any questions or comments from the board? Hearing none, are there any from the public? Hearing none, we will close the hearing on this item and enter deliberative session.

VII. Other Business

1. **Reorganizational Meeting**
   Nomination and election of Chair, Vice Chair, committee members.

   Caitlin Halpert: Motioned to appoint AJ Larosa as Board chair, Brad Rabinowitz 2nd. Vote 5-0. Motion carried.

   Brad Rabinowitz: Motioned to appoint Caitlin Halpert as Board vice chair, Evan Gould 2nd. Vote 5-0. Motion carried.

   AJ LaRosa: Motioned to appoint Caitlin Halpert as ordinance committee member, Evan Gould 2nd. Vote 6-0. Motion carried.

AJ LaRosa: Motioned to appoint Evan Gould as long range planning committee member, Chase Taylor 2nd. Vote 6-0. Motion carried.

VIII. Adjournment

Hearing closed at 6:55 PM

9/5/23

Alexander J. LaRosa, Chair of Development Review Board — Date

Joseph H. Cava

7-24-23

Joseph H. Cava, Permitting & Inspections Permit Technician — Date

Plans may be viewed upon request by contacting the Department of Permitting & Inspections between the hours of 8:00 a.m. and 4:30 p.m. Participation in the DRB proceeding is a prerequisite to the right to take any subsequent appeal. Please note that ANYTHING submitted to the Zoning office is considered public and cannot be kept confidential. This may not be the final order in which items will be heard. Please view final Agenda, at www.burlingtonvt.gov/dpi/drb/agendas or the office notice board, one week before the hearing for the order in which items will be heard.

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