

# ADDENDUM No. 1

ITB No. 4689

## School Girls Glen Culvert Replacement – Nichols Drive

**Due: September 2, 2021 at 2:00 P.M. (local time)**

The information contained herein shall take precedence over the original documents and all previous addenda (if any) and is appended thereto. **This Addendum includes fifty-three (53) pages, and one (1) plan sheet.**

The Proposer is to acknowledge receipt of this Addendum No. 1, including all attachments in its Proposal by so indicating in the proposal that the addendum has been received. Proposals submitted without acknowledgement of receipt of this addendum may be considered non-conforming.

The following forms provided within the ITB Document should be included in submitted proposal:

- City of Ann Arbor Prevailing Wage Declaration of Compliance
- City of Ann Arbor Living Wage Ordinance Declaration of Compliance
- Vendor Conflict of Interest Disclosure Form
- City of Ann Arbor Non-Discrimination Ordinance Declaration of Compliance

**Proposals that fail to provide these completed forms listed above upon proposal opening may be rejected as non-responsive and may not be considered for award.**

### I. CORRECTIONS/ADDITIONS/DELETIONS

Changes to the ITB documents which are outlined below are referenced to a page or Section in which they appear conspicuously. Offerors are to take note in its review of the documents and include these changes as they may affect work or details in other areas not specifically referenced here.

Section/Page(s)	Change
Bid Form – 2 pp	Remove and replace BF-1 and BF-2 with the attached Bid Form <ul style="list-style-type: none"><li>• Items changes on BF-2:<ul style="list-style-type: none"><li>○ REMOVE: Line Item #28 “Embankment, Structure, CIP” from the Bid Form, as this quantity of embankment is covered under the pay item for “Subgrade Undercutting, Modified”.</li><li>○ ADD: Line Item #40 “Arboretum Plantings, Reimbursement [Allowance]” with a Dollar allowance of \$5000. This item will covers the cost of any special plantings the Arboretum will require during restoration of the disturbed areas. Use of this item is by approval from the City ONLY.</li></ul></li></ul>
Plan Sheet Sketch (Pg. 4)	Review the sketch for the additional allowable areas of disturbance on the SW and NE quadrant of the culvert crossing. The Arboretum will allow the contractor to disturb, remove, and restore the plant life in the areas hatched out in “RED”. This area extends approximately

45 feet west from the west end of the southern headwall, and approximately 30 feet east from the east end of the existing northern headwall.

- The Contractor will be responsible for working with the City and Arboretum staff to determine the final limits of allowable disturbance. Within these limits, there could be plants or trees that need protecting and the Contractor will be responsible to avoid at all times.
- Storage of granular material in these areas are prohibited. The Contractor may store equipment, vehicles, or other material (non-granular) or may use this area to park their equipment when not in use.
- The Contractor will be responsible for restoring all areas with the same restoration as detailed in the plans (topsoil, seed, and mulch).Page 11 Remove: "These personnel must be a licensed physician, licensed psychologist or licensed psychiatrist."

Geotechnical Report – 31 pp ADD the attached "Geotechnical Report – MTC Project No. 201675" to the Contract Documents.

EGLE Permit – 16 pp ADD the attached "EGLE Notice of Authorization – Issued Permit WRP029128 School Girl's Glen – Nichols Drive Culvert" to the Contract Documents.

Sign-In sheet – 2 pp Pre-Bid Meeting Sign-In Sheet

## II. QUESTIONS AND ANSWERS

The following Questions have been received by the City. Responses are being provided in accordance with the terms of the RFP. Respondents are directed to take note in its review of the documents of the following questions and City responses as they affect work or details in other areas not specifically referenced here.

Question 1: **What is the Engineer's Estimate for the project?**

Answer 1: \$279,000.00

Question 2: **Can you let me know what the approved truck route from the storage yard on Main to the job would be? I assume we wouldn't be able to use Depot/Fuller Street with loaded dump trucks.**

Answer 2: *Depot/Fuller are major streets and can be used as the most direct route from 721 to Nichols Drive*

Offerors are responsible for any conclusions that they may draw from the information contained in the Addendum.

**BID FORM**

Company: \_\_\_\_\_

Project: **Schoolgirls Glen Culvert Replacement**

File # **2020-026** Bid # **4689**

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Total Price</u>
1	Project Supervision, Max. \$ 10,000	LS	1	\$ _____	\$ _____
2	General Conditions (MAX \$20,000)	LS	1	\$ _____	\$ _____
3	Certified Payroll Compliance and Reporting	LS	1	\$ _____	\$ _____
4	Allowance for Unforeseen Site Conditions	DLR	10000	\$ <u>1.00</u>	\$ <u>10,000.00</u>
5	Preconstruction Audio-Visual Documentation (\$2,500 Max)	LS	1	\$ _____	\$ _____
6	Plastic Drum, High Intensity, Lighted, Furn	EA	20	\$ _____	\$ _____
7	Plastic Drum, High Intensity, Lighted, Oper	EA	20	\$ _____	\$ _____
8	Barricade, Type III, High Intensity, Lighted, Furn	EA	6	\$ _____	\$ _____
9	Barricade, Type III, High Intensity, Lighted Oper	EA	6	\$ _____	\$ _____
10	Sign, Type B, Temp, Prismatic, Furn	SFT	120	\$ _____	\$ _____
11	Sign, Type B, Temp, Prismatic, Oper	SFT	120	\$ _____	\$ _____
12	Minor Traf Devices, Modified	LS	1	\$ _____	\$ _____
13	Pedestrian Type II Barricade, Temp	EA	3	\$ _____	\$ _____
14	Erosion Control, Silt Fence	FT	200	\$ _____	\$ _____
15	Erosion Control, Check Dam, Stone	FT	30	\$ _____	\$ _____
16	Mulch Blanket, Hig Velocity	SYD	70	\$ _____	\$ _____
17	Seeding, Fescue Lawn Mixture	LB	3	\$ _____	\$ _____
18	Water, Sodding/Seeding	UNITS	0.6	\$ _____	\$ _____
19	Tree, Rem, 6 inch to 18 inch	EA	2	\$ _____	\$ _____
20	Clearing	ACRE	0.1	\$ _____	\$ _____
21	Structures, Rem	LS	1	\$ _____	\$ _____
22	Culv, Rem, 24 inch to 48 inch	EA	2	\$ _____	\$ _____
23	Culv, Precast Conc Box, 8 foot x 3 foot, Modified	FT	30	\$ _____	\$ _____
24	Subgrade Undercutting, Modified	CYD	160	\$ _____	\$ _____
25	Excavation, Earth	CYD	400	\$ _____	\$ _____
26	Excavation, Channel	CYD	70	\$ _____	\$ _____

TOTAL THIS PAGE (BF-1) \$ \_\_\_\_\_  
 (Also to be entered on Page BF-2)

**BID FORM**

Company: \_\_\_\_\_

Project: Schoolgirls Glen Culvert Replacement

File # 2020-026 Bid # 4689

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Total Price</u>
27	Backfill Structure, CIP	CYD	160	\$ _____	\$ _____
28	** item not used **			\$ <u>0</u>	\$ <u>0</u>
29	Subbase, CIP	CYD	190	\$ _____	\$ _____
30	Culv Bedding, Box Culv	CYD	15	\$ _____	\$ _____
31	Aggregate Surface Cse, 8 inch	SYD	150	\$ _____	\$ _____
32	Rip Rap, Plain	SYD	30	\$ _____	\$ _____
33	Plunge Pool	EA	3	\$ _____	\$ _____
34	Cascading Rock Channel	LS	1	\$ _____	\$ _____
35	Armored Spillway	FT	12	\$ _____	\$ _____
36	Weir Stabilization	LS	1	\$ _____	\$ _____
37	Project Clean-Up and Restoration, Special	LS	1	\$ _____	\$ _____
38	Rip Rap, Plain [Contingency]	Syd	100	\$ _____	\$ _____
39	Topsoil Surface, Furn, 4 inch [Contingency]	Syd	100	\$ _____	\$ _____
40	Arboretum Plantings, Reimbursement [Allowance]	DLR	5000	\$ <u>1.00</u>	\$ <u>5,000.00</u>
TOTAL THIS PAGE (BF-2)				\$ _____	_____
TOTAL FROM PAGE BF-1				\$ _____	_____
<b>TOTAL BASE BID</b>				\$ _____	_____



**GEOTECHNICAL REPORT**  
SCHOOLGIRL'S GLEN - NICHOLS DRIVE CULVERT REPLACEMENT  
ANN ARBOR, MICHIGAN

**Prepared For:**

FISHBECK  
Novi, Michigan

**Prepared By:**

MATERIALS TESTING CONSULTANTS, INC.  
Ann Arbor, Michigan

June 2021  
MTC Project No. 201675



June 16, 2021  
Project No. 201675

Fishbeck  
39500 MacKenzie Drive, #100  
Novi, MI 48377

Attention: Paul Kammer, P.E.  
Senior Civil Engineer

Reference: Report of Geotechnical Investigation  
Schoolgirl's Glen - Nichols Drive Culvert Replacement  
Ann Arbor, Michigan

Dear Mr. Kammer:

We have completed a geotechnical investigation for the above-referenced project. The purpose of this investigation has been to identify the general subsurface soil conditions in the vicinity of the proposed construction, analyze the conditions relative to the planned construction and to provide recommendations for the design of foundations and earth-related structures. This work has been performed as described in our proposal dated February 12, 2021.

Presented herein are descriptions of our understanding of the design considerations, the geotechnical investigation, encountered conditions and engineering recommendations. The Appendix contains the report limitations and data collected during this investigation.

## DESIGN CONSIDERATIONS

### Available Information

We have been provided the following documents and information for use in this investigation:

- A Technical Memo for the culvert analysis prepared by Fishbeck and dated June 23, 2020.
- A request for proposal email outlining the scope of the investigation and including a boring location plan image, received from Mr. Paul Kammer, P.E. of Fishbeck on January 12, 2021.
- An email containing project elevations and a preliminary culvert cross section, received from Mr. Paul Kammer, P.E. on February 23, 2021.
- A plan set of the proposed culvert installation, with updated elevation information, received from Mr. Mr. Paul Kammer, P.E. on May 24, 2021.
- Telephone and email conversations with Mr. Paul Kammer, P.E. regarding the type of construction, boring locations and project elevations.



Location and Type of Structure

The proposed construction will be located in plan as shown on Figure No. 1. The site is located on Nichols Drive within the Nichols Arboretum in Ann Arbor, Michigan. The culvert is located at the north end of Schoolgirl’s Glen, approximately 700 ft east of the Lower Arboretum Entrance on Nichols Drive.

The proposed culvert replacement is expected to consist of an 8 ft wide by 3 ft tall box culvert with 1 ft thick concrete for its top, base and sidewalls. The culvert is expected to be 30 ft long with invert elevations of 758.0 ft and 755.0 ft at the southern inlet and northern outlet, respectively. We anticipate culvert bedding will consist of 3-inches of MDOT 34R over 9-inches of MDOT 6A with bedding material wrapped in a non-woven geotextile fabric.

A concrete head wall and wing walls are planned at the inlet and outlet with base elevations expected to be near 757 ft and 754 ft at the southern inlet and northern outlet, respectively. The top of the head walls are expected to approximately match the Nichols Drive surface elevations of 764 to 766 ft, resulting in walls on the order of 9 to 12 ft tall with wing wall foundation widths anticipated to be 5 ft or greater. The wing walls are planned to be angled away from the headwall and taper down along the slope. We understand the wing wall lengths have not yet been finalized.

We should be informed of any changes between the actual design conditions and those described herein as this information may affect our recommendations.

INVESTIGATION METHODOLOGY

Conventional soil test borings and sampling, hand auger borings and dynamic cone penetrometer testing (ASTM STP 399) and field engineering reconnaissance were used to investigate the subsurface conditions. Some hand auger borings with shallow refusal were re-attempted up to two times. Boring locations are shown on Figure No. 1. Investigation procedures, soil classification information and boring logs are provided in the Appendix.

Type of Borings	Conventional Drill Rig	Hand Auger
Number of Borings	2	10
Boring Depth Range, ft.	25	0.5 to 3.5

Borings were drilled and other sampling was conducted solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.



## Laboratory

Soil samples were reviewed by one of our engineers and technically classified according to the methods of ASTM D2488 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)". Calibrated penetrometer tests were performed on cohesive samples to obtain an indication of unconfined compressive strength values.

Selected samples were subjected to various laboratory tests, including:

- ASTM D2216 "Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass"
- ASTM D2974 "Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils"

Results of the laboratory tests are provided in the Appendix.

## INVESTIGATION RESULTS

### Regional Geology

The *Map of the Surface Formations of the Southern Peninsula of Michigan*, published by the State of Michigan, indicates the site is in an area of spillways, adjacent to the Huron River. Soil conditions typically are found to be sorted deposits of sand and gravel with occasional cobble and boulder in this type of geologic area. The *Map of Bedrock Topography of the Southern Peninsula of Michigan* indicates bedrock to be at approximately el 650 ft, on the order of 100 ft below site elevations.

### Site Conditions

At the time of our field work, the area of investigation was covered with snow. The areas north and south of Nichols Drive were generally wooded, except for the creek bed upstream and downstream of the culvert. The creek bed was generally covered in cobble and large gravel and was relatively dry, except for areas of standing water near the culvert inlet and near the Huron River. The south bank of the Huron River was observed approximately 50 ft north of the culvert outlet. The road in the vicinity of the culvert was supported by stone headwalls on either side, with the top of the headwalls 1 to 2 ft higher than the adjacent road grades.

Roadway elevations on Nichols Drive near the culvert ranged from approximately 764 to 766 ft. South of Nichols Drive, the ground surface sloped down from south to north, with a low point near elevation 761 ft at the south culvert inlet. North of Nichols Drive, the ground surface sloped down to the Huron River at the north, with an observed water elevation of approximately 751 ft. The stream bed had an elevation near 753 ft near the north culvert outlet, and it also sloped down to the north to the Huron River.



We understand from the Technical Memo for the culvert analysis prepared by Fishbeck, that the existing culvert consists of an active 30-inch pipe in poor condition and a collapsed 24-inch pipe, and the 30-inch pipe is currently located between 1 and 2 ft over the existing creek bed. We expect that fill has been placed in the vicinity of the culvert to raise the ground surface elevations to the current road elevations.

### Subsurface Conditions

#### *Borings B-1 and B-2*

Borings B-1 and B-2 were drilled using conventional rig methods and were located just outside the Nichols Drive gravel surface at a ground surface elevation of 764.5 ft. Borings B-1 and B-2 encountered 1 to 4 inches of clayey topsoil at the surface. Beneath the topsoil, the borings encountered fill to a depth 5.5 ft (el 759.0 ft) consisting of soft to hard sandy lean clay (CL) and very loose to loose clayey sand (SC). Beneath the fill, Borings B-1 and B-2 encountered black sandy organic silt (OL), a possible buried topsoil, to a depth of 8.0 ft (el 756.5 ft). Beneath the organic silt, Boring B-1 encountered very loose to medium dense black clayey sand (SC) with peat lenses to a depth of 17.0 ft (el 747.5 ft) and medium dense to dense brown poorly graded sand with silt (SP-SM) or poorly graded sand (SP) to the explored depth of 25.0 ft (el 739.5 ft). Beneath the organic silt, Boring B-2 encountered very loose gray clayey sand (SC) to a depth of 12.0 ft (el 752.5 ft) and medium dense brown poorly graded sand with silt (SP-SM) or poorly graded sand (SP) to the explored depth of 25.0 ft (el 739.5 ft).

Organic content and moisture content testing were performed on samples from Borings B-1 and B-2. Samples obtained from the sandy organic silt (OL) layer in each boring at a depth of 8.0 ft (el 756.5 ft) measured organic contents ranging from 3.9 to 8.3 percent and moisture contents ranging from 31.8 to 71.0 percent. The sample taken from the black clayey sand (SC) with peat lenses in Boring B-1 at a depth of 15.0 ft (el 749.5 ft) measured an organic content of 4.5 percent and moisture content of 39.3 percent. Moisture content testing on other samples from Borings B-1 and B-2 obtained at depths of up to 10 ft (el 754.5) measured moisture contents ranging from 11.2 to 25.5 percent. A summary of the laboratory test data is provided in the Appendix.

Seepage groundwater from saturated sand lenses was encountered in Boring B-1 at depths ranging from 8.0 to 17.0 ft (el 747.5 to 756.5 ft) and in Boring B-2 at depths ranging from 2.5 to 12.0 ft (el 752.5 to 762.0 ft). Groundwater was encountered in Boring B-1 at a depth of 17.0 ft (el 747.5 ft) and in Boring B-2 at a depth of 12.0 ft (el 752.5 ft).



### *Borings B-3 and B-4*

Borings B-3 and B-4 were drilled using hand auger methods with dynamic cone penetrometer testing and were located in the stream bed on the north and south sides of the proposed culvert. The ground surface elevation for Boring B-3, on the north side of the culvert, was 753.0 ft. The ground surface elevation for Boring B-4, on the south side of the culvert, was 761.0 ft.

The borings generally encountered medium dense brown gray poorly graded gravel with sand (GP) and met refusal at depths ranging from 0.5 to 0.8 ft on probable cobble. Borings B-3 and B-4 were re-attempted twice each (B-3A, B-3B, B-4A and B-4B) with similar results. Groundwater was encountered at a depth of 0.2 ft in Borings B-3 to B-3B.

### *Borings B-5 to B-8*

Borings B-5 to B-8 were drilled using hand auger methods with dynamic cone penetrometer testing and were located on slopes adjacent to the creek bed on the north and south sides of Nichols Drive. Ground surface elevation for Borings B-5 and B-6, on the north side of Nichols Drive, were 754.6 and 755.9 ft, respectively. Ground surface elevation for Borings B-7 and B-8, on the south side of Nichols Drive, were 765.4 and 765.2 ft, respectively.

Borings B-5 and B-6 generally encountered sandy topsoil with a loose relative density to the explored depths of 2.8 to 3.0 ft (el 751.6 to 753.1 ft). Borings B-7 and B-8 generally encountered 1.5 ft of sandy topsoil at the surface underlain by medium dense brown poorly graded sand with silt (SP-SM) with frequent peat seams to the explored depths of 3.0 to 3.5 ft (el 761.9 to 762.2 ft). In each boring, occasional gravel was encountered within the topsoil and each boring met refusal on possible coarse gravel or cobble. Groundwater was not encountered in Borings B-5 to B-8.

Groundwater levels will fluctuate due to seasonal variations such as precipitation, snowmelt, nearby river or lake levels and other factors that may not be evident at the time of measurement. Groundwater levels may be different at the time of construction.

The relative density of granular soil is based on recorded SPT or DCP N-values, while the consistency of cohesive soil is based on both recorded SPT N-values and on estimates of the unconfined compressive strength obtained with a calibrated penetrometer.

This section has provided a generalized description of the encountered subsurface soil conditions. The boring logs located in the Appendix should be reviewed for detailed soil descriptions. A generalized subsurface profile, Figure No. 2, has been prepared which displays the boring information along an axis perpendicular to the culvert alignment. Some variation between boring locations may be expected.



## CONCLUSIONS AND RECOMMENDATIONS

We expect the organic soil consisting of organic silt and the peat lenses encountered in our investigation between elevations 747.5 and 759.0 ft were a contributing factor to the deterioration of the existing culverts. Since the organic silt and peat was encountered beneath the existing culvert elevations, as the organic material decayed it would have consolidated and settled, likely causing the overlying culvert structures to settle, deform and break.

In general, support of the proposed concrete box culvert and poured concrete walls on conventional shallow foundations with bearing elevations ranging from 754.0 to 757.0 ft is expected to be feasible; however, due to the existing fill, very loose sand and organic soil consisting of organic silt and peat encountered to elevations ranging from 747.5 to 752.5 ft, subgrade improvement is expected to be required prior to installation of structures.

Subgrade improvement is expected to include undercuts on the order of 5 to 10 ft below the bearing elevation of the structures to remove unsuitable fill and organic soil full-depth. We recommend that further investigation by test pit excavation be undertaken prior to construction to delineate the extent and removal quantity of the unsuitable soil.

Given the groundwater encountered within our investigation relative to the possible undercut depths, a steel sheet piling cofferdam system may be necessary depending on groundwater levels at the time of construction to both control groundwater seepage into the excavation and to retain soil. If required, the cofferdam system should be designed by the Contractor with the design submittal stamped by a State of Michigan P.E. and submitted to the Engineer a minimum of two weeks prior to start of work for review.

The removal of soil for installation of the box culvert is expected to result in a net zero or net stress decrease on the soil underlying the culvert, with the exception of the proposed culvert wing wall foundations which have recommendations for their structural elements provided in the following section. Considering appropriate subgrade improvement is undertaken beneath the box culvert as described in this report, a minimum safety factor to resist bearing capacity of 3.0 and settlement of less than 1 inch is anticipated for the culvert.



## Foundations

A conventional shallow continuous and spread foundation system is recommended for support of the proposed culvert wing walls. It is important that the recommendations of this report, in-particular those pertaining to subgrade preparation, construction observation and testing, be implemented during design and construction.

The following parameters are recommended for foundation design:

Foundation Design Parameters

Bearing pressure for culvert wing walls, maximum net allowable, psf	2,000
Minimum anticipated foundation width, inches	60
Minimum embedment depth for frost protection, inches	42

Foundations are expected to bear on approved engineered fill following full depth removal of existing unsuitable fill and organic soil consisting of organic silt and peat. Foundations may bear on native granular soil provided it is prepared appropriately and confirmed to not contain deleterious material which may affect the culvert's performance. Subgrade preparation recommendations are contained in the following section.

Foundation recommendations presented herein are based on a safety factor to resist bearing capacity failure of at least 3.0 and a maximum anticipated total foundation settlement of 1 inch or less.

## Below-Grade Walls

The lateral earth pressure against below-grade walls is a function of the rigidity of the wall, the nature of the backfill material, the slope of the top surface of the retained soil and surcharge loads.

For design of below-grade rigid walls with horizontal front and backslopes, the following soil parameters may be used:

Rigid Wall Lateral Earth Pressures

Coefficient of at-rest earth pressure	0.47
Coefficient of passive earth pressure	1.5
Friction angle of backfill	32 degrees
Total unit weight of backfill	120 pcf
Friction angle between rough concrete & sand	24 degrees

The at-rest pressure is recommended for relatively rigid walls, such as culvert walls, due to the lack of minor movement that is necessary to reduce the applied pressure from the at-rest to the active condition.



For design of cantilever retaining walls, the following soil parameters may be used:

Cantilever Wall Lateral Earth Pressures

Coefficient of active earth pressure	0.33
Coefficient of passive earth pressure	3.0
Friction angle of backfill	32 degrees
Total unit weight of backfill	120 pcf
Friction angle between smooth concrete & sand	20 degrees
Friction angle between rough concrete & sand	24 degrees

Any possible surcharge loads should be included in the design of all earth-retaining structures.

Site and Subgrade Preparation

Any topsoil, vegetation, roots, organic soil including organic silt and peat and any other miscellaneous debris should be removed from within the proposed construction areas. The limits of the proposed construction area, prior to the placement of any structures or engineered fill material, should be proof-rolled and, where granular soil is present, compacted in the upper 12 inches using suitable compaction equipment to at least 95 percent of the soil's maximum ASTM D 1557 dry density by the contractor. Proof-rolling is defined as the passing of relatively heavy construction equipment over the soil subgrade under observation by the Geotechnical Engineer. The response of the soil, when subjected to the applied load, is subjectively evaluated by our staff with respect to its ability to support the overlying soil or structure. In areas where excessive deflection is observed, special subgrade preparation measures may be recommended to provide an acceptable subgrade condition. These measures may consist of compaction of the subgrade at moisture contents close to the optimum value, undercutting affected areas and replacing with engineered fill, use of a geotextile separation fabric or some combination of these measures.

Due to the fill, very loose sand and organic soil consisting of organic silt and peat encountered in the field investigation to elevations ranging from 747.5 to 752.5 ft and due to variations that may exist between borings, it is expected that some form of subgrade improvement will be required to provide suitable foundation bearing conditions. Subgrade improvement may include, but not be necessarily limited to, densification of existing soil in-place or excavation of all unsuitable material to an approved subgrade and replacement with engineered fill. If overexcavation is selected, it should encompass soil within the stress influence region of the foundation, defined as a region bordered by 2V:1H planes extending down and away from the bottom edge of the foundation to the approved bearing stratum. We expect fill and organic soil consisting of organic silt and peat will be overexcavated and very loose sand without organics may either be overexcavated or densified in-place.

The foundation subgrade should be inspected and tested by qualified geotechnical personnel familiar with the geotechnical recommendations. As part of the inspection and testing, the subgrade at each individual bearing element should be verified to be consistent with the



conditions encountered in this investigation and the indicated recommended allowable bearing pressures. This testing should include the verification of acceptable unconfined compressive strengths in cohesive soil and a dynamic cone penetrometer (ASTM STP 399) to verify minimum relative densities and equivalent N-values in granular soil. Care should be taken to maintain the natural moisture content of clayey subgrade soil which may become soft when saturated from rainfall, etc.

Engineered fill is approved on-site or imported soil placed in uniform layers and compacted to a minimum required density. Imported fill should meet the requirements for MDOT Class II granular material. MDOT Class II soil should be used as backfill against below-grade walls and foundations.

Granular engineered fill and backfill should be compacted to at least 95 percent of the soil's maximum dry density as determined by the Modified Proctor test (ASTM D1557). Vibratory compaction methods are typically found to be most effective in granular soils, however, relatively light equipment should be used adjacent to retaining or culvert walls to avoid overstressing the walls. The fill should be placed and compacted in horizontal layers not exceeding 9 inches. Field density tests (ASTM D2922) should be taken on each lift, as the fill is being placed, to verify compliance with compaction specifications. If the earthwork takes place during winter months, fill must not be placed on frozen ground and fill with frozen conglomerations of soil must not be used.

Because the site has been previously developed, there may be buried items not encountered in our borings related to the existing culvert which may cause settlement problems. The contract documents should reflect that it is necessary to remove or relocate such structures and to fill the excavation with engineered fill.

### Groundwater

Groundwater was encountered in Boring B-1 at a depth of 17.0 ft (el 747.5 ft) and in Boring B-2 at a depth of 12.0 ft (el 752.5 ft), and the nearby Huron River was observed with a water level near elevation 751 ft. Seepage groundwater or possibly perched groundwater was encountered in Borings B-1 to B-3B at elevations ranging from 752.8 to 762.0 ft.

Groundwater will be encountered during construction and suitable control of groundwater should be anticipated and planned for accordingly before the start of construction. The contractor should be responsible for selecting and implementing an appropriate groundwater control system. The contractor should have previous dewatering experience on sites with similar conditions. Suitable silt and sediment traps should be incorporated into the dewatering system.

To prevent the accumulation of water and resulting hydrostatic pressure along below-grade walls, a footing drain should be included in the design.



### Slopes and Temporary Excavations

The owner and the contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including current OSHA excavation and trench safety standards. Construction site safety generally is the sole responsibility of the contractor. The contractor shall also be solely responsible for the means, methods, techniques, sequences and operations of construction operations. We are providing the following information solely as a service on this project and, under no circumstances, should our provision of the following information be construed to mean that we are assuming responsibility for construction site safety or the contractor's activities; such responsibility is not implied and should not be inferred.

The contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations; e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. For this site, the overburden soil encountered in our exploratory program is primarily granular. We anticipate that OSHA will classify these materials as Type C. OSHA recommends a maximum slope inclination of 1 ½H:1V for this type of soil under ideal conditions. If any excavation is extended to a depth of more than 20 ft, OSHA requires that the side slopes of such excavation be designed by a professional engineer registered in the State of Michigan.

As an alternative to temporary slopes, vertical excavations can be temporarily shored. The contractor or the specialty subcontractor should be responsible for the design of the temporary shoring in accordance with applicable regulatory requirements. Temporary shoring may consist of a steel sheet pile cofferdam system depending on groundwater elevations at the time of construction and the Contractor's selected means and methods.

### CLOSURE

In this report, descriptions of the geotechnical investigation, encountered conditions and recommendations for the design of foundations and earth-related structures have been presented. The limitations of this study are described in the Appendix.

The recommendations presented in this report are based upon a limited number of subsurface samples obtained from various sampling locations. The samples may not fully indicate the nature and extent of the variations that actually exist between sampling locations. For that reason, among others, we strongly recommend that a qualified geotechnical firm be retained to observe earthwork construction. If variations or other latent conditions become evident during construction, it will be necessary for us to review these conditions and our recommendations as appropriate.



We appreciate the opportunity to provide this service to you on this project. Should you have any questions or require further assistance, please contact our office.

Sincerely,

**MATERIALS TESTING CONSULTANTS, INC.**

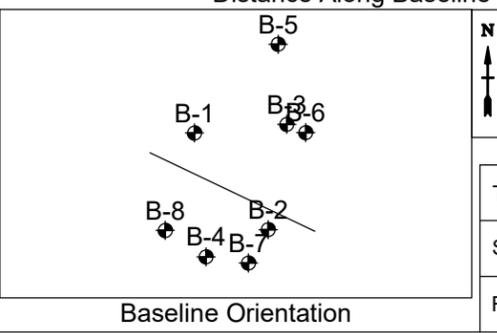
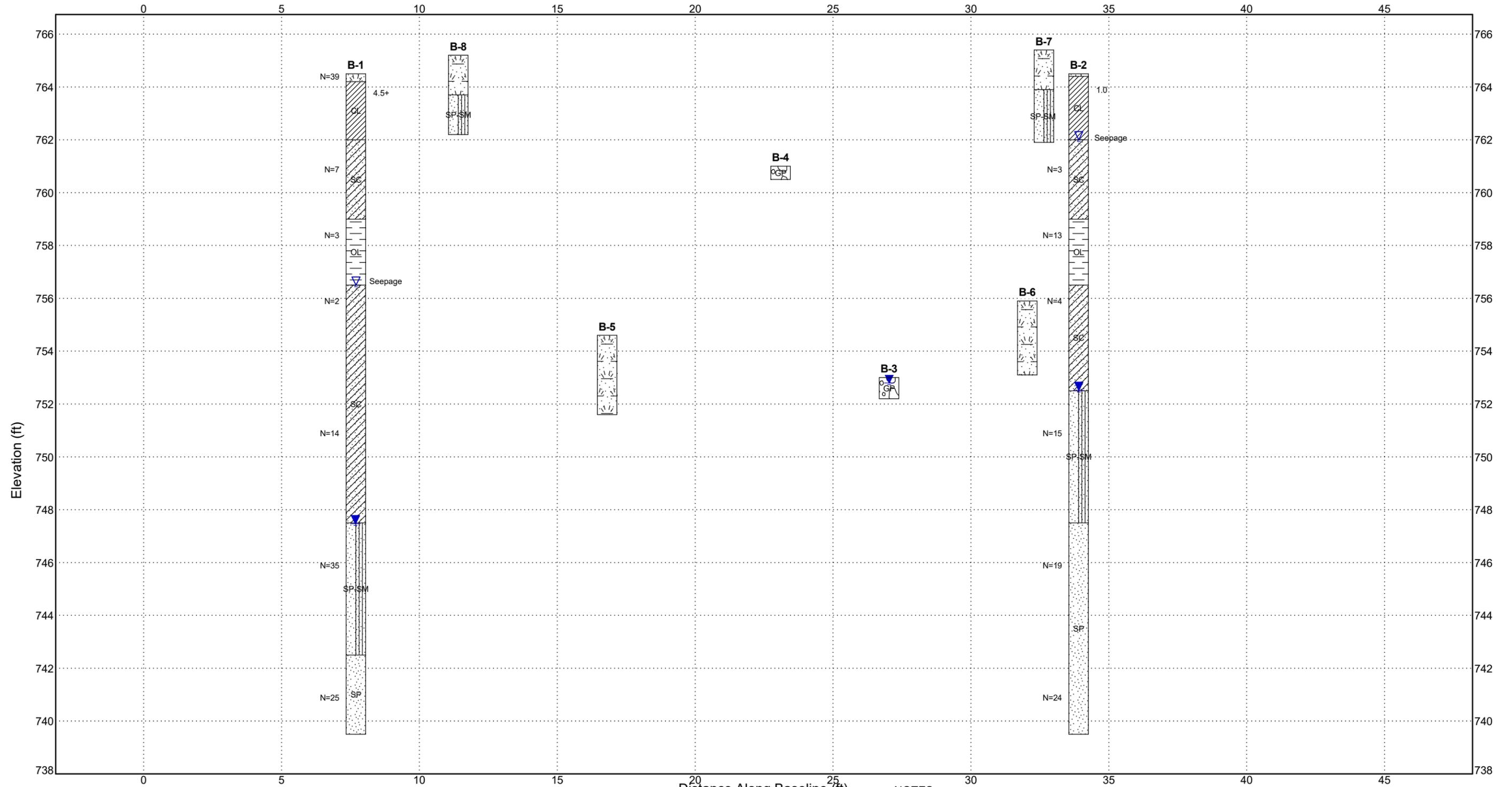
Robert J. Warren, P.E.  
Project Manager

Todd D. Munger, P.E.  
Senior Project Manager



- Attachments:
- Figure No. 1 - Boring Location Plan
  - Figure No. 2 - Generalized Subsurface Profile
  - Appendix
    - Limitations
    - Test Drilling and Sampling Procedures
    - Boring Log Terminology and Classification Outline
    - Boring Logs
    - Summary of Laboratory Test Data





NOTES:  
 1. SUBSURFACE CONDITONS ARE GENERALIZED. REFER TO BORING LOGS FOR SPECIFIC DESCRIPTIONS.  
 2. CONDITIONS BETWEEN BORINGS AND GROUNDWATER ELEVATIONS BETWEEN BORINGS MAY VARY.

TITLE: GENERALIZED SUBSURFACE PROFILE			PROJECT: SCHOOLGIRL'S GLEN - NICHOLS DRIVE CULVERT REPLACEMENT	
SCALE: VISUAL	DATE: 3-15-21	PROJECT NO.: 201675	<b>Materials Testing Consultants, INC</b>	
FIG. NO.: 2	DR. BY: RW	REV. BY: RW		



## *APPENDIX*

- Limitations
- Test Drilling and Sampling Procedures
- Boring Log Terminology and Classification Outline
- Boring Logs
- Summary of Laboratory Test Data



## LIMITATIONS

### Soil Variations

The recommendations in this report are based upon the data obtained from the soil borings. This report does not reflect variations which may occur between these borings, and which would not become evident until construction. If variations then become evident, it would be necessary for a re-evaluation of recommendations of this report, after performing on-site observations.

### Warranties

We have prepared this report in accordance with generally accepted soil and foundation engineering practices. We make no other warranties, either expressed or implied, as to the professional advice provided under the terms of our agreement and included in this report. This report is prepared exclusively for our client and may not be relied upon by other parties without written consent from our office.

### Boring Logs

In the process of obtaining and testing samples and preparing this report, we follow reasonable and accepted practice in the field of soil engineering. Field logs maintained during drilling describe field occurrences, sampling locations, and other information. The samples obtained in the field are subjected to additional testing in the laboratory and differences may exist between the field logs and the final logs. The engineer reviews the field logs and laboratory test data, and then prepares the final boring logs. Our recommendations are based on the contents of the final logs.

### Review of Design Plans and Specifications

In the event that any changes in the design of the building or the location, however slight, are planned, our recommendations shall not be considered valid unless modified or approved in writing by our office. We recommend that we be provided the opportunity to review the final design and specifications in order to determine whether changes in the original concept may have affected the validity of our recommendations, and whether our recommendations have, in fact, been implemented in the design and specifications.



## TEST DRILLING AND SAMPLING PROCEDURES

### Test Drilling Methods:

- Hollow stem auger, ASTM D6151
- Mud rotary, ASTM D5783
- Casing advancer, ASTM D5872
- Rock coring, ASTM D2113
- Cone Penetration Testing, ASTM D5778

*Note: Cone penetration test data can be used to interpret subsurface stratigraphy and can provide data on engineering properties of soils. The ASTM procedure does not include a procedure for determining soil classification from CPT testing. Soil classifications shown on CPT logs are based on published procedures and are not based on physical ASTM soil classification tests.*

### Sampling Methods:

- SPT, ASTM D1586, CME Auto hammer (140 lb., 30" drop, 2" OD split spoon sampler)
- Thin-walled tube sampler (Shelby), ASTM D1587

*Note: The number of hammer blows required to drive the SPT sampler 12 inches, after seating 6 inches, is termed the soil N-value and provides an indication of the soil's relative density and strength parameters at the sample location. SPT blow counts in 6 inch increments are recorded on the boring logs.*

### Drill Rig:

- CME 45
- CME 750 Rubber tired (ATV)
- CME 95 Truck
- Geoprobe Direct Push
- Geoprobe Rotary Sonic

### Boreholes Backfilled With:

- Excavated soil
- Cement bentonite grout
- Piezometer or Monitoring Well (see notes on logs)
- Concrete or asphalt patch where appropriate

### Sample Handling and Disposition:

- SPT samples labeled, placed in jars, returned to MTC Laboratory
- Discard after 60 days



# BORING LOG TERMINOLOGY AND ASTM D 2488 CLASSIFICATION OUTLINE

## TERMS DESCRIBING CONSISTENCY OR CONDITION

**COARSE-GRAINED SOILS** (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 5
Loose	15 to 35 %	5 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

Per ASTM D2487, the following conditions must be met based on laboratory testing to justify the label 'well graded' in a soil description.

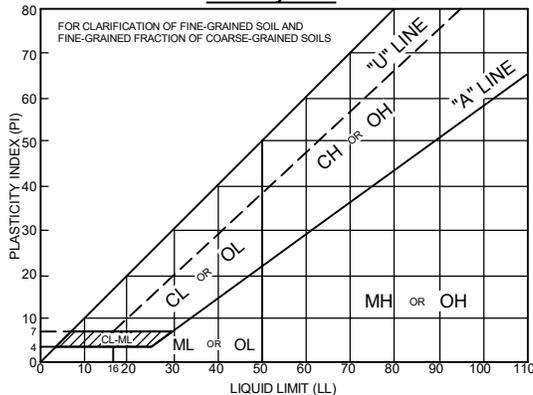
Gravel:  $C_U = \frac{D_{60}}{D_{10}}$  greater than 4;  $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$  between 1 and 3

Sand:  $C_U = \frac{D_{60}}{D_{10}}$  greater than 6;  $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$  between 1 and 3

**FINE-GRAINED SOILS** (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength TSF	SPT Blow Count
Very soft	< 0.25	< 2
Soft	0.25 to 0.5	2 to 4
Medium stiff	0.5 to 1.0	4 to 8
Stiff	1.0 to 2.0	8 to 15
Very stiff	2.0 to 4.0	15 to 30
Hard	> 4.0	> 30

**Plasticity Chart**



MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LESS THAN 15% FINES	GW	WELL-GRADED GRAVELS WITH OR WITHOUT SAND
		GRAVELS WITH 15% OR MORE FINES	GP	POORLY-GRADED GRAVELS WITH OR WITHOUT SAND
			GM	SILTY GRAVELS WITH OR WITHOUT SAND
		GC	CLAYEY GRAVELS WITH OR WITHOUT SAND	
	SANDS MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 15% FINES	SW	WELL-GRADED SANDS WITH OR WITHOUT GRAVEL
			SP	POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL
		SANDS WITH 15% OR MORE FINES	SP-SM	POORLY-GRADED SANDS WITH SILT WITH OR WITHOUT GRAVEL
			SM	SILTY SANDS WITH OR WITHOUT GRAVEL
		SC	CLAYEY SANDS WITH OR WITHOUT GRAVEL	
		FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS	ML
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL			
OL	ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL			
SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%	MH		INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL	
	CH		INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL	
OH	ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL			
HIGHLY ORGANIC SOILS		PT/OL	PEAT AND OTHER HIGHLY ORGANIC SOILS	

## GENERAL NOTES

- Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- "Grades with" or "Grades without" may be used to describe soil when characteristics vary within a stratum.
- Preserved soil samples will be discarded after 60 days unless alternate arrangements have been made.

## GROUNDWATER OBSERVATIONS:

**During** - indicates water level encountered during the boring  
**End** - indicates water level immediately after drilling  
**Date and Depth** - Measurements at indicated date

## SAMPLE TYPES AND NUMBERING

S	SPT, split barrel sample, ASTM D1586
U	Shelby tube sample, ASTM D1587
R	Rock core run
*S	Other than 2" split barrel sample
L	SPT with liner, ASTM D1586
A	Auger cuttings
G	Geoprobe liner

## MINOR COMPONENT QUANTIFYING TERMS

Less than 5%	TRACE
5 to 10%	FEW
15 to 25%	LITTLE
30 to 40%	SOME
50 to 100%	MOSTLY

## GRAIN SIZE

BOULDER	>12"
COBBLE	12" to 3"
COARSE GRAVEL	3" to 0.75"
FINE GRAVEL	0.75" to No. 4
COARSE SAND	No. 4 to No. 10
MEDIUM SAND	No. 10 to No. 40
FINE SAND	No. 40 to No. 200



# LOG OF BORING

**Project No.:** 201675

**Boring No.:** B-1

**Sheet:** 1 of 1

**Project:** Schoolgirl's Glen - Nichols Drive Culvert Replacement

**Client:** Fishbeck

**Location:** Ann Arbor, Michigan

**Drill Type:** CME 45

**Crew Chief:** ZM      **Field Eng.:** JS      **Rev. By:** RW

**Coordinates:** N=285984.8 E=13297135.8 (MI South lift)

**Elevation:** 764.5 ft      **Datum:** NAVD 88 (GPS Observation)

**Notes:**

**Date Begin:** 02/22/2021

**Date End:** 02/22/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 1/4"	During	8.0
Sampler	SPT	2"	End	5.6*
Core			Seepage	8.0
Tube			Date	Depth, ft.
SPT Hammer	Auto			

**Plugging Record:** Backfilled borehole with compacted cuttings. Cave in at 6.6 ft.

**Depth Drilled:** 25.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP =** Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
763.5	1	S-1	1.5	13-24-15 N=39	CL	4" Clayey Topsoil	0.3	4.5+	11.5	Fill: 0' to 5.5'
762.5	2					Brown to black sandy CLAY; mostly clayey fines, some coarse to fine sand, moist, Fill	2.5			
761.5	3	S-2	1.5	2-4-3 N=7	SC	Brown clayey SAND; mostly coarse to fine sand, little clayey fines, moist, Fill	5.5	11.2	31.8	S-3: Organic content = 3.9%
760.5	4									
759.5	5	S-3	1.5	3-2-1 N=3	OL	Black sandy organic SILT; mostly silty fines, some coarse to fine sand, trace organic fines, moist, possible buried topsoil	8.0	39.3	39.3	S-4: Poor recovery; possible coarse gravel / COBBLE *Charged augers with water at 10.0'
758.5	6									
757.5	7	S-4	0.2	1-1-1 N=2	SC	Black clayey SAND; mostly coarse to fine sand, some clayey fines, moist with occasional peat lenses and wet sand lenses	17.0	22.0	22.0	S-5: Organic content = 4.5%
756.5	8									
755.5	9	S-5	1.5	7-7-7 N=14	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few coarse to fine gravel, wet	22.0	22.0	22.0	S-6: First sampler had no recovery, second attempt taken.
754.5	10									
753.5	11	S-6	1.5	13-17-18 N=35	SP	Brown poorly graded SAND; mostly coarse to fine sand, wet	25.0	25.0	25.0	End of Boring
752.5	12									
751.5	13	S-7	1.5	7-10-15 N=25	SP		25.0	25.0	25.0	
750.5	14									
749.5	15									
748.5	16									
747.5	17									
746.5	18									
745.5	19									
744.5	20									
743.5	21									
742.5	22									
741.5	23									
740.5	24									
739.5	25									

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

**Project No.:** 201675

**Boring No.:** B-2

**Sheet:** 1 of 1

**Project:** Schoolgirl's Glen - Nichols Drive Culvert Replacement

**Client:** Fishbeck

**Location:** Ann Arbor, Michigan

**Drill Type:** CME 45

**Crew Chief:** ZM      **Field Eng.:** JS      **Rev. By:** RW

**Coordinates:** N=285961.4 E=13297153.7 (MI South lift)

**Elevation:** 764.5 ft      **Datum:** NAVD 88 (GPS Observation)

**Notes:**

**Date Begin:** 02/22/2021

**Date End:** 02/22/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 1/4"	During	2.5
Sampler	SPT	2"	End	2.5*
Core			Seepage	2.5
Tube			Date	Depth, ft.
SPT Hammer	Auto			

**Plugging Record:** Backfilled borehole with compacted cuttings. Cave in at 9.5 ft.

**Depth Drilled:** 25.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP =** Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
763.5	1	S-1	0.4	50/5"	CL	1" Clayey Topsoil	0.1	1.0	16.9	Fill: 0' to 5.5' S-1: Poor recovery; possible coarse gravel / COBBLE
762.5	2					Brown sandy CLAY; mostly clayey fines, some coarse to fine sand, few coarse to fine gravel, moist, Fill	2.5			
761.5	3									
760.5	4	S-2	1.5	5-2-1 N=3	SC	Gray clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill with occasional peat and wet sand lenses	5.5	25.5		
759.5	5									
758.5	6	S-3	1.5	8-7-6 N=13	OL	Black sandy organic SILT; mostly silty fines, some coarse to fine sand, few organic fines, moist, possible buried topsoil	8.0	71.0	S-3: Organic content = 8.3%	
757.5	7									
756.5	8									
755.5	9	S-4	1.5	3-2-2 N=4	SC	Gray clayey SAND; mostly coarse to fine sand, some clayey fines, moist with occasional wet sand lenses	12.0	13.0		
754.5	10									
753.5	11	S-5	1.5	7-7-8 N=15	SP-SM	Brown poorly graded SAND with silt; mostly medium to fine sand, few silty fines, wet	17.0	17.0		*Charged augers with water at 15.0'
752.5	12									
751.5	13									
750.5	14									
749.5	15									
748.5	16	S-6	1.5	7-9-10 N=19	SP	Brown poorly graded SAND; mostly coarse to fine sand, wet	25.0	25.0		
747.5	17									
746.5	18									
745.5	19									
744.5	20	S-7	1.5	11-11-13 N=24						
743.5	21									
742.5	22									
741.5	23									
740.5	24									
739.5	25									

End of Boring

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

Project No.: 201675

Boring No.: B-3

Sheet: 1 of 1

Project: Schoolgirl's Glen - Nichols Drive Culvert Replacement

Client: Fishbeck

Location: Ann Arbor, Michigan

Drill Type: Hand Auger

Crew Chief: Field Eng.: JS Rev. By: RW

Coordinates: N=285986.9 E=13297158.2 (MI South 1ft)

Elevation: 753.0 ft Datum: NAVD 88 (GPS Observation)

Notes:

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 02/23/2021

Date End: 02/23/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	0.2
Sampler	Hand Auger	3 1/4"	End	0.2
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 0.8 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
752.8	0.25	A-1		10	GP	Brown gray poorly graded GRAVEL with sand; mostly coarse to fine gravel, some coarse to fine sand, moist Grades wet at 0.2'	0.8			
752.5	0.50									
752.3	0.75									
						End of Boring				Auger refusal at 0.8' due to probable COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

Project No.: 201675

Boring No.: B-3A

Sheet: 1 of 1

Project: Schoolgirl's Glen - Nichols Drive Culvert Replacement

Client: Fishbeck

Location: Ann Arbor, Michigan

Drill Type: Hand Auger

Crew Chief: Field Eng.: JS Rev. By: RW

Coordinates: N=285988.9 E=13297158.2 (MI South 1ft)

Elevation: 753.0 ft Datum: NAVD 88 (GPS Observation)

Notes:

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 02/23/2021

Date End: 02/23/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	0.2
Sampler	Hand Auger	3 1/4"	End	0.2
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 0.8 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
752.8	0.25			10		Brown gray poorly graded GRAVEL with sand; mostly coarse to fine gravel, some coarse to fine sand, moist Grades wet at 0.2'				
752.5	0.50				GP					
752.3	0.75						0.8			
						End of Boring				Auger refusal at 0.8' due to probable COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

**Project No.:** 201675

**Boring No.:** B-3B

**Sheet:** 1 of 1

**Project:** Schoolgirl's Glen - Nichols Drive Culvert Replacement

**Client:** Fishbeck

**Location:** Ann Arbor, Michigan

**Drill Type:** Hand Auger

**Crew Chief:** Field Eng.: JS      **Rev. By:** RW

**Coordinates:** N=285983.9 E=13297158.2 (MI South 1ft)

**Elevation:** 753.0 ft      **Datum:** NAVD 88 (GPS Observation)

**Notes:**

**Plugging Record:** Backfilled borehole with compacted cuttings.

**Date Begin:** 02/23/2021

**Date End:** 02/23/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	0.2
Sampler	Hand Auger	3 1/4"	End	0.2
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

**Depth Drilled:** 0.8 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP =** Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
752.8	0.25			11		Brown gray poorly graded GRAVEL with sand; mostly coarse to fine gravel, moist Grades wet at 0.2'				
752.5	0.50				GP					
752.3	0.75						0.8			
						End of Boring				Auger refusal at 0.8' due to probable COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

Project No.: 201675

Boring No.: B-4

Sheet: 1 of 1

Project: Schoolgirl's Glen - Nichols Drive Culvert Replacement

Client: Fishbeck

Location: Ann Arbor, Michigan

Drill Type: Hand Auger

Crew Chief: Field Eng.: JS Rev. By: RW

Coordinates: N=285954.8 E=13297138.6 (MI South 1ft)

Elevation: 761.0 ft Datum: NAVD 88 (GPS Observation)

Notes:

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 02/23/2021

Date End: 02/23/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 0.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
760.8	0.25	A-1			GP	Brown gray poorly graded GRAVEL with sand; mostly coarse to fine gravel. some coarse to fine sand, moist				
760.5	0.50						0.5			
						End of Boring				Auger refusal at 0.5' due to probable COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

Project No.: 201675

Boring No.: B-4A

Sheet: 1 of 1

Project: Schoolgirl's Glen - Nichols Drive Culvert Replacement

Client: Fishbeck

Location: Ann Arbor, Michigan

Drill Type: Hand Auger

Crew Chief: Field Eng.: JS Rev. By: RW

Coordinates: N=285956.8 E=13297138.6 (MI South 1ft)

Elevation: 761.0 ft Datum: NAVD 88 (GPS Observation)

Notes:

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 02/23/2021

Date End: 02/23/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 0.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
760.8	0.25				GP	Brown gray poorly graded GRAVEL with sand; mostly coarse to fine gravel, some coarse to fine sand, moist	0.5			
760.5	0.50									
						End of Boring				Auger refusal at 0.5' due to probable COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

Project No.: 201675

Boring No.: B-4B

Sheet: 1 of 1

Project: Schoolgirl's Glen - Nichols Drive Culvert Replacement

Client: Fishbeck

Location: Ann Arbor, Michigan

Drill Type: Hand Auger

Crew Chief: Field Eng.: JS Rev. By: RW

Coordinates: N=285951.8 E=13297138.6 (MI South 1ft)

Elevation: 761.0 ft Datum: NAVD 88 (GPS Observation)

Notes:

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 02/23/2021

Date End: 02/23/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 0.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
760.8	0.25				GP	Brown gray poorly graded GRAVEL with sand; mostly coarse to fine gravel, some coarse to fine sand, moist	0.5			
760.5	0.50									
						End of Boring				Auger refusal at 0.5' due to probable COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

**Project No.:** 201675

**Boring No.:** B-5

**Sheet:** 1 of 1

**Project:** Schoolgirl's Glen - Nichols Drive Culvert Replacement

**Client:** Fishbeck

**Location:** Ann Arbor, Michigan

**Drill Type:** Hand Auger

**Crew Chief:** Field Eng.: JS      **Rev. By:** RW

**Coordinates:** N=286006.3 E=13297156.1 (MI South 111)

**Elevation:** 754.6 ft      **Datum:** NAVD 88 (GPS Observation)

**Notes:**

**Plugging Record:** Backfilled borehole with compacted cuttings.

**Date Begin:** 02/24/2021

**Date End:** 02/24/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

**Depth Drilled:** 3.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP =** Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
754.4	0.25	A-1		5		Sandy Topsoil with occasional roots and few coarse to fine gravel				
754.1	0.50									
753.9	0.75									
753.6	1.00									
753.4	1.25									
753.1	1.50									
752.9	1.75									
752.6	2.00	A-2		8		End of Boring				
752.4	2.25									
752.1	2.50									
751.9	2.75									
751.6	3.00									

						End of Boring				Auger refusal at 3.0' due to possible coarse gravel / COBBLE
--	--	--	--	--	--	---------------	--	--	--	--

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

**Project No.:** 201675

**Boring No.:** B-6

**Sheet:** 1 of 1

**Project:** Schoolgirl's Glen - Nichols Drive Culvert Replacement

**Client:** Fishbeck

**Location:** Ann Arbor, Michigan

**Drill Type:** Hand Auger

**Crew Chief:** Field Eng.: JS      **Rev. By:** RW

**Coordinates:** N=285984.9 E=13297162.8 (MI South ift)

**Elevation:** 755.9 ft      **Datum:** NAVD 88 (GPS Observation)

**Notes:**

**Plugging Record:** Backfilled borehole with compacted cuttings.

**Date Begin:** 02/24/2021

**Date End:** 02/24/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

**Depth Drilled:** 2.8 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP =** Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
755.7	0.25	A-1		7		Sandy Topsoil with occsaional roots and few coarse to fine gravel				
755.4	0.50									
755.2	0.75									
754.9	1.00									
754.7	1.25									
754.4	1.50									
754.2	1.75	A-2		9						
753.9	2.00									
753.7	2.25									
753.4	2.50									
753.2	2.75						2.8			
						End of Boring				Auger refusal at 2.8' due to possible coarse gravel / COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

**Project No.:** 201675

**Boring No.:** B-7

**Sheet:** 1 of 1

**Project:** Schoolgirl's Glen - Nichols Drive Culvert Replacement

**Client:** Fishbeck

**Location:** Ann Arbor, Michigan

**Drill Type:** Hand Auger

**Crew Chief:** Field Eng.: JS      **Rev. By:** RW

**Coordinates:** N=285953.3 E=13297148.9 (MI South 1ft)

**Elevation:** 765.4 ft      **Datum:** NAVD 88 (GPS Observation)

**Notes:**

**Plugging Record:** Backfilled borehole with compacted cuttings.

**Date Begin:** 02/24/2021

**Date End:** 02/24/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

**Depth Drilled:** 3.5 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP =** Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
765.2	0.25	A-1		8		18" Sandy Topsoil with occasional roots and few coarse to fine gravel				
764.9	0.50									
764.7	0.75									
764.4	1.00									
764.2	1.25									
763.9	1.50	A-2		11	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist with frequent peat seams	1.5			
763.7	1.75									
763.4	2.00									
763.2	2.25									
762.9	2.50									
762.7	2.75									
762.4	3.00									
762.2	3.25									
761.9	3.50					3.5				
						End of Boring				Auger refusal at 3.5' due to possible coarse gravel / COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



# LOG OF BORING

**Project No.:** 201675

**Boring No.:** B-8

**Sheet:** 1 of 1

**Project:** Schoolgirl's Glen - Nichols Drive Culvert Replacement

**Client:** Fishbeck

**Location:** Ann Arbor, Michigan

**Drill Type:** Hand Auger

**Crew Chief:** Field Eng.: JS      **Rev. By:** RW

**Coordinates:** N=285961.2 E=13297128.7 (MI South 1ft)

**Elevation:** 765.2 ft      **Datum:** NAVD 88 (GPS Observation)

**Notes:**

**Plugging Record:** Backfilled borehole with compacted cuttings.

**Date Begin:** 02/24/2021

**Date End:** 02/24/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

**Depth Drilled:** 3.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP =** Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
765.0	0.25	A-1		7		18" Sandy Topsoil with occasional roots and few coarse to fine gravel				
764.7	0.50									
764.5	0.75									
764.2	1.00									
764.0	1.25									
763.7	1.50									
763.5	1.75	A-2		11	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist with frequent peat seams	1.5			
763.2	2.00									
763.0	2.25									
762.7	2.50									
762.5	2.75									
762.2	3.00									

End of Boring

Auger refusal at 3.0' due to possible coarse gravel / COBBLE

\* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



## SUMMARY OF LABORATORY TEST DATA

Boring Number	Sample No.*	Sample Depth (ft)	Sample Description (USCS Symbol)	Natural Moisture Content (%)	Organic Material (%)
B-1	S-1	0-1.5	CL	11.5	
B-1	S-2	3.5-5	SC	11.2	
B-1	S-3	6-7.5	OL	31.8	3.9
B-1	S-5	13.5-15	SC	39.3	4.5
B-2	S-1	0-1.5	CL	16.9	
B-2	S-2	3.5-5	SC	25.5	
B-2	S-3	6-7.5	OL	71.0	8.3
B-2	S-4	8.5-10	SC	13.0	

\* S – Split Spoon Sample (ASTM D 1586)

PROJECT NO.: 201675  
PAGE: 1 OF 1



## NOTICE OF AUTHORIZATION

Permit Number: WRP029128 v. 1

Date Issued: June 21, 2021

Site Name: 81 - School Girl's Glen - Nichols Drive Culvert

Expiration Date: June 21, 2026

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, specifically:

- Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- Part 301, Inland Lakes and Streams.
- Part 303, Wetlands Protection.
- Part 315, Dam Safety.
- Part 323, Shorelands Protection and Management.
- Part 325, Great Lakes Submerged Lands.
- Part 353, Sand Dunes Protection and Management.

**Authorized Activities: Remove the existing two culverts, and construct a 40.0 foot long, 8.0-foot span, 3.0 foot rise concrete box culverts at the School Girl's Glen-Nichols Drive crossing of a tributary of the Huron River. Construct cascade grade control structures over 125 linear feet of channel upstream of the culvert, and construct three step-pool grade control structures over 90 linear feet of the channel downstream of the culvert. Place one cubic yards of riprap erosion protection at the sanitary sewer structure at the upstream end of the project. Place 90 cubic yards of material within the 100-year floodplain of the Huron River. All activities shall be completed in accordance with approved plans, and conditions of this permit.**

To be conducted at property located in Washtenaw County, Waterbody: Tributary of the Huron River; Huron River, Section 28, Town 02S, Range 06E, City of Ann Arbor

Permittee:  
City of Ann Arbor  
301 East Huron Street  
Ann Arbor, Michigan 48104

John Skubinna  
Transportation Review Unit  
Water Resources Division  
517-256-1469

*This notice must be displayed at the site of work.  
Laminating this notice or utilizing sheet protectors is recommended.*  
Please refer to the above permit number with any questions or concerns.



**MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY  
WATER RESOURCES DIVISION PERMIT**

**Issued To:**

**City of Ann Arbor  
301 East Huron Street  
Ann Arbor, Michigan 48104**

Permit No: WRP029128 v.1  
Submission No.: HP7-NZAW-J7AC0  
Site Name: 81 - School Girl's Glen - Nichols Drive Culvert  
Issued: June 21, 2021  
Revised:  
Expires: June 21, 2026

This permit is being issued by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically:

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Part 301, Inland Lakes and Streams                                    | <input type="checkbox"/> Part 323, Shorelands Protection and Management |
| <input type="checkbox"/> Part 303, Wetlands Protection  | <input type="checkbox"/> Part 325, Great Lakes Submerged Lands          |
| <input type="checkbox"/> Part 315, Dam Safety   | <input type="checkbox"/> Part 353, Sand Dunes Protection and Management |
| <input checked="" type="checkbox"/> Part 31, Water Resources Protection (Floodplain Regulatory Authority) |   |

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

**Authorized Activities: Remove the existing two culverts, and construct a 40.0 foot long, 8.0-foot span, 3.0 foot rise concrete box culverts at the School Girl's Glen-Nichols Drive crossing of a tributary of the Huron River. Construct cascade grade control structures over 125 linear feet of channel upstream of the culvert, and construct three step-pool grade control structures over 90 linear feet of the channel downstream of the culvert. Place one cubic yards of riprap erosion protection at the sanitary sewer structure at the upstream end of the project. Place 90 cubic yards of material within the 100-year floodplain of the Huron River. All activities shall be completed in accordance with approved plans, and conditions of this permit.**

Waterbody Affected: Tributary of the Huron River; Huron River  
Property Location: Washtenaw County, City of Ann Arbor, Town/Range/Section 02S06E28  
Property Tax No.

**Authority granted by this permit is subject to the following limitations:**

- A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
- B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.

- C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
- D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
- E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
- F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with 2013 PA 174 (Act 174) and comply with each of the requirements of Act 174.
- G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
- H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary, to protect his rights.
- I. Permittee shall notify EGLE within one week after the completion of the activity authorized by this permit.
- J. This permit shall not be assigned or transferred without the written approval of EGLE.
- K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
- L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31 of the NREPA, and wetlands).
- M. In issuing this permit, EGLE has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, EGLE may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
- N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the state: (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the state, and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act, 1969 PA 306, as amended, challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
- O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, EGLE may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
- P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from EGLE. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by EGLE prior to being implemented.
- Q. This permit may be transferred to another person upon written approval of EGLE. The permittee must submit a written request to EGLE to transfer the permit to the new owner. The new owner must also submit a written request to EGLE to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties that includes all the above information may be provided to EGLE. EGLE will review the request and, if approved, will provide written notification to the new owner.
- R. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.

- S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
- T. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent (CEA).
- U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.
- V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
- W. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the water body are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
- X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources, Fisheries Division.
- Y. Work to be done under authority of this permit is further subject to the following special instructions and specifications:
1. Authority granted by this permit does not waive permit or program requirements under Part 91 of the NREPA or the need to acquire applicable permits from the CEA. To locate the Soil Erosion Program Administrator for your county, visit [www.mi.gov/eglestormwater](http://www.mi.gov/eglestormwater) and select "Soil Erosion and Sedimentation Control Program" under "Related Links."
  2. The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive the permittee's obligation to acquire any local, county, state, or federal approval or authorization necessary to conduct the activity.
  3. No fill, excess soil, or other material shall be placed in any wetland, floodplain, or surface water area not specifically authorized by this permit, its plans, and specifications.
  4. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.
  5. The permit placard shall be kept posted at the work site in a prominent location at all times for the duration of the project or until permit expiration.
  6. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by EGLE, will be for a five-year period beginning on the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.
  7. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.
  8. The permittee is responsible for acquiring all necessary easements or rights-of-way before commencing any work authorized by this permit. All construction operations relating to or part of this project shall be confined to the existing right-of-way limits or other acquired easements.
  9. Temporary soil erosion and sedimentation control measures shall be installed before or upon commencement of the earth change and shall be maintained daily. Temporary soil erosion and sedimentation control measures shall be maintained until permanent soil erosion and sedimentation control measures are in place and the area is stabilized. Permanent soil erosion and sedimentation control measures for all slopes, channels, ditches, or any disturbed area shall be installed within five (5) calendar days after final grading, or the final earth change has been completed.

10. All raw areas in uplands resulting from the permitted construction activity shall be effectively stabilized with sod and/or seed and mulch (or other technology specified by this permit or project plans) in a sufficient quantity and manner to prevent erosion and any potential siltation to surface waters or wetlands. Temporary stabilization measures shall be installed before or upon commencement of the permitted activity and shall be maintained until permanent measures are in place. Permanent measures shall be in place within five (5) days of achieving final grade.
11. All raw earth within 100 feet of a lake, stream, or wetland that is not brought to final stabilization by the end of the active growing season shall be temporarily stabilized with mulch blankets in accordance with the following dates: September 20<sup>th</sup> for the Upper Peninsula, October 1<sup>st</sup> for the Lower Peninsula north of US-10, and October 10<sup>th</sup> for the Lower Peninsula south of US-10.
12. This permit placard shall be kept posted at the work site, in a prominent location at all times for the duration of the project, or until permit expiration.
13. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by EGLE, will be for a five-year period beginning at the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.
14. All dredge/excavated spoils including organic and inorganic soils, vegetation, and other material removed shall be placed on upland (non-wetland, non-floodplain or non-bottomland), prepared for stabilization, revegetated and reseeded with native Michigan species appropriate to the site, and mulched in such a manner so as to prevent and ensure against erosion of any material into any waterbody, wetland, or floodplain.
15. During removal or repair of the existing structures, every precaution shall be taken to prevent debris from entering any watercourse. Any debris reaching the watercourse during the removal and/or reconstruction of the structure shall be immediately retrieved from the water. All material shall be disposed of in an acceptable manner consistent with local, state, and federal regulations.
16. Prior to the removal of the existing structures, cofferdams of steel sheet piling, gravel bags, clean stone, coarse aggregate, concrete or other acceptable barriers shall be installed to isolate all construction activity from the water. The barriers shall be maintained in good working order throughout the duration of the project. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site.
17. All cofferdam and temporary steel sheet pile shall then be removed in its entirety, unless specifically shown to be left in plan on the accepted plans. Cofferdam and sheet pile that is left in place shall be cut off at the elevation shown on the plans and shall be a minimum of one foot below the stream bottom.
18. The existing structure shall be kept open to pass flow during removal of the existing road fill.
19. The placement of the new culvert and the initial placement of fill in the watercourse shall be done immediately after removal of the existing culvert. The placement shall be conducted in such a manner that all flow is immediately passed through the new culverts, allowing the major placement of fill to be done in the dry or in still water where erosion and sedimentation will be minimized. The fill material used in this initial placement shall be washed gravel, coarse aggregate, or rock and shall be placed at both ends of the culvert to a level above normal water level before backfill material is placed.
20. The culvert shall be installed to align with the center line of the existing watercourse at both the inlet and outlet ends and must be buried below the bed to provide a natural channel substrate through the structure as shown on the approved plans.
21. Road fill side slopes shall not be steeper than 1-on-2 (1 vertical to 2 horizontal) except where headwalls of reinforced concrete, mortar masonry, dry masonry, or other acceptable methods are used.
22. Road fill side slopes terminating in the watercourses and any raw banks resulting from the construction shall be stabilized with temporary measures in accordance with appropriate Best Management

Practices based on site conditions, and if necessary, may be riprapped extending above the ordinary high-water mark, before or upon commencement of the permitted activity. Temporary stabilization measures shall be maintained until permanent measures are in place.

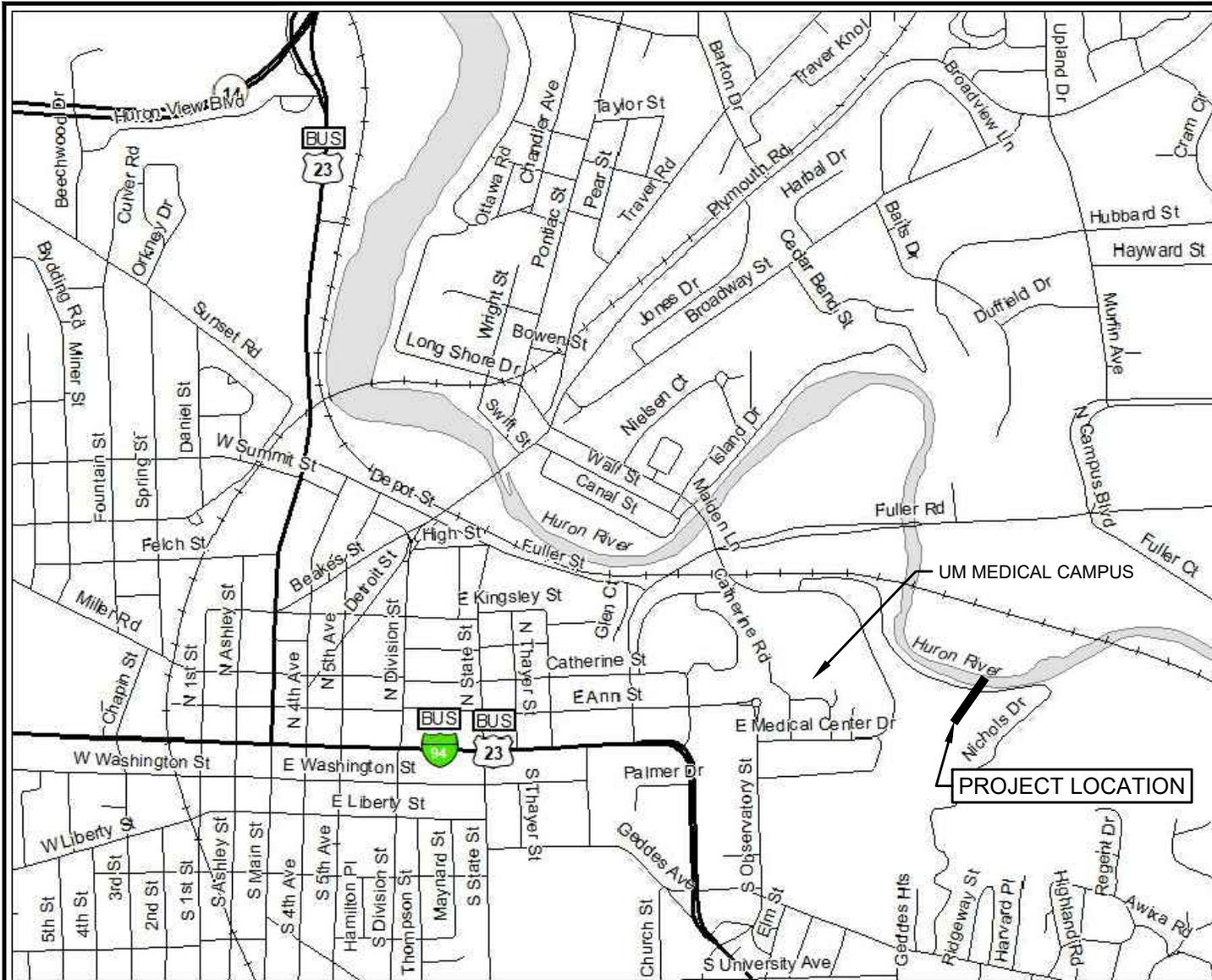
23. All other road fill slopes, ditches, and other raw areas draining directly to the watercourse may be protected with riprap, sod and/or seed and mulch as may be necessary to provide effective erosion protection. The placement of riprap shall be limited to the minimum necessary to ensure proper stabilization of the side slopes and fill in the immediate vicinity of the structure.
24. If the project, or any portion of the project, is stopped and lies incomplete for any length of time other than that encountered in a normal work week, every precaution shall be taken to protect the incomplete work from erosion, including the placement of temporary gravel bag riprap, temporary seed and mulch, or other acceptable temporary protection.
25. No work shall be done in the watercourse during periods of above-normal flows except as necessary to prevent erosion.
26. No work or dredging within the water authorized by this permit is allowed from May 1 to June 30 due to critical spawning, migration, and/or recreational use periods.



Issued By: \_\_\_\_\_

John Skubinna  
Transportation Review Unit  
Water Resources Division  
517-256-1469

cc: Washtenaw County Drain Commissioner  
Washtenaw CEA  
Ms. Cheryl Pitchford, Fishbeck  
Mr. Matt Konieczki, EGLE  
Ms. Melissa Letosky, EGLE



VICINITY MAP



CITY OF ANN ARBOR  
WASHTENAW COUNTY  
MICHIGAN

SHEET INDEX

- 1 PROJECT LOCATION
- 2 OVERALL PLAN VIEW
- 3 PROFILE VIEW
- 4 SECTION DETAILS
- 5 SECTION DETAILS
- 6 CASCADING ROCK CHANNEL DETAIL
- 7 CASCADING ROCK CHANNEL WEIR DETAIL
- 8 FIELDSTONE SPILLWAY
- 9 PLUNGE POOL COMPLEX DETAILS
- 10 PLUNGE POOL COMPLEX DETAILS



NORTH

SCHOOLGIRLS' GLEN CULVERT  
**PROJECT LOCATION**

NO SCALE

PROJECT: SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT  
 APPLICANT: CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN  
 WATERWAY: TRIBUTARY TO HURON RIVER  
 LOCATION: CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN  
 SHEET: 1 OF 10 DATE: 5/18/2021

PREPARED FOR EGLE PERMIT APPLICATION  
NOT FOR CONSTRUCTION

PROPOSED 30'Lx8'Wx3'H  
BOX CULVERT WITH  
HEADWALL AND WINGWALL  
147 CY FILL ABOVE OHWM  
62 CY CUT ABOVE OHWM  
49 CY FILL BELOW OHWM  
54 CY CUT BELOW OHWM  
168 CY FILL ABOVE FLOODPLAIN  
93 CY CUT ABOVE FLOODPLAIN  
29 CY FILL BELOW FLOODPLAIN  
23 CY CUT BELOW FLOODPLAIN

CASCADING ROCK CHANNEL WITH  
WEIR GRADE CONTROL  
58'x8'x2.7'  
46 CY FILL BELOW OHWM  
153 CY CUT BELOW OHWM  
46 CY FILL ABOVE FLOODPLAIN  
153 CY CUT ABOVE FLOODPLAIN

WEIR FIELDSTONE STABILIZATION  
3'x4.5'x2'  
1 CY FILL BELOW OHWM  
1 CY CUT BELOW OHWM  
1 CY FILL ABOVE FLOODPLAIN  
1 CY CUT ABOVE FLOODPLAIN

FIELDSTONE SPILLWAY  
12'x8'x1'  
3.5 CY FILL BELOW OHWM  
3.5 CY FILL ABOVE FLOODPLAIN

PLUNGE POOL COMPLEX  
47'x14'x2.5'  
63 CY FILL BELOW OHWM  
36 CY CUT BELOW OHWM  
63 CY FILL BELOW FLOODPLAIN  
36 CY CUT BELOW FLOODPLAIN

REMOVE  
EXISTING HEADWALL  
FUNCTIONAL CULVERT  
EXISTING 30" RCP CULVERT  
REMOVE

REMOVE EXISTING FUNCTIONAL CULVERT,  
EXISTING NON-FUNCTIONAL CULVERT, AND  
EXISTING HEADWALLS  
30'x10.9'x7.5'  
84 CY CUT ABOVE OHWM  
7 CY CUT BELOW OHWM  
85 CY CUT ABOVE FLOODPLAIN  
6 CY CUT BELOW FLOODPLAIN

NON-FUNCTIONAL CULVERT  
EXISTING 24" CLAY CULVERT  
(BULKHEADED) REMOVE

EXISTING HEADWALL  
REMOVE

HURON RIVER

NICHOLS DRIVE

CREEK ALIGNMENT

EX. 36" SAN. SEWER

HURON RIVER 100  
YR. FLOODPLAIN  
ELEV. 756.6

SCHOOLGIRLS' GLEN  
**PLAN**

SCALE: 1" = 30'



NORTH

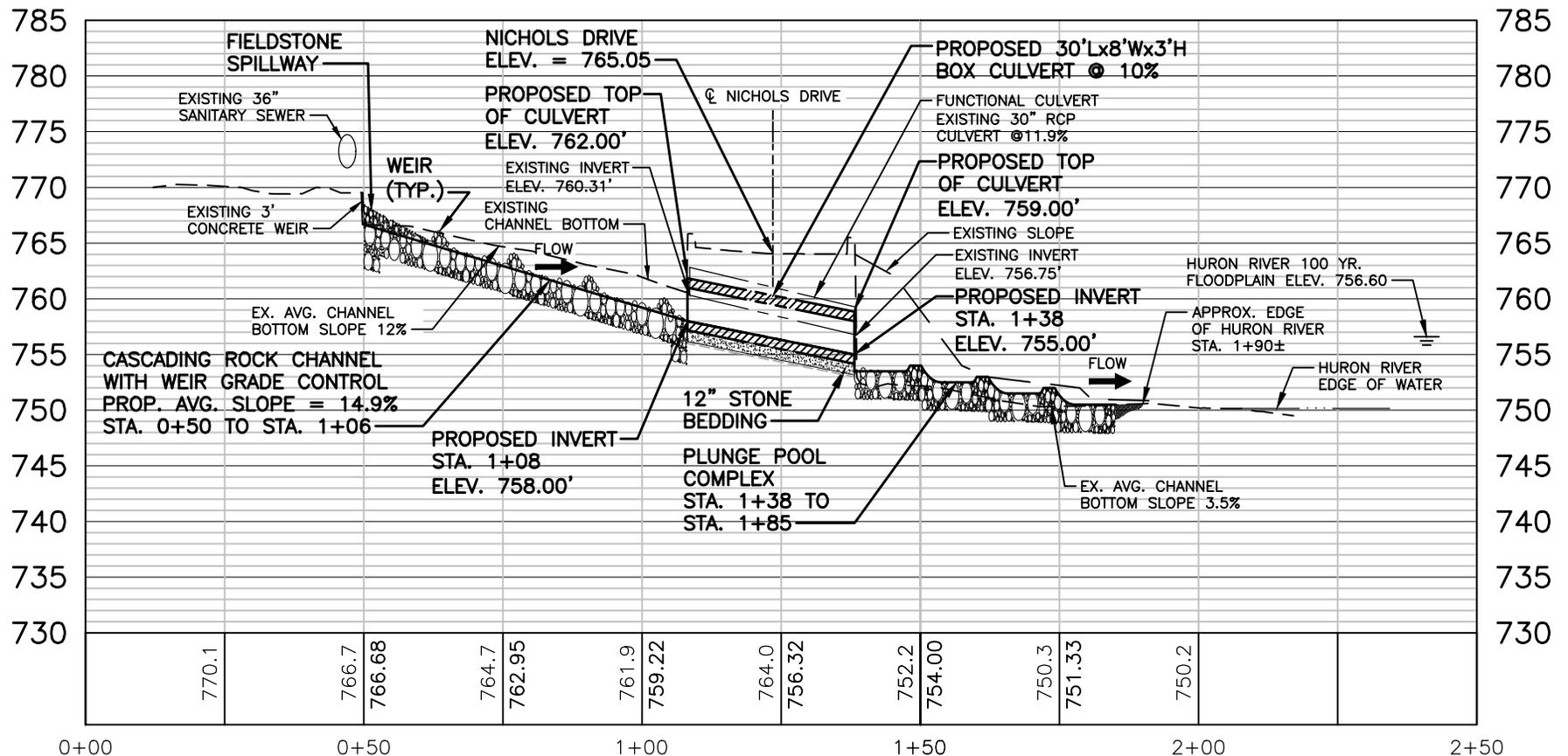


Addendum No. 1  
08/27/21

PROJECT: SCHOOLGIRLS' GLEN CULVERT  
REPLACEMENT PROJECT  
APPLICANT: CITY OF ANN ARBOR, WASHTENAW  
COUNTY, MICHIGAN  
WATERWAY: TRIBUTARY TO HURON RIVER  
LOCATION: CITY OF ANN ARBOR, WASHTENAW  
COUNTY, MICHIGAN  
SHEET: 2 OF 10 DATE: 5/18/2021

PREPARED FOR EGLE PERMIT APPLICATION  
NOT FOR CONSTRUCTION

EGLE-WRP  
WRP029128 v1.0  
Approved  
Issued On:06/21/2021  
Expires On:06/21/2026



**SCHOOLGIRLS' GLEN  
PROFILE**

SCALE: 1" = 30'



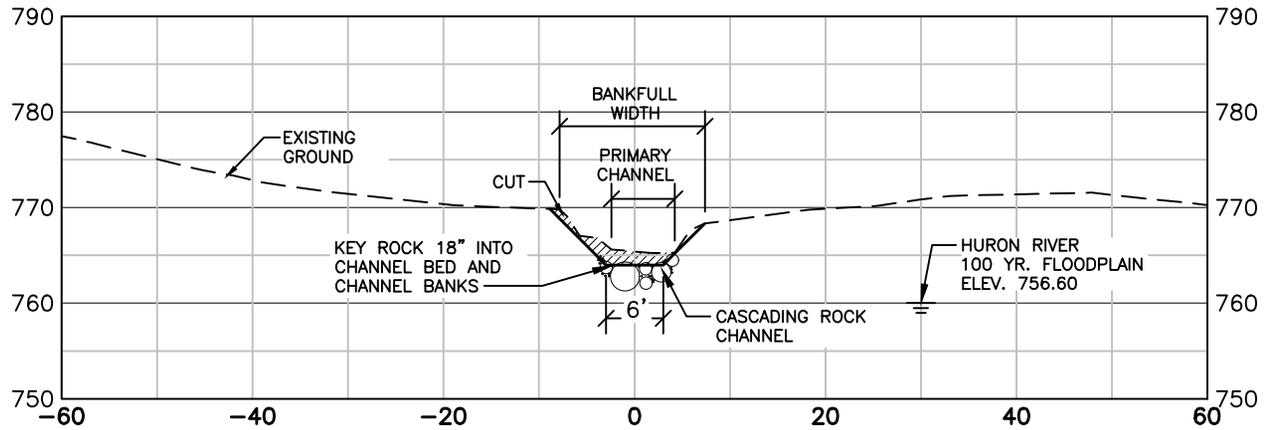
VERT. SCALE: 1" = 15'

Addendum No. 1  
08/27/21

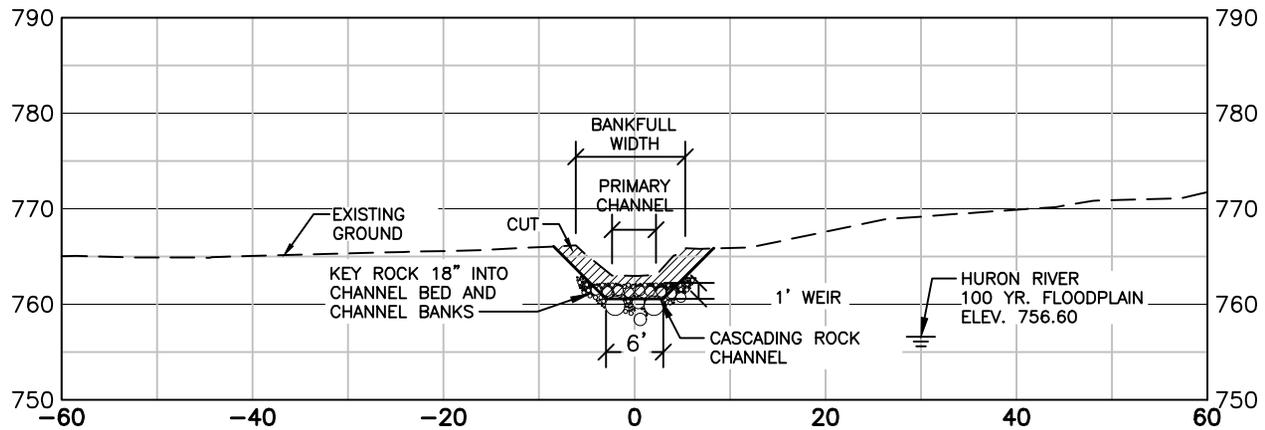
PROJECT: SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT  
 APPLICANT: CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN  
 WATERWAY: TRIBUTARY TO HURON RIVER  
 LOCATION: CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN  
 SHEET: 3 OF 10 DATE: 5/18/2021

PREPARED FOR EGLE PERMIT APPLICATION  
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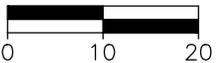
**STATION 0+68**  
LOOKING DOWNSTREAM



**STATION 0+78**  
LOOKING DOWNSTREAM

**SCHOOLGIRLS' GLEN  
SECTIONS**

SCALE: 1" = 20'



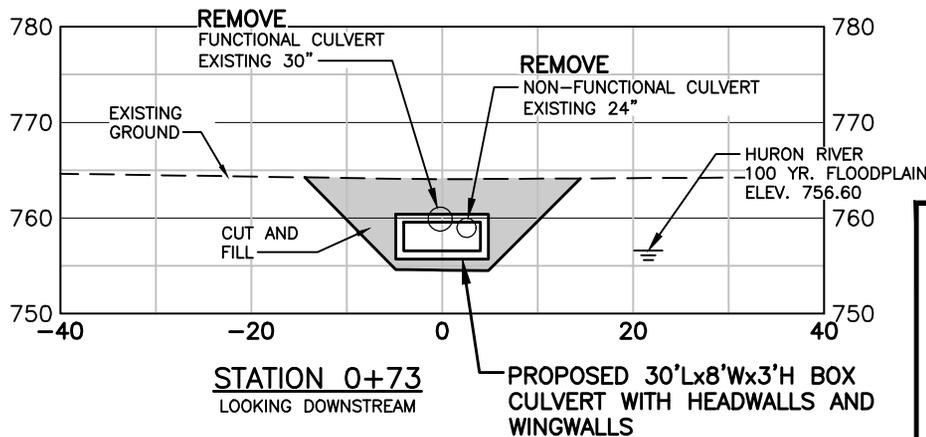
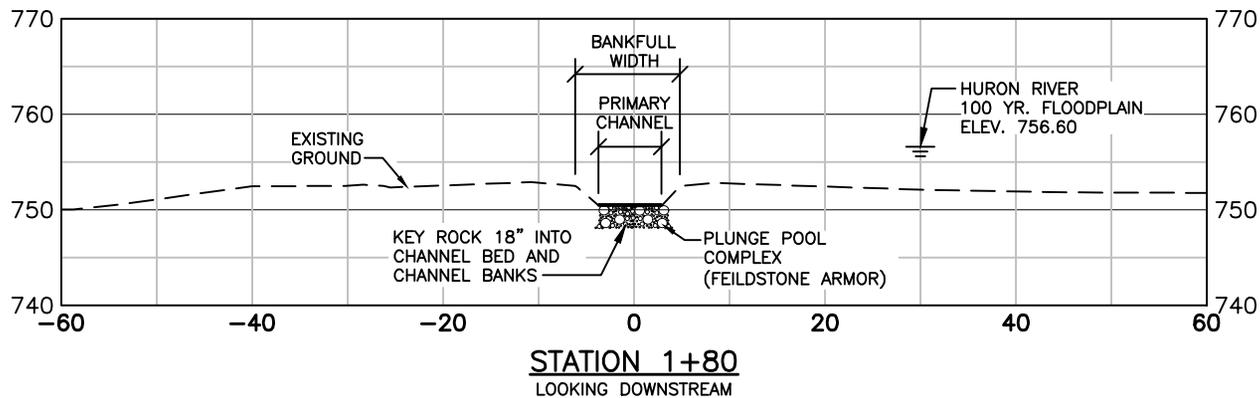
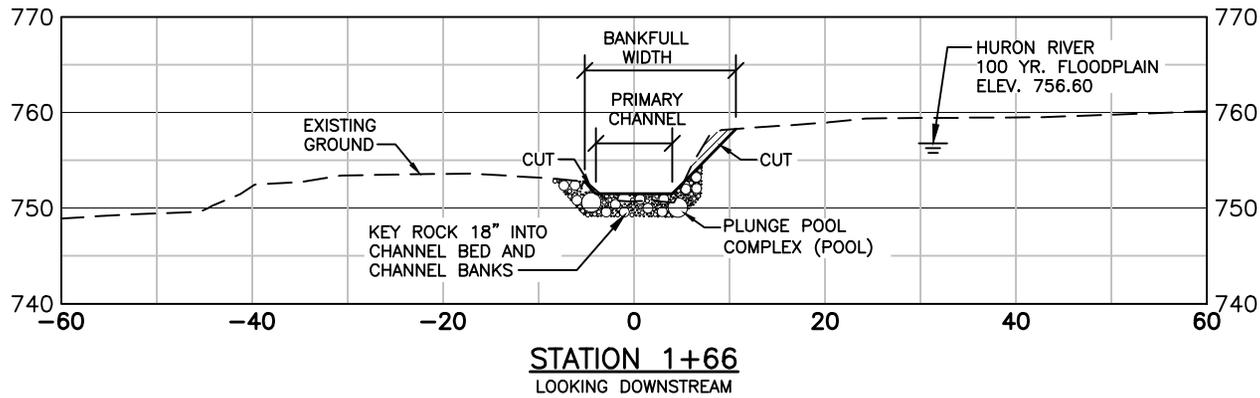
VERT. SCALE: 1" = 20'

Addendum No. 1  
08/27/21

PROJECT:	SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT
APPLICANT:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
WATERWAY:	TRIBUTARY TO HURON RIVER
LOCATION:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
SHEET: 4 OF 10	DATE: 5/18/2021

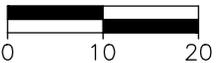
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Expires On:06/21/2026



**SCHOOLGIRLS' GLEN  
SECTIONS**

SCALE: 1" = 20'



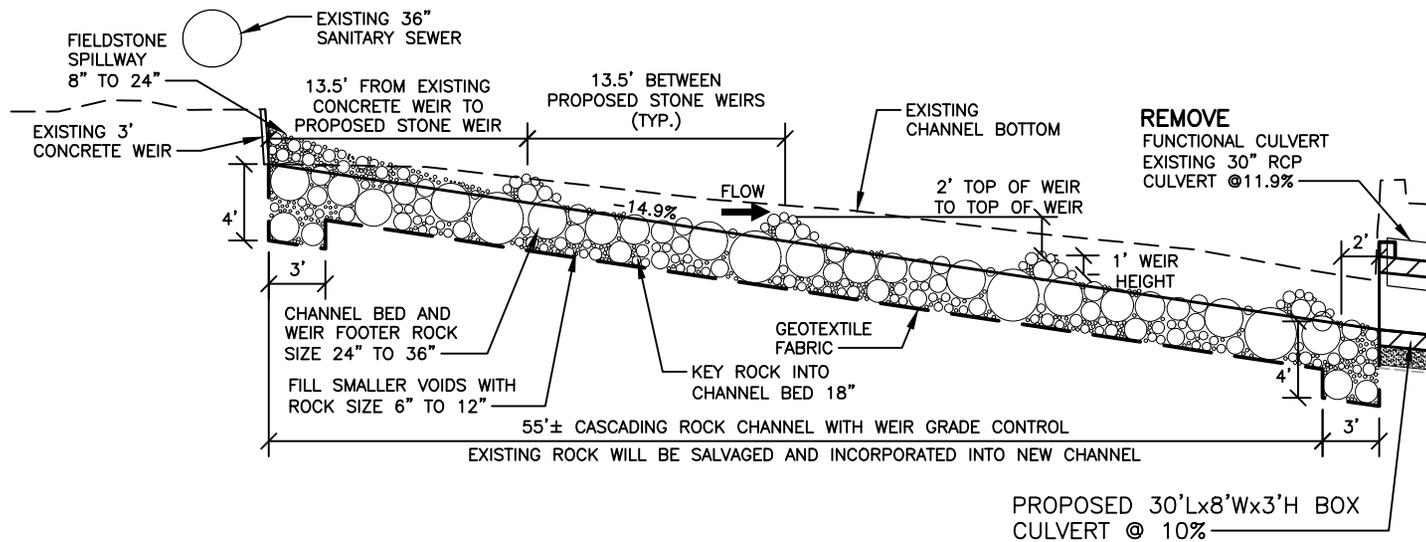
VERT. SCALE: 1" = 20'

Addendum No. 1  
08/27/21

PROJECT: SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT  
 APPLICANT: CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN  
 WATERWAY: TRIBUTARY TO HURON RIVER  
 LOCATION: CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN  
 SHEET: 5 OF 10 DATE: 5/18/2021

PREPARED FOR EGLE PERMIT APPLICATION WRP029128 v1.0  
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 Expires On:06/21/2026



SCHOOLGIRLS' GLEN  
**CASCADING ROCK CHANNEL DETAIL**

SCALE: 1" = 10'



VERT. SCALE: 1" = 10'

Addendum No. 1

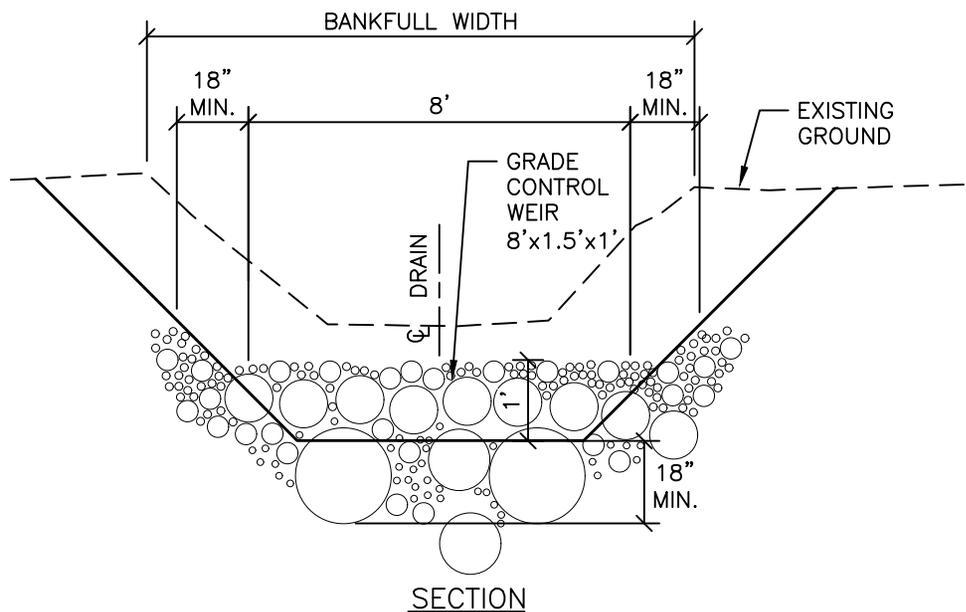
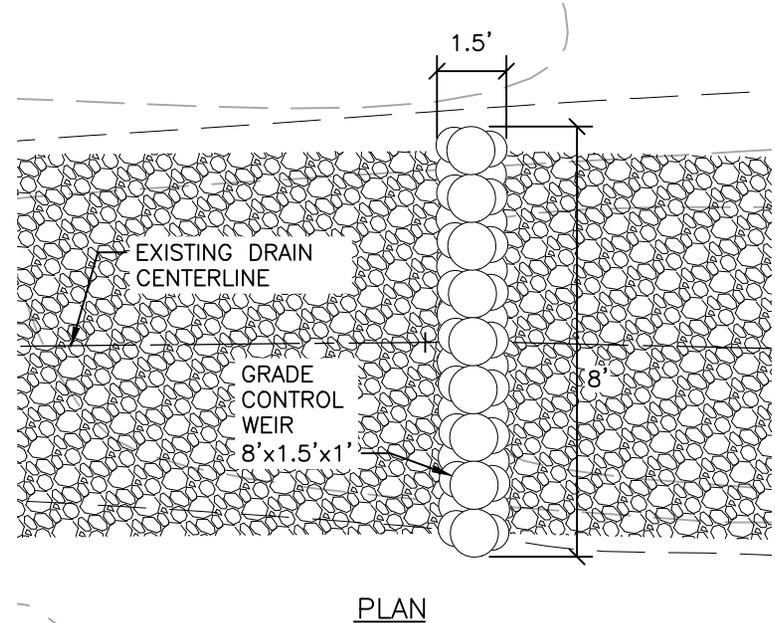
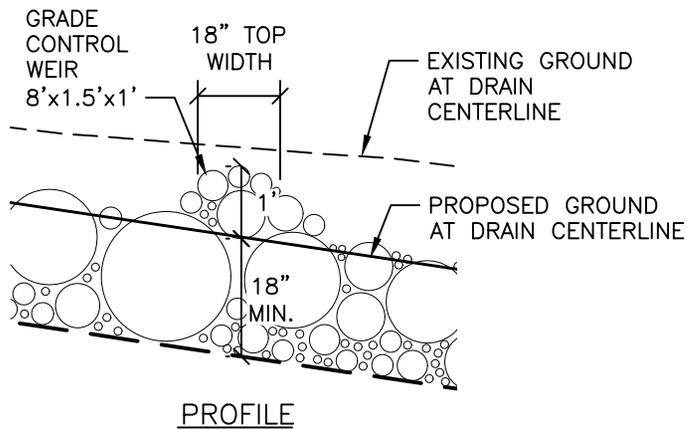
08/27/21

EGLE page 12

PROJECT:	SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT
APPLICANT:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
WATERWAY:	TRIBUTARY TO HURON RIVER
LOCATION:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
SHEET: 6 OF 10	DATE: 5/18/2021

PREPARED FOR EGLE PERMIT APPLICATION  
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SCHOOLGIRLS' GLEN  
**CASCADING ROCK CHANNEL WEIR DETAIL**

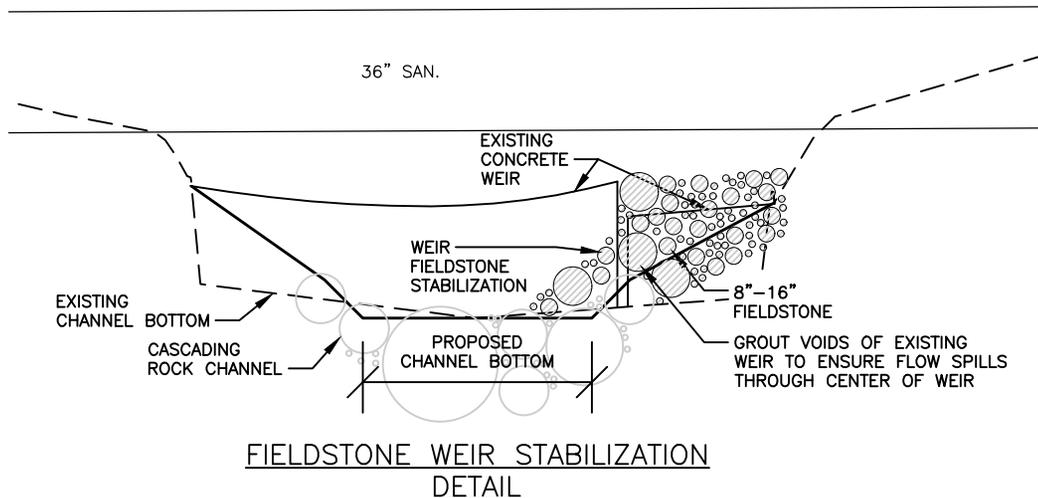
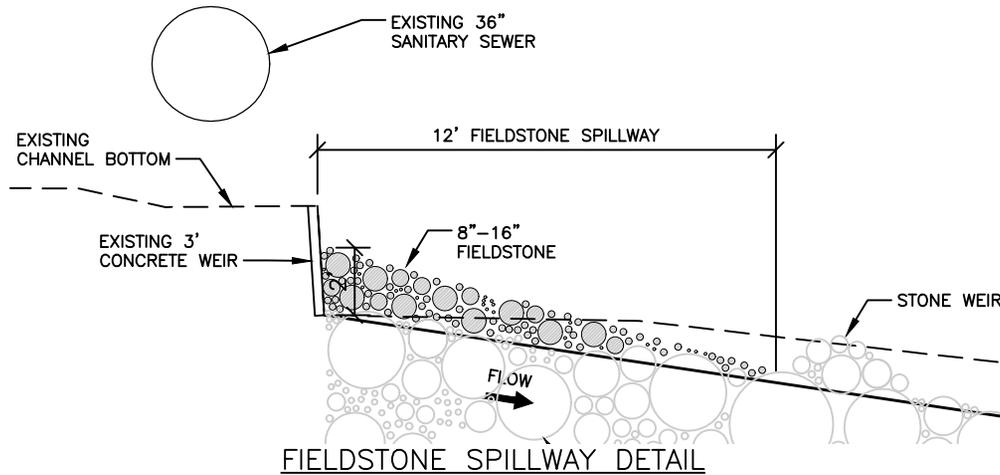
NO SCALE  
 Addendum No. 1  
 08/27/21

EGLE page 13

PROJECT:	SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT
APPLICANT:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
WATERWAY:	TRIBUTARY TO HURON RIVER
LOCATION:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
SHEET: 7 OF 10	DATE: 5/18/2021

PREPARED FOR EGLE PERMIT APPLICATION  
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 Issued On:06/21/2021  
 Expires On:06/21/2026



SCHOOLGIRLS' GLEN  
**FIELDSTONE SPILLWAY AND FIELDSTONE WEIR STABILIZATION DETAILS**

NO SCALE

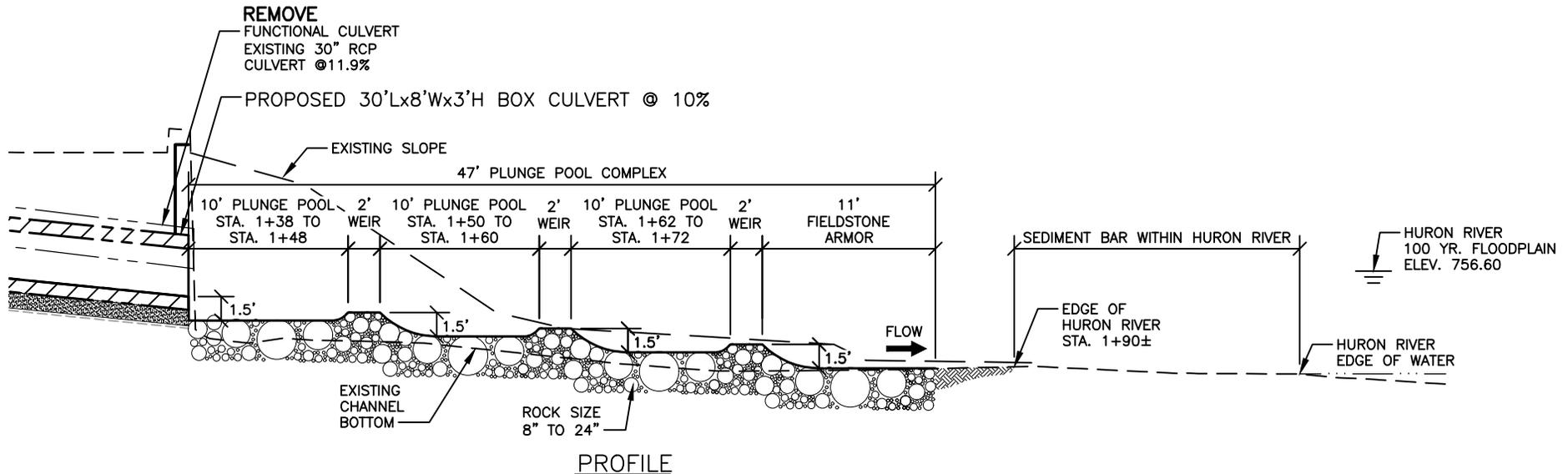
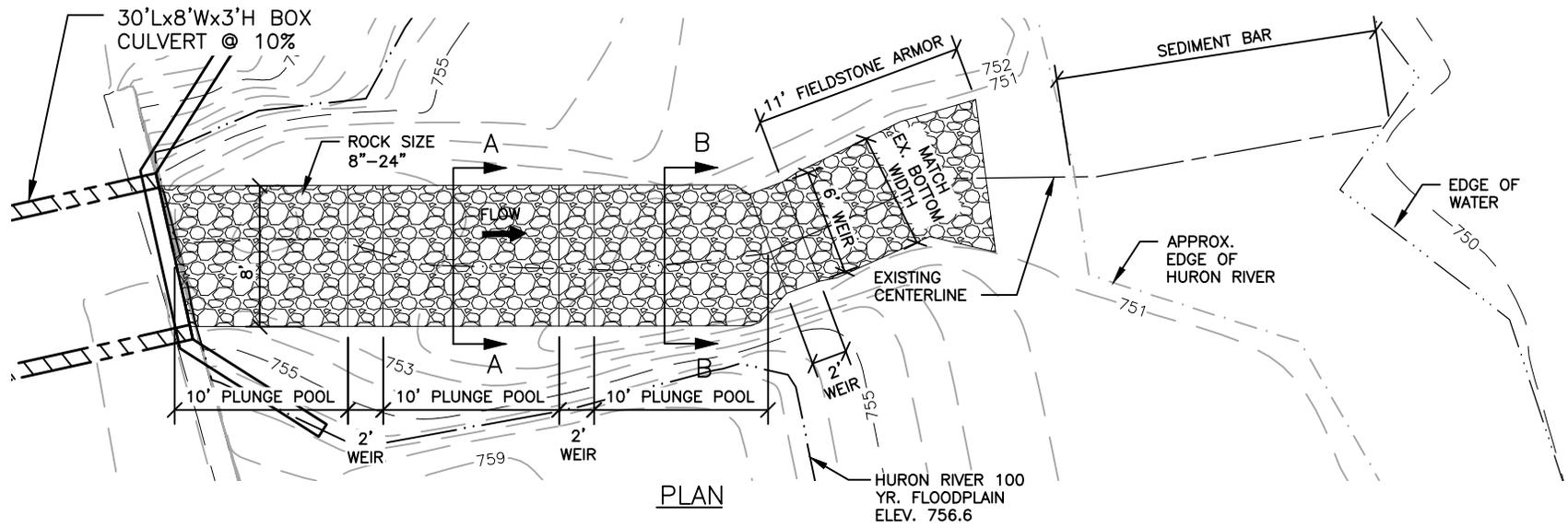
Addendum No. 1  
 08/27/21

EGLE page 14

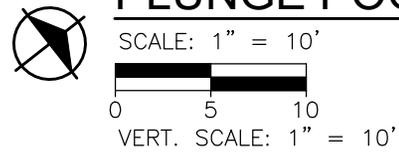
PROJECT:	SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT
APPLICANT:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
WATERWAY:	TRIBUTARY TO HURON RIVER
LOCATION:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
SHEET: 8 OF 10	DATE: 5/18/2021

PREPARED FOR EGLE PERMIT APPLICATION  
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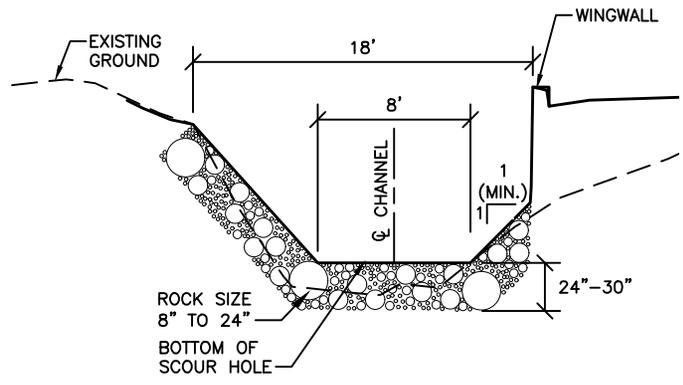
EGLE-WRP  
 WRP029128 v1.0  
 Approved  
 Issued On:06/21/2021  
 Expires On:06/21/2026



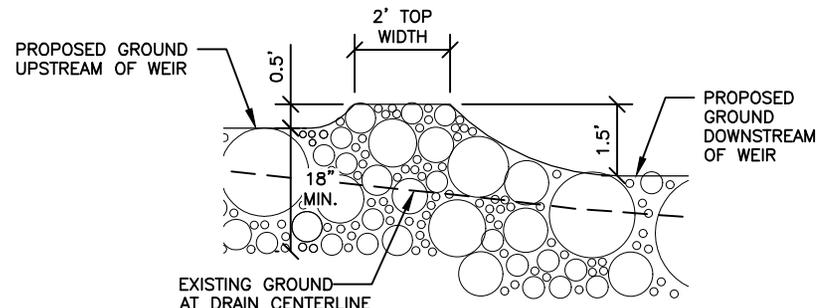
SCHOOL GIRLS' GLEN  
**PLUNGE POOL COMPLEX DETAILS**



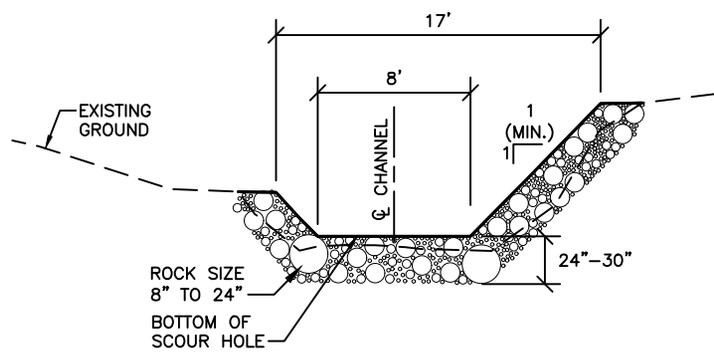
PROJECT:	SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT
APPLICANT:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
WATERWAY:	TRIBUTARY TO HURON RIVER
LOCATION:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
SHEET: 9 OF 10	DATE: 5/18/2021
PREPARED FOR EGLE PERMIT APPLICATION NOT FOR CONSTRUCTION	



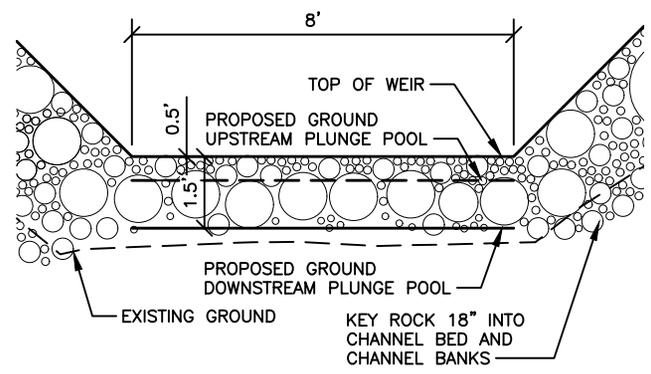
PLUNGE POOL SECTION A



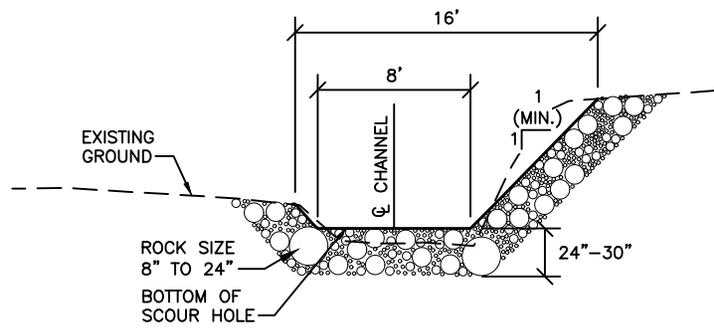
WEIR PROFILE



PLUNGE POOL SECTION B



WEIR SECTION



PLUNGE POOL SECTION C

SCHOOL GIRLS' GLEN  
**PLUNGE POOL COMPLEX DETAILS**

NO SCALE  
 Addendum No. 1  
 08/27/21

PROJECT:	SCHOOLGIRLS' GLEN CULVERT REPLACEMENT PROJECT
APPLICANT:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
WATERWAY:	TRIBUTARY TO HURON RIVER
LOCATION:	CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
SHEET: 10 OF 10	DATE: 5/18/2021
PREPARED FOR EGLE PERMIT APPLICATION NOT FOR CONSTRUCTION	

EGLE-WRP  
 WRP029128 v1.0  
 Approved  
 Issued On:06/21/2021  
 Expires On:06/21/2026

**PREBID MEETING SIGN-IN SHEET**

**PROJECT: Schoolgirls Glen Culvert Replacement  
ITB #4689  
Thursday, August 19, 2021**

PLEASE PRINT

NAME	REPRESENTING	MAILING ADDRESS (optional)	TELEPHONE (optional)	EMAIL
Brian Slizewski	City of Ann Arbor - Engineering	Address: 301 E. Huron Street, P.O. Box 8647 City, State: Ann Arbor, MI Zip: 48107-8647	Office: (734) 794-6410, x43607 Cell: (734) 231-6376	<a href="mailto:bslizewski@a2gov.org">bslizewski@a2gov.org</a>
Paul Kammer	Fishbeck (Designers)	Address: City, State: Zip:	Office: Cell:	<a href="mailto:pkammer@fishbeck.com">pkammer@fishbeck.com</a>
Elizabeth Spencer	U of M Arboretum	Address: City, State: Zip:	Office: Cell:	<a href="mailto:espenc@umich.edu">espenc@umich.edu</a>
ERIC Stahley	Hoffman Bros's	Address: 8574 Verona Rd City, State: Battle Creek Zip: 49014	Office: 269 965 1207 Cell: 517 795 3722	<a href="mailto:estahley@HoffmanBrosInc.com">estahley@HoffmanBrosInc.com</a>
John Schmitt	TRI-CITY GRANDBREAKERS	Address: 4440 N. EASTMAN RD City, State: MIDLAND, MI Zip: 48642	Office: 989-232-0600 Cell: 989-239-2149	<a href="mailto:John@tricitygroundbreakers.com">John@tricitygroundbreakers.com</a>
Mike Leppke	Fishbeck	Address: City, State: Zip:	Office: 248-324-4746 Cell:	<a href="mailto:mtleppke@fishbeck.com">mtleppke@fishbeck.com</a>
BRIAN MCKISSEN	FISHBECK	Address: City, State: Zip:	Office: 248-324-1572 Cell:	<a href="mailto:BLMCKISSEN@FISHBECK.COM">BLMCKISSEN@FISHBECK.COM</a>
FERNANDO CAZARES	DIPONIO	Address: City, State: Zip:	Office: Cell:	<a href="mailto:fcazares@diponioContracting.com">fcazares@diponioContracting.com</a>

## PREBID MEETING SIGN-IN SHEET

**PROJECT: Schoolgirls Glen Culvert Replacement**  
**ITB #4689**  
**Thursday, August 19, 2021**

**MEETING SIGN-IN SHEET      PLEASE PRINT**

NAME	REPRESENTING	MAILING ADDRESS	TELEPHONE	EMAIL
Mike Haussler	Miller Bros. Const. Inc.	Address:	Office:	mikehaussler@ mbcholdings.com
		City, State:      Zip:	Cell: 734-260-1732	
		Address:	Office:	
		City, State:      Zip:	Cell:	
		Address:	Office:	
		City, State:      Zip:	Cell:	
		Address:	Office:	
		City, State:      Zip:	Cell:	
		Address:	Office:	
		City, State:      Zip:	Cell:	
		Address:	Office:	
		City, State:      Zip:	Cell:	
		Address:	Office:	
		City, State:      Zip:	Cell:	
		Address:	Office:	
		City, State:      Zip:	Cell:	

Z:\2019\191660\CAD\C004191660.dwg Dwg Created: 10-Aug-21 - standard (reduced).ctb - Plot Date: 10-Aug-21

**MISS DIG 811**  
 3 full working days before you dig:  
 1-800-482-7171  
 on the web at: www.missdig.org

**811**  
 Know what's below.  
 Call before you dig.

**BENCHMARKS**

BENCH MARK G ELEVATION: 779.28  
 CHISELED SQUARE ON NORTHEASTERLY CORNER OF CONCRETE SANITARY VAULT ON WEST SIDE OF CREEK.  
 BENCH MARK H ELEVATION: 766.37  
 MAG SPIKE ON NORTHERLY SIDE OF 18" DECIDUOUS TREE ON SOUTH SIDE OF NICHOLS DRIVE AND ± 100' EAST OF CREEK.

**LEGEND**

- x-x-x-x- REMOVE STRUCTURE OR UTILITY
- × REMOVE OBJECT
- [Hatched Box] REMOVE GRAVEL PAVEMENT
- - - - - APPROXIMATE LIMITS OF DISTURBANCE
- [Circle with X] TREE, REM
- [Star] TREE, REM

**NOTES**

1. THE EXTENT OF REMOVALS AND DEMOLITION SHALL BE FIELD VERIFIED BY CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF ANY DEVIATIONS FROM INFORMATION SHOWN.
2. PRIOR TO CONSTRUCTION ALL FENCING, BARRICADES, ENCLOSURES, ETC., MUST BE INSTALLED AND APPROVED BY OWNER OR CONSTRUCTION MANAGER.
3. DISPOSE OF DEMOLITION AND EXCAVATION MATERIALS IN ACCORDANCE WITH CONTRACT DOCUMENTS.
4. UNLESS SPECIFICALLY NOTED FOR REMOVAL ON THE PLANS, ALL SIDEWALKS, DRIVES, CULVERTS, DRAINAGE STRUCTURES, AND ABOVE AS WELL AS BELOW GRADE UTILITIES SHALL BE PROTECTED. ALL SUCH ITEMS DAMAGED OR DESTROYED DURING CONSTRUCTION SHALL BE REMOVED AND REPLACED WITH NEW AT NO ADDITIONAL COST TO THE OWNER.
5. PERFORM CLEARING, GRUBBING, TREE AND STUMP REMOVAL, TOPSOIL REMOVAL AND STOCKPILING IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY CRITICAL INVERT INFORMATION PRIOR TO BEGINNING CONSTRUCTION.
7. DAMAGE CAUSED TO SURROUNDING AREA PAVEMENT OUTSIDE THE CONSTRUCTION LIMITS SHALL BE SAWCUT AND REPLACED AT NO ADDITIONAL COST TO THE OWNER.
8. 100 SY OF 8"-24" FIELDSTONE AND 100 SY OF TOP SOIL IS INCLUDED AS CONTINGENCY PAY ITEM TO BE PLACED AS DIRECTED BY ENGINEER.

SURVEY PERFORMED BY:  
 FISHBECK INC.  
 39500 MACKENZIE DRIVE, SUITE 100  
 NOV, MI 48377  
 DATE: 1/21/2021  
 517.882.0383 PHONE  
 517.882.0388 FAX  
 www.fishbeck.com

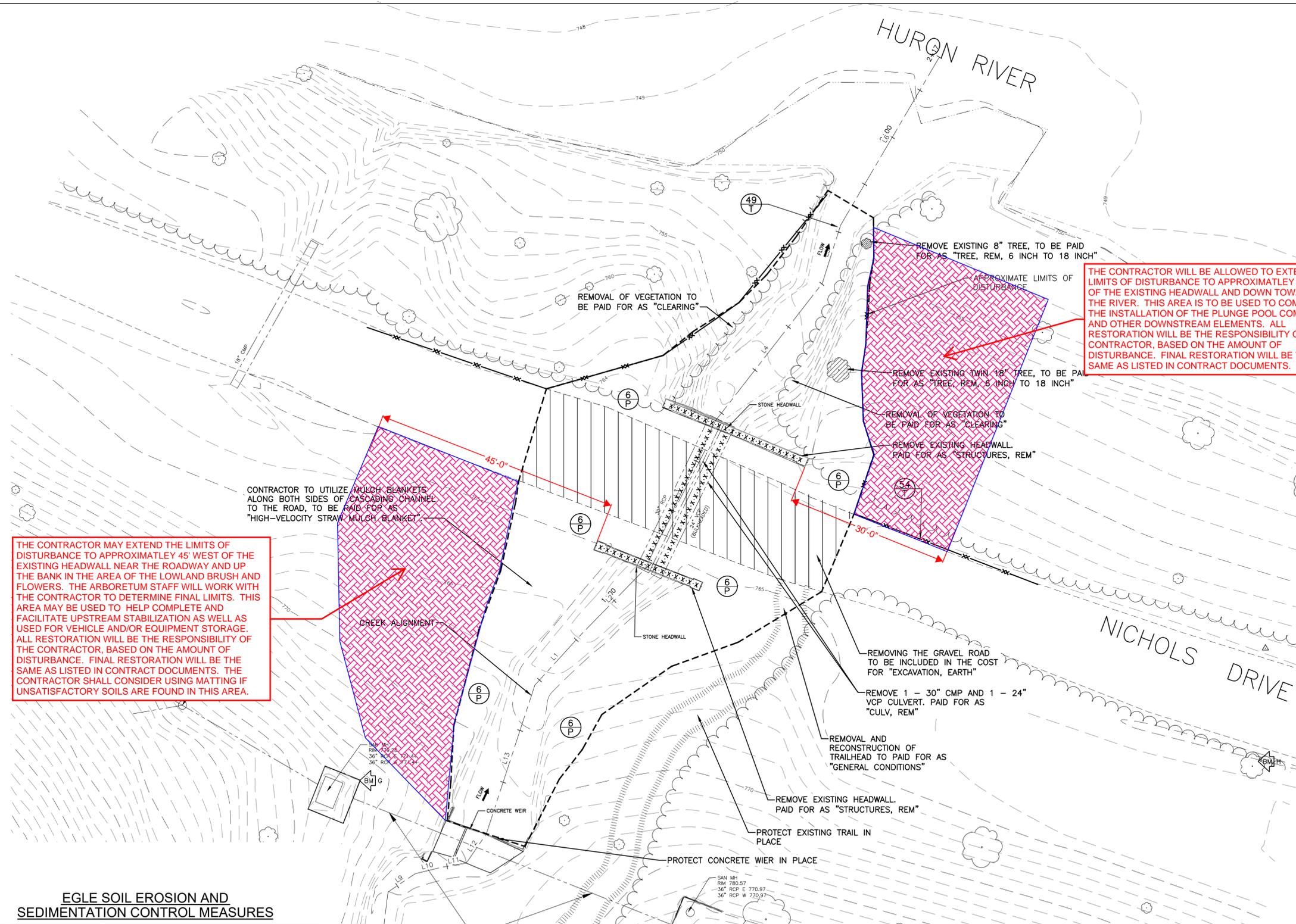
CITY OF ANN ARBOR  
 PUBLIC SERVICE  
 301 EAST HURON STREET  
 ANN ARBOR, MI 48107-8647  
 734-794-6410  
 www.a2gov.org



PUBLIC SERVICES-ENGINEERING - CITY OF ANN ARBOR  
 SCHOOL GIRLS GLEN CULVERT REPLACEMENT - NICHOLS DRIVE  
 EXISTING, REMOVAL, AND SESC MEASURES

SCALE PLAN:  
 DRAWING No.  
 2021-XXX-4

SHEET No.  
 4



THE CONTRACTOR MAY EXTEND THE LIMITS OF DISTURBANCE TO APPROXIMATELY 45' WEST OF THE EXISTING HEADWALL NEAR THE ROADWAY AND UP THE BANK IN THE AREA OF THE LOWLAND BRUSH AND FLOWERS. THE ARBORETUM STAFF WILL WORK WITH THE CONTRACTOR TO DETERMINE FINAL LIMITS. THIS AREA MAY BE USED TO HELP COMPLETE AND FACILITATE UPSTREAM STABILIZATION AS WELL AS USED FOR VEHICLE AND/OR EQUIPMENT STORAGE. ALL RESTORATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR, BASED ON THE AMOUNT OF DISTURBANCE. FINAL RESTORATION WILL BE THE SAME AS LISTED IN CONTRACT DOCUMENTS. THE CONTRACTOR SHALL CONSIDER USING MATTING IF UNSATISFACTORY SOILS ARE FOUND IN THIS AREA.

THE CONTRACTOR WILL BE ALLOWED TO EXTEND THE LIMITS OF DISTURBANCE TO APPROXIMATELY 30' EAST OF THE EXISTING HEADWALL AND DOWN TOWARDS THE RIVER. THIS AREA IS TO BE USED TO COMPLETE THE INSTALLATION OF THE PLUNGE POOL COMPLEX AND OTHER DOWNSTREAM ELEMENTS. ALL RESTORATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR, BASED ON THE AMOUNT OF DISTURBANCE. FINAL RESTORATION WILL BE THE SAME AS LISTED IN CONTRACT DOCUMENTS.

**EGLS SOIL EROSION AND SEDIMENTATION CONTROL MEASURES**

KEY	DETAIL	CHARACTERISTICS
6	Seeding with Mulch and/or Matting	Facilitates establishment of vegetative cover. Effective for drainageways with low velocity. Easily placed in small quantities by inexperienced personnel. Should include prepared topsoil bed.
49	Check Dams	Reduces flow velocity. Catches sediment. Can be constructed of logs, straw, hay, rock, lumber, masonry or sand bags.
54	Geotextile Silt Fence	Use geotextile and posts or poles. May be constructed or prepackaged. Easy to construct and locate as necessary.

XX TEMPORARY MEASURE  
 YY PERMANENT MEASURE

\* DATES ARE APPROXIMATE AND WILL BE REVISED AT PRECONSTRUCTION MEETING.

SESC SCHEDULE AND SEQUENCING	JAN 2021	FEB 2021	MAR 2021	APR 2021
INSTALL PROTECTIVE FENCING AND SILT FENCE	█			
INSTALL CATCH BASIN FILTERS		█		
CONSTRUCT SEDIMENT TRAP AND CHECK DAM		█		
INSTALL DRAIN BYPASS PLAN			█	
CLEAR AND GRUB			█	
REMOVALS			█	
PARTIAL WIDTH CONSTRUCTION			█	
INSTALL PROPOSED CULVERT			█	
BACKFILL SUBGRADE			█	
SITE PAVING				█
LANDSCAPE AND FINAL RESTORATION				█



**NICHOLS DRIVE EXISTING, REMOVAL, & SESC MEASURES**

SCALE: 1" = 10'