



**CITY OF BURLINGTON
BOARD OF HEALTH**

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BOARD OF HEALTH

David Casey, RN, Chair; Mary D. Hart, RN; Julie Hathaway, MD, PhD; Taylor Newton; Caroline Tassey, APRN

HEALTH OFFICER

William Ward, Director of Code Enforcement

The mission of the BOH is to educate the citizens of Burlington and to promote, improve and protect their health and well-being while contributing toward building a healthy community and environment in which to live.

**AGENDA FOR REGULAR MEETING OF
BURLINGTON BOARD OF HEALTH**

Robert Miller Center, 130 Gosse Court

Thursday, 14 February 2019 at 6:30 PM

1. Approvals
 - Agenda & January meeting minutes
2. Public Forum / Emerging Issues
3. Proposed Interactive Jet Fountain – City Hall Park
4. Update on marijuana legalization info card
 - Approval of card text
 - Update on graphics
 - Production and distribution timeline draft
5. Chair's report
6. Discussion on FY19 Budget
7. Public outreach/communications
 - Language for FPF update
8. Next Meeting – currently set as 14 March 2019
9. Adjournment

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Steve Cormier

From: Wayne Senville <wsenville@gmail.com>
Sent: Thursday, January 31, 2019 8:00 PM
To: William Ward; Steve Cormier; David Casey; Mary Hart; Caroline Tasse; Taylor; Julie Hathaway
Cc: lori.cragin@vermont.gov
Subject: Worrying info about potential health hazard in new City Hall Park plan

To: Bill Ward, Burlington Health Officer; Steve Cormier, Health Administrator; and Members of the Burlington Board of Health
cc: Lori Cragin, State Epidemiologist
From: Wayne Senville, Burlington Resident
Date: Jan. 31, 2019
Subject: Health Risks Associated with Planned Jet Sprays in City Hall Park

Dear Mr. Ward, Mr. Cormier, and Members of the Burlington Board of Health:

While attending the Monday, January 28th Burlington City Council meeting, there was much discussion about City Hall Park.

One speaker made some very concerning comments about a potential public health hazard I had not previously been aware of. I couldn't quite catch her name, but she said she was a retired New York State public health veterinarian and epidemiologist. She mentioned health risks associated with spray fountains -- like the one planned for City Hall Park -- and noted concerns especially about animal and human waste being aerosolized by the sprays. She said that New York State has laws and regulations to prevent this, including requiring fencing around jet spray areas; having foot baths and bath houses nearby; and ensuring staffing of the Park. I haven't heard whether these protective measures have been considered for City Hall Park -- but I'm pretty sure there was nothing in the plan about protective fencing or a nearby bath house or foot baths, or Park staffing.

You can view this speaker's testimony by watching the Jan. 28th meeting on CCTV; go to 47:50 of the video; her remarks are just about two minutes long -- <https://www.cctv.org/watch-tv/programs/burlington-city-council-395>

After the meeting I looked online, and, sure enough, New York does have regulations as the speaker described: https://www.health.ny.gov/regulations/nycrr/title_10/part_6/subpart_6-3.htm#s632

I am also copying the Vermont State Epidemiologist in case she has any knowledge about this, or would have colleagues in New York State who might be able to provide you with information on dealing with public health hazards from jet sprays.

I have no idea if anyone from the City of Burlington considered this issue when the plans for City Hall Park were being reviewed -- but it certainly would be best to clarify things now before construction contracts are let out in a week or so, and work on the Park renovations begins. The worst thing would be to find out a year from now that there's a problem with what's been installed.

Please let me know if this is something that's already been examined, or if this is something you will look into.

Thank you.

Spray Park Public Health Risk, Summary, 2/14/19

Prepared by Millicent Eidson, MA, DVM, DACVPM (Specialty: Epidemiology)
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Spray parks have been associated with disease outbreaks (some summarized below). The risk is due to contamination of human waste (children in diapers) or animal waste (dogs or wildlife with access). Although viruses, bacteria, or parasites are a risk, disinfection with chemicals such as chlorine can be effective, if there is sufficient contact time to kill the organism. Spray parks may aerosolize waste into human faces before there has been enough contact time with a disinfectant to kill the organisms. Most disease outbreaks have been associated with the parasite *Cryptosporidium*, which is not killed by disinfection (but can be managed with filtration and UV radiation, depending on success of the system).

New York outbreak: August, Sept. 2005, *Cryptosporidium parvum*

Spraypark at Seneca Lake State Park near Geneva NY

https://www.cdc.gov/eis/downloads/2006.EIS_Conference.pdf (abstract, p. 31)

https://marlerclark.com/news_events/spraypark-lawsuit-gets-its-first-day-in-court

Abstract: 425 confirmed and 1,374 probable cases (lawsuit report lists more)

Organism found in two water storage tanks that supplied the 11,000 square foot park

Had a water-recycling system, filtration and disinfection insufficient to remove *Crypto* oocysts

NYSDOH regulations for recreational aquatic spray grounds developed after Seneca Lake outbreak (do not apply to a facility that discharges to waste without impoundment or recirculation of the water).

Requires fenced area with locked gate, personnel supervision, foot baths, bathrooms and bath houses, restriction of children in diapers, fencing to keep out animals, signage.

https://www.health.ny.gov/regulations/nycrr/title_10/part_6/subpart_6-3.htm

NYSDOH Recreational Aquatic Spray Grounds Safety Plan:

<https://www.health.ny.gov/forms/doh-4474.pdf>

Additional *Crypto* outbreak in Niagara County NY, Nov. 14-16, 2010, 12 cases, age 1-66

Authored by Hopkins J, Hague H, Hudgin G, Ross L, Moore D, J Environ Health, 2013 May;75(9):28-33

UV disinfection system was offline (shut down for maintenance) during the day on Nov. 14.

(article not directly available online, see separate download of article)

Idaho, August, 2007, *Crypto*: 5 lab confirmed and 45 clinically compatible cases:

<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5822a2.htm>

Florida; August 1999: 38 cases meeting case definition, ages 2-65 years, *Shigella* and *Crypto*

<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm4925a3.htm>

Subsequently added exclusion of children in diapers, signs advising showering first and avoiding water consumption; chlorine monitor to halt fountain automatically when residual chlorine levels were low; cartridge filtration system; mentioned *Crypto* being resistant to chlorine so filtration important; mentioned that disinfection is not instantaneous for bacteria

June 24-July 11, 1997; spray park at Minnesota zoo; 369 cases identified, *Crypto*

<https://www.cdc.gov/mmwr/preview/mmwrhtml/00055289.htm>

► INTERNATIONAL PERSPECTIVES

An Outbreak of *Cryptosporidium* at a Recreational Water Park in Niagara Region, Canada

Although most of the information presented in the Journal refers to situations within the United States, environmental health and protection know no boundaries. The Journal periodically runs International Perspectives to ensure that issues relevant to our international membership, representing over 20 countries worldwide, are addressed. Our goal is to raise diverse issues of interest to all our readers, irrespective of origin.

Abstract *Cryptosporidium* is a parasitic protozoan found in water sources and spread through the fecal-oral route. Cryptosporidiosis is characterized by gastroenteritis and is increasingly associated with recreational water sources. On December 3, 2010, Niagara Region Public Health was informed of a laboratory-confirmed case of *Cryptosporidium*. Over the subsequent two weeks, a total of three additional laboratory-confirmed cases were reported. All cases had visited the same water park in Niagara Region, Canada, over November 14–16, 2010. A total of 12 cases associated with the outbreak ranged in age from 1 to 66 years. This article describes the outbreak, environmental investigation, and control measures. The environmental investigation revealed that the ultraviolet disinfection system was offline on November 14, 2010, which may have allowed for the transmission of *Cryptosporidium* to bathers. Further research into the detection of *Cryptosporidium* outbreaks and regulations and guidelines for water park operators may help to decrease future outbreaks.

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Introduction

Cryptosporidium is a parasitic protozoan found in water sources and spread through fecal-oral transmission (Centers for Disease Control and Prevention [CDC], 2011a; Heymann, 2008; Putignani & Menichella, 2010). Two species, *C. hominis* and *C. parvum*, are primarily responsible for human illness (CDC, 2011a; Heymann, 2008; Putignani & Menichella, 2010). Infection presents as gastroenteritis characterized by profuse watery diarrhea, although some may also have cramping, abdominal pain, malaise, fever, anorexia, nausea, and vomiting (CDC, 2011a; Ministry of Health and Long-Term Care, 2009; Putignani & Menichella, 2010). Asymptomatic infections are common and may be a source of transmission (CDC, 2011a; Heymann, 2008). *Cryptosporidium* has the ability to produce oocysts that are resistant to chlorine levels normally used to disinfect drinking water or swimming pools (Heymann, 2008; Putig-

nani & Menichella, 2010). Cryptosporidiosis outbreaks have been increasingly associated with exposure to recreational water sources, such as splash parks and swimming pools (Causer et al., 2006; CDC, 2011b; Coetzee, Edeghere, Orendi, Chalmers, & Morgan, 2008; Insulander, Lebbad, Stenstrom, & Svenungsson, 2005).

On December 3, 2010, a symptomatic laboratory-confirmed case of *Cryptosporidium* was reported to Niagara Region Public Health (NRPH). During the next two weeks, a total of three additional laboratory-confirmed cases were reported to NRPH. All cases had visited the same water park in Niagara Region over November 14–16, 2010. This article describes the outbreak investigation and interventions to prevent subsequent spread in the community. It also highlights the need for proactive interjurisdictional communication, as cases resided in other parts of Ontario and the U.S.

Methods

Outbreak Investigation

NRPH was informed of a laboratory-confirmed case of *Cryptosporidium* on December 3, 2010 (case 1), by Halton Public Health. The initial investigation by this health department demonstrated the major risk factor for the case was a visit to a water park in Niagara Region; NRPH was contacted to initiate an environmental investigation. For all cases, NRPH used a cryptosporidiosis questionnaire to determine potential risk factors, including exposure to swimming pools, splash pads, water parks, restaurants (including those at the water park), drinking water, other recreational water sources, and travel.

As further cases were reported, NRPH declared an outbreak and engaged in active surveillance and risk communication with local physicians and public health depart-

TABLE 1

Summary of Outbreak-Associated Cases

Case	Age	Sex	Health Unit of Residence	Onset of Symptoms	Date of Visit to Water Park	Laboratory Confirmed
1	10	M	Halton, ON	November 20, 2010	November 14, 2010	Yes
2	4	M	Wellington Dufferin Guelph, ON	November 22, 2010	November 14–15, 2010	Yes
3	6	M	Wellington Dufferin Guelph, ON	November 20, 2010	November 14–15, 2010	No, family member of case 2
4	12	M	Niagara, ON	November 30, 2010	November 15–16, 2010	Yes
5	5	M	Niagara, ON	November 29, 2010	November 15, 2010	No, family member of case 4
6	11	M	Niagara, ON	December 6, 2010	November 15, 2010	Yes
7	37	F	Niagara, ON	December 9, 2010	November 15, 2010	Yes
8	1	M	Erie County, U.S.	November 14, 2010	November 14, 2010	Yes
9	24	F	Erie County, U.S.	November 22, 2010	November 14, 2010	No, family member of case 8
10	26	M	Erie County, U.S.	November 22, 2010	November 14, 2010	No, family member of case 8
11	50	F	Erie County, U.S.	November 26, 2010	November 14, 2010	No, family member of case 8
12	66	M	Erie County, U.S.	November 27, 2010	November 14, 2010	No, family member of case 8

ments in Ontario and the U.S., provincial public health officials, and Canadian public health practitioners to encourage enhanced surveillance for cryptosporidiosis, appropriate testing, and reporting to local public health.

Environmental Investigation

Early in the outbreak investigation, a water park in Niagara Region was identified as a common source among cases. Public health inspectors conducted an environmental investigation of the water park to determine potential sources and risk for past and ongoing spread of *Cryptosporidium*.

Results

Case Definitions

A confirmed primary case was defined as laboratory confirmation of infection with symptoms of diarrhea with or without one or more of cramping, abdominal pain, fever, anorexia, vomiting, or malaise with exposure to a water park in Niagara Region in November 2010. A probable case had signs and symptoms consistent with a laboratory-confirmed case and with exposure to a water park in Niagara Region in November 2010. A secondary case may or may not have had lab confirmation, but had signs and symptoms consistent with a case and was epidemiologically linked to a confirmed or probable case.

Outbreak Investigation

On December 7, 2010, a referral was received from Wellington Dufferin Guelph Public Health for laboratory-confirmed (case 2) and probable (case 3) cases of cryptosporidiosis in a family whose main risk factor for disease was having visited a water park in Niagara Region. Table 1 provides a summary of the cases associated with the outbreak.

On December 9, 2010, a laboratory-confirmed case of cryptosporidiosis was reported to NRPH (case 4). This case and three family members (cases 5–7) had visited the same water park as cases 1–3 during the same time period of November 14–16, 2010. Clinical signs and symptoms included diarrhea, abdominal pain, nausea, and vomiting.

Concurrently, NRPH was receiving alerts through the emergency department syndromic surveillance system for gastrointestinal illness. From November 28 to December 6, 2010, the incidence of people with gastrointestinal complaints presenting to local emergency departments was higher than expected for the time period. When the alerts first began appearing, no mandatory reportable diseases exceeded baseline levels, and we initially suspected a viral gastroenteritis in the community. With three laboratory-confirmed cases of cryptosporidiosis linked to a water park in Niagara Region, however, we questioned whether the gastrointestinal illnesses may have been

related to the previous cryptosporidiosis cases. An outbreak was declared on December 8, 2010, and further investigations were undertaken. Cases were questioned about whether or not they visited the food service establishments at the water park; cases did not all eat at the restaurants.

Epidemiologic Investigation

From November 14 to December 9, 2010, four confirmed cases, six probable cases, and two secondary cases presented (Figure 1). As all cases attended the water park on November 14 or November 15, 2011, it was challenging to determine whether or not cases 9–12 were due to exposure at the water park or through person-to-person contact with case 8. Fifty percent ($n = 6$) attended only on November 14, 25% ($n = 3$) attended only on November 15, 17% ($n = 2$) attended on both days, and 8% ($n = 1$) on November 15 and 16. The average age of all cases was 21 years with a median of 12 and a range of 1 to 66 years. Figure 2 illustrates the percentage of cases that played in each of the water park areas.

Active Surveillance and Risk Communication

On December 10, 2010, a medical advisory was sent to all physicians, emergency departments, and walk-in clinics in Niagara Region encouraging heightened surveil-

lance and testing for *Cryptosporidium* in people with exposure to local water parks during November 2010. A summary of the investigation was posted to national and provincial infectious diseases message boards. Given the proximity of Niagara Region to the U.S. and resultant cross-border tourist traffic, we contacted the relevant county health authorities in the U.S. This resulted in case 8 and his family (cases 9–12) coming to our attention.

Laboratory Investigation

Three specimens were identified as *Cryptosporidium* species using initial testing with auramine-rhodamine fluorescent stain and confirmatory testing with safranin stain or on formalin, either concentrate or on a direct wet prep, from a sodium acetate formalin container. Further speciation was not possible as the specimens had been discarded by the laboratory. Further speciation for research purposes was conducted on two secondary cases by Public Health Ontario; these demonstrated *C. hominis*. No water samples were obtained from the pools or backwash as the full volume of water for the water park had been changed prior to the investigation.

Environmental Investigation

The water park is a large complex of water features that is a popular tourist destination. It is comprised of seven distinct bodies of water, including a splash pad, a larger spray/splash pad with water slides, a wave pool, two groups of water slides (“body” slides and “tube” slides), two spas, and an outdoor wading pool. The wading pool is open year-round and is a nonregulated recreational water facility due to its water depth (Ministry of Health and Long-Term Care, 2010).

The wave pool and the “body” slides share the same water and recirculation system (Figure 3). All others operate with their own separate water and recirculation system. The spas were emptied and refilled daily. Half the volume of water in the larger spray/splash pad with water slides was replaced daily. All other water features had water added daily in accordance with provincial regulations requiring a minimum of 20 L per bather per day.

All bodies of water were designed to utilize the oxidation-reduction potential (ORP) system. The sanitizer was a mixture of liquid chlorine and chlorine pucks. Alarms for the

FIGURE 1

Epidemic Curve for the Outbreak by Date of Symptom Onset

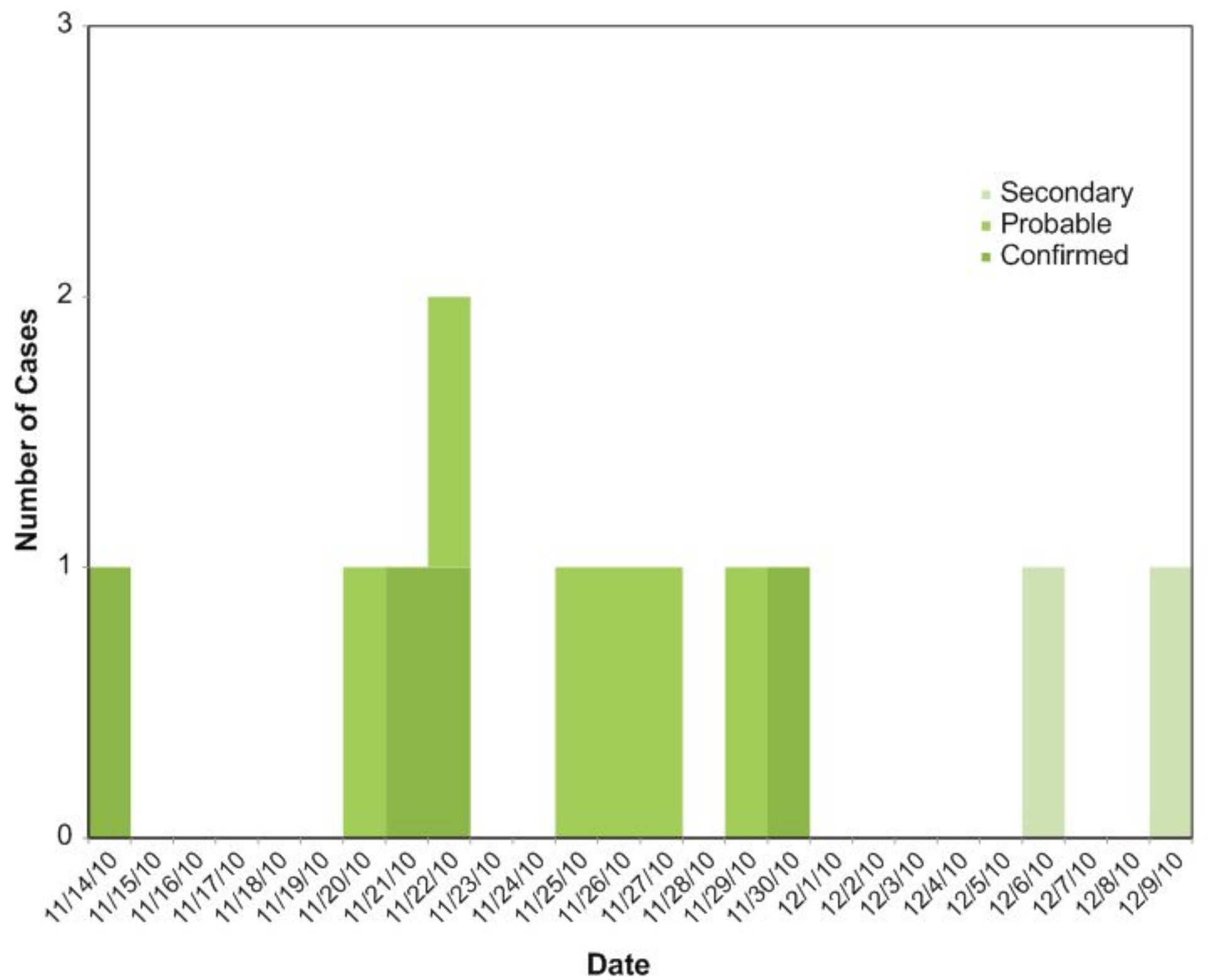


FIGURE 2

Percentage of Cases Who Played in Different Water Park Areas

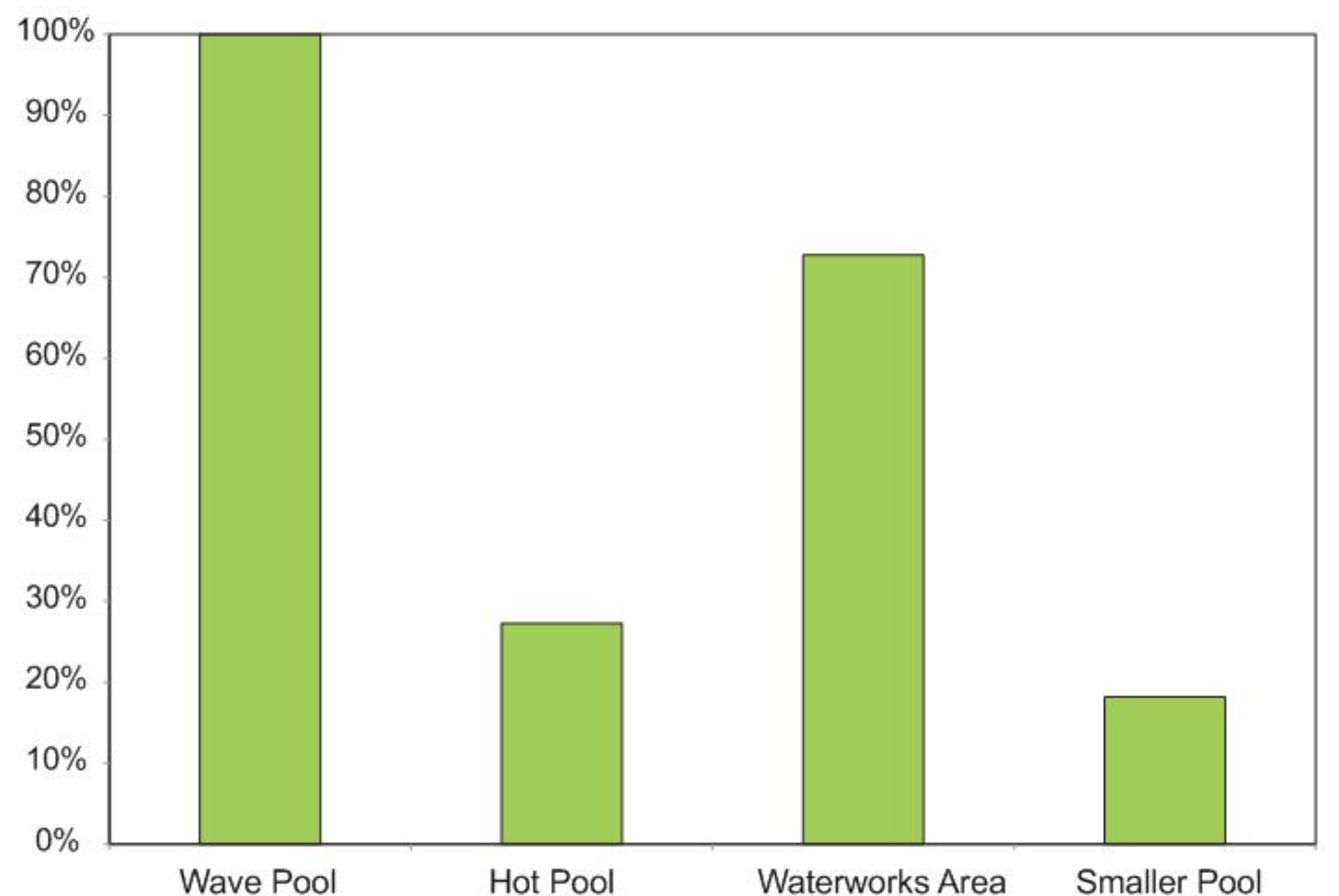
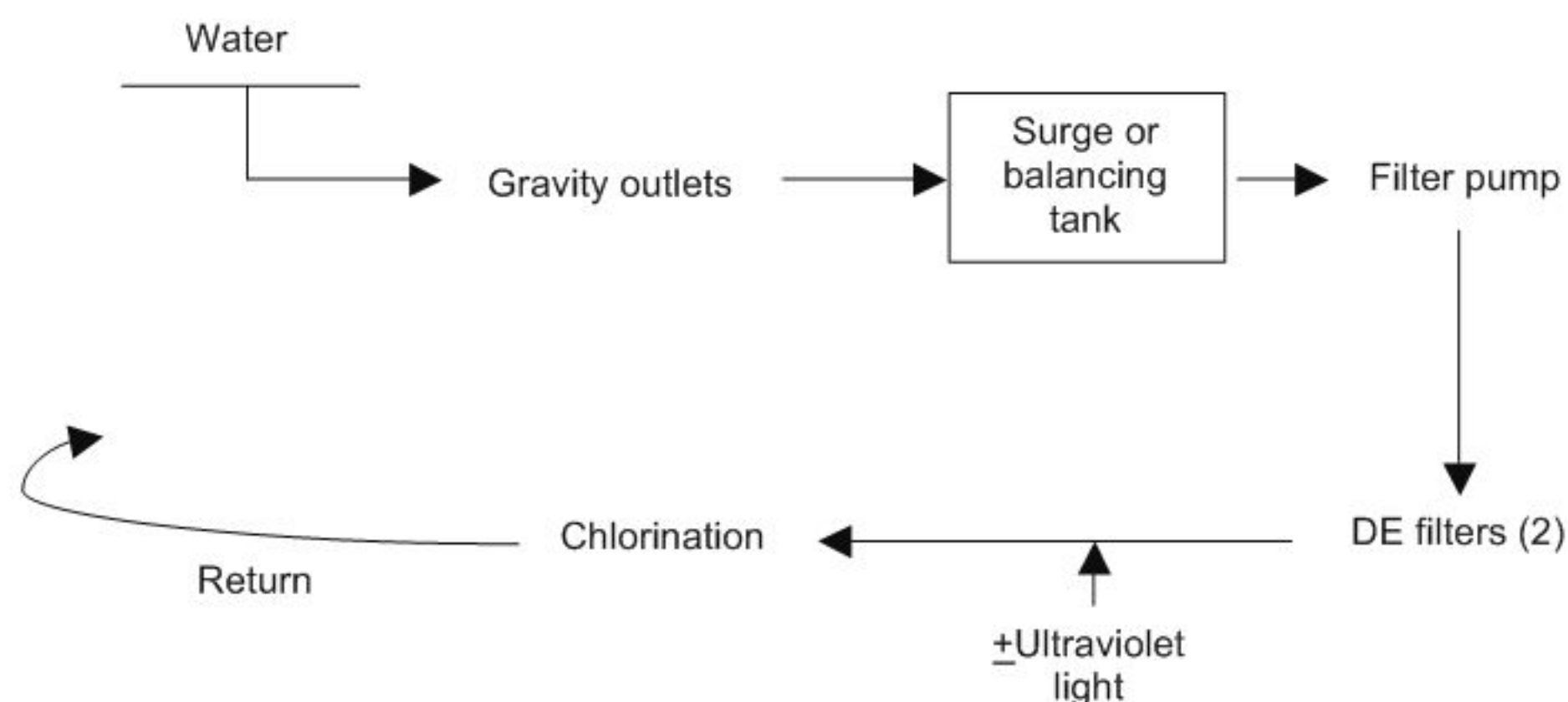


FIGURE 3

Recirculation Systems for the Water Features

DE = diatomaceous earth. Only the wave pool and body slides used ultraviolet light.

ORP, pH, filter, and pump were present and functioning. The recirculation systems in all bodies of water used diatomaceous earth (DE)-like filters, automatic chlorination, and automatic acid feed. With the exceptions of the two spas and outdoor wading pool, all were equipped with a surge or balancing tank.

A medium-pressure ultraviolet (UV) light system was incorporated into the recirculation system for the wave pool/body slides and was positioned prior to chlorination. The system consisted of a single bulb unit with a flow rate of 1,319 gallons per minute. The UV unit had a digital readout of the "percentage" of UV strength plus an alarm if it fell below a specified level. The bulb was replaced according to the sensor reading and the system had a built-in screen to capture glass from broken bulbs. This was the only body of water equipped with a UV light system and it had been in service for less than one year. Documentation and discussion with the operator demonstrated appropriate changing of the bulbs.

The water park had separate washrooms/change rooms and showers. Signage was present at the entrances to the washrooms/change rooms regarding showering and other related issues, such as diaper protocols. Swim diapers were available to patrons for a nominal fee. All other appropriate

safety signage as per legislation was present. Attendants or lifeguards were present throughout the facility and placed appropriately at the various water features. Other areas of the water park included a children's play area and a fast food sit-down restaurant. Investigation of the food service establishments did not reveal any concerns.

A site inspection of the water park was conducted on December 3, 2010. Daily records showed no lapses in free available chlorine levels (documented minimums above 0.5 parts per million) or other parameters, such as pH (documented in the range of 7.2 to 7.8), on November 14, 2010. Approximately 200 persons used the water park that day, and no pool fouling was noted that day. A pool fouling episode was documented on November 12, 2010, however, at the wave pool; it was documented as a formed stool. The procedure for a pool fouling incident was documented in accordance with the pool fouling protocol for formed stool (CDC, 2010). The records indicated that the UV light system for the wave pool/body slides was shut down for maintenance from 8 a.m. to 4 p.m. on November 14, 2010.

Due to further cases of cryptosporidiosis, another inspection was conducted on December 8, 2010. Further information was gathered on engineering and maintenance. It was reported that the total volume

of water in the wave pool/body slides was wasted in order to repair a section of flooring at the beach front of the wave pool on December 5, 2010. Fresh water was being added at the time of the inspection (the water park was not open to the public on this day). The DE filters for the wave pool were backwashed and new filter media added. The water in all bodies of water had been replaced since November 14, 2010. Wasting and adding fresh make-up water was carried out daily and exceeded the minimum 20 L/bather/day required by Ontario regulations (Health Protection and Promotion Act, 2007). The total volume of water for the splash pad and the two spas was wasted daily. The larger splash pad was wasted and replaced approximately three-fourths of the volume daily during times of high bather load. Water slides were regularly cleaned depending on usage.

The DE filter fabric or elements (a polyester synthetic fiber that held the filter media) were routinely checked every three months. Checks and replacement occurred more frequently if anything suggested tears in the fabric. The filters in the larger bodies of water (e.g., wave pool), were arranged in parallel so that if one filter malfunctioned, it was bypassed and a new filter was installed quickly.

Discussion

This outbreak of cryptosporidiosis resulted in four confirmed, six probable, and two secondary cases. Although it was not possible to confirm the water park as the source of *Cryptosporidium*, all cases had exposure to the water park on November 14 or 15, 2010. November 14, 2010, was also the day when the UV light system, which would have inactivated *Cryptosporidium* oocysts, was shut down for most of the day. *Cryptosporidium* is known to survive for days under normal chlorine levels found in recreational waters (Heymann, 2008). In Ontario, pools having a water depth of 0.75 m or less are exempt from the public pools regulation. In spite of the water park operators being highly compliant with recreational water guidelines and protocols, given the incubation period mean of seven days (range 1–12 days), we hypothesize that a pool-fouling incident, such as the one that occurred on November 12, 2010, led to this outbreak of cryptosporidiosis.

Outbreak Detection and Interjurisdictional Challenges

The detection of cryptosporidiosis outbreaks associated with water parks is challenging. Water parks are often tourist destinations, so people may travel distances or from out of the country to visit. In Ontario, provincial monitoring of mandatory reportable disease rates may allow detection of such events. Health units that border other provinces or the U.S., however, may not be aware of cases outside of their jurisdiction. Strong interjurisdictional communications are essential to remaining abreast of potential outbreaks.

Laboratory Methods

Laboratories play an important role in identifying organisms responsible for infectious disease outbreaks. In this outbreak, challenges arose around specimen management, including discarded specimens and specimens sitting too long in media for further analysis. Speciation is currently considered experimental. As further recreational water outbreaks of cryptosporidiosis occur, however, it will be helpful to develop policies and procedures so that health care practitioners; public health departments; and local, provincial, and national laboratories can collaborate to determine responsible species and advance research in this area.

Environmental Measures

Cryptosporidium is a hardy protozoan that withstands levels of chlorine commonly used in swimming pools. Previous studies have demonstrated that medium-pressure UV light is effective in inactivating *Cryptosporidium* oocysts (Bukhari, Hargy, Bolton, Dussert, & Clancy, 1999; Clancy et al., 2000; Craik, Weldon, Finch, Bolton, & Belosevic, 2001). Although this water park had a UV light system in one of its recirculation systems, it was off during the suspected exposure time. We believe it is of interest to public health to better understand the effectiveness of current legislation and regulations for public pools in preventing waterborne illness. This outbreak highlights the fact that even highly compliant facilities following current guidelines may serve as sources of recreational water illness. Further research should explore the effectiveness and cost effectiveness of UV light systems in preventing recreational water illness and processes that could minimize risk to swimmers when UV light systems are offline. Water parks should also be encouraged to ensure children in diapers wear only swim diapers while in water features. Parents may benefit from education around proper attire for young children and diaper change facilities to minimize pool soiling events. Although swim diapers are of minimal benefit in a diarrheal acci-

dent, they may prevent the release of formed stool, with the hope of decreasing the bacterial load released into the pool environment.

Limitations of the outbreak investigation included the lack of definitive laboratory evidence linking the water park to the cases and possible underestimation of the number of cases involved in the outbreak due to self-resolution of cases without seeing a physician, lack of testing of symptomatic cases, and failure to attribute cases to the outbreak in jurisdictions beyond Ontario and New York State.

Conclusion

This article described NRPH's experience of an outbreak of cryptosporidiosis associated with a water park. This outbreak investigation highlights the challenges encountered and the need for ongoing research into surveillance, laboratory testing, environmental control, and communications for the prevention of recreational water illness. ■

Acknowledgements: The authors thank Public Health Ontario for specimen analysis.

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References

- Bukhari, Z., Hargy, T.M., Bolton, J.R., Dussert, B., & Clancy, J.L. (1999). Medium-pressure UV for oocyst inactivation. *Journal of the American Water Works Association*, 91(3), 86–94.
- Causser, L.M., Handzel, T., Welch, P., Carr, M., Culp, D., Lucht, R., Mudahar, K., Robinson, D., Neavear, E., Fenton, S., Rose, C., Craig, L., Arrowood, M., Wahlquist, S., Xiao, L., Lee, Y.-M., Mirel, L., Levy, D., Beach, M.J., Poquette, G., & Dworkin, M.S. (2006). An outbreak of *Cryptosporidium hominis* infection at an Illinois recreational water park. *Epidemiology and Infection*, 134(1), 147–156.
- Centers for Disease Control and Prevention. (2010). *Healthy swimming fecal incident response recommendations for pool staff*. Retrieved from www.cdc.gov/healthywater/pdf/swimming/pools/fecal-incident-response-recommendations.pdf
- Centers for Disease Control and Prevention. (2011a). *Cryptosporidium*. Retrieved from <http://www.cdc.gov/parasites/crypto/>
- Centers for Disease Control and Prevention. (2011b). Surveillance for waterborne disease outbreaks and other health events associated with recreational water—United States, 2007–2008. *Morbidity and Mortality Weekly Report Surveillance Summaries*, 60(SS12), 1–32.
- Clancy, J.L., Bukhari, Z., Hargy, T.M., Bolton, J.R., Dussert, B.W., & Marshall, M.M. (2000). Using UV to inactivate *Cryptosporidium*. *Journal of the American Water Works Association*, 92(9), 97–104.
- Coetzee, N., Edeghere, O., Orendi, J.M., Chalmers, R., & Morgan, L. (2008). A swimming pool-associated outbreak of cryptosporidiosis in Staffordshire, England, October to December 2007. *Euro-surveillance*, 13(45), 1–3.
- Craik, S.A., Weldon, D., Finch, G.R., Bolton, J.R., & Belosevic, M. (2001). Inactivation of *Cryptosporidium parvum* oocysts using medium- and low-pressure ultraviolet radiation. *Water Research*, 35(6), 1387–1398.
- Health Protection and Promotion Act R.R.O. 1990, Regulation 565, Public Pools (2007). Retrieved from www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900565_e.htm

References

Heymann, D.L. (Ed.). (2008). *Cryptosporidiosis*. In *Control of communicable diseases manual* (19th ed., pp. 157–160). Washington, DC: American Public Health Association.

Insulander, M., Lebbad, M., Stenstrom, T.A., & Svenungsson, B. (2005). An outbreak of cryptosporidiosis associated with exposure to swimming pool water. *Scandinavian Journal of Infectious Disease*, 37(5), 354–360.

Ministry of Health and Long-Term Care. (2009). Appendix A: Disease specific chapters. *Cryptosporidiosis*. *Ontario Public Health*

Standards Infectious Diseases Protocol (pp. 81–86). Toronto, Ontario, Canada: Queen's Printer of Ontario.

Ministry of Health and Long-Term Care. (2010). *Operating procedures for non-regulated recreational water facilities guidance document*. Toronto, Ontario, Canada: Queen's Printer of Ontario.

Putignani, L., & Menichella, D. (2010). Global distribution, public health, and clinical impact of the protozoan pathogen cryptosporidium. *Interdisciplinary Perspectives on Infectious Diseases*, 2010, 1–39.

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SECTION 131213 - EXTERIOR FOUNTAINS

PART 1 - GENERAL

INTERACTIVE FOUNTAIN SYSTEM

1. DESCRIPTION. This work shall consist of furnishing and installing a complete interactive fountain system and foundation in accordance with the Plans and as directed by the Engineer. This includes but is not limited to mechanical vault, water reservoir vault, chemical vaults, fountain hardware, pumps, control panel, plumbing and wiring.

The fountain consists of (12) Pop-jet nozzles with integral RGB LED ring light with the showerhead spray pattern operating at a maximum display height of 6' and (13) Smooth Bore Pop-jet nozzles with integral RGB LED ring light, the Pop-jet nozzles will operate at a maximum display height of 6'.

2. MATERIALS. Interactive Fountain shall be as specified by the fountain designer and shall meet the specifications outlined in the Plans, details and specifications.
3. INSTALLATION. All work shall be free of blemishes or defects which could affect durability, strength, or appearance. The interactive fountain shall be installed true to line and grade as shown on the Plans or as directed by the Engineer.

The interactive fountain shall be installed at the location indicated in the Plans, to the configuration shown in the Plans, and in accordance with the manufacturer's recommendations. All locations shall be field approved by the Engineer prior to installation.

The Contractor shall protect all parts of the interactive fountain and maintain them in an undamaged condition until they are installed and accepted for payment.

4. MANUFACTURER. The interactive fountain equipment shall be as specified and designed by Delta Fountains:

Manufacturer: Delta Fountains
11494 Columbia Park Dr W # 4, Jacksonville, FL 32258
www.deltafountains.com
(904) 886-9030

5. METHOD OF MEASUREMENT. The quantity of Special Provision (Interactive Fountain System) to be measured for payment will be on a lump sum basis in the complete and accepted work, at the location(s) indicated in the Plans.
6. BASIS OF PAYMENT. The accepted quantity of Special Provision (Interactive Fountain System) will be paid for at the Contract lump sum price. Payment will be full compensation for installing a complete interactive fountain system and necessary foundation and anchoring materials and labor in accordance with the Contract Documents, and for

furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work including but not limited to any materials required for operation.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.645 Special Provision (Interactive Fountain System)	Lump Sum

1.1 SUMMARY

A. Work of this Section includes all labor, materials, equipment, tools, incidentals, and services necessary to design, engineer, manufacture, supply, and install the Stationary Fountain with related mechanical and electrical systems complete including all components, hardware, and accessories as indicated on the Contract Drawing and specified herein:

1. Discharge and suction piping systems.
2. Electrical conduit and wiring systems.
3. Subterranean Vault
4. Mechanical and electrical equipment with components and accessories.
5. Manufacture of primary fountain equipment and components is a "Basis of Design".
6. Include fountain system testing, adjustment, and operational training for Owner.
7. Custom fabricated fixtures.

B. Related Sections include the following:

1. Division 7, Section 071000 "Damp proofing and Waterproofing"
2. Division 13 Section 130112 "Operation and Maintenance of Fountains"
3. Division 13 Section 130500 "Common Work Results for Special Construction"
4. Division 13 Section 130812 "Commissioning of Fountains"
5. Division 22 Section 220110 "Operation and Maintenance of Plumbing Equipment"
6. Division 22 Section 220150 "Operation and Maintenance of Pool and Fountain Plumbing Systems"
7. Division 22 Section 221513 "Common Motor Requirements for Plumbing Equipment"
8. Division 22 Section 220516 "Expansion Fittings and Loops for Plumbing Piping"
9. Division 22 Section 220519 "Meters and Gages for Plumbing and Piping"
10. Division 22 Section 220523 "General-Duty Valves for Plumbing Piping"
11. Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment"
12. Division 22 Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment"

13. Division 22 Section 220553 "Identification for Plumbing Piping and Equipment"
14. Division 22 Section 220650 "Schedules for Pool and Fountain Plumbing Systems"
15. Division 22 Section 220700 "Plumbing Insulation"
16. Division 22 Section 220800 "Commissioning of Electrical Systems"
17. Division 22 Section 221116 "Domestic Water Piping"
18. Division 22 Section 221316 "Sanitary Waste and Vent Piping"
19. Division 22 Section 221423 "Storm Drainage Piping Specialties"
20. Division 22 Section 225200 "Fountain Plumbing Systems"
21. Division 26 Section 260500 "Common Work Results for Electrical"
22. Division 26 Section 260526 "Grounding and Bonding for Electrical Systems"
23. Division 26 Section 262816 "Enclosed Switches and Circuit Breakers"
24. Division 26 Section 265529 "Underwater Lighting"

C. Related Fountain System Work to be Provided by Other Separate Contractors:

1. Paving systems.
2. Earthwork including trench excavation and backfill.

1.2 REFERENCES AND STANDARDS

A. General: As Specified in Division 1.

B. "Rules Governing and Restricting the Use and Supply of Water", City of Burlington, VT. Department of Environmental Protection, Bureau of Water and Sewer Operations, Division of Water Connections and Permits.

C. Other Standards and References:

1. American Society for Testing and Materials (ASTM).
2. American Water Works Association (AWWAA).
3. American Public Works Association (APWA).
4. American National Standards Institute, Inc. (ANSI).
5. National Fire Protection Association (NFPA).
6. Underwriters Laboratories, Inc. (UL).
7. National Sanitation Foundation (NSF).
8. Department of Health (DOH).
9. National Electric Code (NEC).
10. American Society of Mechanical Engineers (ASME).
11. American Society of Sanitary Engineering (ASSE).
12. Commercial Standards (CS).
13. National Electrical Manufacturer's Association (NEMA).
14. Uniform Building Code (UBC).
15. Institute of Electrical and Electronic Engineers (IEEE).
16. Insulated Power Cable Engineers Association (IPCEA).
17. International Plumbing Code (IPC)

D. All work shall conform to the latest edition of the National Building Code and/or International Plumbing Code.

1.3 SYSTEM REQUIREMENTS

A. Design Requirements:

1. The fountain described in this Section shall be a fully automated, self-contained type stationary feature.
2. The work of this Section shall include design of equipment items for fabrication and installation of fountain equipment and components to suit Project requirements as approved by Owner. See Division 1 for additional provisions related to delegated design by Owner's Engineer.

B. Performance Requirements:

The fountain consists of (12) Pop-jet nozzles with integral DMX programmable RGB LED ring light with the showerhead spray pattern operating at a maximum display height of 6' and (13) Smooth Bore Pop-jet nozzles with integral DMX programmable RGB LED ring light, the Pop-jet nozzles will operate at a maximum display height of 6'. The nozzles are to be interchangeable with the ability to change the nozzle display at a later date, at the discretion of the owner. The pumps are sized to provide enough volume and head pressure assuming all of the nozzles were to be showerhead displays. The nozzles will be divided into three zones with each zone operating independently of the other two for display heights. An anemometer is incorporated into the controls system to limit the height of the nozzles based on wind speed input to the controller. The RGB lighting will be programmed in consultation with the owner for various shows for special events and holidays.

1.4 SUBMITTALS

A. General: Refer to and comply with Division 1 Section, for procedures and additional submittal criteria.

B. Installer Qualifications: Comply with Article "Quality Assurance" herein. Submit fountain system installer qualifications including resume and system identification of previous work experience on fountain systems of type indicated for Project and the following work:

1. Plumbing work.
2. Electrical work
3. Concrete and Waterproofing Work.
4. Other specific work; rock work, stainless steel, etc...

C. Product Data:

1. Submit manufacturers' data for all equipment and individual components listed in "Part 2 - Products".

2. Submit a comprehensive electrical package to include a power diagram, logic diagram, process and instrumentation diagram, panel layout, component schedule, and cut sheets on all individual components in the control panel. The contractor shall furnish evidence that the building department has been contacted to assure local compliance and that any exceptions to local requirements or the National Electric Code have been addressed.
 3. Submit for other items and materials of system not indicated in this Section including for items of conduit, wiring, electrical devices, piping and fittings, sealants and/or seals to confirm compatibility and conformance to Project wide requirements.
- D. Shop Drawings: A concise plan, details, and section(s) shall accompany the submittal data on all components to assure compliance with the intended design as specified and shown on the Contract Drawings.
1. Include equipment and material handling instructions and interfacing requirements and coordination notes with other trades and contractors.
 2. If family product data sheets are submitted for approval, cross out all items not appropriate and highlight the selections for the components to be submitted, include all options.
- E. Samples for Verification: Submit for surface exposed elements of system as requested by Architect and highlight only the information that is pertinent.
- F. Quality Control Submittals:
1. Test Reports: Fountain manufacturer's test report must be included in the control panel information package. This report shall include results of the test on both motors and all lighting circuits and uncommissioning report indicating proper operation.
 2. Field Reports: The manufacturer shall provide a field test report in the controls package. This report, which includes information on the field voltage, current, and resistance at all components, must be filled out by the installing electrical contractor and submitted to the manufacturer and the Architect for approval.
- G. Contract Closeout, Operations and Maintenance: Submit manuals pertaining to the operations and maintenance of the fountain system prior to final approval of system installation. The manuals shall include specification sheets, operations and maintenance data, exploded diagrams, replacement part lists, copies of field and test reports, and warranty information. Comply with Division 1.

1.5 QUALITY ASSURANCE

A. General:

1. Insofar as possible, all materials and equipment used in the installation of this work shall be of the same brand or manufacturer throughout for each class of material or equipment. The specification has allowed for substitutions, however, the substitution process will be strictly adhered to. If the process is incomplete, or not within the time frame, no substitutions will be considered. Substitutions will not be partially approved. If any item is not approved, the entire submittal will be rejected, not for resubmission. There will be no consideration for alternates, after the bid. Conform to Reference Standards and other Project Manual Sections as applicable.
 2. Piping materials shall bear label, stamp, or other markings of specified testing agency.
 3. Use numbers of skilled workmen equal to work requirement or occasion. The skilled workman shall be thoroughly trained and experienced in the necessary crafts and shall be completely familiar with the specified requirements and methods needed for proper performance of the work in this Section.
- B. Fountain Manufacturer: The fountain equipment described in this section shall be supplied by Delta Fountains, Jacksonville, Florida, (800) 641-6675, Fax: (904) 886-9089. All other fountain manufacturers requesting approval must comply with the requirements listed in the SUBMITTALS section under the Product Data paragraph. All manufacturers' data on individual components listed in PART 2: Products, or pre approved equals where allowed, shall be submitted to the Landscape Architect and fountain consultant, prior to approval. Manufacturers requesting prior approval shall submit to owner, at least 10 business days prior to the bid date, all data on all individual components listed in PART 2: Products, for review by the owner and fountain consultant. All approvals will be issued in an addendum prior to the bid date.
- C. Installer's Qualifications: Plumbing and electrical work for fountain system installation shall be performed by firms with each having at least 5 years of successful commercial fountain installation experience on features similar to that required for the Project.
- D. Water feature contractor qualifications:
1. The water feature installing contractor shall have five (5) projects of similar complexity in the past 3 years. In entering into a contract covering this work, the Contractor accepts the specifications and drawings and guarantees that the work will be performed in accordance with the requirements of the specifications and drawings or such modifications to said specifications and drawings as may be made in the contract documents. The Contractor, in accepting the contract, has verified the design, and will perform such work as is required to achieve the design intent.
 2. The contractor shall currently be in the business of constructing custom water features and shall have a continuous 5 year record of no less than 5 successful projects of equal or greater scope.
 3. The Contractor further guarantees that the workmanship and material will be of the best quality procurable and that none

but experienced workmen, familiar with each particular class of work, will be employed

4. The Contractor further agrees to hold himself responsible for any defects which may develop in any part of the entire system, including equipment as provided for under this specification, due to faulty workmanship, design or material and to replace, make good, without cost to the Owner, any such faulty parts or construction which may develop at any time within one (1) year from the date of the final acceptance. Any repairs or replacements required because of defects, as outlined in this clause, are to be made promptly and approved in writing by the Landscape Architect.

- E. Field Measurements: Verify dimensions with other work on Project which adjoins the equipment item(s) of this Section or to which work of this Section will be a part.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Fountain manufacturer shall adequately package all shipments to protect the material during shipment. Consolidate freight of like items when possible to ensure minimal shipments. All shipments to be freight on board, manufacturer's plant, with fully insured freight allowed to the jobsite.
- B. Handling and Unloading: All shipments shall be driver signed and counted to verify that all components listed on the packing slips are included in shipment prior to leaving the manufacturer's premise.
- C. Special Handling: Contractor to take necessary precautions in unloading, handling, moving, and storing all shipments, until it is installed in its final position, to protect all components from damage. Contractor to refer to all notes on the shop drawings for any additional instructions on handling fountain equipment.
- D. Acceptance at Site: Contractor to schedule and arrange for delivery of all shipments. Contractor is responsible for preparations of all equipment necessary to safely facilitate the unloading of all shipments and moving it to the final location. Freight is F.O.B plant, full freight allowed to jobsite. Contractor to account for all items in each shipment for accuracy before signing for acceptance of shipment. All damages and shortages shall be clearly documented on the Bill of Lading and packing slip before the delivery driver leaves the premises. The manufacturer shall be promptly notified within 24 hours of any and all documented damages and shortages. By signing the bill of lading, it is mutually agreed that the goods listed are accepted in apparent good order, condition and correct quantity, except as noted, and are in proper condition for transportation according to the applicable regulations of the department of transportation (for truck load shipments). In cases where shipments that are damaged in-transit and are signed for in good condition, it will be the contractor's responsibility to replace those damaged items. All shipments are subject to the manufacture's standard terms and conditions.

- E. Storage and Protection: Contractor shall store all components in their original packages and protect all items from damage until final placement occurs. Contractor shall rotate all motor shafts $\frac{1}{4}$ turn each and every month during storage up to the time of first performance to ensure motor shaft integrity.

1.7 WARRANTY

- A. Contractor and installer shall furnish warranty for fountain system installation for a minimum period of one year from date of Substantial Completion of the Contract as specified in Contract Conditions. Contractor shall include provisions of warranty to Owner not otherwise covered by manufacturer. Warranty to include the following:
1. Fountain system to be free of defects of materials and workmanship.
 2. Fountain system performance to the designated water volumes, heights, patterns, and display features, as outlined in the design requirements in section 1.3(E)(3).
 3. Adjustments and/or corrections to warranted equipment shall be made at factory as per standard warranty terms.
- B. The manufacturer shall warrant all properly installed and maintained fountain equipment (except lamps) as provided in "Part 2 - Products" of this Section, free of defects in material and workmanship for a minimum period of 18 months from shipment or one year from 1st performance, whichever comes first. The fountain manufacturer, at their option, shall replace or repair any materials, components, or workmanship found to be defective within the warranty period when returned to the factory, freight pre-paid. No component may be returned for repair or replacement without an approved return materials authorization.
1. Extended Warranties: Fountain manufacturer shall furnish to Owner any extended warranty that is standard and usually available from item manufacture/supplier for an item of equipment.

1.8 MAINTENANCE AND EXTRA MATERIALS

- A. Contractor shall supply chemical treatment materials of sufficient quantity, in addition to materials needed for system testing and adjustment, for use by Owner in maintenance of the system for a period of at least one month after Substantial Completion.
- B. Contractor shall supply any other special tools or parts that would be needed for Owner's maintenance of the fountain system.
- C. Extra Materials - one additional replacement element is to be provided for all cartridge filters. Contractor to supply 30 day supply of chemicals

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Mechanical Components: The major mechanical components of the stationary fountain are as follows:

1. DFFP-400, 4 Hp, Self-priming, ETL listed full-rated filter pump. One piece plastic case constructed with basket strainer, easy on on/off two piece lid for tool free access to removable basket strainer. Chemical and UV resistant with re-enforced suction and discharge connections. The motor shall be 208V, 3 phase, 3500 R.P.M. The pump shall operate at a minimum of 150 GPM at 65' TDH and shall have 4" suction and 4" discharge ports. Filter pump is pre-plumbed and pre-wired in the equipment vault including all necessary check valves, isolation/flow control valves, true union type, and vacuum switch gauge panel assembly as shown on the drawings.
2. DFCF-200, 200 SQ. FT. Cartridge filter, heavy-duty abs constructed with cam & ramp lid for easy access to removable, washable filter media. Include one spare element.
3. DFWMUA-100, 1" water make-up assembly, type 304, schedule 40 stainless steel constructed with 110V, bronze, slow closing solenoid valve, water hammer arrestor and (3) 1" heavy-duty bronze constructed ball valves. The water make-up assembly is pre-plumbed ready for installation by the contractor. PVC or copper construction is not acceptable. The contractor shall connect in-line on fresh water make-up line and provide back-flow preventer and/or reduced pressure zone, and pressure reducing valve to ensure the incoming line pressure does not exceed 50 P.S.I.
4. Hammer Arrestor, ASSE 1010 certified, type L copper tube, HHPP piston with two lubricated EPDM O-rings, FDA approved lubricant, rolled piston stop, wrought copper male thread adapter. (manufacturer and product: Sioux Chief Mfg. Co., Inc., Series 650 and 660).
5. DFWLS-T, Transducer style water level sensor, min. type 316 stainless steel housing with isolated diaphragm sensors. The transducer is certified intrinsically safe, 4 to 20 mA outputs. The transducer is shipped complete with polyurethane jacketed shielded cable with polyethylene vent tube and Kevlar tension members, 200 lbs pull strength for use in a 5' depth tank. Conductors are 22 AWG. The length of the cable shall be no less than 150' and shall be verified by contractor if more is required to make home run to PLC without a junction.
6. DFDS-14SS-PJ/SH, Custom fabricated type 304 stainless steel and fiberglass constructed discharge sump with stainless steel grate, 27W/12VAC RGB LED ring light with nozzle insert (showerhead and smooth bore), 12VAC Pop-jet nozzle with quick connect fitting and valve, junction box, potting compound and cord seals.
7. DFPJN-100F, Animated pop jet nozzle with machined stainless steel nozzle (nozzle insert in ring light fixture), stainless steel support and high density synthetic construction, capable of producing programmed effects at a high switching speed of up

- to 10 times per second via a 12 VAC switching mechanism. The nozzle is to be housed in a stainless steel sump with light and grate, pre-plumbed with Cam-Lock type quick disconnect fittings attached to rib reinforced Tigerflex tubing that will not kink.
8. DFUL-27W, (27W) selectable 12VAC RGB LED UL Listed, IP68 rated, wet/dry fountain ring light fixture with oversized face ring, certified marine grade 316SS housing with minimum 1/8" thick shell (stamped or spun fixture housing will not be accepted), silicone gasket, tempered glass lens, 10-15 degree beam angle, 3M UL listed SOW cable (3,5 or 7 wire). Static or Auto preprogrammed color change with connection to power supply, supplied with internal DMX-512 and driver on board. Replaceable LEDs, removable base disc and yoke for wet or dry installation and standard "sparkle matt" face ring with optional mirror polish SS.
 9. DFJB-4, 4-Tap underwater junction box, cast bronze constructed with silicone gasket and (1) 3/4" bottom tap and (4)
 10. DFGDF-400, 4" N.P.T. Gravity drain fitting, sch. 40 type 304 stainless steel constructed with integral water-stop flange.
 11. DFGDF-600, 6" N.P.T. Gravity drain fitting, sch. 40 type 304 stainless steel constructed with integral water-stop flange.
 12. DFCC-50, 1/2" Machined brass cord seals with neoprene grommet, for water sensor cord.
 13. DFPC-2123C, two part re-enterable potting compound for application in the junction boxes to provide watertight environment for electrical connections.
 14. DFCFV-3030, 30" X 30" Chemical feed vault with aluminum tile set hatch, fiberglass constructed with all fittings glassed to the tank wall for watertight integrity. Includes 20 gal. polypropylene tank for acid and 60 gal. tank for chlorine storage.
 15. DFST-11200, 8' x 14' x 6' subterranean equipment vault, heavy-duty fiberglass constructed with minimum (13) layers of fiberglass or a minimum of 1" thick, one-piece molded construction on bottom shell and lid. Fabricating the bottom shell from fiberglass sheets and caulking the joints will not be acceptable. The vault access hatch shall be 42" X 42" Aluminum tile set hatch bolted to the fiberglass with stainless steel lockable hardware. 6" vents with fiberglass vent caps. All pipe connection fittings to be glassed and sealed to the tank wall for watertight integrity. The use of bulkhead type fittings will not be accepted. A leveling skid fabricated from steel tubing shall be glassed to the vault bottom allowing for clearance of the sump and for ease of leveling and handling of the vault on site. The vault is to house the feature/filter pump, filtration equipment, UL listed control panel, automatic sump pump, exhaust fan, utility light and access ladder. The vault is pre-plumbed and pre-wired ready for installation and dome lid. As shown on the drawings.
 16. DFORP/pH-PM200, 120VAC 5A single phase combination ORP/pH chemical controller. Fully interactive Ethernet TCP/IP graphical interface with security access codes. 2 line, 16 character LCD display, 5 buttons, 2 LEDs: Steady Blue = "OK", Flashing Blue = flow switch is in "Recovery Delay" after a flow interruption, Flashing Red = "Alarm". Control - On/Off, P/PI/PID, Time Modulated, Event Timer, Flow Restored delay (adjustable).

- Communication - HTML server on board, standard, USB port, Standard Ethernet, Wireless EVDO Cellular, Optional WiFi for use with Smartphone / iPad, HTML Micro Web Server with user definable IP address Non-metallic NEMA 4x enclosure with lithium battery for ram stored values.
17. DFCT-3600, 6, x 6," x 6' Collector tank, heavy-duty fiberglass constructed with minimum (13) layers of fiberglass or a minimum of 3/4" thick, one-piece molded construction on bottom shell and lid. Fabricating the bottom shell from fiberglass sheets and caulking the joints will not be acceptable. The vault access hatch shall be 42" x 42" Aluminum tile set hatch and bolted to the fiberglass with stainless steel lockable hardware, All pipe connection fittings to be glassed and sealed to the tank wall for watertight integrity. The use of bulkhead type fittings will not be accepted. A leveling skid fabricated from steel tubing shall be glassed to the vault bottom allowing for clearance of the sump and for ease of leveling and handling of the tank on site. The tank will house the sump pump, overflow, junction box, water level sensor, and filter discharge manifold. The tank is pre-plumbed and ready for installation.
 18. DFUV-30. Ultraviolet light sanitizer, 208V, 1 phase, 114 GPM maximum flow to produce a UV dosage rate of 40mJ/sec/cm2 at the end of the bulb life. The unit shall have an average bulb life expectancy under normal conditions equal to 8,000 - 12,000 hours. The UV chamber unit is manufactured of 316L stainless steel, with 3" flanged ANSI 150 RF fittings and produces wave lengths that operate within a 200 nanometer to 315 nanometer range or UV-C spectrum and remain unaffected by water temperature variance. The unit comes equipped with temperature probes, UV monitor probes, power control, and automatic wiper system. The medium pressure system shall produce an energy band in the bacterial region and shall emit multiple wave lengths suitable for chlorine destruction and have high power outputs (1.3kw -7.3kw). The UV units shall be validated via 3rd party testing to meet the requirements of the health department codes. An external signal supplied from a flow switch/meter shall be tied into the control cabinet for water flow detection through the chamber to not allow the lamp to operate in a no flow condition. The chambers shall include temperature sensors and UV output monitors wired to the control unit. The control system for the UV unit shall be located in a NEMA 12 (IP54) rated panel. The control unit shall incorporate simple touchpad control buttons for ease of operation and shall be capable of incorporating many user configurable features for system integration and the microprocessor shall be able to be set up and monitored from a remote computer. The unit shall have a polychromatic light for improved chloramines destruction and shall also be designed to improve performance by treating 100% of the filtration flow. The unit shall be NSF/ANSI 50 certified, manufactured in the US, have MET/UL/CSA approval, and ISO9001 quality systems compliancy. The unit shall incorporate advanced wiper technology that is DC electrically powered. The wiper shall be able to park away from the lamp reducing wiper ring degradation. The location of the wiper shall incorporate an optical readout and have no proximity switches, magnets, or timers and shall incorporate multiple seal arrangements for long

- life. The UV control unit shall include many interface options such as process interlock for local pressure switch pump interference, low power overnight operation, automatic restart on power supply interruption, and shall have profibus interface capabilities. The lamp technology shall incorporate chokes. Units supplied with ballasts are not acceptable. The control panel unit incorporates multiple levels of operation and shall include stop/start reset buttons. The unit shall also include LED two line text display indicating UV dosage, lamp current, UV intensity, flow, temperature, operational hours, lamp fault, low UV and temperature alarm, pre-temperature alarm, power supply over-temp alarm, ground fault trip, and wiper fault. The unit shall incorporate interface controls of local remote operation, process interruption, valve control with limit switch feedback, UV shutdown, and flow meter input. The unit shall have built in data-logging which include parameters logged of UV intensity required, UV intensity measured, lamp current, temperature, flow, time and date, and all alarms generated.
19. DFVG-100, Vacuum Switch and gauge panel assembly equipped with (1) weathertight nema 4 enclosed, single pole/double throw switching element, combination vacuum switch with viton o-rings that are suitable for temperatures of 32° - 400° F. Panel also includes (1) ¾" N.P.T., glycerin liquid filled, 304 stainless steel cased pressure gauge with 2.25" dia. face, and (1) ¾" N.P.T., glycerin liquid filled, 304 stainless steel cased vacuum gauge with 2.25" dia. face. Mounted on P.V.C. backboard.
 20. DFDP-100, Differential Pressure Switch and gauge panel assembly equipped with (1) weathertight nema 4 enclosed, single pole/double throw switching element, pressure differential switch with viton o-rings that are suitable for temperatures of 32°- 400° F. Panel is also equipped with influent and effluent ¾" N.P.T. glycerin liquid filled, 304 stainless steel cased pressure gauges with 2.25" dia. face. Mounted on P.V.C. backboard.
 21. DFFP-050, ½ Hp, Self-priming, NSF approved full-rated filter pump and fitted 2" FPT connections. The pump shall operate at a minimum of 40 GPM at 40' TDH. Pump is one piece case constructed with oversized basket strainer, double ring lock design lid for tool free access to removable basket strainer and pump internals. The pump shall have a floating eye seal between the closed impeller and diffuser for maximum efficiency. The motor shall be 208V, 3 phase, 3450 R.P.M and have a rust-proof stainless steel shaft, and permanently lubricated, sealed bearings. Filter pump is pre-plumbed and pre-wired in the equipment vault including all necessary check valves, isolation/flow control valves, true union type, as shown on the drawings.
 22. DFFS-3.14, 24 1/2" Diameter Sand filter with automatic back washing valve, 3.14 square feet of filter surface area and stainless steel linkage valve system with pressure differential switch for backwash activation, pre-plumbed on tank., The sand filter tank is heavy duty one piece re-enforced fiberglass constructed with UV resistant outer coating surface finish. Sand filter includes easy access, heavy duty closure with integral pressure gauge with air-relief valve, swing away diffuser for easy access to sand and internal parts, all internal parts are

threaded for ease of service, maximum operating pressure - 50 p.s.i. The automatic backwash linkage system shall consist of one 3-port bronze body ball valve with electronic actuator, one cast bronze 3-port ball valve and sch. 80 P.V.C. Piping with flanged, clear acrylic sight glass. The valves are connected by type 304 stainless steel single lever linkage with double operator arms and stainless steel jam nuts and couplings to facilitate manual adjustment of the linkage assembly. The electronic actuator shall be powered by 120V relay outputs from either the P.L.C. (if provided) or relays in the control panel. The backwash initiation shall be configurable for either a set time for backwashing or by use of a pressure differential switch measuring pressure differential from the influent and effluent sensors located on the face piping manifold of the filter. A visual alarm light or dedicated screen on the H.M.I. will be incorporated in the main control panel to alert when the system is in the backwash cycle. Controls for the automatic backwash will switch the position of the 3-port valve when the pressure transmitters read the set pressure differential level. Once the 3-port valve state is switched, the controls will run through a timer controlled backwash cycle. Once the time set of the cycle is complete, the controls will switch the 3-port valve back returning to normal filtration cycle. Sand filter is pre-plumbed in equipment vault. Filter media is to be provided by contractor.

23. DFPV-200, 120VAC NEMA 4X aluminum alloy powder coated electric actuator, designed for load requirements of up to 445 in/lbs and be used in either a horizontal or upright position. Outdoor or humid environments actuators must be continuously powered up and the heater is functioning. Actuator has two auxiliary switches, (shared common, rated at 3A 250V Max.), an internal low power heater and mechanical connections that are ISO5211 compliant. The Actuator shall come with the optional internal proportional control card that accepts a wide range of control signal and generates multiple feedback signals and built-in manual override capabilities. Duty cycle on all actuators shall be a minimum of 75% with an ambient temperature operating range of -30°C to +65°C (-22°F to +150°F). The actuator shall have a minimum of (2) selectable and programmable 2-10vdc, 1-5vdc, 4-20mA control signal inputs and also come with a minimum of (2) 2-10vdc or 4-20mA feedback signal outputs.
24. DFCFP-33, 110V, 1-phase Fractional Horse Power Chemical Feed pumps. NSF approved with output of 0.18gph capacity with discharge pressure of 145psi. Polypropylene constructed with EPDM seals, PVDF wetted ends eliminate compatibility concerns, integral bleed valve prevents loss of prime, and external control via dry contact pulse.

B. Electrical Components: The major components to be included in the control panel and to be incorporated into a fully functional operating fountain system are specified and listed below:

1. The fountain control system shall be designed for 208 Volts, 3 phase, 4 wire service and shall operate (3) 4 Hp feature pumps, (1) 1/2 Hp filter pump, (25) 27W/12VAC led lights, (1) Anemometer for wind speed compensation control of the display pump, and

- appurtenances of the fountain. A transducer type low water cut off system shall be provided to de-energize the control system during a low water level condition. The water level sensor shall also provide a separate water level control system to increase the water level before the low water cut off alarms in both operating and static environments.
2. NEMA 3R enclosure of galvanized steel construction, primed and phosphatized, finished with ANSI 49 gray baked on enamel, manufactured by Hoffman, equal to HCR series shall be provided. The enclosure shall have collar studs for sub-panel mounting, hasp and staple for padlocking, butterfly type stainless steel draw latches and hinged cover. All Hardware shall be stainless steel.
 3. All components shall be mounted to a removable sub-panel. The sub-panel shall be fabricated from 14-gauge steel and shall be finished with baked on white enamel.
 4. Service entrance lugs shall be provided, sized for 600 volts, 300-amp minimum. The power distribution block shall have a flammability rating of UL 94V-0, shall be based on NEC table using 75 degrees C wire and shall be equivalent to Square D class 9080.
 5. A 600V lightning arrestor shall be provided and connected to the service entrance lugs for 3 phase power and 250V lighting arrestor for single phase power.
 6. Motor starters for feature pump shall be IEC rated full voltage, non-reversing with thermal overload relay. Auxiliary contacts shall be provided as required for the specific control functions. Motor starters shall be as manufactured by Square 'D', Allen Bradley or pre-approved equal.
 7. All 120 volt equipment shall be protected individually by thermal magnetic circuit breakers with an interrupting rating of 10KAIC @ 240 volt minimum. All circuit breakers shall be calibrated and sealed at the factory and shall be equivalent to Square D, type QOU.
 8. The lighting and filter pump contactors shall be 30 amps rated and shall be equivalent to Omron type g72 or equal.
 9. The fountain feature / filter pump, and lights shall be controlled by individual 24-hour time clock settings. The time clocks shall be electronic with 24-hour capabilities or shall be integral to the memory module or PLC.
 10. The motor and lights shall be controlled by touch screen, designated "Hand - Off - Auto". In the "Hand" mode, the appropriate motor or set of lights shall be energized until the selection is placed in the "Off" mode. In the "Auto" mode, the appropriate motor shall be controlled by the appropriate time clock.
 11. All power wiring shall be color coded using MTW #12 AWG minimum. Control wiring shall be MTW #14 AWG minimum and be numbered/lettered at each end. Wire numbers/letters shall be equivalent to Pass and Seymore "LeGrande".
 12. All wiring shall be routed through a wiring duct system to provide wire protection and an organized appearance.
 13. Terminals shall be provided for interface with field-installed equipment. The terminal blocks shall be mounted on a 30-degree angle for ease of field connection. Terminals shall be equivalent to Siemens, Allen Bradley, or Square D.
 14. All components shall be labeled using a laser-screened Mylar nameplate. The nameplate shall be a laminated two-part system

- using black letters on a white background on the door and yellow background on the back panel providing protection against fading, peeling, or warping. The labeling system shall be computer controlled to provide logos, post-script type or custom design. The use of engraved plastic type tags is not acceptable.
15. The control system shall have complete drawings/schematics using AutoCAD. The drawing shall have a complete Bill of Materials, front panel view with component locations and electrical schematic. References to the Bill of Materials shall be located for each component.
 16. The control system shall be designed and manufactured to meet all state and local codes, Underwriters Laboratories and the National Electric Code (particular attention to article 430 and 680)
 17. The entire control system shall bear a UL 508 serialized label "Enclosed Industrial Control Panel". The use of the UL label "industrial control panel enclosure" without the UL 508 serialized label is not acceptable. Additionally the control panel shall bear a UL label for "Industrial Control Panel for Permanently Attached Fountains".
 18. The low water cutout system shall provide intrinsically safe voltage to the transducer style sensor. The sensor shall provide an input to the PLC to de-energize the pumps and motors. An adjustable time delay shall be provided to prevent nuisance tripping. The HMI shall indicate this alarm as well as provide time delay values for alarm and reset.
 19. The water make up system shall provide intrinsically safe voltage to the transducer style sensor. The sensor shall provide an input to the PLC to energize the water make up solenoid. An adjustable time delay shall be provided to prevent nuisance tripping. The HMI shall indicate this alarm as well as provide time delay values for alarm and reset. The water make-up shall operate on 2 set points for operating and static fill functions.
 20. The variable frequency drive shall be a special purpose drive with application-specific features that add significant "more-for-less" benefits. The VFD shall be a select model for remote access, Siemens G-120, or pre-approved equal.
 - a. ASICs: Application Specific Integrated Circuitry increases reliability.
 - b. Dual-bridge, 12-pulse rectification. By using a phase shift input transformer with dual secondary, input current harmonic distortion factor can be reduced over 90%.
 - c. Energy savings control with Automatic output voltage adjustment in response to actual motor loading. Real-time energy savings based on motor algorithms. Increases motor efficiency by several %.
 - d. Simplified operator keypad with 16 function LEDs provides the perfect execution of old-fashioned simplicity of discrete indicator lights and the modern sophistication of keypad programming and control.
 - e. Built-in PID control that eliminates cost of external device.
 - f. Built-in power consumption monitoring with built-in kW display eliminates the need for external signal conditioner.
 - g. Performance features:

- 1) Ratings: 4 HP at 208 VAC

- 2) Overload capacity: 120% for 60 sec (180% peak)
- 3) Starting torque: 150%
- 4) DC injection braking: ramp or coast to stop, adjustable, current limited
- 5) Electronic reversing
- 6) Adjustable accel/decel: 0.1 to 3600 sec (2 each)
- 7) Controlled speed range: 40:1
- 8) Critical frequency rejection: 2 selectable, adjustable bands
- 9) Torque limiting circuit: 30 to 180%
- 10) Drive efficiency: 96 to 98%
- 11) Energy saving control: improves motor efficiency
- 12) Displacement power factor: 0.98
- 13) Output frequency: 0.1 to 400 Hz
- 14) Frequency resolution: 0.01 Hz with digital reference, 0.06 Hz with analog reference
- 15) Frequency regulation: 0.01% digital (-10° to 40°C), 0.1% analog (15° to 35°C)
- 16) Torque boost: full range, auto
- 17) Jog forward and reverse
- 18) Power loss ride-thru: 2 sec
- 19) Inertia ride-thru
- 20) Selectable auto restart after momentary power loss
- 21) Programmable auto restart (0 to 10 attempts) after re-settable fault
- 22) DC bus reactor: 30 to 125 HP at 230 VAC, 30 to 250 HP at 460 VAC

h. Design Features

- 1) 32-bit microprocessor logic
- 2) Surface mount devices
- 3) Carrier frequency: selectable to 15 kHz
- 4) Keypad operator controls
- 5) LED display: four digit
- 6) 24 VDC control logic
- 7) Programmable contacts, one form C and one NO
- 8) Timer function: contact-initiated
- 9) RS-232 communications port
- 10) Volts/hertz ratio: 15 preset and one infinitely-adjustable pattern
- 11) 5 Multi-speed settings
- 12) Remote speed reference: 0 to 10 VDC or 4 to 20 mA
- 13) Set-point (PID) control
- 14) Signal follower: bias and gain
- 15) Analog monitor output: 0 to 10 VDC
- 16) Fully EMC compliant when optional RFI filter connected
- 17) NEMA 1 enclosed or protected chassis
- 18) UL listed; IEC: 146A
- 19) MTBF: exceeds 28 years
- 20) Embedded web page for remote access and monitoring

i. Protective Features

- 1) DC bus CHARGE indicator

- 2) Optically-Isolated controls
 - a) Phase-to-phase / phase-to-neutral short circuit protection
 - b) Ground fault protection
 - c) Electronic motor overload (UL)
 - d) Current and torque limit
 - e) Fault circuit: over-current, over-voltage, and over-temperature Service Conditions
- 3) Ambient service temperature: -10°C to 40°C (104°F) NEMA 1, to 45°C (113°F) protected chassis
- 4) Humidity: non-condensing to 95%
- 5) Altitude: to 3300 ft; higher by derating
- 6) Input voltage: +10%/-15%, 200 to 230 VAC, 380 to 460 VAC
- 7) Input frequency: 50/60 Hz ± 5%
- 8) 3-phase, 3-wire, phase sequence insensitive
21. A programmable logic controller shall control the fountain pumps. The PLC shall be an Allen Bradley Micrologix series, Siemens S71200 series, or pre-approved equivalent.
 - a. Mechanical features
 - 1) Rugged, compact plastic housing;
 - 2) Easily accessible connection elements and controls
 - 3) Assembly on standard horizontal or vertical;
 - 4) Terminal block as permanent wiring assembly.
 - b. Design features
 - 1) Data integrity; the user program is the most important
 - 2) Parameter settings are stored in the internal EEPROM.
 - 3) Built-in DC 24V sensor/load power supply for the
 - 4) Direct connection of sensors and actuators;
 - 5) On-board digital input/outputs (CPU with 12 inputs and 12 outputs)
 - 6) Interrupt points;
 - 7) High-speed counters;
 - 8) Easy expandability;
 - 9) 2 high-frequency pulse outputs;
 - 10) EEPROM 16K memory sub-module with real time clock.
 - 11) Battery module for long-term back up.
 - 12) Embedded web page for remote access and monitoring.
 - c. Functions
 - 1) Fast instruction execution; Instruction execution times of ms or 0.8
 - 2) Extensive instruction set; A large variety of basic operations such as binary logic, result assignment, save, count, time generation, load, transfer, compare, shift, rotate, complement generation, call subroutines, integrated communications instructions and other user-friendly functions such as pulse duration modulation, pulse train function, arithmetic functions, floating-point arithmetic, PID closed-loop control, jump

- functions, loop functions and code conversions serve to simplify programming.
 - 3) Counting;
 - 4) Interrupt handling;
 - 5) Edge-controlled interrupts
 - 6) Time-driven interrupts
 - 7) Counter interrupts
 - 8) Communications interrupts.
 - 9) Direct interrogation and driving of inputs and outputs;
 - 10) Password protection;
 - 11) Full access
 - 12) Read only
 - 13) Complete protection.
 - 14) Debugging and diagnostic functions.
 - 15) "Forcing" of inputs and outputs in debugging and diagnostic mode
- d. Communications: The built-in PPI (point-to-point interface) provides a range of communications features.
- 1. If the control panel drawings include remote communication, the avenue of connection through Ethernet through cat5 cable will be installed by contractor. The communications capabilities can range from PLC upload/download, to full HMI, VFD, and PLC monitoring and control.
22. Programming: The PLC shall be supplied with a fully functional program that shall perform basic operations including time clock settings and water level control functions.
1. HMI - Simatic HMI TP700 comfort, comfort panel, touch operation, 7" widescreen-TFT-display, 16 mil. colors, 800 x 480 pixels, profinet interface, MPI/Profibus DP interface, 12 mb user memory, Windows CE 6.0, configurable from wincc comfort v11. It shall come with a SMART SERVICE Licenses to allow for connection to a LAN that can be accessed remotely over private VPN tunnel. Siemens Model #6AV2124-0GC01-0AX0 or pre-approved equivalent.
- WIFI Module
- a. The eWON Flexy 200 Router allows OEMs and system integrators to link remote devices in an environment where communication technologies are constantly changing. The Flexy 200 is a data collection gateway without any routing functions between LAN, WAN and serial sides. The main applications with the Flexy 100 are data monitoring and data collection from remote field equipment components. Allows for connection to the device end regardless of the industrial protocol used: serial, MPI, Profibus, Ethernet, proprietary protocols
 - b. WiFi client for WAN access to Internet
 - c. WiFi Flexy extension card with WLAN access points that allow internet connectivity while avoiding connection on the factory/corporate LAN network. The eWON Flexy extension car provides a powerful backup internet access for industrial MM applications. WLAN technology offers free access, high band width, easy deployment (no cabling) and facilitates security network management

2. Synchronorm DMX512 programmable show Controller or pre-approved equivalent. With 2x16 segment LCD display, 6 keys, anemometer control, with all necessary switches and/or DMX to analog decoders.
 - a. Performance Features:
 - 1) Incoming Power: 15 to 24VDC
 - 2) Power Consumption: 8W
 - 3) Protocols: DMX512
 - 4) Ethernet: RJ45 connection
 - 5) Operating Temperatures: 0°C to 40°C
 - 6) Up to 4 Universes of DMX512
 - 7) Programmed: Dependence software
 - 8) Removable SD Card memory card data storage
 - b. Interface Features
 - 1) 2 DMX512-RDM channels
 - 2) 1024 music DMX-RDM channels
 - 3) 8 isolated digital inputs
 - 4) RJ45 socket for 10/100Base-TX Ethernet
 - 5) IEEE 802.3af PoE powered device
 - 6) 5-pin DIN socket for MIDI In
 - 7) 5-pin DIN socket for MIDI Out
3. Acclaim RDS 600 DMX512 signal splitter for RGB lights or pre-approved equivalent.
 - a. Performance Features:
 - 1) Operating Voltage 100-240VAC
 - 2) Operating Frequency: 50/60 Hz
 - 3) Power Consumption: .12A, 14.4W at 120VAC
 - 4) Number of DMX Inputs: 1
 - 5) Number of DMX Outputs: 6
 - 6) Number of DMX Thru Links: 1
 - 7) Protocols: RDM & DMX-512
 - 8) Operating Temperatures: -10°C to 50°C
 - 9) Fixture Connectors: 3 pin terminal blocks for RDM / DMX, Bare wire 3 conductor for AC input
 - 10) Warranty: 3 Year

2.2 INSTALLATION COMPONENTS

A. Piping Materials:

1. Unless architects specifications indicate otherwise, the suggested minimum piping and fitting standard recommended for this installation is Type 1.
2. All interconnecting piping and associated fittings, supplied by installing Contractor, shall be a minimum of Schedule 80 PVC, NSF-PW rated.

3. All welded PVC fittings above 6" diameter shall be fiberglass reinforced and used only on non-pressurized lines.
4. Use only clear PVC cleaner meeting NSF, UPC, and ASTM standards for cleaning and repairing PVC pipe and fitting surfaces for solvent cementing (IPS Corporation "Weld-On" Type C-65 or equivalent). Follow all directions and instructions appearing on product label.
5. Use only purple PVC primer meeting NSF, UPC, and ASTM #F-656 standards for softening and preparing field pipe and fitting surfaces for solvent cementing (IPS Corporation "Weld-On Type P-70 or equivalent). Follow all directions and instructions appearing on product label.
6. Use only clear or white, heavy bodied, medium setting PVC cement meeting NSF, UPC, and ASTM #D-2564 standards for solvent cementing PVC plastic pipe and fittings (IPS Corporation "Weld-On" Type 711 or equivalent). Follow all directions and instructions on product label.
7. Provide Link Seal for all penetrations in equipment room. All penetrations through outside walls to below grade shall be sealed per building specifications. Using "easy-link seals" is recommended
8. All piping penetrations through structure walls into open areas below pool structure must have the necessary allowances made for settlement.
9. Pipe hangers and supports per national plumbing code. All piping in open areas below the pools shall be installed free hanging from the ceiling in the level below with pipe hangers/per specifications and code
10. Reference requirements of other Project Manual Specifications for materials and items not specified herein.
11. Thrust Block for Piping Turns

B. Electrical Materials:

1. Rigid conduit shall be corrosion resistant and either galvanized steel or rigid PVC as specified in Part 3 Article "Basic Electrical Methods" herein. Submit Product Data and related specifications on materials to be used. All electrical conduit and conduit fittings between submersible light fixture niches, junction boxes and control panels will be U.L. listed rigid, nonmetallic, PVC NEMA, TC-2 max. 90°C, sunlight resistant for above and below ground use. All conduits shall be protected at all times from possible water ingress. Use only approved primer and PVS glue suitable for joining all PVC conduits and fittings per manufacturer's instructions.
2. All conductors shall be copper with insulation suitable for the particular wiring location as specified in Part 3.4 Article "Basic Electrical Methods" herein. Submit Product Data and related specifications on materials to be used underwater.
3. Reference requirements of other Project Manual Specifications for materials and items not specified herein.
4. All PVC conduit connections underground shall be SCH40 pressure fittings ((FE) male adaptors and couplings). Use color coded primer, pressure fitting PVC glue, and Teflon paste. The use of normal electrical PVC fittings is prohibited.

5. All connections in the pool/fountain shall be made with the assistance of a plumber, using Teflon paste or Teflon tape to eliminate all leaks. Use only tapered (NPT) stainless steel fittings and nipples. The use of galvanized, black, brass or steel piping is prohibited.
6. All conduit connections between dissimilar metals must be made with dielectric fittings, and sealed with dielectric thread compound to prevent galvanic degradation

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of existing elevations: Verify all joining elevations prior to laying pipe or setting pipe. Notify Fountain equipment manufacturer, Architect, and or Engineer of all discrepancies before proceeding with the construction of the fountain.
- B. Verification of Dimensions: Before proceeding with any work, the contractor shall check and verify all dimensions, sizes, and the like, and shall assume full responsibility for the fitting-in of all materials and equipment to the conditions on site if the Fountain equipment manufacturer, Architect, and or Engineer is not notified in writing and a resolution is not agreed upon.
- C. All conflicts relating to any penetration size, dimension, elevation, equipment location, or equipment size or dimension, shall be addressed and resolved with the manufacturer, Architect, and or Engineer of record before the contractor can proceed with the construction of any part of the fountain that may be or become affected by the confliction.
- D. Verify Utilities: Contractor shall verify with local authorities where the proper tie into sanitary or storm sewer for overflow and drain.
- E. Contractor shall verify matching voltage and phase of main power feed provided to serve the fountain equipment control panel and report all discrepancies in writing to the Fountain Manufacturer, Architect, and Engineer.

3.2 INSTALLATION

- A. All equipment furnished under this Section shall be installed in full conformity with the Contract Documents, engineering data, instructions, and recommendations of the manufacturer.
- B. Contractor shall obtain all necessary installation permits and inspections
- C. Installation of fountain equipment appurtenances shall confirm with provisions of Reference Standards and suit existing conditions on site as approved by Architect.

- D. Contractor shall insure that installation complies with all applicable national and local codes and project specifications.
- E. The incoming water supply line pressure must not exceed 50 PSI and is part of the building contract, not the fountain.
- F. Install horizontal piping 1' below freeze line.
- G. Excavation, Backfill, and Compaction:
 - 1. Excavating, trenching, and backfilling shall be as specified in the Contract Documents and as noted on the drawings and compaction done in a maximum of 6" lifts.
- H. All pools/splash pads shall be waterproofed by specified approved means.
- I. Prior to any finishing materials (I.E. lights, jets, coverplates) being installed, all pools shall be tested for leaks for a minimum of 72 hours and all waterproofing and tile work shall be completed.
- J. Refer to mechanical and electrical notes on drawing for further information.
- K. Contractor shall field verify all dimensions.
- L. Consult architectural, structural, mechanical, and electrical drawings for additional details not shown on these drawings.
- M. When applicable, all weirs shall be installed with an accuracy of "+" or "-1/16" over the entire weir length. Unless otherwise noted, refer to the architectural drawings for weir details.
- N. Contractor shall provide all concrete work as required by all mechanical and electrical fountain equipment requirements including, but not limited to, housekeeping pads, lock-down slabs, and thrust blocks where indicated.
- O. Contractor shall provide all utilities such as power supplies, water supplies, and sewer connections under the building contract up to the fountain controls, equipment and/or pool fittings where indicated.
- P. Contractor shall provide and is responsible for all elevation and X-Y coordinates relating to all fountain equipment including vaults, pool floors, and pumps.

3.3 BASIC PIPING METHODS

- A. The Contractor shall verify and confirm all piping layouts, locations, and dimensions shown in these drawings, and insure that the specified locations do not interfere with other equipment, architecture, or construction before installation. All piping shall be installed as shown and as otherwise specified to make a complete, workable, and neat system.

All piping shall be cut accurately from dimensions established at the Project site and allowances shall be made for clearance of other devices.

- B. All intraconnecting piping and associated fittings, supplied by system manufacturer, shall be a minimum of Schedule 80 PVC, NSF-PW rated. Interconnecting-intraconnecting interface points shall be slip fit, threaded or flanged
- C. All interconnecting piping and associated fittings, supports, and seals shall be per section 2.2 A.
- D. The Contractor shall not deviate from the pipe sizes shown herein unless prior written approval is obtained from the manufacturer and Architect. When a size is not indicated, the Contractor shall request the pipe size from the fountain manufacturer. In the event that interference with other equipment or architecture requires relocation of pipes or a layout different from that shown herein, the Contractor shall notify the fountain manufacturer immediately for reexamination of hydraulic parameters of the affected sections.
- E. Pipe and accessories shall be handled in such a manner to not cause damage. All cutting shall be done in a good workmanlike manner. Before installation, all piping and fittings shall be visually inspected for damage or defects. The interior of the pipe shall be clean during the laying operation. Pipe shall not be laid in water or in the trench when weather conditions are unsuitable for the work. Water shall be kept out of the trench until the pipe is installed. While work is in progress, open ends of the pipe and fittings shall be securely closed so that no trench water, earth, or other foreign matter will enter the piping system or fittings.
- F. Perform adequate trenching and backfill operations when installing PVC piping below grade. Trench width should be minimum of "pipe O.D. plus 12 inches" and deep enough to allow piping to be buried a minimum of 12" below the maximum expected frost penetration line to avoid freeze damage. Lay piping in horizontal, parallel, or perpendicular manner. Avoid vertical stacking of pipes. Space minimum of 3" apart on all parallel runs.
- G. Use only clean, free-flowing, non-expansive backfill material (naturally rounded ¾" pea gravel, 57 stone, or sand) and backfill in 6" lifts with adequate and complete compaction between lifts to 90% of maximum density per ASTM 1557-70. Compaction to excessive loads shall not be permitted. A second pressure test on the piping system must be made at this time to insure that piping has not been damaged during backfill operations.
- H. Concrete "thrust" blocking is recommended at all directional changes (tee's, elbows, etc.), reducer fittings and line terminations (bushings, end caps, plugs, etc.) in fountain display discharge piping 6" and larger.
- I. The bearing surface for the concrete thrust blocks, where possible, should be placed against undisturbed soil. Where it is not possible, the fill between bearing surface and undisturbed soil must be compacted to at least 90% standard proctor density. Thrust block shall be a concrete mix

not leaner than one part cement, two and one-half sand, and five parts stone. Contractor shall coordinate the location of the thrust block with other work and existing conditions. Work shall be performed in accordance with all applicable codes. For additional information, refer to NFPA 24.

- J. The sump pump in the equipment vault shall be connected as immediately as possible after secure placement and shall have a continuous power supply for the duration of the fountain system installation process.
- K. Pressure test all piping as specified in Part 3 Article "Field Quality Control" herein.
- L. Avoid laying suction piping in a manner that could result in a suction loop before, during, or after backfilling and compaction. Always pitch pipe in a downward direction to avoid a suction loop that will cause air to be permanently trapped, causing loss in performance of the piping system due to increased friction and work load demand.
- M. Piping in areas subject to freezing shall be installed at elevation of minimum 1 foot below frost line.
- N. Do not install any water lines above the control panel.
- O. Any and all costs associated with above are responsibility of installer.

3.4 BASIC ELECTRICAL METHODS

- A. The information supplied in the drawings specifies the general requirements of a complete functioning electrical power distribution and control system. The electrical subcontractor shall coordinate all electrical installation activities with the Construction Manager, Contractor, Architect, and (with respect to work Phase) other separate contractors performing work related to fountain installation.
- B. All electrical work shall comply with the latest edition of the National Electric Code (NEC), Section 680, published by the National Fire Protection Association; Quincy, Massachusetts. In the event of conflicting requirements between Contract Documents and any local electric code or other governing organizations for this location, the most stringent shall govern and take precedence. In this event, the Architect shall be notified immediately in writing of such conflict.
- C. The installation of electrical equipment and wiring in water can produce extreme hazards. It is the responsibility of the installing electrical contractor to consult and comply with all electrical codes and safety regulations prior to installation of electrical equipment. Local codes take precedence over the general notes where discrepancies of conflicts exist.
- D. All wiring and conduit shall be sized by the electrical sub-contractor in accordance with the latest edition of the NEC and all electrical codes and regulations. Where wiring and conduit sizes are specified herein, they shall be interpreted as minimum allowable sizes. All conductors

shall be copper with insulation suitable for the particular wiring location. Minimum acceptable insulation is type THWN or better, suitable for both dry and wet locations. Conductor insulation shall be moisture resistant, flame-retardant thermoplastic as approved by the NEC. Conductor sizing shall be based on an ambient temperature of 30°C and a conductor temperature rating of 75°C maximum per Article 310 of NEC. All underwater electrical cable shall either be encased in waterproof, sealed PVC conduit or shall be rated for continuous operation in underwater, marine environments.

- E. Contractor shall obtain all necessary installation permits and inspections.
- F. It is the responsibility of the installing electrical contractor to insure that all electrical equipment is installed and wired by a qualified, licensed electrician, experienced in fountain system wiring. Delta Fountains assumes no responsibility for liability whatsoever for installations not carried out by a qualified, licensed, electrician in accordance with our shop drawings, and all provisions of the latest edition of NEC in general, Article 680 specifically, and local safety regulations. All Delta Fountains electrical control panels include GFCI's when and where required, when furnished.
- G. It is the responsibility of the installing electrical contractor to verify all field dimensions critical to fountain equipment installation and performance and report any discrepancies to Delta Fountains and the engineer upon immediate notice.
- H. All conductors shall be run in rigid conduit sized for the number of wires contained within per NEC requirements. Rigid conduit shall be corrosion resistant and either galvanized steel or rigid PVC. When conduit is submerged or in other wet locations, rigid PVC shall be required. Conductor sizing shall be corrected for the number of wires to be run in a single conduit or raceway in accordance with NEC. All conduit locations and routing shall be approved by the Architect before installation.
- I. The work includes such necessary material and devices of a minor nature that may not be indicated on the drawings or mentioned in the specifications, but which are necessary for the compliance with codes and for the successful operation of the entire control system. The contractor shall be allowed no extra compensation because of this requirement.
- J. All GFCI protected circuits must have a separate neutral. All GFCI breakers have pigtails wired to a neutral bar. A Class 'A' ground fault circuit interrupter (GFCI) must be installed in each branch circuit supplying submersible or underwater fountain equipment. Equipment operating at 15 volts or less must be protected by suitable transformer U.L. Listed and marked for the application.
- K. Conduits are drawn for clarity and do not necessarily show exact routing. Contractor shall install conduits with as few changes in direction as jobsite conditions will allow.

- L. All electrical equipment must be properly bonded and grounded for safety, per the latest NEC and local code requirements. All bonding lugs shall be provided by installing electrical contractor. Installing contractor shall verify all necessary requirements of local inspector before installing, and notify Delta Fountains of any required deviations from specifications or plans or notes, and resolve all conflicts before installing equipment. Contractor to insure that all bonding codes are complied with for each metal pool equipment component.
- M. Submersible/underwater lighting fixtures must be installed for operation at 150 volts or less between conductors. Submersible pumps must operate at 300 volts or less between conductors.
- N. Submersible lighting fixtures must be installed with the top of the fixture lens a minimum of 2" below the normal operation water level and must have the lens adequately guarded to prevent contact by any person.
- O. All electrical equipment which depends on submersion for safe operation must be protected against overheating by an independent low water cutoff device if the water level drops below normal operating levels, or contain an internal Thermal Bimetallic Ambient compensating overload.
- P. Maximum length of exposed submersible cord in the fountain is limited to 9 feet. Cords extending beyond fountain perimeter must be enclosed in approved wiring enclosures.
- Q. All submersible lights and pumps must have sufficient cord length to allow removal from the water for re-lamping and normal maintenance. Fixtures can not be permanently embedded in the fountain structure so that the water level must be reduced or the fountain drained for re-lamping, maintenance, or inspection.
- R. Submersible equipment must be inherently stable or be securely fastened in place with non-corrosive fasteners suitable for the purpose.
- S. Underwater junction boxes must be filled with an approved re-enterable electrical potting compound (wax or paraffin is not acceptable) prior to filling pool and after all circuits have been checked to prevent the entry of moisture and must be firmly attached to supports or directly to the fountain surface and bonded as required. All conduit stubbed up through pool floor must be stainless steel. PVC, Red Brass, and Everdur are not acceptable as a conduit support stub for submersible junction boxes. All conduit entries must be completely sealed prior to potting to prevent compound from entering conduit system. After testing, junction boxes shall be sealed with scotch 3M re-enterable compound or other approved filling compound.
- T. All underwater junction boxes must be equipped with threaded conduit entries and compression type cord connectors for cord entry. Strain relief connectors serving niche-mounted underwater lights shall be capable of sealing both the fixture cord and an AWG #8 insulated bonding wire which may be required by some local codes.

- U. Pull correct quantity and size conductors, wired with separate ground, through conduit into junction box. Make all splices and connections tight and well insulated. Connect ground wire to ground lug in junction box, or other suitable grounding location.
- V. Insert each submersible cord through the brass cord seals provided on the junction box and tighten completely.
- W. Do not operate submersible lights or pumps more than ten seconds unless completely submerged or damage will result and warranty will be voided.
- X. The installing electrical contractor will verify that all electrical equipment grounds will have the same reference potential and will give evidence of such to Delta Fountains before any equipment is initially energized.
- Y. The installing contractor shall size all feed-wires leading to fountain control panel for no more than 2% voltage drop, and shall notify Delta Fountains before fabricating electrical control panel if wire is upsized such that extra large wire lugs are required. It is the responsibility of electrical contractor to provide any disconnect required by local code requirements.
- Z. The fountain control panel shall be adequately protected from debris and stored properly during construction and prior to initial operation and shall be vacuumed clean and all screws for terminal connections tightened.
- AA. The electrical contractor shall ensure that supply voltage is within 5% of design voltage when all equipment is in operation and shall re-tap transformer, up size wire, or supply a buck and boost transformer to get supply voltage to necessary level, if necessary.
- BB. Wires for water level sensors must be run in a separate conduit to the fountain control panel.
- CC. All conduit penetrations through structure walls into trade areas below the pool structure must have the necessary allowances made for settlement.
- DD. Floor mounted motor control centers and transformers for fountain related equipment shall be installed on a 4" concrete housekeeping pad in equipment room.
- EE. Contractor installing fountain manufacturer supplied deck boxes in concrete for fountain lighting is to ensure that all open conduit ports are plugged watertight prior to slab pour around deck boxes.
- FF. All penetrations through outside walls to below grade shall be sealed per building specifications. Using "easy-link-seals" is recommended.
- GG. Any and all costs associated with the above are the responsibility of installing contractor.

3.5 FIELD QUALITY CONTROL

A. Inspection and Testing, General: Labor, materials, instruments, and power for testing shall be furnished by the Contractor. All tests shall be performed to the satisfaction of the Owner, Architect, and such other parties that may have legal jurisdiction. Item or system to be tested shall not be closed up, buried, or covered until testing is completed and owner confirms approval. Prepare reports of testing activities and submit as specified.

1. Reference Division 1 Section 01400 "Quality Requirements" for related and additional provisions.

B. Piping Test:

1. Conduct piping tests before joints are covered and after thrust blocks have been hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water. Flush out all pipes with clean water prior to performing leak tests.
2. Do not include equipment in tests which could be damaged by high pressure.
3. Automatic water make-up systems shall be thoroughly tested and operative at the time of final observation.
4. Pressure testing requires that a prescribed period of curing / drying time be allowed in order to allow the PVC cement to properly cure and take a permanent set. The following table sets forth the minimum drying period before the required pressure tests. Note that the table applies only to weather temperatures ranging from 50° F. to 90°F. For drying times during temperatures that differ from this, consult the fountain manufacturer.

Piping Size	Curing Time
1.5" - 2.5"	8 hours
3" - 4"	18 hours
6" - 8"	24 hours
10" & higher	36 hours

5. A 24-hour static pressure test of 10 ft. above highest vacuum, drainage, or gravity pipe invert elevation shall be performed on all vacuum and or gravity pipe lines using water as the medium. All vacuum and gravity drain piping shall be tested with no loss of water, pressure, or noticeable leaks. All pressure testing shall include a visual check of each joint by the Contractor in the presence of Construction Manager, owner, authorized representative, and/or Architect.
6. The Contractor shall provide all pumps, pressure plugs, gauges, and other instruments and devices necessary to perform the hydrostatic pressure tests specified herein. Each complete discharge piping system shall be hydrostatically tested to a pressure of 150% of the system working pressure. For purposes of this test, system-working pressure shall be defined at 50 PSIG and the hydrostatic test shall be performed at 75 PSIG. Pressure test for at least 8 hours, at which time pressure shall

- remain constant, without additional pumping, pressure loss, or noticeable leaks. PSI is required on all pressure piping to include return inlets piping using water as the medium.
7. Pressure test all water piping prior to commencing backfill operations. Hydrostatic (water) testing shall be the only approved method. DO NOT PRESSURE TEST WITH COMPRESSED AIR as severe pipe damage and bodily injury can occur. Do not exceed the rated operational pressure of the piping and/or fittings carrying the lowest pressure rating. Locate and repair any leaks and retest prior to completion of backfill operations
 8. After the system has operated for one week, contractor and owner's representative shall inspect water make-up rates and agree that water usage is appropriate for a system of this type, are within local ordinances or codes, and that such rates are not indicative of excessive leakage from system. A water meter shall be placed on the fill line for this purpose, if necessary to document precise water usage.

C. Manufacturer's Field Services:

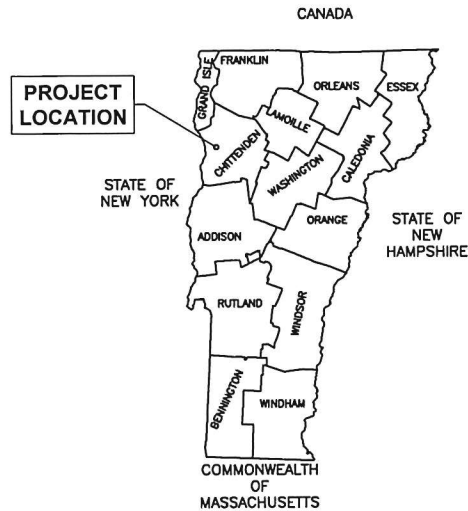
1. The fountain manufacturer shall be present for a minimum of 4 site coordination meetings, which includes the review of the plans and shop drawings with the mechanical, electrical, and structural disciplines. The fountain manufacturer must be available at the jobsite within a one week notice. The representative shall be a factory employee, not a local representative.

3.6 START UP AND ADJUSTMENTS

- A. Manufacturer shall be present for the initial start up of the fountain system.
- B. Contractor shall adjust fountain water system for volume and water flow characteristics to reflect design intent as approved by Architect.
- C. Contractor shall have the following conditions satisfied prior to departure of personnel from factory.
 1. All electrical connections shall be made and tested.
 2. All underwater lighting shall be lamped, installed and tested.
 3. Thoroughly test all fixtures, services, and all circuits for proper operating conditions and freedom from grounds and short circuits before acceptance is requested. All equipment, appliances, and devices shall be operated under load conditions
 4. All underwater junction boxes shall be wired and sealed with potting compound.
 5. Pump and filter motors shall be power tested to insure proper impeller rotation at specified voltage.
 6. Electronic water level control and/or low water cut-off control shall be installed and wired for operation.
 7. All hydraulic lines and fittings shall be pressure tested for leaks, repaired as necessary, and flushed clean. Basket strainers shall be checked and cleaned as required.

8. All nozzles, jets, manifolds, headers, and spray apparatus shall be installed properly and flushed of debris as required. Final nozzle adjustment for position and throttling to achieved specified performance for all display discharge points to be performed by installing contractor.
 9. Pump vaults, when supplied by manufacturer shall be thoroughly cleaned of debris, tested for electrical integrity and pressure tested for leaks.
 10. Chemical feed system, when supplied, shall be filled to proper level with required dosage of chemicals. (Manufacturer does not supply chemicals unless specifically listed in proposal).
 11. The fountain basin shall be thoroughly cleaned and filled to proper water level with clean, fresh water.
 12. Contractor shall make available to factory personnel a plumber and electrician who have first hand knowledge of the fountain installation, at contractors own expense.
 13. Contractor will perform any manual labor or provide any tools for adjustment and start-up.
- D. Contractor acknowledges the above requirements and understands that, should above requirements not be completed, factory personnel may immediately cancel visit and return to factory. In such case, Contractor shall be responsible for all costs and expenses incurred by manufacturer.
- 3.7 DEMONSTRATION
- A. Furnish complete on-site instructions and demonstration to owner in the operation, adjustment and maintenance of fountain system.

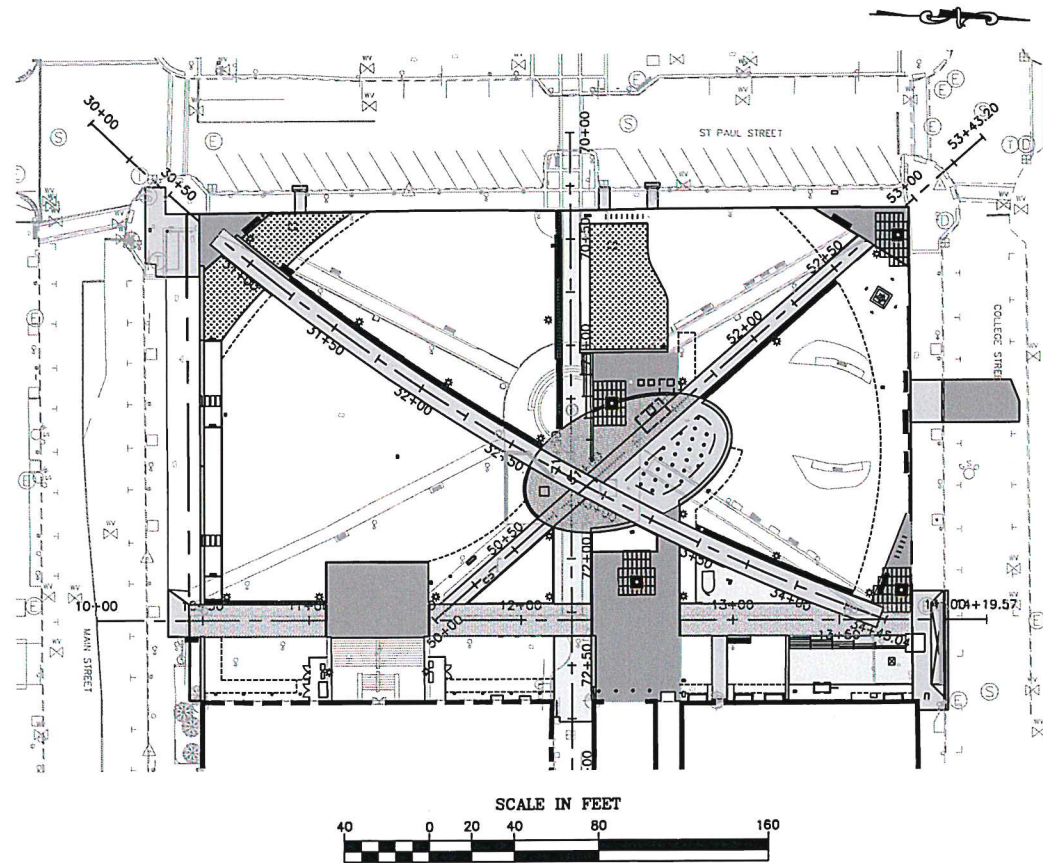
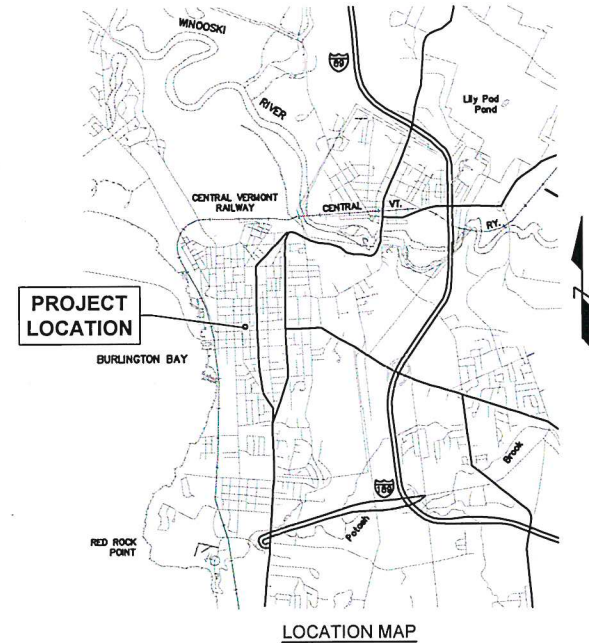
END OF SECTION



PROPOSED IMPROVEMENT CITY OF BURLINGTON COUNTY OF CHITTENDEN CITY HALL PARK

PROJECT LOCATION LOCATED ON THE EAST SIDE OF SAINT PAUL STREET, BETWEEN MAIN STREET AND COLLEGE STREET IN BURLINGTON, VERMONT.

PROJECT DESCRIPTION: WORK TO BE PERFORMED UNDER THIS CONTRACT INCLUDES THE DEMOLITION OF EXISTING SIDEWALK, ROADWAY, AND PARK FEATURES; THE CONSTRUCTION OF CONCRETE SIDEWALKS, SIDEWALKS WITH PAVERS, GRANITE CURBS, PARK LIGHTS, DRAINAGE IMPROVEMENTS, UNDERGROUND POWER AND COMMUNICATIONS, LANDSCAPING, FOUNTAIN INSTALLATION, WATER LINES, SEWER LINES, & IRRIGATION.



INDEX OF DRAWINGS	
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C003	PROJECT CONTROL SHEET
C004	EXISTING CONDITIONS PLAN
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L201	ENLARGEMENT LAYOUT & MATERIAL PLAN
L300	PLANTING PLAN
L301	SOIL AMENDMENT PLAN
L400	WALL SECTIONS & ELEVATIONS
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L402	STEPS & FENCE ELEVATIONS
L500	LANDSCAPE DETAILS
L501	LANDSCAPE DETAILS
L502	LANDSCAPE DETAILS
L503	PLANTING DETAILS & RAIN GARDEN SECTIONS
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C203	ENLARGED GRADING PLAN - SW
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C205	ENLARGED GRADING PLAN - Center
C206	ENLARGED GRADING PLAN - E
C207	ENLARGED GRADING PLAN - NW
C208	ENLARGED GRADING PLAN - NE
C209	STORMWATER PLAN & PROFILE
C210	BIORETENTION BASIN A & B PLAN & PROFILE
C211	BIORETENTION BASIN C PLAN & PROFILE
C212	WATER AND SANITARY SEWER PLAN
C213	EPSC PLAN
C214	IRRIGATION SITE PLAN
C501	CIVIL DETAILS
C502	STRUCTURAL DETAILS
C503	STORMWATER DETAILS
C504	STORMWATER DETAILS
C505	UTILITY DETAILS
C506	UTILITY DETAILS
C507	EPSC DETAILS
C508	EPSC DETAILS
C509	IRRIGATION DETAILS
C510	IRRIGATION DETAILS
C511	IRRIGATION NOTES
F1.00	DISCHARGE PIPING SCHEMATIC
F2.00	SUCTION PIPING SCHEMATIC
F3.00	ELECTRICAL SCHEMATIC
F3.10	POWER SUPPLY & BONDING DETAILS
F4.00	VAULT AND MECHANICAL DETAILS
F4.10	EQUIPMENT INSTALLATION DETAILS
F4.20	THRUST BLOCK DETAILS
F4.21	NOTES
LL100	LIGHTING SCHEDULE
LL101	LIGHTING LAYOUT
LL102	LIGHTING DETAIL 1 OF 5
LL103	LIGHTING DETAIL 2 OF 5
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LL107	LIGHTING CONTROL
E201	ELECTRICAL & COMMUNICATIONS PLAN
E202	EVENT POWER AND COMMUNICATIONS PLAN
E501	ELECTRICAL & COMMUNICATIONS DETAILS
E502	ELECTRICAL & COMMUNICATIONS DETAILS
E503	PANEL SCHEDULE & ELECTRICAL ONE-LINE DIAGRAM
YC100	TRAFFIC CONTROL NOTES
YC101	TRAFFIC CONTROL PLAN PHASE 2A
YC102	TRAFFIC CONTROL PLAN PHASE 2B
PH101	CONSTRUCTION PHASING

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE VTRANS STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2018, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION APRIL, 2018, FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS ARE INCORPORATED IN THESE PLANS.

SURVEYED BY: DUBOIS & KING, INC. 2016-17

DATUM
VERTICAL : NAVD 86 (GEOID 12A)
HORIZONTAL : NAD 83 (2011) EPOCH 2010.0

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PROFESSIONAL SEAL
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NO.	DATE	DESCRIPTION	BY	CHKD
1	12-28-18	100% CD SUBMITTAL	MAM	LDC
2	12-28-18	85% CD SUBMITTAL	MAM	LDC
3	11-07-18	DESCRIPTION	MAM	LDC

PROJECT TITLE
BURLINGTON
GREAT STREETS
CITY HALL PARK

SHEET TITLE
TITLE SHEET

DESIGNED BY DATE
MAM 12/28/2018
CHECKED BY PROJECT #
LDC 623263L3

SHEET NUMBER
G100

GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH THE VERMONT AGENCY OF TRANSPORTATION'S (VTTRANS) STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2018 EDITION, LATEST REVISIONS; VTTRANS' STANDARD DRAWINGS FOR CONSTRUCTION.
2. DISRUPTION OF ANY EXISTING UTILITY SERVICE (PRIVATE OR PUBLIC) WITHOUT WRITTEN AUTHORIZATION FROM THE CITY OF BURLINGTON AND/OR UTILITY COMPANY IS NOT ALLOWED.
3. SURFACE FEATURES SUCH AS SIGNS, FENCES, MAIL BOXES, PROPERTY CORNER MARKERS, ETC., ENCOUNTERED IN THE CONSTRUCTION OF THE PROJECT SHALL BE TAKEN DOWN, STORED AND RESET UNLESS OTHERWISE NOTED ON THE PLANS. THE COST OF REMOVING AND RESETING ITEMS SHALL BE INCIDENTAL TO THE CONTRACT.
4. ALL UTILITY POLES ARE TO REMAIN UNDISTURBED UNLESS OTHERWISE NOTED IN THESE PLANS. REMOVAL OF UTILITY POLES WILL BE DONE BY OTHERS.
5. SUBSURFACE FEATURES SUCH AS ELECTRIC AND COMMUNICATION LINES, WATER LINES, SEWER LINES, STORM DRAIN AND CULVERTS, ETC., ENCOUNTERED IN THE CONSTRUCTION OF THE PROJECT SHALL BE PROTECTED, SUPPORTED, OR REMOVED AND REPLACED UNLESS OTHERWISE NOTED ON THE PLANS. WATER VALVE BOXES, GAS VALVE BOXES, AND SERVICE BOXES SHALL BE ADJUSTED TO FINAL GRADE. NOTIFY THE UTILITY COMPANIES AND/OR HIGHWAY DEPARTMENTS WHEN THE WORK INVOLVES THEIR RESPECTIVE FACILITIES.
6. CONTACT THE CITY OF BURLINGTON WATER AND SEWER DEPARTMENT, THE CITY OF BURLINGTON EXCAVATION INSPECTOR, "DIG SAFE" [1-888-DIG-SAFE (1-888-344-7233)] AND ALL AFFECTED UTILITY COMPANIES PRIOR TO PERFORMING ANY EXCAVATION, IN ACCORDANCE WITH DIG SAFE'S RULES OF NOTIFICATION. THE COST OF COORDINATING WITH DIG SAFE AND THE UTILITY COMPANIES SHALL BE INCIDENTAL TO ITEM 635.11, "MOBILIZATION/DEMObILIZATION".
7. ANY SURFACE OR SUBSURFACE FEATURES DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO A CONDITION AT LEAST EQUAL TO THAT IN WHICH THEY WERE FOUND IMMEDIATELY PRIOR TO THE BEGINNING OF CONSTRUCTION. ALL COSTS ASSOCIATED WITH THE RESTORATION SHALL BE AT THE CONTRACTORS SOLE EXPENSE.
8. TOPOGRAPHIC SURVEY WAS PERFORMED BY DOUBOIS & KING, INC., COMPLETED IN FEBRUARY, 2017.
9. REFERENCES:
 - 9.1. "IMPROVEMENTS TO CITY HALL PARK SITE PLAN - C2" DATED 8/14/92, BY CHAMPLAIN CONSULTING ENGINEERS.
 - 9.2. "MANHOLE INVENTORY SHEETS" BY FARNSWORTH & ASSOCIATED, DATED 8/20/80.
 - 9.3. MAIN AND ST. PAUL INFRASTRUCTURE SHEETS FROM CITY FOR STREET LIGHT UNDERGROUND ELECTRIC.
 - 9.4. AUTOCAD DRAWING PROVIDED BY THE CITY DEPICTING EXISTING UNDERGROUND UTILITIES.
10. PRIOR TO CONSTRUCTION, COORDINATE WITH RESIDENT ENGINEER AND SURVEYOR TO OBTAIN DATA FOR LAYOUT INCLUDING BASELINE, HORIZONTAL AND VERTICAL CONTROL, AND BENCHMARKS ESTABLISHED DURING 2017 TOPOGRAPHIC SURVEY. COST TO LAYOUT, MAINTAIN, AND/OR RE-ESTABLISH CONTROL DISTURBED DURING CONSTRUCTION SHALL BE CONSIDERED INCIDENTAL TO ITEM 635.11, "MOBILIZATION/DEMObILIZATION".
11. PERFORM FIELD MEASUREMENTS OF ALL EXISTING CONDITIONS AFFECTING THE WORK. ANY DISCREPANCIES IN DIMENSIONS, CHARACTER OR EXTENT OF EXISTING FEATURES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE ADVANCING THE WORK. SHOP DRAWINGS REQUIRED FOR VARIOUS ITEMS OF THE WORK SHALL INDICATE THE ACTUAL FIELD MEASUREMENTS PRIOR TO SUBMITTAL FOR THE ENGINEER'S APPROVAL AND SHALL BE SO NOTED.
12. ALL DIMENSIONS ARE HORIZONTAL AND VERTICAL, AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE.
13. RESTORATION OF DISTURBED AREAS: RESTORE DISTURBED AREAS WITH 4" OF TOPSOIL, SEED AND MULCH, UNLESS OTHERWISE NOTED IN LANDSCAPE ARCHITECTURE PLANS OR IF THE RESIDENT ENGINEER DIRECTS THE USE OF SUITABLE EXCAVATED MATERIAL.
14. AN ON-SITE PRE-CONSTRUCTION MEETING SHALL BE HELD PRIOR TO ANY CONSTRUCTION ACTIVITY WITH THE CONTRACTOR, RESIDENT ENGINEER, CITY MANAGER AND OTHER CITY DEPARTMENTS.
15. THIS PROJECT SHALL BE CONSTRUCTED IN COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT.
16. ALL SIGNAGE AND STRIPING SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) 2009 EDITION AND ITS LATEST REVISIONS.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING AND UNDERSTANDING ALL APPLICABLE ENVIRONMENTAL PERMITS AND ENSURE THAT ALL CONSTRUCTION REQUIREMENTS ARE MET.
18. ALL WOODY DEBRIS (TREE LIMBS, BRANCHES) SHALL BE CHIPPED AND MULCHED ON-SITE AND USED FOR TEMPORARY EROSION CONTROL TO THE MAXIMUM EXTENT.
19. SEE TRAFFIC CONTROL DRAWINGS FOR TRAFFIC CONTROL NOTES.
20. SEE EROSION PREVENTION AND SEDIMENT CONTROL DRAWINGS FOR EROSION CONTROL NOTES.
21. REMOVAL OF EXISTING SIDEWALK AND PAVEMENT SHALL BE INCLUDED IN ITEM 203.15 COMMON EXCAVATION.
22. WHERE CONNECTIONS TO EXISTING DRAINAGE OR SANITARY STRUCTURES ARE REQUIRED, CUT NEATLY WITHOUT PERCUSSION INTO THE EXISTING STRUCTURE. THE MAXIMUM SIZE OF THE OPENING SHALL NOT EXCEED THE PIPE'S OUTER DIAMETER PLUS 3 INCHES. CONNECT THE NEW PIPE AND SEAL AROUND IT WITH CEMENT MORTAR.
23. OBTAIN ALL CONSTRUCTION PERMITS INCLUDING BUILDING TRADES, EXCAVATION, STORMWATER, AND CERTIFICATE OF OCCUPANCY. WORK ASSOCIATED WITH OBTAINING PERMITS INCLUDE PERMIT FEES SHALL BE CONSIDERED INCIDENTAL TO ITEM 635.11 "MOBILIZATION/DEMObILIZATION".

VAOT STANDARDS:

STANDARD	DESCRIPTION	REVISION
B-5	SLOPE GRADING, EMBANKMENTS, MUCK	6-1-1994
B-71	STANDARD FOR RESIDENTIAL AND COMMERCIAL DRIVES	7-8-2005
C-2A	PORTLAND CEMENT CONCRETE SIDEWALK DRIVE ENTRANCES WITH SIDEWALK ADJACENT TO CURB	10-14-2005
C-2B	PORTLAND CEMENT CONCRETE SIDEWALK DRIVE ENTRANCES WITH SIDEWALK AND GREEN STRIP	10-14-2005
C-3A	SIDEWALK RAMPS	3-10-2008
C-3B	SIDEWALK RAMPS AND MEDIAN ISLANDS	3-10-2008
C-10	CURBING	2-11-2008
D-4	VARIOUS DRAINAGE DETAILS	8-13-2007
D-11	STEEL OR IRON GRATES& COVERS (TYPE A)	6-1-1994
D-13	CONCRETE CATCH BASIN	1-3-2000
D-15	PRECAST REINF. CONC. MH-GRATES, CAST IRON GRATE WITH FRAME, TYPE D & E	6-1-1994
D-16	DRAINAGE DETAILS, INCLUDING DROP INLETS, IRON GRATE TYPE B&C, CONC END SECTIONS, ETC.	6-1-1994
D-22	SANITARY SEWER SYSTEMS	3-10-1995
E-121	STANDARD SIGN PLACEMENT - CONVENTIONAL ROAD	8-8-1995
E-161	W-SHAPED STEEL SIGN POST	8-18-1995
E-163	TUBULAR STEEL SIGN POST	3-10-2017
E-173	PULL BOXES AND JUNCTION BOXES	8-9-1995
E-191	PAVEMENT MARKING DETAILS	2-1-1999
E-192	PAVEMENT MARKING DETAILS	10-12-2000
E-193	PAVEMENT MARKING DETAILS	8-18-1995
T-1	TRAFFIC CONTROL GENERAL NOTES	4-25-2016
T-2	TRAFFIC SIGNS GENERAL NOTES	4-25-2016
T-10	CONVENTIONS ROADS CONSTRUCTION APPROACH SIGNING	8-6-2012
T-17	TRAFFIC CONTROL MISCELLANEOUS DETAILS	8-6-2012
T-28	CONSTRUCTION SIGN DETAILS	8-6-2012
T-29	CONSTRUCTION SIGN DETAILS	8-6-2012
T-30	CONSTRUCTION SIGN DETAILS	8-6-2012
T-31	CONSTRUCTION SIGN DETAILS	8-6-2012
T-33	MISCELLANEOUS SIGN DETAILS	8-6-2012
T-56	STANDARD SIGN PLACEMENT	10-26-2015
T-133	LIGHT POLE FOUNDATION DETAILS	7-25-2016



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CONSTRUCTION

[illegible]

PROJECT TITL

BURLINGTON
GREAT STREETS
CITY HALL PARK

SHEET TITLE

CIVIL NOTES &
VTRANS STANDARD
DRAWING INDEX

DRN/DSGN BY	DATE 12/28/2018
CHECKED BY LDC	PROJECT # 623263L3

SHEET NUMBER

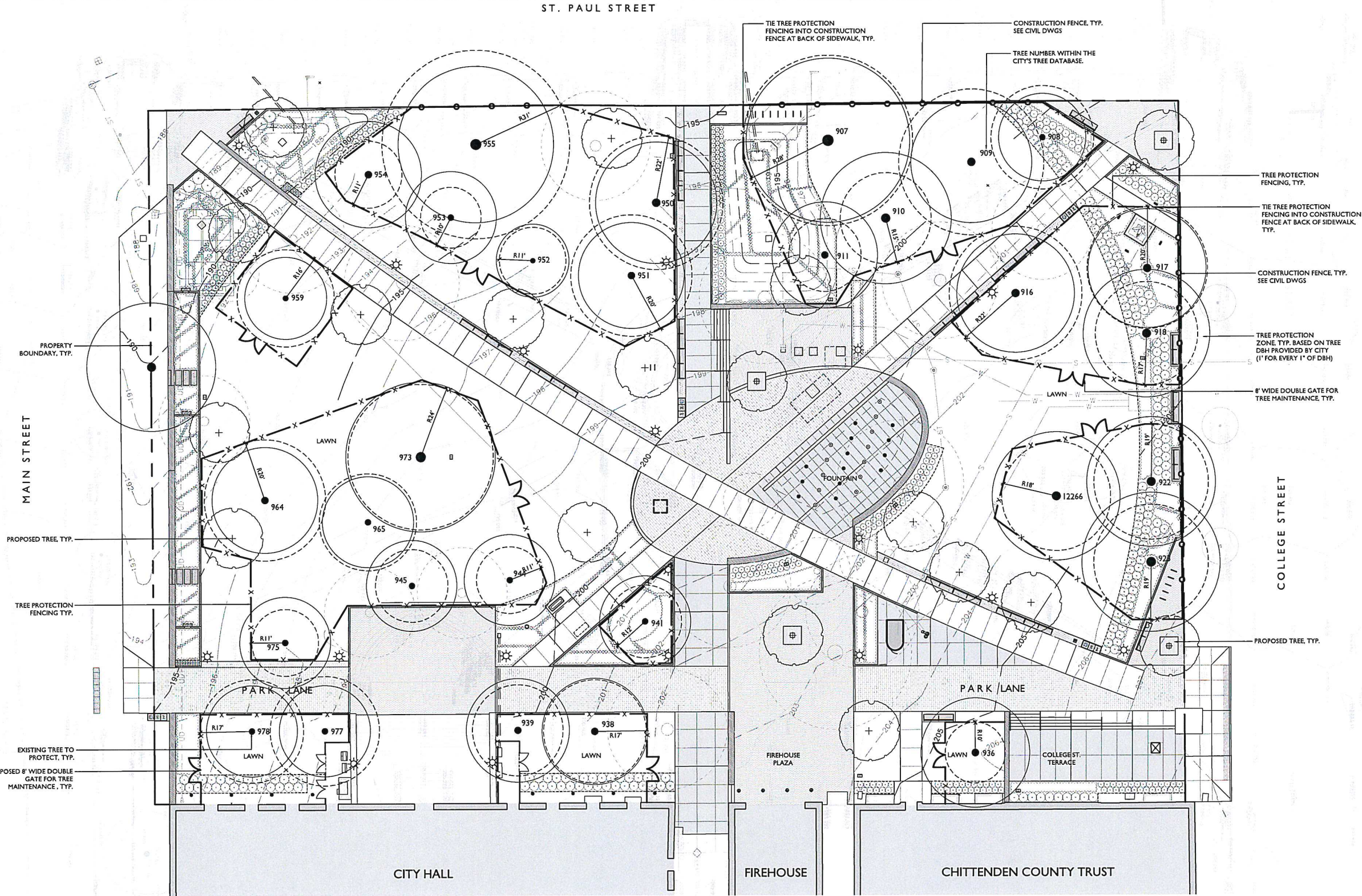
C001

648 Burlington Grant Streets\WHA\CAD\Sheets\CD\100 Tree Protection Plan.dwg 12/21/2018 4:12 PM

TREE PROTECTION NOTES

- Proposed methods, and schedule for effecting tree and plant protection shall be submitted for approval.
- Proposed methods, materials, and schedule for root pruning, construction pruning, and tree fertilization shall be submitted for approval.
- All existing trees shall be protected. Any damages by construction operations shall result in a fine to the Contractor. Liquid damages shall be based on the tree value specified by the City's Tree Value Inventory.
- Damages to trees, shrubs, and other vegetation will be assessed by the Architect and Owner in accordance with the International Society of Arboriculture (ISA) Guide.
- Trees or roots visibly damaged will cause the Owner to withhold from the Contractor an assessed amount conforming to the requirements stipulated above for a period of two years. After that period the impact of the damaged to any tree will be assessed accordingly.
- Designated areas of tree protection are to remain untouched and unharmed.
- Clearly mark all clearing limits in the field and accompany Architect on a joint review of clearing limits before clearing operations have commenced. Limit of clearing is generally defined as the limit of grading.
- Galvanized chain link fencing. See Specifications.
- Prior to start of demolition work and clearing and grubbing operations, tree protection fencing shall be installed in accordance with the following:
 - Fencing shall be installed just outside of the Tree Protection Zones (TPZ) as indicated

- Where construction will be in close proximity to existing trees designated to remain, the contractor shall use an air spade for grading around roots and suitable pruning shall be required as directed by the City Arborist and or Landscape Architect in the field.
- Suitable means for root pruning include, trenching, vibrating plow, and water jet pruning. Any method which tears roots or disturbs the soil beyond the grading limit is unacceptable.
- Trees to receive root pruning shall be reviewed by the City arborist for canopy pruning, fertilization and trench backfill recommendations.
- Selective clearing within tree protection areas shall only be performed when and as directed by the City Arborist.
- Except as otherwise indicated or requested by Landscape Architect, temporary protection devices and facilities installed during course of the work shall be removed only after all work which may injure or damage trees and plants is completed.



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PROFESSIONAL SEAL

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NO.	DATE	DESCRIPTION	BY	CHKD
1	12-28-18	BID SET	AH	JH
2	12-12-18	100% CD SUBMITTAL	AH	JH
3	11-07-18	85% CD SUBMITTAL	AH	JH

PROJECT TITLE

BURLINGTON
GREAT STREETS
CITY HALL PARK

SHEET TITLE

TREE
PROTECTION
PLAN

DESIGNED BY DATE

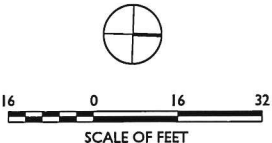
AH 12/28/2018

CHECKED BY PROJECT #

JH 648

SHEET NUMBER

L100



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6			JH	
7			AH	
8			JH	
9			AH	
10			JH	
11			AH	
12			JH	
13			AH	
14			JH	
15			AH	
16			JH	
17			AH	
18			JH	
19			AH	
20			JH	

PROJECT TITLE

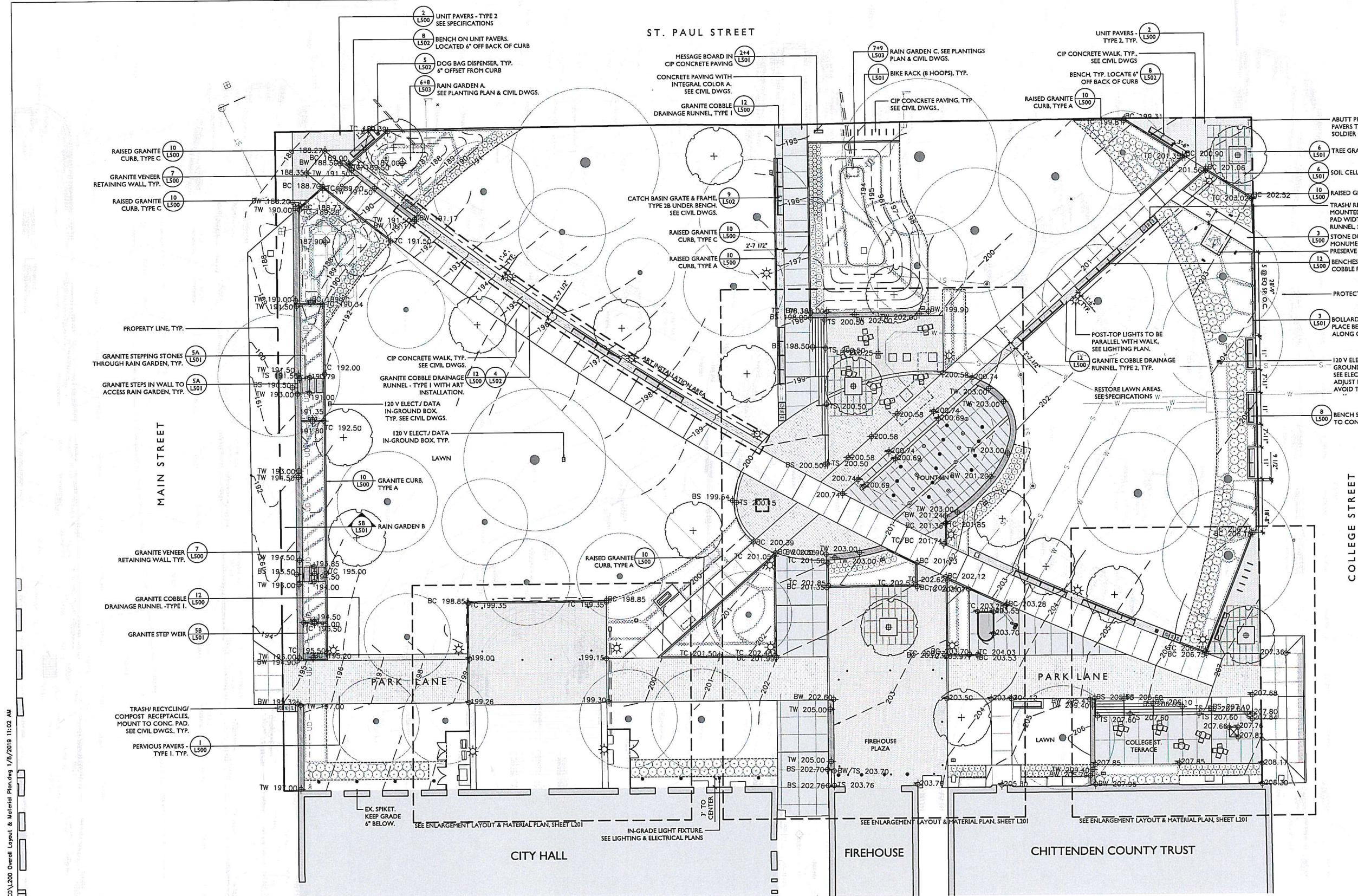
BURLINGTON GREAT STREETS CITY HALL PARK

SHEET TITLE

OVERALL LAYOUT & MATERIAL PLAN

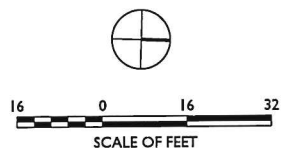
DESIGNED BY	DATE
AH	12/28/2018
CHECKED BY	PROJECT #
JH	648
SHEET NUMBER	

L200



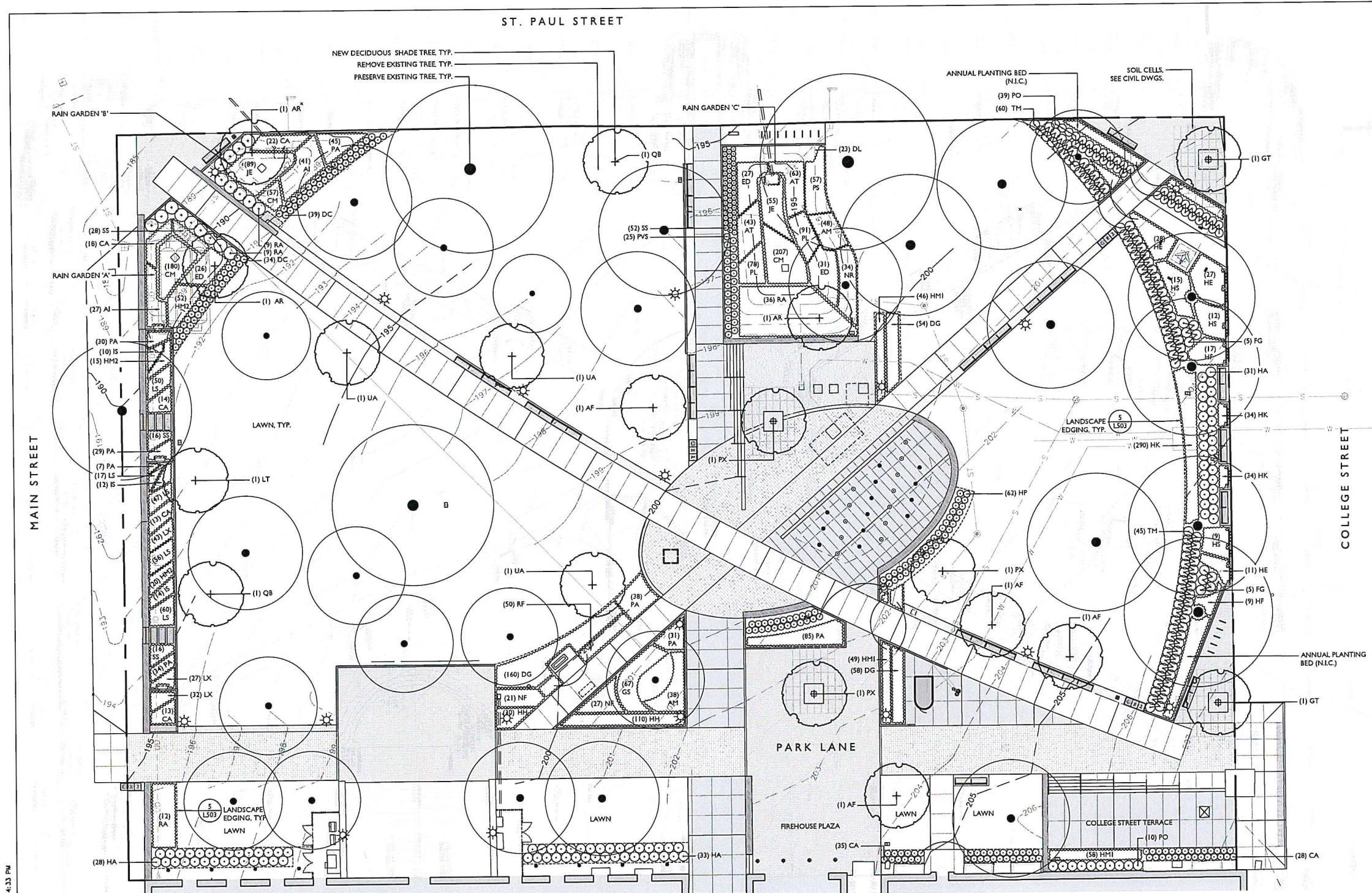
GENERAL NOTES

- Contractor is responsible for all damage due to his operations inside and outside the contract limit line.
- Contractor is responsible for checking spot elevations and verifying proposed grades by providing grade stakes. Grades must be approved by Landscape Architect prior to proceeding.
- Contractor shall blend new work smoothly with existing grades at contract limit line and/or limit of construction line.
- Contractor to verify that subgrades are 6 inches below finished grade prior to spreading top soil for seeded areas.
- All walls shall have 2% cross pitch, and all step treads and wall caps shall have 1% cross pitch unless otherwise noted.
- Light fixture locations may be field adjusted with prior Landscape Architect approval.
- Walkway layout to be approved by Landscape Architect prior to construction.
- Site furniture and wall locations to be verified by Landscape Architect prior to installation.
- General Contractor is responsible for all erosion control measures during construction.
- It is the intent of this contract to avoid any disturbance to existing trees or shrubs on site other than those specifically designated for transplant or removal.
- All existing trees shall be protected. Any damages by construction operations shall result in a fine to the contractor. Liquidated damages shall be based on the tree value specified by the City's Tree Value Inventory. Shrubs shall be \$100 each.
- Base survey prepared by DuBois & King Inc. and Mapping in August 2016 with updates in 2017.



648 Burlington Great Streets\WHA\CA\Sheet\CD\200 Overall Layout & Material Plan.dwg 1/9/2019 11:02 AM

48 Burlington Great Streets WMA (CA) sheet L300 Planting Plan.dwg 12/21/2016 4:33 PM



PLANT SCHEDULE

KEY	QTY	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING
DECIDUOUS TREES (Supplied by City)					
AF	4	Acer x freemanii 'Celebration'	CELEBRATION MAPLE	3.5-4" CAL.	AS SHOWN
AR	3	Acer rubrum 'Redpointe'	RED MAPLE	3.5-4" CAL.	AS SHOWN
GT	2	Gleditsia triacanthos f. inermis 'Shademaster'	THORNLESS HONEYLOCUST	4.4-5" CAL.	AS SHOWN
PX	3	Platanus X Acerfolia 'Exclamation'	LONDON PLANETREE	4.4-5" CAL.	AS SHOWN
QB	2	Quercus bicolor	SWAMP WHITE OAK	4.4-5" CAL.	AS SHOWN
LT	1	Liriodendron tulipifera	TULIP TREE	4.5-5" CAL.	AS SHOWN
UA	3	Ulmus americana 'Accolade'	PRINCETON AMERICAN ELM	4.5-5" CAL.	AS SHOWN
SHRUBS					
TM	105	Taxus x media 'Tauntonii'	TAUNTON DWARF YEW	24"-30" B&B	30" O.C.
FG	10	Fothergilla gardenii	DWARF FORTHERGILLA	#3	3' O.C.
HA	92	Hydrangea arborescens 'NCHAI' 'Invincibelle Spirit II'	SMOOTH HYDRANGEA	#3	3' O.C.
HP	62	Hydrangea paniculata 'Little Quickfire'	DWARF QUICKFIRE HYDRANGEA	#3	2' O.C.
PO	49	Physocarpus opulifolius 'Little Devil'	LITTLE DEVIL NINEBARK	#3	30" O.C.
RA	12	Rhus aromatica 'Gro-Low'	FRAGRANT SUMAC	#3	4' O.C.

ORNAMENTAL GRASSES

CA	63	Calamagrostis x acutiflora 'Karl Foerster'	FEATHER REED GRASS	#2	18" O.C.
DG	272	Deschampsia cespitosa 'Goldau'	GOLD DEW TUFTED HAIR GRASS	#1	18" O.C.
			URBANISE FOREST GRASS	#1	12" O.C.

PERENNIALS

AM	38	Alchemilla mollis	LADY'S MANTLE	#1	2' O.C.
GS	67	Geranium sanguineum	BLOODY CRANBILL	#1	18" O.C.
HH	140	Hemerocallis 'Happy Returns'	DAYLILY	#1	16" O.C.
HM1	153	Hemerocallis 'Mix'	SHORT DAYLILY MIX	#1	18"-24" O.C.
HE	58	Hosta 'Elegans'	HOSTA	#2	30" O.C.
HF	36	Hosta fortunei 'Albo Marginata'	HOSTA	#2	30" O.C.
HS	36	Hosta 'Sum & Substance'	HOSTA	#2	3' O.C.
NF	48	Nepeta x exoniensis 'Walkers Low'	CATMINT	#1	2' O.C.
PA	154	Perovskia atriplicifolia 'Little Spire'	RUSSIAN SAGE	#1	18" O.C.
RF	50	Rudbeckia fulgida 'Goldsturm'	BLACK-EYED SUSAN	#1	18" O.C.

LAWN AREAS

Base Bid: hydroseed complying with VTrans 651.06(b)
Add Alt #2: Sod complying with VTrans 651.08

Hydroseed Seed Mix - Grounds Mixture by greenspace.
Tall Fescue: 30%, Falcon IV & 20%, Dallas
Kentucky Bluegrass: 20% Dura Kentucky Bluegrass
Perennial Ryegrass: 20% Metolus Perennial Ryegrass
Turf Type Tetra ploid Perennial Ryegrass: 10% Double Time

Sod (Add Alt) - Bluegrass/Fescue mix. Submit specifications

RAIN GARDENS A, B & C

AM	48	Alchemilla mollis	LADY'S MANTLE	#1	18" O.C.
AI	68	Asclepias incarnata	SWAMP MILKWEEED	#1	2' O.C.
AT	106	Athyrium filix-femina	LADY FERN	#1	18" O.C.
CA	80	Calamagrostis x acutiflora 'Karl Foerster'	FEATHER REED GRASS	#1	2' O.C.
CH	444	Carex muskingumensis 'oehme'	PALM SEDGE	#1	12" O.C.
DC	73	Deschampsia cespitosa	TUFTED HAIR GRASS	#1	18" O.C.
DL	23	Dierilla lonicera	BUSH HONEYSUCKLE	#3	30" O.C.
ED	84	Eutrochium dubium 'Little Joe'	JOE PEE WEEED	#1	2' O.C.
HM2	87	Hemerocallis mix 'Halcyon', Catherine Woodbury	DAYLILY	#1	18" O.C.
IS	36	Iris sibirica 'Butter & Sugar'	SIBERIAN IRIS	#1	18" O.C.
JE	144	Juncus effusus	COMMON RUSH	#1	18" O.C.
LX	102	Leucanthemum x superbum 'Snowcap'	SHASTA DAISY	#1	12" O.C.
LS	230	Liatris spicata 'Kobold'	BLAZING STAR	#1	12" O.C.
NR	34	Nepeta racemosa 'Walker's Low'	CATMINT	#1	2' O.C.
PA	145	Perovskia atriplicifolia 'Little Spire'	RUSSIAN SAGE	#1	12" O.C.
PL	169	Polygonatum odoratum 'Variegatum'	VARIEGATED SOLOMON'S SEAL	#1	12" O.C.
PS	57	Pulmonaria saccharata 'Mrs. Moon'	BETHLEHEM SAGE	#1	18" O.C.
PVS	25	Panicum virgatum 'Shenandoah'	SWITCH GRASS	#2	18" O.C.
RA	54	Rhus aromatica 'Gro-Low'	FRAGRANT SUMAC	#3	4' O.C.
SS	112	Schizachyrium scoparium	LITTLE BLUESTEM	#1	18" O.C.

PLANTING NOTES

- All plant material in the plant schedule shall be nursery grown in accordance with ANSI in accordance with Z.60.1 Standards for measurement of nursery stock.
- All plants purchased by the Contractor shall be guaranteed by the Contractor for a period of one year from date of receipt of Provisional Acceptance of the completed installation by the Owner.
- Replacement plantings will be required prior to Final Acceptance for any plants which are missing, not true to specifications, have died or are unhealthy or uncharacteristic of the species (due to excessive pruning, dieback or other reasons).
- All plant materials shall be selected and tagged at the nursery by Landscape Architect.
- The Landscape Architect's approval is required for any plant material substitutions.
- The Contractor is responsible for immediately notifying the Landscape Architect if any plant quantity discrepancies exist between the planting plan and the plant list.
- The Landscape Contractor shall have the General Contractor locate all underground utilities in areas to be landscaped prior to commencing any excavation. Adjustments to tree locations will be allowed where utility conflicts are clearly a problem and with prior site approval by Landscape Architect.
- All plant bed, shrub and tree location shall be staked in the field by Contractor for Landscape Architects approval prior to installation.
- Adjustments to plant beds shall be approved by Landscape Architect. General Contractor is responsible for all erosion control measures during construction.
- All disturbed areas are to be topsoiled and seeded or sodded, as indicated in the planting plan.
- Use available bark mulch, Hemlock, cedar or pine bark mulch shall consist of double-shredded hardwood mulch or approved equal. Contractor is responsible for providing samples of mulch to Landscape Architect. Mulch plant materials as shown on plan and details.
- It is the intent of this contract to avoid any disturbance to existing trees or shrubs on site other than those specifically designated for transplant or removal.
- All existing trees shall be protected. Any damages by construction operations will result in a fine to the contractor. These liquidated damages shall be based on the tree value specified by the City's Tree Value Inventory. Shrubs shall be \$100 each.
- During construction, and until the end of warranty period, existing trees that are showing signs of stress as determined by the Landscape Architect are to be deep root fertilized, two injections per caliper inch per tree at 18" - 24" depth with Peter's 20/20/20 fertilizer or Landscape Architect approved equal.
- Contractor is responsible for verifying and confirming all plant counts as supplied by the Landscape Architect with field conditions as constructed. Any discrepancies shall be reported to Landscape Architect for approval and direction.
- Prior to commencement of any construction, all existing trees to remain shall receive tree protection fence at outer edge of dripline whenever possible.
- For all plantings in Blotterton swales & basins top dress with compost.

TREE PROTECTION NOTES

- Proposed methods, and schedule for effecting tree and plant protection shall be submitted for approval.
- Proposed methods, materials, and schedule for root pruning, construction pruning, and tree fertilization shall be submitted for approval.
- All existing trees shall be protected. Any damage by construction operations shall result in a fine to the contractor. Liquid damages shall be based on the tree value specified by the City's Tree Value Inventory.
- A fine of \$1,000 will be levied against the Contractor for each incident of construction inside tree protection areas, that has not been approved by the client.
- Damages to trees, shrubs, and other vegetation will be assessed by the Architect and Owner in accordance with the International Society of Arboriculture (ISA) Guide.
- Trees or roots visibly damaged will cause the Owner to withhold from the Contractor an assessed amount conforming to the requirements stipulated above for a period of two years. After that period the impact of the damage to any tree will be assessed accordingly.
- If any trees or shrubs designated to be saved are damaged and replacement is required, a number and diameter of trees or shrubs of the same species and variety, as specified by the Owner and Architect, shall be furnished and planted by the Contractor. The total inch diameter of the replacement trees or shrubs shall equal the diameter of the tree or shrub to be replaced. The Contractor shall not be liable for any loss or damage which occurs while the Contractor is complying with instructions given by the Owner, Architect, or arborist working on the Project.
- The Contractor's attention is called to the fact that certain areas on the site exist as natural woodland spaces and are to remain as natural woodlands. Therefore, all construction operations must be performed in such a manner, which will preserve these existing natural environments as wood preserves.
- Designated areas of trees, understorey, and wildflowers are to remain untouched and unharmed.
- Clearly mark all clearing limits in the field and accompany Architect on a joint review of clearing limits before clearing operations have commenced. Limits of clearing is generally defined as the limit of grading.
- Galvanized chain link fencing, 4 feet high. Sakes for fencing shall be 8 feet galvanized steel posts, driven a minimum of 3 feet into the ground. Posts shall be spaced 10 feet on center maximum.
- Prior to start of demolition work and clearing and grubbing operations, tree protection fencing shall be installed in accordance with the following:
- Fencing shall be installed at the tree protection areas indicated on the Drawings.
- Fencing shall be installed a minimum of 15 feet beyond the drip line of the trees to be protected, unless otherwise approved by the Architect.
- Where construction will be in close proximity to existing trees designated to remain, roots shall be pruned. Proximity shall be as determined in the field by the Landscape Architect or Arborist.
- Suitable means for root pruning include trenching, vibrating plow, water jet pruning and air spading with compressed air. Any method which tears roots or disturbs the soil beyond the grading limit is unacceptable.
- Trees to receive root pruning shall be reviewed by an arborist for canopy pruning, fertilization and trench backfill recommendations.
- Selective clearing within tree protection areas shall only be performed when and as directed by the Landscape Architect.
- Except as otherwise indicated or requested by Landscape Architect, temporary protection devices and facilities installed during course of the work shall be removed only after all work which may injure or damage trees and plants is completed.



CLIENTS

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Burlington, VT 05401

Department of Public Works
645 Pine St.
Burlington, VT 05401

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PROFESSIONAL SEAL

NOT FOR
CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CHKD
1	12-28-18	BID SET	JH	
2	12-28-18	100% CD SUBMITTAL	JH	
3	11-07-18	85% CD SUBMITTAL	JH	

PROJECT TITLE

BURLINGTON
GREAT STREETS
CITY HALL PARK

SHEET TITLE

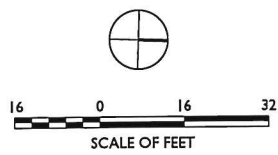
PLANTING PLAN

DESIGNED BY: AH DATE: 12/28/2018

CHECKED BY: JH PROJECT #: 648

SHEET NUMBER

L300



Leddy Park

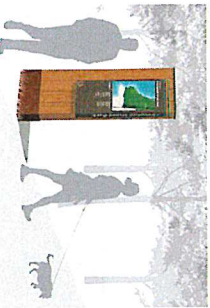
Welcome to Leddy Park



- ### Parks System
- | | |
|---|---------------------------------------|
| 1 Appletree Park | 20 Oakledge Park/Blanchard Beach |
| 2 Arns Park (Urban Wild) | 21 Perkins Pier |
| 3 Arthur Park (Urban Wild) | 22 Pomeoy Park |
| 4 Baird Park | 23 Potvin Park |
| 5 Battery Park | 24 Roosevelt Park |
| 6 Cahapan Park | 25 Roundhouse Park |
| 7 Champlain Park | 26 Schifflit Park |
| 8 City Hall Park | 27 Schmansk Park |
| 9 Crescent Woods (Urban Wild) | 28 Smalley Park |
| 10 Dewey Park | 29 Starr Farm Park |
| 11 Ethan Allen Park | 30 Urban Reserve |
| 12 Lakeside Park | 31 Waterfront Park |
| 13 Leddy Road Overlook | 32 The CORE & Champlain Senior Center |
| 14 Little Park | 33 Leddy Ice Arena |
| 15 McKenzie Park (Urban Wild) | 34 Skating Pier |
| 16 Mt. Calvary Red Maple Wetland (Urban Wild) | 35 Fishing Pier |
| 17 North Beach & Campground | 36 Community Boathouse |
| 18 Northshore Natural Area/City Beach | 37 Pine Street Office |



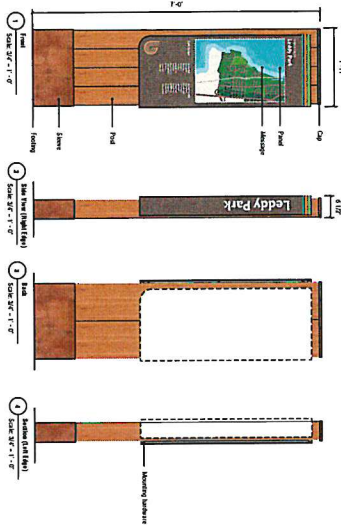
enjoyburlington.com



Map Kiosk
The map kiosk is a self-service information system that provides users with a large, interactive map of the city. It is designed to be user-friendly and easy to use, with a large screen and intuitive navigation controls. The kiosk is located in a central area of the city, making it easily accessible to visitors and residents alike. It provides a wealth of information, including maps, directions, and details about local attractions and events. The kiosk is a valuable tool for anyone visiting the city, providing a convenient way to explore and navigate the area.

MAP KIOSK

DESIGN INTENT ONLY - NOT FOR CONSTRUCTION

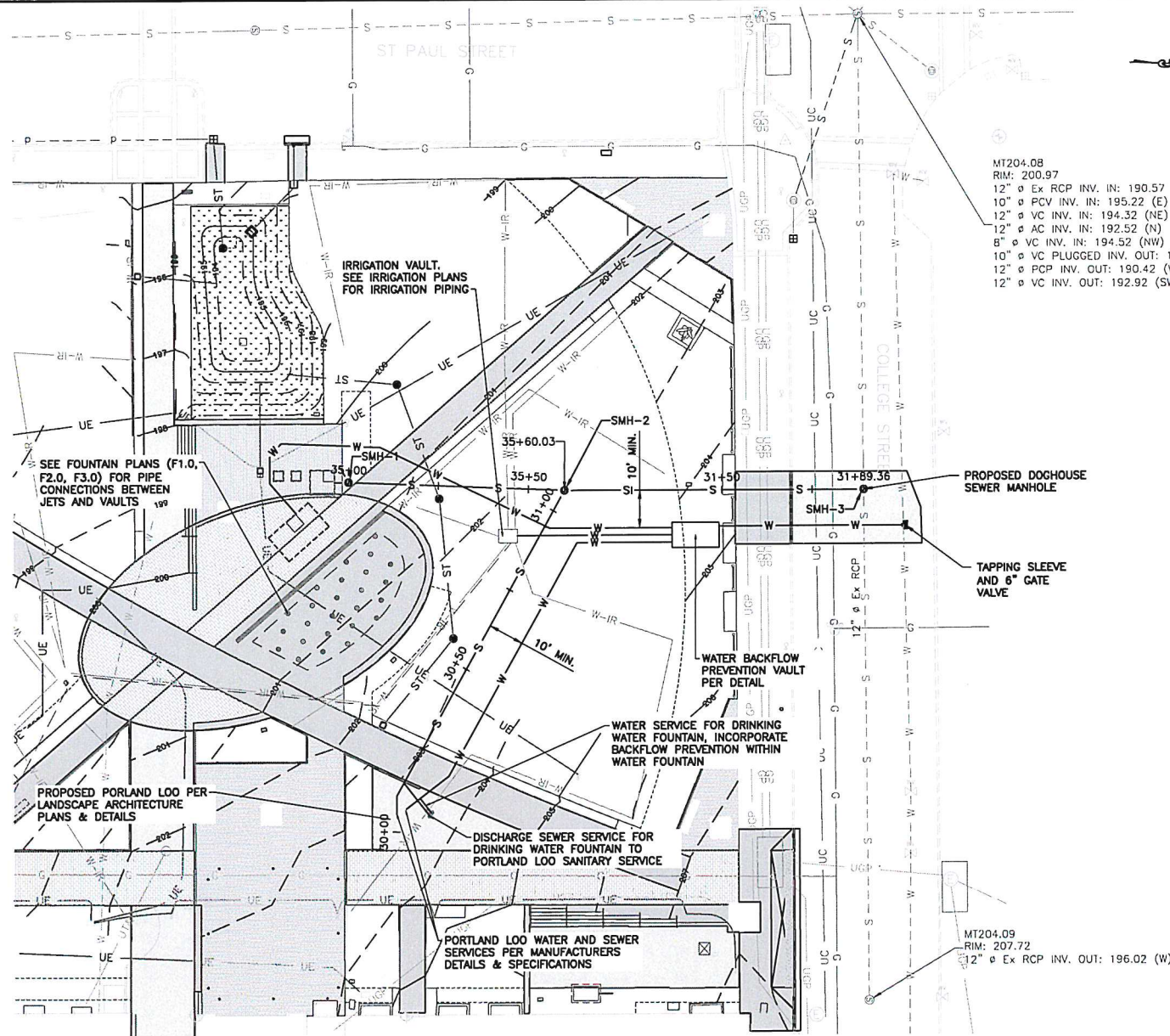


DRAFT



S A S A K I
Burlington, Vermont
45 Pine Street, Burlington, VT 05401
802.255.1234

ADJUST ELEVATION OF VALVE BOX (WSD)
ADJUST ELEVATION OF VALVE BOX (GAS)



NOTES:

- THIS PLAN WAS DEVELOPED USING THE FOLLOWING INFORMATION:
 - TOPOGRAPHIC SURVEY PERFORMED BY DUBOIS & KING, INC.
 - EXISTING STORMWATER, SEWER AND WATER DATA PROVIDED BY THE CITY OF BURLINGTON.
 - EXISTING GAS PROVIDED BY VERMONT GAS SYSTEMS, INC.
 - EXISTING POWER PROVIDED BY BURLINGTON ELECTRIC DEPARTMENT.
 - EXISTING TELECOMMUNICATIONS PROVIDED BY FAIRPOINT AND BURLINGTON TELECOM
- ALL WATER PIPE SHALL BE CLASS 52 DUCTILE IRON PIPE WITH A WORKING PRESSURE OF 250 PSI. ALL JOINTS TO BE RESTRAINED.
- ALL FITTINGS TO BE MECHANICAL JOINTS.
- ALL WATER PIPE SHALL BE INSTALLED WITH 6' MINIMUM COVER.
- CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO INSTALLATION & SHALL NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EXISTING UTILITIES & PROPOSED UTILITIES FROM THE DESIGN PLANS.
- TRANSFER TO NEW WATER SYSTEM SHALL BE PAID FOR UNDER ITEM 629.42 TRANSFER TO NEW SYSTEM, WATER SYSTEM. THIS LUMP SUM ITEM SHALL INCORPORATE THE TRANSFER FOR ALL WATER SERVICES SHOWN ON THIS SHEET.
- NOTIFY VT GAS 48-HOURS PRIOR TO EXCAVATION OF NEAR VT GAS LINE. SO VT GAS CAN BE ON SITE TO ASSIST WITH SUPPORTING/LOWERING/CASING EXISTING GAS MAIN, IF NECESSARY.
- PRIOR TO CASTING SMH-1, CONTRACTOR TO COORDINATE FOUNTAIN SANITARY REQUIREMENTS AND SHALL SUBMIT TO ENGINEER AND FOUNTAIN DESIGNER FOR APPROVAL. THERE WILL BE MULTIPLE SMALL DIAMETER INVERTS REQUIRED.



CLIENTS

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Burlington, VT 05401

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DESIGN TEAM

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904.886.9030

PROFESSIONAL SEAL

NOT FOR
CONSTRUCTION

NO.	DATE	DESCRIPTION	BY	CHKD
1	12-28-18	BID SET	MAM	LDC
2	12-12-18	100% CD SUBMITTAL	MAM	LDC
3	11-07-18	85% CD SUBMITTAL	MAM	LDC

PROJECT TITLE

BURLINGTON
GREAT STREETS
CITY HALL PARK

SHEET TITLE

WATER AND
SANITARY SEWER
PLAN

DESIGNED BY
MAM

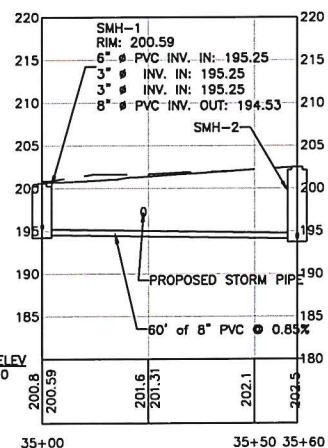
DATE
12/28/2018

CHECKED BY
LDC

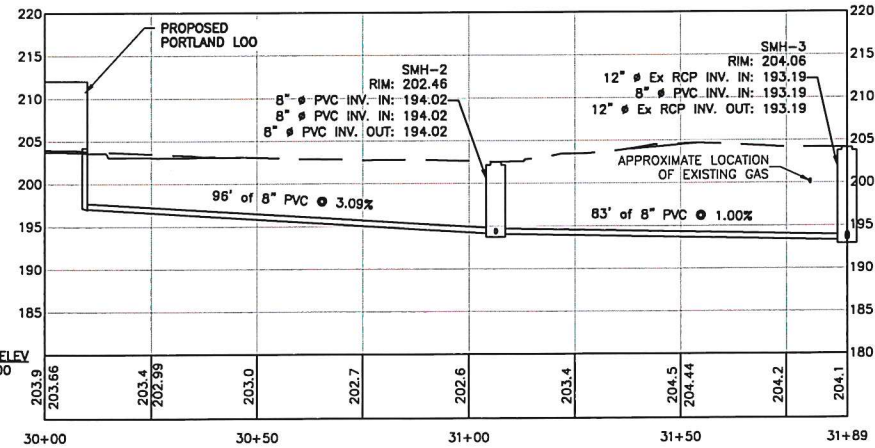
PROJECT #
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SHEET NUMBER

C212

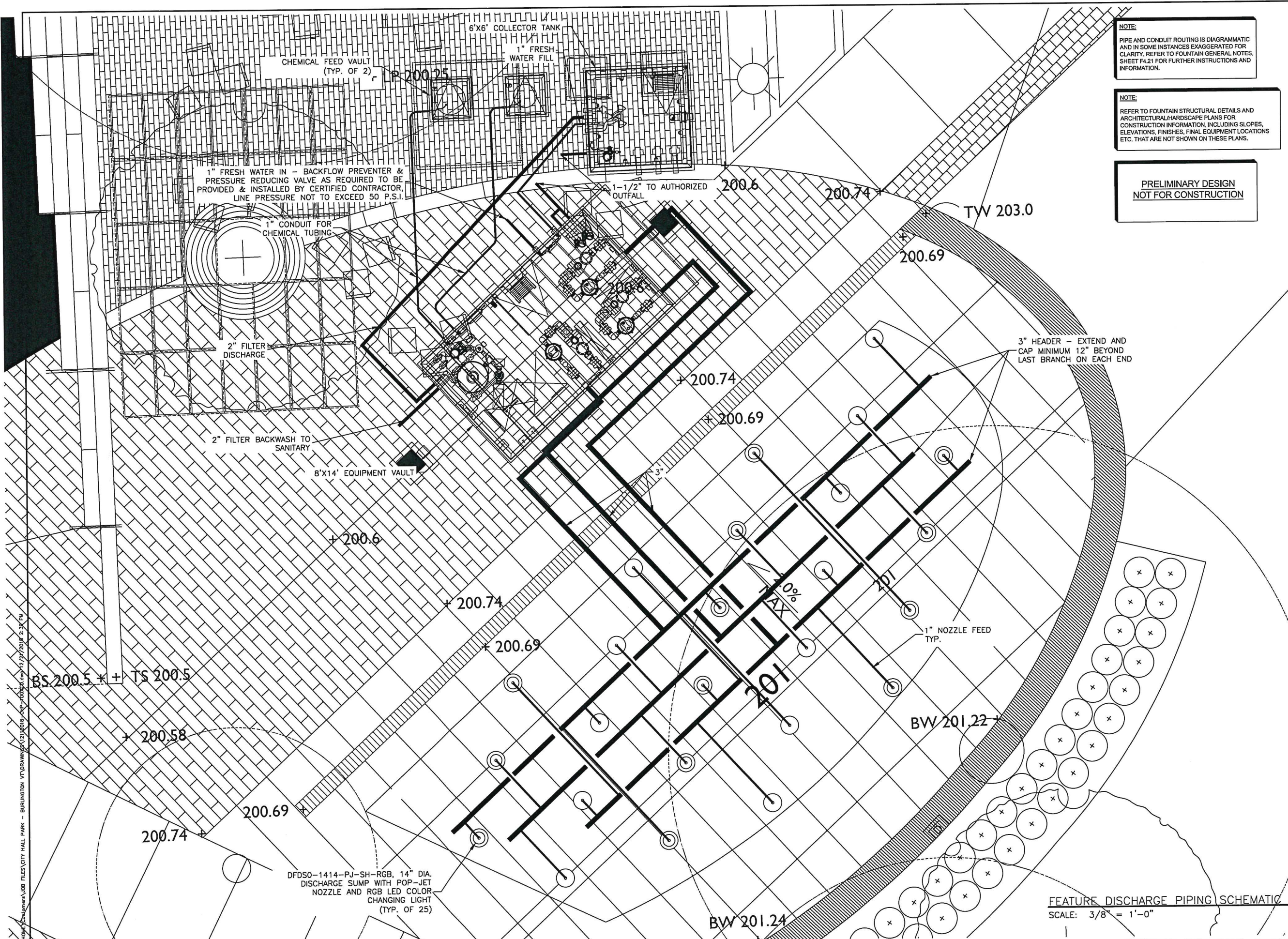


SANITARY PROFILE



SANITARY PROFILE

NOTES:
1. SEE IRRIGATION PLANS FOR
IRRIGATION PIPING



NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC
AND IN SOME INSTANCES EXAGGERATED FOR
CLARITY. REFER TO FOUNTAIN GENERAL NOTES,
SHEET F4.21 FOR FURTHER INSTRUCTIONS AND
INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND
ARCHITECTURAL/HARDSCAPE PLANS FOR
CONSTRUCTION INFORMATION, INCLUDING SLOPES,
ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS
ETC. THAT ARE NOT SHOWN ON THESE PLANS.

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

CLIENTS
Community & Economic
Development Office (CEDO)
149 Church St.
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Department of Public Works
645 Pine St.
Burlington, VT 05401

DESIGN TEAM

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PROFESSIONAL SEAL

**NOT FOR
CONSTRUCTION**

NO.	DATE	DESCRIPTION	BY	CHKD
12-28-18	12-12-18	BID SET	JH	
		100% CD SUBMITTAL	AH	
		85% CD SUBMITTAL	AH	

PROJECT TITLE
BURLINGTON
GREAT STREETS
CITY HALL PARK

SHEET TITLE
DISCHARGE PIPING
SCHEMATIC

DESIGNED BY: AH
CHECKED BY: JH
DATE: 12/28/2018
PROJECT #: 648

SHEET NUMBER
F1.00

FEATURE DISCHARGE PIPING SCHEMATIC
SCALE: 3/8" = 1'-0"

1. THE INSTALLATION OF ELECTRICAL EQUIPMENT AND WIRING IN WATER CAN PRODUCE EXTREME HAZARDS, IT IS THE RESPONSIBILITY OF THE INSTALLING ELECTRICAL CONTRACTOR TO CONSULT & COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE (NEC) PUBLISHED BY THE NATIONAL FIRE PROTECTION ASSOCIATION; QUINCY, MASSACHUSETTS AND SAFETY REGULATIONS PRIOR TO INSTALLATION OF ELECTRICAL EQUIPMENT. IN THE EVENT OF CONFLICTING REQUIREMENTS BETWEEN CONTRACT DOCUMENTS AND ANY LOCAL ELECTRIC CODE OR OTHER GOVERNING ORGANIZATION FOR THIS INSTALLATION, THE MOST STRINGENT SHALL GOVERN AND TAKE PRECEDENCE. IN THIS EVENT, THE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY IN WRITING OF SUCH CONFLICT.
2. IT IS THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL FIELD DIMENSIONS CRITICAL TO FOUNTAIN EQUIPMENT INSTALLATION AND PERFORMANCE AND REPORT ANY DISCREPANCIES, IN WRITING, TO DELTA FOUNTAINS AND THE ENGINEER UPON IMMEDIATE NOTICE.
3. IT IS THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO INSURE THAT ALL ELECTRICAL EQUIPMENT IS INSTALLED AND WIRED BY A QUALIFIED, LICENSED ELECTRICIAN EXPERIENCED IN FOUNTAIN SYSTEM WIRING. DELTA FOUNTAINS ASSUMES NO RESPONSIBILITY OR LIABILITY WHATSOEVER FOR INSTALLATIONS NOT CARRIED OUT BY A QUALIFIED, LICENSED, ELECTRICIAN AND IN ACCORDANCE WITH OUR SHOP DRAWINGS, AND ALL PROVISIONS OF THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE, ARTICLE 680 SPECIFICALLY AND LOCAL SAFETY REGULATIONS. ALL DELTA FOUNTAINS ELECTRICAL CONTROL PANELS INCLUDE GFCI'S WHEN AND WHERE REQUIRED, WHEN FURNISHED.
4. A CLASS 'A' GROUND FAULT CIRCUIT INTERRUPTER (GFCI) MUST BE INSTALLED IN EACH BRANCH CIRCUIT SUPPLYING SUBMERSIBLE OR UNDERWATER FOUNTAIN EQUIPMENT. EQUIPMENT OPERATING AT 15 VOLTS OR LESS MUST BE PROTECTED BY SUITABLE TRANSFORMER U.L. LISTED AND MARKED FOR THE APPLICATION.
5. SUBMERSIBLE/UNDERWATER LIGHTING FIXTURES MUST BE INSTALLED FOR OPERATION AT 150 VOLTS LESS BETWEEN CONDUCTORS. SUBMERSIBLE PUMPS MUST OPERATE AT 300 VOLTS OR LESS BETWEEN CONDUCTORS.
6. WET/DRY LIGHTING FIXTURES MUST BE INSTALLED WITH THE TOP OF THE FIXTURE LENS BELOW THE GRATE AND MUST HAVE THE LENS ADEQUATELY GUARDED TO PREVENT CONTACT BY ANY PERSON.
7. SUBMERSIBLE LIGHTING FIXTURES MUST BE INSTALLED WITH THE TOP OF THE FIXTURE LENS A MINIMUM OF 2' BELOW THE NORMAL OPERATION WATER LEVEL AND MUST HAVE THE LENS ADEQUATELY GUARDED TO PREVENT CONTACT BY ANY PERSON.
8. ALL ELECTRICAL EQUIPMENT WHICH DEPENDS ON SUBMERSION FOR SAFE OPERATION MUST BE PROTECTED AGAINST OVERHEATING BY AN INDEPENDENT LOW WATER CUTOFF DEVICE IF THE WATER LEVEL DROPS BELOW NORMAL OPERATING LEVELS, OR CONTAIN AN INTERNAL THERMAL BIMETALLIC AMBIENT COMPENSATING OVERLOAD.
9. MAXIMUM LENGTH OF EXPOSED CORD IN FOUNTAIN IS LIMITED TO 9'. NO ADDITIONAL CORD OR SPLICES OTHER THAN THOSE MADE IN A WATERPROOF JUNCTION BOX ARE TO BE MADE IN THE FOUNTAIN. CORDS EXTENDING BEYOND FOUNTAIN PERIMETER MUST BE ENCLOSED IN APPROVED WIRING ENCLOSURES.
10. ALL SUBMERSIBLE LIGHTS AND PUMPS MUST HAVE SUFFICIENT CORD LENGTH TO ALLOW REMOVAL FROM THE WATER FOR RE-LAMPING AND NORMAL MAINTENANCE. FIXTURES CANNOT BE PERMANENTLY IMBEDDED IN THE FOUNTAIN STRUCTURE SO THAT THE WATER LEVEL MUST BE REDUCED OR THE FOUNTAIN DRAINED FOR RE-LAMPING, MAINTENANCE, OR INSPECTION.
11. SUBMERSIBLE EQUIPMENT MUST BE INHERENTLY STABLE OR BE SECURELY FASTENED IN PLACE WITH NON-CORROSIVE FASTENERS SUITABLE FOR THE APPLICATION.
12. UNDERWATER JUNCTION BOXES MUST BE FILLED WITH AN APPROVED RE-ENTERABLE ELECTRICAL POTTING COMPOUND (WAX OR PARAFFIN IS NOT ACCEPTABLE) PRIOR TO FILLING FOUNTAIN AND, AFTER ALL CIRCUITS HAVE BEEN CHECKED, TO PREVENT THE ENTRY OF MOISTURE, AND BE FIRMLY ATTACHED TO SUPPORTS OR DIRECTLY TO THE FOUNTAIN SURFACE AND BONDED AS REQUIRED. ALL CONDUIT STUBBED UP THROUGH THE FOUNTAIN FLOOR MUST BE STAINLESS STEEL, PVC, RED BRASS, AND EVERDUR ARE NOT ACCEPTABLE AS A CONDUIT SUPPORT STUB FOR SUBMERSIBLE JUNCTION BOXES. ALL CONDUIT ENTRIES MUST BE COMPLETELY SEALED PRIOR TO POTTING TO PREVENT COMPOUND FROM ENTERING CONDUIT STUBS. AFTER POTTING, JUNCTION BOXES SHALL BE SEALED WITH SCOTCH 3M RE-ENTERABLE COMPOUND OR OTHER APPROVED FILLING COMPOUND. CONFIRM POTTING COMPOUND HAS CURED BEFORE INSTALLING LID ON JUNCTION/DECK BOXES.
13. ALL ELECTRICAL CONDUIT AND CONDUIT FITTINGS BETWEEN SUBMERSIBLE LIGHT FIXTURE NICHES, JUNCTION BOXES AND CONTROL PANELS WILL BE U.L. LISTED RIGID, NONMETALLIC, PVC NEMA, TC-2 MAX. 90°C, SUNLIGHT RESISTANT FOR ABOVE AND BELOW GROUND USE. ALL CONDUITS SHALL BE PROTECTED AT ALL TIMES FROM POSSIBLE WATER INGRESS. USE ONLY APPROVED PRIMER AND PVC GLUE SUITABLE FOR JOINING ALL PVC CONDUITS AND FITTINGS PER MANUFACTURER'S INSTRUCTIONS.
14. ALL UNDERWATER JUNCTION BOXES MUST BE EQUIPPED WITH THREADED CONDUIT ENTRIES AND COMPRESSION TYPE CORD CONNECTORS FOR CORD ENTRY. STRAIGHT RELAY CONNECTORS SERVING NICHE-MOUNTED UNDERWATER LIGHTS SHALL BE CAPABLE OF SEALING BOTH THE FIXTURE CORD AND AT AN MIN. #8 BARE BONDING WIRE WHICH MAY BE REQUIRED BY SOME LOCAL CODES.
15. ALL ELECTRICAL EQUIPMENT MUST BE PROPERLY BONDED AND GROUNDED FOR SAFETY, PER THE LATEST NEC AND LOCAL CODE REQUIREMENTS. ALL BONDING LUGS SHALL BE PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR. INSTALLING CONTRACTOR SHALL VERIFY ALL NECESSARY REQUIREMENTS OF LOCAL INSPECTOR BEFORE INSTALLING, AND NOTIFY DELTA FOUNTAINS OF ANY REQUIRED DEVIATIONS FROM SPECIFICATIONS OR PLANS AND NOTES, AND RESOLVE ALL CONFLICTS BEFORE INSTALLING EQUIPMENT. CONTRACTOR TO INSURE THAT ALL BONDING CODES ARE FOLLOWED.
16. ALL CONDUIT CONNECTIONS BETWEEN DISSIMILAR METALS MUST BE MADE WITH DIELECTRIC FITTINGS, AND SEALED WITH DIELECTRIC THREAD COMPOUND TO PREVENT GALVANIC DEGRADATION.
17. THE INSTALLING ELECTRICAL CONTRACTOR WILL VERIFY THAT ALL ELECTRICAL EQUIPMENT GROUNDS WILL HAVE THE SAME REFERENCE POTENTIAL AND WILL GIVE EVIDENCE OF SUCH TO DELTA FOUNTAINS BEFORE ANY EQUIPMENT IS INITIALLY ENERGIZED.
18. THE INSTALLING CONTRACTOR SHALL SIZE ALL FEED WIRES LEADING TO FOUNTAIN CONTROL PANEL, OR FOR NO MORE THAN 2% VOLTAGE DROP, AND SHALL VERIFY THAT THE SIZE OF THE CONTROL PANEL WIRING IS APPROPRIATE TO THE WIRE SIZE. THE TYPE OF WIRING IS THE BETTER AVAILABLE. IF REQUIRED, IT IS THE RESPONSIBILITY OF ELECTRICAL CONTRACTOR TO PROVIDE ANY DISCONNECT REQUIRED BY LOCAL CODE REQUIREMENTS.
19. THE FOUNTAIN CONTROL PANEL SHALL BE ADEQUATELY PROTECTED FROM DEBRIS AND STORED PROPERLY DURING CONSTRUCTION AND PRIOR TO INITIAL OPERATION AND SHALL BE VACUUMED CLEAN AND ALL SCREWS FOR TERMINAL CONNECTIONS TIGHTENED.
20. THE ELECTRICAL CONTRACTOR SHALL ENSURE THAT SUPPLY VOLTAGE IS WITHIN 5% OF DESIGN VOLTAGE WHEN ALL EQUIPMENT IS IN OPERATION AND THAT THERE IS NO VOLTAGE TRANSFORMER, UP SIZE WIRE, OR SUPPLY A BUCK AND BOOST TRANSFORMER TO GET SUPPLY VOLTAGE TO NECESSARY LEVEL, IF NECESSARY.
21. ANY AND ALL COSTS ASSOCIATED WITH THE ABOVE ARE THE RESPONSIBILITY OF INSTALLING CONTRACTOR.
22. CONDUITS ENTERING FOUNTAIN SYSTEM CONTROL PANELS SHALL BE INSTALLED INTO BOTTOM OF ENCLOSURE IN THE EVENT WATER ENTERS CONDUIT AND FLOWS INTO PANEL THROUGH CONDUIT OPENINGS. A DRAIN OPENING MUST BE MADE IN BOTTOM OF ENCLOSURE PAN TO ALLOW DRAINAGE OF WATER FROM ENCLOSURE IN THE EVENT OF WATER INGRESS. DO NOT MOUNT CONTROL PANEL WHERE IRRIGATION NOZZLES WILL SPRAY DIRECTLY AT PANEL.
23. PULL CORRECT QUANTITY AND SIZE WIRES WITH SEPARATE GROUND THROUGH CONDUIT INTO JUNCTION BOX. MAKE ALL SPLICES AND CONNECTIONS TIGHT AND WELL INSULATED. CONNECT GROUND WIRE TO GROUND LUGS IN JUNCTION BOX. ALL WIRING AND CONDUIT SHALL BE SIZED BY THE ELECTRICAL CONTRACTOR IN ACCORDANCE WITH THE LATEST EDITION OF THE NEC AND ALL ELECTRICAL CODES AND REGULATIONS. WHERE WIRE CONDUIT SIZES ARE SPECIFIED ON THE DRAWINGS, THEY SHALL BE INTERPRETED AS MINIMUM ALLOWABLE SIZES. ALL CONDUCTORS SHALL BE COPPER WITH INSULATION SUITABLE FOR THE APPLICATION AND LOCATION. ALL CONDUIT SHALL BE TYPE EMT OR TYPE RIGID PVC. TYPE EMT SHALL BE APPROVED BY THE NEC. CONDUCTOR SIZING SHALL BE BASED ON AN AMBIENT TEMPERATURE OF 30 DEGREES CELSIUS AND A CONDUCTOR TEMPERATURE RATING OF 75 DEGREES CELSIUS MAX. PER ARTICLE 310 OF THE NEC. ALL UNDERWATER ELECTRICAL CABLE SHALL EITHER BE ENCASED IN WATERPROOF, SEALED PVC CONDUIT OR SHALL BE RATED FOR CONTINUOUS OPERATION IN UNDERWATER, MARINE ENVIRONMENTS.
24. INSERT EACH SUBMERSIBLE CORD THROUGH THE BRASS CORD SEALS PROVIDED ON THE JUNCTION BOX, AND TIGHTEN COMPLETELY.
25. DO NOT OPERATE SUBMERSIBLE LIGHTS OR PUMPS MORE THAN 10 SECONDS UNLESS COMPLETELY SUBMERGED OR DAMAGE WILL RESULT AND WARRANTIES WILL BE VOIDED.
26. ALL CONDUCTORS FOR FEEDERS WHICH EXCEED 200 FEET IN LENGTH SHALL BE INCREASED 1 TRADE SIZE AND INCREASED AN ADDITIONAL 1 TRADE SIZE FOR EACH ADDITIONAL 100 FEET OF FEEDER CABLE LENGTH.
27. THE INFORMATION SUPPLIED IN THESE DRAWINGS SPECIFIES THE GENERAL REQUIREMENTS OF A COMPLETE FUNCTIONING ELECTRICAL POWER DISTRIBUTION AND CONTROL SYSTEM. THE ELECTRICAL SUBCONTRACTOR SHALL COORDINATE ALL ELECTRICAL INSTALLATION ACTIVITIES WITH THE CONSTRUCTION MANAGER, GENERAL CONTRACTOR, ARCHITECT AND (WITH RESPECT TO WORK PHASE) OTHER SEPARATE CONTRACTORS PERFORMING WORK RELATED TO THE FOUNTAIN INSTALLATION.
28. ALL CONDUCTORS SHALL BE RUN IN RIGID CONDUIT SIZED FOR THE NUMBER OF WIRES CONTAINED WITHIN PER NEC REQUIREMENTS. RIGID CONDUIT SHALL BE CORROSION RESISTANT AND EITHER GALVANIZED STEEL OR RIGID PVC. WHEN CONDUIT IS SUBMERGED OR IN OTHER WET LOCATIONS, RIGID PVC SHALL BE REQUIRED. CONDUCTOR SIZING SHALL BE CORRECTED FOR THE NUMBER OF WIRES TO BE RUN IN A SINGLE CONDUIT OR RACEWAY IN ACCORDANCE WITH THE NEC. ALL CONDUIT LOCATIONS AND ROUTING SHALL BE APPROVED BY THE ARCHITECT BEFORE INSTALLATION.
29. THE WORK TO COMPLETE THE INSTALLATION OF THE FOUNTAIN INCLUDES SUCH NECESSARY MATERIAL AND DEVICES OF A MINOR NATURE THAT MAY NOT BE INDICATED ON THE DRAWINGS OR MENTIONED IN THE SPECIFICATIONS, BUT WHICH ARE NECESSARY FOR THE COMPLIANCE WITH CODES AND FOR THE SUCCESSFUL OPERATION OF THE FEATURE. THE CONTRACTOR SHALL BE ALLOWED NO EXTRA COMPENSATION BECAUSE OF THIS REQUIREMENT.
30. THOROUGHLY TEST ALL FIXTURES, SERVICES AND ALL CIRCUITS FOR PROPER OPERATING CONDITIONS AND FREEDOM FROM GROUNDS AND SHORT CIRCUITS BEFORE ACCEPTANCE IS REQUESTED. ALL EQUIPMENT, APPLIANCES AND DEVICES SHALL BE OPERATED UNDER LOAD CONDITIONS.
31. THERMAL OVERLOAD RELAYS SHALL BE SET AT NOT MORE THAN 115% OF MOTOR FULL LOAD CURRENT AND/OR IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
32. ALL CONNECTIONS MUST BE RECHECKED BEFORE START UP AND ONE MONTH AFTER STARTUP BY A QUALIFIED TECHNICIAN.
33. ALL G.F.C.I. PROTECTED CIRCUITS MUST HAVE A SEPARATE NEUTRAL.
34. ALL G.F.C.I. BREAKERS HAVE PIGTAILS WIRED TO THE NEUTRAL BAR.
35. CONTRACTOR TO ENSURE THAT ALL BONDING CODES ARE COMPLIED WITH FOR EACH METAL FOUNTAIN EQUIPMENT COMPONENT.
36. THE WIRING FOR WATER TO BE INSTALLED IN SEPARATE CONDUIT FROM THE FOUNTAIN TO THE CONTROL PANEL.
37. ALL CONDUIT PENETRATIONS THROUGH STRUCTURE WALLS INTO OPEN AREAS BELOW FOUNTAIN STRUCTURE MUST HAVE ALLOWANCES MADE FOR SETTLEMENT.

1. ALL METAL PARTS WITHIN 5 FEET OF THE INSIDE WALLS OF FOUNTAIN AND ALL METAL PARTS OF ASSOCIATED ELECTRICAL EQUIPMENT MUST BE BONDED TOGETHER PER NEC 680.
2. ALL BONDING CONDUCTORS SHALL BE BARE #8 SOLID COPPER.
3. ALL BONDING SHALL BE CONTINUOUS WITHOUT SPLICES. ALL CONNECTIONS SHALL BE MADE BY EXOTHERMIC WELD OR FITTING APPROVED FOR SUCH USE IN FOUNTAINS AND POOLS.
4. IF EXPOXY COATED REBAR IS SPECIFIED THE CONTRACTOR MUST USE A #8 SOLID COPPER WIRE GRID FOR BONDING IN THE CONCRETE OF ALL AREAS CONTAINING WATER OR COMING IN CONTACT WITH WATER IN THE FOUNTAIN. CONTRACTOR TO CONFORM TO NEC AND LOCAL JURISDICTIONAL CODE REQUIREMENTS FOR THE BONDING.



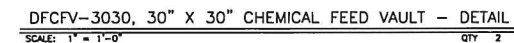
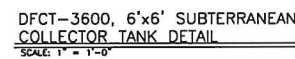
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- The diagram illustrates the electrical wiring for a fountain system. Key components and their connections are labeled as follows:
- INCOMING POWER SUPPLY WITH GROUND WIRE CONDUCTORS**: The main power source entering the system.
 - SERVICE PANEL**: The central distribution point for the system.
 - NEUTRAL BAR**: Located within the service panel, it connects to the **NEUTRAL BAR** in the **FOUNTAIN JUNCTION BOX**.
 - GROUND BAR**: Located within the service panel, it connects to the **GROUND BAR** in the **FOUNTAIN JUNCTION BOX**.
 - FOUNTAIN CONTROL PANEL**: Receives power from the service panel and controls the **FOUNTAIN PUMP MOTOR**.
 - FOUNTAIN PUMP MOTOR**: The primary load of the system, connected to the junction box.
 - FOUNTAIN LIGHT**: A secondary load, connected to the junction box via a **FLEXIBLE S.O. CORD**.
 - FOUNTAIN JUNCTION BOX**: A central hub containing a **3 CONDUCTOR H-N-G** (Hot-Neutral-Ground) cable that links the service panel to the pump motor and light.
 - GROUNDING TERMINAL**: A point where the system's ground is connected to the building's structure.
 - #8 AWG BOND WIRE**: Two bonding wires are shown: one connecting the **GROUND BAR** to the **GROUNDING TERMINAL**, and another connecting the **GROUND BAR** to the **STRUCTURAL STEEL**.

2 TYPICAL FOUNTAIN "GROUNDING" SCHEMATIC
F3.00 NTS

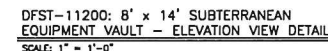
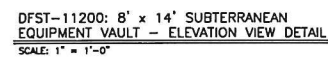
*REFER TO NFPA 70 (NEC) ARTICLE 250

3 ELECTRICAL POWER SUPPLY OPTIONS
F3.00 NTS

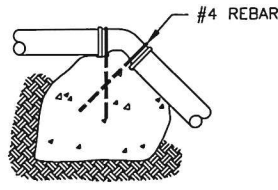
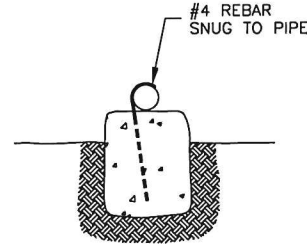
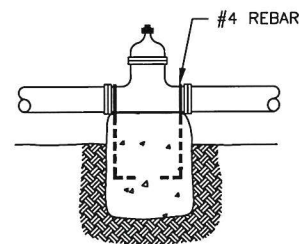
F3.10



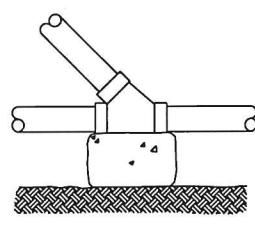
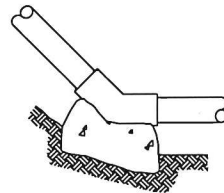
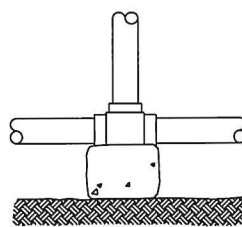
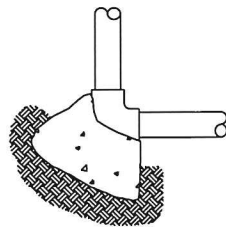
PRELIMINARY DESIGN
NOT FOR CONSTRUCTION



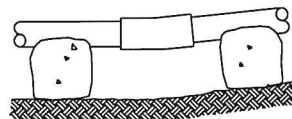
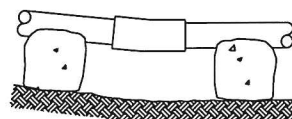
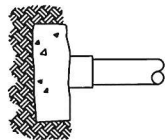
F4.10



IF THRUSTS DUE TO HIGH PRESSURE ARE EXPECTED,
ANCHOR VALVES AS ABOVE. AT VERTICAL BANDS
ANCHOR TO RESIST OUTWARD THRUSTS.



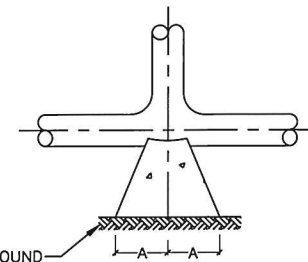
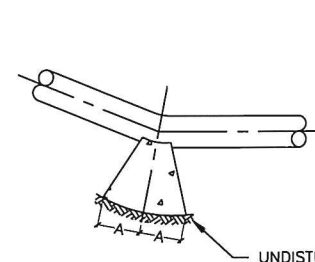
TYPICAL THRUST BLOCK LOCATIONS



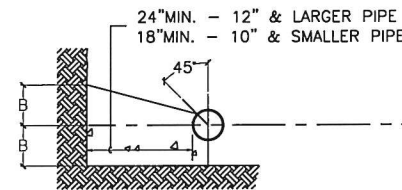
SIDE THRUST BLOCKING – 6" AND 8" DIA. PIPES

MIN. BEARING AREA OF REACTION BACKING (CONCRETE)

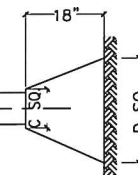
PIPE SIZE	END	TEE	90°	45°	22.5°	VALVE
6"	4.0 SQ. FT.	4.0 SQ. FT.	5.5 SQ. FT.	3.0 SQ. FT.	1.5 SQ. FT.	2.0 SQ. FT.
8"	7.0 SQ. FT.	7.0 SQ. FT.	9.0 SQ. FT.	5.0 SQ. FT.	2.5 SQ. FT.	2.0 SQ. FT.
10"	10.0 SQ. FT.	10.0 SQ. FT.	14.0 SQ. FT.	7.5 SQ. FT.	4.0 SQ. FT.	2.0 SQ. FT.
12"	14.0 SQ. FT.	14.0 SQ. FT.	20.0 SQ. FT.	11.0 SQ. FT.	5.5 SQ. FT.	2.0 SQ. FT.
14"	19.0 SQ. FT.	19.0 SQ. FT.	27.0 SQ. FT.	14.5 SQ. FT.	7.5 SQ. FT.	2.0 SQ. FT.
16"	25.0 SQ. FT.	25.0 SQ. FT.	35.0 SQ. FT.	19.0 SQ. FT.	10.0 SQ. FT.	2.0 SQ. FT.

BENDS

TEES



SECTION
(BENDS & TEES)



PLUGS

TYPE	SIZE	90° BENDS		45° BENDS		22.5° BENDS		TEES		PLUGS	
		A	B	A	B	A	B	A	B	C	D
TYPE-I 4000 PSF SOIL	6"	8"	10"	6"	8"	3"	8"	8"	8"	10"	15"
	8"	12"	12"	8"	12"	5"	9"	9"	12"	12"	20"
	10"	16"	14"	10"	12"	6"	10"	11"	14"	14"	25"
	12"	19"	16"	12"	14"	8"	11"	14"	16"	16"	30"
	14"	23"	18"	14"	16"	10"	12"	16"	18"	18"	34"
	16"	26"	20"	16"	18"	11"	13"	18"	20"	20"	38"
TYPE-II 2000 PSF SOIL	6"	16"	10"	9"	10"	6"	8"	10"	12"	10"	21"
	8"	22"	13"	12"	13"	8"	10"	13"	16"	12"	29"
	10"	26"	17"	14"	17"	10"	13"	16"	20"	14"	36"
	12"	29"	21"	16"	21"	11"	16"	18"	24"	16"	41"
	14"	35"	24"	19"	24"	11"	20"	22"	27"	18"	48"
	16"	38"	27"	21"	27"	12"	24"	24"	30"	20"	54"

NOTE: BASED ON 100 PSI STATIC PRESSURE PLUS AWWA HAMMER

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PROFESSIONAL SEAL

NOT FOR
CONSTRUCTION

	NO.	DATE	DESCRIPTION	SU	AMT	AH	JH
			BID SET			AH	JH
		12-12-18	100% CD SUBMITTAL			AH	JH
		11-07-16	85% CD SUBMITTAL			AH	JH

PROJECT TITLE					

BURLINGTON
GREAT STREETS
CITY HALL PARK

SHEET TITLE

THRUST BLOCK DETAILS

IN/DSGN BY AH	DATE 12/28/2018
CHECKED BY JH	PROJECT # 648

SHEET NUMBER

F4.20

EQUIPMENT VAULT INSTALLATION INSTRUCTIONS:

RECEIVING THE VAULT

A. UPON ARRIVAL OF THE VAULT, THE RECEIVING AGENT SHOULD INSPECT THE INTERIOR AND EXTERIOR FOR ANY VISIBLE DAMAGE THAT MAY HAVE OCCURRED DURING SHIPPING. IF ANY DAMAGE IS FOUND, ALL DAMAGES AND SHORTAGES SHALL BE CLEARLY DOCUMENTED ON THE BILL OF LADING AND PACKING SLIP BEFORE THE DELIVERY DRIVER LEAVES THE PREMISES. THE RECEIVING AGENT SHOULD IMMEDIATELY NOTIFY THE FREIGHT LINE, NOTE THE BILL OF LADING AND CONTACT DELTA FOUNTAINS. IF THE EQUIPMENT VAULT IS NOT GOING TO BE INSTALLED AT THE TIME OF DELIVERY, THE VAULT SHOULD BE STORED IN A COVERED AREA SAFE FROM FLOODING.

B. CONTRACTOR SHALL COMPONENTS IN THEIR ORIGINAL PACKAGES AND PROTECT ALL ITEMS FROM DAMAGE UNTIL FINAL PLACEMENT OCCURS. CONTRACTOR SHALL ROTATE ALL MOTOR SHAFTS X TURN EACH AND EVERY MONTH DURING STORAGE UP TO THE TIME OF FIRST PERFORMANCE TO ENSURE MOTOR SHAFT INTEGRITY. TIGHTEN ALL PLUGS, BOLTS, NUTS, AND UNION TYPE FITTINGS AND CLOSE ALL VALVES UNTIL SYSTEM IS READY FOR STARTUP.

C. FIELD VERIFY ALL EQUIPMENT DIMENSIONS PRIOR TO EXCAVATION. DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE. ANY DISCREPANCIES SHOULD BE REPORTED, IN WRITING, IMMEDIATELY TO DELTA FOUNTAINS. DELTA FOUNTAINS IS NOT RESPONSIBLE FOR ANY DIMENSIONAL DISCREPANCIES IF THE CONTRACTOR FAILS TO NOTIFY DELTA FOUNTAINS IN A TIMELY MANNER BEFORE INSTALLATION OF THE EQUIPMENT VAULT.

EXCAVATION

A. EXCAVATE TO PROPER DEPTH TO RECEIVE THE VAULT AND A MINIMUM CLEAR AREA OF 3'-0" AROUND THE PERIMETER OF THE VAULT.

B. FIELD VERIFY EQUIPMENT DIMENSIONS AND REPORT ANY DISCREPANCIES IN WRITING TO DELTA FOUNTAINS.

C. ALLOW FOR TAPERING OF THE SOIL TO PREVENT CAVE IN AND/OR PROVIDE SOIL SUPPORT PER OSHA GUIDELINES.

D. ADD COMPACTED GRAVEL BASE AND POUR THE CONCRETE ANCHOR SLAB AS INDICATED ON THE DRAWINGS. THE ANCHOR SLAB IS TO BE REINFORCED WITH GRID USING #4 REBAR ON 12" CENTERS.

E. ONE PIECE MOLDED STAINLESS STEEL ANCHOR BOLTS AND ¼" DIAMETER STAINLESS STEEL ANCHOR WIRE ARE TO BE PROVIDED AND INSTALLED BY THE FOUNTAIN CONTRACTOR. THE ANCHOR BOLTS SHOULD BE TIED TO THE REINFORCING GRID.

INSTALLING THE VAULT

*ALL OF THE FOLLOWING SHALL BE COMPLETED WITHOUT FAIL ON THE SAME DAY THE PUMP VAULT IS LOWERED DOWN INTO THE DESIGNATED SPACE:

A. CHECK FOR FAVORABLE AND DRY METEOROLOGICAL FORECAST PRIOR TO BEGINNING INSTALLATION OF PUMP VAULT.

B. THE VAULT SHOULD BE RIGGED WITH STRAPS, LIFTING FROM THE BOTTOM OF THE VAULT, NOT THE STEEL SKID SUPPORT. CARE SHOULD BE TAKEN TO POSITION THE STRAPS AWAY FROM ANY PLUMBING CONNECTIONS ON THE SIDE OF THE VAULT. DO NOT USE CHAINS OR CABLES TO LIFT THE VAULT. DO NOT USE THE ANCHOR BOLTS ON THE SIDE OF THE VAULT FOR LIFTING. LOWER THE VAULT ON TO THE ANCHOR SLAB AND ADJUST THE POSITION AS NECESSARY.

C. THE FOUNTAIN CONTRACTOR IS TO SUPPLY AND INSTALL THE STAINLESS STEEL ANCHOR CABLES (¼" DIAMETER MIN. BY CONTRACTOR) FROM THE VAULT EYEHOOKS TO THE ANCHOR BOLTS IN THE SLAB (ANCHOR BOLTS BY CONTRACTOR). REMOVE SLACK FROM THE CABLES AND TIGHTEN. DO NOT OVER TIGHTEN THE CABLE.

D. ONCE THE VAULT IS IN PLACE, IMMEDIATELY CONNECT THE TWO VENTILATION LINES AND ROUTE THEM TO THEIR DESIGNATED LOCATION.

E. REMANENT POWER IS TO BE PROVIDED TO THE SUMP PUMP IN THE VAULT BY A 24 HOUR/DAY OPERATIONAL 120vac, 60 HZ, 20A POWER SUPPLY TO THE SUMP PUMP(S). THIS SERVICE CAN BE ROUTED TEMPORARILY THROUGH THE VENTILATION SYSTEM (AIR SUPPLY - CLOSEST LINE TO THE FLOOR).

F. CONNECT THE 1 ½" OR 2" BACKWASH/SUMP PUMP DISCHARGE LINES TO THE SEWER SYSTEM; EITHER SANITARY OR STORM, PER LOCAL CODES OR AS DESIGNATED ON THE CIVIL/MEP DRAWINGS. CHECK THE BALL VALVE ON THE SUMP PUMP DISCHARGE LINE AND MAKE SURE IT IS OPEN.

G. LIFT THE FLOAT ON THE SUMP PUMP (ONCE POWER CONNECTION IS MADE) TO MAKE SURE THE PUMP OR PUMPS ARE WORKING.

H. WHILE OPERATING UNDER TEMPORARY POWER IN AN UNFINISHED STATE, CHECK THE VAULT DAILY ESPECIALLY BEFORE AND AFTER RAIN.

I. PIPELINES AND CONDUIT CONNECTIONS MUST BE MADE AS SOON AS POSSIBLE TO PREVENT FLOODING OF THE VAULT. IF PIPING CANNOT BE CONNECTED AT THE TIME OF THE INSTALLATION, THE FOUNTAIN CONTRACTOR MUST CHECK TO MAKE SURE THAT ALL INTERIOR VALVES ARE CLOSED AND ALL CONDUIT CONNECTIONS ARE PLUGGED OR SEALED.

J. POUR ANCHOR SLAB. REFER TO INSTALLATION DETAIL DRAWINGS.

K. INSTALL ADDITIONAL TEMPORARY AUTOMATIC SUMP PUMP OF SUITABLE SIZE OUTSIDE OF THE VAULT IF THE HOLE HAS TO BE LEFT OPEN OVERNIGHT. CONTRACTOR IS RESPONSIBLE TO KEEP THE EXCAVATION AREA AROUND THE VAULT PUMPED AND DRY AT ALL TIMES WHILE AREA IS EXCAVATED.

L. THE ACCESS HATCH ON THE VAULT SHOULD BE CLOSED AND LOCKED AT ALL TIMES WHILE UNATTENDED DURING THE INSTALLATION PERIOD.

WARNING

FLOODING OF THE VAULT THRU THE NEGLIGENCE OF THE CONTRACTOR TO ADHERE TO THESE INSTALLATION SPECIFICATIONS VOIDS THE WARRANTY ON ALL EQUIPMENT IN THE VAULT. REPLACEMENT OF DAMAGED EQUIPMENT WILL BE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR. THE GUIDELINES OUTLINED ABOVE WILL AID IN THE PREVENTION OF FLOODING. IN ADDITION, CONSULT ALL INSTALLATION DETAILS IN THE CONSTRUCTION DOCUMENTS PROVIDED BY DELTA FOUNTAINS.

CONCRETE ANCHOR SLAB

A. POUR 4" – 6" CONCRETE LEVELING SLAB OR USE 4" COMPACTED GRAVEL BASE. STAINLESS STEEL ANCHOR BOLTS SHOULD BE INSERTED IN THE LEVELING SLAB.

B. LEVELING SLAB/COMPACTED GRAVEL BASE SHOULD BE SLOPED SLIGHTLY TO THE CORNER OF THE VAULT WHERE THE SUMP PUMP/GRAVITY DRAIN SUMP IS LOCATED.

C. POUR ANCHOR SLAB IN ACCORDANCE WITH DETAILS ON CONTRACT DOCUMENTS. THE CONCRETE SHOULD BE POURED WITH A MIN. 8" SLUMP TO ENSURE THE CONCRETE ADEQUATELY COVERS THE MOUND AND FILLS THE ENTIRE VOID UNDER THE VAULT BETWEEN LEVELING SLAB AND BOTTOM OF VAULT.

PIPING AND CONDUIT CONNECTIONS

A. CONNECT ALL PIPING AND CONDUIT AS INDICATED ON THE CONSTRUCTION DOCUMENTS. DO NOT EXTERNALLY LOAD THE VAULT CONNECTIONS OR ALLOW THE CONNECTIONS TO SUPPORT THE WEIGHT OF THE CONNECTED PIPING. IF THE PIPING IS NOT SUPPORTED PROPERLY, SOIL SETTling CAN RESULT IN EXCESSIVE LOADING ON THE PIPING. THIS CAN RESULT IN BROKEN PIPING AND MISALIGNED CONNECTIONS IN THE VAULT.

B. ALL OPEN CONDUITS CONNECTED TO THE VAULT SHOULD BE SEALED OR PLUGGED TO PREVENT WATER INTRUSION.

C. AFTER ANCHOR SLAB IS POURED, PLACE A 4" OR 6" PERFORATED PIPE LOOP AROUND THE BOTTOM PERIMETER OF THE VAULT AND PIPE TO STORM DRAIN.

D. THE EQUIPMENT VAULT IS PRE-WIRED AT THE FACTORY FOR TESTING PURPOSES. IN THE EVENT THE LOCAL AUTHORITY, HAVING JURISDICTION OVER THE INSTALLATION OF THE VAULT AND FINAL PASS/FAIL INSPECTION, REQUIRES ANY MODIFICATIONS TO THE CONDUIT OR WIRING AS INSTALLED, THE CONTRACTOR WILL BE RESPONSIBLE FOR MAKING THE CHANGES OR MODIFICATIONS AS REQUIRED TO CONFORM TO ALL LOCAL CODES.

WARNING

IF ALL DISCHARGE/SUCTION PIPING, ELECTRICAL CONDUIT CONNECTIONS AND AIR VENTS ARE NOT ROUTED ABOVE GRADE AND CAPPED, FLOODING WILL OCCUR DURING ADVERSE WEATHER CONDITIONS. DELTA RECOMMENDS A ONE DAY INSTALLATION.

PRESSURE TESTING

A. PRESSURE TEST ALL PIPING CONNECTED TO THE VAULT TO ENSURE THERE ARE NO LEAKS IN THE SYSTEM. REFER TO THE FOUNTAIN EQUIPMENT SPECIFICATIONS FOR PRESSURE TESTING PROCEDURES OR INSTRUCTIONS BELOW.

INTAKE AND EXHAUST VENTS

A. INSTALL AIR INTAKE AND EXHAUST VENTS AS SUPPLIED AND IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS. THE VENT CAPS AS PROVIDED SHOULD BE INSTALLED IMMEDIATELY TO PREVENT WATER INTRUSION.

BACKFILLING AND COMPACTION

A. PROVIDE ADEQUATE INTERIOR BRACING DURING BACKFILLING TO PREVENT DAMAGE TO THE FIBERGLASS SHELL.

B. ALL OPEN PIPING AND CONDUIT SHOULD BE PROTECTED DURING THE BACKFILL PROCESS. BACKFILL MATERIAL TO BE #57 CRUSHED STONE OR ROUNDED GRAVEL, ¾" MAX. AND LESS THAN 5% FINES. BACKFILLING AND COMPACTION SHOULD OCCUR IN 6" LIFTS. EACH LIFT IS TO BE HAND TAMPPED. DO NOT USE POWER OPERATED COMPACTORS. A MIN. OF 2' OF BACKFILL MATERIAL SHOULD BE PLACED BETWEEN THE VAULT WALLS AND SURROUNDING EARTH. IN SOME GEOGRAPHIC LOCATIONS IT MAY BE NECESSARY TO PROVIDE ADDITIONAL DRAINAGE AROUND THE VAULT.

C. FOR VAULTS IN AREAS OF HIGH GROUND WATER TABLES IT IS RECOMMENDED TO ENCASE THE VAULT IN CONCRETE;

1. BRACE INTERIOR WALLS, IF NECESSARY, WITH 4 EA. 4" x 4" LUMBER AND 2 EA. CROSS MEMBERS.

2. BRACE INSIDE CEILING, IF NECESSARY, WITH 4 EA. 4" x 4" LUMBER AND 2 EA. CROSS MEMBERS.

3. FORM THE OUTER SHELL BY CONVENTIONAL MEANS. THE FIBERGLASS VAULT WILL BE USED AS THE INSIDE FORM.

4. POUR THE CONCRETE IN FOUR SEPARATE AND EQUAL LIFTS.

WARNING

DO NOT USE SAND, CLAY OR DIRT FOR BACKFILL.

WARNING

GUARD THE VAULT AT ALL TIMES AGAINST CROSSING BY ANY HEAVY MACHINERY OR CONCRETE TRUCKS.

PRESSURE TESTING

1. PERFORM TESTS IN THE PRESENCE OF THE OWNER, ARCHITECT, OR AUTHORIZED REPRESENTATIVE FOR DESIGNATED DURATION WITH NO PRESSURE LOSS OR NOTICEABLE LEAKS.

2. DO NOT INCLUDE EQUIPMENT IN TESTS WHICH COULD BE DAMAGED BY HIGH PRESSURE.

3. FLUSH OUT ALL PIPES WITH CLEAN WATER PRIOR TO PERFORMING LEAK TESTS.

4. PERFORM TESTS AS FOLLOWS:

SYSTEM	TEST PRESSURE	MEDIUM	DURATION
WATER	150 PSI OF OPERATING PRESSURE	WATER	8 HOURS
DRAINAGE	10FT. OVER HIGHEST PIPE INVERT	WATER	24 HOURS

5. AUTOMATIC MAKE-UP WATER SYSTEMS SHALL BE THOROUGHLY TESTED AND OPERATIVE AT THE TIME OF FINAL OBSERVATION.

6. AFTER THE SYSTEM HAS OPERATED FOR ONE WEEK, CONTRACTOR AND OWNER'S REPRESENTATIVE SHALL INSPECT WATER MAKE-UP RATES AND AGREE THAT WATER USAGE IS APPROPRIATE FOR A SYSTEM OF THIS TYPE, ARE WITHIN LOCAL ORDINANCES OR CODES, AND THAT SUCH RATES ARE NOT INDICATIVE OF EXCESSIVE LEAKAGE FROM SYSTEM. A WATER METER SHALL BE PLACED ON THE FILL LINE FOR THIS PURPOSE, IF NECESSARY TO DOCUMENT PRECISE WATER USAGE.

PVC INSTALLATION NOTES

1. UNLESS ARCHITECTS SPECIFICATIONS INDICATE OTHERWISE, THE SUGGESTED MINIMUM PIPING AND FITTING STANDARD RECOMMENDED FOR THIS INSTALLATION IS TYPE 1. PVC TYPE 1 CELL CLASSIFICATION 12454, CONFORMING TO ASTM STANDARD 1784.

2. USE ONLY PURPLE PVC PRIMER MEETING NSF, UPC, AND ASTM #F-656 STANDARDS FOR SOFTENING AND PREPARING FIELD PIPE AND FITTING SURFACES FOR SOLVENT CEMENTING (IPS CORPORATION "WELD-ON" TYPE 711 OR EQUIVALENT). WELD-ON 711 GREY, HEAVY BODIED, MEDIUM SET, HIGH STRENGTH SOLVENT CEMENT FOR CEMENTING ALL SCHEDULES AND CLASSES OF PVC PIPE AND FITTINGS THROUGH 12" INCLUDING SCHEDULE 80. WELD-ON 719 GREY OR WHITE, EXTRA HEAVY BODIED, THIXOTROPIC (PASTE-LIKE), HIGH STRENGTH SOLVENT CEMENT FOR CEMENTING ALL SCHEDULES AND CLASSES OF PVC PIPE AND FITTINGS 4" THROUGH 30" INCLUDING SCHEDULE 80. WELD-ON 711 AND 719 FOR USE ON ALL TYPES OF PVC PLASTIC PIPE APPLICATIONS, TYPE I AND TYPE II. IT IS APPROVED FOR USE WITH POTABLE WATER PRESSURE SYSTEMS, IRRIGATION, TURF IRRIGATION, GAS, CONDUIT, INDUSTRIAL PIPE APPLICATIONS, SEWER AND DRAIN, WASTE AND VENT SYSTEMS. FOLLOW ALL DIRECTIONS AND INSTRUCTIONS ON PRODUCT LABEL.

3. PRESSURE TEST ALL WATER PIPING PRIOR TO COMMENCING BACKFILL OPERATIONS. (SEE #4 IN "PRESSURE TESTING" SECTION ABOVE). HYDROSTATIC (WATER) TESTING SHALL BE THE ONLY APPROVED METHOD. DO NOT PRESSURE TEST WITH COMPRESSED AIR. SEVERE PIPE DAMAGE AND BODY INJURY CAN OCCUR. DO NOT EXCEED THE RATED OPERATIONAL PRESSURE OF THE PIPING AND/OR FITTINGS CARRYING THE LOWEST PRESSURE RATING. LOCATE AND REPAIR ANY LEAKS AND RETEST (PER #4 IN "PRESSURE TESTING" SECTION ABOVE) PRIOR TO COMPLETION OF BACKFILL OPERATIONS. CONCRETE "THRUST" BLOCKING IS RECOMMENDED AT ALL DIRECTIONAL CHANGES (TEE'S, ELBOWS, ETC.), REDUCER FITTINGS AND LINE TERMINATIONS (BUSHINGS, END CAPS, PLUGS, ETC.) IN FOUNTAIN DISCHARGE PIPING 6" AND LARGER.

4. PERFORM ADEQUATE TRENCHING AND BACKFILL OPERATIONS WHEN INSTALLING PVC PIPING BELOW GRADE. TRENCH WIDTH SHOULD BE MINIMUM OF "PIPE O.D. PLUS 12 INCHES" AND DEEP ENOUGH TO ALLOW PIPING TO BE BURIED A MINIMUM OF 12" BELOW THE MAXIMUM EXPECTED FROST PENETRATION LINE TO AVOID FREEZE DAMAGE. LAY PIPING IN HORIZONTAL, PARALLEL, AND PERPENDICULAR MANNER. AVOID VERTICAL STACKING OF PIPES. SPACE MINIMUM OF 3" APART ON ALL PARALLEL RUNS.

5. USE ONLY CLEAN, FREE-FLOWING, NON-EXPANSIVE BACKFILL MATERIAL (NATURALLY ROUNDED ¾" PEA GRAVEL, 57 STONE, OR SAND) AND BACKFILL IN 6" LIFTS WITH ADEQUATE AND COMPLETE COMPACTION BETWEEN LIFTS TO 90% OF MAXIMUM DENSITY PER ASTM 1557-70. COMPACTION TO EXCESSIVE LOADS SHALL NOT BE PERMITTED. A SECOND PRESSURE TEST ON THE PIPING SYSTEM MUST BE MADE AT THIS TIME TO INSURE THAT PIPING HAS NOT BEEN DAMAGED DURING BACKFILL OPERATIONS (SEE #4 IN "PRESSURE TESTING" SECTION ABOVE).

6. AVOID TRYING SUCTION PIPING IN A MANNER THAT COULD RESULT IN A SUCTION LOOP BEFORE, DURING, OR AFTER BACKFILLING AND COMPACTION. ALWAYS PITCH PIPE IN A DOWNWARD DIRECTION TO AVOID A SUCTION LOOP THAT WILL CA



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BOARD OF HEALTH

David Casey, RN (Chair); Mary D. Hart, RN; Julie Hathaway, MD, PhD; Taylor Newton; Caroline Tassey, APRN

HEALTH OFFICER

William Ward, Director of Code Enforcement

**MINUTES FOR REGULAR MEETING OF
BURLINGTON BOARD OF HEALTH**

Robert Miller Center, 130 Gosse Ct

THURSDAY 14 FEBRUARY 2019 AT 6:30 PM

Attending: *David Casey; Mary Hart (arrives at meeting at 6:40 PM); Taylor Newton; Caroline Tassey; William Ward; Steve Cormier, Board of Health Staff*

Absent: *Julie Hathaway*

Meeting called to order by Chair Casey at 6:32 PM

ITEM	DISCUSSION	ACTION
1. Approvals: a) Agenda		Ms. Tassey made motion to accept agenda. Mr. Newton seconded. All in favor.
b) January meeting minutes		Mr. Newton made motion to accept minutes. Ms. Tassey seconded. All in favor.

2. Public Forum / Emerging Issues	The Board and staff make introductions, with members of the public introducing themselves: Director of Parks, Recreation, & Waterfront, Cindi Wight; Emeritus Professor of Epidemiology and Biostatistics, Dr. Millicent Eidson; Kathleen Ryan, Ward 6 resident. <i>**Mrs. Hart arrives at meeting**</i>	Mr. Newton made motion to accept 03 received communications concerning Agenda Item 03 into record: email from Wayne Senville; <i>Spray Park Public Health Risk, Summary, 2/14/19; An Outbreak of Cryptosporidium at a Recreation Water Park in Niagara Region, Canada</i>. Ms. Tassey seconded. All in favor.
3. Proposed Interactive Jet Fountain – City Hall Park	Director Wight commented on the proposed fountain infrastructure with Chair Casey, Ms. Tassey, and Director Ward asking questions. Dr. Eidson commented on reports of disease outbreak related to such fountains and, with Ms. Ryan, commented on requirements for such fountains under State of Florida and State of New York code; Director Ward commented on comparing Florida and New York codes for such fountains, with Chair Casey agreeing, which Director Wight agreed to provide to staff. Mr. Newton commented on 3-year-old timeframe and review of proposed project. Chair Casey commented on wanting to look further into the proposed fountain infrastructure and introduced 02 items presented by Director Wight concerning	

	Agenda Item 03 into record: <i>Burlington City Hall Park Special Provisions Section 131213 – Exterior Fountains; Proposed Improvement City of Burlington County of Chittenden City Hall Park.</i>	
4. Update on marijuana legalization info card • Approval of card text • Update on graphics • Production and distribution timeline draft	Ms. Tassey commented on meeting with City Attorney Nicholas Lopez concerning the card's text and, with Chair Casey, commented on the design and proposed text changes.	Mr. Newton made motion to allocate no more than \$1,500.00 on production, following a bidding process, and then giving Dr. Hathaway authority to print cards. Ms. Tassey seconded. All in favor.
5. Chair's report	Chair Casey discussed the previous Tuesday's inspection of the Champlain Elementary School. Ms. Tassey commented on wanting to discuss the pre-approval process for pesticides at the March meeting. Chair Casey commented on discussing the Emerald Ash Borer issue and inviting City Arborist VJ Comai to discuss.	
6. Discussion of FY 19 Budget	Mr. Newton commented on the remainder of money left in the Board's budget for FY 19. The Board discussed additional opportunities with which to apply Board funds toward. Director Ward commented on needing to	

	have budget ideas submitted no later than the April meeting.	
7. Public outreach/communications Language for FPF update	Chair Casey commented on making a post concerning the Governor's Opioid Council on Front Porch Forum.	
8. Next Meeting – currently set as 21 March 2019		
9. Adjournment		Ms. Tassey made motion to adjourn. Mrs. Hart seconded. All in favor.

Meeting adjourned at 8:08 PM