

ADDENDUM NO. 2

February 1, 2019

PROJECT: City Hall Park Improvement Project

BID DUE DATE: **Monday, February 11, 2019 at 9:00 AM**
(Bid Due Date has not been extended due to award schedule constraints)

BIDDER QUESTIONS: **January 29, 2019 at 5:00 PM**

RESPONSES TO BIDDER QUESTIONS: To be posted on city website by 5:00 PM February 1, 2019

FROM: Nina Safavi, City of Burlington Parks, Recreation & Waterfront, Project Manager

To All Bidders:

This addendum forms a part of the bidding documents and will be incorporated into the Contract Documents, as applicable. Insofar as the original Contract Documents, Specifications, and Drawings are inconsistent, this Addendum shall govern. Please acknowledge receipt of this Addendum on the Bid Proposal Form submitted to the City of Burlington. **FAILURE TO ACKNOWLEDGE RECEIPT OF ADDENDUM ON THE BID FORM MAY BE CAUSE FOR DISQUALIFICATION.**

CONTRACT DOCUMENTS:

1. **BID PROPOSAL FORM:** The Bid Proposal Form shall be replaced in the Contract Documents with the attached. The changes to the Bid Proposal Form include the following:
 - a. Item 204.20 Trench Excavation of Earth quantity has been changed to 2,100 CY.
 - b. Item 541.25 Concrete, Class B quantity has been changed to 155 CY.
 - c. Item 651.35 Topsoil has been added
 - d. Item 900.620 Special Provision (Rain Gardens A, B, & C Planting) was renamed to 900.620 Special Provision (Rain Gardens A, B, C, & D Planting)
 - e. Item 900.620 Special Provision (Bioretention B Outlet Structure) was renamed to 900.620 Special Provision (Bioretention A Outlet Structure)
 - f. Item 900.640 Pedestrian Hand Rail has been added
(item inadvertently deleted in Addendum No 1)
 - g. Item 900.675 Concrete with Integral Color A & B has been added
(item inadvertently deleted in Addendum No 1)
2. **SPECIFICATIONS:**
 - a. The following specifications have been modified.
 - i. Section 900 – Pervious Pavers. Replace specification Pervious Pavers in its entirety with the attached specification.
 - ii. Section 900 – Landscape Edging. Replace specification Landscape Edging in its entirety with the attached specification.

- iii. Section 900 – Irrigation System. Replace specification Irrigation System in its entirety with the attached specification.
- iv. Section 900 – Curb Inlet & Trench Drains. Replace specification Landscape Edging in its entirety with the attached specification.
- v. Section 900 – Lawn Restoration under Pay Item Special Provision (Lawn Restoration – Topsoil & Hydroseed) add the following:

“Furnishing Topsoil shall be paid for under Item 651.35”

- 3. APPENDICES: The following has been added to contract documents
 - a. Site Investigation Report – City Hall Park prepared by Waite Heindel dated January 25, 2019

(Note: DEC has given conceptual approval to Corrective Action Items described in this report. CAP approval with public comment approval is anticipated by approximately April 1st)

CONSTRUCTION DRAWINGS:

- 1. Sheet C201
 - a. Updated raingarden/bioretenction name labels
- 2. Sheet C509
 - a. Updated Backflow Prevention Vault Details
- 3. Sheet E503
 - a. Updated distribution panel schedules and One-Line Drawing
- 4. Sheet L300 - Revise Tree Protection Notes as follows:
 - 3. 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.~~ **Contractor will be held responsible for excessive damage or death of trees that are to be retained during the reconstruction of the park where it is determined by the City Arborist that there was a failure to follow specifications set forth in the contract for working within the critical root zones of these trees or where encroachment within the tree protection zone of a tree occurs without prior consultation with and approval by the City Arborist. Contractor will not be held accountable for damages or death of trees number 911 (Silver Linden) and 907 (Silver Maple) both of which are located on the northern edge of the large rain garden at the western edge of the park adjacent to Saint Paul St. Additionally tree number 964(Sugar Maple) located on the south side of the park The City of Burlington understands the risks to these trees associated with the excavation required in this area to construct as designed and the City Arborist will work closely with the contractor to ensure that every effort is made to complete this work with the goal of minimizing adverse impacts to the trees to the extent possible.**
 - 4. 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.

5. 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.
6. 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.
7. 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 **in the park and/or at City designated location in downtown**. 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.

ANSWERS TO BIDDERS' QUESTIONS

During the advertisement phase of this project all questions shall be addressed solely to the Municipal Project Manager (MPM): Nina Safavi, Burlington Parks Comprehensive Planner, (802) 865-7248, 645 Pine Street, Burlington, VT 05401. Questions may also be sent to nsafavi@burlingtonvt.gov.

Written questions submitted after issuance of Addendum No. 1 and electrical written questions received January 21, 2019 are included herein. Any additional written questions prior to the question submittal deadline will be answered under separate response.

1. An item was added in Addendum #1 – 900.620 – SP – Catch Basin Vapor Trap Pipe Elbow. We cannot find this item detailed on the plans nor is there a specification for this item, please detail and provide specification.
RESPONSE: Item 900.620 Special Provision (Catch Basin Vapor Trap Pipe Elbow) is for the installation of a catch basin trap equivalent to Neenah R-3700 on existing drainage inlet structures. The two existing drainage structures are in the alleyway between City Hall and Burlington City Arts as shown on sheet C201
2. “There is a discrepancy between the Civil Plans and Landscape Plans and how they label Rain Garden ‘A’ and Rain Garden ‘B’. The rain garden labeled ‘A’ on the Planting Plan (starts in the SW corner and runs along Main St) is substantially larger, but on civil plans it is labeled ‘B’. In the addendum to the question about stepping stones through the Rain Garden, the answer indicates the stepping stones are incidental to Rain Garden ‘C’, which has no stepping stones. I’m hoping to have that cleared up.”
RESPONSE: The rain garden labels on Sheet C201 have been modified as follows: Rain Garden B is at the SW corner of the site. Rain Garden A is the rain garden with the arch pipe proposed beneath it. Rain Garden C is the northernmost, mid-block rain garden (not shown on Sheet C201). Rain Garden D is the linear garden which runs behind the Main Street wall and dumps into Rain

Garden A. As a result of this clarification, descriptions for associated bid items have been modified as follows:

Bid Item 900.620 Special Provision (Rain Gardens A, B, & C Planting) was renamed to 900.620 Special Provision (Rain Gardens A, B, C, & D Planting),

Bid Item 900.620 Special Provision (Bioretention B Outlet Structure) was renamed to 900.620 Special Provision (Bioretention A Outlet Structure),

3. Many of the Special Provision items include common VTRANS items such as Common Excavation. In general, please explain where the items listed below are to be used for the associated work:

- a. 203.32 – Granular Borrow
- b. 541.25 – Concrete, Class B

RESPONSE: 203.32 – Granular Borrow is proposed to be utilized in trench backfill, assuming a percentage of the existing materials will not be suitable for backfill. 541.21 – Concrete, Class B is proposed to be utilized to support granite curb, concrete encased conduit, yard drain surround, and bioretention outlet surround. Other special provisions such as retaining walls incorporate these common VTrans materials as incidental elements.

4. Item 900.620 SP – Light Pole Base, please provide a detail for diameter and depth as well as a specification.

RESPONSE: See VTrans Standard T-133. For a mounting height below 20', the diameter shall be 2 ft and the depth shall be 6 ft.

5. Sheet C509, Backflow Prevention Vault Detail. Please provide rim elevation, bottom of vault elevation, dimensions of vault (LxWxH). Does this vault need to be traffic (H20) rated?

RESPONSE: Approximate inside dimensions have been incorporated on revised sheet C509. Note that final vault dimensions must be confirmed by contractor in conjunction with Irrigation system design and use of plate strainers. Precast structure shall be rated for H20. Access hatch shall be rated for 300 lb/sf.

6. Per Addendum #1, I think two items on the bid form were inadvertently deleted:

- a. 900.640 – Pedestrian Hand Rail – 90 l.f.
- b. 900.675 – Concrete with Integral Color A&B – 624 s.f.

RESPONSE: Correct, these items have been added back onto the Bid Form.

7. Per Drawing E503 Panel MDP there are no AIC ratings listed- (Company Panel 1, Event Panel LCP, and Company Panel 2).

RESPONSE: See revised Sheet E503 for the updated Panel Schedules and One-Line Drawing.

8. Event Panel per the spec says it's a main circuit breaker, but the E503 one line shows it as an MLO- So question is which option MCB or MLO?

RESPONSE: This is a MCB. See the revised Sheet E503 for the updated Panel Schedules and One-Line Drawing.

9. Per "Note 1" on E502 distribution panel to be "Forest Green" are there any others to be green?

RESPONSE: All distribution panels may be standard grey or steel finish. Note 1 on E502 to be revised to read as follows: "1. Provide Enclosure NEMA 3R (Heavy Duty) with hinged cover and provisions for pad locking with HASP closure."

10. On E502- MDP (does MDP) need to be Nema 3R due to enclosure being called for Nema3R?

RESPONSE: Yes. NEMA 3R.

11. On page 31 of "Bid Proposal" form (678.23) shows footages 2,750 LF and 640 LF what are the sizes? And how many LF of each size run to equal these total amounts?

RESPONSE: Items 678.23 Wired Conduit (Ethernet/Event Power) and Item 678.23 Wired Conduit (Site and Lighting Electrical) incorporate various wiring and conduit sizing as indicated on plan sheets. Location for conduit runs are indicated on sheet E201 and E202 with reference to "Electrical Service, Telephone Conduit & Wire Schedule" and "Audio Visual Circuit Schedule" shown on E501.

12. Is there a required or desired manufacturer for the 10x15" and 18x24" standard pull boxes?

RESPONSE: Hoffman or equal.

13. Lastly, the only panel schedule I have is MDP do you have them for the others?

RESPONSE: See revised Sheet E503 for the updated Panel Schedules and One-Line Drawing.

14. The revised Bid Proposal form is missing some items. In Add Alternate No. 2 you have a negative number for Concrete with Integral Color however in the revised Bid Proposal (per addendum #1) the colored concrete item has been omitted.

RESPONSE: See revised bid proposal form.

15. You should distinguish the Bid Proposal Form when changed by adding a header or footer indicating "Changed by Addendum # *.* This will reduce confusion regarding which version is being completed and will allow the city to readily identify a correct bid tabulation.

RESPONSE: See revised bid proposal form.

16. Do you have the value of trees based on the City's Tree Value Inventory?

RESPONSE: See revised Tree Protection notes for Sheet L300 above.

17. Will the contractor be required to pay the City Arborist for services rendered during this project?

RESPONSE: No. City arborist will provide oversight, coordination, and consultation as City representative. Performance of all work is responsibility of contractor.

18. Is the city going to isolate the park for 1 year after the project has been completed? Will the contractor be required to repair areas trampled by the public once the park is open to the public?

RESPONSE: Grass areas shall be isolated until turf establishment. Final inspections will include coordination between City and contractor on timing for opening to public.

19. What kind of trees exist in City Hall Park, specifically are there any Ash Trees and if so are there any specific instructions for the removal of possibly infected trees by the Emerald Ash Borer?

RESPONSE: There is only one ash tree and it is being removed as a part of this project.

20. If a material component is no longer manufactured (discontinued & superseded by new unit, same manufacturer) Should the latest specs for the new model be submitted or is this to be considered an approved alternate?

RESPONSE: It is assumed that the new model will be equivalent to the discontinued unit. However, these will need to be provided as part of the submittal process for approval.

21. The written Specifications appear to be missing Materials. More specifically, Drip Tubing & Control Valve. Please Provide Manufacturer & Model.

RESPONSE: See revised special provision attached.

22. Please provide further direction on the requirement of any rain sensors to control shut off times based on the natural amount of rain fall.

RESPONSE: A rain sensor shall be required. "Rain Sensor: Use rain sensor that is compatible with control unit and can automatically shut down controller operation in rain event. Controller to be Rain Bird ESP-LXMEF or approved equal. See revised special provision attached.

23. Please provide requirements of a Backflow Device to prevent contamination of water supply.

RESPONSE: See section 900 – Backflow Prevention Vault provided in Addendum No. 1 and updated Sheet C509 Backflow Prevention Vault Details incorporated in this Addendum.

24. Landscape Mineral Mulch – What is it? Why is Pike industries the only place to obtain this product. Is it a specific product or just ¾" to 1 ½" stone? Is it river stone or crushed stone?

RESPONSE: It is gravel mulch. We are looking for a blue/gray crushed stone. If there is another source for this we would be open to it.

25. Special Provisions Under "CURB INLET AND TRENCH DRAINS", - Basis of Payment says to be paid for under (Water Backflow Prevention and Vault)?

RESPONSE: See revised special provision attached.

26. What Concrete Strength is required under the Granite Cobble Runnels, for the Dog Waste Bag Dispenser, Concrete Setting Bed under the Granite Curbing

RESPONSE: Concrete shall meet requirements of Section 541 Class B concrete.

27. What are the dimensions of the Light pole bases. The drawings refer to structural drawings??

RESPONSE: See VTrans Standard T-133. For a mounting height below 20', the diameter shall be 2 ft and the depth shall be 6 ft.

28. Is the landscape edging associated with the stone dust path to be captured in special provision 900.608 (stone dust)? Or isn't all metal edging supposed to be paid under the Landscape Edging item?

RESPONSE: Landscape edging along stone dust path shall be paid under 900.640 Special Provision (Metal Landscape Edging)

29. Pg 159 900.620 Special Provisions (Landscape Edging) – Method of Measurement – "The quantity of Special Provisions (Landscape Edging) to be measured for payment will be the number of each drinking fountain system installed and complete and accepted work" Shouldn't it be 900.640 and what does the drinking fountains have to do with the landscape edging?

RESPONSE: See revised special provision attached.

30. How many or how frequent for the threaded steel rods on the weathered steel bench topper?

RESPONSE: This open to be determined by lengths of the wood slats, to be reviewed during shop drawings.

31. What color do you want the colored concrete? There is a big difference in color additives which in some cases can double the cost of the concrete.

RESPONSE: Exact pigment colors are to be determined in conjunction with final selection of paver colors. Both of the colors are likely to be a medium to dark gray.

32. What standard will the hand railing need to comply with. The special provisions provide specification standards for the materials but there is no reference to any building code or standard that the hand railing in its completed form needs to meet. We need more than "approximately 34" high"

RESPONSE: Handrail shall meet 2010 ADA standards for accessible design.

33. Does the fabrication shop constructing the hand railing need to have a "Fracture Critical" endorsement?

RESPONSE: Fracture critical endorsement is not required for hand railing.

34. Will the contractor have to pay excavation fees to the city?

RESPONSE: Yes, the excavation fee would apply for the service work on College and sidewalk work on St. Paul/Main. No other fees related to occupancy of the ROW such as obstruction or encumbrance would be applicable. The contractor is required to restore, and repair any damage that occurs within their allocated staging areas in the public right of way as a condition of the contract.

35. Irrigation Specs. Specifically, the 'Irrigation Site Plan C214' does not specify automated water for the majority of plantings, instead, Quick coupling valves are indicated for hand watering. Is this the intent? If not please clarify.

RESPONSE: Yes, this is the intent. Sprinkler watering for grassed areas, drip irrigation for trees in hardscape areas, and quick connect coupling for watering planter beds.

36. Is the 1" setting bed inclusive in the Pervious Paver item?

RESPONSE: Pervious pavers call for 1 ½" setting bed. Setting bed shall be same material as joint fill material. Joint fill and sand setting bed material shall be incidental to item 900.670 Special Provision (Pervious Pavers). See revised special provision

37. Please specify and edge restraint method where Pervious Pavers are adjacent to grassed areas. Is this edging inclusive in the Pervious Paver item?

RESPONSE: Permeable Pavers shall be restrained on all sides by either concrete sidewalk or edging along grassed or planter areas. Edging shall be Permaloc Geoedge restraint with capture plate, 8' length straight with 10" spiral spike 12" on center or approved equal. Geoedge connection to capture plate shall be via #14x1 ¼" stainless steel hex washer, self-tapping screws. (PERMALOC CORPORATION, 13505 Barry ST, Holland, MI 49424, 1-800-356-9660, www.permaloc.com) Restraint edging shall be incidental to item 900.670 Special Provision (Pervious Pavers). See revised special provision

38. For the Corten pipe, what color is the finish on that pipe? I didn't see anything in the specifications, so I am left to assume it will be raw metal.

RESPONSE: Corten is the finish designation.

39. Also, for the screening fence around the HVAC, I was wondering if some value engineering alternatives would be considered. AMETCO was the only listed option for the screening fence. Alumiguard or Ameristar could save up to 75% the cost. Although its not an exact design match, it could help alleviate some of the costs.

RESPONSE: Provide bid pricing for the specified screen fence systems as part of Alternate Bid Item No. 1 – Screen Fence System. Any value engineering will occur after bid in accordance with section 105.30.

END OF ADDENDUM NO. 2

Burlington City Hall Park
Bid Documents

December 2018

BID PROPOSAL FORM
Great Streets BTV – City Hall Park Improvement Project

Proposal of _____ (hereinafter called Bidder),
organized and existing under the laws of the State of Vermont doing business as

(a corporation, a partnership, of an individual)

To the City of Burlington, Vermont (hereinafter called Owner)

The Bidder represents that this bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation. The bidder has not directly or indirectly induced or solicited any other bidder to submit a false bid. Bidder has not solicited or induced any person, firm or corporation to refrain from bidding and the bidder has not sought by collusion to obtain for himself any advantage over any other bidder or Owner.

The undersigned bidder proposed and agrees, if this bid is accepted, to enter into an agreement with Owner to furnish all materials and to complete all work as specified or indicated in the Contract Documents for the contract price and within the contract time indicated in this bid and in accordance with the Contract Documents.

Bidder hereby agrees to commence Work under this contract on the date of issuance of the Notice to Proceed and that the Final Completion date for this contract is May 21st, 2020.

Bidder acknowledges receipt of the following Addenda:

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Bidder agrees to perform all the Work described in the Contract Documents for the following schedule of prices. Unqualified bids will not be accepted.

The Total Base Bid is the basis for contract award. All unit prices for the same item description shall be the same unit cost, no matter whether the quantities are in the Base Bid or Add Alternates. The City shall determine whether to include the Add Alternates in the contract based on final bid results and local funding limits.

BASE BID – BASIS OF CONTRACT AWARD

Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
201.10	Clearing and Grubbing, Including Individual Trees and Stumps	LS	1	\$_____	\$_____
Unit Price in Words:					
201.15	Removing Medium Trees	EA	3	\$_____	\$_____
Unit Price in Words:					
201.15	Removing Large Trees	EA	16	\$_____	\$_____
Unit Price in Words:					
201.20	Removing Medium Stumps	EA	3	\$_____	\$_____
Unit Price in Words:					
201.21	Removing Large Stumps	EA	16	\$_____	\$_____
Unit Price in Words:					
203.15	Common Excavation	CY	4270	\$_____	\$_____
Unit Price in Words:					
203.32	Granular Borrow	CY	124	\$_____	\$_____
Unit Price in Words:					
204.20	Trench Excavation of Earth	CY	2100	\$_____	\$_____
Unit Price in Words:					
204.25	Structure Excavation	CY	22	\$_____	\$_____
Unit Price in Words:					
204.30	Granular Backfill for Structures	CY	70	\$_____	\$_____
Unit Price in Words:					
301.25	Subbase of Crushed Gravel, Coarse Graded	CY	46	\$_____	\$_____
Unit Price in Words:					
301.26	Subbase of Crushed Gravel, Fine Graded	CY	875	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
301.35	Subbase of Dense Graded Crushed Stone	CY	900	\$_____	\$_____
Unit Price in Words:					
404.65	Emulsified Asphalt	CWT	1	\$_____	\$_____
Unit Price in Words:					
406.25	Marshall Bituminous Concrete Pavement	TON	30	\$_____	\$_____
Unit Price in Words:					
514.10	Water Repellant, Silane	GAL	95	\$_____	\$_____
Unit Price in Words:					
541.25	Concrete, Class B	CY	155	\$_____	\$_____
Unit Price in Words:					
601.2601	6" Drainage Pipe (SDR35 PVC)	LF	17	\$_____	\$_____
Unit Price in Words:					
601.2603	8" Drainage Pipe (SDR35 PVC)	LF	50	\$_____	\$_____
Unit Price in Words:					
601.2605	12" Drainage Pipe (SDR35 PVC)	LF	247	\$_____	\$_____
Unit Price in Words:					
601.2615	18" Drainage Pipe (SDR35 PVC)	LF	78	\$_____	\$_____
Unit Price in Words:					
604.20	Precast Reinforced Concrete Catch Basin with Cast Iron Grate	EA	2	\$_____	\$_____
Unit Price in Words:					
604.22	Sanitary Sewer Manhole	EA	3	\$_____	\$_____
Unit Price in Words:					
604.40	Changing Elevation of Drop Inlets, Catch Basins or Manholes	EA	1	\$_____	\$_____
Unit Price in Words:					
605.20	Underdrain Carrier Pipe (4 Inches)	LF	210	\$_____	\$_____
Unit Price in Words:					
605.95	Underdrain Flushing Basin	EA	2	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
609.10	Dust Control with Water	MGAL	25	\$_____	\$_____
Unit Price in Words:					
609.15	Dust and Ice Control with Calcium Chloride	TON	1	\$_____	\$_____
Unit Price in Words:					
613.16	Riprap, Light Type	CY	2	\$_____	\$_____
Unit Price in Words:					
616.41	Removal of Existing Curb	LF	1311	\$_____	\$_____
Unit Price in Words:					
618.10	Portland Cement Concrete Sidewalk, 6 Inch	SY	775	\$_____	\$_____
Unit Price in Words:					
618.30	Detectable Warning Surface	SF	80	\$_____	\$_____
Unit Price in Words:					
620.55	Removal of Existing Fence	LF	164	\$_____	\$_____
Unit Price in Words:					
628.35	PVC Sewer Pipe(SDR35)	LF	300	\$_____	\$_____
Unit Price in Words:					
629.23	Seamless Copper Water Tube	LF	260	\$_____	\$_____
Unit Price in Words:					
629.24	Ductile Iron Pipe, Cement-Lined	LF	360	\$_____	\$_____
Unit Price in Words:					
629.35	Tapping Sleeve and Valve Box	EA	1	\$_____	\$_____
Unit Price in Words:					
629.42	Transfer to New System, Water System	LS	1	\$_____	\$_____
Unit Price in Words:					
630.10	Uniformed Traffic Officer	HR	416	\$_____	\$_____
Unit Price in Words:					
630.15	Flaggers	HR	4160	\$_____	\$_____
Unit Price in Words:					
631.10	Field Office, Engineers	LS	1	\$_____	\$_____
Unit Price in Words:					
635.11	Mobilization/ Demobilization	LS	1	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
641.15	Portable Changeable Message Sign	EA	4	\$_____	\$_____
Unit Price in Words:					
649.11	Geotextile for Roadbed Separator	SY	80	\$_____	\$_____
Unit Price in Words:					
649.41	Geotextile for Underdrain Trench Lining	SY	410	\$_____	\$_____
Unit Price in Words:					
651.35	Topsoil	CY	735	\$_____	\$_____
Unit Price in Words:					
653.35	Stabilized Construction Entrance	CY	25	\$_____	\$_____
Unit Price in Words:					
653.40	Inlet Protection Device, Type I	SY	5	\$_____	\$_____
Unit Price in Words:					
653.41	Inlet Protection Device, Type II	EA	6	\$_____	\$_____
Unit Price in Words:					
653.20	Rolled Erosion Control Product, Type I	SY	50	\$_____	\$_____
Unit Price in Words:					
653.475	Silt Fence, Type 1	LF	948	\$_____	\$_____
Unit Price in Words:					
656.30	Deciduous Trees (Planting & Staking Only)	EA	18	\$_____	\$_____
Unit Price in Words:					
656.35	Deciduous Shrubs	EA	330	\$_____	\$_____
Unit Price in Words:					
656.41	Perennials	EA	770	\$_____	\$_____
Unit Price in Words:					
656.65	Landscape Watering	MGAL	267	\$_____	\$_____
Unit Price in Words:					
678.23	Wired Conduit (Ethernet/Event Power)	LF	2,750	\$_____	\$_____
Unit Price in Words:					
678.23	Wired Conduit (Site and Lighting Electrical)	LF	640	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
678.25	Pull Box, Standard (10"x15")	EA	20	\$_____	\$_____
Unit Price in Words:					
678.25	Pull Box, Standard (18"x24")	EA	5	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Bioretention Soil)	CY	385	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Compost Mulch)	CY	75	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Horticultural Soil)	CY	255	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Landscape Mineral Mulch)	CY	10	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Peastones)	CY	10	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Stonedust)	CY	2	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Subbase of Drainage Aggregate)	CY	260	\$_____	\$_____
Unit Price in Words:					
900.608	Special Provision (Washed River Rock)	CY	10	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Soil Cells)	EA	136	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Yard Drain)	EA	3	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Bioretention Overflow Drain)	EA	2	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.620	Special Provision (Bioretention A Outlet Structure)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Runnel Drain)	EA	3	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Bench)	EA	23	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Bike Rack) In-Ground	EA	5	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Bike Rack) Surface Mount	EA	8	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Dog Waste Bag Dispenser Posts)	EA	2	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Drinking Fountain)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Current Transformer Cabinet)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Current Rated Meter)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Event Distribution Panel)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Main Distribution Panel)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Union Company Switch)	EA	2	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Light Pole Base)	EA	17	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.620	Special Provision (Light Pole with Post Top Luminaire, Type P1)	EA	17	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Post Top Luminaire, Type P1A)	EA	2	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (In-Grade Uplight, Type P3)	EA	4	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (In-Grade Uplight, Type P4)	EA	5	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Bracket Mounted Luminaire, Type P5)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Lighting Control System)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Message Board Base Bid)	EA	1	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Tent Tie Down Hardware)	EA	24	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Big Belly Receptacles)	EA	2	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Tree Grates)	EA	4	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Outdoor Electrical & Communications Ground Boxes)	EA	20	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Grasses)	EA	693	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Bulbs)	EA	800	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.620	Special Provision (Rain Gardens A, B, C & D Planting)	EA	2121	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Art Disc Placement)	EA	120	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Curb Inlet & Trench Drain)	EA	2	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Catch Basin Vapor Trap Pipe Elbow)	EA	2	\$_____	\$_____
Unit Price in Words:					
900.640	Special Provision (Pedestrian Hand Railing)	LF	90	\$_____	\$_____
Unit Price in Words:					
900.640	Special Provision (Metal Landscape Edging)	LF	800	\$_____	\$_____
Unit Price in Words:					
900.640	Special Provision (Temporary Chain-Link Fence, 6 Feet)	LF	1725	\$_____	\$_____
Unit Price in Words:					
900.640	Special Provision (Vertical Granite Curb Type A, B, C, and Flush)	LF	975	\$_____	\$_____
Unit Price in Words:					
900.640	Special Provision (Trench Drain) (12")	LF	55	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Arch Pipe Detention System)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Bollard & Rail Fence System)	LS	1	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.645	Special Provision (Demolition and Salvage Existing Fountain & Amphitheater Wall)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Granite Block Seatwall at Ellipse)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Granite Stair)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Granite Veneer Wall Central Rain Garden)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Granite Veneer Wall College St. Terrace)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Granite Veneer Retaining Wall Main St & SW Corner)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Interactive Fountain System)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Irrigation System)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Lawn Restoration)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Misc Demolition)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Moveable Tables and Chairs)	LS	1	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.645	Special Provision (Restroom Facilities)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Relocate Monument & Install New Flagpole)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Rain Garden A)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Rain Garden B)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Rain Garden C)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Tree Protection)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Traffic Control, All-Inclusive)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Water Backflow Prevention and Vault)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Weathered Steel Seatwall)	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Contaminated Soils Management) N.A.B.I.	LS	1	<u>\$ 225,000</u>	<u>\$ 225,000</u>
Unit Price in Words:					
900.670	Special Provision (Paver Type 2 and Type 3)	SF	4820	\$_____	\$_____
Unit Price in Words:					
900.670	Special Provision (Paver Type 4 and Type 5)	SF	3880	\$_____	\$_____
Unit Price in Words:					

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Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.670	Special Provision (Paver Type 6)	SF	410	\$_____	\$_____
Unit Price in Words:					
900.670	Special Provision (Pervious Pavers)	SF	3648	\$_____	\$_____
Unit Price in Words:					
900.670	Special Provision (City Hall Foundation Repair)	SF	100	\$_____	\$_____
Unit Price in Words:					
900.670	Special Provision (Chittenden County Trust Foundation)	SF	140	\$_____	\$_____
Unit Price in Words:					
900.675	Special Provision (Concrete With Integral Color A and B)	SY	624	\$_____	\$_____
Unit Price in Words:					
900.675	Special Provision (Granite Drainage Runnel)	SY	140	\$_____	\$_____
Unit Price in Words:					

Total Base Bid \$_____

Total Base Bid Words (Basis of Contract Award) _____

Bidders must bid on all pay items in each set of Alternate Bid Items as well as Add Alternate Items. Add Alternate Item pricing shall include costs for additional work beyond that outlined in the base bid as described under each Add Alternate.

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Alternate Bid Item No. 1 – Screen Fence System

Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.645	Special Provision (Screen Fence System) Option A	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Screen Fence System) Option B	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Screen Fence System) Option C	LS	1	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Screen Fence System) Option D	LS	1	\$_____	\$_____
Unit Price in Words:					

Add Alternate No. 1 – City Hall Uplights

Add Alternate No. 1 – City Hall Uplights will be full compensation for furnishing, transporting, handling, assembling, and placing the additional materials specified as described under special provision (Exterior Lighting). Work shall be in conjunction with other Special Provision (Exterior Lighting) items.

Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.620	Special Provision (Bracket Mounted Luminaire, Type P2 and P2A)	EA	4	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (In-Grade Uplight, Type P3A)	EA	16	\$_____	\$_____
Unit Price in Words:					

Total Add Alternate No 1- City Hall Uplights \$_____

Total Add Alternate No. 1 Words_____

Add Alternate No. 2 – Terrace Pavers

Add Alternate No. 2 – Terrace Pavers will be full compensation for furnishing, transporting, handling, assembling, and placing Special Provision (Paver Type 2) materials as described under special provisions. This work shall be in lieu of placing Special Provision (Concrete With Integral

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Color A and B) as described in special provisions at the location specified on plans. The quantity for Item 900.675 Special Provision (Concrete With Integral Color A and B) below is a reduction and should be accounted as such in the Add Alternate total.

Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.675	Special Provision (Concrete With Integral Color A and B)	SF	(109)	\$_____	\$_____
Unit Price in Words:					
900.670	Special Provision (Paver Type 2)	SF	980	\$_____	\$_____
Unit Price in Words:					

Total Add Alternate No. 2- Terrace Pavers \$ _____

Total Add Alternate No. 2 Words _____

Add Alternate Bid Item No. 3 – Lawn Restoration- Sodding

Add Alternate No. 3 – Lawn Restoration – Sodding will be full compensation for preparing, maintaining, implementing lawn restoration, including but not limited to preparation of area, coordination with city arborist, removal of mulch, aeration, application of amendments, scarifying subgrade, topsoil, sodding, and watering, and for furnishing all labor, tools, materials, equipment, and incidentals to complete the work under Special Provision (Lawn Restoration - Sodding) as described under special provisions. This work shall be in lieu of placing Special Provision (Lawn Restoration – Topsoil & Hydroseed) as described in special provisions at the location specified on plans. The quantity for Item 900.645 Special Provision (Lawn Restoration – Topsoil & Seed) below is a reduction and should be accounted as such in the Add Alternate total.

Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.645	Special Provision (Lawn Restoration – Topsoil & Hydroseed)	LS	(1)	\$_____	\$_____
Unit Price in Words:					
900.645	Special Provision (Lawn Restoration – Sodding)	LS	1	\$_____	\$_____
Unit Price in Words:					

Total Add Alternate No. 3- Lawn Restoration- Sodding \$ _____

Total Add Alternate No. 3 Words _____

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Add Alternate No. 4 – Message Board

Add Alternate No. 4 – Message Board will be full compensation for furnishing and installation of message board (s) including furnishing all labor, tools, materials, equipment, and incidentals to complete the work under Special Provision (Message Board Add Alt) as described under special provisions. This work shall be in lieu of placing Special Provision (Message Board Base Bid) as described in special provisions at the location specified on plans. The quantity for Item 900.620 Special Provision (Message Board Base Bid) below is a reduction and should be accounted as such in the Add Alternate total.

Vtrans Item #	ITEM DESCRIPTION	UNITS	BID QTY	UNIT PRICE	TOTAL PRICE
900.620	Special Provision (Message Board Base Bid)	EA	(1)	\$_____	\$_____
Unit Price in Words:					
900.620	Special Provision (Message Board Add Alt.)	EA	1	\$_____	\$_____
Unit Price in Words:					

Total Add Alternate No. 4 – Message Board \$_____

Total Add Alternate No. 4 Words_____

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The lowest responsive and responsible bidder will be determined by the Total Base Bid. The above unit prices shall include all labor, materials, removal, overhead, profit, insurance, etc. to cover the finished work of the several kinds called for on the drawings and specifications.

THE ABOVE PROPOSAL IS HEREBY RESPECTFULLY SUBMITTED BY:

Contractor

By

Title

Business Address

City

State

Date

ATTEST _____

LS = lump sum

EA = each

SY = square yard

SF = square feet

CWT = hundredweight

GAL = gallon

HR = hour

LU = lump unit

CY = cubic yard

LF = linear foot

TON = ton

MGAL = thousand gallons

LB = pound

MFBM = thousand feet, board measure

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STATEMENT OF INTENT TO COMPLY

The Contractor and subcontractors on this project have read and understand the provisions of the City of Burlington's:

1. City Livable Wages Ordinance
2. Prequalification of Construction Contractors Ordinance
3. City Outsourcing Ordinance
4. City Union Deterrence Ordinance

as described in the Ordinance and the Administrative Policy statement.

The Contractor shall submit prior to the signing of the contract a completed Employment Plan, including wages to comply with the governing Ordinances. This Employment Plan shall have been approved by the Owner before the signing of the contract.

The Contractor and all subcontractors shall prepare and submit Monthly Compliance Reports no later than the first Thursday of each month following the month work is performed **OR** approved supporting documentation as appropriate to demonstrate adherence to the above referenced Ordinances with each pay request. The Owner shall be notified of any work suspension, the day work was suspended, and the day the work commencement is anticipated. This Compliance Report or documentation shall document the name, address, social security number and sex of each worker, job classification, and total hours worked each day on the project, total hours worked during this time period, rate of pay and gross earnings.

The Contractor and subcontractors shall comply with all Ordinances spelled out in the Contract Documents throughout the contract period.

(Signature of Authorized Official)

(Date)

CURB INLET & TRENCH DRAINS

XX. DESCRIPTION. This work shall consist of furnishing and installing street curb inlets and associated trench drains at the locations indicated in the Plans and as directed by the Engineer.

XX. MATERIALS. Materials shall conform to the requirements of the respective section 543 and/or section 540 and as specified in the Plans and as specified in the following subsections:

Portland Cement	701.02
Fine Aggregate for Cement	704.01
Coarse Aggregate for Concrete	704.02
Reinforcing Steel	713.01
Epoxy Coating	713.07(b)
Granular Backfill for Structures	704.08

xx. SUBMITTALS. Working Drawings, calculations and pertinent data shall be submitted to the Engineer in accordance with Section 105.

Working Drawings shall provide layout and dimensions of all pieces to be fabricated. Proposed cover shall be detailed on the Working Drawings, including proposed mounting details to provide a flush cover with the top of the curb flow channel and adjacent sidewalk.

XX. CONSTRUCTION REQUIREMENTS. Construction requirements shall be in accordance with section 543 and the following:

Penetrations required shall be completed by the manufacturer and not in the field. The vault placement shall be as shown in the Plans or directed by the Engineer, and as approved by the affected utility companies.

The curb flow channels shall be placed on level aggregate base. Precast components to be joined shall have mechanical connection capable of developing the required strength due to loadings specified. All joints shall be sealed with butyl rubber as indicated in the Plans.

XX. METHOD OF MEASUREMENT. The quantities of Special Provision (Curb Inlet & Trench Drains) to be measured for payment will be the number of units of the respective types used in the complete and accepted work in the complete and accepted work.

XX. BASIS OF PAYMENT. The accepted quantities of Special Provision (Curb Inlet & Trench Drains) will be paid for at the Contract Unit Price per each. Payment will be full compensation for furnishing, transporting, handling, and placing the materials specified, including curb inlet casting, precast and/or cast in place concrete trench, frame and cover and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Curb Inlet & Trench Drains)	Each

LANDSCAPE EDGING

- XX. DESCRIPTION. This work shall consist of furnishing and installing landscape edging in accordance with the Plans and as directed by the Engineer.
- XX. MATERIALS. Landscape edging shall be as specified by the manufacturer and shall meet the specifications outlined in the Plans.
- XX. INSTALLATION. All work shall be free of blemishes or defects which could affect durability, strength, or appearance. The landscape edging shall be installed true to line and grade as shown on the Plans or as directed by the Engineer.

The landscape edging 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 landscape edging and maintain them in an undamaged condition until they are installed and accepted for payment.

- XX. METHOD OF MEASUREMENT. The quantity of Special Provision (Landscape Edging) to be measured for payment will be the number of linear feet of edging installed in the complete and accepted work.
- XX. BASIS OF PAYMENT. The accepted quantity of Special Provision (Landscape Edging) will be paid for at the Contract linear foot price. Payment will be full compensation for installing a complete landscape edging system and necessary 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 anchoring and any concrete required for anchor footings.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Landscape Edging)	Linear Foot

IRRIGATION SYSTEM

xx. DESCRIPTION. Contractor is responsible for designing and providing a system with full and complete coverage. Furnish all labor, materials, supplies, equipment, tools, and transportation, and perform all operations in connection with and reasonably incidental to the complete design and installation of the irrigation system, and guarantee/warranty as shown on the drawings, the installation details, and as specified herein. Items of work specifically included are:

- (a) Procurement of design layout by professional irrigation designer. Designer shall have a minimum of 5 years of experience in the design of landscape irrigation systems similar in size and complexity.
- (b) Procurement of all applicable licenses, permits, and payment of required fees.
- (c) Coordination of Utility Locates ("Dig-Safe").
- (d) Maintenance period.
- (e) Sleeving for irrigation pipe and wire.

XX. QUALIFICATIONS.

- (a) Contractor:
 - 1. Irrigation Contractor must have demonstrated experience with the installation of at least five (5) irrigation systems having large diameter HDPE pipe (6-inch) and larger), two-wire decoder technology control systems, electrically operated remote control valves, and large radius rotary sprinklers (minimum 1-inch inlet with swing joint).
- (b) Equipment Manufacturer:
 - 1. Manufacturer regularly and presently manufactures the item as one of their principal products.
- (c) System Requirements:
 - 1. Full and complete coverage is required. Contractor shall, at no additional cost to the City, make necessary adjustments to layout required to achieve full coverage of irrigated areas.
 - 2. Layout work as closely as possible to drawings. Drawings are diagrammatic to the extent that swing joints, offsets and all fittings are not shown.

xx. SUBMITTALS.

- (a) The irrigation plan is intended to be a general concept for the layout of landscape irrigation. The Contractor shall submit a site specific irrigation plan stamped by a professional irrigation designer licensed to the Engineer for acceptance prior to the start of construction. The irrigation layout, design and materials shall be coordinated with, and reviewed by, the City of Burlington prior to submittal to the Engineer.
- (b) Make submittal and provide four (4) copies of irrigation information in a 3-ring binder with table of contents and index sheet. Provide sections that are indexed and labeled for valves, sprinklers, pipe and fittings, wire and wire connectors, ID tags, shop drawings and all other irrigation equipment shown or described on the drawings and within these specifications. Highlight items being supplied on the catalog cut sheets. Submittal package must be complete prior to being reviewed by the Contracting Officer's Technical Representative. Incomplete submittals will be returned without review.
- (c) Documentation of contractor qualifications.

- (d) Materials List: Include all materials and products that are part of the irrigation system including, but not limited to: pipe, fittings, valves, mainline components, water emission components, and control system components. Quantities of materials need not be included.
- (e) Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on the materials list.
- (f) Shop Drawings: Submit shop drawings called for in the installation details. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to the installation detail.
- (g) Testing: Submit a proof of testing report following completion of each test listed in Part 1 of these specifications. Unless otherwise noted, include name of test, date of test, name of the individual completing the test, name of the company completing the test, and a summary of the test results. If system fails test, document any and all retests until system passes test.
- (h) Maintenance and Operation Instructions: Submit information listed in Part 3 of these specifications.
- (i) Record Drawings: Submit information listed in Part 3 of these specifications.

xx. APPLICABLE PUBLICATIONS.

- (a) The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- (b) Federal Specifications (Fed. Spec.): RR-F-621E Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole
- (c) American National Standard Institute (ANSI):
 - 1. A21.4-Cement-Mortar Lining/Cast and Ductile Iron Pipe and Fittings
 - 2. B40.1-91-Gauges-Pressure Indicating Dial Type Elastic Element
- (d) American Society of Agricultural Engineers (ASAE):
 - 1. S398-Sprinkler Testing and Performance Reporting
- (e) American Society for Testing and Materials (ASTM):

B61-93	Steam or Valve Bronze Castings
B62-93	Composition Bronze or Ounce Metal Castings
C857	Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
C858	Specification for Underground Precast Concrete Utility Structures
C891	Practice for Installation of Underground Precast Concrete Utility structures
D1785-91	Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120
D2241-89	Poly(Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series)
D2287-81	Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
D2464-91	Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D2466-90	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D2564-94	Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings

- D2855-90 Making Solvent Cement Joints with Poly(Vinyl Chloride) (PVC) Pip and Fittings
- F477-90 Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- F656-08 Primers for use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings F714. Standard Specification for Polyethylene (PE) 4170 Plastic Pipe (SDR-PR) Based on Outside Diameter

(f) American Water Works Association (AWWA):

- C104 Cement-Mortar Lining/Cast and Ductile Iron Pipe and Fittings
- C110-93 Ductile-Iron and Gray-Iron Fittings, 3-Inch Through 48-Inch for Water and other Liquids
- C500-93 Gate Valves for Water and Sewerage Systems
- C504-87 Rubber Sealed Butterfly Valves
- C600-93 Installation for Ductile-Iron Water Mains and their Appurtenances
- C901-02 Polyethylene (PE) Pressure Pipe and Tubing, ½ in. through 3 in., for Water Service

(g) Manufacturers Standardization Society (MSS):

- SP70-90 Cast Iron Gate Valves, Flanged and Threaded Ends

(h) National Electrical Manufacturers Association (NEMA):

(i)

- 250-85 Enclosures for Electrical Equipment (1000 Volts Maximum); Revision 1, May 1986

(j)

(k) National Electric Code: (latest edition)

(l) Uniform Plumbing Code: (latest edition)

(m) Irrigation Association:

- 1. Irrigation System Installation and Maintenance, 2nd Edition
- 2. Irrigation Contractor Workbook, 2nd Edition
- 3. Landscape Irrigation Auditor Manual, 3rd Edition

xx. RULES AND REGULATIONS.

- (a) Work and materials will be in accordance with the latest edition of the National Electric Code, the Uniform Plumbing Code, and applicable laws and regulations of the governing authorities.
- (b) When the contract documents call for materials or construction of a better quality or larger size than required by the contract documents.
- (c) If quantities are provided either in these specifications or on the drawings, these quantities are provided for information only. It is the Contractor's responsibility to determine the actual quantities of all material, equipment, and supplies required by the project and to complete an independent estimate of quantities and wastage.

xx. TESTING.

- (a) Notify the Engineer five working days in advance of testing.
- (b) Subject pipelines jointed with rubber gaskets or threaded connections to a pressure test after partial completion of backfill. Pipelines jointed with solvent-welded PVC joints will be allowed to cure at least 24 hours before testing.

- (c) Subsections of mainline pipe may be tested independently, subject to the review of the Engineer.
- (d) Furnish clean, clear water, pumps, labor, fittings, and equipment necessary to conduct tests or retests.
- (e) Hydrostatic Pressure Test - Solvent Weld Lateral Pipe and HDPE mainline Pipe:
 - 1. Subject lateral pipe to a hydrostatic pressure equal to the anticipated operating pressure of 100 PSI for 1 hour.
 - 2. Cap all sprinkler risers.
 - 3. Backfill top revent pipe from moving under pressure. Expose couplings and fittings.
 - 4. Leakage will be detected by visual inspection. Replace defective pipe, fitting, joint, valve, or appurtenance. Repeat the test until the pipe passes test.
 - 5. As an alternative to the visual inspection described in Item 4 above, the Engineer may request that a pressure drop test be performed:
 - i. Purge air from pipe before test. Attach pressure gauge to a riser in the middle of the lateral. Cap all sprinkler risers.
 - ii. Pressurize the lateral via the remote control valve then turn down flow control handle on remote control valve to seal off lateral.
 - iii. Observe pressure loss on pressure gauge. If pressure loss is greater than 5 PSI, identify reason for pressure loss. Replace defective pipe, fitting, joint, valve, or appurtenance. Repeat test until pressure loss is equal to or less than 5 PSI.
 - iv. Cement or caulking to seal leaks is prohibited.
 - v. After lateral passes test and prior to operational test, install sprinklers and backfill and compact all pipe, fittings, joints, or appurtenances.
- (f) Operational Test - Remote Control Valves, Lateral Piping and Sprinklers:
 - 1. Activate each remote control valve in sequence from each controller. Manual operation of the valves from the bleed valve on the remote control valve is not an acceptable method of activation. Engineer will visually observe operation, water application patterns, and leakage.
 - 2. Replace defective remote control valve, solenoid, wiring, or appurtenance to correct operational deficiencies.
 - 3. Replace, adjust, add, or move water emission devices to correct operational or coverage deficiencies.
 - 4. Replace defective pipe, fitting, joint, valve, sprinkler, or appurtenance to correct leakage problems. Cement or caulking to seal leaks is prohibited.
 - 5. Repeat test(s) until each lateral passes all tests. Repeat tests, replace components, and correct deficiencies at no additional cost to the Owner.
- (g) Catch Can Test:
 - 1. Perform a catch can test on the following to document application rate for programming of climate-based controller:
 - i. One representative zone of rotors in each burial section
 - ii. One representative zone of tree lawn rotors in each burial section
 - iii. All spray sprinkler zones
 - 2. Select the representative zones for testing with the Engineer.

3. Perform a catch can test using procedures recommended by the Irrigation Association Certified Landscape Auditor procedure.
 4. Provide a written report of the test data listing controller name, station number, application rate for each zone, date of test, name of the individual completing the test, name of the company completing the test. Submit report to the Engineer.
 5. An Irrigation Association Certified Landscape Irrigation Auditor must perform the test. Provide written evidence of certification prior to conducting test.
- (h) Control System Grounding:
1. Test for proper grounding of control system per manufacturer's recommendations. Test results must meet or exceed manufacturer's guidelines for acceptance.
 2. Replace defective wire, grounding rod or appurtenances. Repeat the test until the manufacturer's guidelines are met.
 3. If the test is acceptable, the individual completing the test must document the results of the grounding test via a written report. Documentation should include decoder number or location, date of test, and the ohms resistance to ground.
 4. A written report of the test data listing decoder number or location, date of test, name of the individual completing the test, name of the company completing the test and the ohms resistance to ground for each decoder must be submitted to the Engineer.
- (i) Acceptance Test Prior to Final Inspection:
1. Upon completion of construction and prior to Final Inspection, an Acceptance Test must be passes.
 2. Coordinate start of Acceptance Test with Engineer.
 3. During the Acceptance Test, the irrigation system must be fully operational from the control system. The irrigation system must operate with no faults for 14 consecutive days. If at any time during the 14-day test period, a system fault occurs, the source of the fault must be determined and corrected and the 14-day evaluation period will start again. If a system fault occurs, make repairs within 72 hours of notification from Engineer. Document any faults in the proof of test report listing date of fault, fault, cause of the fault, and the corrective action taken.
 4. When the system has operated for 14 days without fault, contact the Engineer to schedule Final Inspection.
- xx. CONSTRUCTION REVIEWS.
- (a) The purpose of on-site review by the Engineer is to periodically observe the work in progress, the Contractor's interpretation of the construction documents, and to address questions with regard to the installation.
1. Schedule review for the irrigation system layout or testing with the Engineer as required by these specifications.
 2. Impromptu reviews may occur at any time during the project.
 3. A Final Inspection will occur at the completion of the irrigation Acceptance Test. The intent of the Final Inspection is to verify that all installation; testing; maintenance and operation submittals; and project record drawing submittals are completed prior to the start of the Maintenance and Guarantee/Warranty periods.
 4. All costs, including travel expenses and site visits by the City of Burlington or City of Burlington representative(s) for

additional Inspection(s) that may be required after the Final Inspection due to non-compliance with the Construction Documents are the sole responsibility of the Contractor.

xx. GUARANTEE/WARRANTY AND REPLACEMENT.

- (a) The purpose of this guarantee/warranty is to insure that the City receives irrigation materials of prime quality, installed and maintained in a thorough and careful manner.
- (b) Guarantee/warranty irrigation materials, equipment, and workmanship against defects for a period of one year from Final Inspection by the Engineer. Fill and repair depressions. Restore landscape, utilities, structures or site feature damaged by the settlement of irrigation trenches or excavations. Repair damage to the premises caused by construction or a defective item. Make repairs within 72 hours of notification from the Engineer.
- (c) Replace damaged items with identical materials and methods per contract documents or applicable codes. Make replacements at no additional cost to the contract price.
- (d) Guarantee/warranty applies to originally installed materials and equipment and replacements made during the guarantee/warranty period.

xx. MATERIALS.

- (a) QUALITY.
 - 1. Use new materials without flaws or defects.
- (b) SUBSTITUTIONS.
 - 1. Pipe sizes referenced in the construction documents are minimum sizes, and may be increased at Contractor's option.
- (c) SLEEVING.
 - 1. Provide sleeve beneath hardscape for irrigation pipe and wiring. Provide separate sleeve beneath hardscape for wiring.
 - 2. Use rigid, unplasticized polyvinyl chloride (PVC) 1120, 1220 National Sanitation Foundation (NSF) approved pipe, extruded from material meeting the requirements of Cell Classification 12454-A or 23565-B, ASTM Standard D1784, with an integral belled end.
 - 3. Use Class 200, SDR-21, rated at 200 PSI, conforming to dimensions and tolerances established by ASTM Standard D2241 for mainline pipe, lateral pipe and wiring sleeves.
 - 4. Mainline and lateral pipe sleeves are as shown on the drawings.
 - 5. Install control wiring sleeve inside pipe sleeves as presented in the installation details. Wiring bundle contained in the sleeve should not exceed 40% of the available area within the sleeve per NEC recommendations.
- (d) PIPE AND FITTINGS.
 - 1. HDPE Pipe and Fittings:
 - a. Use high density, extra high molecular weight polyethylene pipe (HDPE) 4710, extruded from material meeting the specifications of cell classification on PE 245434C, ASTM standard D 3350, SDR 9, rated at 200 PSI conforming to the dimensions and tolerances established by ASTM F 714 for mainline pipe.
 - b. Join pipe lengths using butt-fusion technique as recommended by pipe manufacturer.
 - 2. Lateral Pipe and Fittings:
 - a. Use rigid, unplasticized polyvinyl chloride (PVC 1120, 1220 National Sanitation Foundation (NSF) approved pipe,

- extruded from material meeting the requirements of Cell Classification 12454-A or 12454-B, ASTM Standard D1784, with an integral belled end suitable for solvent welding.
- b. Use Class 200, SDR-21, rated at 200 PSI, conforming to dimensions and tolerances established by ASTM Standard D2241.
- c. Use solvent weld pipe for lateral pipe. Use Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784 for PVC pipe. Primer for use with solvent cement to conform to ASTM F656 and purple in color. Solvent cement to conform to ASTM Standard D2564, of type approved by pipe manufacturer.
- 3. Specialized Pipe and Fittings:
 - a. Ductile Iron Pipe: Use Class 50 conforming to ANSI A21.51 (AWWA C151). Use minimum of Class 53 thickness pipe for flanged piping. Use cement-mortar lining conforming to ANSI/AWWA C104-A21.4.
 - b. Use mechanical joints conforming to ANSI A 21.10 (AWWA C110) and ANSI A21.11 (AWWA C111) or flanged fittings conforming to ANSI/AWWA C110 and ANSI B16.1 (125#).
 - c. Joint sealant: Use only Teflon-type tape or Teflon based paste pipe joint sealant on plastic threads. Use nonhardening, nontoxic pipe joint sealant formulated for use on water-carrying pipes on metal threaded connections.
- 4. Joint Restraint Harness:
 - a. Use a joint restraint harness as presented in the installation details and wherever joints are not positively restrained by flanged fittings, threaded fittings, and/or thrust blocks.
 - b. Use a joint restraint harness with transition fittings between metal and PVC pipe, where weak trench banks do not allow the use of thrust blocks, or where extra support is required to retain a fitting or joint.
 - c. Use bolts, nuts, retaining clamps, all-thread, or other joint restraint harness materials that are stainless steel. Use retainer conforming to ASTM A536. Use high strength, low alloy steel bolts and connecting hardware conforming to ANSI/AWWA C111/A21.11.
 - d. acceptable manufacturer is Uni-Flange, or approved equal.
- (e) MAINLINE COMPONENTS.
 - 1. Isolation Gate Valve Assembly:
 - a. As presented in the installation details.
 - b. Iron body, bronze mounted, double disc with parallel or inclined seats, non-rising stem turning clockwise to close, 200 PSI minimum working pressure. AWWA C509. Acceptable manufacturers are Clow, Kennedy, Mueller, Waterous or approved equal.
 - c. Valve Box: Use plastic (ABS) 10-inch round valve box with black lid. Acceptable manufacturer is Brooks Products or approved equal.
 - d. Filter Fabric: Use a spunbond polyester 3.5 oz. per square yard landscape fabric.
 - 2. Hydrometer:
 - a. As presented in the installation details.

- b. Valve Box: Use plastic (ABS) jumbo rectangular valve box with black lid. Acceptable manufacturer is Carson or approved equal.
 - c. Filter Fabric: Use a spunbond polyester 3.5 oz per square yard landscape fabric.
 - d. Acceptable manufacturer is Bermad IR-910-MO-KX normally open or approved equal.
 - 3. Air-Vacuum Relief Valve Assembly:
 - a. As presented in the installation details.
 - b. Cast iron body with epoxy coating, polypropylene float, glass fiber reinforced nylon kinetic float, Buna-N seals and O-rings, stainless steel nuts and bolts, pressure range 2 PSI to 230 PSI. Use a continuous acting combination air and vacuum and air release valve. Acceptable manufacturer is Bermad, Crispin, Fresno, Waterman or approved equal.
 - c. PVC Ball Valve: Use a true union ball rated to 235 PSI. Use valve with safe-t-blocked seal carrier (full rated pressured), safe-t-shear stem, and self-adjusting floating seat. Acceptable manufacturer is Spears or approved equal.
 - d. Filter Fabric: Use spunbound polyester 3.5 oz per square yard landscape fabric.
 - 4. Quick Coupling Valve Assembly:
 - a. As presented in the installation details.
 - b. Brass construction, 1-inch nominal size, operating pressure 5-125 PSI with locking rubber or vinyl cover. Acceptable manufacturer and model is Hunter QCV, Rain Bird 5LRC, Toro 100-SLVLC or approved.
 - c. Swing Joint: Use pre-manufactured bolt on anchor. Acceptable manufacturer is Harco or approved equal.
 - d. Valve Box: Use plastic (ABS) 10-inch round valve box with black lid. Acceptable manufacturer is Brooks Products or approved equal.
 - e. Filter Fabric: Use a spunbound polyester 3.5 oz per square yard landscape fabric.
- (f) SPRINKLER IRRIGATION COMPONENTS.
 - 1. Remote Control Valve Assembly:
 - a. As presented in the installation details.
 - b. Remote Control Valve: PVC body, diaphragm filtered rated to 150 PSI compatible with control wiring system. Rainbird DVF or approved equal.
 - c. PVC Ball Valve: Use a true union ball rated to 235 PSI. Use valve with safe-t-blocked seal carrier (full rated pressured), safe-t-shear stem, and self-adjusting floating seat. Acceptable manufacturer is Spears or approved equal.
 - d. PVC Union: Use a Schedule 40 threaded union with O-ring seal. Acceptable manufacturer is Spears or approved equal.
 - e. Valve Box: Use plastic (ABS) standard valve box with black lid. Acceptable manufacturer is Brooks Products or approved equal.
 - f. Filter Fabric: Use a spunbond polyester 3.5 oz per square yard landscape fabric.
 - g. Install assembly over gravel sump as presented in the installation details.
 - h. Decoder: Single station decoder with surge suppression and ground wire.

- i. Wire connectors: Use 3M DBY or DBR.
 - j. Lightning protection: Provide grounding rods at decoders as recommended by control system manufacturer.
 - k. Use standard Christy I.D. tags with hot-stamped black letters on a yellow background.
2. Pop-Up Rotor Sprinkler Assembly:
- a. As presented in the installation details.
 - b. Rotary Sprinkler: Use a gear drive sprinkler capable of covering the radius with the discharge rate at the pressure as presented on the drawings. Furnish part circle sprinklers with an adjustable arc of 20- to 340-degrees, and full circle sprinklers with a non-adjustable arc. Furnish sprinkler with stainless steel pop-down spring. Nozzle must be tested per ASAE S398.1 and be verified to deliver Distribution Uniformity of 80% or more and a Scheduling Coefficient of 1.2 or less at the specified offset spacing. Furnish sprinkler with stainless steel risers, integral check valve in base of the case capable of holding back 10 feet of elevation. Minimum pop-up height is 3 ½-inches. Acceptable manufacturer and model is Rain Bird 8005-SS, Hunter I-35-SS or approved equal.
 - c. Swing Joint: Use pre-manufactured triple swing joint. Acceptable manufacturer is Rain Bird, Spears, Lasco or approved equal.
3. Pop-Up Spray Sprinkler Assembly:
- a. As presented in the installation details.
 - b. Sprinkler: Use a spray sprinkler capable of covering the radius with the discharge rate at the pressure as presented on the drawings. Furnish sprinkler with pressure reducing module in the riser stem and integral check valve in base of the case capable of holding back a minimum of 8 feet of elevation. Minimum pop-up height is 4 inches. Acceptable manufacturer and model is Hunter Institutional Series, Rain Bird 1800 Series, Toro 570Z-COM Series or approved equal.
 - c. Low Density Polyethylene Hose (Swing Pipe): Use pipe specifically intended for use as flexible swing joint. Use spiral barb fittings supplied by the same manufacturer as hose. Acceptable manufacturer is Rain Bird or approved equal.

(g) CONTROL SYSTEM COMPONENTS.

1. Control Units:

- a. Description: Stand alone climate-based unit that uses two-wire decoder technology. Control unit must have passed Irrigation Association SWAT protocol testing. Acceptable manufacturers and models are Rain Bird ESP-LXMEF, Rain Master Eagle, Toro Sentinel, Tucor RKD or approved equal.
- b. Basic Capabilities:
 - 1. Uses preprogrammed historic evapotranspiration (ET) rate data for the area or is capable of manually entering ET rate data for use with the ET based scheduling.
 - 2. 100% solid state electrical components with heavy duty electrical surge protection for input and output circuits.

3. 24 VAC transformer compatible with two-wire decoder technology.
 4. Built in lightning and surge protection.
 5. Battery backup of at least 14 days.
 6. Manual activation of remote control valves from hand held radio.
 7. Minimum number of stations as shown on the drawings. Maximum number of stations is in excess of 50.
 8. Use wall mount configuration.
 9. Compatible with master valve and flow sensor. Capable of automatically closing master valve if a high flow condition is identified by the flow sensor.
 10. Flow learning mode or programmable flow enable or disable mode.
 - c. Rain Sensor: Use rain sensor that is compatible with control unit and can automatically shut down controller operation in a rain event.
 - d. Electrical Conduit: Use PVC Schedule 40 conforming to the dimensions and tolerances established by ASTM Standard D-1785. Fittings for PVC conduit will be Schedule 40, Type 1, PVC solvent weld fittings, ASMTA Standards D2466 and D1784.
 - e. Wire Markers: Pre-numbered or labeled with indelible nonfading ink, made of permanent, nonfading material.
 - f. Lightning Protection: Provide one 12"x36"x0.0625" ground plate, earth contact enhancement material, one 5/8"x10-foot copper clad UL listed grounding rod, approximately 30 feet of #6 AWG bare copper grounding wire, 6-inch plastic round valve box and CADWELD connectors at each control unit per installation detail.
2. Hand Held Radio:
- a. Description: Hand held radio system that allows operation of the irrigation for maintenance purposes via interfacing with the control unit. System to be as recommended by control unit manufacturer.
 - b. Basic Capabilities:
 1. Single or multi-station capability for testing
 2. Timed station operation
 3. Ability to turn an irrigation program on and off
 4. Water and mud resistant
 - c. Provide three (3) hand held radios each complete with either replaceable lithium battery or rechargeable batteries and charging station.
 - d. Provide permanent receivers with antennas, necessary cabling and connectors in each control unit.
3. Controller Wire:
- a. Use American Wire Gauge (AWG) #14 two-wire cable between control unit and decoder as recommended by control system manufacturer.
 - b. Use American Wire Gauge (AWG) #14 solid copper, Type UF between decoder and remote control valve.
 - c. Color: Wire color must be continuous over its entire length.
 - d. Splices: Use 3M DBY-6 or 3M DBR-6 splices as recommended by control system manufacturer.

- e. Valve Box: Use plastic (ABS) standard rectangular valve with black lid. Acceptable manufacturer is Brooks Products or approved equal.
- f. Warning tape: Inert plastic film highly resistant to alkalis, acids, or other destructive chemical components likely to be encountered in soils. Three inches wide colored red and imprinted with "CAUTION: BURIED ELECTRIC LINE BELOW" in black lettering.

(h) DRIP IRRIGATION COMPONENTS

1. Remote Control Valve (RCV) Assembly for Drip Laterals: As presented in the manufacturer installation details (Rain Bird or approved equal). Use wire connectors and waterproofing sealant to join control wires to solenoid valves. Use standard Christy I.D. tags with hot-stamped black letters on a yellow background. Install a separate valve box over a 3-inch depth of 3/4-inch gravel for each assembly.
2. Drip Emitter Assembly:
 - a. Barb-mounted, pressure compensating emitter device as presented in the manufacturer installation details. The device shall be Rain Bird XB-20 or approved equal.
 - b. Install emitter types and quantities on the following schedule:
 1. Ground cover plant: 1 single outlet emitter each or 1 single outlet emitter per square foot of planting area, whichever is less.
 2. Shrub: 2 single outlet emitters each.
 3. Tree: 8 single outlet emitters each.
 - c. Use 1/4-inch diameter flexible plastic tubing to direct water from emitter outlet to emission point. Length of emitter outlet tubing shall not exceed five feet. Secure emitter outlet tubing with tubing stakes.
3. Flush Cap Assembly: as presented in the manufacturer installation details. Locate at the end of each drip irrigation lateral pipe. Install a separate valve box over a 3-inch depth of 3/4-inch gravel for each assembly.

(i) OTHER COMPONENTS.

1. Tools and Spare Parts: Provide operating keys, servicing tools, spare parts and other items indicated in the General Notes of the drawings.
2. Other materials: Provide other materials or equipment shown on the drawings or installation details that are part of the irrigation system, even though such items may not have been referenced in these specifications.

xx. CONSTRUCTION REQUIREMENTS.

(a) GENERAL CONSTRUCTION REQUIREMENTS.

1. Coordinate construction of irrigation system with the Engineer and the City.
2. Control of Excavations: See Section 3.3 for safety and access directions.
3. Install irrigation components in landscaped areas only.
4. Construction cannot proceed unless staking of irrigation mainline, remote control valve locations, and sprinkler locations are reviewed and accepted by the Contracting Officer's Technical Representative.

(b) INSPECTIONS AND REVIEWS.

1. Site Inspections:
2. Verify construction site conditions and note irregularities affecting work of this section. Report irregularities to the Engineer prior to beginning work.
3. Beginning work of this section implies acceptance of existing conditions.
4. Utility Locates (Call Before You Dig"):
 - a. Arrange for and coordinate with local authorities the location of all underground utilities.
 - b. Repair any underground utilities damaged during construction. Make repairs at no additional cost to the contract price.
5. Irrigation System Layout Review: Irrigation system layout review will occur after the staking has been completed. Notify the Engineer one week in advance of review. The Engineer will identify modifications during this review.

(c) LAYOUT OF WORK.

1. Excavate to permit the pipes to be laid at the intended elevations and to permit workspace for installing connections and fittings.
2. Survey Markers:
 - a. Protect markers during construction.
 - b. If a survey marker is disturbed during construction, the Contractor is responsible for replacing the marker. The Contractor must hire a licensed surveyor to resurvey the location of the marker and replace it.
3. Minimum Cover
 - a. 24-inches over irrigation mainline pipe in landscaped areas (distance from top of pipe to finish grade).
 - b. 18-inches over irrigation lateral pipe to sprinklers (distance from top of pipe to finish grade).
 - c. 18-inches over control wire when not in common trench with mainline or lateral piping (distance from top of control wire to finish grade).
 - d. 18-inches vertical separation between lateral and mainline pipe installed in a common trench.
 - e. 2-inches minimum horizontal separation between pipes and wiring in a common trench.
 - f. Install sleeves at depth to maintain specified depth of pipe or wire routed through sleeve.
4. All excavations must be backfilled by the end of each workday.
5. Enclose pipe and wiring beneath roadways, walks, curbs, etc in sleeves. Backfill sleeves in the following manner:
 - a. Backfill trench using excavated material in 6-inch layers. Minimum compaction of backfill for sleeves shall

be a minimum of 95% Standard Proctor Density, ASTM D698-78. Backfill to bottom of road base under roads or to finish grade under walks and curbs.

6. Enclose pipe and wiring beneath roadways, walks, curbs, etc., in sleeves.
7. Dress backfilled areas to original grade. Remove excess backfill to on-site location as directed by the Engineer.
8. Where utilities conflict with irrigation trenching and piper work, contact the Engineer for trench depth adjustments.

(d) SLEEVING AND BORING.

1. Install sleeaking at a depth that permits the encased pipe or wiring to remain at the specified burial depth.
2. Extend sleeve ends a minimum of 12-inches beyond the edge of the paved surface. Cover pipe ends and mark edge of pavement with a chisel or saw.
3. Verify that sleeve sizing is adequate prior to installation. Note that sleeves required for pipe with restrained casing spacers are larger than twice the diameter of the pipe.

(e) ASSEMBLING PIPE AND FITTINGS.

1. General:

- a. Keep pipe free from dirt and pipe scale. Cut pipe ends square and debur. Clean pipe ends.
- b. Keep ends of assembled pipe capped. Remove caps only when necessary to continue assembly.
- c. Trenches may be curved to change direction or avoid obstructions within the limits of the curvature of the pipe. Minimum radius of curvature and offset per 20-foot length of mainline and lateral pipe by pipe size are shown in the following table. All curvature results from the bending of the pipe lengths. No deflection will be allowed at a pipe joint.

SIZE	RADIUS	OFFSET PER 20' LENGTH
1 1/2"	25'	7'-8"
2"	25'	7'-8"
2 2/1"	100'	1'-11"
3"	100'	1'-11"
4"	100'	1'-11"

2. Mainline Pipe and Fittings:

a. PVC Rubber-Gasketed Pipe:

1. Use pipe lubricant. Join pipe in the manner recommended by manufacturer and in accordance with accepted industry practices.
2. Ductile iron fittings will not be struck with a metallic tool. Cushion blows with a wood block or similar shock absorber.

b. Fittings: The use of cross type fittings is not permitted.

3. Lateral Pipe and Fittings:

a. PVC Solvent Weld Pipe:

1. Use primer and solvent cement. Join pipe in manner recommended by manufacturer and in accordance with accepted industry practices.
 2. Cure for 30 minutes before handling and 24 hours before pressurizing or installing with vibratory plow.
 3. Snake pipe from side to side within trench.
 - b. Fittings: The use of cross type fittings is not permitted.
 4. Specialized Pipe and Fittings:
 - a. Ductile Iron Pipe: Install in accordance with accepted industry practices.
 - b. Mechanical joint connections: Install fittings, fasteners and gaskets in manner recommended by manufacturer and in accordance with accepted industry practices.
 - c. PVC Threaded Connections:
 1. Use only factory-formed threads. Field-cut threads are not permitted.
 2. Apply thread sealant in manner recommended by component, pipe and sealant manufacturers and in accordance with accepted industry practices.
 3. Use plastic components with male threads and metal components with female threads where connection is plastic-to-metal.
 5. Thrust Blocks:
 - a. Use cast-in-place concrete bearing against undisturbed soil.
 - b. Size, orientation and placement will be as shown on the installation details.
 - c. Wrap fitting with plastic to protect bolts, joint, and fitting from concrete.
 - d. Install rebar with mastic coating as shown on the installation details.
 6. Joint Restraint Harness:
 - a. Install harness in the manner recommended by the manufacturer and in accordance with accepted industry practices.
 - b. Use restrained casing spacers for gasketed pipe routed through sleeving. Install harness in the manner recommended by the manufacturer and in accordance with accepted industry practices. Install self-restraining casing spacers at all gasketed pipe bell joints and every 10-feet along the gasketed mainline pipe installed through sleeving. Provide correct number and type of restraints per manufacturer's requirements.
- (f) INSTALLATION OF MAINLINE COMPONENTS.
1. Isolation Gate Valve Assembly:
 - a. As presented in the installation details, per manufacturer's instructions.
 - b. Install where indicated in the irrigation plans.
 - c. Brand "GV" in 2-inch high by 3/16-inch deep letters on valve box lid.
 2. Hydrometer:

- a. As presented in the installation details, per manufacturer's instructions. Install where indicated in the irrigation plans.
 - b. Brand "MV" in 2-inch high by 3/16-inch deep letter on valve box lid.
 - 3. Air/Vacuum Relief Valve Assembly:
 - a. As presented in the installation details, per manufacturer's instructions.
 - b. Install where indicated in the irrigation plans.
 - c. Brand "AV" in 2-inch high by 3/16-inch deep letters on valve box lid.
 - 4. Quick Coupling Valve Assembly:
 - a. As presented in the installation details, per manufacturer's instructions.
 - b. Install where indicated in the irrigation plans.
 - c. Brand "QC" in 2-inch high by 3/16-inch deep letters on the valve box lid.
- (g) INSTALLATION OF SPRINKLER IRRIGATION COMPONENTS.
- 1. Remote Control Valve Assembly:
 - a. Mainline Flushing:
 - 1. Thoroughly flush mainline before installation of Remote Control Valve Assemblies.
 - 2. Identify remote control valve service tee(s) to be used for mainline flushing. Plug service tees not being used for flushing.
 - 3. Connect 2-inch pipe to flushing service tee(s). Use pipe to direct water away from trench.
 - 4. Use a volume of water such that the velocity in the largest pipe flushing o this point is 3 FPS.
 - 5. Multiple points may be flushed simultaneously.
 - 6. Flush for a minimum of 20 minutes. Continue flushing until the water is clear of any and all debris.
 - 7. Engineer will review the flushing operation and clarity of water before stopping the flushing operation.
 - 8. Disconnect pipe from service tee(s) and install remote control valve(s).
 - b. Install per manufacturer's recommendations where indicated on the drawings.
 - c. adjust valve to regulate the downstream operating pressure to 70 PSI for rotor sprinklers and 35 PSI for spray sprinklers.
 - d. Use wire connectors and waterproof sealant to connect two-wire cable to decoder and decoder to solenoid wires. Install connectors and sealant per the manufacturer's recommendations.
 - e. Drive full length of grounding rod into soil. Connect decoder to grounding rod as recommended by control system manufacturer. Install number of grounding rods as recommended by control system manufacturer.
 - f. Install only one remote control valve to a valve box. Locate valve box 5-feet from and align square with nearby edges of paved areas.
 - g. Attach ID tag with controller station number to control wiring at solenoid.

- h. Brand controller and station number in 2-inch high by 3/16-inch deep letters on valve box lid.
 - 2. Pop-Up Rotor Sprinkler Assembly:
 - a. Thoroughly flush lateral pipe before installing sprinkler assembly. Water must be clear of any debris before flushing operation stops.
 - b. Install per the installation details at locations shown on the drawings.
 - c. Allow 3-inch separation between side of rotary sprinkler and adjacent edges of paved areas, walls or fences.
 - d. Install sprinklers perpendicular to the finish grade.
 - e. Install swing joint per manufacturer's recommendations with the appropriate angle between the lateral pipe and the lay length nipple as presented in the installation details.
 - f. Supply appropriate nozzle or adjust arc of coverage of each sprinkler for best performance.
 - g. Adjust the radius of throw of each sprinkler for best performance.
 - 3. Pop-Up Spray Sprinkler Assembly:
 - a. Thoroughly flush lateral pipe before installing sprinkler assembly. Water must be clear of any debris before flushing operation stops.
 - b. Install per the installation details at locations shown on the drawings.
 - c. Allow 3-inch separation between side of rotary sprinkler and adjacent edges of paved areas, walls or fences.
 - d. Install sprinklers perpendicular to the finish grade.
 - e. Install swing joint per manufacturer's recommendations with the appropriate angle between the lateral pipe and the lay length nipple as presented in the installation details.
 - f. Supply appropriate nozzle or adjust arc of coverage of each sprinkler for best performance.
 - g. Adjust the radius of throw of each sprinkler for best performance.
- (h) INSTALLATION OF CONTROL SYSTEM COMPONENTS.
- 1. Control Units:
 - a. Install control unit at location shown in construction documents. Control unit to be installed in Solar Assembly enclosure per installation detail.
 - b. Install electrical connections per control system manufacturer's recommendations. Electrical connections are to be completed by control system manufacturer's trained representative.
 - c. Lightning protection: Install per installation detail. Drive grounding rod into soil its full length. Connect #6 AWG copper grounding wire to rod and plate using CADWELD connections. Connect to control unit dedicated ground terminal.
 - d. Connect two-wire cable to the corresponding control unit terminals.
 - e. Install permanent receiver for hand held radio if not factory installed.

- f. Install rain sensor and complete electrical connections to per control unit manufacturer's recommendations.
- g. Create and program each new control unit with a peak season irrigation program.

2. Control Wire:

- a. Route two-wire cable in mainline trench.
- b. Provide a 24-inch excess length of wire in an 8-inch diameter loop at each 90 degree change of direction, at both ends of sleeves, and at 100-foot intervals along continuous runs of wiring. Do not tie wiring loop. Coil 24-inch length of wire within each remote control valve box.
- c. If cable must be spliced, use waterproof wire connectors and sealant installed per the manufacturer's instructions. Locate splice in turf areas using a valve box that contains an irrigation valve assembly, or in a separate valve box. Use same procedure for connection to valves as for in-line splices. If a separate valve box is used for wire splices, brand "WS" in 2-inch high by 3/16-inch deep letters on valve box lid.
- d. Unless noted on plans, install wire parallel with and below mainline pipe.
- e. Protect wire not installed with PVC mainline piper with a continuous run of warning tape placed in the backfill 6-inches above the wiring.

(i) INSTALLATION OF OTHER COMPONENTS.

1. Tools and Spare Parts:

- a. Prior to the Review at completion of construction, provide operating keys, servicing tools, spare parts, and any other items indicated on the drawings.

2. Other Materials: Install other materials or equipment shown on the drawings or installation details that are part of the irrigation system, even though such items may not have been referenced in these specifications.

(j) MAINTENANCE AND OPERATION INSTRUCTIONS.

1. Tools and Spare Parts:

- a. Prior to Final Inspection, provide two one-day training sessions to operating personnel on proper operation and maintenance of the irrigation system. Training session should cover aspects of maintaining, operating, and repairing the new irrigation system components.
- b. Provide the following information:
 - 1. Catalog cut sheets for control system, valves, sprinklers, pipe and fittings, wire and wire connectors, ID tags, shop drawings, and all other irrigation equipment shown or described on the drawings and within these specifications.
 - 2. Manufacturer's Operation and Maintenance manuals.
 - 3. Manufacturer's Technical Service Bulletins.
 - 4. Manufacturer's Warranty Documentation.
 - 5. Recommended routine maintenance inspections for weekly, monthly and annual inspections and recommended actions for the inspections and a recommended method for recording the findings of the inspections.

6. Predictive schedule for component replacement.
 7. Listing of technical support contacts.
 - c. Operation and maintenance submittal package must be complete prior to being reviewed by the Contracting Officer's Technical Representative. Incomplete submittals will be returned without review.
 2. Control System Programming:
 - a. Verify or enter historic ET rate data for irrigation season.
 - b. Create and program each controller with a peak season irrigation schedule for the areas being irrigated by the controller.
 - c. Using the precipitation rate results of the Distribution Uniformity tests calculate the peak season run time for each station.
 - d. Verify operation of program.
 - e. Prepare a memorandum documenting the details and assumptions of the programming.
 - f. Turn over memorandum to the Engineer. Completion of the memorandum is a prerequisite for final inspection and operational testing of the irrigation system.
 - g. Program must be created by manufacturer's training personnel or an individual with documented experience in programming the control system. Provide documentation of programming experience if requested by the Engineer.
- (k) COLORED CONTROLLER CHARTS.
1. Prepare a map diagram showing location of all valves, lateral lines, and route of the control wires. Identify all valves as to size, station, number and type of irrigation. "As-built" drawings must be approved before charts are prepared.
 2. Include legend listing components used for the controller. Include a separate sprinkler table listing station number, sprinkler manufacturer and model, zone capacity, and number of sprinklers on the zone.
 3. Provide one colored full sized controller chart for each irrigation controller showing the area covered by the controller. Provide two 11"x17" reduced colored charts of the actual "as-built" drawing. Chart must be readable at the reduced size.
 4. Laminate one 11"x17" sized colored chart and place laminated chart in lid of controller.
- (l) PROJECT RECORD DRAWINGS.
1. The Contractor is responsible for documenting installed system and all changes to the design. Maintain on-site and separate from documents used for construction, one complete set of contract documents as Project Documents. Keep documents current. Do not permanently cover work until as-built information is recorded and work has been inspected and approved by the Engineer.
 2. Record irrigation components, pipe and wiring network alterations. Record work that is installed differently than shown on the construction drawings. Record accurate reference dimensions, measured from at least two permanent reference points, of each irrigation system valve, each controller or control unit, each stub-out for future pipe or wiring

connections, and other irrigation components enclosed within a valve box.

3. Prior to project completion label each sheet of the project drawings (redlines) as "Record Drawings" and turn over to Contracting Officer's Technical Representative for delivery to Engineer. Completion of the Record Drawings is a prerequisite for Final Inspection.

(m) MAINTENANCE.

1. Operate and maintain irrigation system for a duration of 30 calendar days from Final Inspection. Make periodic examinations and adjustments to irrigation system components so as to achieve the most desirable application of water.

(n) CLEANUP.

1. Upon completion of work, remove from the site all machinery, tools, excess materials, and rubbish. Restore site to normal or original condition.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Irrigation System) to be measured for payment will be a lump sum in the complete and accepted work.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Irrigation System) will be paid for at the Contract unit price on a lump sum basis. Payment will be full compensation for design, furnishing, transporting, handling, assembling, excavation, bedding and placing materials specified with connection to backflow prevention vault, including all incidental parts, hardware, and for removing all materials after use and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Irrigation System)	Lump Sum

PERVIOUS PAVERS

XX. DESCRIPTION. This work shall consist of furnishing and installing pervious pavers in accordance with the plans, the manufacturers specifications, and as directed by the Engineer.

XX. QUALIFICATIONS. The installer shall provide their installation history, including installation of pervious pavers, to the Engineer.

The installer's foreman shall have a minimum of 5 years of experience in the installation of unit paver systems of similar size and complexity.

XX. MATERIALS. The pervious pavers shall be as provided by the manufacturer and shall meet the specifications outlined in the Plans.

(a) Excavation. Excavation shall meet the requirements of Standard Specification Section 203.

(b) Joint Filler for Concrete Pavers Provide Permeable Joint Opening Aggregate conforming to ASTM C 33 and gradation requirements presented in Table 1:

Table 1
Permeable Joint Opening Aggregate Gradation Requirements

1/8 to 3/16 inch chips	
Sieve Size	Percent Passing
1/4 in (6 mm)	97 to 100
No. 4 (4.75 mm)	70 to 83
No. 8 (2.36 mm)	37 to 50
No. 16 (1.18 mm)	0 to 12
No. 200	< 1

(b) Sand Setting Bed. Same as joint fill material.

(c) Edging. Permaloc Geoedge restraint with capture plate

xx. MANUFACTURER.

(a) Pavers. The pervious pavers shall by Unilock

Manufacturer: Unilock
Tel.; (508) 278-4536
www.unilock.com

Paver Type 1: Eco-Line Permeable Paver
Size: Random Bundle, including:
10.875" X 3.25" X 3.875"
10.875" X 4.5" X 3.875"
12.5" X 3.25" X 3.875"
12.5" X 4.5" X 3.875"
14" X 3.25" X 3.875"
14" X 4.5" X 3.875"
9.375" X 3.25" X 3.875"

9.375" X 4.5" X 3.875"

Finish: Il Campo.

Initial color selection: Heritage Brown

(a) Edging.

PERMALOC CORPORATION
13505 Barry ST
Holland, MI 49424
1-800-356-9660
www.permaloc.com

XX. MOCKUPS.

- (a) Mockups: Build mockups (min. 3' x 3' section) to verify initial selections made, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
- (b) Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

xx. INSTALLATION. The pervious pavers shall be handled and installed at the locations 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.

XX. CONSTRUCTION REQUIREMENTS. Care should be taken to follow the manufacturer's installation specifications as improper handling or use of material may clog or damage the pervious pavers and reduce or eliminate their effectiveness at infiltrating water.

- (a) Restraint / Edging for Granite Pavers. Permeable Pavers shall be restrained on all sides by either concrete sidewalk or edging along grassed or planter areas. Edging shall be Permaloc Geoedge restraint with capture plate, 8' length straight with 10" spiral spike 12" on center or approved equal. Geoedge connection to capture plate shall be via #14x1 1/4" stainless steel hex washer, self-tapping screws.

XX. METHOD OF MEASUREMENT. The quantity of Special Provision (Pervious Pavers) to be measured for payment will be the number of square feet placed in the complete and accepted work.

XX. BASIS OF PAYMENT. The accepted quantity of Special Provision (Pervious Pavers) will be paid for at the contract unit price per square foot. Payment will be full compensation for transporting, handling, and placing the material specified, including pavers, stone chips, joint fill, setting bed, edge restraint, sand, replacing damaged pavers damaged at no fault to the Contractor; performing any other required excavation; cleaning the completed surface as required; and for all labor, tools, equipment and incidentals necessary to complete the work.

The Contractor will be responsible for replacing, at no additional cost to the State, any pavers that are broken or otherwise damaged by the Contractor's operations.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.670 Special Provision (Pervious Pavers)	Square Foot

January 25, 2019

Lynda Provencher
Vermont Department of Environmental Conservation
1 National Life Drive, Davis 1
Montpelier, VT 05620-3704

Sent via email: lynda.provencher@vermont.gov

RE: Site Investigation Report
City Hall Park
Burlington, Vermont (SMS Site #2018-4806)

Dear Lynda:

Waite-Heindel Environmental Management (WHEM) is pleased to present this *Site Investigation Report* for the City Hall Park in Burlington, VT. This report is being provided on behalf of the City of Burlington, owner of the property. The City project manager is Kirsten Merriman Shapiro with Community and Economic Development Office (CEDO). The objective of this work is to comply with the recommendations of your Initial Release Notification Letter dated August 17, 2018, and assist the City in renovating the Park during 2019. This report satisfies the requirements of the Site Investigation Report, Section 35-305 of the Investigation of Contaminated Properties Rule (IRULE).

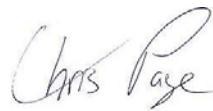
Please note that in the Recommendations Section of the report, we provide a summary of the proposed components of the Corrective Action Plan that will need to be prepared and implemented during the park renovation. We look forward to your input on our strategy, which was developed in coordination with Burlington Parks, Recreation and Waterfront, Burlington DPW, VT Department of Forest Parks and Recreation, and the engineer for the project, Dubois & King.

Do not hesitate to call WHEM at (802) 860-9400 if you have any questions. Thank you for providing the opportunity to be of service.

Sincerely,



Miles E. Waite, PhD, PG
Senior Hydrogeologist



Chris Page
Project Scientist

Enclosure

cc: Kirsten Merriman Shapiro, CEDO
Cindi Wight, Nina Safavi & VJ Comai, Burlington Parks Recreation Waterfront
Elise Schadler, VT Forest, Parks, and Recreation
Laura K. Wheelock, PE, Department of Public Works
David Conger, PE, Dubois & King

SITE INVESTIGATION REPORT

City Hall Park
Burlington, Vermont
VT DEC Site #2018-4806

January 22, 2019

Prepared for:
City of Burlington
CEDO
Attn: Kirsten Merriman Shapiro
City Hall, 149 Church St
Burlington, VT, 05401

Prepared by:



7 Kilburn Street, Suite 301
Burlington, Vermont 05401
(802) 860-9400
www.waiteenv.com

WHEM Project # 2018-55

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Appendix 1: Figures

USGS Site Location Map

Figure 1: Existing Conditions Plan

Figure 2: Site Plan with Utilities

Figure 3: Soil Data Plan – PAHs

Figure 4: Soil Amendment Plan

Appendix 2: Tables

Table 1: SVOC Summary Table

Table 2: Pesticides Summary Table

Appendix 3: Laboratory Reports

Appendix 4: Soil Boring Logs

Appendix 5: EDR Sanborn Map Report

1.0 INTRODUCTION

Waite-Heindel Environmental Management (WHEM) is pleased to present this *Site Investigation Report* for the City Hall Park (CHP) in Burlington, Vermont (see USGS Map in Attachment). The work completed in accordance with WHEM's *Work Plan for Site Investigation* dated October 29, 2018. This work was completed on behalf of City of Burlington, the owner of the property. The City project manager is Kirsten Merriman Shapiro with the Community and Economic Development Office (CEDO). This project is part of the Master Agreement for Brownfield Consulting Services between WHEM and CEDO, with an Amendment to the agreement dated October 26, 2018. This Site Investigation Report was prepared in accordance with the requirements of Section 35-305 ("Site Investigation Report") of the Investigation of Contaminated Properties Rule (IRULE).

The City of Burlington is in the process of renovating CHP. In anticipation of the work, the City hired the Johnson Company (JCO) to conduct a preliminary soil assessment (report dated June 5, 2017; refer to Section 6.0 for detailed analysis), that was provided to the VT DEC for review. In their Initial Release Letter dated August 17, 2018, the VT DEC focused on two findings of the JCO report:

- Soil samples collected from several locations at depths ranging from 0-4' below ground surface contained concentrations of polycyclic aromatic hydrocarbons (PAHs) above Vermont Soil Screening Levels; and
- Concentrations of the pesticide 4,4-DDE was also detected in several soil samples.

This work was conducted to satisfy the requests contained in that letter, which include:

- Identify the source, degree, and spatial extent of contamination (PAHs and pesticides);
- Identify pathways of contamination (PAHs and pesticides)
- Identify sensitive receptors
- Identify the need to conduct further investigation or corrective action
- Develop a conceptual site model
- Identify data gaps

It should be noted that the planning for the renovation of CHP has identified that many of the existing trees in the park are succumbing to fungal infections, soil compaction, and over-shading¹, but that the public sentiment is to keep as many trees as possible. Given the concern for tree health, WHEM consulted with the City of Burlington arborist, an urban forester with the Vermont Forest Parks & Recreation, and the engineer for the project, Dubois & King. The design plans for the renovation have a Soil Amendment Plan intended to improve the health of the trees during the renovation process.

2.0 SITE INFORMATION

Property Owner and Operator

	Name	Business	Phone	E-mail
Owner	City of Burlington Dept Parks, Recreation & Waterfront	City Hall Park	Cindi Wight (802) 865-7557	cwight@burlingtonvt.gov
Rep	City of Burlington, CEDO	City Hall Park	Kirsten Merriman-Shapiro (802) 865-7144	kmerriman@burlingtonvt.gov
Occupant	Public Park	City Hall Park	N/A	N/A

3.0 CURRENT USE OF PROPERTY

The subject property is a public park bounded by City Hall to the east, Main Street to the south, St. Paul Street to the west, and College Street to the north. It comprises a full block, landscaped with shade and ornamental trees, a central fountain, paths, benches, and other features. The property was deeded for use as a public park in the late 18th century, and has functioned as a public park since that time.

4.0 CURRENT USE OF ADJOINING PROPERTIES

- North: College Street, with commercial properties beyond.
- East: City Hall (149 Church) and other commercial properties (131 Church and 117 Church)
- South: Main Street, with commercial properties beyond.
- West: St. Paul Street, with commercial properties beyond.

¹ City Arborist as per article in Burlington Free Press, March 2, 2018

5.0 SITE DESCRIPTION

5.1 *Physical Description*

The subject property is a public park. It comprises nearly a full block, landscaped with shade and ornamental trees, a central fountain, paths, benches, and other features. Refer to the attached **Figure 1** for an Existing Conditions Plan of the park. Refer to **Figure 2-4** for a layout of the proposed improvements to the park.

5.2 *Environmental Description*

Topography:

The park topography has a slight slope to the southwest. Based on the topographical contours shown on Plan C-100, the slope is calculated at approximately 5%.

Bedrock and Surficial Geology:

No areas of exposed rock exist on the subject property. Bedrock mapping indicates the Site is underlain by reddish brown sandstone and dolostone of the Monkton Quartzite Formation. Surficial Geological mapping indicates the Site is underlain by Pebbly Marine Sand. During JCO's soil boring installations, bedrock was not encountered down to 6 ft below ground surface (bgs), so depth to bedrock under the Park is not known.

Soils:

Chittenden County Soils mapping does not extend into the center of the City. Based on the soil borings conducted by WHEM and JCO, the soil stratigraphy consists brown or dark brown sandy loam above tan-gray fine-medium sand with trace silt and fine gravel.

Surface Waters and Wetlands:

There are no State mapped surface waters, or Vermont Significant Wetlands Inventory (VSWI) wetlands located on the subject property. The closest body of water is Lake Champlain, located 2,000 ft to the west.

6.0 BACKGROUND / CONCEPTUAL SITE MODEL (CSM) / DATA GAP ANALYSIS

6.1 Background

WHEM has reviewed the Preliminary Soil Assessment Report prepared by the Johnson Company, as well as the civil engineering plan set for the project. We have processed the analytical data (see attached Tables) from the JCO soil borings, identified as “SB” and “HA” on **Figure 2**. Based on our review, we have come up with the following conclusions:

- The shallow soil is generally comprised of urban development soils, with concentrations of polycyclic aromatic hydrocarbons (PAHs) at levels above VT DEC Soil Screening Values (urban background concentration of 580 ug/Kg), but below hazardous levels, so must be managed accordingly. The data collected by Johnson Company suggests that PAHs are generally limited to the upper 0-1 ft of soils. PAHs are the primary contaminant of concern.
- The shallow soil also has residual concentrations of the pesticides 4,4'-DDE (DDE) and 4,4'-DDT (DDT), with DDE at levels above the residential SSV (EPA Residential Regional Screening Level of 2,000 ug/Kg) but below the industrial SSV (9,300 ug/Kg). Data suggest that pesticides also are limited to the upper 1 ft of soil. Pesticides are the secondary contaminant of concern.
- JCO Data suggest that shallow soil has detectable levels of the urban development soil contaminants lead and arsenic, but all concentrations below the SSVs (Vermont background for arsenic of 16 ppm, and EPA Residential RSL for lead of 400 ppm). These metals are not a contaminant of concern.
- The suite of analyses for soil testing by JCO was very comprehensive, and will suffice for obtaining approval for disposal at an approved solid waste landfill. Because the data indicate insignificant/non-detectable levels of VOCs, metals, PCBs, herbicides, cyanide, sulfide, pH, ignitability or TPH, further testing for these compounds should not be required.

6.2 Conceptual Site Model

The property has been used as a public park since the 1790's, when the land was originally deeded for this purpose. According to the National Registry of Historic Places Inventory Nomination Form (April 18, 1983), “... The downtown area has never experienced a major fire,” though at least one fire is noted in the nomination form; the so-called McAuliffe Building (117 Church Street) on the corner of Church and College is the only surviving remnant of the YMCA Block building, which burned in 1928. There are no known historical uses of the surrounding buildings that would point to a significant source of PAHs. While the McAuliffe Building fire of 1928 may have contributed to the load of PAHs on CHP, current and historic use of the property suggest that the **PAHs identified in shallow soils are likely from atmospheric fallout of combustion by-products from emissions related to automobile use and building heating over the past century. The source of the pesticides is likely the routine historical use by arborists and gardeners in parks such as CHP.** With the focus on PAHs and pesticides and consideration of the proposed earthwork that will be required, we have developed the following considerations:

- All soil testing data indicate that the shallow soil in the 0-1 ft range has PAHs levels in excess of SSVs. All soil excavated/disturbed in the 0-1 ft range will have to be managed appropriately. This means segregating/stockpiling the shallow soil, and then either emplacement back onsite under engineering controls, or management offsite at a disposal facility or receiving site.
- Shallow soils in the southern half of the CHP have lower levels of PAHs and pesticides, and there is planned to be less disturbance of soils; WHEM did not conduct any further investigation on these soils, as we feel that the characterization conducted by JCO will suffice.
- Due to a lack of discrete sampling data, and overall higher PAH and Pesticide concentrations, the work described in this report was focused on soils in the northern half of CHP. Soil sampling was conducted to a maximum depth of 6 ft to better delineate the vertical extent of PAH and pesticide contamination in this portion of the CHP property.
- Additional sampling was conducted by WHEM in the vicinity of the proposed rain garden. One sample was submitted for PAH analysis by Synthetic Precipitation Leaching Procedure (SPLP). This testing is required by the IRULE if offsite management of soil is pursued at a receiving site, and will be helpful in the engineering of the rain garden.
- WHEM continues to believe that since the CHP has a recreational property use with no buildings, no soil vapor or groundwater sampling is merited from a pathway perspective. The receptor pathways of concern are ingestion, inhalation, and dermal contact of soil and dust by Park users and construction workers. As a result, WHEM conducted soil sampling only at the site.

6.3 Data Gaps

After review of the JCO report, WHEM has identified the following data gaps:

- Shallow soils in the northern half of CHP have higher levels of PAHs and pesticides, and sampling by JCO was composite only. We feel that there is a need to conduct additional discrete soil sampling down to a maximum depth of 6 ft to satisfy the requirements for degree and extent of contamination.
- In addition, the soil beneath the proposed location of a rain garden has not been adequately tested. We propose to advance soil borings with discrete testing in this area. In addition to total PAHs and pesticides, one sample will be submitted for PAHs for Synthetic Precipitation Leaching Procedure (SPLP). This testing is required by the IRULE if offsite management of soil is pursued at a receiving site, and will be helpful in the engineering of the rain garden.

7.0 SITE INVESTIGATION

7.1 *Work Plan*

WHEM generated a work plan based on the data gaps and concerns laid out by the Initial Release Letter from the State of Vermont dated August 17, 2018. WHEM submitted the Work Plan for Site Investigation to the VTDEC via e-mail on October 29, 2018, but did not receive any specific comments from the VT DEC site manager. The work plan was accepted by CEDO. Following approval, WHEM pre-marked boring locations for DIGSAFE notification, coordinated with the drilling subcontractor (Aztech Environmental Technologies), and coordinated with City of Burlington CEDO, Department of Public Works, and Parks and Recreation personnel to ensure that no subsurface utilities would be damaged and that drilling would be completed with minimal disturbance to the park's use and condition. Only one boring location was altered from the original work plan: site B-102, located at the eastern edge of the proposed rain garden, was moved 2 ft to the west to avoid existing irrigation infrastructure.

7.2 *Historical Map, Photo and Records Review*

WHEM conducted a historical records review using a variety of historical sources, including Sanborn Fire & Insurance Maps, aerial photography, USGS topographic maps, and Beers Atlas Maps, as well as the 1983 National Registry of Historic Places nomination form for the City Hall Park Historic District. A description of findings from each of these sources is included below.

The following historical sources were utilized to develop a history of the previous uses of the subject property and surrounding area, in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the Site.

WHEM reviewed the Sanborn Fire Insurance Maps (see Appendix 5) of the Site and abutting properties to identify any possible sources of PAHs and or pesticides. The Site is identified as City Hall Park in the earliest available map (1885), and appears identical to the current architecture of the park. The Site remains unchanged in both use and size for all available maps, up to 1989. No available Sanborn Fire Insurance Maps exist after 1989 for this search area. The blocks abutting the Site were reviewed as well; no historic use of the abutting properties identifies a source of PAHs or pesticides. The College Street block north and upgradient of the Site was primarily used as a banking sector. The Church Street block east and cross-gradient of the Site was primarily used for public services such as a library, fire station, police station and the eventual location of City Hall in 1926. The downgradient, or downhill, blocks along Saint Paul Street and Main Street were reviewed as well, with no historic uses of concern identified.

WHEM reviewed the National Historic Nomination Form for the City Hall Park Block. The detailed historic document highlights the history of the Site and surrounding area dating back to the 1790s. The document focuses on the architectural and cultural significance of buildings rather than their historic uses, so little information was gained in terms of potential sources of contamination. The document indicates that prior to being set aside by the proprietors of Burlington in the 1790s as the site for a courthouse and public common, the current CHP was the site of “lumbermen’s shanties.” According to this document, the property has operated as a public common space since that time. The nomination documents mention that one fire did occur in 1928 at the so-called McAuliffe Building (117 Church Street), located east of the northeast corner of the Site. The document also states that the downtown district of Burlington has seen “no significant fires” in its history, suggesting that although the 1928 fire at the McAuliffe building destroyed some of that original structure, the fire was contained and did not spread to surrounding buildings.

Information provided by DPW indicates that there have been several fires downtown Burlington within a 1-block radius of the park. These include: Armory building (2003); Van Ness House/Keybank (1867 and 1951); American House/Hotel Vermont (1906); Chittenden County Courthouse (1982); Strong Theater (1971); 154 Church (1962); B. Turk & Brother Clothing (3 buildings) (1946); and Hotel Burlington & Woodbury-Walker (1910). It is reasonable to expect that these historical fires have contributed to the PAHs present in shallow soils at City Hall Park.

WHEM reviewed aerial photography from 2016, 2014, 2011, 2009, 2008, 2003, 1988, 1974, 1962, and 1942. Upon review of the aerial photographs, the Site appears as a wooded area as early as 1942. Aerial photographs from 1962, 1974, and 1988 were taken when no foliage was present on the trees and the Site can be positively identified as a park, with no indication of any other use and no evidence of structures present.

WHEM reviewed 7.5-minute USGS topographic maps from 2013 and 1906. Upon review of the USGS maps, WHEM identified building symbols on Site in the 1906 map; however, these building symbols likely identify the buildings along the borders of CHP, as there is no evidence that a structure has ever been present on the Site.

WHEM Reviewed the UVM Landscape Change Program, an on-line database for historic photographs depicting the Site. Multiple pictures of the Site were found dating back to 1859, where the Site is identified as an ovular park with no structures. Pictures depicting the Site confirm that site use has not changed since that time.

The 1869 Beers Atlas map was reviewed. The map shows six (6) structure symbols on Site; however, these symbols are likely for buildings located along the perimeter of the Site. Additionally, the 1857 Beers Atlas map was reviewed. The ovular shape of CHP is visible on the map and further confirmed by the 1859 image of the ovular park found in the UVM Landscape Change Program database.

7.3 Site Investigation

On December 3, 2019, WHEM oversaw the drilling of three (3) soil borings (two to 5 ft bgs, one to 6 ft bgs; samples collected at 1, 3, and 5, or 2, 4, and 6 ft bgs) in the northern portion of the Site, and two (2) shallow soil borings (0-2 ft bgs) in the vicinity of a proposed rain garden, as per the current CHP design plans. Refer to **Figure 2** in Appendix 1 for soil boring locations, identified as B-101, B-102, B-103, B-104, and B-105. Refer to Appendix 4 for soil boring logs. The drilling contractor for this project was Aztech Environmental Technologies of Ballston Spa, NY. Borings were advanced with a GeoProbe 6610DT track-mounted drill rig via direct push. All boring locations were pre-marked for DigSafe and cleared by Burlington DPW and Parks & Recreation personnel prior to drilling.

At B-101 and B-102, located in the proposed rain garden area near Saint Paul Street, soil samples for analysis of PAHs (EPA Method 8270D) and pesticides (Method 8081B) were collected from 2 ft bgs. An additional sample from B-101 was collected for analysis PAHs by SPLP (SW-846 Test Method 1312). These samples were collected to confirm whether PAH and pesticide concentrations decline at a depth greater than 0-1 ft bgs, and to determine whether PAHs present in soils at depth could have any potential to impact stormwater passing through the rain garden.

The remaining sample locations were located in the northern portion of the park, where PAH and pesticide concentrations appeared to be highest based on data collected by JCO. At B-103 and B-105, located respectively in the northwest and northeast corners of the park, soil samples were collected at or around 2 ft bgs, 4 ft bgs, and 6 ft bgs for analysis of PAHs and pesticides. At B-104, soil samples were collected at 1 ft, 3 ft, and 5 ft bgs for the same parameters. At each location, WHEM field staff logged soils and screened samples for any visual or olfactory evidence of PAH or VOC contamination; soil samples were also screened using a calibrated IonScience Photoionization Detector (PID). All soil samples were collected in accordance with WHEM protocol, and delivered to Endyne Laboratories in Williston, Vermont for analyses.

7.3.1 Description of Soils

Complete soil boring logs are provided in Appendix 4 of this report. Soils were fairly consistent across the site, and generally matched descriptions provided in the JCO report. At all locations, a topsoil consisting of dark brown loamy fine sand or fine sandy loam, generally quite dense from compaction, gives way to a tan fine-medium sand with trace silt and trace fine gravel, generally loose/granular or friable. The depth of the transition from loamy A horizon to the medium sandy B horizon varied slightly from location to location, but was generally observed between 1-2 ft bgs. This observed variation may also have been related to differences in soil sample recovery from location to location.

Soils were free and clear of any evidence of VOC contamination, based on visual and olfactory observation, and PID screening of all soil samples, which all reported background VOC levels (0.0-0.3 ppm). There was no clear indication of PAH contamination, though some black staining was observed at borings B-104 and B-105 to a depth of about 2.5 ft bgs. Such staining was not observed at any other sample location.

7.3.2 Soil Quality Results – B-101 and B-102

A plan depicting reported PAH concentrations at sampled depth intervals is presented as **Figure 3** in Appendix 1. Tabulated PAH results are provided in Table 1, and pesticide results are provided as Table 2 of Appendix 2. The data tables also present earlier soil quality data collected by JCO. Full laboratory reports are provided in Appendix 3. All laboratory results were compared to Soil Screening Values (SSVs), per Table § 35-APX-A1 from Appendix A of the IRule. These Soil Screening Values include compound-specific standards, which reference the EPA’s Regional Screening Levels (RSLs), as well as the Vermont Screening Level for Benzo[a]pyrene and VT DEC Background Soil Concentration for PAHs based on the Benzo[a]pyrene Toxicity Equivalent Quotient (B[a]P TEQ). For urban background soils, this value is 580 ug/Kg.

Pesticide results were also compared to SSVs, which reference EPA RSLs in addition to a VT Residential Screening Level for Aldrin (20.2 ug/Kg). The table on the following page outlines the contaminants of concern and presents the most relevant SSV for each compound or parameter. The compounds listed in this table are those that exceeded or nearly exceeded SSVs in the JCO sampling data; while a number of other PAHs have been detected, only the two compounds found to exceed standards, as well as the B[a]P TEQ, are listed.

Table 1: SSV Summary Table for Contaminants of Concern

Contaminant	Compound/Parameter	Soil Screening Value, ug/Kg	Referenced Soil Standard
PAHs (8270D)	Benzo[a]pyrene	1,540	Industrial VSL
	Dibenzo[a,h]anthracene	290	EPA RSL, Industrial
	B[a]P TEQ	580	VTDEC Urban Background
	Benzo[a]pyrene by SPLP	0.2 ug/L	Vermont Groundwater Enforcement Standard
Pesticides (8081B)	4,4’-DDE	9,300	EPA RSL, Industrial
	4,4’-DDT	8,500	EPA RSL, Industrial

Analytical results from **B-101, 2 ft bgs** report the presence of several PAH compounds, but none in exceedance of Soil Screening Values. The B[a]P TEQ for this sample was 98.4 ug/Kg, well below the SSV. Two (2) pesticides were detected in the 2 ft sample, 4,4'-DDE and 4,4'-DDT; both were well below SSVs. A sample was also collected for analysis of PAHs by SPLP; PAHs were non-detected (< 0.5 ug/L; B[a]P = ND / 1.2 ug/L) in the SPLP sample. No compounds were reported in exceedance of SSVs.

Analytical results from **B-102, 2 ft bgs** reported only one PAH, Fluoranthene (20.1 ug/Kg), below its SSV. The TEQ for this sample is < 33.0 ug/Kg, well below the Urban Background concentration. Among pesticides, only 4,4'-DDE was detected (5.8 ug/Kg), well below its SSV.

7.3.3 Soil Quality Results – B-103, B-104, and B-105

Analytical results from **B-103** are as follows:

- **2 ft bgs:** A suite of PAHs was detected, but no compounds were reported in exceedance of SSVs. No PAHs were detected in exceedance of SSVs. The TEQ (209 ug/Kg) was below the Urban Background concentration. Two pesticides were detected: 4,4'-DDE (419 ug/Kg) and 4,4'-DDT (76.4 ug/Kg). These compounds were reported well below SSVs.
- **4 ft bgs:** A suite of PAHs was detected, but at much lower concentrations than those observed in the 2 ft bgs sample. No PAHs were detected in exceedance of SSVs. The TEQ (67.4 ug/Kg) is well below the Urban Background concentration. Two pesticides were detected: 4,4'-DDE (9.0 ug/Kg) and 4,4'-DDT (3.9 ug/Kg). The reported concentrations are much lower than those observed in the 2 ft sample, and well below SSVs.
- **6 ft bgs:** At 6 ft bgs, no PAHs or pesticides were detected.

Analytical results from **B-104** are as follows:

- **1 ft bgs:** A suite of PAHs was detected. Two compounds, Benzo(a)pyrene (3,570 ug/Kg) and Dibenzo(a,h)anthracene (534 ug/Kg), were reported in exceedance of SSVs. The TEQ (5,120 ug/Kg) was far in exceedance of the Urban Background concentration. The reported concentrations are comparable to composite sampling data collected by JCO from composited hand auger samples collected from 0-1 ft bgs. Three pesticides were detected: 4,4'-DDE (674 ug/Kg), 4,4'-DDD (10.9 ug/Kg), and 4,4'-DDT (231 ug/Kg). No pesticides were reported in exceedance of SSVs.
- **3 ft bgs:** A suite of PAHs was detected, but at much lower concentrations than those in the 1 ft bgs sample. No PAHs were detected in exceedance of SSVs. The TEQ (116 ug/Kg) was below the Urban Background concentration. Three pesticides were detected, 4,4'-DDE (214 ug/Kg), 4,4'-DDD (4.3 ug/Kg), and 4,4'-DDT (55.1 ug/Kg). No pesticide compounds were reported in exceedance of SSVs.

- **5 ft bgs:** Neither PAHs nor pesticides were detected in the 5-ft soil sample, continuing the trend of decreasing concentrations with depth.

Analytical results from **B-105** are as follows:

- **2 ft bgs:** A suite of PAHs was detected. Two compounds, Benzo(a)pyrene (3,080 ug/Kg) and Dibenzo(a,h)anthracene (427 ug/Kg) were reported in exceedance of SSVs. The TEQ (4,390 ug/Kg) was far in exceedance of the Urban Background concentration. Three pesticides were detected: 4,4'-DDE (1,070 ug/Kg), 4,4'-DDD (35 ug/Kg), and 4,4'-DDT (782 ug/Kg). No pesticide compounds were reported in exceedance of SSVs.
- **4 ft bgs:** A suite of PAHs was detected. No compounds were reported in exceedance of SSVs. The TEQ (86.8 ug/Kg) was below the Urban Background concentration. Two pesticides were detected: 4,4'-DCE (70.6 ug/Kg) and 4,4'-DDD (35.8 ug/Kg). Neither compound was reported in exceedance of SSVs.
- **6 ft bgs:** A suite of PAHs was detected, at concentrations much higher than the 4 ft sample, and much higher than any other soil samples collected from > 3 ft. Two compounds, Benzo(a)pyrene (2,360 ug/Kg) and Dibenzo(a,h)anthracene (367 ug/Kg) were reported in exceedance of SSVs. The TEQ (3,410 ug/Kg) was far in exceedance of the Urban Background concentrations. Three pesticides were detected: 4,4'-DCE (1,170 ug/Kg), 4,4'-DDD (52.5 ug/Kg), and 4,4'-DDT (502 ug/Kg). No pesticide compounds were reported in exceedance of SSVs, though the concentrations of 4,4'-DCE and 4,4'-DDD were the highest among samples collected by WHEM.
 - The anomalous spike in both PAHs and pesticides in the 6 ft sample suggests that mixing may have occurred when deepening the hole to 6 ft, which required removing tooling from the borehole, causing topsoil to backfill and mix with deeper soils.

7.4 Discussion

The purpose of the Site Investigation was to better delineate the vertical extent of PAH and pesticide contamination that had previously been identified by JCO, as well as to determine the feasibility of utilizing a portion of the park for a rain garden. Additionally, historical research on the Site and surrounding properties was required to confirm the site's long-term use as a park, and to determine whether any historic uses or significant fire events may have contributed to the presence of PAHs at the Site. Prior sampling by JCO indicates that contaminant levels were considerably higher in shallow soils (0-1 ft), based on composite sampling. Soil sampling results from greater depths showed that PAHs and pesticides are present in deeper soils, but that concentrations are generally below standards. Because the shallow data was from composite sampling, and depth ranges for deeper samples were irregular, the initial data alone are not sufficient for generating a Corrective Action Plan (CAP) for the site.

7.4.1 Updates to Conceptual Site Model

A review of historical sources conducted by WHEM confirmed that the Site has been utilized as a public common since the 1790's. A review of surrounding properties did not reveal any indication of historic uses related to the release of PAHs or pesticides. No significant fires are known to have occurred in the downtown district of Burlington. The site history supports our CSM, which states that PAHs are present due primarily to deposition from combustion engines and building heating, and that pesticides are present due to their historic use by arborists and groundskeepers. These contaminants are present primarily in surficial (0-1 ft) soils, with downward migration into soils being driven primarily by precipitation. Given the diffuse source (atmospheric deposition) and limited mobility of these compounds, concentrations drop off quickly with depth. Depth-to-groundwater is unknown at the site, but is expected to be greater than 20 feet below grade based on monitoring data from the Burlington Free Press Site (SMS #2013-4393), which is located approximately 260 ft east of the Site, and is likely hydrologically up-gradient. Based on the estimated depth of groundwater and limited vertical extent, it is very unlikely that groundwater would be impacted by the observed shallow soil contamination.

Analytical data collected by WHEM generally fits this CSM, as both PAH and pesticide concentrations decrease rapidly with depth. This trend was clearly observed at all sampling locations except **B-105, 6 ft**, where it is likely shallow soils backfilled and mixed with the 6 ft sample when removing drilling tooling to deepen the boring beyond 5 ft. Both PAH and pesticide concentrations decreased with depth, most dramatically decreasing below 1 ft. Of the four (4) samples collected from 2 ft bgs, only one reported PAHs in exceedance of SSVs; below 2 ft bgs, no samples reported SSV exceedances except for the likely tainted sample from B-105, 6 ft. B-105, 4 ft reported concentrations well below the 2 ft sample, which was the only 2-ft sample to report SSV exceedances. Pesticides did not exceed SSVs at any location sampled by WHEM.

The presence of PAHs and pesticides in surficial soils confirms that the sensitive receptors for the identified contaminants are park users and construction workers, who may come into contact with concentrations of PAHs Benzo(a)pyrene and Dibenzo(a,h)anthracene in exceedance of SSVs, as well as the pesticide 4,4'-DDE. Groundwater is not considered a sensitive receptor, given that depth to groundwater is expected to be around 20 ft bgs and that contaminant concentrations decrease dramatically in the top few feet of soil. No other sensitive receptors have been identified, and none are expected to exist based on the data collected to date.

One final addition to the CSM is the importance of tree health to the future of the park. To improve tree health, a soil amendment effort will be undertaken. The soil amendment plan can be incorporated into a future Corrective Action Plan for the project.

7.4.2 Data Gap Evaluation

The following data gaps were identified in WHEM's Site Investigation Work Plan:

- The vertical extent of PAH and pesticide contamination in the northern portion of the park, which reported the highest PAH concentrations, was not sufficiently defined.
- Additional testing in the vicinity of the rain garden along Saint Paul Street is necessary to confirm whether the soils may impact stormwater passing through the rain garden.

Both of these data gaps have been addressed by the Site Investigation. The data confirms that our CSM accurately reflects site conditions. WHEM does not believe that any further data gaps exist that pertain to existing conditions at the park, and that sufficient data is available to prepare a robust Corrective Action Plan for the site to reduce possible risk to human health and the environment from the identified soil contamination at the Site.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results presented in this report, WHEM reaches the following conclusions:

1. A review of historical sources, including fire insurance maps, photographs of the site, aerial photographs of the site and surrounding area, as well as the site's nomination form for the National Registry of Historic Places revealed that the park has been in continuous use as public common since it was deeded as the site for a common and courthouse in the early 1790s. No structures are known to have existed on the property, and no other historic uses were identified. Furthermore, the historical review did not reveal any historic uses of surrounding properties that would indicate a likely source of PAH or pesticide contamination to the park, but that a history of building fires within a 1-block radius of the property may be a factor in the presence of PAHs in shallow soils.
2. Soils data collected by WHEM confirm that PAHs, expressed as B[a]P TEQ, are present in exceedance of SSVs (580 ug/Kg urban background) in shallow soils (1 ft bgs), with the highest reported concentrations to date along the northern edge of the park. Data also show that PAH and pesticide concentrations decrease substantially beyond 1 ft bgs, and met standards at all but one location at 2 ft bgs. Beyond 2 ft bgs, concentrations decrease further. The one exception to this pattern, the 6 ft sample from B-105, appears to have been contaminated by surface soils caused by backfill during removal of tooling and sampling equipment. Based on the soil testing data, the shallow soil down to 18" depth will need to be managed as Non-Hazardous Waste Contaminated Soil (IRULE Section 35-510) or as Development Soils (Section 35-512). A Soil Management Plan will be an integral component of the Corrective Action Plan that will be required to be approved prior to the renovation of the park.

3. The PAHs in the shallow soil are bound to organic molecules and not prone to dissolution by rainwater. This conclusion is based on testing of the soil for PAHs by Synthetic Precipitation Leaching Procedure (SPLP), which resulted in no detections by PAHs. Based on the results, stormwater infiltration through the soil including the proposed raingardens in the western and southern portions of the park should not result groundwater contamination by PAHs.
4. The sensitive receptors to this site are park users and construction workers who risk dermal contact with soils that contain PAHs and the pesticide 4,4'-DDE in exceedance of SSVs. No other sensitive receptors were revealed by the research or sampling conducted for this Site Investigation.
5. Many of the trees at the park which are slated to be retained are unhealthy, so the renovation of the park will involve a soil amendment plan to attempt to improve tree health, and the renovation must consider limiting the thickness of topsoil used as cover over the tree root zones. The soil amendment/management plan will be incorporated into the Corrective Action Plan.

Based on these conclusions, WHEM recommends that a Corrective Action Plan be prepared in accordance with Section 35-505 of the IRULE. Given the team and expertise that has been involved on the project, we do not see the need for an Evaluation of Corrective Action Alternatives for this project. The primary component of the CAP will be a Soil Management Plan, to have the proposed methodology described below:

- Shallow soils (<18") site-wide need to be managed as either Non-Hazardous Waste Contaminated Soils or as Development Soils. Given the park's ongoing use as a recreational public space, City ownership, and concern for tree health, this Soil Management Plan will combine several methods, described briefly below and supported by Figure 4 in Appendix 1.
 - Soils down to 18" to be excavated for new hardscaping (sidewalks, fountain area, Firehouse plaza) should be temporarily stockpiled near the excavation zone, then returned as fill (assuming compactible) below the hardscaping. If onsite space is limited for soil stockpiling, then approval will be sought from VT DEC to temporarily stockpile soil offsite at a City-owned location. For excess soils above 18" that cannot be buried under impervious surfaces, proper disposal at an approved landfill, categorically certified facility, or approved receiving site will be required; additional testing of any stockpiled soils will be required. Institutional controls will also be required.

- Soil deeper than 18” does not need to be managed in this manner, and can be used as common fill elsewhere in the park or elsewhere on a City-owned property inside the VT DEC urban background area. Without limitation for soil deeper than 18”, soil from under new hardscaping could be over-excavated in order to allow for burial of shallow soil described above.
 - In the northeastern corner of the park, near B-105, soils from 18”-36” below grade should be stockpiled and set aside for additional testing; data collected by WHEM suggest that PAH contamination may extend deeper than the 18” bgs anticipated elsewhere on-site. If testing confirm, then this deeper soil will need to be managed as discussed above.
 - In areas of the park where there is no excavation necessary and no hardscaping and only grass surface (see Zone “A” in Figure 4), the corrective action will be a combination of use of 6” of clean topsoil and turf development to protect users from dermal contact with PAHs soils. The 6” thickness, necessary to ensure proper drainage and tree health, will require specific approval by the VT DEC as it is a reduction in the thickness (18”) required in the IRULE. Imported topsoil shall be tested for PAHs to ensure it meets SSVs.
 - In areas under the drip line of existing trees to be retained (see “B”, “C”, and “D” circles in Figure 4), the existing shallow soil will first be amended through aeration by air spade followed by vacuum extraction of fines followed by amendment with clean topsoil. Additional clean topsoil and seed will be applied under the drip line tapering from 6” at the edge to 0” at the tree trunk, followed by bark mulch in a minimum of 6 ft radius around the trunk. After re-seeding, the area below the drip line will be restricted to foot traffic for a period long enough to ensure proper turf development. This amendment/remedial method can be done in stages (spring and fall) before and after the park renovation process.
- Proper institutional controls, supported by and As-Built Plan and Operation & Maintenance Manual for tree work and turf health, will be a component of the Corrective Action Plan.
 - The implementation of the Soil Management Plan will be overseen by a qualified environmental professional (QEP) during the construction process.

WHEM will be preparing the CAP during the winter of 2019 in order to support the renovation work being conducted during the 2019 construction season. The CAP will be reviewed/stamped by the Project Engineer, Dubois & King, with input from the City Engineer. The City has already issued an RFP for the construction work and will chose the contractor by the end of January.

9.0 ENVIRONMENTAL PROFESSIONAL SIGNATURE

I certify under penalty of perjury that I am an environmental professional and that all content contained within this deliverable is to the best of my knowledge true and correct. I certify that this report was conducted in accordance with the approved work plan.



Miles Waite, PhD, PG
Senior Hydrogeologist

U:\PROJECTS - WHEM\CEDO\City Hall Park\Reports\December 2018 Site Investigation\City Hall Park Site Investigation_FINAL.docx

APPENDIX 1

FIGURES

USGS Site Location Map

Figure 1: Existing Conditions Plan

Figure 2: Site Plan with Utilities

Figure 3: Soil Data Plan – PAHs

Figure 4: Soil Amendment Plan



USGS Map - City Hall Park

Vermont Agency of Natural Resources

vermont.gov



LEGEND

☐ Town Boundary

1: 24,000

October 29, 2018



1,219.0 0 610.00 1,219.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere

© Vermont Agency of Natural Resources

1" = 2000 Ft.

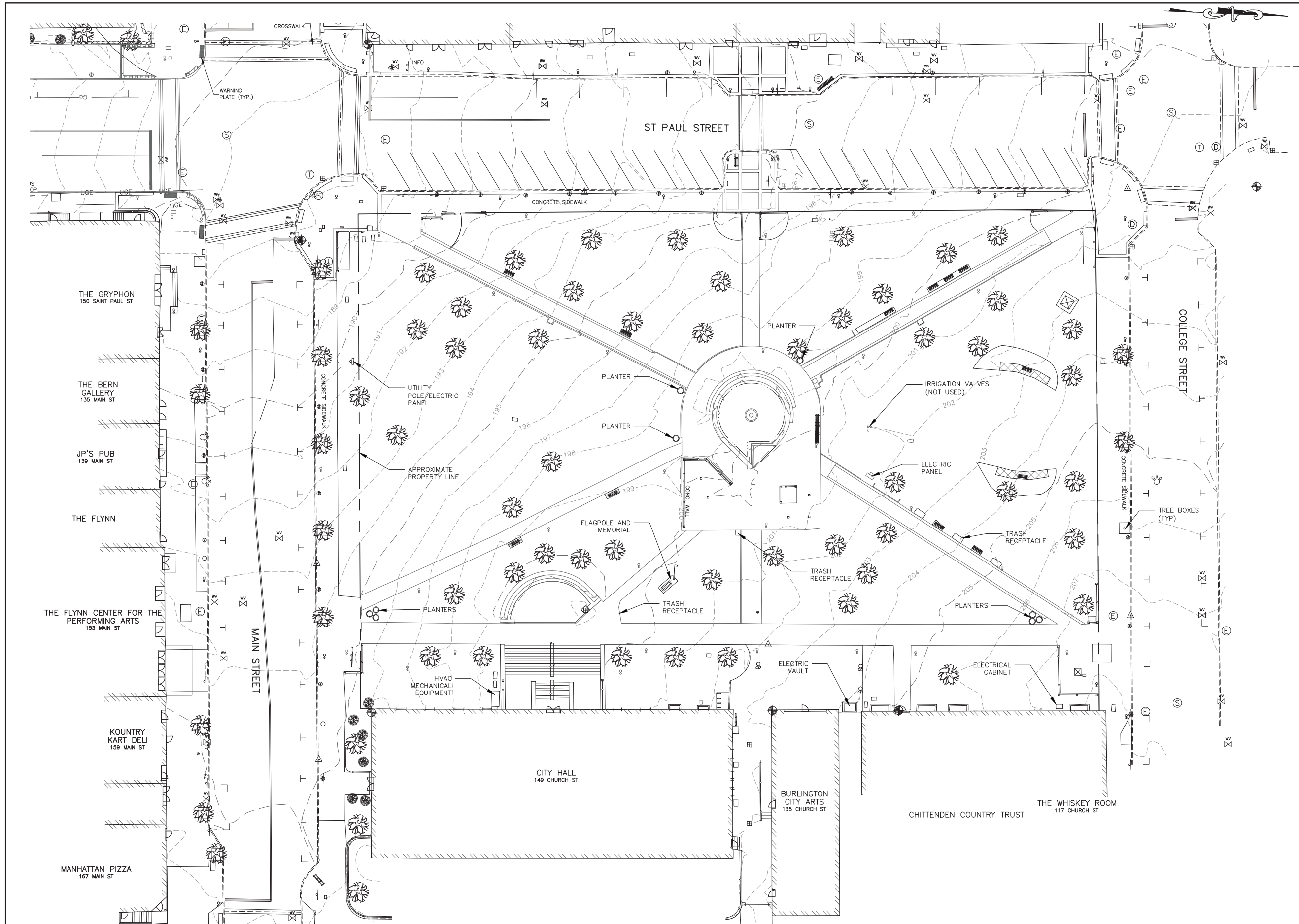
1cm = 240 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

NOTES

Map created using ANR's Natural Resources Atlas



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PROFESSIONAL SEAL

NOT FOR
CONSTRUCTION

[illegible]

PROJECT TITLE

BURLINGTON
GREAT STREETS
CITY HALL PARK

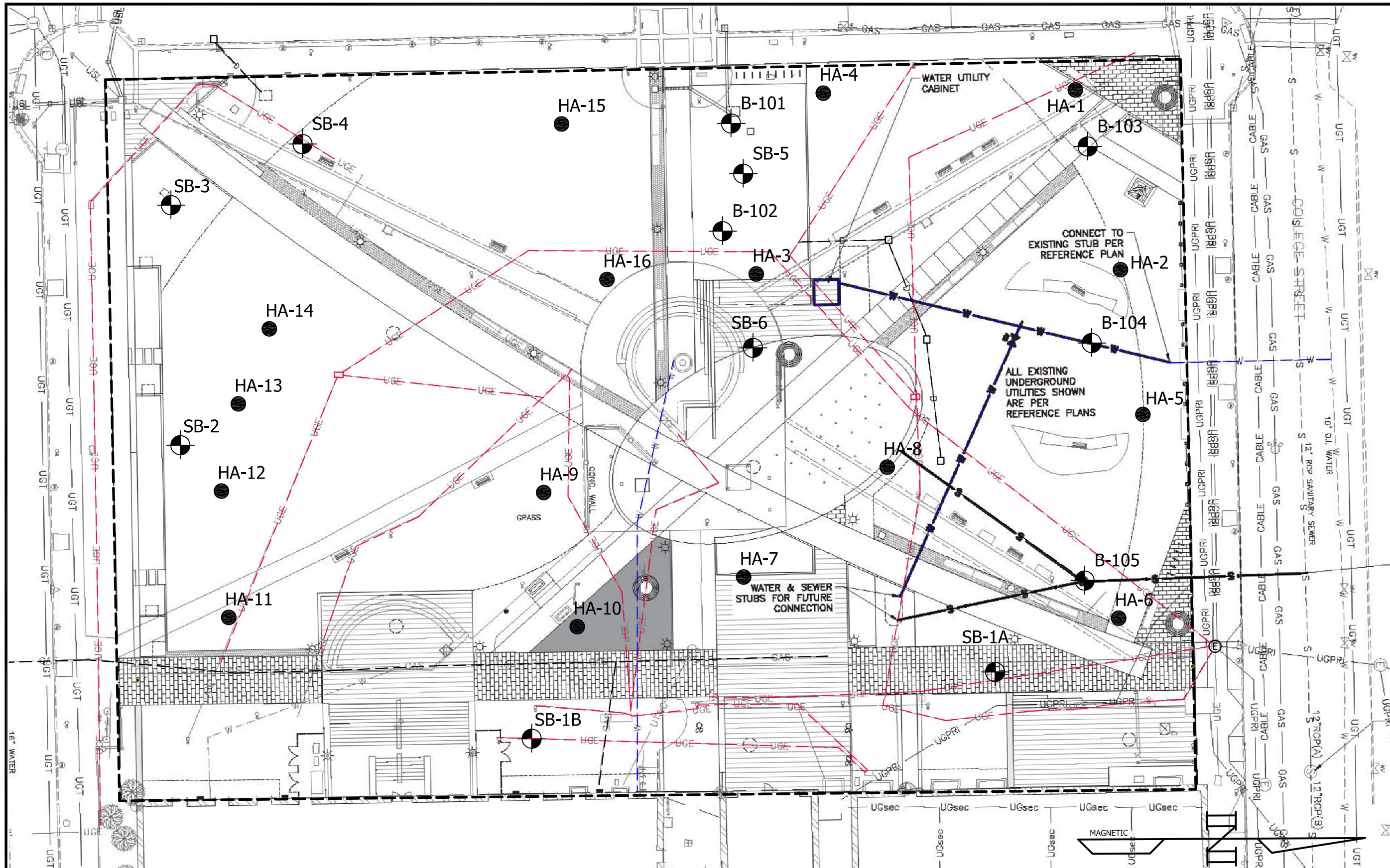
SHEET TITLE

EXISTING
CONDITIONS PLAN

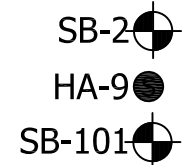
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CHECKED BY LDC	PROJECT # 623263L3

SHEET NUMBER

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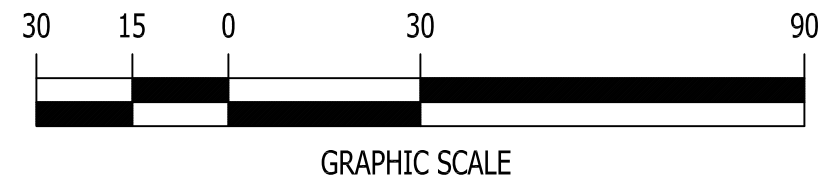
LEGEND



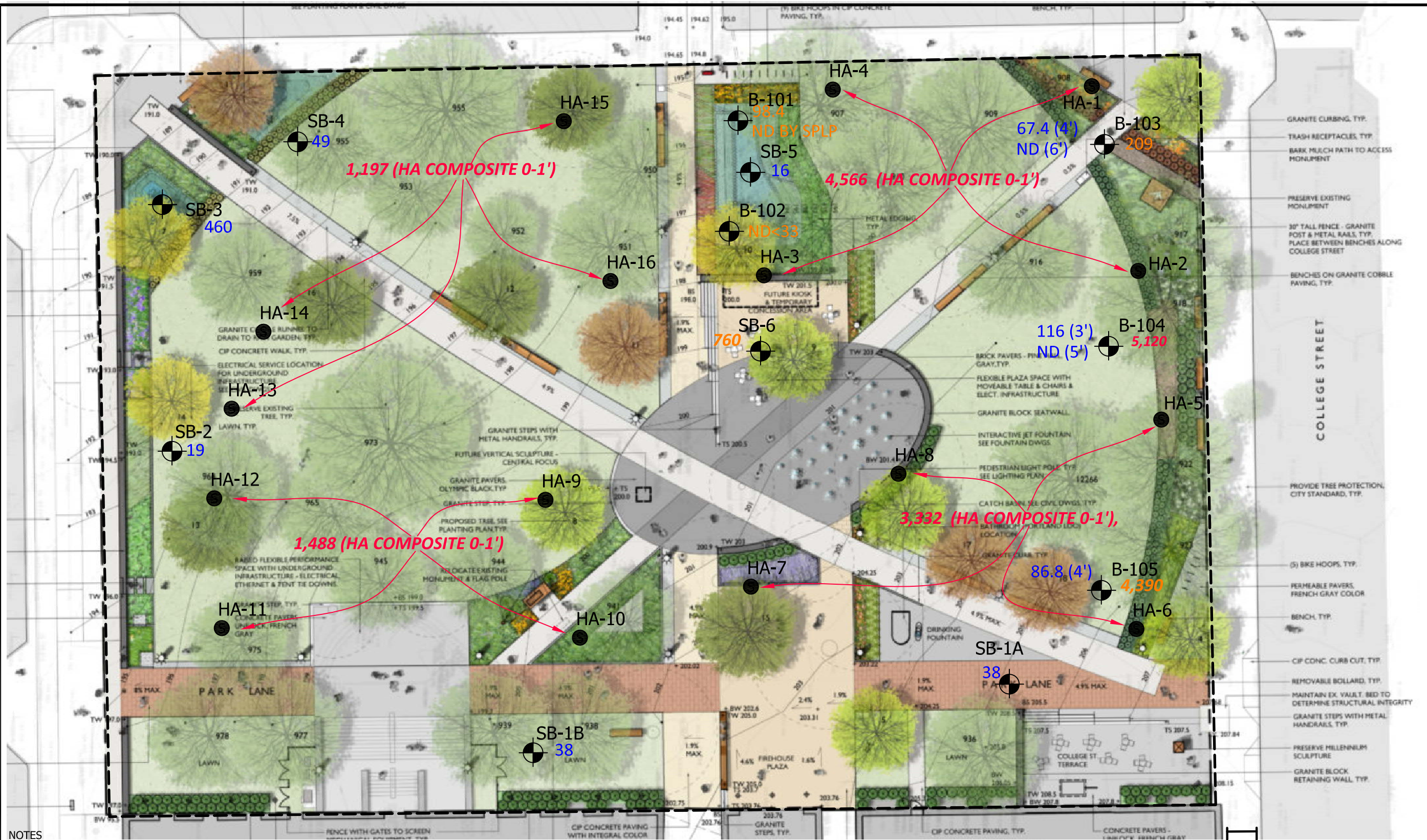
SOIL BORING BY JCO: >1.0 FT (2017)
HAND AUGER BY JCO: 0-1' (2017)
SOIL BORING BY WHEM: >1.0 FT (2018)

NOTES

1. BASE MAP FOR THIS PLAN IS "UTILITY PLAN, SHEET C102, CITY HALL PARK" BY DUBOIS & KING, FROM PLAN SET DATED JANUARY 2018. SOME UTILITY LINES WILL BE REMOVED.
2. THIS PLAN WAS DEVELOPED FOR ILLUSTRATIVE PURPOSES ONLY FOR ENVIRONMENTAL ASSESSMENT AND PLANNING, NOT TO BE USED FOR ENGINEERING OR SURVEYING. ALL LOCATIONS ARE APPROXIMATE. THIS IS NOT A LEGAL SURVEY.



CITY HALL PARK BURLINGTON, VERMONT		Waite - Heindel Environmental Management  Hydrogeology • Environmental Services • Water and Wastewater Design • Burlington, Vermont • (802) 860-9400		FIGURE 2	
DATE: 1/3/19		PROJECT NO. 2018-55		DRAWN BY: M.E.W.	
PROJECT MGR: C.P.		APPROVED: M.E.W.		☐ DRAFT ☒ FINAL	
SITE PLAN WITH UTILITIES		FILE: WHEM_CHP Plan.dwg		SCALE: 1"=30'	



NOTES
1. [BaP] = BENZO(A)PYRENE TOXICITY EQUIVALENCE, IN UG/KG (PPB); BG = BACKGROUND CONCENTRATION; JCO = THE JOHNSON COMPANY.
2. ALL [BaP] RESULTS ARE FROM LAB ANALYSIS BY EPA METHOD 8270D.
3. DATA ARE FROM SAMPLING BY THE JOHNSON CO (APRIL 2017) AND BY WHM (DECEMBER 2018).

LEGEND

- SB-2

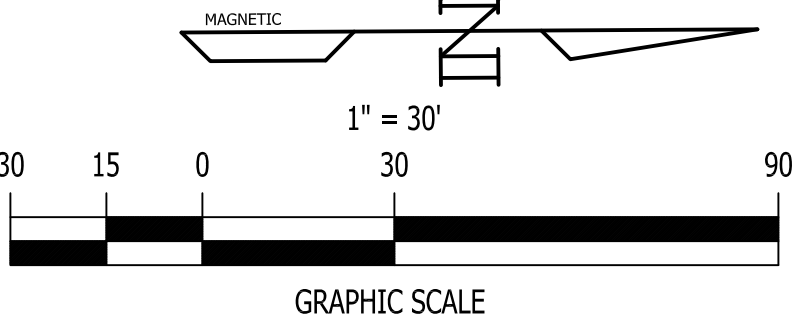
HA-9

SB-101
- 1,197

[BaP] (ug/kg) AT 0-1 FT
- 209***

[BaP] (ug/kg) AT 1-2 FT
- 49

[BaP] (ug/kg) AT > 2 FT



Waite - Heindel
Environmental Management

Hydrogeology • Environmental Services •
Water and Wastewater Design •
Burlington, Vermont • (802) 860-9400

DATE: 1/17/19

PROJECT NO. 2018-55

DRAWN BY: M.E.W.

PROJ. MGR: C.P.

APPROVED: M.E.W.

☐ DRAFT

☒ FINAL

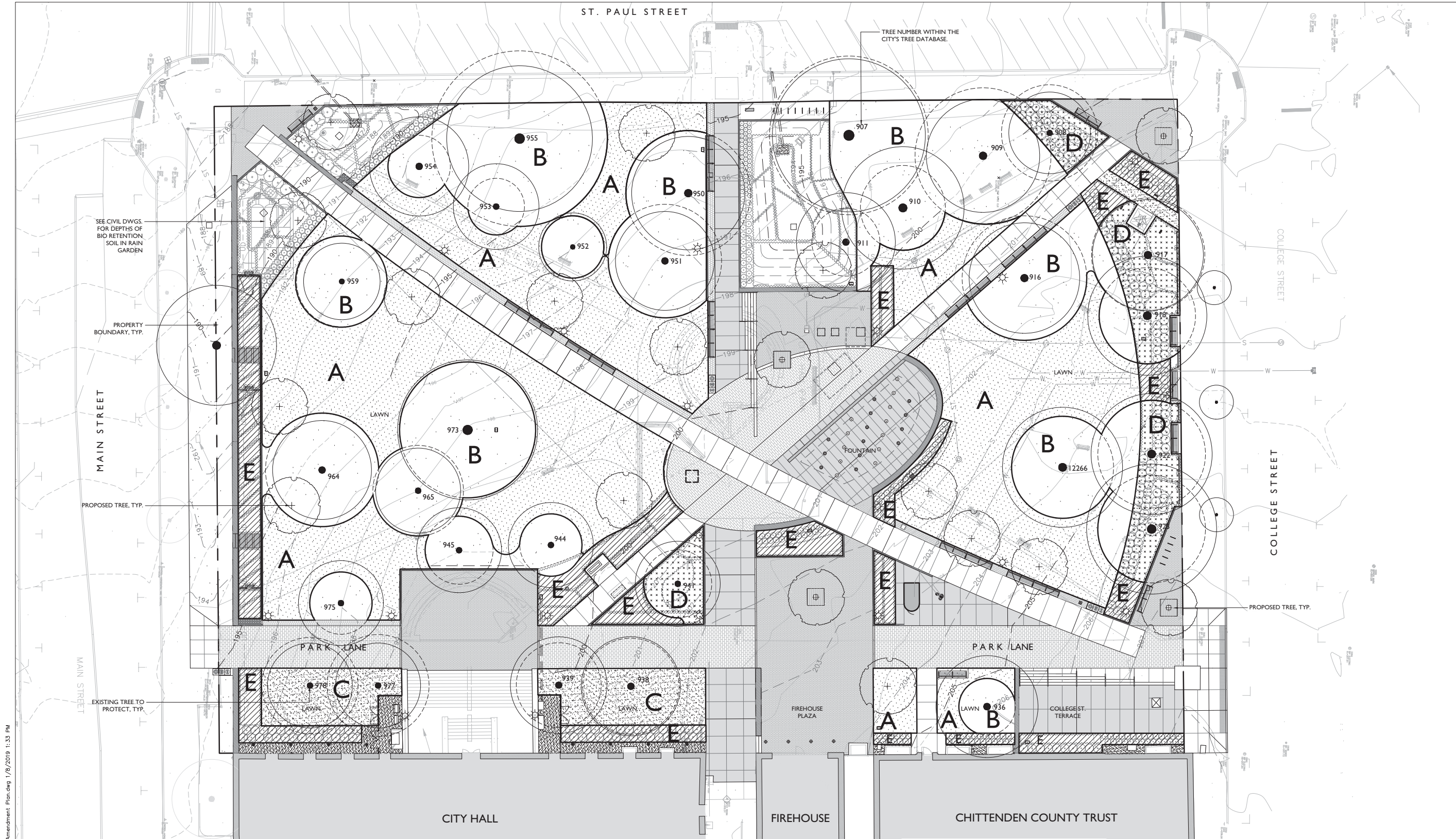
BURLINGTON GREAT STREETS
CITY HALL PARK
BURLINGTON, VERMONT

SOIL DATA PLAN - PAHS

FILE: WHM_CHP Plan.dwg

SCALE: 1"=30'

FIGURE 3



SOIL AMENDMENT ZONES

- A: PROVIDE 6" TOPSOIL, TAPERING TO LESS AS NECESSARY DUE TO PRESENCE OF TREE ROOTS OR TO MEET EXISTING GRADE WITHIN TREE CANOPY. SCARIFY SUBGRADE TO RECEIVE TOPSOIL.
- B: DO NOT CHANGE GRADE OVER ROOTS OF EXISTING TREES TO REMAIN. CONSULT CITY ARBORIST REGARDING AERATION AND APPLYING AMENDMENTS TO PROMOTE TURF ESTABLISHMENT.
- C: REMOVE MULCH & TOPDRESS WITH TOPSOIL FOR TURF ESTABLISHMENT.
- D: DO NOT CHANGE GRADE OVER ROOTS OF EXISTING TREES TO REMAIN. INSTALL PLANTS BETWEEN EXISTING TREE ROOTS AND AMEND WITH HORTICULTURAL SOIL PER PLANTING DETAILS.
- E: PROVIDE 18" DEEP HORTICULTURAL SOIL IN PLANTING BED.

- REMEDIATION ZONES:**
- ZONE A:** PROVIDE 6" TOPSOIL AS SPECIFIED; PRE-TEST TOPSOIL FOR PAHS AND GET QEP APPROVAL BEFORE USE. 6" CLEAN TOPSOIL AND ESTABLISHED TURF WILL ACT AS BARRIER.
- ZONES B,C,D:** AERIFY AND VACU-EXTRACT SOIL, ADD TOPSOIL TO TAPER FROM 6" AT DRIP LINE TO 0" AT TRUNK, ADD MULCH AROUND TRUNK, RESTRICT FOOT TRAFFIC UNTIL TURF IS ESTABLISHED. TURF AND MULCH WILL ACT AS BARRIER. THIS WORK WILL BE DONE IN PHASES DURING SPRING AND FALL.
- ZONE E:** PROVIDE 18" HORTICULTURAL SOIL AS SPECIFIED. CLEAN SOIL WILL ACT AS BARRIER.
- HARDSCAPE ZONES:** HARDSCAPING SHALL BE USED AS BARRIER. ANY EXCAVATED SOIL FROM 0-18" FROM ANYWHERE IN THE PARK SHALL BE STOCKPILED FOLLOWED BY EITHER RE-BURIAL UNDER HARDSCAPING OR OFFSITE DISPOSAL AT AN APPROPRIATE FACILITY.

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PROFESSIONAL SEAL

NOT FOR CONSTRUCTION

				JH		CRD
				AH		BY
				BID SET		
				100% CD SUBMITTAL		
				85% CD SUBMITTAL		
				DATE		
				NO.		

PROJECT TITLE

BURLINGTON GREAT STREETS CITY HALL PARK

SHEET TITLE

SOIL AMENDMENT PLAN

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

SHEET NUMBER

L301

APPENDIX 2

TABLES



Table 1: SVOC Summary Table
City Hall Park (SMS #2018-4806)
Burlington, VT

		SOIL SCREENING VALUES (SSVs)				SHALLOW				DEEP					
Sample Location		EPA Regional	EPA Regional	VT Screening	VT DEC	Comp-HA-1,2,3,4	Comp-HA-5,6,7,8	Comp-HA-9,10,11,12	Comp-HA-13,14,15,16	Comp-SB-1	SB-2	SB-3	SB-4	SB-5	SB-6
Sample Depth Interval (ft)		RSL	RSL	Levels	Background Soil	(0-1)	(0-1)	(0-1)	(0-1)	(1.5-5)	(1.5-5)	(1-4)	(1-5)	(1-6)	(1-3)
Sample Date		Residential	Industrial	Residential	Concentrations	4/24/2017	4/24/2017	4/24/2017	4/24/2017	4/24/1947	4/24/1947	4/24/1947	4/24/1947	4/24/1947	4/24/1947
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270D)															
Naphthalene	ug/Kg (ppb)	--	17,000	1,420	--	190	130	56	50	ND / <7	ND / <7	21	ND / <7	ND / <7	25
2-Methylnaphthalene	ug/Kg (ppb)	240,000	3,000,000	--	--	42	49	18	19	ND / <7	ND / <7	ND / <8	ND / <7	ND / <7	ND / <7
1-Methylnaphthalene	ug/Kg (ppb)	18,000	73,000	--	--	59	44	15	15	ND / <7	ND / <7	ND / <8	ND / <7	ND / <7	ND / <7
Acenaphthylene	ug/Kg (ppb)	--	--	--	--	530	300	130	140	ND / <7	ND / <7	39	ND / <7	ND / <7	47
Acenaphthene	ug/Kg (ppb)	3,600,000	45,000,000	--	--	100	95	42	35	ND / <7	ND / <7	14	ND / <7	ND / <7	24
Fluorene	ug/Kg (ppb)	2,400,000	30,000,000	--	--	140	130	52	45	ND / <7	ND / <7	15	ND / <7	ND / <7	21
Phenanthrene	ug/Kg (ppb)	--	--	--	--	2,700	1,900	990	650	10	11	250	28	ND / <7	400
Anthracene	ug/Kg (ppb)	18,000,000	230,000,000	--	--	640	470	200	170	ND / <7	ND / <7	57	ND / <7	ND / <7	82
Fluoranthene	ug/Kg (ppb)	2,400,000	30,000,000	--	--	5,000	3,700	1,900	1,400	34	18	520	60	ND / <7	970
Pyrene	ug/Kg (ppb)	1,800,000	23,000,000	--	--	4,900	3,600	1,700	1,300	39	16	490	54	ND / <7	930
Benzo(a)anthracene	ug/Kg (ppb)	160	2,900	--	--	3,000	2,200	960	730	23	12	290	32	ND / <7	510
Chrysene	ug/Kg (ppb)	16,000	290,000	--	--	3,200	2,300	1,100	830	21	9	310	32	ND / <7	510
Benzo(b)fluoranthene	ug/Kg (ppb)	160	2,900	--	--	3,900	2,800	1,300	1,000	30	12	420	43	ND / <7	660
Benzo(k)fluoranthene	ug/Kg (ppb)	1,600	29,000	--	--	1,300	1,000	460	390	10	ND / <7	150	15	ND / <7	240
Benzo(a)pyrene	ug/Kg (ppb)	--	--	76 / 1,540 [†]	--	3,000	2,200	1,000	820	24	9	310	32	ND / <7	520
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	160	2,900	--	--	2,500	1,800	760	590	16	ND / <7	230	23	ND / <7	360
Dibenzo(a,h)anthracene		16	290	--	--	610	440	180	140	ND / <7	ND / <7	54	ND / <7	ND / <7	84
Benzo(g,h,i)perylene		--	--	--	--	2,100	1,500	650	190	17	ND / <7	210	21	ND / <7	330
BaP Toxic Equiv. Quotient	ug/Kg (ppb)	--	--	--	26 / 580*	4,566	3,332	1,488	1,197	38	19	460	49	16	760

		SOIL SCREENING VALUES (SSVs)				1'	2'				3'	4'		5'	6'	
Sample Location		EPA Regional	EPA Regional	VT Screening	VT DEC	B-104, 1'	B-101, 2'	B-102, 2'	B-103, 2'	B-105, 2'	B-104, 3'	B-103, 4'	B-105, 4'	B-104, 5'	B-103, 6'	B-105, 6'
Sample Depth Interval (ft)		RSL	RSL	Levels	Background Soil	(1')	(2')	(2')	(2')	(2')	(3')	(4')	(4')	(5')	(6')	(6')
Sample Date		Residential	Industrial	Residential	Concentrations	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270D)																
Naphthalene	ug/Kg (ppb)	--	17,000	1,420	--	ND / <209	ND / <19.5	ND / <19.3	ND / <19.6	ND / <196	ND / <19.0	ND / <18.4	ND / <18.6	ND / <19.0	ND / <18.2	ND / <200
2-Methylnaphthalene	ug/Kg (ppb)	240,000	3,000,000	--	--	ND / <209	ND / <19.5	ND / <19.3	ND / <19.6	ND / <196	ND / <19.0	ND / <18.4	ND / <18.6	ND / <19.0	ND / <18.2	ND / <200
1-Methylnaphthalene	ug/Kg (ppb)	18,000	73,000	--	--	ND / <209	ND / <19.5	ND / <19.3	ND / <19.6	ND / <196	ND / <19.0	ND / <18.4	ND / <18.6	ND / <19.0	ND / <18.2	ND / <200
Acenaphthylene	ug/Kg (ppb)	--	--	--	--	ND / <209	ND / <19.5	ND / <19.3	ND / <19.6	ND / <196	ND / <19.0	ND / <18.4	ND / <18.6	ND / <19.0	ND / <18.2	ND / <200
Acenaphthene	ug/Kg (ppb)	3,600,000	45,000,000	--	--	ND / <209	ND / <19.5	ND / <19.3	ND / <19.6	ND / <196	ND / <19.0	ND / <18.4	ND / <18.6	ND / <19.0	ND / <18.2	ND / <200
Fluorene	ug/Kg (ppb)	2,400,000	30,000,000	--	--	ND / <209	ND / <19.5	ND / <19.3	ND / <19.6	ND / <196	ND / <19.0	ND / <18.4	ND / <18.6	ND / <19.0	ND / <18.2	ND / <200
Phenanthrene	ug/Kg (ppb)	--	--	--	--	1,690	40.3	ND / <19.3	123	1,690	61.2	ND / <18.4	34.2	ND / <19.0	ND / <18.2	1,410
Anthracene	ug/Kg (ppb)	18,000,000	230,000,000	--	--	267	ND / <19.5	ND / <19.3	22.4	266	ND / <19	ND / <18.4	ND / <18.6	ND / <19.0	ND / <18.2	240
Fluoranthene	ug/Kg (ppb)	2,400,000	30,000,000	--	--	4,490	100.0	20.1	253	4,520	143	32.4	91.4	ND / <19.0	ND / <18.2	3,670
Pyrene	ug/Kg (ppb)	1,800,000	23,000,000	--	--	4,750	87.5	ND / <19.3	221	4,810	127	28.0	81.0	ND / <19.0	ND / <18.2	3,840
Benzo(a)anthracene	ug/Kg (ppb)	160	2,900	--	--	2,380	56.3	ND / <19.3	133	2,530	69.2	30.9	47.9	ND / <19.0	ND / <18.2	1,980
Chrysene	ug/Kg (ppb)	16,000	290,000	--	--	2,730	62.9	ND / <19.3	147	2,810	77.2	37.9	55.0	ND / <19.0	ND / <18.2	2,210
Benzo(b)fluoranthene	ug/Kg (ppb)	160	2,900	--	--	4,630	87.5	ND / <19.3	189	3,970	99.6	59.6	72.5	ND / <19.0	ND / <18.2	3,010
Benzo(k)fluoranthene	ug/Kg (ppb)	1,600	29,000	--	--	1,850	30.5	ND / <19.3	74.2	1,310	39.5	25.4	27.1	ND / <19.0	ND / <18.2	1,140
Benzo(a)pyrene	ug/Kg (ppb)	--	--	76 / 1,540 [†]	--	3,570	64.9	ND / <13.5	145	3,080	79.4	41.9	56.9	ND / <13.3	ND / <12.7	2,360
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	160	2,900	--	--	2,890	50.4	ND / <19.3	108	2,200	62.7	32.7	45.0	ND / <19.0	ND / <18.2	1,710
Dibenzo(a,h)anthracene		16	290	--	--	534	ND / <13.7	ND / <13.5	20.0	427	ND / <13	ND / <12.9	ND / <13.0	ND / <13.3	ND / <12.7	367
Benzo(g,h,i)perylene		--	--	--	--	2,450	44.2	ND / <19.3	84.8	1,890	49.4	30.2	37.5	ND / <19.0	ND / <18.2	1,550
BaP Toxic Equiv. Quotient	ug/Kg (ppb)	--	--	--	26 / 580*	5,120	98.4	ND / <33.0	209	4,390	116	67.4	86.8	ND / <32.5	ND / <31.1	3,410

NOTES:
1. All standards as listed are from Appendix A - § 35-APX-A1 - Soil Screening Values, in the VT Investigation and Remediation of Contaminated Properties Rule, Effective July 27, 2017.
2. ND/<X = Not Detected above method detection Limit shown.
3. Results reported above the method detection limit are indicated in bold.
4. Shaded results are above applicable soil screening value.
5. Underlined result are above industrial guideline
† = Benzo(a)pyrene-TE Vermont Screening Level; both Residential/Industrial standards shown.
* = VT DEC Background Soil Concentration; both Rural/Urban standads shown.



Table 2: Pesticides Summary Table
City Hall Park (SMS #2018-4806)
Burlington, VT

SOIL SCREENING VALUE						SHALLOW				DEEP		
Sample Location		EPA Regional	EPA Regional	VT Screening	VT DEC	Comp-HA-1,2,3,4	Comp-HA-5,6,7,8	Comp-HA-9,10,11,12	Comp-HA-13,14,15,16	SB-3	SB-6	
Sample Depth Interval (ft)		RSL	RSL	Levels	Background Soil	(0-1)	(0-1)	(0-1)	(0-1)	(1-4)	(1-3)	
Sample Date		Residential	Industrial	Residential	Concentrations	4/24/2017	4/24/2017	4/24/2017	4/24/2017	4/24/1947	4/24/1947	
POLY-CHLORINATED BIPHENYLS (PCBs) (EPA METHOD 8082)												
alpha-BHC	ug/Kg (ppb)	86	360	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
gamma-BHC (Lindane)	ug/Kg (ppb)	570	2,500	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
beta-BHC	ug/Kg (ppb)	300	1,300	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
delta-BHC	ug/Kg (ppb)	--	--	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Heptachlor	ug/Kg (ppb)	130	630	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Aldrin	ug/Kg (ppb)	--	180	20.2	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Heptachlor Epoxide	ug/Kg (ppb)	70	330	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
4,4'-DDE	ug/Kg (ppb)	2,000	9,300	--	--	2,300	2,900	990	1,300	73	150	
Endosulfan I	ug/Kg (ppb)	470,000	7,000,000	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Dieldrin	ug/Kg (ppb)	34	140	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Endrin	ug/Kg (ppb)	19,000	25,000	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
4,4'-DDD		2,300	9,600	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Endosulfan II		--	--	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
4,4'-DDT	ug/Kg (ppb)	1,900	8,500	--	--	1,300	1,500	770	990	99	100	
Endrin Aldehyde	ug/Kg (ppb)	--	--	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Endosulfan Sulfate	ug/Kg (ppb)	--	--	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Methoxychlor	ug/Kg (ppb)	320,000	4,100,000	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	
Chlordane	ug/Kg (ppb)	1,700	7,700	--	--	ND / <200	ND / <200	ND / <200	ND / <200	ND / <200	ND / <200	
Toxaphene	ug/Kg (ppb)	490	2,100	--	--	ND / <60	ND / <60	ND / <60	ND / <60	ND / <60	ND / <50	

SOIL SCREENING VALUE						1'	2'					3'	4'		5'	6'	
Sample Location		EPA Regional RSL	EPA Regional RSL	VT Screening Levels	VT DEC Background Soil	B-104, 1'	B-101, 2'	B-102, 2'	B-103, 2'	B-105, 2'	B-104, 3'	B-103, 4'	B-105, 4'	B-104, 5'	B-103, 6'	B-105, 6'	
Sample Depth Interval (ft)				Residential	Concentrations	(7')	(2')	(2')	(2')	(2')	(3')	(4')	(4')	(5')	(6')	(6')	
Sample Date			Residential	Industrial	Residential		12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018
POLY-CHLORINATED BIPHENYLS (PCBs) (EPA METHOD 8081B)																	
alpha-BHC	ug/Kg (ppb)	86	360	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
gamma-BHC (Lindane)	ug/Kg (ppb)	570	2,500	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
beta-BHC	ug/Kg (ppb)	300	1,300	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
delta-BHC	ug/Kg (ppb)	--	--	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Heptachlor	ug/Kg (ppb)	130	630	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Aldrin	ug/Kg (ppb)	--	180	20.2	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Heptachlor Epoxide	ug/Kg (ppb)	70	330	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
4,4'-DDE	ug/Kg (ppb)	2,000	9,300	--	--	674	91.8	5.8	419	1,070	214	9.0	70.6	ND / <3.7	ND / <3.6	1,170	
Endosulfan I	ug/Kg (ppb)	470,000	7,000,000	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Dieldrin	ug/Kg (ppb)	34	140	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Endrin	ug/Kg (ppb)	19,000	25,000	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
4,4'-DDD	ug/Kg (ppb)	2,300	9,600	--	--	10.9	ND / <3.9	ND / <3.8	ND / <3.8	35	4.3	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	52.5	
Endosulfan II	ug/Kg (ppb)	--	--	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
4,4'-DDT	ug/Kg (ppb)	1,900	8,500	--	--	231	30.6	ND / <3.8	76.4	782	55.1	3.9	35.8	ND / <3.7	ND / <3.6	502	
Endrin Aldehyde	ug/Kg (ppb)	--	--	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Endosulfan Sulfate	ug/Kg (ppb)	--	--	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Methoxychlor	ug/Kg (ppb)	320,000	4,100,000	--	--	ND / <4.1	ND / <3.9	ND / <3.8	ND / <3.8	ND / <3.7	ND / <4.0	ND / <3.7	ND / <3.5	ND / <3.7	ND / <3.6	ND / <3.6	
Chlordane	ug/Kg (ppb)	1,700	7,700	--	--	ND / <20.6	ND / <19.3	ND / <19.2	ND / <18.9	ND / <18.3	ND / <19.9	ND / <18.7	ND / <17.6	ND / <18.5	ND / <17.8	ND / <18.1	
Toxaphene	ug/Kg (ppb)	490	2,100	--	--	ND / <20.6	ND / <19.3	ND / <19.2	ND / <18.9	ND / <18.3	ND / <19.9	ND / <18.7	ND / <17.6	ND / <18.5	ND / <17.8	ND / <18.1	

NOTES:
1. All standards as listed are from Appendix A - § 35-APX-A1 - Soil Screening Values, in the VT Investigation and Remediation of Contaminated Properties Rule, Effective July 27, 2017.
2. ND/<X = Not Detected above method detection Limit shown.
3. Results reported above the method detection limit are indicated in bold.
4. Shaded results are above applicable soil screening value.
5. Underlined result are above industrial guideline
† = Benzo(a)pyrene-TE Vermont Screening Level; both Residential/Industrial standards shown.
* = VT DEC Background Soil Concentration; both Rural/Urban standads shown.

APPENDIX 3

LABORATORY REPORTS



Waite-Heindel Environmental

7 Kilburn Street, Suite 301

100675

Burlington, VT 05406

Atten: Miles Waite

PROJECT: City Hall Park Rev

WORK ORDER: **1812-30675**

DATE RECEIVED: December 03, 2018

DATE REPORTED: January 08, 2019

SAMPLER: Chris Page

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com

160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 01/08/2019

CLIENT: Waite-Heindel Environmental
 PROJECT: City Hall Park Rev

WORK ORDER: 1812-30675
 DATE RECEIVED: 12/03/2018

001	Site: B-101,2'		Date Sampled: 12/3/18		Time: 11:45		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
SPLP Extract-SVOA/Metals	Completed		EPA 1312	12/6/18	W FAA	N	
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	
alpha-BHC	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	91.8	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan I	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	30.6	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endrin Aldehyde	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 19.3	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 19.3	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	64	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	74	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons	SPLP						Note
Liquid/Liquid Sep Funnel	Completed		EPA 3510C	12/12/18	W ITR	A	
Naphthalene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
2-Methylnaphthalene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
1-Methylnaphthalene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	U	
Acenaphthylene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Acenaphthene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Fluorene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Phenanthrene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Anthracene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Fluoranthene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Pyrene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Benzo(a)anthracene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Chrysene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Benzo(b)fluoranthene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Benzo(k)fluoranthene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Benzo(a)pyrene	< 0.2	ug/L	EPA 8270D	12/27/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Dibenzo(a,h)anthracene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
Benzo(g,h,i)perylene	< 0.5	ug/L	EPA 8270D	12/13/18	W EEP	A	
BaP Toxic Equiv. Quotient	< 1.2	ug/L	EPA 8270D	12/13/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	64	%	EPA 8270D	12/13/18	W EEP	A	

Laboratory Report

DATE REPORTED: 01/08/2019

CLIENT: Waite-Heindel Environmental
PROJECT: City Hall Park Rev

WORK ORDER: 1812-30675
DATE RECEIVED: 12/03/2018

001	Site: B-101,2'		Date Sampled: 12/3/18		Time: 11:45		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
B/N Surr.2 2-Fluorobiphenyl	67	%	EPA 8270D	12/13/18	W EEP	A	
B/N Surr.3 Terphenyl-d14	100	%	EPA 8270D	12/13/18	W EEP	A	
Unidentified Peaks	> 10		EPA 8270D	12/13/18	W EEP	U	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 19.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
2-Methylnaphthalene	< 19.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
1-Methylnaphthalene	< 19.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
Acenaphthylene	< 19.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Acenaphthene	< 19.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluorene	< 19.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Phenanthrene	40.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Anthracene	< 19.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluoranthene	100	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Pyrene	87.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)anthracene	56.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Chrysene	62.9	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(b)fluoranthene	87.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(k)fluoranthene	30.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)pyrene	64.9	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	50.4	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Dibenzo(a,h)anthracene	< 13.7	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(g,h,i)perylene	44.2	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
BaP Toxic Equiv. Quotient	98.4	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	58	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	63	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	79	%	EPA 8270D	12/11/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/11/18	W EEP	U	

002	Site: B-102,2'			Date Sampled: 12/3/18	Time: 12:00		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	
alpha-BHC	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	5.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan I	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	

Laboratory Report

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CLIENT: Waite-Heindel Environmental
PROJECT: City Hall Park Rev

WORK ORDER: 1812-30675
DATE RECEIVED: 12/03/2018

002	Site: B-102,2'		Date Sampled: 12/3/18		Time: 12:00		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Endosulfan II	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC2
Endrin Aldehyde	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 19.2	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 19.2	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	69	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	82	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
2-Methylnaphthalene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
1-Methylnaphthalene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
Acenaphthylene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Acenaphthene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluorene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Phenanthrene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Anthracene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluoranthene	20.1	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Pyrene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)anthracene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Chrysene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(b)fluoranthene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(k)fluoranthene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)pyrene	< 13.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Dibenzo(a,h)anthracene	< 13.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(g,h,i)perylene	< 19.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
BaP Toxic Equiv. Quotient	< 33.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	64	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	64	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	82	%	EPA 8270D	12/11/18	W EEP	U	
Unidentified Peaks	3		EPA 8270D	12/11/18	W EEP	U	

003	Site: B-103,2'		Date Sampled: 12/3/18		Time: 13:20		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	
alpha-BHC	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	

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Laboratory Report

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CLIENT: Waite-Heindel Environmental
PROJECT: City Hall Park Rev

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DATE RECEIVED: 12/03/2018

003	Site: B-103,2'		Date Sampled: 12/3/18		Time: 13:20		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Heptachlor Epoxide	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	419	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan I	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	76.4	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endrin Aldehyde	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 18.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 18.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	64	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	82	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 19.6	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
2-Methylnaphthalene	< 19.6	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
1-Methylnaphthalene	< 19.6	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
Acenaphthylene	< 19.6	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Acenaphthene	< 19.6	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluorene	< 19.6	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Phenanthrene	123	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Anthracene	22.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluoranthene	253	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Pyrene	221	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)anthracene	133	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Chrysene	147	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(b)fluoranthene	189	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(k)fluoranthene	74.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)pyrene	145	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	108	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Dibenzo(a,h)anthracene	20.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(g,h,i)perylene	84.8	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
BaP Toxic Equiv. Quotient	209	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	75	%	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	74	%	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	91	%	EPA 8270D	12/8/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/8/18	W EEP	U	

004	Site: B-103,4'		Date Sampled: 12/3/18		Time: 13:25		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	

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PROJECT: City Hall Park Rev

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004	Site: B-103,4'		Date Sampled: 12/3/18		Time: 13:25		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
alpha-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	9.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan I	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	3.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC2
Endrin Aldehyde	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 18.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 18.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	47	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	74	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
2-Methylnaphthalene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
1-Methylnaphthalene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
Acenaphthylene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Acenaphthene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluorene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Phenanthrene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Anthracene	< 18.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluoranthene	32.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Pyrene	28.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)anthracene	30.9	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Chrysene	37.9	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(b)fluoranthene	59.6	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(k)fluoranthene	25.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)pyrene	41.9	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	32.7	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Dibenzo(a,h)anthracene	< 12.9	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(g,h,i)perylene	30.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
BaP Toxic Equiv. Quotient	67.4	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	72	%	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	75	%	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	99	%	EPA 8270D	12/8/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/8/18	W EEP	U	

**ENDYNE Inc.**

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DATE REPORTED: 01/08/2019

CLIENT: Waite-Heindel Environmental
 PROJECT: City Hall Park Rev

WORK ORDER: 1812-30675
 DATE RECEIVED: 12/03/2018

005	Site: B-103,6'		Date Sampled: 12/3/18		Time: 13:35		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	
alpha-BHC	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan I	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC2
Endrin Aldehyde	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 17.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 17.8	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	66	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	81	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
2-Methylnaphthalene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
1-Methylnaphthalene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
Acenaphthylene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Acenaphthene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluorene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Phenanthrene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Anthracene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluoranthene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Pyrene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)anthracene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Chrysene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(b)fluoranthene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(k)fluoranthene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)pyrene	< 12.7	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Dibenzo(a,h)anthracene	< 12.7	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(g,h,i)perylene	< 18.2	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
BaP Toxic Equiv. Quotient	< 31.1	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	74	%	EPA 8270D	12/8/18	W EEP	U	

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005	Site: B-103,6'			Date Sampled: 12/3/18	Time: 13:35		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
B/N Surr.2 2-Fluorobiphenyl	73	%	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	90	%	EPA 8270D	12/8/18	W EEP	U	
Unidentified Peaks	0		EPA 8270D	12/8/18	W EEP	U	

006	Site: B-104,1'			Date Sampled: 12/3/18	Time: 13:48		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	
alpha-BHC	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	674	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan I	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	10.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	231	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endrin Aldehyde	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 4.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 20.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 20.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	22	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	82	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 209	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
2-Methylnaphthalene	< 209	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
1-Methylnaphthalene	< 209	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
Acenaphthylene	< 209	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Acenaphthene	< 209	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluorene	< 209	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Phenanthrene	1,690	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Anthracene	267	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluoranthene	4,490	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Pyrene	4,750	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)anthracene	2,380	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Chrysene	2,730	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(b)fluoranthene	4,630	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(k)fluoranthene	1,850	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	

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006	Site: B-104,1'			Date Sampled: 12/3/18	Time: 13:48		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Benzo(a)pyrene	3,570	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	2,890	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Dibenzo(a,h)anthracene	534	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(g,h,i)perylene	2,450	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
BaP Toxic Equiv. Quotient	5,120	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	112	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	87	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	128	%	EPA 8270D	12/11/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/11/18	W EEP	U	

007	Site: B-104,3'		Date Sampled: 12/3/18		Time: 13:52		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	
alpha-BHC	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	214	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan I	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	4.3	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	55.1	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endrin Aldehyde	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 4.0	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 19.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 19.9	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	65	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	91	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 19.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
2-Methylnaphthalene	< 19.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
1-Methylnaphthalene	< 19.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
Acenaphthylene	< 19.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Acenaphthene	< 19.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluorene	< 19.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Phenanthrene	61.2	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Anthracene	< 19.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	

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007	Site: B-104,3'			Date Sampled: 12/3/18	Time: 13:52		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Fluoranthene	143	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Pyrene	127	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)anthracene	69.2	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Chrysene	77.2	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(b)fluoranthene	99.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(k)fluoranthene	39.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)pyrene	79.4	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	62.7	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Dibenzo(a,h)anthracene	< 13.3	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(g,h,i)perylene	49.4	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
BaP Toxic Equiv. Quotient	116	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	52	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	50	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	89	%	EPA 8270D	12/11/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/11/18	W EEP	U	

008	Site: B-104,5'			Date Sampled: 12/3/18	Time: 13:56		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/6/18	W SMY	A	
alpha-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan I	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB1
4,4'-DDD	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC2
Endrin Aldehyde	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	LFB2
Endosulfan Sulfate	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC1
Chlordane	< 18.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 18.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	68	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	79	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
2-Methylnaphthalene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	

**ENDYNE Inc.**

www.endynelabs.com

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PROJECT: City Hall Park Rev

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008	Site: B-104,5'		Date Sampled: 12/3/18		Time: 13:56		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
1-Methylnaphthalene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
Acenaphthylene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Acenaphthene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluorene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Phenanthrene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Anthracene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Fluoranthene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Pyrene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)anthracene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Chrysene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(b)fluoranthene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(k)fluoranthene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(a)pyrene	< 13.3	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Dibenzo(a,h)anthracene	< 13.3	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
Benzo(g,h,i)perylene	< 19.0	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	A	
BaP Toxic Equiv. Quotient	< 32.5	ug/Kg, dry	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	70	%	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	67	%	EPA 8270D	12/8/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	87	%	EPA 8270D	12/8/18	W EEP	U	
Unidentified Peaks	0		EPA 8270D	12/8/18	W EEP	U	

009	Site: B-105,2'		Date Sampled: 12/3/18		Time: 14:10		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/18/18	W ITR	A	
alpha-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	1070	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan I	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDD	35.4	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	CC3
Endosulfan II	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	782	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endrin Aldehyde	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan Sulfate	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.7	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC4
Chlordane	< 18.3	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 18.3	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	

Laboratory Report

DATE REPORTED: 01/08/2019

CLIENT: Waite-Heindel Environmental
 PROJECT: City Hall Park Rev

WORK ORDER: 1812-30675
 DATE RECEIVED: 12/03/2018

009	Site: B-105,2'			Date Sampled: 12/3/18	Time: 14:10		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Surrogate-TCMX	55	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	77	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 196	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
2-Methylnaphthalene	< 196	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
1-Methylnaphthalene	< 196	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
Acenaphthylene	< 196	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Acenaphthene	< 196	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluorene	< 196	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Phenanthrene	1,690	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Anthracene	266	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluoranthene	4,520	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Pyrene	4,810	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)anthracene	2,530	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Chrysene	2,810	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(b)fluoranthene	3,970	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(k)fluoranthene	1,310	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)pyrene	3,080	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	2,200	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Dibenzo(a,h)anthracene	427	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(g,h,i)perylene	1,890	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
BaP Toxic Equiv. Quotient	4,390	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	96	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	76	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	103	%	EPA 8270D	12/11/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/11/18	W EEP	U	

010	Site: B-105,4'			Date Sampled: 12/3/18	Time: 14:15		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/18/18	W ITR	A	
alpha-BHC	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDE	70.6	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan I	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDD	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan II	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	

**ENDYNE Inc.**

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Laboratory Report

DATE REPORTED: 01/08/2019

CLIENT: Waite-Heindel Environmental
PROJECT: City Hall Park Rev

WORK ORDER: 1812-30675
DATE RECEIVED: 12/03/2018

010		Site: B-105,4'		Date Sampled: 12/3/18		Time: 14:15	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
4,4'-DDT	35.8	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endrin Aldehyde	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	M
Endosulfan Sulfate	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.5	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC4
Chlordane	< 17.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 17.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	61	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	89	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 18.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
2-Methylnaphthalene	< 18.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
1-Methylnaphthalene	< 18.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
Acenaphthylene	< 18.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Acenaphthene	< 18.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluorene	< 18.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Phenanthrene	34.2	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Anthracene	< 18.6	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluoranthene	91.4	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Pyrene	81.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)anthracene	47.9	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Chrysene	55.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(b)fluoranthene	72.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(k)fluoranthene	27.1	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)pyrene	56.9	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	45.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Dibenzo(a,h)anthracene	< 13.0	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(g,h,i)perylene	37.5	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
BaP Toxic Equiv. Quotient	86.8	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	73	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	75	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	89	%	EPA 8270D	12/11/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/11/18	W EEP	U	

011		Site: B-105,6'		Date Sampled: 12/3/18		Time: 14:20	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Priority Pollutant Pesticides							
Ultrasonic Extraction	Completed		EPA 3550B	12/18/18	W ITR	A	
alpha-BHC	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
gamma-BHC (Lindane)	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
beta-BHC	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
delta-BHC	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Aldrin	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Heptachlor Epoxide	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	

Laboratory Report

DATE REPORTED: 01/08/2019

CLIENT: Waite-Heindel Environmental
 PROJECT: City Hall Park Rev

WORK ORDER: 1812-30675
 DATE RECEIVED: 12/03/2018

011 Site: B-105,6'		Date Sampled: 12/3/18		Time: 14:20			
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
4,4'-DDE	1170	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan I	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Dieldrin	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endrin	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDD	52.5	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endosulfan II	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
4,4'-DDT	502	ug/Kg, dry	EPA 8081B	12/20/18	W DPD	A	
Endrin Aldehyde	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Endosulfan Sulfate	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Methoxychlor	< 3.6	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	CC4
Chlordane	< 18.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Toxaphene	< 18.1	ug/Kg, dry	EPA 8081B	12/18/18	W DPD	A	
Surrogate-TCMX	60	%	EPA 8081B	12/18/18	W DPD	A	
Surrogate-DCB	95	%	EPA 8081B	12/18/18	W DPD	A	
Poly-Aromatic Hydrocarbons							
Ultrasonic Extraction	Completed		EPA 3545a	12/5/18	W SMY	A	
Naphthalene	< 200	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
2-Methylnaphthalene	< 200	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
1-Methylnaphthalene	< 200	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
Acenaphthylene	< 200	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Acenaphthene	< 200	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluorene	< 200	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Phenanthrene	1,410	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Anthracene	240	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Fluoranthene	3,670	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Pyrene	3,840	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)anthracene	1,980	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Chrysene	2,210	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(b)fluoranthene	3,010	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(k)fluoranthene	1,140	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(a)pyrene	2,360	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Indeno(1,2,3-cd)pyrene	1,710	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Dibenzo(a,h)anthracene	367	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
Benzo(g,h,i)perylene	1,550	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	A	
BaP Toxic Equiv. Quotient	3,410	ug/Kg, dry	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.1 Nitrobenzene-d5	103	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.2 2-Fluorobiphenyl	81	%	EPA 8270D	12/11/18	W EEP	U	
B/N Surr.3 Terphenyl-d14	111	%	EPA 8270D	12/11/18	W EEP	U	
Unidentified Peaks	> 10		EPA 8270D	12/11/18	W EEP	U	

**ENDYNE Inc.**

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Laboratory Report

DATE REPORTED: 01/08/2019

CLIENT: Waite-Heindel Environmental
PROJECT: City Hall Park Rev

WORK ORDER: **1812-30675**
DATE RECEIVED: 12/03/2018

Report Summary of Qualifiers and Notes

Note: Sample -001 PAH analysis was performed on the SPLP extract of the sample and the results are reported in ug/L. Total PAH's were also determined for sample -001 and the results are reported as ug/Kg, dry.

M: The Laboratory Fortified Matrix (LFM) recovery for this parameter was 56% of the expect target, the sample result may be biased low.

LFB1: The Laboratory Fortified Blank recovery for this parameter was 52% of the expect target, the sample result may be biased low.

LFB2: The Laboratory Fortified Blank recovery for this parameter was 37% of the expect target, the sample result may be biased low.

CC1: Instrument performance degraded during the analytical sequence. The closing calibration verification recovery was 79% of the expected target, the result may be biased low.

CC2: Instrument performance degraded during the analytical sequence. The closing calibration verification recovery was 76% of the expected target, the result may be biased low.

CC3: Instrument performance degraded during the analytical sequence. The closing calibration verification recovery was 133% of the expected target, the result may be biased high.

CC4: Instrument performance degraded during the analytical sequence. The closing calibration verification recovery was 60% of the expected target, the result may be biased low.

Revised report to reflect sample 006 correction from B104-7 to B104-1 per client request. ET



CHAIN-OF-CUSTODY-RECORD

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

Special Reporting Instructions/PO#:

Project Name: <u>City Hall Park</u>	Client/Contact Name: <u>Chris Page, WHEM</u>	Sampler Name: <u>Chris Page, WHEM</u>
State of Origin: VT ☒ NY ☐ NH ☐ Other ☐	Phone #: <u>802 860 7400 x 104</u>	Phone #: <u>802 860 9400 x 104</u>
Endyne WO #	Mailing Address: <u>7 Kilburn Street, Ste 320</u>	Billing Address: <u>SAME</u>
	<u>Burlington, VT 05401</u>	

Sample Location	Matrix	G R B	G M P	Date/Time Sampled (G-M-P - Times per Bottle)	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due Date
					No.	Type/Size				
SB-101, 2'	Soil	X		12/13/18 1200	2	8oz Amber	-	26, 27, 33		
SB-102, 2'				1200	1	8oz Amber	-	26, 27		
SB-103, 2'				1320						
SB-103, 4'				1325						
SB-103, 6'				1335						
SB-104, 1'				1348						
SB-104, 3'				1352						
SB-104, 5'				1356						
SB-105, 2'				1410						
SB-105, 4'				1415						

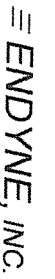
Relinquished by: <u>[Signature]</u>	Date/Time: <u>12/13/18 1532</u>	Received by: <u>[Signature]</u>	Date/Time: <u>12/13/18 1532</u>
-------------------------------------	---------------------------------	---------------------------------	---------------------------------

1 pH	6 TKN	11 Total Solids	16 Sulfate	21 1664 TPH/FOG	26 8270 PAH Only
2 Chloride	7 Total P	12 TSS	17 Coliform (Specify)	22 8015 GRO	27 8081 Pest
3 Ammonia N	8 Total Diss. P	13 TDS	18 COD	23 8015 DRO	28 8082 PCB
4 Nitrite N	9 BOD	14 Turbidity	19 VT PCF	24 8260B	
5 Nitrate N	10 Alkalinity	15 Conductivity	20 VOC Halocarbons	25 8270 B/I	
31 Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se,					
32 TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					
34 Corrosivity	35 Ignitability	36 Reactivity	37 Other		
38 Other					

1812-30675

1812-30675
Waite-Heindel Environmental
City Hall Park

LAB USE ONLY
Delivery: client
Temp: 3-8
Comment:



160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

Project Name: City Hall Park

Client/Contact Name: Chris Fogg, WTEA
Phone #: 802 860 9400x104

Sampler Name: Chris Pogg, Witten
Phone #: 802 860 2432 wlv

State of Origin: VT ☒ NY ☐ NH ☐ Other ☐

Mailing Address: 7 Kilsyn Street Ste 301

Billing Address:

Endyne WO #

Burlington VT 05401

SAN E

[illegible]

Relinquished by:

Date/Time

Received by:

Date/Time

Received by:

Date/Time

12/3/18 1532

Received by:	Date/Time
<i>Mr. Attala</i>	12/3/18 15:32

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)						33 Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY

Delivery: *Client*
 Temp: *3.8*
 Comment:

LAB USE ONLY

Delivery: *Client*

Temp: 3.8

Comments:

APPENDIX 4: SOIL BORING LOGS

SOIL BORING LOG

B-101

Site Name:	CEDO/CITY HALL PARK Burlington, VT
------------	---------------------------------------

Location: Immediately east of St. Paul Street sidewalk, north of park sidewalk, 9 ft from box labeled "electric".

WHEM Project # 2018-55

Date Installed: 12/3/2018

VT DEC Site # 2018-4806

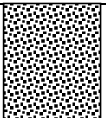
Drilling Method: Geoprobe 6610DT Direct Push

Drilled by : Aztech Drilling

Sampling Method: Geoprobe MC-5: 2" x 60" clear soil liners

Logged by: Chris Page

Development Method: NA

Well Construction		Pen/Rec(in)	Interval (ft)	PID (ppm)	Soil Characteristics	Letter	Graphical
Grade = 0							
0.5		24"	0-2'	0.0	0-12": Fine Sandy Loam, dark brown, friable, moist.	SM	
1.0					12-26": Med - Fine Sand, tan, well graded, some fines, fine gravel, moist.	SW	
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Legend

	Road Box with Bolt Down Cover, Set in Cement.
	Existing Surface.
	Bentonite Seal Placed in Annulus.
	Grade #1 Silica Sand Pack Placed in Annulus.
	Native Soil Placed in Annulus.

SOIL BORING LOG

B-102

Site Name:	CEDO/CITY HALL PARK Burlington, VT
------------	---------------------------------------

Location: Due east of SB-101.

WHEM Project # 2018-55

Date Installed: 12/3/2018

VT DEC Site # 2018-4806

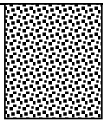
Drilling Method: Geoprobe 6610DT Direct Push

Drilled by : Aztech Drilling

Sampling Method: Geoprobe MC-5: 2" x 60" clear soil liners

Logged by: Chris Page

Development Method: NA

Grade = 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0	Well Construction	Pen/Rec(")	Interval (ft)	PID (ppm)	Soil Characteristics	Letter	Graph
Ft < Grade ↓		18"	0-2'	0.0	0-12": Fine Sandy Loam, dark brown, friable, moist.	SM	
					12-26": Medium Sand, some fines, tan, fine gravel, loose, moist.	SW	
					Sample B-102, 2' collected at 2 ft for PAHs and Pesticides		

Legend

	Road Box with Bolt Down Cover, Set in Cement.
	Existing Surface.
	Bentonite Seal Placed in Annulus.
	Grade #1 Silica Sand Pack Placed in Annulus.
	Native Soil Placed in Annulus.



SOIL BORING LOG

B-103

Site Name: CEDO/CITY HALL PARK
Burlington, VT

Location: Near NW corner of park, 12' west of statue.

WHEM Project # 2018-55

Date Installed: 12/3/2018

VT DEC Site # 2018-4806

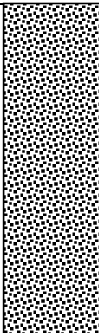
Drilling Method: Geoprobe 6610DT Direct Push

Drilled by : Aztech Drilling

Sampling Method: Geoprobe MC-5: 2" x 60" clear soil liners

Logged by: Chris Page

Development Method: NA

Grade = 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0	Well Construction	Pen/Rec(")	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol	Graphic
Ft < Grade ↓		30"	0-5	0.2	0-10": Fine Sandy Loam, topsoil, dark brown	SM	
				0.0	10-30": Fine and Medium sand, dense, friable, medium brown, moist.	SW	
				0.0	30-76": Medium and Coarse Sand, occasional gravel, tan with faint iron mottling, well graded		
		9"	5-6.5				
					Samples B-103 collected for PAHs, Pesticides at 2 ft, 4 ft, and 6 ft.		

Legend

-  Road Box with Bolt Down Cover, Set in Cement.
-  Existing Surface.
-  Bentonite Seal Placed in Annulus.
-  Grade #1 Silica Sand Pack Placed in Annulus.
-  Native Soil Placed in Annulus.

SOIL BORING LOG

B-104

Site Name:	CEDO/CITY HALL PARK Burlington, VT
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WHEM Project # 2018-55

VT DEC Site # 2018-4806

Drilled by : Aztech Drilling

Logged by: Chris Page

Date Installed: 12/3/2018

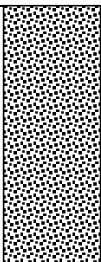
Drilling Method: Geoprobe 6610DT Direct Push

Sampling Method: Geoprobe MC-5: 2" x 60" clear soil liners

Development Method: NA

Letter Symbol

Graphic

Well Construction		Pen/Rec(")	Interval (ft)	PID (ppm)	Soil Characteristics	Letter	Graphical
Grade = 0							
0.5		28"	0-5	0.0	0 - 16": Fine Sand, dark brown, trace silt, friable, moist	SM	
1.0							
1.5							0.0
2.0							
2.5							
3.0							
3.5							
4.0				0.0	30-60": Medium Sand, trace Coarse Sand, poorly sorted fine gravel, no staining.	SW	
4.5							
5.0							
5.5					Samples B-104 collected at 1', 3', and 5' for PAHs and Pesticides		
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Legend

- | | |
|---|---|
|  | Road Box with Bolt Down Cover, Set in Cement. |
|  | Existing Surface. |
|  | Bentonite Seal Placed in Annulus. |
|  | Grade #1 Silica Sand Pack Placed in Annulus. |
|  | Native Soil Placed in Annulus. |



SOIL BORING LOG

B-105

**Site Name: CEDO/CITY HALL PARK
Burlington, VT**

WHEM Project # 2018-55	Date Installed: 12/3/2018	Letter Symbol	Graphic
VT DEC Site # 2018-4806	Drilling Method: Geoprobe 6610DT Direct Push		
Drilled by : Aztech Drilling	Sampling Method: Geoprobe MC-5: 2" x 60" clear soil liners		
Logged by: Chris Page	Development Method: NA		

Well Construction	Pen/Rec(in)	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol	Graphic
Grade = 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0						
0-10": Loamy Fine Sand, dark brown, moist, friable, no odor.			0.2		SM	
10" to 36": Medium Sand, some fines, light gravel, moist, black streaking at 30-32".			0.3			
36" to 68": Medium and Coarse Sand with loose, poorly sorted gravel, likely fill material.			0.2		SW	
68" to 80": Silty Fine Sand, moist, friable.			0.1		SM	
80" to 90": Medium Sand, loose, dry			0.2		SW	
Samples B-105 collected from 2', 4', and 6' for PAHs and Pesticides						

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Native Soil Placed in Annulus.

APPENDIX 5: SANBORN MAPS

CLIENTS

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Department of Public Works
645 Pine St.
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PROFESSIONAL SEAL

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NOTES:

- ALL PROPOSED CB'S SHALL BE PRECAST REINFORCED CONCRETE CONCRETE CATCH BASINS (VTRANS STANDARD DRAWING D-15) WITH CAST IRON GRATES, TYPE E.
- ALL PROPOSED DMH'S SHALL BE PRECAST REINFORCED CONCRETE MANHOLES WITH CAST IRON COVERS PER VTRANS STANDARD D-15.
- ALL PROPOSED STORM PIPES SHALL BE SDR 35 PVC.
- ALL PROPOSED UNDERDRAIN SHALL BE 4" Ø PVC PLASTIC UNDERDRAIN. SEE TYPICAL SECTIONS FOR BURY DEPTH.
- RIM ELEVATIONS OF OVERFLOW STRUCTURES/CATCH BASINS WITHIN BIORETENTION RAINGARDENS SHALL BE 6" ABOVE THE BOTTOM GRADE OF THE RAINGARDEN.
- BIORETENTION B'S INLET SHALL BE A CATCH BASIN (CB), PER NOTE 1.

PROJECT TITLE

BURLINGTON
GREAT STREETS
CITY HALL PARK

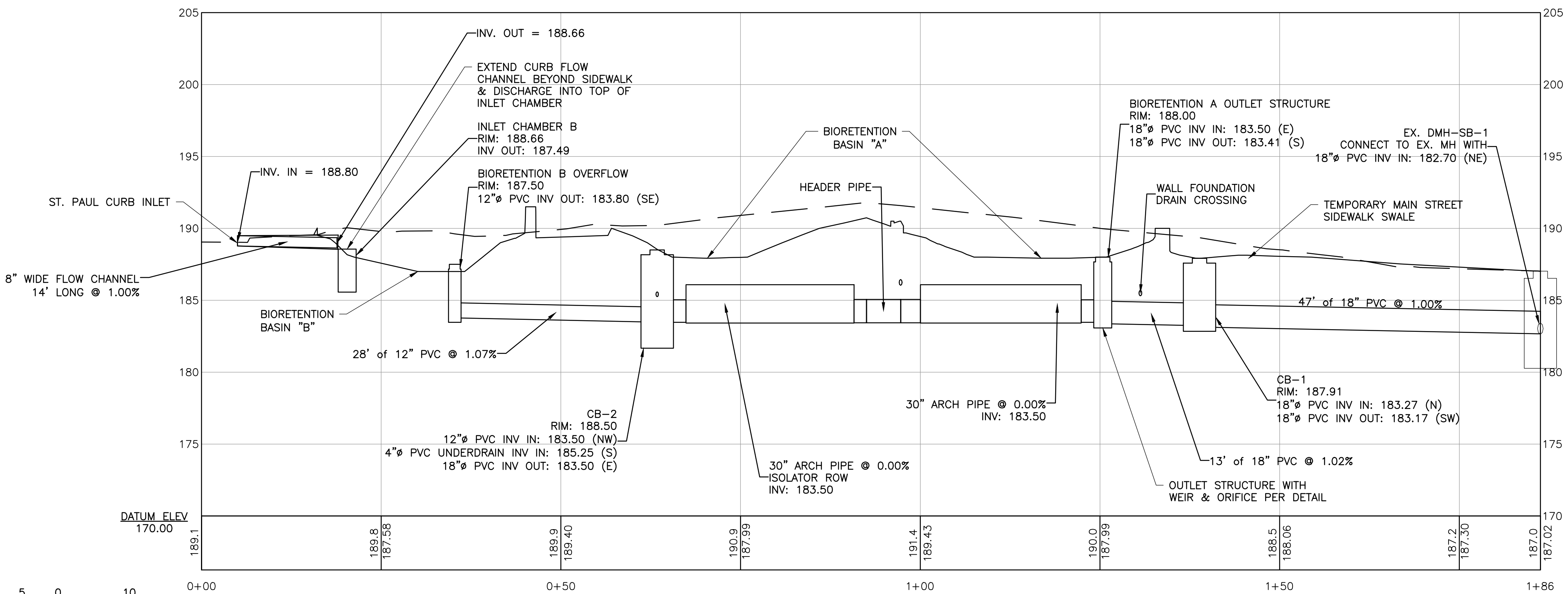
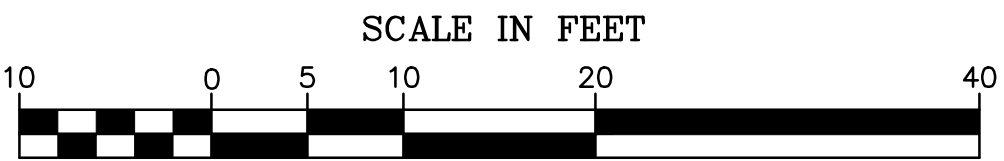
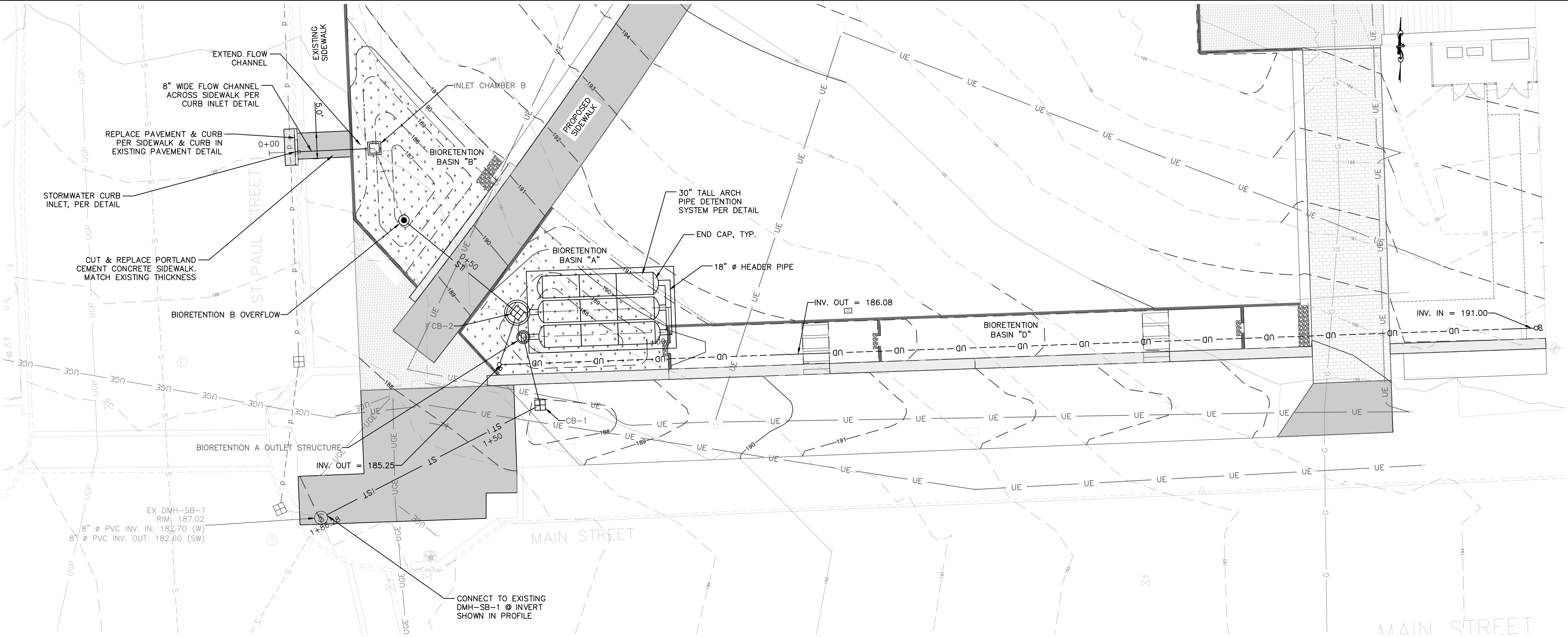
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BIORETENTION BASIN
A & B PLAN & PROFILE

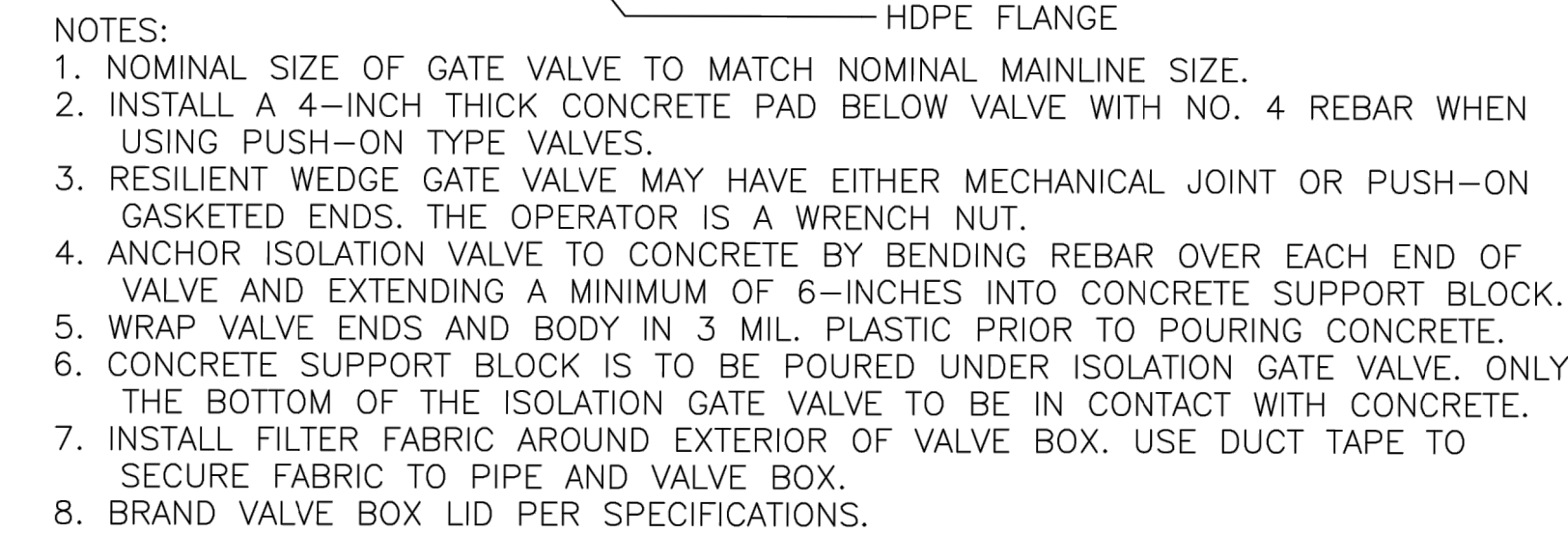
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MAM	12/28/2018
CHECKED BY	PROJECT #
LDC	623263L3

SHEET NUMBER

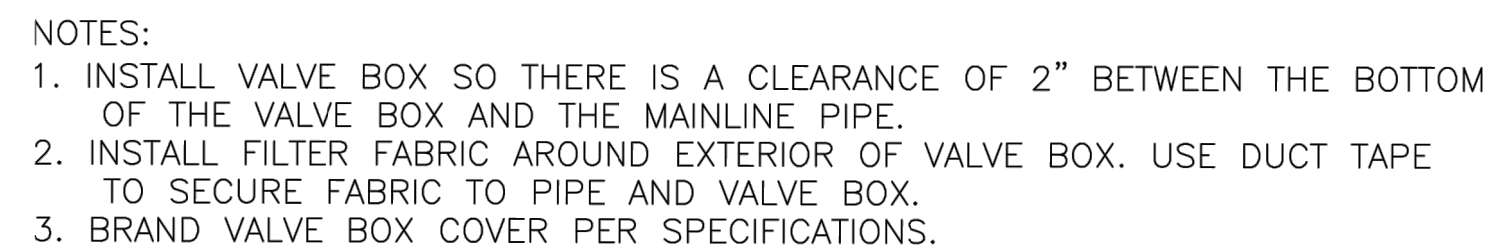
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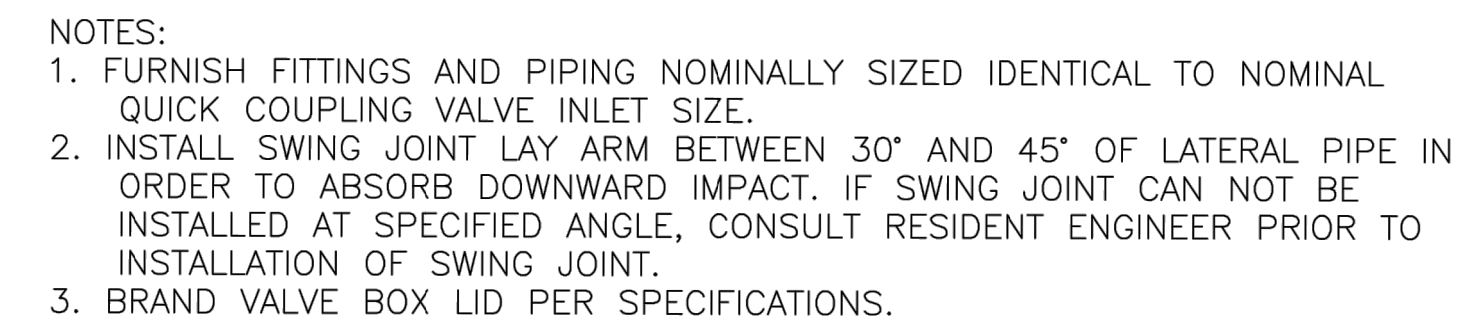
BIORETENTION BASIN A & B PROFILE



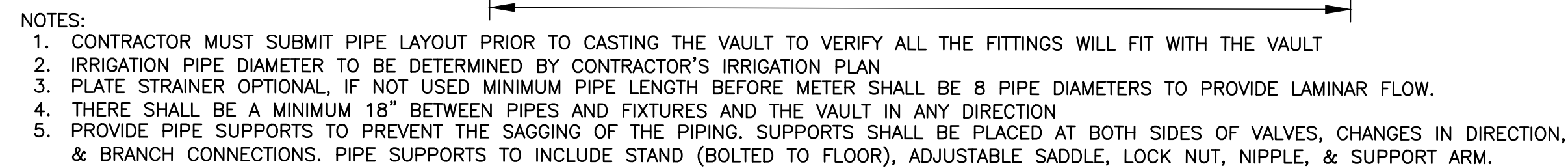
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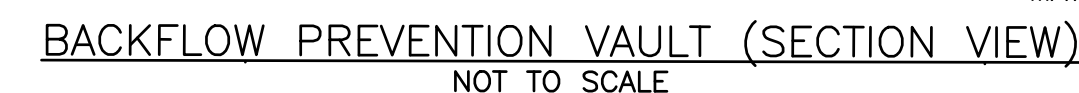
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NTS



NOT TO SCALE



I:\6\623263L3-GreatStreets\Graphics Files\AutoCAD\CHP\CHP_ELECTRICAL_DETAILS.dwg 1/28/2019 11:42 AM

PANEL DESIGNATION SCHEDULE								
PANEL: MDP			LOCATION:					
FED FROM: EXISTING TRANSFORMER			MOUNTING: SURFACE, NEMA 3R					
22,000 AIC			MAINS: 120/208V, 3-PHASE, 4-WIRE, 800A MAIN CIRCUIT BREAKER					
			CONNECTED LOAD: 63.4 kW					
CKT NO.	kW LOAD	DESCRIPTION	BREAKER		BREAKER		DESCRIPTION	kW LOAD
			P	AMP	AMP	P		
1		PANEL 'P1'	3	200	200	3	PANEL 'P2'	2
3								4
5								6
7	11.0	PANEL 'EVENT PANEL'	3	140	150	3	FOUNTAIN	43.2
9								10
11								12
13	0.1	PORTLAND LOO	1	20	20	2	LIGHTING CONTROL PANEL	3.3
15	1.0	P1 POLE RECEPTACLES	1	20				16
17	1.0	P1 POLE RECEPTACLES	1	20	20	1	SPARE	18
19	1.0	P1 POLE RECEPTACLES	1	20	20	1	SPARE	20
21	1.0	P1 POLE RECEPTACLES	1	20	20	1	SPARE	22
23	1.0	P1 POLE RECEPTACLES	1	20				24
25	0.4	RECEPTACLE	1	20				26
27	0.4	RECEPTACLE	1	20				28
29		SPARE	1	20				30
31		SPARE	1	20				32
33		SPARE	1	20				34
35								36
37								38
39								40
41								42

PANEL DESIGNATION SCHEDULE								
PANEL: EVENT PANEL			LOCATION:					
FED FROM: PANEL 'MDP'			MOUNTING: SURFACE, NEMA 3R					
10,000 AIC			MAINS: 120/208V, 3-PHASE, 4-WIRE, 150A MAIN CIRCUIT BREAKER					
			CONNECTED LOAD: 11.0 kW					
CKT NO.	kW LOAD	DESCRIPTION	BREAKER		BREAKER		DESCRIPTION	kW LOAD
			P	AMP	AMP	P		
1	1.0	BOX 'A' RECEPTACLES	1	20 GFI	20 GFI	1	BOX 'F' RECEPTACLES	1.0
3	1.0	BOX 'B' RECEPTACLES	1	20 GFI	20 GFI	1	BOX 'G' RECEPTACLES	1.0
5	1.0	BOX 'C' RECEPTACLES	1	20 GFI	20 GFI	1	BOX 'H' RECEPTACLES	1.0
7	1.0	BOX 'D' RECEPTACLES	1	20 GFI	20 GFI	1	BOX 'I' RECEPTACLES	1.0
9	1.0	BOX 'E' RECEPTACLES	1	20 GFI	20 GFI	1	BOX 'J' RECEPTACLES	1.0
11		SPARE	1	20 GFI	20 GFI	1	BOX 'K' RECEPTACLES	1.0
13		SPARE	1	20 GFI	20 GFI	1	SPARE	14
15		SPARE	1	20 GFI				16
17		SPARE	1	20 GFI				18
19								20
21								22
23								24
25								26
27								28
29								30

ELECTRICAL SERVICE, TELEPHONE CONDUIT & WIRE SCHEDULE	
KEY	DESCRIPTION
A	PRIMARY ELECTRICAL SERVICE - (2) 4" CONDUITS WITH (2) 600 MCM-XHHW-CU PER PHASE AND NEUTRAL
B	(1) 1" PVC WITH (3)#10 COPPER, SITE LIGHTING CIRCUITS. (1) 1" PVC WITH (3)#10 COPPER FOR POLE RECEPTACLE CIRCUITS. SEE LIGHTING PLAN FOR # OF CIRCUITS.
C	(1) 2" PVC WITH (1)3/0 XHHW-CU PER PHASE AND NEUTRAL FOR FOUNTAIN. (1) 2" PVC FOR FUTURE KIOSK BUILDING.
D	(1) 1 1/2" PVC WITH (3)#8 PER CIRCUIT FOR EVENT POWER, (1) 2" FOR EVENT COMMUNICATIONS.
E	(1) 1" PVC WITH (3)#10 COPPER, SITE LIGHTING CIRCUIT.
F	(1) 2" PVC FOR EVENT COMMUNICATIONS
G	(1) 2" PVC FOR PORTLAND LOO
H	(1) 2" PVC WITH (1)3/0 XHHW-CU PER PHASE FOR FOUNTAIN. (1) 2" PVC FOR FUTURE KIOSK BUILDING. (1) 2" PVC FOR PORTLAND LOO.
I	(1) 1 1/2" PVC WITH (3)#8 PER CIRCUIT FOR EVENT POWER



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904.886.9030

PROFESSIONAL SEAL

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CONSTRUCTION

				LDC			
				MAM	LDC		
				ADDENDUM #2	MAM	LDC	
				BID SET	MAM	LDC	BY
				100% CD SUBMITTAL	MAM	LDC	
				85% CD SUBMITTAL	MAM	LDC	
				DESCRIPTION			
				4	1-30-19		
				3	12-28-18		
				2	12-12-18		
				1	11-07-18		
				NO.	DATE		

PROJECT TITLE

BURLINGTON
GREAT STREETS
CITY HALL PARK

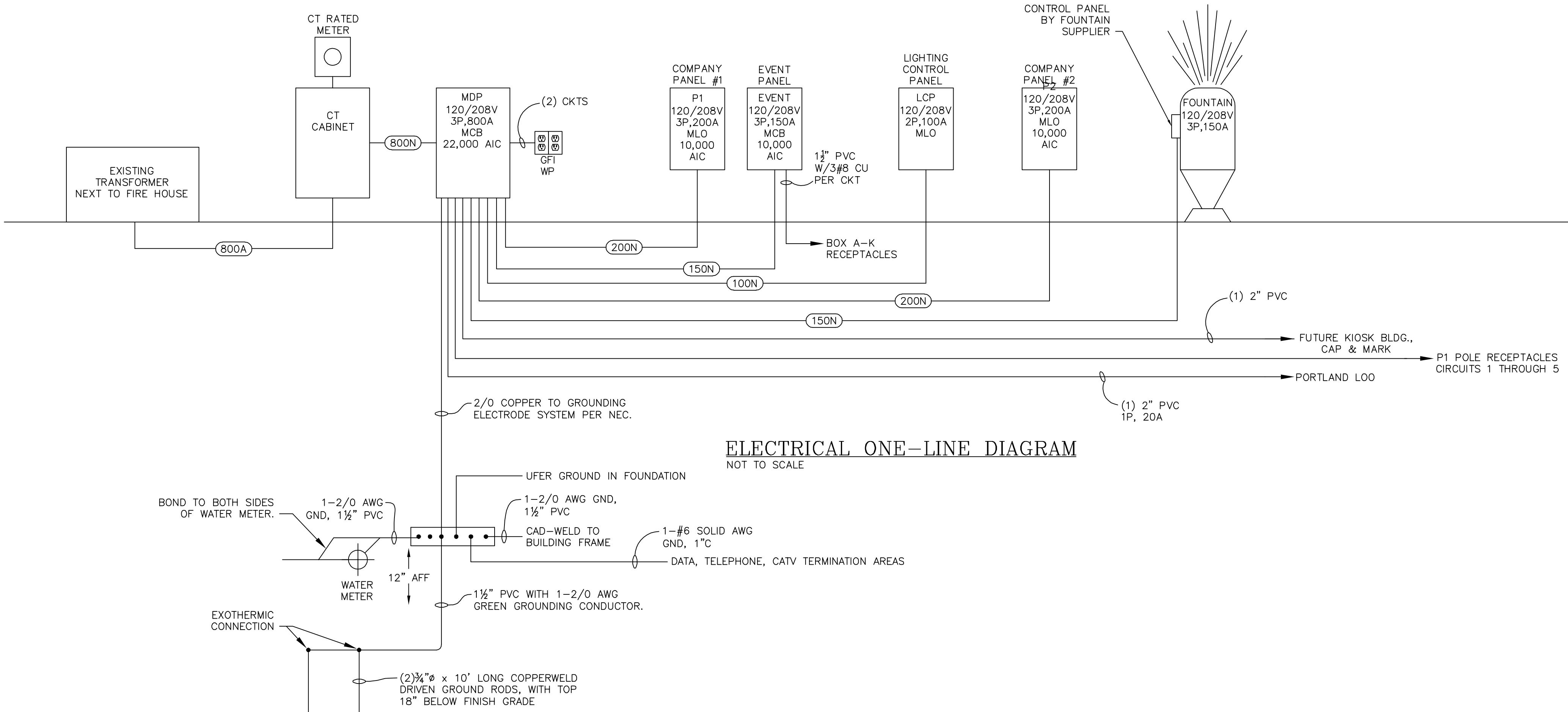
SHEET TITLE

PANEL SHEDULE &
ELECTRICAL
ONE-LINE DIAGRAM

DRIVDSGN BY	DATE
CLD	12/28/2018
CHECKED BY	PROJECT #
ASG	623263L3

SHEET NUMBER

E503



FEEDER SCHEDULE					
MARK	AMPS	PHASE	CONDUIT	WIRE SIZE	GROUND
800	800	3	(2) 4"	(2) 600 MCM-XHHW-CU PER PHASE	
800N	800	3	(2) 4"	(2) 600 MCM-XHHW-CU PER PHASE AND NEUTRAL	(2) 1/0 CU
200N	200	3	(1) 2"	(1) 3/0 XHHW-CU PER PHASE AND NEUTRAL	#6 CU
150N	150	3	(1) 2"	(1) 3/0 XHHW-CU PER PHASE AND NEUTRAL	#6 CU
100N	100	3	(1) 1 1/2"	(1) 3 XHHW-CU PER PHASE AND NEUTRAL	#8 CU
80	80	3	(1) 1 1/4"	(1) 4 XHHW-CU PER PHASE	#8 CU