ADDENDUM
NO. 4

October 31, 2022

Carey Ridge Elementary Addition & Renovation
16231 Carey Road
Westfield, IN 46074

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications and the Drawings dated September 30, 2022, by CSO Architects. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Page ADD 4-1, and attached Addendum No. 4 from CSO Architects, consisting of two (4) pages, Specification Sections: 23 21 23 Hydronic Pumps.

Below is the link for the Virtual Bid Opening, which Bids are due November 3, 2022, at 2:00PM at Westfield Washington Schools, Community Board Room, 19500 Tomlinson Road, Suite B, Westfield, IN 46074.

Microsoft Teams meeting

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Meeting ID: 255 660 938 951

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+1 317-762-3960,,632490404# United States, Indianapolis

Phone Conference ID: 632 490 404#

A. SPECIFICATION SECTION 00 20 00 INFORMATION AVAILABLE TO BIDDERS

1. Subsurface Investigation Report prepared by Alt & Witzig Engineering, Inc.

Subsurface Investigation &
Geotechnical Recommendations

Addition to Carey Ridge Elementary School
Westfield, Indiana
A&W Project No.: 22IN0410

Prepared For:
Westfield Washington Schools
Westfield, Indiana

Prepared By:
Alt & Witzig Engineering, Inc.
Geotechnical Division

August 29, 2022

Alt & Witzig Engineering, Inc.
4105 West 99th Street • Carmel • Indiana • 46032
Ph (317) 875-7000 • Fax (317) 876-3705

August 29, 2022

Westfield Washington Schools
1143 East 181st Street
Westfield, Indiana 46074
Attention: Mr. Joe Montalone

Report of Subsurface Investigation and Geotechnical Recommendations

RE: Addition to Carey Ridge Elementary School
16231 Carey Road
Westfield, Indiana
A&W Project No.: **22IN0410**

Mr. Montalone:

In compliance with the request from Mark LaVier of Lynch, Harrison & Brumleve, Inc., we have conducted a subsurface investigation and geotechnical evaluation for the above referenced project. It is our pleasure to transmit an electronic copy of the report.

The purpose of this subsurface investigation was to determine the various soil profile components, the engineering characteristics of the subsurface materials, and to provide criteria for use by the design engineers in assessing the site for construction, preparation of site grading plans, and determination of appropriate foundation types. A detailed discussion of our subsurface investigation results and recommendations are presented herein.

We appreciated the opportunity to work with you on this project. Often, because of design and construction details that occur on a project, questions arise concerning the soil conditions. If we can give further service in these matters, please contact us at your convenience.

THOMAS J. COFFEY
REGISTERED
No. 19975
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Sincerely,
Alt & Witzig Engineering, Inc.

Nicholas K. Hayes, E.I.

Thomas J. Coffey, P.E.

Cc: Lynch, Harrison & Brumleve – ATTN: Mr. Mark LaVier

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INTRODUCTION

This report presents the results of a subsurface investigation performed for the proposed Addition to Carey Ridge Elementary School to be constructed in Westfield, Indiana. Our investigation was conducted for Westfield Washington Schools of Westfield, Indiana. Authorization to perform this investigation was in the form of a proposal prepared by Alt & Witzig, Engineering, Inc. (Alt & Witzig Proposal: *2205G31*) that was accepted by a representative of the client.

The scope of this investigation included a review of geological maps of the area and a review of geologic and related literature, a reconnaissance of the immediate site, a subsurface exploration, field and laboratory testing, and engineering analysis and evaluation of the materials.

The purpose of this subsurface investigation was to determine the various soils profile components, the engineering characteristics of the subsurface materials, and to provide criteria for use in assessing the site for construction and evaluating subsurface conditions.

The scope or purpose of this investigation did not either specifically or by implication provide an environmental assessment of the site.

Description of Site

The site is located at 16231 Carey Road in Westfield, Indiana. An aerial photograph of the site taken in 2021 is provided in *Exhibit 1* below.

Exhibit 1 – 2021 Aerial Photograph of Site; Google Earth

Site Description

The proposed classroom addition site is sloping down from west to east, with an estimated relief of approximately five (5) feet. The approximate elevation of the site ranges between 845 feet to 850 feet, per the provided topographic survey. The ground surface across the classroom addition area during boring operations consisted of grass and concrete sidewalks. The site is currently occupied by the existing Carey Ridge Elementary School, along with the associated pavements, playgrounds, and sporting fields. The surrounding areas are developed with residential and commercial structures, paved roadways, and underground/overhead utilities.

FIELD INVESTIGATION

General

Field investigations to determine the engineering characteristics of the subsurface materials included a reconnaissance of the project site and performing seven (7) soil borings, at locations selected by the client, located approximately as shown on the *Boring Location Plan*, performing standard penetration tests, and obtaining soil samples retained in the standard spilt-spoon sampler for further laboratory testing. The apparent groundwater level at each boring location was also determined.

Twelve (12) pavements cores were also conducted. Photographs of the pavement cores, along with the existing pavement thicknesses are presented in Appendix B.

Drilling and Sampling Procedures

The soil borings were drilled using a track-mounted drilling rig equipped with a rotary head. Hollow-stem augers were used to advance the holes. The advancement of the borings was temporarily stopped at regular intervals in order to perform standard penetration tests in accordance with ASTM Procedure D-1586.

The standard penetration test involves driving a split spoon soil sampler into the ground by dropping a 140-pound hammer thirty (30) inches. The number of hammer drops required to advance the split-spoon sampler one (1) foot into the soil is defined as the standard penetration value. The soil samples retained in the split-spoon sampling device as a result of the penetration tests were obtained, classified, and labeled for further laboratory investigation.

Water Level Measurements

The apparent groundwater level at each boring location was measured during and upon completion of the drilling operations.

These water level measurements consisted of observing the depth at which water was encountered on the drilling rods during the soil sampling procedure and measuring the depth to the top of any water following removal of the hollow stem augers. It should be noted that the groundwater level measurements recorded on the individual *Boring Logs* in Appendix A of this report are accurate only for the specific dates on which the measurements were performed. It must be understood that the groundwater levels will fluctuate throughout the year and the *Boring Logs* do not indicate these fluctuations.

Ground Surface Elevation

Ground surface elevations were not available at the time of this report. However, available topographic information provided by topographic survey indicates that the proposed classroom addition site varies in elevation from approximately 845 to 850 feet.

LABORATORY INVESTIGATION

In addition to field investigations, a supplemental laboratory investigation was conducted to ascertain additional pertinent engineering characteristics of the subsurface materials. The laboratory-testing program included:

- Classification of soils in general accordance with ASTM D-2488
- Moisture content tests in general accordance with ASTM D-2216
- Samples of the cohesive soil were frequently tested in unconfined compression by use of a calibrated spring testing machine.
- A soil Penetrometer was used as an aid in determining the strength of the soil.

The values of the unconfined compressive strength as determined on soil samples from the split-spoon sampling must be considered, recognizing the manner in which they were obtained since the split-spoon sampling techniques provide a representative but somewhat disturbed soil sample.

SUBSURFACE CONDITIONS

General

The types of foundation materials encountered have been visually classified and are described in detail on the *Boring Logs*. The results of the field penetration tests, strength tests, water level observations and laboratory water contents are presented on the *Boring Logs* in numerical form. Representative samples of the soils encountered in the field were placed in sample jars and are now stored in our laboratory for further analysis if desired. Unless notified to the contrary, all samples will be disposed of after two (2) months.

Soil Conditions

Borings B-01, B-02, B-03, and B-04, conducted within the addition area, encountered approximately four (4) to seven (7) inches of topsoil at the ground surface. Beneath the topsoil layer, these borings generally encountered medium stiff to stiff cohesive soils within the upper seven (7) to eleven (11) feet. These soils then transitioned to stiff to hard cohesive soils to the termination depths of twenty-one (21) feet. Borings B-02 and B-04 encountered possible fill materials within the upper five (5) to seven and one-half (7½) feet. Those borings also encountered loose to dense granular soil between seven and one-half (7½) and twenty-five (25) feet.

Borings S-02 and S-03, conducted within the playground area, encountered approximately four (4) inches of mulch at the ground surface. Boring S-01 encountered approximately four (4) inches of topsoil at the ground surface. Beneath the surface materials, the borings generally encountered medium stiff to stiff cohesive soil to the termination depths of the borings. Boring S-01 encountered a layer of granular soil between seven and one-half (7½) and eleven (11) feet. The cohesive soils of boring S-03 exhibited elevated moisture contents, ranging between 21 and 44 percent.

Detailed soil descriptions at each boring location have been included on the *Boring Logs* in Appendix A of this report.

According to the *Soil Survey of Hamilton County, Indiana* published by the United States Department of Agriculture Soil Conservation Service, the majority of the soil covering this site is classified as Brookston silty clay loam-Urban land complex (YbvA), Crosby silt loam (YclA), Miami silt loam-Urban land complex (YmsA & YmsB2), and Whitaker loam-Urban land complex

(YwsA). The *Custom Soil Resource Report for Hamilton County, Indiana* has been included in Appendix B.

Bedrock Geology

Geologic maps published by the Indiana Geological Survey indicate the bedrock at this site consists of the Muscatatuck Group, which is characterized by dolomite, limestone, sandstone, and gypsum of the Devonian age. The approximate elevation of this bedrock is 700 feet, which is greater than 100 feet below the existing ground surface.

Seismic Consideration

Based on the field and laboratory tests performed on the subsurface materials and an assumption that the bedrock surface is greater than 100 feet below the existing ground surface, this site should be considered a Site Class D in accordance with the current Indiana Building Code.

Maximum spectral response acceleration values of S_s=0.143 g and S_1=0.080 g are recommended for seismic design.

Groundwater

Table 1 below indicates the groundwater depths as encountered during and upon completion of the boring operations. The exact location of the water table may fluctuate somewhat depending upon normal seasonal variations in precipitation and surface runoff.

The *Soil Survey of Hamilton County, Indiana* indicates a seasonal high groundwater table as shallow as the natural ground surface. Again, it should be noted that the groundwater level measurements recorded on the individual *Boring Logs* included in Appendix A of this report, are accurate **only** for the dates on which the measurements were performed.

Table 1 – Groundwater Depths

Boring	*During Drilling*	*Upon Completion*
B-01	*Dry*	*Dry*
B-02	*7.5 ft.*	*N/A*
B-03	*Dry*	*Dry*
B-04	*20.0 ft.*	*18.0 ft.*

Boring	*During Drilling*	*Upon Completion*
S-01	*Dry*	*Dry*
S-02	*3.0 ft.*	*5.0 ft.*
S-03	*Dry*	*Dry*

GEOTECHNICAL ANALYSIS & RECOMMENDATIONS

Project Description

Based on the provided plans and the RFP, it is understood that a one-story, steel framed, slab-on-grade addition is proposed. In areas of pavement rehabilitation, it is also understood that some of the existing pavement sections will be milled and resurfaced. The location of the soil borings in relation to the layout of the site are shown on the enclosed *Boring Location Plan*.

Grading plans were not available at the time of this report. It is assumed that finished grade will match the existing grade of the existing structure. Based on the existing structure's final floor elevation of 853.00 feet, approximately three (3) to seven (7) feet of fill will be necessary.

It is assumed that structural loads for the building addition will be transferred to the soils by spread footings and continuous wall footings founded at a shallow depth, if possible. Maximum column loads of 90 kips and wall loads of 1.5 klf were provided by Lynch, Harrison & Brumleve, Inc.

Existing Structure/Utility Concerns

As previously mentioned, the existing Carey Ridge Elementary School building occupies the site. Shallow, uncontrolled fills may be evident from activities associated with past construction. Care should be taken to properly abandon the existing utilities located in the area of the addition. At no time should new foundations be placed on or above abandoned utilities. Some loose fill materials should be anticipated in areas of the utilities. Some loose fill materials should be anticipated in areas of the utilities. It is recommended that Alt & Witzig Engineering, Inc. evaluate the soil conditions in the area of the possible utilities prior to backfilling.

Adjacent Foundations

New foundations to be placed near or adjacent to existing foundations should be constructed such that undermining of adjacent footings and lateral loading of footings located at a different elevation is avoided. If it is necessary to construct the new foundations within the "influence area" of the existing structure, shoring or underpinning of the existing structure will be necessary to allow for construction. The lateral loads applied by the existing footing should be considered in design of the proposed foundation. This investigation did not include the evaluation of the existing structures or foundation systems. Caution must be exercised during construction to not undermine existing foundations or jeopardize the integrity of the existing structures.

Settlement

The fill used to create the building pad will induce some settlement, especially in the areas of deepest fill at the site where five (5) to seven (7) feet is proposed. It is anticipated that a majority of this settlement will occur during construction. The building pad should be constructed a minimum of five (5) feet beyond the outside edge of the exterior foundations or a distance equal to the depth of the fill beyond the outside edge of the exterior foundations, whichever is greater.

Foundation Recommendations

Considering the encountered soil conditions at the boring locations, the estimated loads of the structure, and the relative economics of the available foundation types, conventional spread and continuous wall footings founded at a shallow depth appear to represent a feasible foundation solution for this project.

Based on the existing topography of the site, it is anticipated that the footings will be founded on both medium stiff to stiff, natural cohesive soils and structural fill materials. Net allowable bearing pressures of **2,500** and **2,000 psf** are recommended for dimensioning spread footings and continuous wall footings, respectively, provided they are founded on firm natural soil or structural fill.

It is recommended that a representative of Alt & Witzig Engineering, Inc. inspect all foundation excavations prior to the placement of concrete. At the time of this inspection, Housel penetrometer or other approved tests may be performed in order to confirm that suitable soil materials are present.

The above recommended bearing pressures will help reduce differential settlements associated with footings founded on soil with varying stiffness across the building pad. Using the above-mentioned bearing pressure and recommendations for limiting settlements, total settlements of less than one (1) inch and differential settlements of one half (½) inch or less can be anticipated. In utilizing the above-mentioned net allowable pressures for dimensioning footings, it is necessary to consider only those loads applied above the finished floor elevation.

In order to alleviate the effects of seasonal variation in moisture content on the behavior of the footings and eliminate the effects of frost action, all exterior foundations should be founded a minimum of three (3) feet below the final grade.

Some modifications to the recommendations provided in this report may be necessary based on potential complications or modifications to the design plan. The modifications may influence the overall cost of the project and construction sequence. If complications become apparent to the design team or owner, this information should be provided to Alt & Witzig Engineering, Inc. at the earliest possible date.

Floor Slab Recommendations

In those areas where the existing grade is below the final floor elevation, a well-compacted structural fill will be necessary to raise the site to the desired grade. All fill materials may consist of approved materials if proper moisture content and compaction procedures are maintained.

Prior to elevating the site, the existing subgrade soils must be proofrolled with approved equipment. It is recommended that a representative of Alt & Witzig Engineering, Inc. be present to determine the exact depth of undercutting and to monitor backfilling operations if necessary. Also, areas of shallow unstable materials may be encountered is some areas due to slightly elevated moisture contents discovered in the shallow soils, such as in borings B-01. The exact remediation method used will be dependent upon the size of the area and the types of materials encountered, as well as the project schedule. If weather conditions are favorable, the soils may be aerated, dried, and recompacted or undercut and replaced. However, if weather conditions or construction schedule dictate immediate improvement then chemical modification or stabilization may be necessary. Remediation will be dictated by the field conditions upon construction.

The building pad should be constructed a minimum of five (5) feet beyond the outside edge of the exterior foundations or a distance equal to the depth of the fill beyond the outside edge of the exterior foundations, whichever is greater.

After the building area has been raised to the proper elevation, a free draining layer of granular material should be placed immediately beneath all floor slabs. It is recommended that the materials within the subgrade area, above footing elevation, be compacted to a minimum density of 93 percent of maximum density in accordance with ASTM D-1557.

Pavement Recommendations

The strength of the subgrade soils at this site depends upon several variables including compaction and drainage. It is, therefore, extremely important that all paved areas be designed to prevent water from collecting or ponding immediately beneath the pavement. This can be accomplished by sheet draining the parking area and sloping the subgrade soils and outletting them to a drain or a ditch to allow for subgrade drainage, or by the installation of a subsurface drainage system. It is recommended that underdrains be installed at the transitions from concrete to asphalt as well.

For these soils to provide adequate support for pavement, it will also be necessary that the earthmoving contractor follow proper site work techniques. The exposed subgrade should be proofrolled with equipment approved by a representative of Alt & Witzig Engineering, Inc. This proof-rolling will assist in identifying pockets of soft unstable materials beneath exposed subgrades. As mentioned before, some of the shallow soils exhibited elevated moisture contents, particularly in the area of boring S-03. These soils may not pass proofroll inspection, especially if earthmoving is conducted during the wetter portions of the year. If weather conditions are favorable, the soils may be aerated, dried, and recompacted or undercut and replaced. However, if weather conditions or construction schedule dictate immediate improvement then chemical stabilization may be necessary. Remediation will be dictated by the field conditions upon construction.

In areas where fill will be required to raise the site to proposed grade, the performance of the pavements will be greatly affected by the quality of compaction achieved in the subgrade soils. Thus, it is recommended that all pavement areas be compacted to 93 percent of the material's maximum dry density as determined by ASTM D-1557.

CONSTRUCTION CONSIDERATIONS

Site Preparation

Excessively organic topsoil and loose dumped fill materials will generally undergo high volume changes that are detrimental to the behavior of pavements, floor slabs, structural fills, and foundations placed upon them. It is recommended that all topsoil and/or loose materials be stripped from the construction areas and wasted or stockpiled for later use.

The depth and consistency of these materials will vary across the site. It should be noted that the soil borings only indicate the apparent topsoil, asphalt pavement, and stone section thicknesses at their specific locations. Borings do not indicate variations in the thickness of these layers between selected locations. Thus, borings only provide a general indication of the amount of stripping.

The condition of the subgrade at the time of earthmoving operations and the methods used by the contractor will influence the depth of stripping. A representative of Alt & Witzig Engineering, Inc. in the field should determine the exact depth of stripping and undercutting at the time of stripping operations.

It is recommended that after the above-mentioned stripping procedures have been performed, the exposed subgrade should be proofrolled with approved equipment. This proofrolling will determine where areas of soft unsuitable materials are encountered. Due to the elevated moisture contents encountered in some of the shallow cohesive soils across the site, it is anticipated that some of the subgrade soils will not favorably pass a proofroll inspection. It is recommended that a representative of Alt & Witzig Engineering, Inc. be present for this phase of this project.

After the existing subgrade soils are excavated to design grade, proper control of subgrade compaction and fill, and structural fill replacement should be maintained in accordance with the *Recommended Specifications for Compacted Fills and Backfills*, presented in Appendix A of this report; thus, minimizing volume changes and differential settlements which are detrimental to behavior of shallow foundations, floor slabs and pavements. The building pad should be constructed a minimum of five (5) feet beyond the outside edge of the exterior foundations or a distance equal to the depth of the fill beyond the outside edge of the exterior foundations, whichever is greater.

Groundwater

Depending upon the time of the year and the weather conditions when the excavations are made, seepage from surface runoff may occur into shallow excavations or soften the subgrade soils. Since these foundation materials tend to loosen when exposed to free water, every effort should be made to keep the excavations dry should water be encountered. Sump pumps or other conventional dewatering procedures should be sufficient for this purpose within the cohesive soils. Significant dewatering should be expected if excavations penetrate groundwater within a sand layer, such as in borings B-02 and B-04. It is also recommended that all concrete for footings be poured the same day as the excavation is made.

STATEMENT OF LIMITATIONS

This report is solely for the use of Westfield Washington Schools c/o Lynch, Harrison & Brumleve, Inc. and any reliance of this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties for other uses. This report shall only be presented in full and may not be used to support any other objectives than those set out in the scope of work, except where written approval and consent are provided by Westfield Washington Schools c/o Lynch, Harrison & Brumleve, Inc. and Alt & Witzig Engineering, Inc.

An inherent limitation of any geotechnical engineering study is that conclusions must be drawn based on data collected at a limited number of discrete locations. The geotechnical parameters provided in this report were developed from the information obtained from the test borings that depict subsurface conditions only at these specific locations and on the date indicated on the boring logs. Soil conditions at other locations may differ from conditions encountered at these boring locations and groundwater levels shall be expected to vary with time. The nature and extent of variations between the borings may not become evident until the course of construction.

The exploration and analysis reported herein is considered in sufficient detail and scope to form a reasonable basis for initial design. The recommendations submitted are based on the available soil information and assumed design details enumerated in this report. If actual design details differ from those specified in this report, this information should be brought to the attention of Alt & Witzig Engineering, Inc. so that it may be determined if changes in the foundation recommendations are required.

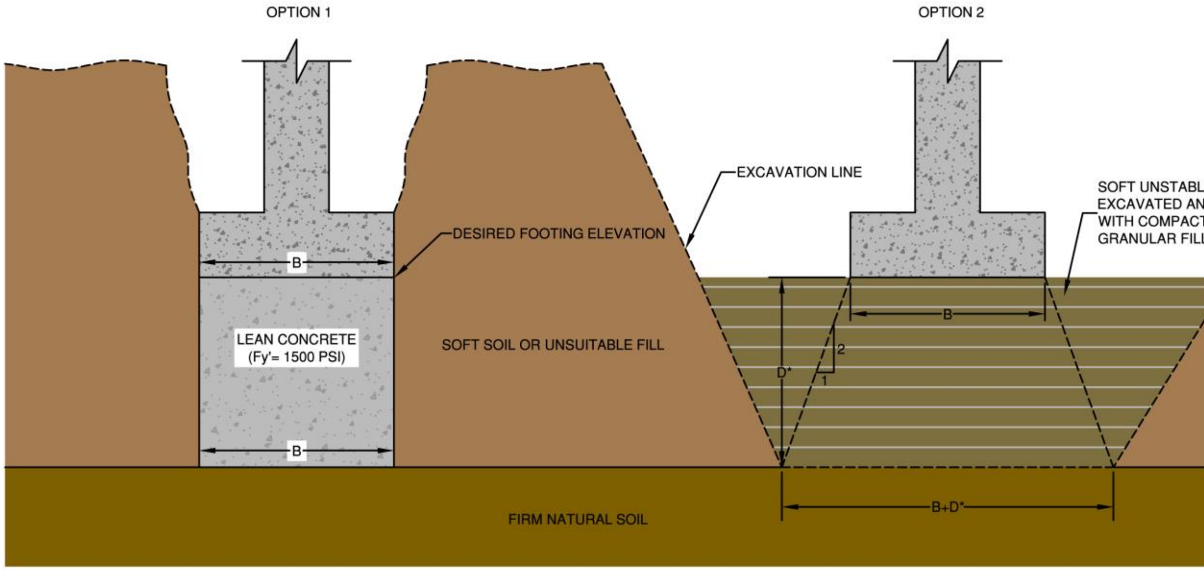
APPENDIX A

Recommended Specifications for Compacted Fills and Backfills
Undercut Detail for Footing Excavation in Unstable Materials
Boring Location Plan
Boring Logs
General Notes

RECOMMENDED SPECIFICATIONS FOR COMPACTED FILLS AND BACKFILLS

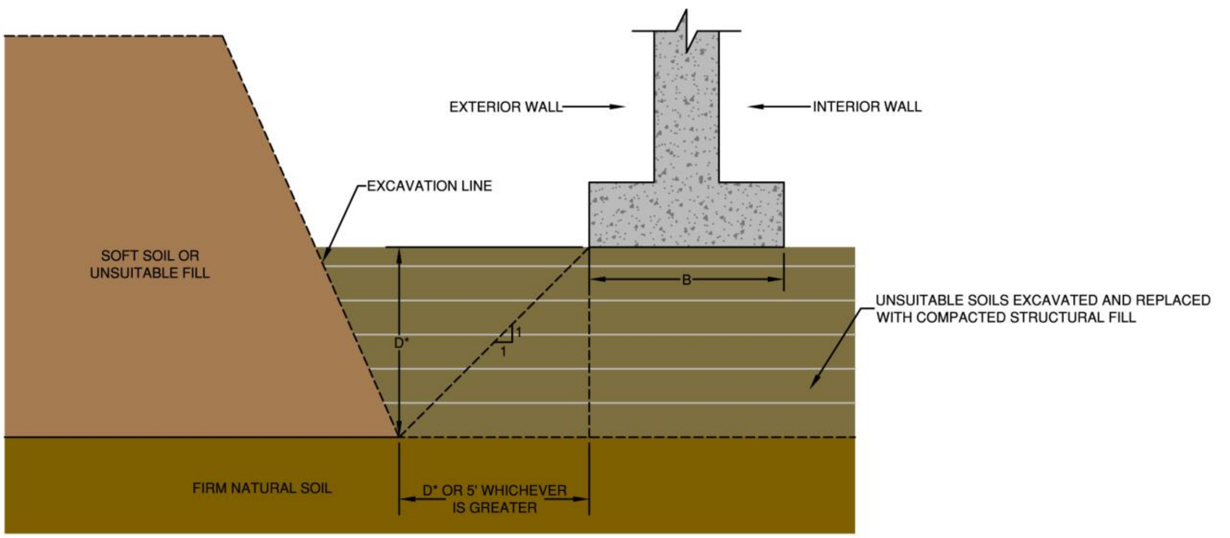
All fill shall be formed from material free of vegetable matter, rubbish, large rock, and other deleterious material. Prior to placement of fill, a sample of the proposed fill material should be submitted to Alt & Witzig Engineering, Inc. for approval. The surface of each layer will be approximately horizontal but will be provided with sufficient longitudinal and transverse slope to provide for runoff of surface water from every point. The fill material should be placed in layers not to exceed eight (8) inches in loose thickness. Each layer should be uniformly compacted by means of suitable equipment of the type required by the materials composing the fill. Under no circumstances should a bulldozer or similar tracked vehicles be used as compacting equipment. Material containing an excess of water so the specified compaction limits cannot be attained should be spread and dried to a moisture content that will permit proper compaction. The addition of water may be required if the fill is below moisture content that will permit compaction. All fill should be compacted to the specified percent of the maximum density obtained in accordance with ASTM density Test D-1557 (95 percent of maximum dry density below the base of footing elevation, 93 percent of maximum dry density beneath floor slabs and pavements). Should the results of the in-place density tests indicate that the specified compaction limits are not obtained; the areas represented by such tests should be reworked and retested as required until the specified limits are reached.

UNDERCUT EXCAVATION FOR ISOLATED FOOTINGS IN UNSTABLE MATERIALS



D* IS DEPTH FOR SUITABLE SOILS

MASS EXCAVATION FOR FOOTINGS IN UNSTABLE MATERIALS



D* IS DEPTH FOR SUITABLE SOILS

Undercut Detail for Footing Excavation in Unstable Material

PROJECT: **Carey Ridge Elementary School**
LOCATION: Noblesville, IN
CLIENT: **Lynch, Harrison & Brumleve, Inc.**
A&W File No.: 22IN0410

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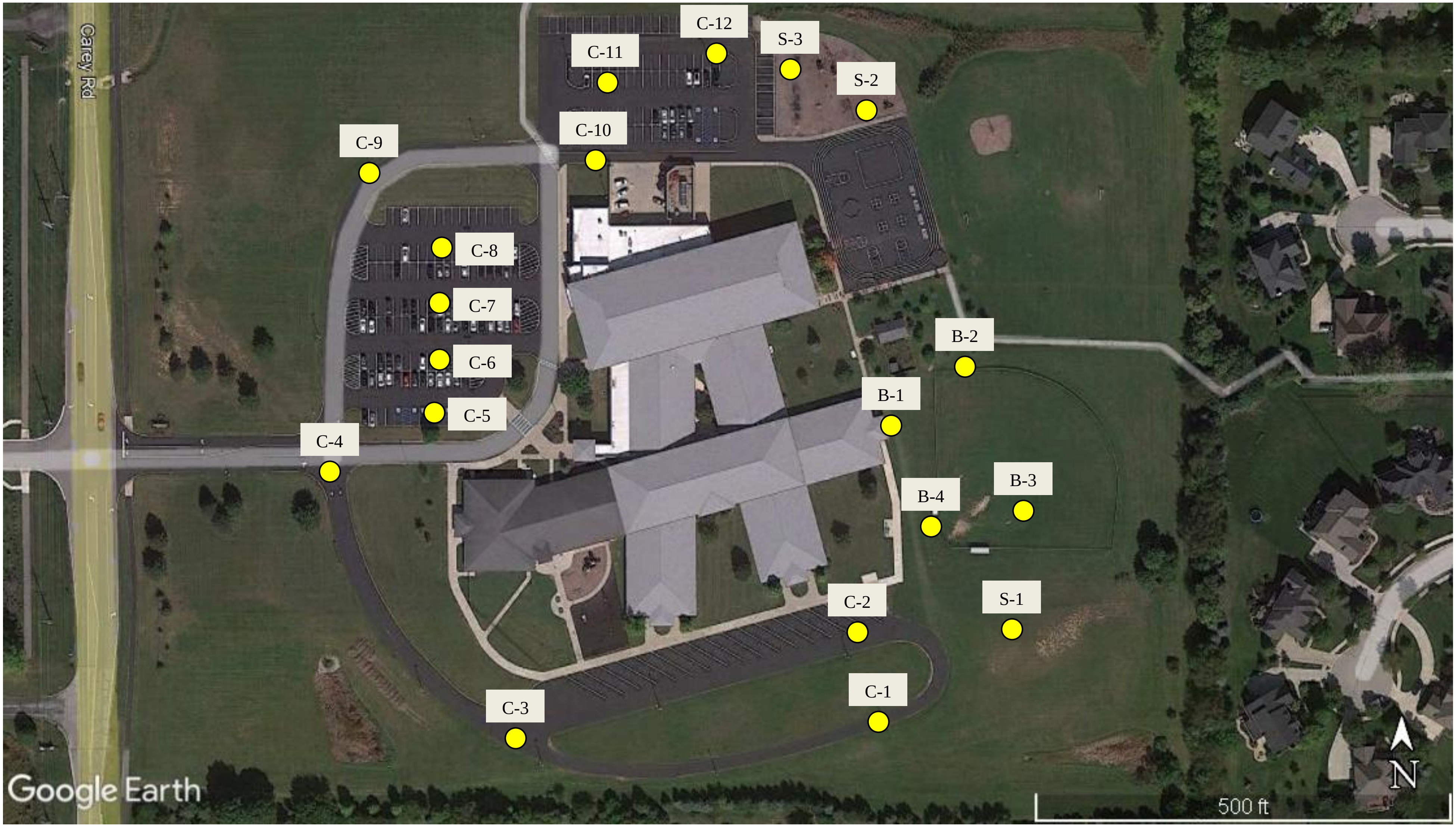

BORING LOCATION PLAN

PROJECT: **Carey Ridge Elementary School**
LOCATION: Noblesville, IN
CLIENT: **Lynch, Harrison & Brumleve, Inc.**
A&W File No.: 22IN0410

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BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT: **Westfield Washington Schools**
BORING #: **B-01**
PROJECT NAME: **Addition to Carey Ridge Elementary School**
ALT & WITZIG FILE #: **22IN0410**
PROJECT LOCATION: **Westfield, IN**

DRILLING and SAMPLING INFORMATION

Date Started	**7/8/22**	Hammer Wt.	**140** lbs.
Date Completed	**7/8/22**	Hammer Drop	**30** in.
Boring Method	**HSA**	Spoon Sampler OD	**2** in.
Driller	**J. Livingston**	Rig Type	**D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION / SURFACE ELEVATION 850.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
849.7	TOPSOIL	0.3										
	Brown Silty CLAY			1	SS			13	1.6	2.0	21.1	
846.0		4.0										
	Brown Sandy Silty CLAY		5	2	SS			7	1.4	1.0	14.3	
				3	SS			5	1.0		17.4	
			10	4	SS			6		3.5	11.6	
835.0		15.0										
	Gray Sandy Silty CLAY		15	5	SS			28	5.4	4.5	8.3	
			20	6	SS			13	2.1	3.0	10.4	
829.0		21.0										
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Westfield Washington Schools**
BORING # **B-02**

PROJECT NAME **Addition to Carey Ridge Elementary School**
ALT & WITZIG FILE # **22IN0410**

PROJECT LOCATION **Westfield, IN**

DRILLING and SAMPLING INFORMATION

Date Started	**7/8/22**	Hammer Wt.	**140** lbs.
Date Completed	**7/8/22**	Hammer Drop	**30** in.
Boring Method	**HSA**	Spoon Sampler OD	**2** in.
Driller	**J. Livingston**	Rig Type	**D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION / SURFACE ELEVATION 847.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
846.7	TOPSOIL	0.3										
	Brown Sandy Silty CLAY *(Possible Fill)*			1	SS			15		4.5	8.9	
			5	2	SS			13		4.5	9.8	
839.5		7.5		3	SS		○	6				
836.5	Brown, Wet SAND and GRAVEL	10.5	10	4	SS			14	2.3	3.0	10.9	
	Gray Sandy Silty CLAY		15	5	SS			13	3.9	4.5	10.0	
826.0		21.0	20	6	SS			14		2.0	12.8	
	End of Boring at 21 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *7.5 ft.*
▽ At Completion *ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT: **Westfield Washington Schools**
BORING #: **B-03**
PROJECT NAME: **Addition to Carey Ridge Elementary School**
ALT & WITZIG FILE #: **22IN0410**
PROJECT LOCATION: **Westfield, IN**

DRILLING and SAMPLING INFORMATION

Date Started	**7/8/22**	Hammer Wt.	**140** lbs.
Date Completed	**7/8/22**	Hammer Drop	**30** in.
Boring Method	**HSA**	Spoon Sampler OD	**2** in.
Driller	**J. Livingston**	Rig Type	**D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION (SURFACE ELEVATION 845.0)	Strata Depth	Depth Scale	Sample No.	Sample Type	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % *Dry Unit Weight (pcf)*	Remarks
844.8	TOPSOIL	0.3								
840.0	Brown Silty Sandy CLAY	5.0		1	SS	9	0.9		15.8	
838.0	Brown Sandy CLAY	7.0	5	2	SS	6	0.9	1.5	18.9	
				3	SS	8	1.6	1.5	17.7	
			10	4	SS	8	1.8	1.5	12.6	
830.0	Brown Sandy Silty CLAY	15.0	15	5	SS	12	2.0		12.1	
824.0	Gray Sandy Silty CLAY	21.0	20	6	SS	11	2.6	2.0	10.9	
	End of Boring at 21 feet									

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling: *Dry ft.*
▽ At Completion: *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT: **Westfield Washington Schools**
PROJECT NAME: **Addition to Carey Ridge Elementary School**
PROJECT LOCATION: **Westfield, IN**

BORING #: **B-04**
ALT & WITZIG FILE #: **22IN0410**

DRILLING and SAMPLING INFORMATION

Date Started	**7/7/22**	Hammer Wt.	**140** lbs.
Date Completed	**7/7/22**	Hammer Drop	**30** in.
Boring Method	**HSA**	Spoon Sampler OD	**2** in.
Driller	**J. Livingston**	Rig Type	**D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 847.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
846.4	TOPSOIL	0.6										
	Brown Sandy Silty CLAY *(Possible Fill)*			1	SS			9		3.5	12.3	
842.0		5.0	5	2	SS			6	1.4	2.5	20.8	
	Brown Silty CLAY			3	SS			5	1.0	0.5	19.8	
838.0		9.0										
	Brown Sandy CLAY		10	4	SS			7	0.4		23.2	
832.0		15.0	15	5	SS			13	4.7	3.5	10.5	
	Gray Sandy Silty CLAY						▽ (18.0 ft)					
827.0		20.0	20	6	SS		○ (20.0 ft)	43				
	Gray, Wet SAND and GRAVEL											
822.0		25.0	25	7	SS			21	5.4	4.5	10.5	
	Gray Sandy Silty CLAY		30	8	SS			49	3.3	4.5	9.6	
816.0		31.0										
	End of Boring at 31 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *20.0 ft.*
▽ At Completion *18.0 ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Westfield Washington Schools**
PROJECT NAME **Addition to Carey Ridge Elementary School**
PROJECT LOCATION **Westfield, IN**

BORING # **S-01**
ALT & WITZIG FILE # **22IN0410**

DRILLING and SAMPLING INFORMATION

Date Started **7/8/22**
Date Completed **7/8/22**
Boring Method **HSA**
Driller **J. Livingston**

Hammer Wt. **140** lbs.
Hammer Drop **30** in.
Spoon Sampler OD **2** in.
Rig Type **D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 852.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % *Dry Unit Weight (pcf)*	Remarks
851.8	TOPSOIL	0.3								
	Brown Sandy Silty CLAY			1	SS	14	1.7		10.2	
			5	2	SS	15	2.9	4.5	10.2	
844.5		7.5		3	SS	15				
	Brown, Dry Fine SAND		10	4	SS	22				
841.0	End of Boring at 11 feet	11.0								

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
⊻ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Westfield Washington Schools**
BORING # **S-02**
PROJECT NAME **Addition to Carey Ridge Elementary School**
ALT & WITZIG FILE # **22IN0410**
PROJECT LOCATION **Westfield, IN**

DRILLING and SAMPLING INFORMATION

Date Started	**7/8/22**	Hammer Wt.	**140** lbs.
Date Completed	**7/8/22**	Hammer Drop	**30** in.
Boring Method	**HSA**	Spoon Sampler OD	**2** in.
Driller	**J. Livingston**	Rig Type	**D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION / SURFACE ELEVATION 846.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % / *Dry Unit Weight (pcf)*	Remarks
845.7	Mulch	0.3										
	Dark Brown Silty CLAY			1	SS		○	5	1.2	1.0	17.2	
			5	2	SS		∇	6		0.5	19.4	
840.0		6.0										
	Brown and Gray Silty CLAY			3	SS			6	0.7		17.8	
836.0		10.0	10	4	SS			11	1.9	2.0	12.2	
835.0	Brown Sandy Silty CLAY	11.0										
	End of Boring at 11 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *3.0 ft.*
∇ At Completion *5.0 ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

BORING LOG

Alt & Witzig Engineering, Inc.

CLIENT **Westfield Washington Schools**
BORING # **S-03**
PROJECT NAME **Addition to Carey Ridge Elementary School**
ALT & WITZIG FILE # **22IN0410**
PROJECT LOCATION **Westfield, IN**

DRILLING and SAMPLING INFORMATION

Date Started	**7/8/22**	Hammer Wt.	**140** lbs.
Date Completed	**7/8/22**	Hammer Drop	**30** in.
Boring Method	**HSA**	Spoon Sampler OD	**2** in.
Driller	**J. Livingston**	Rig Type	**D-50 Track ATV**

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 847.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content % *Dry Unit Weight (pcf)*	Remarks
846.6	Mulch	0.4										
	Dark Gray Silty CLAY			1	SS			8		4.0	22.2	
			5	2	SS			8	2.2	1.5	23.2	
839.0		8.0		3	SS			6	0.4		43.5	
	Brown and Gray Silty CLAY		10	4	SS			6	0.4		21.3	
836.0		11.0										
	End of Boring at 11 feet											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
○ During Drilling *Dry ft.*
▽ At Completion *Dry ft.*

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

MATERIAL GRAPHICS LEGEND

CL-ML: USCS Low Plasticity Silty Clay	CL: USCS Low Plasticity Sandy Clay	FILL: Fill (made ground)
SP: USCS Poorly-graded Sand	SP-GP: USCS Poorly-graded Gravelly Sand	TOPSOIL

SOIL PROPERTY SYMBOLS

N: *Standard "N" penetration value. Blows per foot of a 140-lb hammer falling 30" on a 2" O.D. split-spoon.*

Qu: *Unconfined Compressive Strength, tsf*

PP: *Pocket Penetrometer, tsf*

LL: *Liquid Limit, %*

PL: *Plastic Limit, %*

PI: *Plasticity Index, %*

DRILLING AND SAMPLING SYMBOLS

GROUNDWATER SYMBOLS

○ *Apparent water level noted while drilling.*

▽ *Apparent water level noted upon completion.*

▼ *Apparent water level noted upon delayed time.*

SAMPLER SYMBOLS

☒ SS: Split Spoon

RELATIVE DENSITY & CONSISTANCY CLASSIFICATION (NON-COHESIVE SOILS)

TERM	*BLOWS PER FOOT*
Very Loose	0 - 5
Loose	6 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	>51

RELATIVE DENSITY & CONSISTANCY CLASSIFICATION (COHESIVE SOILS)

TERM	*BLOWS PER FOOT*
Very Soft	0 - 3
Soft	4 - 5
Medium Stiff	6 - 10
Stiff	11 - 15
Very Stiff	16 - 30
Hard	>31

Alt & Witzig

Telephone:
Fax:

GENERAL NOTES

Project: Addition to Carey Ridge Elementary School

Location: Westfield, IN

Number: 22IN0410

APPENDIX B

Seismic Design Parameters
Pavement Core Report (TC22015)
Custom Soil Resource Report for Hamilton County, Indiana

22IN0410

Latitude, Longitude: 40.024599, -86.105063

Date	7/20/2022, 11:20:38 AM
Design Code Reference Document	IBC-2012
Risk Category	III
Site Class	D - Stiff Soil

Type	Value	Description
S_S	0.143	MCE_R ground motion. (for 0.2 second period)
S_1	0.08	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.229	Site-modified spectral acceleration value
S_{M1}	0.193	Site-modified spectral acceleration value
S_{DS}	0.153	Numeric seismic design value at 0.2 second SA
S_{D1}	0.128	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2 second
F_v	2.4	Site amplification factor at 1.0 second
PGA	0.065	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.105	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	0.143	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.157	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.08	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.093	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.6	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.909	Mapped value of the risk coefficient at short periods
C_{R1}	0.865	Mapped value of the risk coefficient at a period of 1 s

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Alt & Witzig Engineering, Inc.
4105 West 99th Street • Indianapolis • Indiana • 46032
Ph (317) 875-7000 • Fax (317) 876-3705

Report Date: July 5, 2022

Tested For:
Mr. Joe Montalone
Westfield Washington School Corporation
1143 East 181st St.
Westfield, Indiana 46074

Project:
New Westfield Elementary Core Investigation
16231 Carey Rd
Westfield, Indiana 46074
A&W Project: TC22015

Coring Investigation

Coring of the existing asphalt pavement was conducted in the west parking lot at this site on July 1st, 2022. A total of twelve (12) cores were taken during our field work for this project. The approximate locations of the cores are shown in our Core Location Plan, attached to this report.

The asphalt sampling process was performed by core drilling the existing pavement with a six (6) inch outside diameter diamond studded, water cooled core barrel attached to our coring rig. The core barrel was advanced through the pavement materials and each core sample was removed, measured, labeled, and packaged for return to our Carmel, Indiana laboratory.

After removal of the core was complete, the underlying subbase stone, if present, was measured and bagged for return to our laboratory. Additionally, field testing of the shallow subgrade soils was performed. Our testing included dynamic cone penetrometer (DCP) testing to a maximum depth of twenty-four (24) inches below the base of the stone subbase. Additionally, samples of the subgrade to a depth of twenty-four (24) inches below the base of the subbase were collected and were placed in glass jars that were sealed with Teflon™ lined lids. The soil samples were packaged for return to our laboratory for moisture content testing and visual classification. A summary of our field data and observations along with our laboratory photographs and data are presented in the Appendix of this report.

If you have any questions regarding this report, please do not hesitate to contact us. We appreciate the opportunity to work with you on this project and look forward to continuing to work with you.

Senior Project Manager: Keith Huddleston

Senior Project Engineer: Jacob L. Rankin, M.Eng., P.E.

Appendix

Table 1: C-1 Data

Core I. D.: C-1					
Pavement Section Data	**Overall Asphalt Thickness** (in.)		6		
	Subbase Thickness (in.)		9 ¼		
	Subbase Description		Fine to Coarse Crushed Limestone		
Soil Data			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
	Depth (in)	0-6	BrGr SaSiCl	18.4	3.0
		6-12	Br SaSiCl w/ Gravel	18.9	2.75
		12-18	Br SaSiCl	20.2	1.75
		18-24		17.1	2.5
DCP blow counts (per 6" increment)	4 – 4 – 4 – 7				

Figure 1a: C-1 Core Photograph

Figure 1b: Field Photograph

Table 2: C-2 Data

Core I. D.: C-2					
Pavement Section Data	**Overall Asphalt Thickness** (in.)		6 ¾		
	Subbase Thickness (in.)		8 ½		
	Subbase Description		Fine to Coarse Crushed Limestone		
Soil Data			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
	Depth (in)	0-6	Gr SaSiCl	18.8	2.0
		6-12		18.4	4.5+
		12-18	Br SiCl	18.6	4.5+
		18-24	BrGr SaSiCl	18.6	3.0
DCP blow counts (per 6" increment)	2 – 8 – 8 – 9				

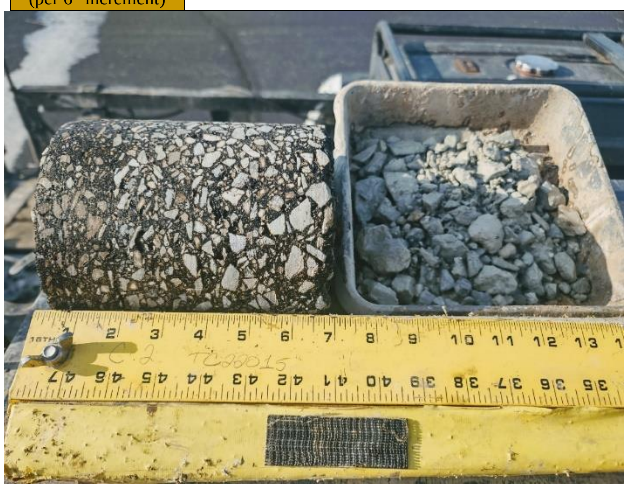

Figure 2a: C-2 Core Photograph

Figure 2b: Field Photograph

Table 3: C-3 Data

Core I. D.: C-3		
Pavement Section Data	**Overall Asphalt Thickness** (in.)	6 ¾
	Subbase Thickness (in.)	8 ¼
	Subbase Description	Fine to Coarse and Coarse Crushed Limestone

			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
Soil Data	Depth (in)	0-6	Gr SaSiCl w/ Gravel	16.4	2.5
		6-12	BrGr SaSiCl w/ Gravel	17.1	2.25
		12-18	Br SaCl	21.2	2.5
		18-24		20.1	2.0
DCP blow counts (per 6" increment)	6 – 13 – 19 – 6				

Figure 3a: C-3 Core Photograph

Figure 3b: Field Photograph

Table 4: C-4 Data

Core I. D.: C-4					
Pavement Section Data	**Overall Asphalt Thickness** (in.)		6 ¼		
	Subbase Thickness (in.)		7		
	Subbase Description		Fine to Coarse and Coarse Crushed Limestone		
Soil Data			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
	Depth (in)	0-6	DrGr SaSiCl w/ Gravel	18.2	1.0
		6-12	LtBr SiCl	19.4	4.0
		12-18	Br SaSiCl	21.2	4.5
		18-24	-	-	-
DCP blow counts (per 6" increment)	32 – 50+				

Figure 4a: C-4 Core Photograph

Figure 4b: Field Photograph

Table 5: C-5 Data

Core I. D.: C-5		
Pavement Section Data	**Overall Asphalt Thickness** (in.)	5
	Subbase Thickness (in.)	8 ¼
	Subbase Description	Fine to Coarse and Coarse Crushed Limestone

			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
Soil Data	Depth (in)	0-6	Br SaCl w/ Gravel	18.2	N/A
		6-12		15.6	4.5+
		12-18	Br SaSiCl	13.6	4.25
		18-24	Br SaSiCl w/ Gravel	14.0	4.5+
DCP blow counts (per 6" increment)	24 – 15 – 12 – 19				

Figure 5a: C-5 Core Photograph

Figure 5b: Field Photograph

Table 6: C-6 Data

Core I. D.: C-6					
Pavement Section Data	**Overall Asphalt Thickness** (in.)		4 ½		
	Subbase Thickness (in.)		5		
	Subbase Description		Fine to Coarse Crushed Limestone		
Soil Data			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
	Depth (in)	0-6	GrBr & Bl SiCl w/ Sa	25.2	1.25
		6-12	Gr SiCl	29.2	1.0
		12-18	GrBr & Bl SiCl w/ Sa	21.5	1.50
		18-24		19.9	1.25
DCP blow counts (per 6" increment)	2 – 2 – 2 – 3				

Figure 6a: C-6 Core Photograph

Figure 6b: Field Photograph

Table 7: C-7 Data

<table>
<tr><th colspan="6">Core I. D.: C-7</th></tr>
<tr><td rowspan="3">Pavement Section Data</td><td colspan="2">Overall Asphalt Thickness (in.)</td><td colspan="3">4 ¾</td></tr>
<tr><td colspan="2">Subbase Thickness (in.)</td><td colspan="3">4 ¾</td></tr>
<tr><td colspan="2">Subbase Description</td><td colspan="3">Fine to Coarse Crushed Limestone</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td rowspan="5">Soil Data</td><td colspan="2"></td><td>Soil Description</td><td>Moisture Content (%)</td><td>Pocket Penetrometer (TSF)</td></tr>
<tr><td rowspan="4">Depth (in)</td><td>0-6</td><td rowspan="2">Br SaCl</td><td>25.8</td><td>1.5</td></tr>
<tr><td>6-12</td><td>27.7</td><td>1.75</td></tr>
<tr><td>12-18</td><td rowspan="2">Br SaSiCl</td><td>20.2</td><td>2.0</td></tr>
<tr><td>18-24</td><td>16.3</td><td>2.25</td></tr>
<tr><td>DCP blow counts (per 6" increment)</td><td colspan="5">17 – 17 – 2 – 8</td></tr>
</table>

Figure 7a: C-7 Core Photograph

Figure 7b: Field Photograph

Table 8: C-8 Data

<table>
<tr><th colspan="6">Core I. D.: C-8</th></tr>
<tr><td rowspan="3">Pavement Section Data</td><td colspan="2">Overall Asphalt Thickness (in.)</td><td colspan="3">5</td></tr>
<tr><td colspan="2">Subbase Thickness (in.)</td><td colspan="3">6</td></tr>
<tr><td colspan="2">Subbase Description</td><td colspan="3">Fine to Coarse Crushed Limestone</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td rowspan="5">Soil Data</td><td colspan="2"></td><td>Soil Description</td><td>Moisture Content (%)</td><td>Pocket Penetrometer (TSF)</td></tr>
<tr><td rowspan="4">Depth (in)</td><td>0-6</td><td rowspan="3">BrGr SaSiCl</td><td>20.6</td><td>2.25</td></tr>
<tr><td>6-12</td><td>19.1</td><td>N/A</td></tr>
<tr><td>12-18</td><td>17.0</td><td>1.5</td></tr>
<tr><td>18-24</td><td>Br SaSiCl</td><td>10.8</td><td>4.5+</td></tr>
<tr><td>DCP blow counts (per 6" increment)</td><td colspan="5">23 – 32 – 5 – 8</td></tr>
</table>

Figure 8a: C-8 Core Photograph

Figure 8b: Field Photograph

Table 9: C-9 Data

Core I. D.: C-9		
Pavement Section Data	**Overall Asphalt Thickness** (in.)	6 ½
	Subbase Thickness (in.)	5 ½
	Subbase Description	Fine to Coarse Crushed Limestone

			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
Soil Data	Depth (in)	0-6	Gr SaSiCl w/ Stone	14.8	4.5+
		6-12	Br SaSi	11.9	N/A
		12-18	-	-	-
		18-24	-	-	-
DCP blow counts (per 6" increment)	50 / 3"				

Figure 9a: C-9 Core Photograph

Figure 9b: Field Photograph

Table 10: C-10 Data

Core I. D.: C-10		
Pavement Section Data	**Overall Asphalt Thickness** (in.)	7
	Subbase Thickness (in.)	7 ¾
	Subbase Description	Fine to Coarse Crushed Limestone

Soil Data			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
Soil Data	Depth (in)	0-6	Gr SiCl w/ Gravel & Sa	17.8	1.25
		6-12		16.6	1.25
		12-18		18.9	4.0
		18-24		11.5	4.5+
DCP blow counts (per 6" increment)	6 – 7 – 1 – 15				

Figure 10a: C-10 Core Photograph

Figure 10b: Field Photograph

Table 11: C-11 Data

Core I. D.: C-11					
Pavement Section Data	**Overall Asphalt Thickness** (in.)		4		
	Subbase Thickness (in.)		8 ½		
	Subbase Description		Fine to Coarse Crushed Limestone		
Soil Data			Soil Description	Moisture Content (%)	Pocket Penetrometer (TSF)
	Depth (in)	0-6	DrGr SaSiCl	20.9	2.5
		6-12		20.3	2.5
		12-18		40.7	1.25
		18-24		24.4	1.0
DCP blow counts (per 6" increment)	3 – 3 – 2 – 4				

Figure 11a: C-11 Core Photograph

Figure 11b: Field Photograph

Table 12: C-12 Data

<table>
<tr><th colspan="6">Core I. D.: C-12</th></tr>
<tr><td rowspan="3">Pavement Section Data</td><td colspan="2">Overall Asphalt Thickness (in.)</td><td colspan="3">5 ½</td></tr>
<tr><td colspan="2">Subbase Thickness (in.)</td><td colspan="3">6</td></tr>
<tr><td colspan="2">Subbase Description</td><td colspan="3">Fine to Coarse Crushed Limestone</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td rowspan="5">Soil Data</td><td colspan="2"></td><td>Soil Description</td><td>Moisture Content (%)</td><td>Pocket Penetrometer (TSF)</td></tr>
<tr><td rowspan="4">Depth (in)</td><td>0-6</td><td>DrGr SaSiCl</td><td>19.9</td><td>4.5</td></tr>
<tr><td>6-12</td><td rowspan="2">DrGr SiCl</td><td>18.4</td><td>3.0</td></tr>
<tr><td>12-18</td><td>23.7</td><td>2.75</td></tr>
<tr><td>18-24</td><td>Bl SiCl w/ Sa</td><td>26.1</td><td>3.0</td></tr>
<tr><td>DCP blow counts (per 6" increment)</td><td colspan="5">5 – 3 – 4 – 5</td></tr>
</table>

Figure 12a: C-12 Core Photograph

Figure 12b: Field Photograph

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Hamilton County, Indiana

22IN0410

June 30, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:2,550 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 35, 70, 140, 210

Feet: 0, 100, 200, 400, 600

N

Map projection: Web Mercator   Corner coordinates: WGS84   Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hamilton County, Indiana
Survey Area Data: Version 22, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Sep 30, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
YbvA	Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes	5.4	19.4%
YclA	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	11.2	39.7%
YmsA	Miami silt loam-Urban land complex, 0 to 2 percent slopes	1.7	6.1%
YmsB2	Miami silt loam-Urban land complex, 2 to 6 percent slopes, eroded	7.9	28.0%
YwsA	Whitaker loam-Urban land complex, 0 to 2 percent slopes	1.9	6.8%
Totals for Area of Interest		**28.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hamilton County, Indiana

YbvA—Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w57n
Elevation: 600 to 1,260 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Brookston and similar soils: 65 percent
Urban land: 30 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brookston

Setting

Landform: Till plains, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Parent material: Loess over loamy till

Typical profile

Ap - 0 to 16 inches: silty clay loam
Btg1 - 16 to 32 inches: silty clay loam
Btg2 - 32 to 44 inches: loam
C - 44 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F111AY007IN - Till Depression Flatwood
Hydric soil rating: Yes

Minor Components

Crosby

Percent of map unit: 5 percent
Landform: Till plains
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F111AY008IN - Wet Till Ridge
Hydric soil rating: No

YclA—Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w57p
Elevation: 600 to 1,040 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Crosby and similar soils: 60 percent
Urban land: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crosby

Setting

Landform: Recessionial moraines, ground moraines, water-lain moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Silty material or loess over loamy till

Typical profile

Ap - 0 to 10 inches: silt loam
Btg - 10 to 17 inches: silty clay loam
2Bt - 17 to 29 inches: clay loam
2BCt - 29 to 36 inches: loam
2Cd - 36 to 79 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 24 to 40 inches to densic material
Drainage class: Somewhat poorly drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 55 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F111AY008IN - Wet Till Ridge
Hydric soil rating: No

Minor Components

Williamstown, eroded

Percent of map unit: 5 percent
Landform: Recessionial moraines, ground moraines, water-lain moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Ecological site: F111AY009IN - Till Ridge
Hydric soil rating: No

Treaty, drained

Percent of map unit: 5 percent
Landform: Swales, water-lain moraines, depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F111AY007IN - Till Depression Flatwood
Hydric soil rating: Yes

YmsA—Miami silt loam-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y480
Elevation: 700 to 1,040 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 145 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Miami and similar soils: 60 percent
Urban land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miami

Setting

Landform: Till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over loamy till

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 38 inches: clay loam
H3 - 38 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 24 to 40 inches to densic material
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.02 to 0.60 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: F111AY009IN - Till Ridge
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

YmsB2—Miami silt loam-Urban land complex, 2 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2w586
Elevation: 180 to 1,040 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Miami, eroded, and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miami, Eroded

Setting

Landform: Till plains
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over loamy till

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 13 inches: silty clay loam
2Bt - 13 to 31 inches: clay loam
2BCt - 31 to 36 inches: loam
2Cd - 36 to 79 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 24 to 40 inches to densic material
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 45 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F111AY009IN - Till Ridge
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Williamstown

Percent of map unit: 5 percent
Landform: Till plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F111AY009IN - Till Ridge
Other vegetative classification: Trees/Timber (Woody Vegetation)

Hydric soil rating: No

Treaty

Percent of map unit: 5 percent
Landform: Till plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F111AY007IN - Till Depression Flatwood
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Crosby

Percent of map unit: 5 percent
Landform: Till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F111AY008IN - Wet Till Ridge
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

YwsA—Whitaker loam-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2xf6k
Elevation: 700 to 1,040 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 145 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Whitaker and similar soils: 55 percent
Urban land: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitaker

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy outwash

Typical profile

H1 - 0 to 13 inches: loam
H2 - 13 to 38 inches: clay loam
H3 - 38 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 45 percent
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F111AY014IN - Outwash Upland
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Westland

Percent of map unit: 5 percent
Landform: Depressions
Ecological site: R111AY016IN - Outwash Mollisol
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Sleeth

Percent of map unit: 5 percent
Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F111AY014IN - Outwash Upland
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

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ADDENDUM 04

October 31, 2022

Westfield-Washington Schools
Carey Ridge Elementary School – Addition and Renovations

Mussett, Nicholas & Associates, Inc.
502 S. West St
Indianapolis, IN 46225
MNA Commission No.: 2022095

TO ALL HOLDERS OF PROCUREMENT DOCUMENTS

This Addendum forms a part of the Contract Documents and modifies the original Procurement Documents dated 9/30/2022 and any previously issued Addenda, as noted below. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject bidder to disqualification.

RESPONSES TO QUESTIONS RECEIVED

Item No. 1 Gibson-Lewis asked to confirm that the MEP contractors are responsible for all MEP penetrations through gypsum partitions.

1. ANSWER: MEP contractors are responsible for all MEP penetrations. Refer to specification 23 05 17.

Item No. 2 Johnson Controls asked to confirm the 4" static pressure listen in the SF-8 schedule is total or external and to confirm the expected external static pressure.

1. ANSWER: 4" static pressure listed for SF-8 is the total system pressure. The expected external static pressure is 1.4".

Item No. 3 Greiner Brothers asked if Specification Section 23 01 30.52 "Existing HVAC Air Distribution System Cleaning" would be issued via addendum or not be required.

1. ANSWER: Cleaning of existing ductwork will not be required. Sections 23 01 30.52 "Existing HVAC Air Distribution System Cleaning" will not be issued via addendum.

Item No. 4 Greiner Brothers asked if sealing the duct ends would be acceptable in lieu of duct cleaning for the new ductwork.

1. ANSWER: Sealing duct ends is acceptable in lieu of duct cleaning for the new ductwork.

Item No. 5 Greiner Brothers asked to confirm hot water return being installed at each SK-1.

1. ANSWER: Hot water return will not be installed at each SK-1. Note 1 on P101H – FIRST FLOOR PLAN – UNIT H - PLUMBING has been updated.

Item No. 6 Greiner Brothers asked where the hot water return piping connection location should be made.

1. The as-builts indicate an existing 3/4" hot water return pipe located above the corridor in unit "D". It is recommended to connect unit "H" hot water return piping to existing hot water return piping in unit "D".

Item No. 7 ESL Spectrum: for W1, Axis does not have the silver louver. Is it okay to use Zumtobel SL3?

1. ANSWER: Yes, see updated light fixture schedule.

CHANGES TO SPECIFICATIONS

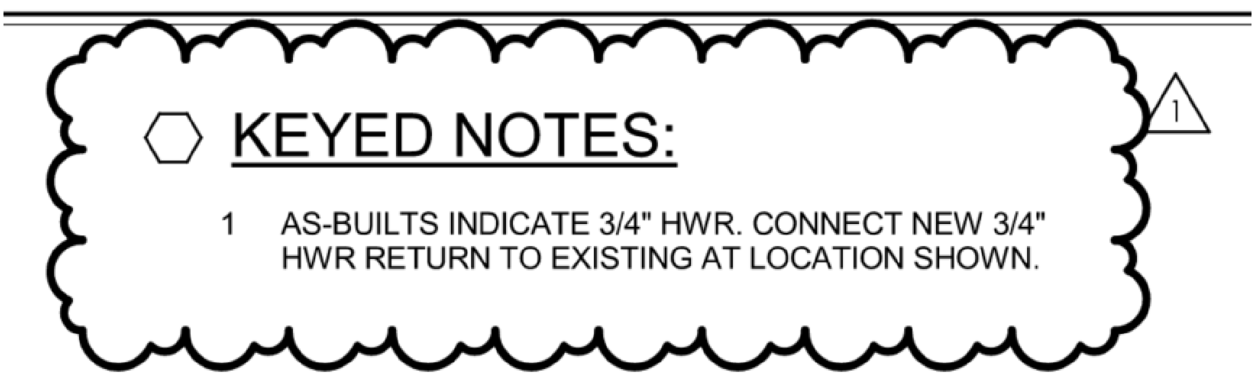
Item No. 1 Section 23 73 13.13 – HYDRONIC PUMPS

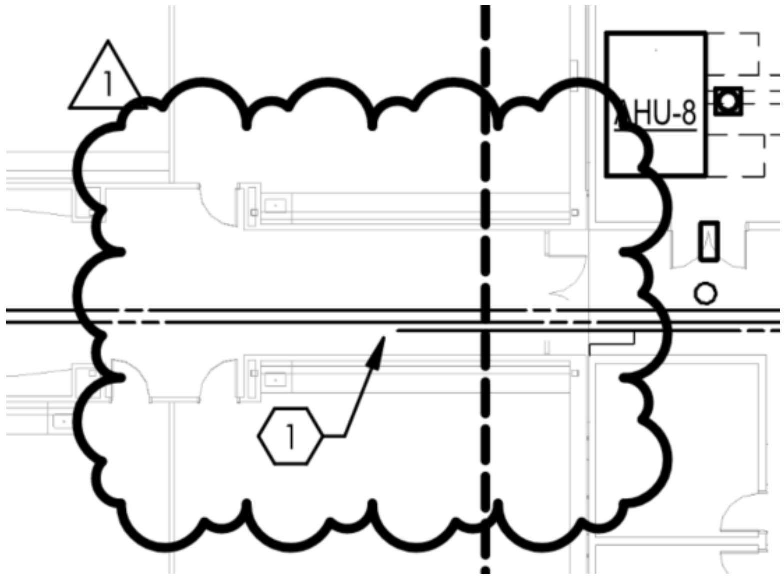
A. New Specification section. See attached.

CHANGES TO DRAWINGS

Item No. 1 SHEET – P101 – FIRSRTH FLOOR PLAN – PLUMBING

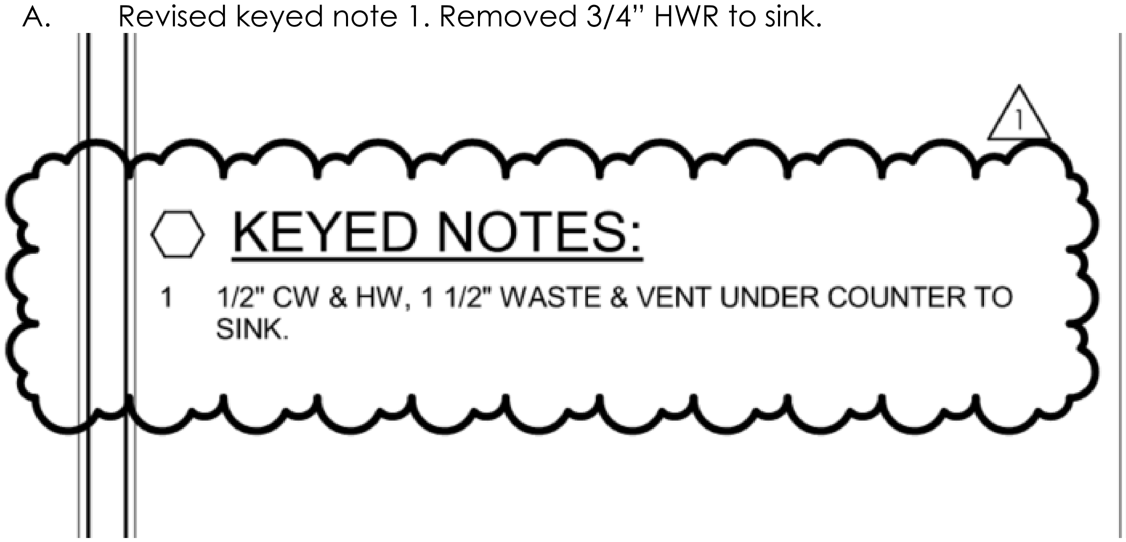
A. Added keyed note 1 for clarification.





Item No. 2 SHEET – P101H – FIRST FLOOR PLAN – UNIT H – PLUMBING

A. Revised keyed note 1. Removed 3/4” HWR to sink.



Item No. 3 Sheet E601 – ELECTRICAL SCHEDULES

A. Modified light fixture types as indicated above from contractor question No. 7

By: ________________________________
David Bailey

Attachments: 23 21 23 – Hydronic Pumps

END OF ADDENDUM 4

SECTION 23 21 23 - HYDRONIC PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Close-coupled, in-line centrifugal pumps.
2. Automatic condensate pump units.

1.2 DEFINITIONS

A. ECM: Electronically commutated motor.

B. EPDM: Ethylene propylene diene monomer.

C. FKM: Fluoroelastomer polymer.

D. HI: Hydraulic Institute.`

E. NBR: Nitrile rubber or Buna-N.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of pump.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 AUTOMATIC CONDENSATE PUMP UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Beckett Corporation.
2. Crane Pumps & Systems.
3. Little Giant; a brand of Franklin Electric Co., Inc.
4. Trane Technologies

B. Description: Packaged units with corrosion-resistant pump, [**aluminum**] [**plastic**] tank with cover, and automatic controls. Collects and removes condensate from fan coil units, air handling units, condensing boilers, and similar components. Include factory- or field-installed check valve and 72-inch- (1800-mm-) minimum, electrical power cord with plug.

C. Capacities and Characteristics:
1. Pump Capacity: 3.7 g/hr.
2. Maximum Lift: 16.5 ft.
3. Electrical Characteristics:

a. Volts: 208 V.
b. Phase: Single.
c. Hertz: 60 Hz.

2.3 ELECTRONICALLY COMMUTATED MOTOR (ECM)

A. Provide pumps so they are specified or scheduled with ECM.

1. Synchronous, constant torque, ECM with permanent magnet rotor. Rotor magnets to be time-stable, nontoxic ceramic magnets (Sr-Fe).
2. Driven by a frequency converter with an integrated power factor correction filter. Conventional induction motors will not be acceptable.
3. Each motor with an integrated variable-frequency drive, tested as one unit by manufacturer.
4. Motor speed adjustable over full range from 0 rpm to maximum scheduled speed.
5. Variable motor speed to be controlled by a 0- to 10 V-dc or 4- to 20-mA input.
6. Integrated motor protection verified by UL to protect the pump against over-/undervoltage, overtemperature of motor and/or electronics, overcurrent, locked rotor, and dry run (no-load condition).

PART 3 - EXECUTION

3.1 PUMP INSTALLATION

A. Comply with HI 1.4.

B. Install pumps to provide access for periodic maintenance including removing motors, impellers, couplings, and accessories.

C. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.

D. Automatic Condensate Pump Units: Install units for collecting condensate and extend to open drain.

E. Equipment Mounting: Install in-line pumps with continuous-thread hanger rods and elastomeric hangers of size required to support weight of in-line pumps.

3.2 ALIGNMENT

A. Perform alignment service. When required by manufacturer to maintain warranty coverage, engage a factory-authorized service representative to perform it.

B. Comply with requirements in HI standards for alignment of pump and motor shaft. Add shims to the motor feet and bolt motor to base frame. Do not use grout between motor feet and base frame.

C. Comply with pump and coupling manufacturers' written instructions.

D. After alignment is correct, tighten foundation bolts evenly but not too firmly. Completely fill baseplate with nonshrink, nonmetallic grout while metal blocks and shims or wedges are in place. After grout has cured, fully tighten foundation bolts.

3.3 PIPING CONNECTIONS

A. Where installing piping adjacent to pump, allow space for service and maintenance.

B. Connect piping to pumps. Install valves that are same size as piping connected to pumps.

C. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.

D. Install flexible connectors on suction and discharge sides of base-mounted pumps between pump casing and valves.

E. Install check valve on each condensate pump unit discharge unless unit has a factory-installed check valve.

3.4 ELECTRICAL CONNECTIONS

A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
   1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch (13 mm) high.

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

3.6 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks in accordance with manufacturer's written instructions.
2. Check piping connections for tightness.
3. Clean strainers on suction piping. Use startup strainer for initial startup.
4. Perform the following startup checks for each pump before starting:

    a. Verify bearing lubrication.
    b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
    c. Verify that pump is rotating in correct direction.

5. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
6. Start motor.
7. Open discharge valve slowly.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Hydronic pumps will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain hydronic pumps.

END OF SECTION 23 21 23