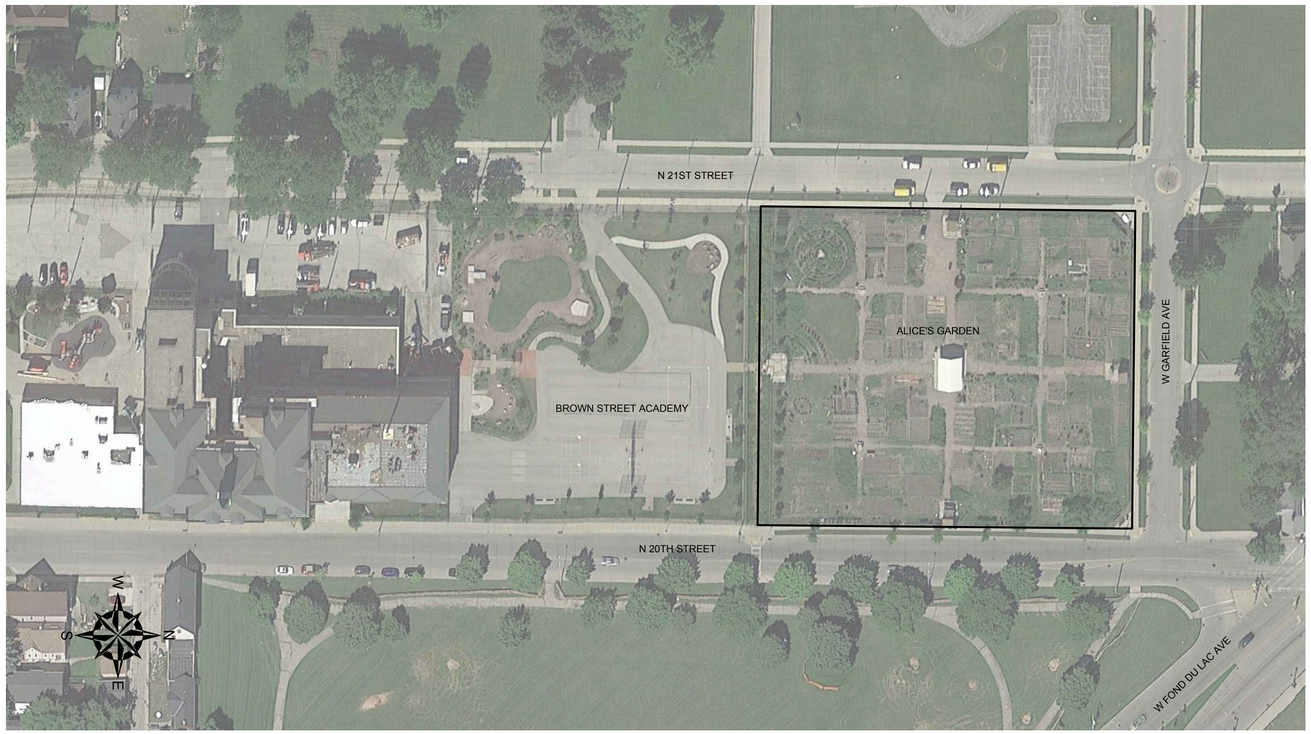
ALICE'S GARDEN
RAINWATER HARVESTING PROJECT



SITE LOCATION AERIAL PHOTO

MILWAUKEE COUNTY

PREPARED FOR PROJECT OWNER:

ALICE'S GARDEN
2136 N 21ST STREET
MILWAUKEE, WISCONSIN

INDEX OF FIGURES	
FIGURE NUMBER	FIGURE TITLE
1	COVER
2	EXISTING SITE SURVEY
3	PROPOSED SITE LAYOUT
4	GRADING AND EROSION CONTROL PLAN
5	BIOSWALE DETAILS
6	CISTERN DETAILS
7	VAULT DETAILS
8	ELECTRICAL DETAILS AND LAYOUT

The Table / Alice's Garden
Project Owner
2136 N 21st Street
Milwaukee, Wisconsin

Reflo Sustainable Water Solutions
Project Partner
908 S 5th Street
Milwaukee, Wisconsin

HNTB Corporation
Project Engineer
11414 W Park Place
Milwaukee, Wisconsin

GZA GeoEnvironmental, Inc.
Project Engineer
247 Freshwater Way, Suite 542
Milwaukee, Wisconsin

FIGURE 1

August 16, 2018

TOPOGRAPHIC MAP

CONC. MON. WITH BRASS CAP NE COR. OF NW 1/4 SEC. 19, T7N, R22E.

SITE BENCHMARK: 93.215
CHISELED CROSS ON TOP OF HYDRANT

CLIENT
Reflo

SITE ADDRESS
2136 North 21st Street, City of Milwaukee, Milwaukee County, Wisconsin.

LEGAL DESCRIPTION
All of Lots 1 to 15 inclusive all of Lots 25 to 30. Also including the Alley's described as follows: The vacated 15.00 feet alley abutting Lots 1 thru 9 and all of the North-South alley abutting Lots 10 thru 15 & Lot 30 thru 25. Also North 1/2 of the 15.00 vacated alley abutting Lots 15 and 25; all in Block 229 in Continuation of Brown's Addition,in the Northwest 1/4 of Section 19, Town 7 North, Range 22 East, in the City of Milwaukee, Milwaukee County, Wisconsin.

BASIS OF BEARINGS
Bearings are referenced to the Wisconsin State Plane Coordinate System (South Zone), in which the East line of the NW 1 /4 bears N00°47'32"West.

LAND AREA
The Land Area of the subject property is 85,938 square feet or 1.9728 acres.

Vertical datum is based on City of Milwaukee Vertical Datum which is NVGD - 580.603.

TABLE "A" ITEMS
Utility lines are shown from visible surface evidence, municipal plans and from plans and markings provided by Diggers Hotline, the One-call Utility Marking System (Wisconsin Statute 182.0175), Ticket Number 20170103240 & 20170103227. This survey represents the underground utilities that participated with the request and were marked on the time of the survey. Additional utilities may exist, but were non-responsive to the request.

MUNICIPAL ZONING
Municipal Code: Sec. 295-903.3 (B),(C),(D4).
Site is zoned: PK (Park District)
Principle building front setback: Average
Principle building side setback: 25 feet
Principle building rear setback: 25 feet
Accessory building front setback: 25 feet
Accessory building side setback: 25 feet
Accessory building rear setback: 25 feet
Fences: Fences shall comply with the fence regulations of the residential zoning districts as specified in S.295-505-4-f.

VICINITY MAP

GRAPHIC SCALE
0 30 60 90
(IN FEET)
1 inch = 30 ft.

LEGEND

- INDICATES FOUND 1" IRON PIPE
- INDICATES SET 1" IRON PIPE
- INDICATES FOUND CHISELED CROSS
- SANITARY MANHOLE
- SANITARY CLEANOUT OR VENT
- M.I.S. MANHOLE
- UNKNOWN MANHOLE
- STORM MANHOLE
- INLET (ROUND)
- INLET (SQUARE)
- CURB INLET
- STORM SEWER END SECTION
- GAS VALVE
- GAS METER
- WATER VALVE
- HYDRANT
- WATER MANHOLE
- WATER SERVICE CURB STOP
- WELL HEAD
- STAND PIPE
- WALL INDICATOR VALVE
- POST INDICATOR VALVE
- LIGHT POLE
- SPOT/YARD LIGHT
- UTILITY POLE
- GUY WIRE
- WATER SPIGOT
- ELECTRIC MANHOLE
- ELECTRIC PEDESTAL
- ELECTRIC METER
- TELEPHONE MANHOLE

- TELEPHONE PEDESTAL
- CABLE PEDESTAL
- CONTROL BOX
- FIBER OPTIC SIGN
- TRAFFIC LIGHT
- COMMUNICATION MANHOLE
- BOLLARD
- SOIL BORING/MONITORING WELL
- WATER SURFACE
- WETLANDS FLAG
- MARSH
- FLAGPOLE
- PARKING METER
- SIGN
- MAILBOX
- RAILROAD CROSSING SIGNAL
- HANDICAP SPACE
- CONIFEROUS TREE
- DECIDUOUS TREE
- SANITARY SEWER
- STORM SEWER
- WATERLINE
- MARKED GAS MAIN
- MARKED ELECTRIC
- OVERHEAD WIRES
- MARKED TELEPHONE
- MARKED CABLE TV LINE
- MARKED FIBER OPTIC
- FENCE

EAST LINE OF THE NW 1/4 SEC. 19
N00°47'32"W 2654.60' (M)
2654.42' (M)

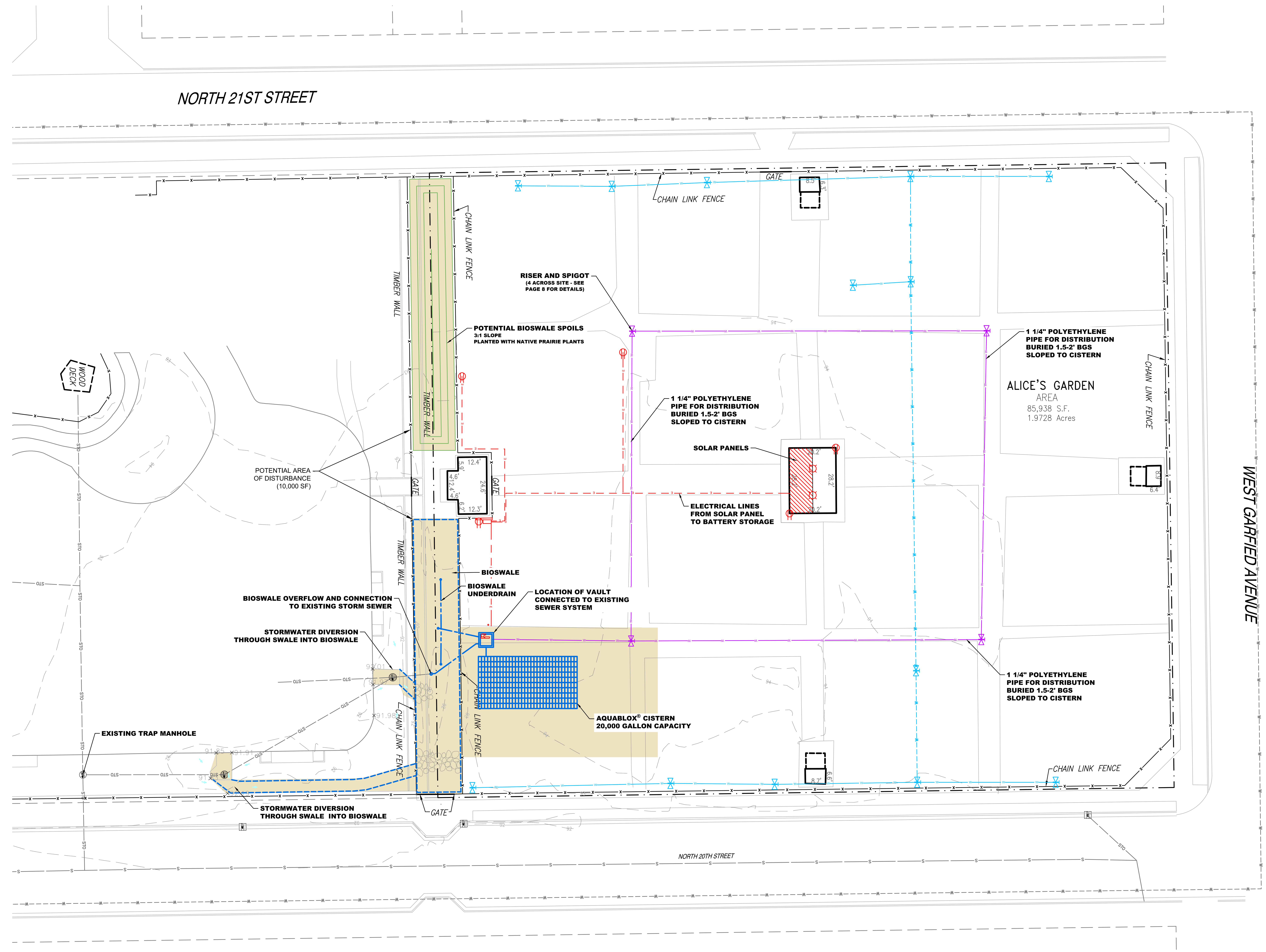
STARTING BENCHMARK: 100.993
SPIKE ON SOUTH FACE OF POWER POLE

CONC. MON. WITH BRASS CAP SE COR. OF NW 1/4 SEC. 19, T7N, R22E.

CHAPUT LAND SURVEYS LLC
234 W. FLORIDA STREET
MILWAUKEE, WI 53204
414-224-8068
www.chaputlandsurveys.com

Date: January 19, 2016
Drawing No. 2493-far

CHAPUT LAND SURVEYS LLC



LEGEND

- ALICE'S GARDEN PROPERTY BOUNDARY
- EXISTING MAJOR CONTOURS (5 INTERVAL)
- EXISTING MINOR CONTOURS (1' INTERVAL)
- FENCE LINE
- LOCATION OF BIOSWALE AND UNDERGROUND CISTERN
- STORM SEWER
- COMBINED STORM AND SANITARY SEWER
- WATER MAIN LINE
- ADJACENT PROPERTY BOUNDARIES
- BUILDING STRUCTURES
- EXISTING WATER SPIGOT LOCATIONS
- EXISTING WATER DISTRIBUTION LINE (DASHED WHERE UNCERTAIN)
- PROPOSED RAINWATER HARVESTING SPIGOT LOCATIONS
- PROPOSED WATER DISTRIBUTION LINE
- PROPOSED ELECTRICAL LINE
- PROPOSED WATERPROOF OUTLETS
- PROPOSED SWITCH OPERATED LIGHTS
- PROPOSED BIOSWALE SPOILS LOCATION

NOTES

1. BASE MAP DEVELOPED BY CHAPUT LAND SURVEYS, LLC DATED JANUARY 19, 2016, DRAWING NO. 2493-far.

ELECTRICAL SPECS

1. ELECTRICAL RECEPTACLES SHALL BE EQUIPPED WITH A WHILE-IN-USE WEATHERPROOF COVER WITH PROVISIONS FOR OWNER PROVIDED PAD LOCK. THOMAS & BETTS CKMUV COVER OR APPROVED EQUAL.
2. SEE SPEC SHEETS FOR ALL VAULT ELECTRICAL AND PUMPING COMPONENTS INSTALLATION
   - VIQUA UV TREATMENT SYSTEM SHALL BE USED TO FUNCTION WITH THE PROPOSED SEQUENCED FILTERING SYSTEM.
   - KELLER AMERICA, INC PRESSURE TRANSDUCER SHALL BE USED TO MONITOR WATER LEVELS IN THE CISTERN.
   - GOULDS SUBMERSIBLE WATER PUMP 1SC SHALL BE USED FOR IRRIGATION.

0 10' 20' 40' 60'
SCALE IN FEET 1" = 20'

NO.	ISSUE/DESCRIPTION	BY	DATE

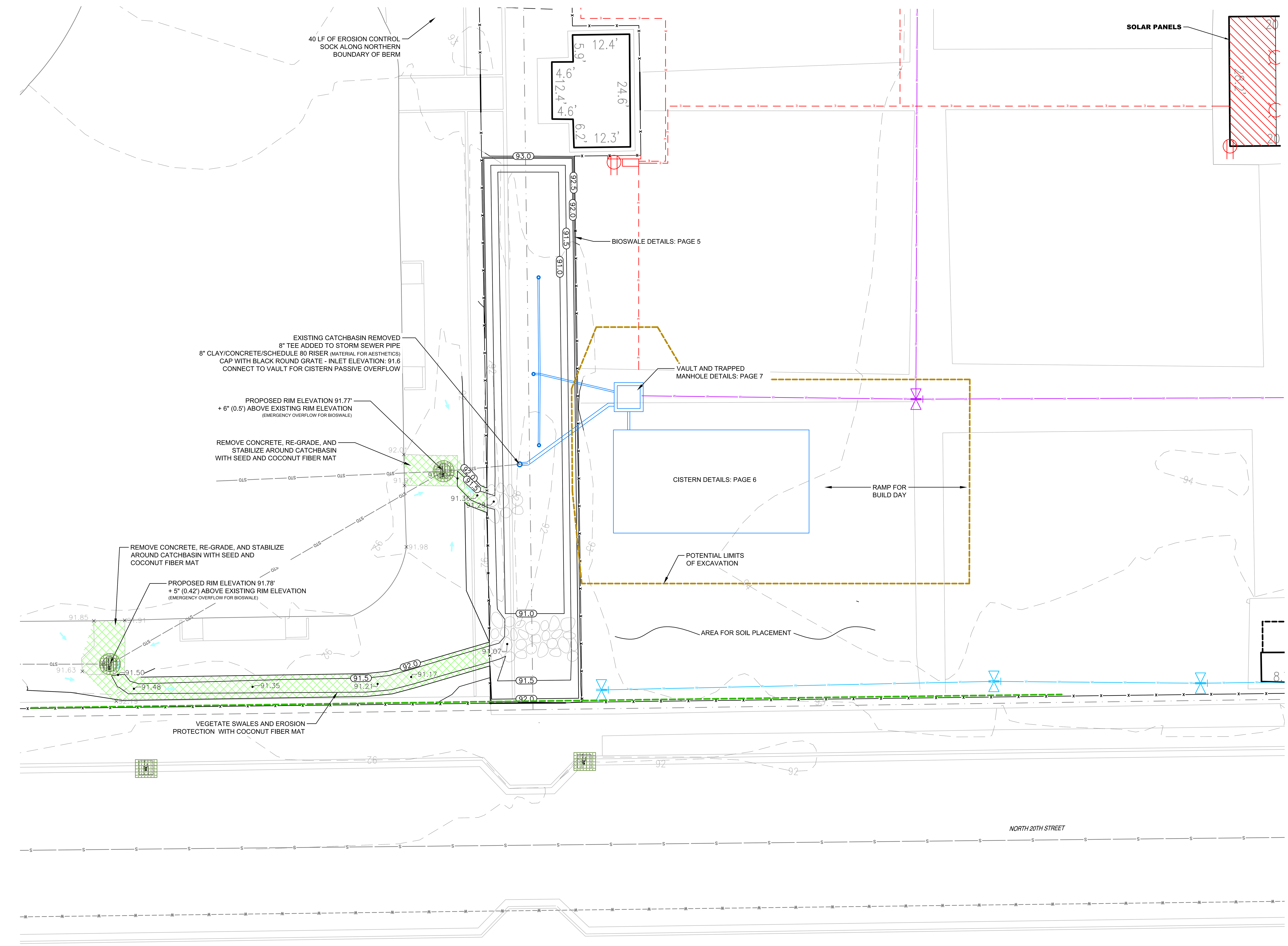
ALICE'S GARDEN RAINWATER HARVESTING PROJECT
2136 NORTH 21ST STREET
MILWAUKEE, WISCONSIN 53205

PROPOSED SITE LAYOUT

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

PROJ MGR: KLK	REVIEWED BY: JDG	CHECKED BY: JDG	FIGURE 3
DESIGNED BY: KLK	DRAWN BY: KLK	SCALE: see above	
DATE: AUGUST, 2018	PROJECT NO. 20.0155403.00	REVISION NO.	SHEET NO. 3 OF 8



LEGEND

- ALICE'S GARDEN PROPERTY BOUNDARY
- EXISTING MAJOR CONTOURS (5 INTERVAL)
- EXISTING MINOR CONTOURS (1' INTERVAL)
- PROPOSED MAJOR CONTOURS (5' INTERVAL)
- PROPOSED MINOR CONTOURS (1' INTERVAL)
- FENCE LINE
- STORM SEWER
- COMBINED STORM AND SANITARY SEWER
- WATER MAIN LINE
- ADJACENT PROPERTY BOUNDARIES
- BUILDING STRUCTURES
- PIPE CENTERLINE
- EROSION CONTROL SOCK
- EROSION CONTROL INLET PROTECTION
- EROSION PROTECTION
- EXISTING WATER SPIGOT LOCATIONS
- EXISTING WATER DISTRIBUTION LINE
- PROPOSED HARVESTED RAINWATER SPIGOT LOCATIONS
- PROPOSED WATER DISTRIBUTION LINE
- PROPOSED ELECTRICAL LINE

NOTES

1. BASE MAP DEVELOPED BY CHAPUT LAND SURVEYS, LLC DATED JANUARY 19, 2016, DRAWING NO. 2493-far.

0 5' 10' 20' 30'
SCALE IN FEET 1" = 10'

NO.	ISSUE/DESCRIPTION	BY	DATE

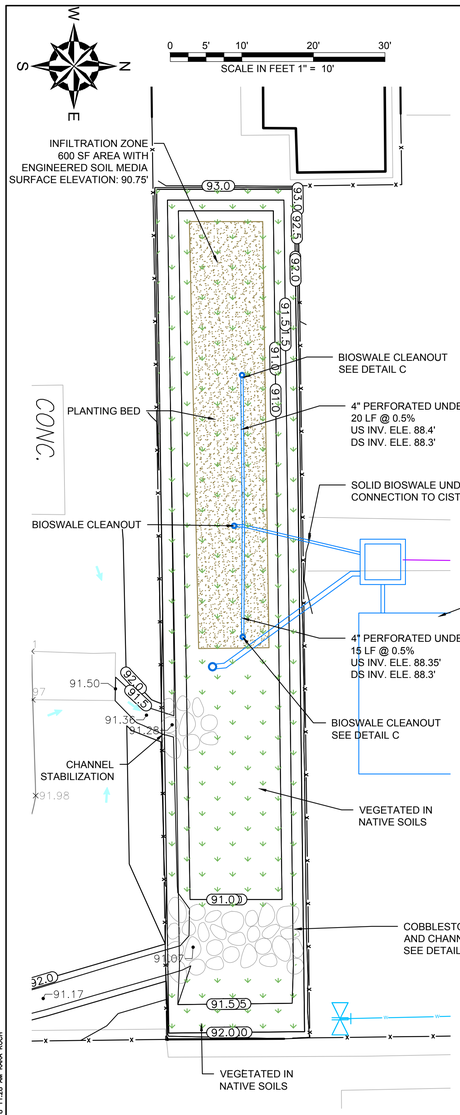
ALICE'S GARDEN RAINWATER HARVESTING PROJECT
2136 NORTH 21ST STREET
MILWAUKEE, WISCONSIN 53205

GRADING AND EROSION CONTROL PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

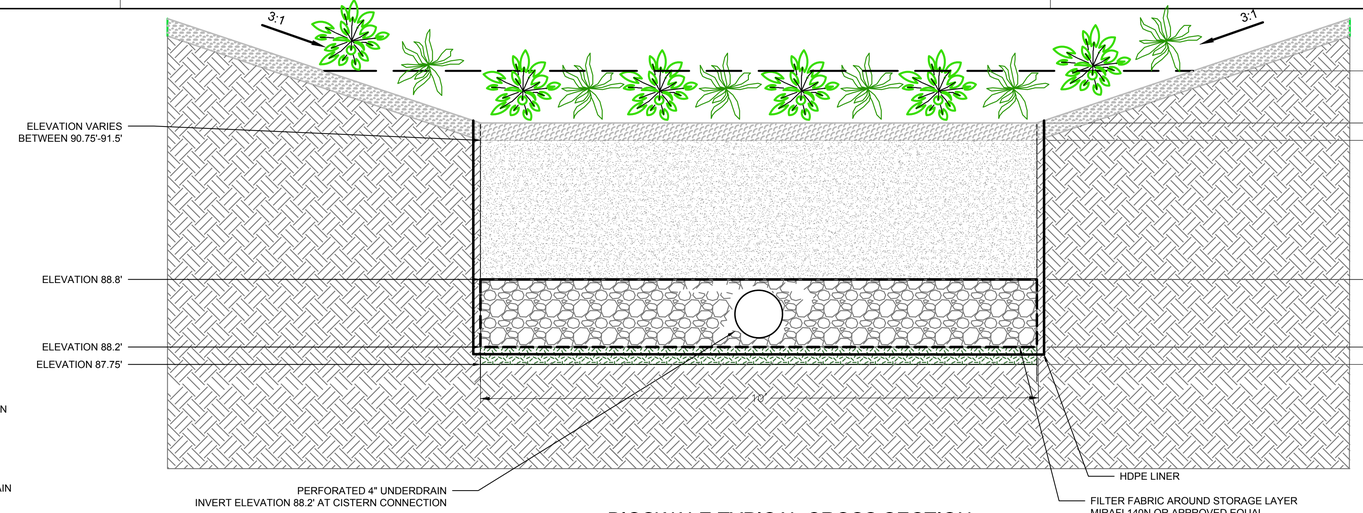
PROJ MGR: KLK	REVIEWED BY: JDG	CHECKED BY: JDG	FIGURE 4
DESIGNED BY: KLK	DRAWN BY: KLK	SCALE: see above	
DATE: AUGUST, 2018	PROJECT NO. 20.0155403.00	REVISION NO.	SHEET NO. 4 OF 8



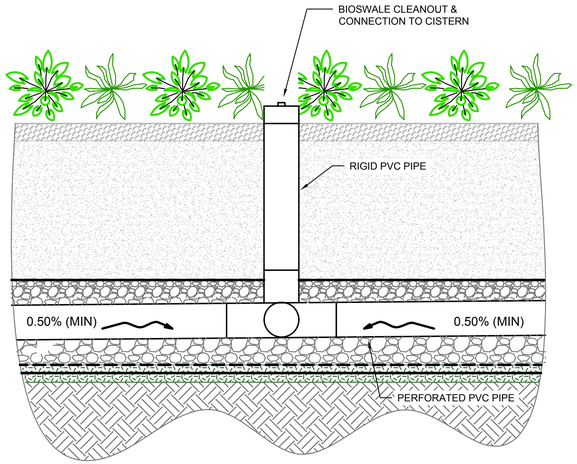
BIOSWALE PLANTING

BOTTOM OF BIOSWALE: 640 sq-ft
- PALE PURPLE CONEFLOWER
- LITTLE BLUESTEM

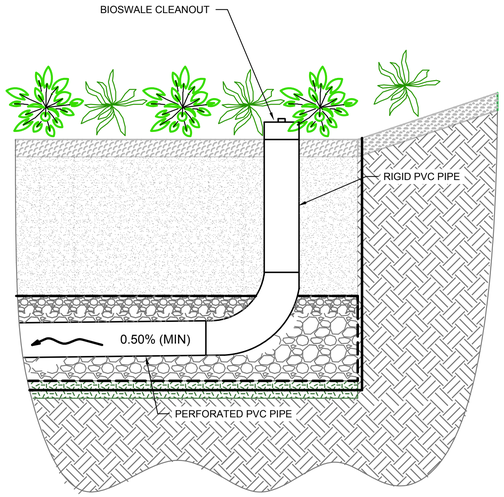
SIDE SLOPES OF BIOSWALE: 1,613 sq-ft
- PRAIRIE DROPSEED
- BUTTERFLY WEED



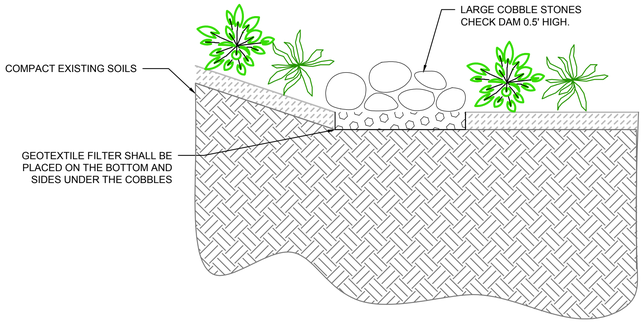
BIOSWALE TYPICAL CROSS SECTION
DETAIL A



OUTLET CONNECTION DETAIL
DETAIL B



TYPICAL CLEANOUT DETAIL
DETAIL C



COBBLESTONE DAM DETAIL
DETAIL D

NOTES
1. ALL UNDERGROUND PIPING ASSOCIATED TO STORMWATER COLLECTION AND MANAGEMENT SHALL USE SCHEDULE 30 PVC.

MATERIALS

1. GENERAL
All bioswale green infrastructure strategies shall meet the requirements of the following specifications. The OWNER reserves the right to take samples of materials whenever deemed necessary.

2. ENGINEERED SOIL MEDIA
The engineered soil media shall conform to the following specifications:

a. The engineered soil media mixture shall consist of a mixture of 70% to 75% sand and 25% to 30% compost. The percentages are based on volume. Special attention should be given to plant selection when the percentage of sand exceeds 75%.

b. The sand component of the engineered soil media shall meet one of the following gradation requirements:

i. USDA Coarse Sand (0.02-0.04 inches)

ii. ASTM C33 (Fine Aggregate Concrete Sand)

iii. Wisconsin Standards and Specifications for Highway and Structure Construction, Section 501.2.5.3.4 (Fine Aggregate Concrete Sand) latest edition, or an equivalent as approved by the OWNER.

c. The compost component of the engineered soil media shall meet the requirements of Wisconsin Department of Natural Resources Specification 5100, Compost, following attached Green Infrastructure Standard Specification Appendix B Page 5

d. The engineered soil media mixture shall be free of rocks, stumps, roots, brush or other material over 1 inch in diameter. No other materials shall be mixed with the planting soil that may be harmful to plant growth or prove a hindrance to planting or maintenance.

e. The engineered soil medial mixture shall have a Ph between 5.5 and 8.0.

f. The engineered soil media mixture shall have adequate nutrient content to meet plant growth requirements.

g. The saturated hydraulic conductivity of the engineered soil media mixture shall be 6 to 10 inches per hour tested in accordance with ASTM F1815. The total porosity shall be 35% to 55% and the moisture holding capacity shall be 15% to 25%. Conduct infiltration test to ensure soil mix meets the standard hydraulic conductivity criteria.

h. The engineered soil media shall be a minimum of 24" thick in low lying areas and may extend up to 36" thick along the eastern edge of the bioswale. This variation is due to the flat underlying surface, yet with a bioswale surface pitched to divert water to the western edge of the bioswale to allow longer travel times through the vegetation.

3. SURFACE MULCH LAYER / COCONUT FIBER MAT
Shredded hardwood mulch or chips, aged a minimum of 12 months, or a Class II erosion control mat (blanket) made of coconut fibers shall be placed on the surface of the bioretention / bioswale area. The shredded hardwood mulch or chips shall be 2 to 3 inches in depth and the mat shall be overlapped, and anchored with hardwood stakes (6 inches or longer to hold the mat to the media). The use of an erosion control mat shall also be placed over the hardwood mulch to prevent the mulch from floating at least until dense vegetation is established. The mulch shall be free of foreign material, including other plant material.

4. STORAGE LAYER
The storage layer below the engineered soil media is intended to temporary storage of stormwater runoff and required when the infiltration rate of the native soil is less than 3.6 inches/hour. The storage layer shall be flat across the entire bioswale with a top elevation of 87.92. The storage layer shall consist of either gravel or sand that shall conform to the following specifications:

a. The gravel shall be poorly-graded coarse aggregate that meets the coarse aggregate specifications of Wisconsin Standards and Specifications for Highway and Structure Construction, Section 501.2.5, latest edition, or an equivalent as approved by the OWNER. Gravel shall be double-washed. The aggregate shall be sized in accordance with AASHTO No. 4 aggregate (size number according to AASHTO M43) to meet the gradation requirements in the GI Standard Specification Appendix B Page 6.

b. The sand shall meet the same requirements specified above in the Engineered Soil Media materials section for sand.

c. Filter fabric - Filter fabric shall cover the storage layer. The fabric shall meet the specifications of Wisconsin Standards and Specifications for Highway and Structure Construction, Section 645.2.4, Schedule Test B, latest edition, or an equivalent approved by the engineer.

5. LINER
A compacted clay layer or HDPE liner shall be used to reduce the infiltration from the storage layer to the existing subsurface. If clay is used, 3 inches shall be placed and compacted to elevation 86.92'. The surface of the bottom layer is flat across the entire bioswale.

6. UNDERDRAIN PIPING
The underdrain pip shall conform to the following specifications:

a. The underdrain pipe shall have a minimum diameter of 8 inches and be made of SDR-35 PVC or other material approved by the engineer. The pipe shall be capable of withstanding expected traffic loads over portions of the pipe extending beyond the soil planting bed.

b. The total opening area of all perforation holes combined shall be sufficient to allow the underdrain pipe to discharge at full capacity, as would occur if there were no orifice restriction. The amount of perforations shall increase to provide a margin of safety but shall not be so great as to compromise structural integrity of the pipe material. The size of the perforations shall be small enough to prevent surrounding aggregate material from traveling through the perforations. A minimum of three rows of perforations shall be used.

c. The underdrain pipe shall be protected from clogging by use of a filter fabric or filter sock. If the storage layer is sand, a filter sock shall be used. A cover of pea gravel may also be used. The pea gravel, filter fabric and filter sock shall conform to the following specifications:

i. Filter fabric - Filter fabric shall cover the underdrain pipe and shall not extend laterally from either side of the pipe more than two feet. The fabric shall meet the specifications of Wisconsin Standards and Specifications for Highway and Structure Construction, Section 645.2.4, Schedule Test B, latest edition, or an equivalent approved by the engineer.

iii. Filter sock - A filter sock shall only be used to protect the underdrain pipe when a sand storage layer is used. A filter sock is not permitted when an aggregate storage layer is used. The openings in the fabric shall be small enough to prevent sand particles from entering the underdrain pipe. The flow rate of the fabric shall be capable of passing water at a rate equal to or greater than the flow rate capacity of the total combined perforations in the underdrain pipe. In addition, the fabric shall meet the other requirements of Wisconsin Standards and Specifications for Highway and Structure Construction, Section 612.2.8(1-3), latest edition, or an equivalent approved by the engineer.

d. The underdrain pipe shall have a vertical, connecting standpipe to serve as a clean-out port for the underdrain pipe. The pipe shall be rigid, non-perforated SDR-35 PVC, a minimum of 6 inches in diameter and covered with a watertight cap that is 3 inches above the finished surface elevation of the bioretention device.

NO.	ISSUE/DESCRIPTION	BY	DATE

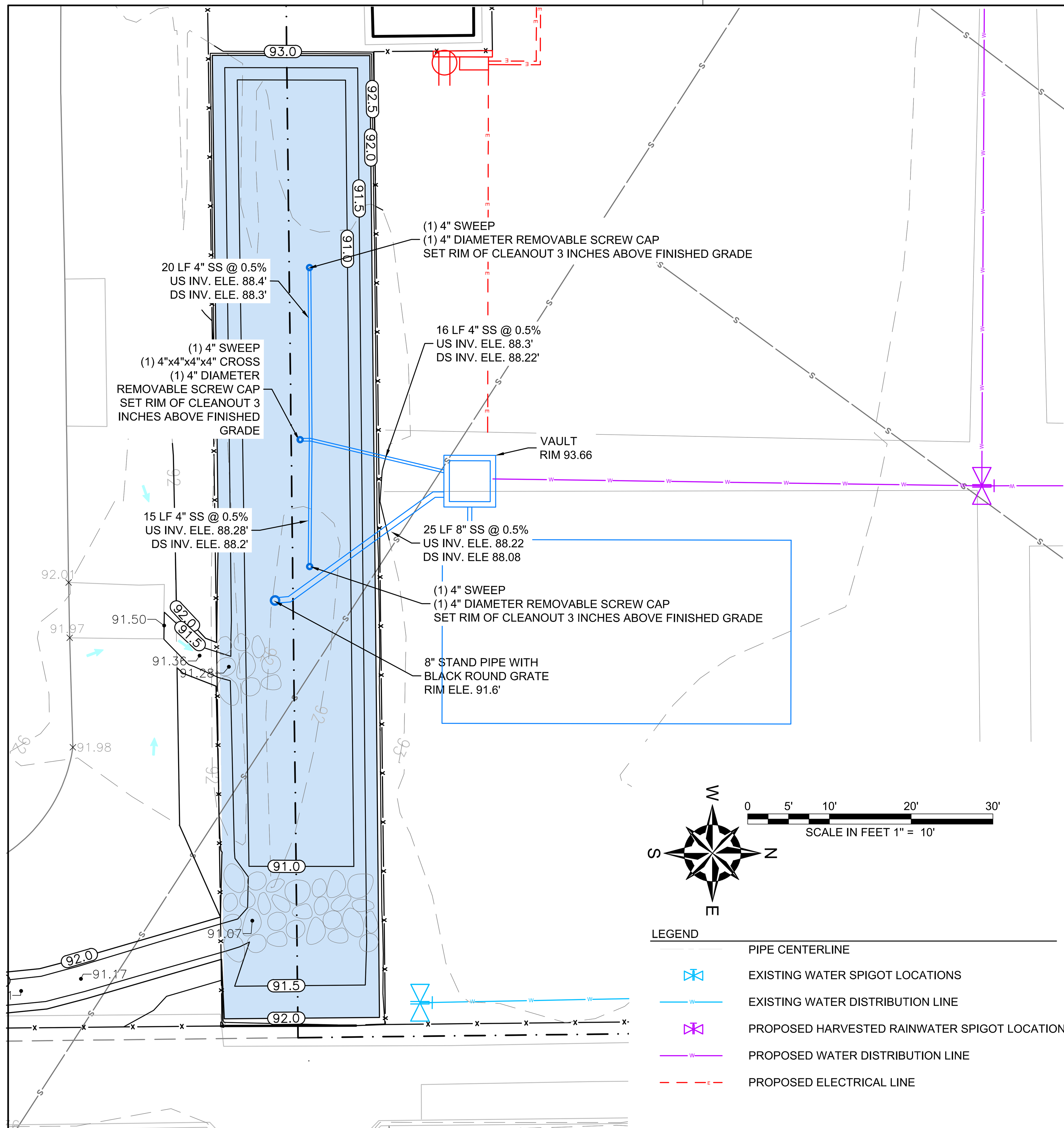
ALICE'S GARDEN RAINWATER HARVESTING PROJECT
2136 NORTH 21ST STREET
MILWAUKEE, WISCONSIN 53205

BIOSWALE DETAILS

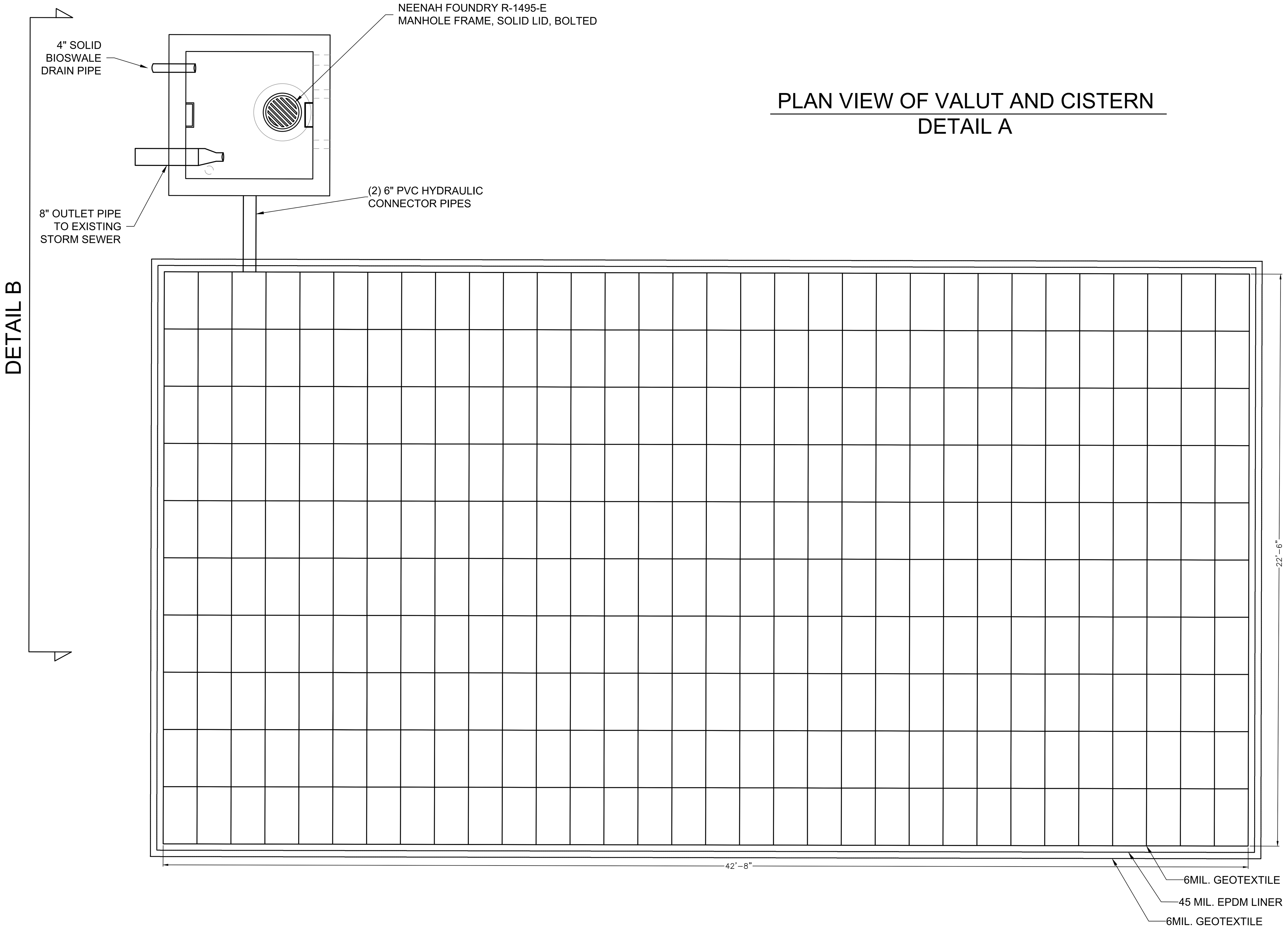
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

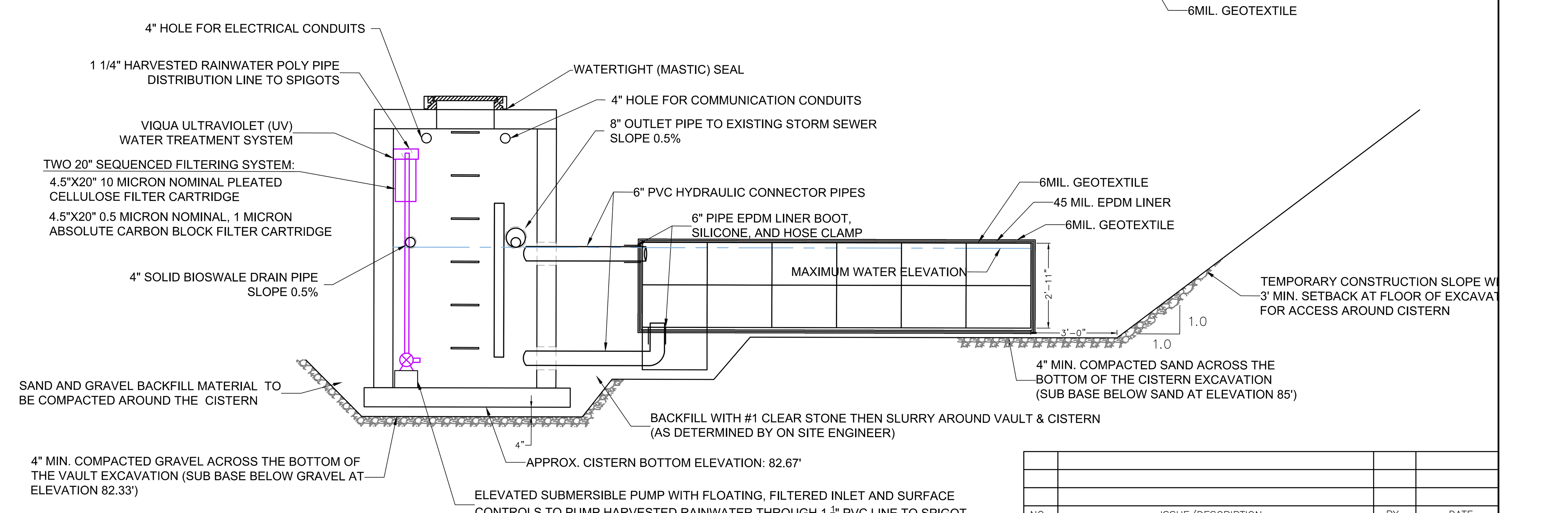
PREPARED FOR:

PROJ MGR: KLK	REVIEWED BY: JDG	CHECKED BY: JDG	FIGURE 5
DESIGNED BY: KLK	DRAWN BY: KLK	SCALE: see above	
DATE: AUGUST, 2018	PROJECT NO. 20.0155403.00	REVISION NO.	SHEET NO. 5 OF 8



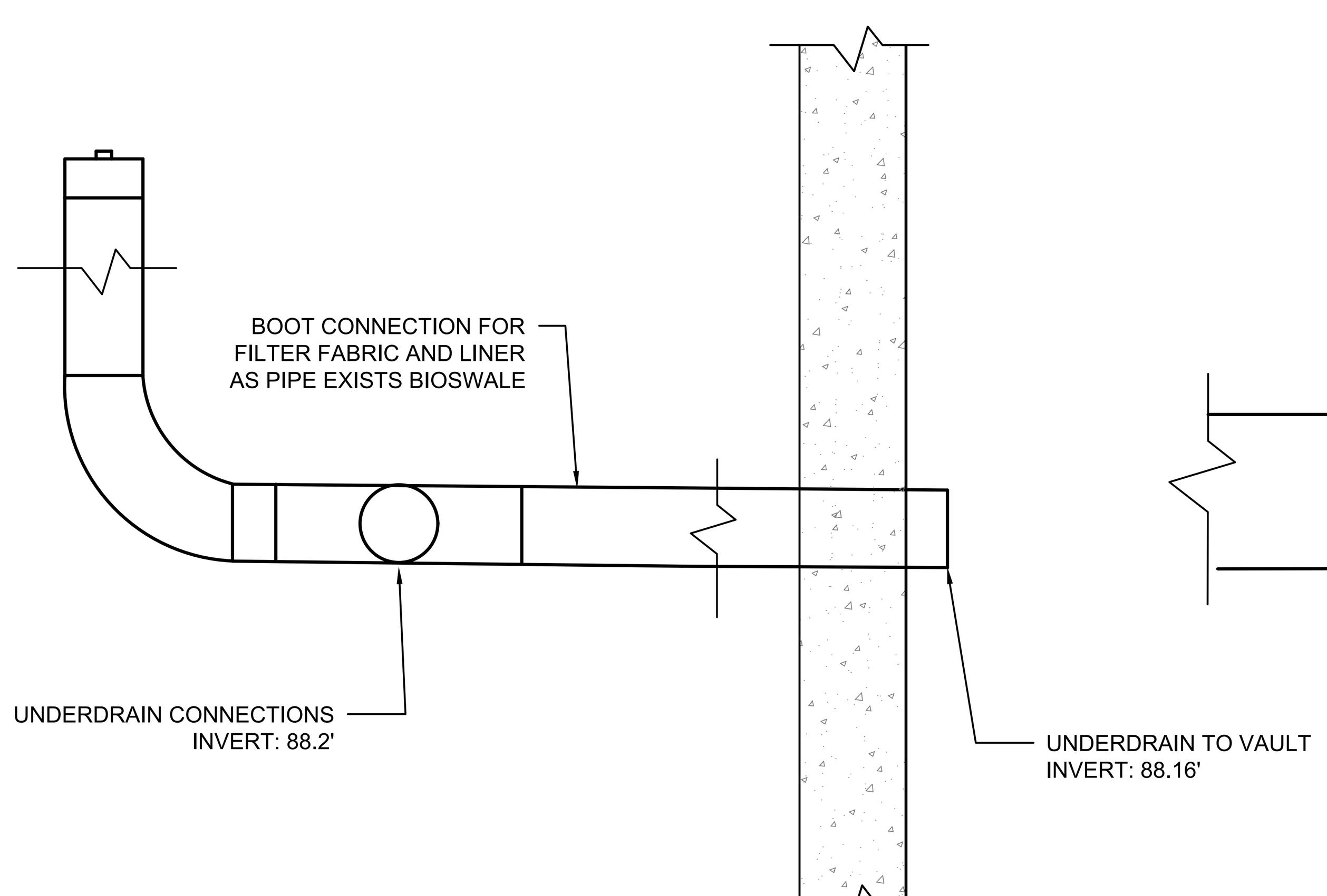
PLAN VIEW OF VALUT AND CISTERN
DETAIL A



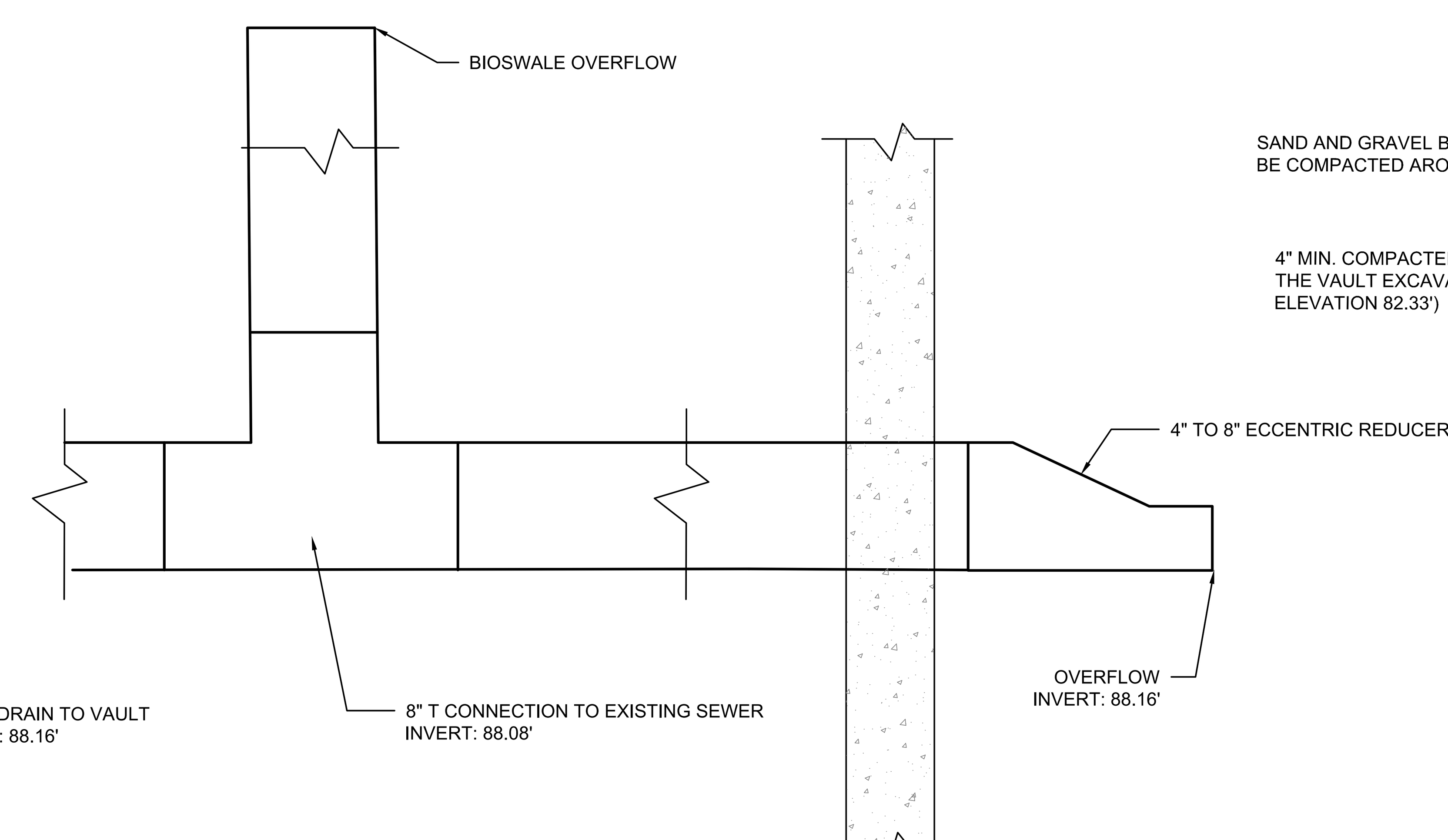


CROSS SECTION VIEW OF VALUT AND CISTERN
DETAIL B

BIOSWALE UNDERDRAIN TO VAULT
DETAIL C



OVERFLOW FROM VAULT TO SEWER
DETAIL D



NOTES

1. ALL UNDERGROUND PIPING ASSOCIATED TO STORMWATER COLLECTION AND MANAGEMENT SHALL USE SCHEDULE 30 PVC.

NO.	ISSUE/DESCRIPTION	BY	DATE

ALICE'S GARDEN RAINWATER HARVESTING PROJECT
2136 NORTH 21ST STREET
MILWAUKEE, WISCONSIN 53205

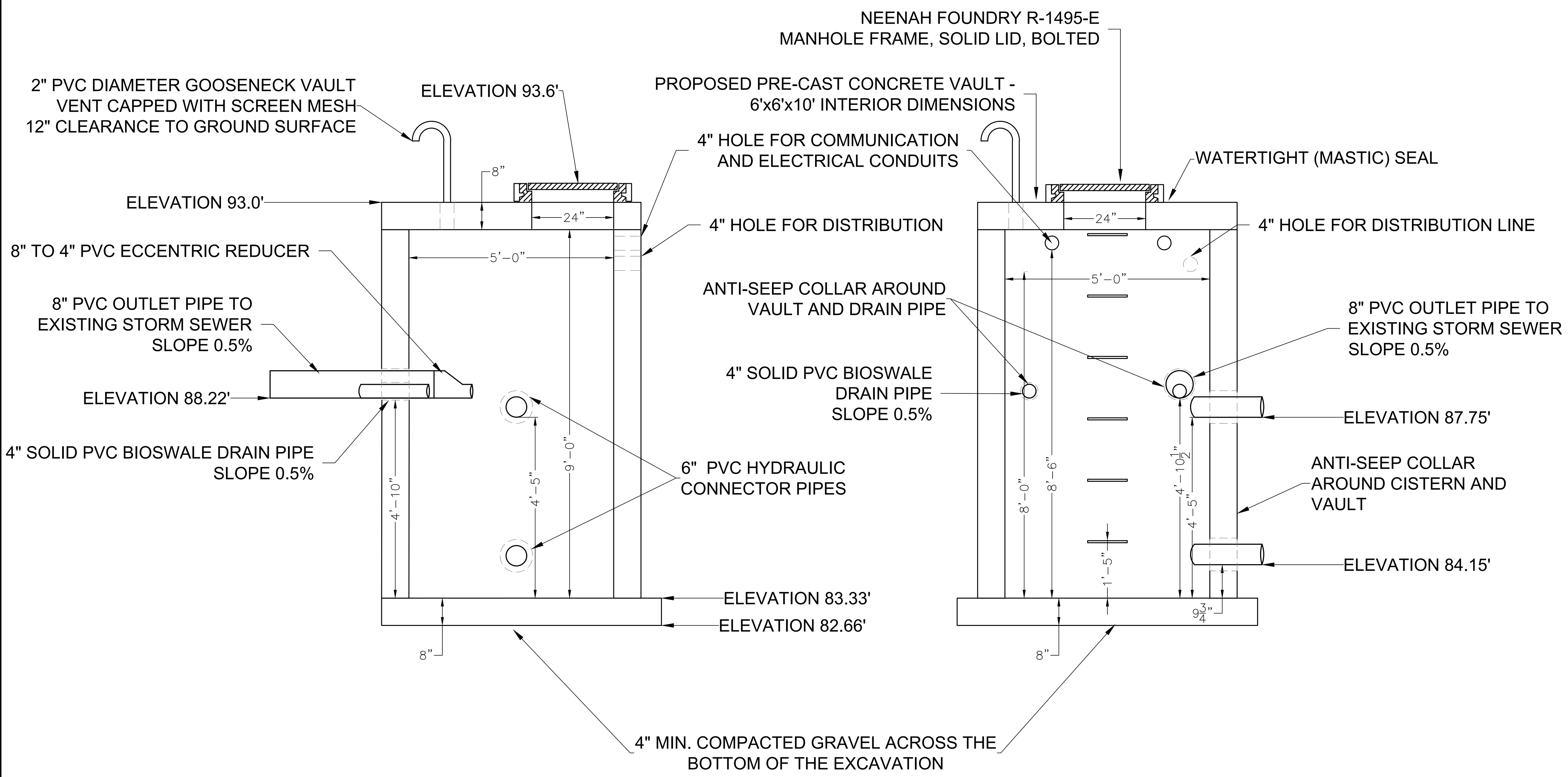
CISTERN DETAILS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

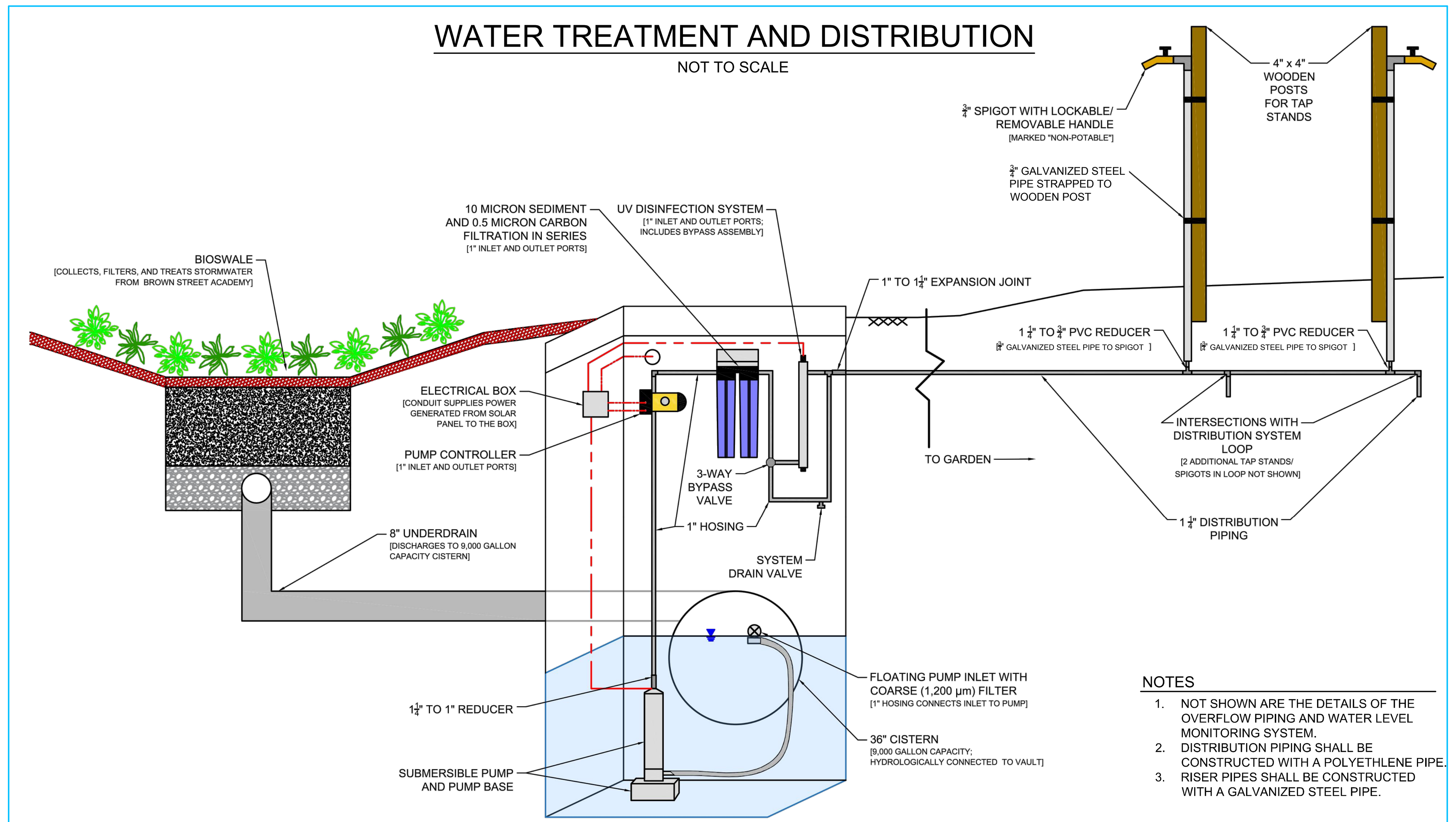
PROJ MGR: KLK	REVIEWED BY: JDG	CHECKED BY: JDG	FIGURE
DESIGNED BY: KLK	DRAWN BY: KLK	SCALE: see above	6
DATE: AUGUST, 2018	PROJECT NO. 20.0155403.00	REVISION NO.	SHEET NO. 6 OF 8

VAULT DIMENSIONS - SIDE VIEW



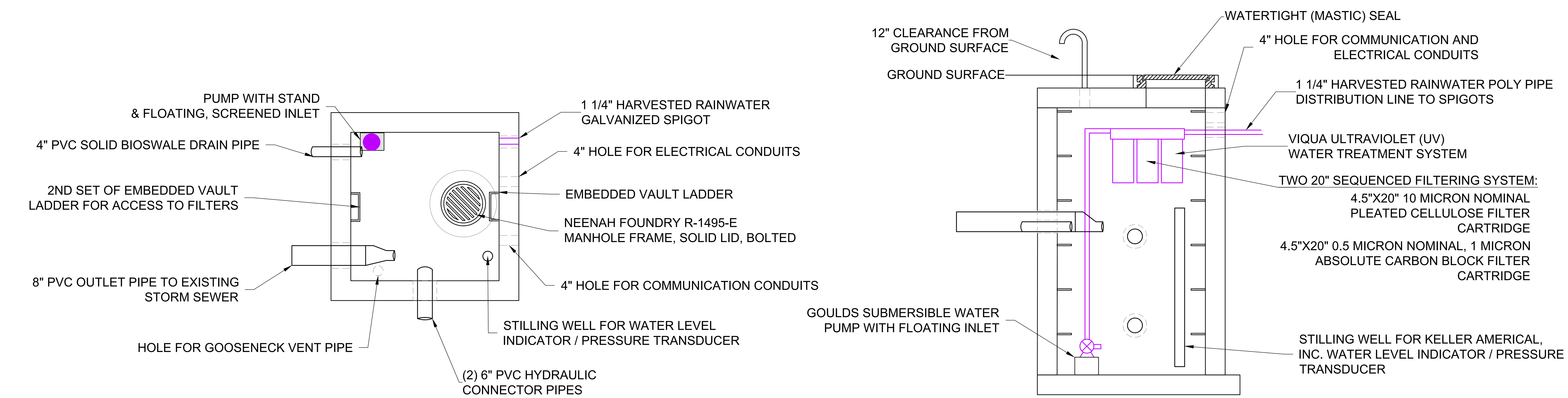
WATER TREATMENT AND DISTRIBUTION

NOT TO SCALE



NOTES
1. NOT SHOWN ARE THE DETAILS OF THE OVERFLOW PIPING AND WATER LEVEL MONITORING SYSTEM.
2. DISTRIBUTION PIPING SHALL BE CONSTRUCTED WITH A POLYETHLENE PIPE.
3. RISER PIPES SHALL BE CONSTRUCTED WITH A GALVANIZED STEEL PIPE.

VAULT PLUMBING AND ELECTRICAL DETAILS



NOTES FOR MANHOLE ENTRANCE
1. MANHOLE COVERS SHALL BE PROVIDED WITH LOCKING DEVICES OR OTHER EFFECTIVE MEASURE TO PREVENT UNAUTHORIZED ACCESS.

NOTES FOR MANHOLE VENT
1. VENT TERMINAL SHALL BE AT LEAST 2" IN DIAMETER.
2. VENT SHALL TERMINATE AT LEAST 12" ABOVE FINISHED GRADE AND TERMINATE WITH A RETURN BEND.
3. VENTS SHALL BE FITTED WITH MESH SCREENS FOR VECTOR CONTROL.

NOTES FOR HOSE BIB
1. HOSE BIB SHALL BE LABELED AS NON-POTABLE AND SHALL BE EQUIPPED WITH A REMOVABLE KEY HANDLE.

0 1' 2' 4' 6'
SCALE IN FEET 1" = 2'

NO.	ISSUE/DESCRIPTION	BY	DATE

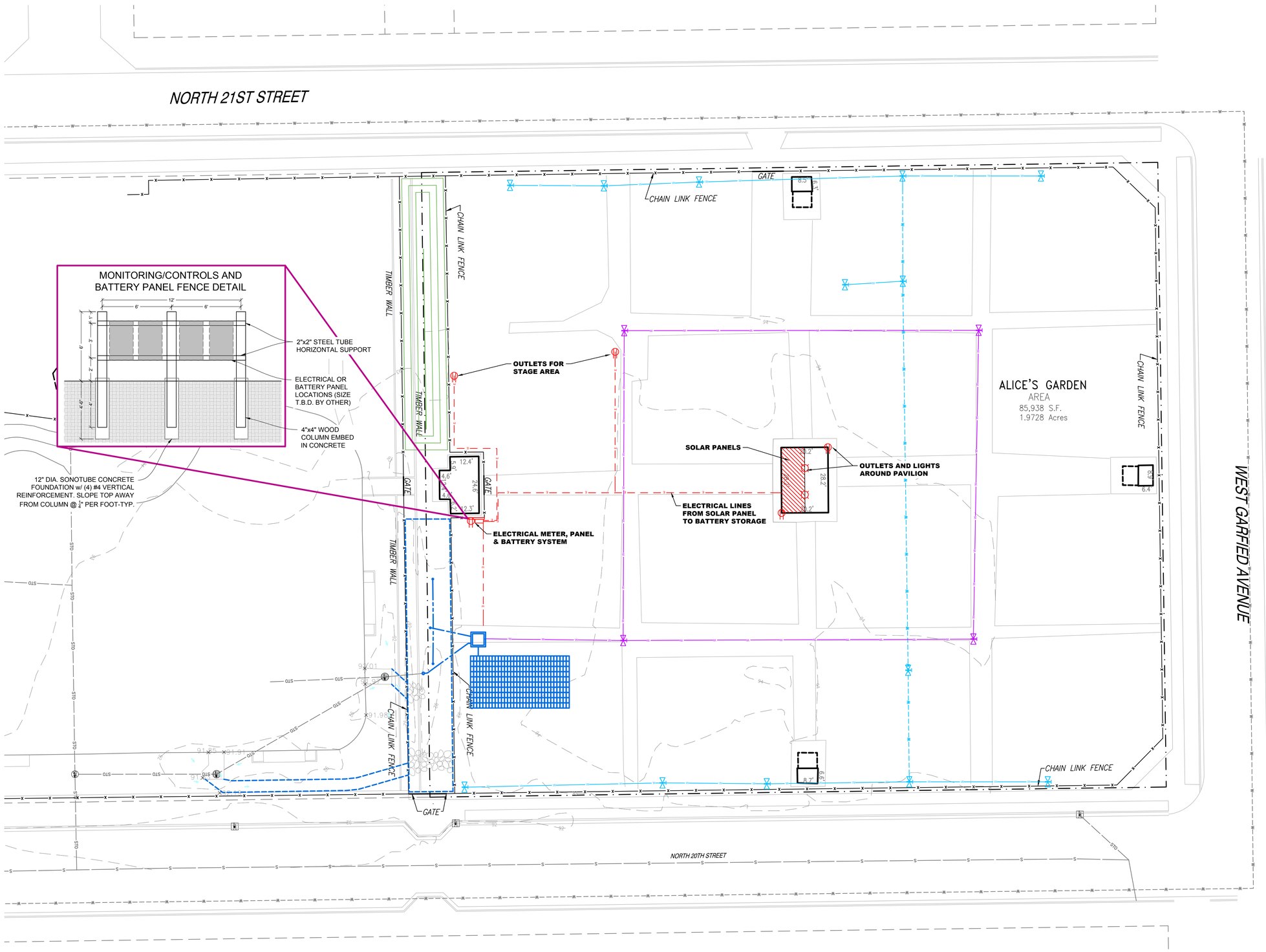
ALICE'S GARDEN RAINWATER HARVESTING PROJECT
2136 NORTH 21ST STREET
MILWAUKEE, WISCONSIN 53205

VAULT DETAILS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

PROJ MGR: KLK	REVIEWED BY: JDG	CHECKED BY: JDG	FIGURE
DESIGNED BY: KLK	DRAWN BY: KLK	SCALE: see above	7
DATE: AUGUST, 2018	PROJECT NO. 20.0155403.00	REVISION NO.	SHEET NO. 7 OF 8



LEGEND

- ALICE'S GARDEN PROPERTY BOUNDARY
- EXISTING MAJOR CONTOURS (5 INTERVAL)
- EXISTING MINOR CONTOURS (1' INTERVAL)
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- PROPOSED ELECTRICAL LINE
- PROPOSED WATERPROOF OUTLETS
- PROPOSED SWITCH OPERATED LIGHTS
- PROPOSED BIOSWALE SPOILS LOCATION

NOTES

1. BASE MAP DEVELOPED BY CHAPUT LAND SURVEYS, LLC DATED JANUARY 19, 2016, DRAWING NO. 2493-far.

ELECTRICAL SPECS

1. ELECTRICAL RECEPTACLES SHALL BE EQUIPPED WITH A WHILE-IN-USE WEATHERPROOF COVER WITH PROVISIONS FOR OWNER PROVIDED PAD LOCK. THOMAS & BETTS CKMUV COVER OR APPROVED EQUAL.
2. SEE SPEC SHEETS FOR ALL VAULT ELECTRICAL AND PUMPING COMPONENTS INSTALLATION
   - VIQUA UV TREATMENT SYSTEM SHALL BE USED TO FUNCTION WITH THE PROPOSED SEQUENCED FILTERING SYSTEM.
   - KELLER AMERICA, INC PRESSURE TRANSDUCER SHALL BE USED TO MONITOR WATER LEVELS IN THE CISTERN.
   - GOULDS SUBMERSIBLE WATER PUMP 1SC SHALL BE USED FOR IRRIGATION.

ELECTRICAL CIRCUIT LIST

- (1) OUTLET BY POWER STATION
- (1) LIGHTS BY PAVILION
- (1) OUTLET BY PAVILION
- (1) OUTLETS BY STAGE
- (1) PUMP
- (1) UV AND MONITORING SYSTEM

W S N E

0 10' 20' 40' 60'

SCALE IN FEET 1" = 20'

NO.	ISSUE/DESCRIPTION	BY	DATE

ALICE'S GARDEN RAINWATER HARVESTING PROJECT
2136 NORTH 21ST STREET
MILWAUKEE, WISCONSIN 53205

ELECTRICAL DETAILS AND LAYOUT

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com			
PROJ MGR: KLK	REVIEWED BY: JDG	CHECKED BY: JDG	FIGURE 8
DESIGNED BY: KLK	DRAWN BY: KLK	SCALE: see above	
DATE: AUGUST, 2018	PROJECT NO. 20.0155403.00	REVISION NO.	SHEET NO. 8 OF 8