June 17, 2013

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Thomas J. DiPietro, Jr.
Deputy Director
Department of Public Works
104 Landfill Road
South Burlington, VT 05403

RE: Mayfair Park Stormwater Collection System Improvements
Conceptual Options

Hoyle, Tanner & Associates, Inc. (Hoyle, Tanner) is pleased to submit this report of conceptual options for the Mayfair Park Stormwater Collection System Improvements for discussion purposes with the City.

Mayfair Park has been identified as a location with a failing drainage conveyance system on private property and ongoing high groundwater problems resulting in water in neighborhood basements as reported by residents. The City has identified the following goals for this project:

- Move parts of the neighborhood's drainage conveyance system that are located on private residential property into the City's right-of-way.
- Replace damaged and deteriorated infrastructure.
- Include stormwater treatment/detention into the project design as much as possible.

To that end, this report has identified various concepts of implementing stormwater conveyance improvements in the Mayfair Park neighborhood and opportunities for potential groundwater alleviation and stormwater treatment within the system.

It is the City's goal to move all stormwater infrastructure into the City's right-of-way so that it can be easily maintained. All stormwater piping that is buried on residential properties will be left in place in its current condition to minimize impacts to private property and provide what, if any, ongoing seasonal high groundwater dewatering. The only infrastructure on private property that the City plans on replacing is the Discharge Point 1 outfall which is located between the houses at 7 & 11 Mayfair Street. The City plans on obtaining an easement for future maintenance in this area and no other.

Hoyle, Tanner retained DiBernardo Associates, LLC to survey the neighborhood, locate the existing stormwater system and utilities, and obtain topographic information. The survey provided elevation data of the existing stormwater

system. Using this survey data, Hoyle, Tanner developed two piping layout concepts for the City's consideration, along with estimated project costs and a discussion of advantages and disadvantages for each concept. The existing survey information, as identified by DiBernardo Associates, is attached to this memo.

Piping Layout - Concept 1

Concept 1 is to enhance the existing stormwater infrastructure with a new expanded system located within the City's right-of-way, as outlined in the attached Concept 1 Layout map. This concept consists of the following:

<u>Discharge Point 1</u>

- In roadways remove all existing 12" piping and replace with new 15" perforated pipe and replace existing catch basins with new pre-cast concrete catch basins.
- Extend new 15" perforated pipe and install new catch basins down Elsom Parkway and eastward along Mayfair Street to a new manufactured stormwater treatment device (MSTD) prior to Discharge Point 1.
- Replace Discharge Point 1 outfall with 15" pipe.
- Outfall shall be stabilized to prevent erosion and the discharge area leading to Potash Brook would be regraded.
- Leave in-place the existing systems that are located on residential property. The existing system north of Woodbine Street will be hydraulically disconnected from the system on Woodbine Street by hard-piping through to the existing system located between Woodbine and Mayfair Streets. The existing system will tie into the new system upstream of the new stormwater MSTD proposed for Mayfair Street.

<u>Discharge Point 2</u>

- Remove existing 12" piping and install new 15" perforated pipe down the west side of Victoria Drive from Williston Road to Beacon Street and replace existing catch basins with new pre-cast concrete catch basins.
- Install new 15" perforated pipe along the eastern half of Woodbine Street to the new system on Victoria Drive and replace existing catch basins with new pre-cast concrete catch basins.
- Remove existing 12" piping and install new 15" perforated pipe from Victoria Drive along Beacon Street to new stormwater MSTD prior to Discharge Point 2 and replace existing catch basins with new pre-cast concrete catch basins.
- The existing 12" piping on the east side of Victoria Drive will be left in place and tied into the new stormwater system at Beacon Street.
- The existing 12" piping on the east side of Beacon Street will be left in place and tied into the new stormwater MSTD prior to Discharge Point 2.

- The existing outfall at Discharge Point 2 will remain in place. The existing outfall pipe at Discharge Point 2 is a 15” pipe, sloped adequately, and it is our understanding that this outfall has been replaced and is in good operable condition.

Discharge Point 3

- Leave existing system and Discharge Point 3 outfall in place.

Piping Layout - Concept 2

The second alternative proposed for moving the stormwater infrastructure into the City’s right-of-way minimizes the expansion of the stormwater system by limiting it mostly to areas that are currently serviced by the existing system. This concept is outlined on the attached Concept 2 Layout map and consists of the following:

Discharge Point 1

- Remove existing 12” piping and install new 15” perforated piping on Mayfair Street to Discharge Point 1 and replace existing catch basins with new pre-cast concrete catch basins.
- Replace Discharge Point 1 outfall with 15” pipe.
- Outfall shall be stabilized to prevent erosion and the discharge area leading to Potash Brook would be regraded.
- Leave in-place the existing systems that are located on residential property. The existing system north of Woodbine Street will be hydraulically disconnected from the system on Woodbine Street by hard-piping through to the existing system located between Woodbine and Mayfair Streets. The existing system will tie into the new system upstream of the new stormwater MSTD proposed for Mayfair Street.

Discharge Point 2

- Remove existing 12” piping on Elsom Parkway and replace with new 15” perforated pipe and replace existing catch basins with new pre-cast concrete catch basins.
- Install new 15” perforated piping along Woodbine Street to connect the system on Elsom Parkway to Victoria Drive and replace catch basins with new pre-cast concrete catch basins.
- Remove existing 12” piping and install new 15” perforated pipe down the west side of Victoria Drive from Williston Road to Beacon Street and replace existing catch basins with new pre-cast concrete catch basins.
- Remove existing 12” piping and install new 15” perforated pipe from Victoria Drive along Beacon Street to new stormwater MSTD prior to

Discharge Point 2 and replace existing catch basins with new pre-cast concrete catch basins.

- The existing 12” piping on the east side of Victoria Drive will be left in place and tied into the new stormwater system at Beacon Street.
- The existing 12” piping on the east side of Beacon Street will be left in place and tied into the new stormwater MSTD prior to Discharge Point 2.
- The existing outfall at Discharge Point 2 will remain in place. The existing outfall pipe at Discharge Point 2 is a 15” pipe, sloped adequately, and it is our understanding that this outfall has been replaced and is in good operable condition.

<u>Discharge Point 3</u>

- Leave existing system and Discharge Point 3 outfall in place.

Design Considerations

It is understood that the existing perforated piping system buried on residential property was installed in order to seasonally dewater portions of the neighborhood. During periods when the groundwater is higher than the stormwater system, perforated pipe would dewater the portions of the neighborhood in which it is installed. The system was reportedly installed during in the 1940’s and has since been found to be clogged with sediment. It is assumed that the system is not operating as effectively to dewater the neighborhood as it had when it was first installed. Installing the new perforated piping under the road at the same general elevation or lower than the existing system would likely help with seasonal dewatering and reduce the frequency of basement flooding within the neighborhood.

However, installing perforated piping below the groundwater level would not allow infiltration of stormwater into the ground. Perforated pipes effectively infiltrate stormwater into the ground during periods when the groundwater table is below the perforated piping system. To allow for more frequent infiltration, the perforated piping system would need to be installed at an elevation that provides separation from the seasonal groundwater elevation.

Groundwater elevation data is currently unavailable for the Mayfair Park neighborhood. The annual high and low groundwater elevations are unknown and therefore it cannot be projected as to how frequently a proposed perforated piping system would be seasonally dewatering versus infiltrating stormwater.

The benefit of the perforated pipe system being installed at a deeper elevation to provide seasonal dewatering would come at a cost to City stormwater goals of maximizing opportunities for infiltration. It would also increase the amount of excavation required, as well as increase the depth of the catch basins; both adding costs to the project. Installing the perforated piping system at an elevation

that generally matches the elevation of the existing perforated piping system would drive pipes down to a buried depth of approximately 7.5' in some areas of Drainage Area 2, with an average buried depth of approximately 5.0 feet.

Constructing a new perforated pipe system to adequately convey stormwater and provide for minimum coverage throughout the network would result in a system with an average buried depth of approximately 4.0 feet. Raising the system in elevation, where possible, would likely provide increased opportunities for infiltration and reduced installation costs. Additionally, installing the stormwater system at a higher elevation would increase the amount of clearance above sewer utility crossings. Note that potential utility crossing conflicts have been identified on the Concept Layout maps.

For both of the concepts perforated pipe is proposed. Perforated pipe will convey collected stormwater to the discharge points, and will also help to dewater saturated soils during times of high groundwater levels and conversely, allow infiltration of stormwater into the ground during times of low groundwater levels. Solid-walled pipe would not dewater or infiltrate, it would only convey collected stormwater from the catch basins to the discharge points.

Perforated pipe would be surrounded by crushed stone, wrapped in geotextile fabric in order to help protect the groundwater and stormwater system from sediment accumulation. The City should anticipate additional maintenance requirements and associated costs with a perforated pipe system than compared to a solid pipe system. There is a greater risk of the perforated system accumulating sediment and failing overtime.

Other design considerations include the concern of connecting the existing groundwater/stormwater system located on residential property to the new proposed system. Connecting these systems would continue to allow the existing system to contribute to dewatering, what if any, of the neighborhood. It is believed the current state of the existing system has been greatly diminished due to buildup of sediment over time. By connecting the existing system to the new system, the City risks the potential for debris and sediment to enter the new system from the existing system and lead to premature failure or clogging of the new drainage system. This risk will require more frequent inspections and potential increased maintenance efforts to be carried out at points where the old system is connected to the new system. Keeping this in consideration, both proposed concepts limit the connection of the existing system to a limited portion of the new system within Drainage Area 1.

Opinion of Estimated Costs

A cost estimate for open trench construction has been provided below for each concept. Cost estimates presented herein have been determined based on standard engineering economic principles and practices. Unit cost estimates have been established with consideration given to recently bid stormwater projects in South Burlington. We acknowledge that all costs presented within this report are approximations and would be refined during the final planning stage of a proposed project.

Concept 1 – Opinion of Estimated Cost				
	Unit	Quantity	Unit Price	Total Price
Disposal of Existing Catch Basins	EA	20	$200	$4,000
Stormwater Treatment Device	EA	2	$6,500	$13,000
Concrete Catch Basins	EA	20	$3,000	$60,000
15" Perforated PE Pipe	LF	2655	$65	$172,600
Trench Pavement Replacement	TON	190	$200	$38,000
Outfall Stabilization & Regrading	LS		$7,500	$7,500
Mobilization & Demobilization (5%)				$14,400
Site Preparation & Restoration (5%)				$14,400
Sub Total				**$323,900**
Contingencies (20%)				$64,800
Escalation (3%)				$9,800
Contractor Overhead & Profit (15%)				$48,600
Total Construction Total				**$447,100**
Permitting				$10,000
Engineering Design Fee (6.9%)*				$30,900
Engineering Construction Fee (12.65%)*				$56,600
Total Project Cost				**$544,600**

***Per VTDEC-FED Guidance, September 1, 2011

Concept 2 – Opinion of Estimated Cost				
	Unit	Quantity	Unit Price	Total Price
Disposal of Existing Catch Basins	EA	20	$200	$4,000
Stormwater Treatment Device	LS	2	$6,500	$13,000
Concrete Catch Basins	EA	20	$3,000	$60,000
15" Perforated PE Pipe	LF	2555	$65	$166,100
Trench Pavement Replacement	TON	180	$200	$36,000
Outfall Stabilization & Regrading	LS		$7,500	$7,500
Mobilization & Demobilization (5%)				$14,000
Site Preparation & Restoration (5%)				$14,000
Sub Total				**$314,600**
Contingencies (20%)				$63,000
Escalation (3%)				$9,500
Contractor Overhead & Profit (15%)				$47,200
Total Construction Total				**$434,300**
Permitting				$10,000
Engineering Design Fee (6.9%)*				$30,000
Engineering Construction Fee (12.65%)*				$55,000
Total Project Cost				**$529,300**

*****Per VTDEC-FED Guidance, September 1, 2011

Discussion of Concepts

Piping Layout - Concept 1

Concept 1 provides one alternative for the stormwater infrastructure layout in the Mayfair Park Neighborhood which would expand the stormwater system to a larger area than the existing system serves (see Concept 1 Layout map). Total construction cost estimates for this piping arrangement are $544,600.

The City could realize a savings of approximately $36,000 if 15" solid-walled pipe is installed in lieu of perforated pipe. If the City chooses to use solid-walled pipe, no groundwater alleviation will be provided in the wet season, nor will any stormwater infiltration be provided during periods with a low groundwater table.

This option balances the conveyance of stormwater between the two discharge points, whereas Concept 2 sends the majority of the water to Discharge Point 2. Balancing the flow between two discharge points would likely allow for maintenance of the associated infrastructure (piping, catch basins, outfalls, stormwater MSTDs) to be performed within the same general frequency.

Piping Layout - Concept 2

Concept 2 provides an alternative route for moving the stormwater system to within the City's right-of-way.

The connection of the Elsom Parkway infrastructure to the Victoria Drive infrastructure along Woodbine Drive was chosen as the most direct route with the least impact. The disadvantage of this route is that it unbalances the amount of stormwater between the discharge points and sends the majority of flow to Discharge Point 2.

Total construction cost estimates for this piping arrangement are $529,300. The City could realize a savings of approximately $27,100 if 15" solid-walled pipe is installed in lieu of perforated pipe. If the City chooses to use solid-walled pipe, no in-pipe groundwater alleviation or infiltration will be provided.

Concept 2 provides an estimated savings of less than 3% when compared to Concept 1. This project cost difference falls within the accuracy limitations of the engineering estimate.

Additional Stormwater Treatment Considerations

The footprint of any stormwater treatment practices would need to be limited to the size of the City's easements throughout the neighborhood, and are vertically constrained by the elevation of the groundwater table. While the majority of easements and right-of-ways are too narrow to contain surface detention/treatment of stormwater, the City owned property between Discharge Point 1 and Potash Brook may be adequately sized for a surface detention/treatment system.

A surface detention system could provide both quality and quantity stormwater treatment. The option of surface treatment was considered and discussed with City staff, but was not advanced further at this time due to reasons of access, safety, and the impacts on the neighborhood, such as tree removal, visual impacts, etc.

A high groundwater table would prevent an infiltration treatment practice from functioning consistently. A series of monitor wells should be installation and groundwater monitoring should be conducted in order to determine seasonal high and low groundwater levels. This data can then be used to determine the depth at which a perforated piping system can be placed and project the duration that a system would be infiltrating water versus dewatering. Groundwater data within the project area would support the feasibility of implementing underground stormwater storage/infiltration within the project area.

Additionally, groundwater monitoring data can be used to assess the feasibility of installing an underground stormwater perforated detention system along Mayfair Street. Should the groundwater table be low enough, a series of perforated pipes could provide detention for the Drainage Area 1. Detaining stormwater prior to discharge to Potash Brook would help meet the City's stormwater goals. New regulations in the City's MS4 permit require the reduction of stormwater flowing to Potash Brook. In this case, Concept 1 would allow for a larger Drainage Area 1 to be treated, than Concept 2. If the groundwater table is too high, the system may be routinely inundated with water, or the system would need to be raised in elevation, conflicting with the goals of preventing further groundwater issues in the Mayfair Park neighborhood.

Stormwater manufactured treatment devices (MSTDs) could be installed in a relatively small footprint in place of the catch basins prior the outlets of the stormwater system. These systems would improve the water quality, settle out solids and reduce sediment loading to Potash Brook, although they are not formally recognized by the Vermont Stormwater Management Manual as meeting water quality treatment requirements. In addition, these systems do not reduce the flow of stormwater flowing to Potash Brook.

It is the City's interest to pursue stormwater treatment options within the Mayfair Park neighborhood to make use of available State grant dollars available through the VTDEC to incentivize stormwater treatment practices, as well as meet City stormwater objectives.

With consideration to the neighborhood's concerns to minimize the impacts of groundwater in Mayfair Park, a collective effort by homeowners to install rain barrels to collect rooftop runoff could be implemented in effort reduce the total runoff into the stormwater system during rainfall events. Additionally, sump pumps may be connected to the stormwater system in order to help prevent basement flooding during seasonal high groundwater periods. The City should make an effort to determine where all foundation drains are currently connected in order to allow for appropriate connection to the new stormwater system. Additionally, any new connections to the system must have backflow preventers installed, to prevent stormwater from backing up into basements.

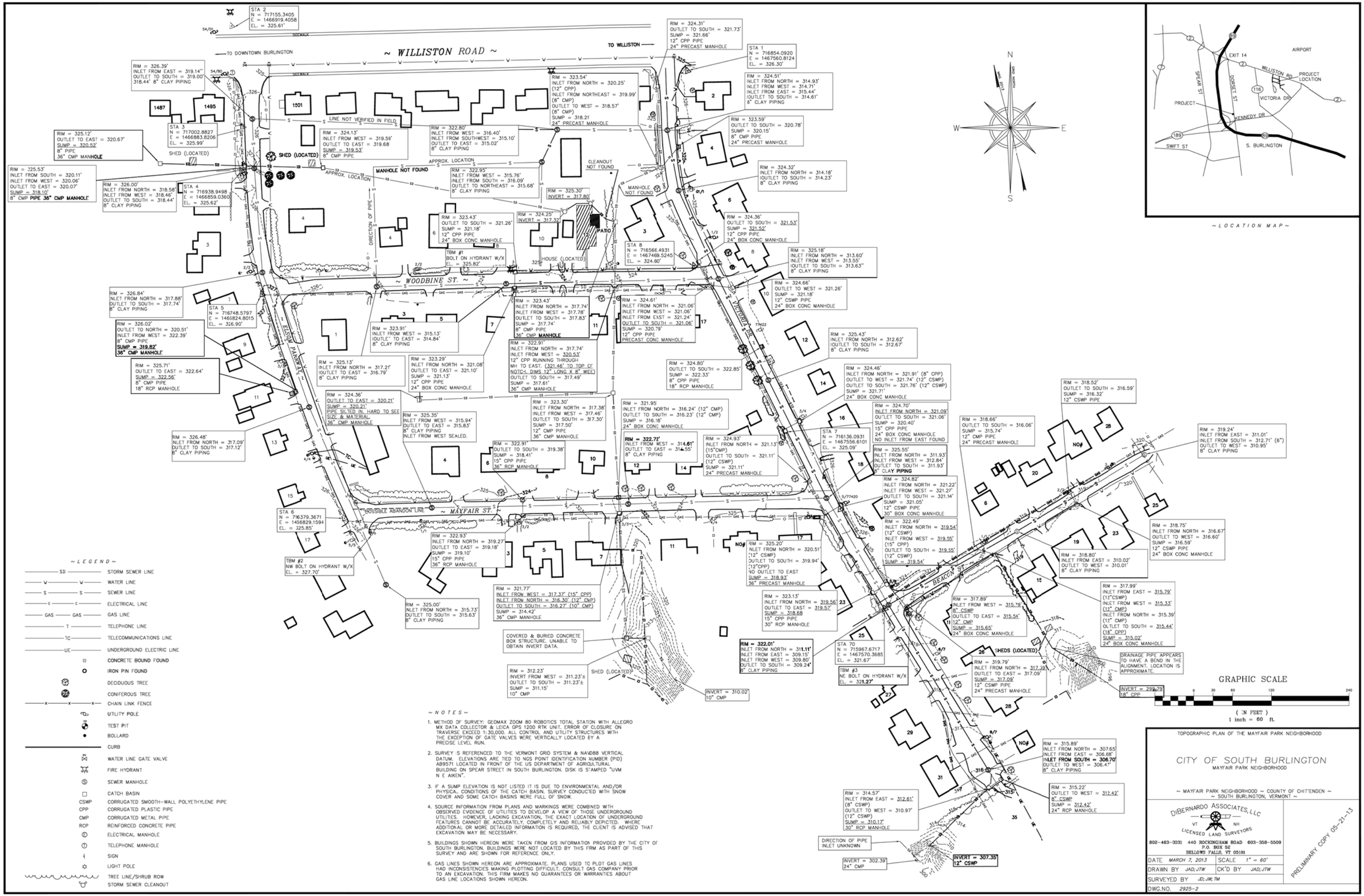
Recommendations

In consideration of the various identified project goals, Hoyle, Tanner recommends that the City replace the existing stormwater system located within the City's right-of-way with a new 15" perforated pipe system. We recommend the implementation of Concept 1 to improve stormwater conveyance, provide seasonal dewatering and infiltration within the Mayfair Park neighborhood. The Concept 1 option balances stormwater flows between the two discharge points, while Option 2 will result in a system that sends the majority of stormwater flows to Discharge Point 2. While the total cost of Concept 1 is approximately 3%

more than Concept 2, this is within the level of accuracy of our opinion of estimated costs.

Hoyle, Tanner recommends that further efforts be carried out to determine seasonal groundwater levels, including the installation of groundwater monitoring wells. Establishing seasonal groundwater elevations will be necessary to determine the feasibility and proposed vertical alignment of a perforated piping system and potential options for additional underground stormwater treatment. If perforated piping is deemed feasible, it could provide both infiltration and dewatering to the neighborhood, meeting both stormwater goals, as well as concerns of neighborhood residents. If perforated piping is ultimately determined not to be desirable, installing solid-walled piping could provide a savings of approximately $36,000 for Concept 1.

We understand that the City has multiple stormwater related projects that it is pursuing and does not currently have $500,000 in its budget to make the proposed changes. We recommend evaluating options to phase the proposed improvements. In addition, we recommend that the City have further conversations with residents to determine which items in the proposed concept they believe would have the greatest benefit.



~ LEGEND ~

- STORM SEWER LINE
- WATER LINE
- SEWER LINE
- ELECTRICAL LINE
- GAS LINE
- TELEPHONE LINE
- TELECOMMUNICATIONS LINE
- UNDERGROUND ELECTRIC LINE
- CONCRETE BOUND FOUND
- IRON PIN FOUND
- DECIDUOUS TREE
- CONIFEROUS TREE
- CHAIN LINK FENCE
- UTILITY POLE
- TEST PIT
- BOLLARD
- CURB
- WATER LINE GATE VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- CATCH BASIN
- CSWP — CORRUGATED SMOOTH-WALL POLYETHYLENE PIPE
- CPP — CORRUGATED PLASTIC PIPE
- CMP — CORRUGATED METAL PIPE
- RCP — REINFORCED CONCRETE PIPE
- ELECTRICAL MANHOLE
- TELEPHONE MANHOLE
- SIGN
- LIGHT POLE
- TREE LINE/SHRUB ROW
- STORM SEWER CLEANOUT

~ NOTES ~

1. METHOD OF SURVEY: GEOMAX ZOOM 80 ROBOTICS TOTAL STATION WITH ALLEGRO MX DATA COLLECTOR & LEICA GPS 1200 RTK UNIT. ERROR OF CLOSURE ON TRAVERSE EXCEED 1:30,000. ALL CONTROL AND UTILITY STRUCTURES WITH THE EXCEPTION OF GATE VALVES WERE VERTICALLY LOCATED BY A PRECISE LEVEL RUN.
2. SURVEY IS REFERENCED TO THE VERMONT GRID SYSTEM & NAVD88 VERTICAL DATUM. ELEVATIONS ARE TIED TO NGS POINT IDENTIFICATION NUMBER (PID) AB9571 LOCATED IN FRONT OF THE US DEPARTMENT OF AGRICULTURAL BUILDING ON SPEAR STREET IN SOUTH BURLINGTON. DISK IS STAMPED "UVM N E AIKEN".
3. IF A SUMP ELEVATION IS NOT LISTED IT IS DUE TO ENVIRONMENTAL AND/OR PHYSICAL CONDITIONS OF THE CATCH BASIN. SURVEY CONDUCTED WITH SNOW COVER AND SOME CATCH BASINS WERE FULL OF SNOW.
4. SOURCE INFORMATION FROM PLANS AND MARKINGS WERE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES TO DEVELOP A VIEW OF THOSE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.
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6. GAS LINES SHOWN HEREON ARE APPROXIMATE. PLANS USED TO PLOT GAS LINES HAD INCONSISTENCIES MAKING PLOTTING DIFFICULT. CONSULT GAS COMPANY PRIOR TO AN EXCAVATION. THIS FIRM MAKES NO GUARANTEES OR WARRANTIES ABOUT GAS LINE LOCATIONS SHOWN HEREON.

TOPOGRAPHIC PLAN OF THE MAYFAIR PARK NEIGHBORHOOD

CITY OF SOUTH BURLINGTON

MAYFAIR PARK NEIGHBORHOOD

~ MAYFAIR PARK NEIGHBORHOOD ~ COUNTY OF CHITTENDEN ~
~ SOUTH BURLINGTON, VERMONT ~

DIBERNARDO ASSOCIATES, LLC
VT NH
LICENSED LAND SURVEYORS
802-463-3031 440 ROCKINGHAM ROAD 603-358-5509
P.O. BOX 52
BELLOWS FALLS, VT 05101

DATE MARCH 7, 2013	SCALE 1" = 60'
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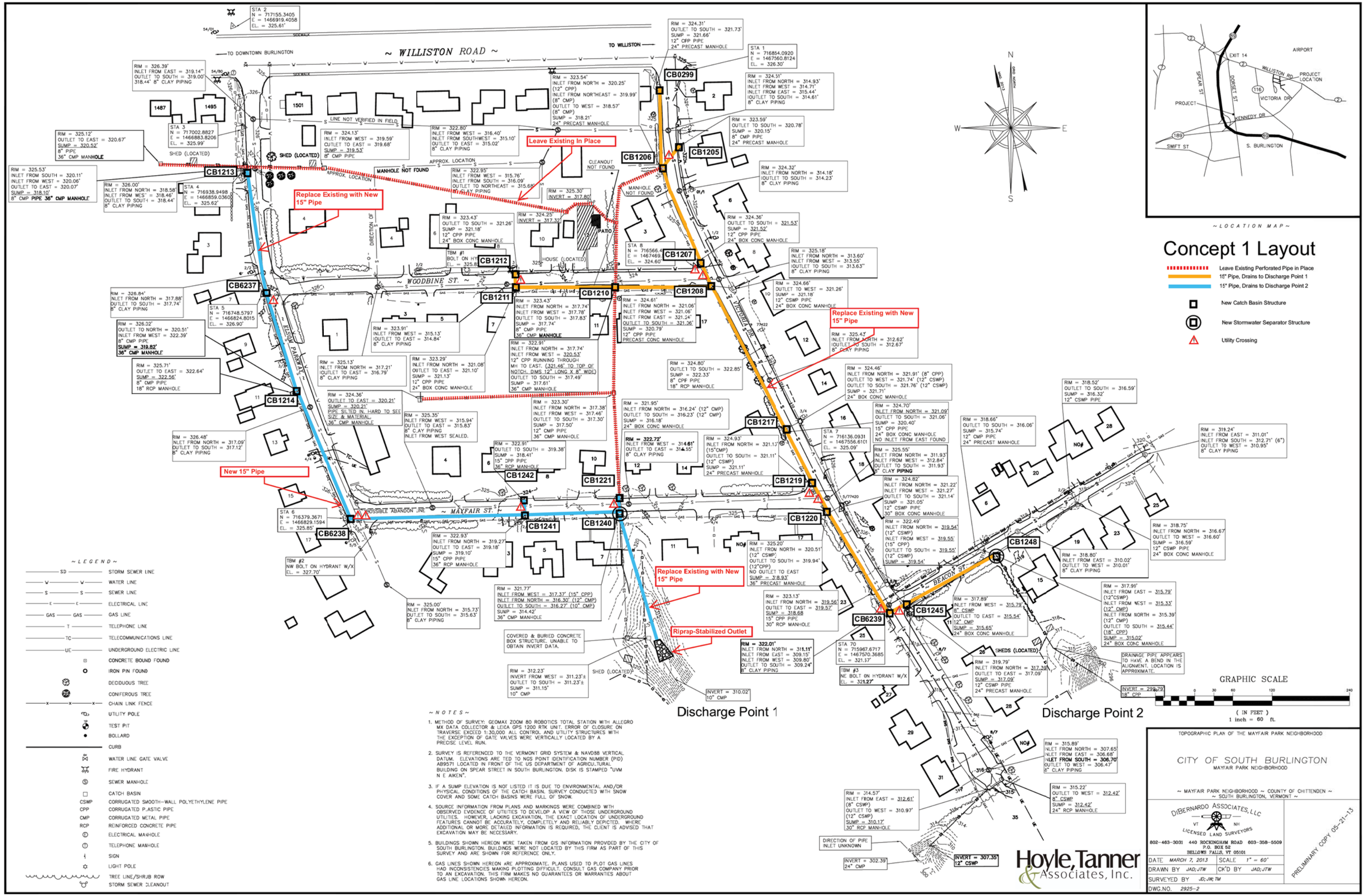
~ WILLISTON ROAD ~
TO DOWNTOWN BURLINGTON
TO WILLISTON
~ WOODBINE ST. ~
~ MAYFAIR ST. ~
~ BEACON ST. ~
BASOM PARKWAY
VICTORIA DR.
Leave Existing In Place
Replace Existing with New 15" Pipe
New 15" Pipe
Replace Existing with New 15" Pipe
Riprap-Stabilized Outlet
POSSIBLE ABANDON LINE
MANHOLE NOT FOUND
CLEANOUT NOT FOUND
SHED (LOCATED)
HOUSE (LOCATED)
PATIO
CB0299
CB1206
CB1205
CB1213
CB1212
CB1207
CB1211
CB1210
CB1208
CB6237
CB1214
CB1217
CB1242
CB1221
CB1219
CB1241
CB1240
CB1220
CB6238
CB1248
CB1245
CB6239
Discharge Point 1
Discharge Point 2
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
~ LOCATION MAP ~
AIRPORT
EXIT 14
WILLISTON RD
PROJECT LOCATION
SPEAR ST
DORSEY ST
VICTORIA DR
PROJECT
KENNEDY DR
SWIFT ST
S. BURLINGTON
Concept 1 Layout
Leave Existing Perforated Pipe in Place
15" Pipe, Drains to Discharge Point 1
15" Pipe, Drains to Discharge Point 2
New Catch Basin Structure
New Stormwater Separator Structure
Utility Crossing
~ LEGEND ~
STORM SEWER LINE
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SEWER LINE
ELECTRICAL LINE
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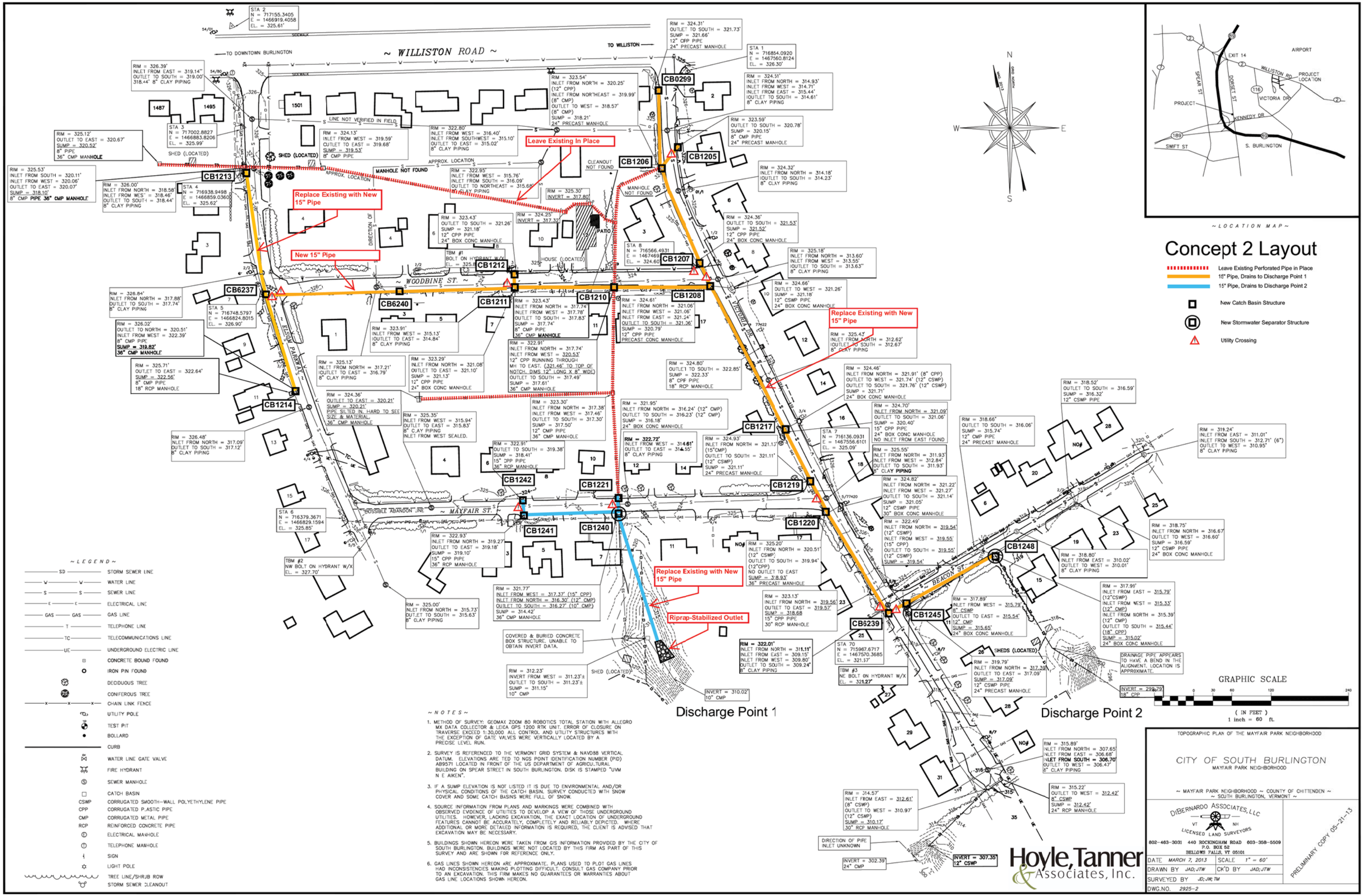
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Discharge Point 1
Discharge Point 2
CB0299
CB1206
CB1205
CB1213
CB1207
CB1212
CB1210
CB1208
CB1211
CB6237
CB6240
CB1214
CB1217
CB1219
CB1220
CB1242
CB1221
CB1241
CB1240
CB1248
CB1245
CB6239
N
S
E
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~ LOCATION MAP ~
AIRPORT
EXIT 14
WILLISTON RD
PROJECT LOCATION
SPEAR ST
DORSEY ST
VICTORIA DR
PROJECT
KENNEDY DR
SWIFT ST
S. BURLINGTON
Concept 2 Layout
Leave Existing Perforated Pipe in Place
15" Pipe, Drains to Discharge Point 1
15" Pipe, Drains to Discharge Point 2
New Catch Basin Structure
New Stormwater Separator Structure
Utility Crossing
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
~ LEGEND ~
STORM SEWER LINE
WATER LINE
SEWER LINE
ELECTRICAL LINE
GAS LINE
TELEPHONE LINE
TELECOMMUNICATIONS LINE
UNDERGROUND ELECTRIC LINE
CONCRETE BOUND FOUND
IRON PIN FOUND
DECIDUOUS TREE
CONIFEROUS TREE
CHAIN LINK FENCE
UTILITY POLE
TEST PIT
BOLLARD
CURB
WATER LINE GATE VALVE
FIRE HYDRANT
SEWER MANHOLE
CATCH BASIN
CSWP CORRUGATED SMOOTH-WALL POLYETHYLENE PIPE
CPP CORRUGATED PLASTIC PIPE
CMP CORRUGATED METAL PIPE
RCP REINFORCED CONCRETE PIPE
ELECTRICAL MANHOLE
TELEPHONE MANHOLE
SIGN
LIGHT POLE
TREE LINE/SHRUB ROW
STORM SEWER CLEANOUT
~ NOTES ~
1. METHOD OF SURVEY: GEOMAX ZOOM 80 ROBOTICS TOTAL STATION WITH ALLEGRO MX DATA COLLECTOR & LEICA GPS 1200 RTK UNIT. ERROR OF CLOSURE ON TRAVERSE EXCEED 1:30,000 ALL CONTROL AND UTILITY STRUCTURES WITH THE EXCEPTION OF GATE VALVES WERE VERTICALLY LOCATED BY A PRECISE LEVEL RUN.
2. SURVEY IS REFERENCED TO THE VERMONT GRID SYSTEM & NAVD88 VERTICAL DATUM. ELEVATIONS ARE TIED TO NGS POINT IDENTIFICATION NUMBER (PID) AB9571 LOCATED IN FRONT OF THE US DEPARTMENT OF AGRICULTURAL BUILDING ON SPEAR STREET IN SOUTH BURLINGTON. DISK IS STAMPED "UVM N E AIKEN".
3. IF A SUMP ELEVATION IS NOT LISTED IT IS DUE TO ENVIRONMENTAL AND/OR PHYSICAL CONDITIONS OF THE CATCH BASIN. SURVEY CONDUCTED WITH SNOW COVER AND SOME CATCH BASINS WERE FULL OF SNOW.
4. SOURCE INFORMATION FROM PLANS AND MARKINGS WERE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES TO DEVELOP A VIEW OF THOSE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.
5. BUILDINGS SHOWN HEREON WERE TAKEN FROM GIS INFORMATION PROVIDED BY THE CITY OF SOUTH BURLINGTON. BUILDINGS WERE NOT LOCATED BY THIS FIRM AS PART OF THIS SURVEY AND ARE SHOWN FOR REFERENCE ONLY.
6. GAS LINES SHOWN HEREON ARE APPROXIMATE. PLANS USED TO PLOT GAS LINES HAD INCONSISTENCIES MAKING PLOTTING DIFFICULT. CONSULT GAS COMPANY PRIOR TO AN EXCAVATION. THIS FIRM MAKES NO GUARANTEES OR WARRANTIES ABOUT GAS LINE LOCATIONS SHOWN HEREON.
Hoyle, Tanner & Associates, Inc.
TOPOGRAPHIC PLAN OF THE MAYFAIR PARK NEIGHBORHOOD
CITY OF SOUTH BURLINGTON
MAYFAIR PARK NEIGHBORHOOD
~ MAYFAIR PARK NEIGHBORHOOD ~ COUNTY OF CHITTENDEN ~
~ SOUTH BURLINGTON, VERMONT ~
DIBERNARDO ASSOCIATES, LLC
VT NH
LICENSED LAND SURVEYORS
802-463-3031 440 ROCKINGHAM ROAD 603-358-5509
P.O. BOX 62
BELLOWS FALLS, VT 05101
DATE MARCH 7, 2013
SCALE 1" = 60'
DRAWN BY JAD; JTW
CK'D BY JAD; JTW
SURVEYED BY JD; JW; TM
DWG.NO. 2925-2
PRELIMINARY COPY 05-21-13