ADDENDUM NO. 1

PALESTINE-HOLLANSBURG JOINT SEWER DISTRICT Centralized Wastewater System July 28, 2021

To: Planholders

From:	Mote & Associates, Inc.	Phone:	(937) 548-7511
	214 West Fourth Street	Fax:	(937) 548-7484
	Greenville, Ohio 45331	E-mail:	info@moteassociates.com

Re: Palestine-Hollansburg Joint Sewer District Centralized Wastewater System

This Addendum forms a part of the Contract Documents and modifies the original Contract Documents dated July, 2021. Acknowledge receipt of this Addendum in the space provided on the Bid Proposal Form. Failure to do so may subject the Bidder to disqualification.

CHANGES/CLARIFICATIONS TO THE CONTRACTING DOCUMENTS:

1. Section 00 75 52, DAVIS BACON WAGE DETERMINATION SCHEDULE

The "Heavy/Highway" General Wage Decision has been modified. The revised Heavy/Highway Wage Decision dated 07/16/2021 with 10 modifications is attached hereto and are the wage rates that will be in effect for this project.

CHANGES/CLARIFICATIONS TO THE TECHNICAL SPECIFICATIONS

2. <u>Section 26 32 13.50 – SINGLE PHASE DIESEL-ENGINE DRIVEN GENERATOR SETS</u>

Attached is a revised specification for the Diesel-Engine Driven Generators that reflects use of singlephase power at both generator locations. This specification shall replace Section 26 32 13.10, Diesel-Engine Driven Generator Sets from the original Contract Documents Manual.

3. <u>Section 33 32 20 – PACKAGE LIFT STATIONS</u>

Attached is Technical Specification 33 32 20, Package Lift Stations for Alternate #3 which allows the use of package lift station(s) at either the Palestine or Glen Karn sites. The proposed price for the use of a package lift station shall include all other costs related to installation including phase conversion consideration with use of single-phase electric service which is all that is available at both sites.

A lockable lid for the dewatering "wells" at the lift stations will be required, regardless of the type of lift station that is installed.

4. <u>Section 40 75 13 – PH ANALYZER PROBE</u>

This Technical Specification for a pH Analyzer Probe shall be deleted as this item has been eliminated from the project.

5. Section 40 75 43 – DISSOLVED OXYGEN ANALYZER PROBE

This Technical Specification for a Dissolved Oxygen Analyzer Probe shall be deleted as this item has been eliminated from the project.

6. Section 40 75 53 - TURBIDITY ANALYZER PROBE

This Technical Specification for a Turbidity Analyzer Probe shall be deleted as this item has been eliminated from the project.

7. Section 40 92 13.13 – ELECTRICALLY OPERATED PRIMARY CONTROL VALVES

Attached is Technical Specification 40 92 13.13, Electrically Operated Primary Control Valves to address the requirements for the dilution water control valve as shown on Electrical Plans Sheet #5 of 10 and the Influent Control Panel shown on Sheet #8 of 10.

GENERAL CLARIFICATIONS:

- 8. The Owner is releasing the attached Geotechnical Engineering Investigation for informational purposes only. This Inspection Report is not part of the Contract Documents. See Contract Documents General Conditions, Section 00 72 00, Section 5.03 "Subsurface and Physical Conditions" (Page 13 of 64).
- 9. All items noted within the lift station plan sheets and required to make the lift stations fully operational shall be included in the Lump Sum Bid Price. This includes any item not specifically shown or called out on the plans or within the specifications, but is required to complete the work in place and to be fully operational.
- 10. Any material suppliers requesting "or equal" or "approved equal" status will be reviewed. If additional material suppliers are approved, they will be duly noted in an Addendum. Otherwise, all materials shall be based on the brand names included in the specifications.
- 11. Any requests for equals to the brand name generators shall include analysis of fuel consumption and operational costs.
- 12. All variable frequency drives shall be the same brand/type/model for ease in replacement parts and service.
- 13. The Pre-Bid Meeting Notes and Sign-In Sheet are attached hereto.

END OF ADDENDUM

Attachments: Section 00 75 52, Davis-Bacon Wage Determination Schedule (07/16/21) Section 26 32 13.50, Single-Phase – Diesel Engine Driven Generator Sets Section 33 32 20, Package Lift Stations Section 40 92 13.13, Electrically-Operated Control Valves Geotechnical Report Pre-Bid Meeting Notes & Sign-In Sheet

DAVIS BACON WAGE DECISION SCHEDULE 00 75 52

"General Decision Number: OH20210001 07/16/2021

Superseded General Decision Number: OH20200001

State: Ohio

Construction Types: Heavy and Highway

Counties: Ohio Statewide.

Heavy and Highway Construction Projects

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification	Number	Publication	Date
0		01/01/2021	
1		01/22/2021	
2		02/12/2021	
3		04/23/2021	
4		04/30/2021	
5		05/21/2021	
б		05/28/2021	
7		06/18/2021	
8		07/02/2021	
9		07/09/2021	
10		07/16/2021	

BROH0001-001 06/01/2019

DEFIANCE, FULTON (Excluding Fulton, Amboy & Swan Creek Townships), HENRY (Excluding Monroe, Bartlow, Liberty, Washington, Richfield, Marion, Damascus & Townships & that part of Harrison Township outside corporate limits of city of Napoleon), PAULDING, PUTNAM and WILLIAMS COUNTIES

	Rates	Fringes
Bricklayer, Stonemason	\$ 29.34	16.11
BROH0001-004 06/01/2019		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER.	\$ 29.34	16.11
BROH0003-002 06/01/2019		

FULTON (Townships of Amboy, Swan Creek & Fulton), HENRY (Townships of Washington, Damascus, Richfield, Bartlow, Liberty, Harrison, Monroe, & Marion), LUCAS and WOOD (Townships of Perrysburg, Ross, Lake, Troy, Freedom, Montgomery, Webster, Center, Portage, Middleton, Plain, Liberty, Henry, Washington, Weston, Milton, Jackson & Grand Rapids) COUNTIES

	I	Rates	Fringes
Bricklayer,	Stonemason\$	29.34	16.11

BROH0005-003 06/01/2020

CUYAHOGA, LORAIN & MEDINA (Hinckley, Granger, Brunswick, Liverpool, Montville, York, Homer, Harrisville, Chatham, Litchfield & Spencer Townships and the city of Medina)

Rates Fringes BRICKLAYER BRICKLAYERS; CAULKERS; CLEANERS; POINTERS; & STONEMASONS.....\$ 36.64 17.13 SANDBLASTERS.....\$ 36.39 17.13 SEWER BRICKLAYERS & STACK BUILDERS.....\$ 36.64 17.13 SWING SCAFFOLDS.....\$ 37.14 17.13 BROH0006-005 06/01/2019

CARROLL, COLUMBIANA (Knox, Butler, West & Hanover Townships), STARK & TUSCARAWAS

Fringes Rates Bricklayer, Stonemason.....\$ 29.34 16.11 _____ BROH0007-002 06/01/2019 LAWRENCE Rates Fringes Bricklayer, Stonemason.....\$ 29.34 16.11 _____ BROH0007-005 06/01/2019 PORTAGE & SUMMIT Rates Fringes BRICKLAYER.....\$ 29.34 16.11 _____ BROH0007-010 06/01/2019 PORTAGE & SUMMIT Rates Fringes MASON - STONE.....\$ 29.34 16.11 _____ BROH0008-001 06/01/2019 COLUMBIANA (Salem, Perry, Fairfield, Center, Elk Run, Middleton, & Unity Townships and the city of New Waterford), MAHONING & TRUMBULL Rates Fringes BRICKLAYER.....\$ 29.34 16.11 _____ BROH0009-002 06/01/2019 BELMONT & MONROE COUNTIES and the Townships of Warren & Mt. Pleasant and the Village of Dillonvale in JEFFERSON COUNTY Rates Fringes Bricklayer, Stonemason.....\$ 29.34 16.11 Refractory.....\$ 31.45 19.01 _____ BROH0010-002 06/01/2019 COLUMBIANA (St. Clair, Madison, Wayne, Franklin, Washington, Yellow Creek & Liverpool Townships) & JEFFERSON (Brush Creek & Page 3 of 46

	Rates	Fringes
Bricklayer, Stonemason	\$ 29.34	16.11
BROH0014-002 06/01/2019		
HARRISON & JEFFERSON (Except Mt. Saline & Salineville Townships &	Pleasant, Warren the Village of 1	n, Brush Creek, Dillonvale)
	Rates	Fringes
Bricklayer, Stonemason	\$ 29.34	16.11
BROH0016-002 06/01/2019		
ASHTABULA, GEAUGA, and LAKE COUNT	IES	
	Rates	Fringes
Bricklayer, Stonemason	\$ 29.34	16.11
BROH0018-002 06/01/2019		
BROWN, BUTLER, CLERMONT, HAMILTON Israel, Lanier, Somers & Gratis	, PREBLE (Gaspe: Townships) & WA	r, Dixon, RREN COUNTIES:
	Rates	Fringes
Bricklayer, Stonemason	\$ 29.34	16.11
BROH0022-004 06/01/2019		
CHAMPAIGN, CLARK, CLINTON, DARKE, MIAMI, MONTGOMERY, PREBLE (Jackso Jefferson & Washington Townships)	GREENE, HIGHLA n, Monroe, Harr and SHELBY COU	ND, LOGAN, ison, Twin, NTIES
	Rates	Fringes
Bricklayer, Stonemason	\$ 29.34	16.11
BROH0032-001 06/01/2019		
GALLIA & MEIGS		
	Rates	Fringes
Bricklayer, Stonemason	\$ 29.34	16.11
BROH0035-002 06/01/2019		

ALLEN, AUGLAIZE, MERCER and VAN WERT COUNTIES Rates Fringes Bricklayer, Stonemason.....\$ 29.34 16.11 _____ BROH0039-002 06/01/2019 ADAMS & SCIOTO Rates Fringes Bricklayer, Stonemason.....\$ 29.34 16.11 _____ BROH0040-003 06/01/2019 ASHLAND, CRAWFORD, HARDIN, HOLMES, MARION, MORROW, RICHLAND, WAYNE and WYANDOT (Except Crawford, Ridge, Richland & Tymochtee Townships) COUNTIES Fringes Rates Bricklayer, Stonemason.....\$ 29.34 16.11 FOOTNOTE: Layout Man and Sawman rate: \$1.00 per hour above journeyman rate. Free standing stack work ground level to top of stack; Sandblasting and laying of carbon masonry material in swing stage and/or scaffold; Ramming and spading of plastics and gunniting: \$1.50 per hour above journeyman rate. ""Hot"" work: \$2.50 above journeyman rate. _____ BROH0044-002 06/01/2019 Rates Fringes Bricklayer, Stonemason COSHOCTON, FAIRFIELD, GUERNSEY, HOCKING, KNOX, KICKING, MORGAN, MUSKINGUM, NOBLE (Beaver, Buffalo, Seneca & Wayne Townships) & PERRY COUNTIES:.....\$ 29.34 16.11 _____ BROH0045-002 06/01/2017 FAYETTE, JACKSON, PIKE, ROSS and VINTON COUNTIES Rates Fringes Bricklayer, Stonemason.....\$ 28.65 14.55

BROH0046-002 06/01/2019

ERIE, HANCOCK, HURON, OTTAWA, SANDUSKY, SENECA, WOOD (Perry & Bloom Townships) and WYANDOT (Tymochtee, Crawford, Ridge & Richland Townships) COUNTIES & the Islands of Lake Erie north of Sandusky

	Rates	Fringes		
Bricklayer, Stonemason	\$ 29.34	16.11		
FOOTNOTE: Layout Man and Sawman rate: \$1.00 per hour above journeyman rate. Free standing stack work ground level to top of stack; Sandblasting and laying of carbon masonry material in swing stage and/or scaffold; Ramming and spading of plastics and gunniting: \$1.50 per hour above journeyman rate. ""Hot"" work: \$2.50 above journeyman rate.				
BROH0052-001 06/01/2019				
ATHENS COUNTY				
	Rates	Fringes		
Bricklayer, Stonemason	\$ 29.34	16.11		
BROH0052-003 06/01/2019				
NOBLE (Brookfield, Noble, Center, Jackson, Jefferson & Elk Township	Sharon, Olive, os) and WASHING	Enoch, Stock, TON COUNTIES		
	Rates	Fringes		
Bricklayer, Stonemason	\$ 29.34	16.11		
BROH0055-003 06/01/2017				
DELAWARE, FRANKLIN, MADISON, PICK	XAWAY and UNION (COUNTIES		
	Rates	Fringes		
Bricklayer, Stonemason	\$ 28.65	14.55		
CARP0003-004 05/01/2017				
MAHONING & TRUMBULL				
	Rates	Fringes		
CARPENTER	\$ 26.20	17.42		
Page 6 of 46	Davis	Bacon Wage Decision Schedule		

_____ CARP0069-003 05/01/2017 CARROLL, STARK, TUSCARAWAS & WAYNE Rates Fringes CARPENTER.....\$ 25.98 15.98 _____ CARP0069-006 05/01/2017 COSHOCTON, HOLMES, KNOX & MORROW Rates Fringes CARPENTER.....\$ 24.04 15.29 _____ CARP0171-002 05/01/2019 BELMONT, COLUMBIANA, HARRISON, JEFFERSON & MONROE Rates Fringes CARPENTER.....\$ 27.37 20.02 _____ CARP0200-002 05/01/2017 ADAMS, ATHENS, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GUERNSEY, HIGHLAND, HOCKING, JACKSON, LAWRENCE, LICKING, MADISON, MARION, MEIGS, MORGAN, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, ROSS, SCIOTO, UNION, VINTON and WASHINGTON COUNTIES Rates Fringes CARPENTER.....\$ 29.07 16.22 Diver.....\$ 39.41 10.40 PILEDRIVERMAN.....\$ 29.07 16.22 _____ CARP0248-005 07/01/2008 LUCAS & WOOD Fringes Rates CARPENTER.....\$ 27.27 14.58 CARP0248-008 07/01/2008 Rates Fringes CARPENTER DEFIANCE, FULTON, HANCOCK, HENRY, PAULDING & WILLIAMS

Page 8 of 46		Davis Bacon Wage Decision Sch
Piledrivermen & Diver's Tender	\$ 27.30	16.05
	Rates	Fringes
CRAWFORD, DEFIANCE, FULTON, HANG PAULDING, SANDUSKY, SENECA, WILI	COCK, HENRY LIAMS & WOOI	, LUCAS, OTTAWA, D
CARP1393-002 07/01/2008		
Carpenter & Piledrivermen	\$ 29.34 \$ 40.58	15.95 9.69
	Rates	Fringes
BROWN, BUTLER, CHAMPAIGN, CLARK, GREENE, HAMILTON, LOGAN, MIAMI, WARREN	, CLERMONT, MONTGOMERY	CLINTON, DARKE, , PREBLE, SHELBY &
CARP1311-001 05/01/2017		
CARPENTER	\$ 26.30	17.91
	Rates	Fringes
ASHLAND, ERIE, HURON, LORAIN & F	RICHLAND	
CARP0735-002 05/01/2019		
CARPENTER	\$ 30.42	16.99
	Rates	Fringes
MEDINA, PORTAGE & SUMMIT		
CARP0639-003 05/01/2017		
CARPENTER	\$ 24.54	18.21
	Rates	Fringes
ALLEN, AUGLAIZE, HARDIN, MERCER,	, PUTNAM & V	VAN WERT
CARP0372-002 05/01/2016		
CARPENTER	\$ 32.40	16.97
	Rates	Fringes
ASHTABULA, CUYAHOGA, GEAUGA & LA	AKE	
CARP0254-002 05/01/2017		
COUNTIES	\$ 23.71	13.28

DIVERS - \$250.00 per day		
CARP1393-003 07/01/2008		
ALLEN, AUGLAIZE, HARDIN, MERCER, P	UTNAM, VAN WERI	C & WYANDOT
	Rates	Fringes
Piledrivermen & Diver's Tender\$	25.15	15.92
DIVERS - \$250.00 per day		
CARP1871-006 05/01/2017		
BELMONT, HARRISON, & MONROE		
	Rates	Fringes
Diver, Wet\$ Piledrivermen; Diver, Dry\$	48.11 32.07	17.33 17.33
CARP1871-008 05/01/2017		
ASHLAND, ASHTABULA, CUYAHOGA, ERIE LORAIN, MEDINA, PORTAGE, RICHLAND	, GEAUGA, HURON & SUMMIT	J, LAKE,
	Rates	Fringes
Diver, Wet\$ Piledrivermen; Diver, Dry\$	45.80 30.53	18.84 18.84
CARP1871-014 05/01/2017		
CARROLL, STARK, TUSCARAWAS & WAYNE		
	Rates	Fringes
Diver, Wet\$ Piledrivermen; Diver, Dry\$	38.34 25.56	16.95 16.95
CARP1871-015 05/01/2017		
COSHOCTON, HOLMES, KNOX & MORROW		
	Rates	Fringes
Diver, Wet\$ Piledrivermen; Diver, Dry\$	37.34 24.89	16.07 16.07
CARP1871-017 05/01/2017		
MAHONING & TRUMBULL		

Rates Fringes Diver, Wet.....\$ 40.65 17.62 Piledrivermen; Diver, Dry.....\$ 27.10 17.62 _____ CARP2235-012 01/01/2014 COLUMBIANA & JEFFERSON Rates Fringes PILEDRIVERMAN.....\$ 31.74 16.41 _____ CARP2239-001 07/01/2008 CRAWFORD, OTTAWA, SANDUSKY, SENECA & WYANDOT Rates Fringes CARPENTER.....\$ 23.71 13.28 -----ELEC0008-002 05/25/2020 DEFIANCE, FULTON, HANCOCK, HENRY, LUCAS, OTTAWA, PAULDING, PUTNAM, SANDUSKY, SENECA, WILLIAMS & WOOD Rates Fringes CABLE SPLICER.....\$ 38.98 18.96 4.5%+20.73 ELECTRICIAN.....\$ 41.81 _____ ELEC0032-003 11/29/2020 ALLEN, AUGLAIZE, HARDIN, LOGAN, MERCER, SHELBY, VAN WERT & WYANDOT (Crawford, Jackson, Marseilles, Mifflin, Ridgeland, Ridge & Salem Townships) Rates Fringes ELECTRICIAN.....\$ 32.12 20.29 _____ ELEC0038-002 04/27/2020 CUYAHOGA, GEAUGA (Bainbridge, Chester & Russell Townships) & LORAIN (Columbia Township) Rates Fringes ELECTRICIAN Excluding Sound & Communications Work.....\$ 39.88 21.22

FOOTNOTES; a. 6 Paid Holidays: New Year's Day; Memorial Day; July 4th; Labor Day; Thanksgiving Day; & Christmas Day b. 1 week's paid vacation for 1 year's service; 2 weeks' paid vacation for 2 or more years' service ELEC0038-008 04/26/2021 CUYAHOGA, GEAUGA (Bainbridge, Chester & Russell Townships) & LORAIN (Columbia Township) Rates Fringes Sound & Communication Technician Communications Technician...\$ 28.80 12.77 Installer Technician.....\$ 27.55 12.77 FOOTNOTES; a. 6 Paid Holidays: New Year's Day; Memorial Day; July 4th; Labor Day; Thanksgiving Day; & Christmas Day b. 1 week's paid vacation for 1 year's service; 2 weeks' paid vacation for 2 or more years' service _____ ELEC0064-003 11/30/2020 COLUMBIANA (Butler, Fairfield, Perry, Salem & Unity Townships) MAHONING (Austintown, Beaver, Berlin, Boardman, Canfield, Ellsworth, Coitsville, Goshen, Green, Jackson, Poland, Springfield & Youngstown Townships), & TRUMBULL (Hubbard & Liberty Townships) Rates Fringes ELECTRICIAN.....\$ 35.67 16.37 _____ ELEC0071-001 01/01/2019 ASHLAND, CHAMPAIGN, CLARK, COSHOCTON, CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GUERNSEY, HIGHLAND, HOCKING, JACKSON (Coal, Jackson, Liberty, Milton, Washington & Wellston Townships), KNOX, LICKING, MADISON, MARION, MONROE, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE (Beaver, Benton, Jackson, Mifflin, Pebble, Peepee, Perry & Seal

Townships), RICHLAND, ROSS, TUSCARAWAS (Auburn, Bucks, Clay, Jefferson, Oxford, Perry, Salem, Rush, Washington & York Townships), UNION, VINTON (Clinton, Eagle, Elk, Harrison, Jackson, Richland & Swan Townships), and WASHINGTON COUNTIES

Rates

Fringes

Line	Construction Equipment Operators\$ Groundmen\$ Linemen & Cable Splicers	33.62 24.17 38.27	13.40 11.32 14.42
요니요\	20071-004 01/01/2019		
AUGLZ MONT(AIZE, CLINTON, DARKE, GREENE, GOMERY, PREBLE, and SHELBY COU	LOGAN, MERCER, NTIES	MIAMI,
	1	Rates	Fringes
Line	Construction Equipment Operator\$ Groundman\$ Lineman & Cable Splicers\$	33.62 24.17 38.27	13.40 11.32 14.42
ELE	20071-005 12/31/2018		
ASHT	ABULA, CUYAHOGA, GEAUGA, LAKE a	& LORAIN	
]	Rates	Fringes
LINE Opera LINE LINE Line	CONSTRUCTION: Equipment ator DOT/Traffic Signal & Highway Lighting Projects\$ Municipal Power/Transit Projects\$ CONSTRUCTION: Groundman DOT/Traffic Signal & Highway Lighting Projects\$ Municipal Power/Transit Projects\$ CONSTRUCTION: men/Cable Splicer DOT/Traffic Signal & Highway Lighting Projects\$ Municipal Power/Transit Projects\$	32.44 40.10 25.06 31.19 36.13 44.56	14.10 16.42 12.26 14.11 15.03 17.58
ELE(20071-008 01/01/2019		
COLUI	MBIANA, MAHONING, and TRUMBULI	L COUNTIES	
	1	Rates	Fringes
Line	Construction Equipment Operator\$ Groundman\$ Lineman & Cable Splicers\$	33.62 24.17 38.27	13.40 11.32 14.42
ELE(20071-010 01/01/2019		

BELMONT, CARROLL, HARRISON, HOLMES, JEFFERSON, MEDINA, PORTAGE, STARK, SUMMIT, and WAYNE COUNTIES

	1	Rates	Fringes
Line	Construction Equipment Operator\$ Groundman\$ Lineman & Cable Splicers\$	33.62 24.17 38.27	13.40 11.32 14.42
ELE(C0071-013 01/01/2019		
BROWI	N, BUTLER, CLERMONT, HAMILTON,	and WARF	REN COUNTIES
	1	Rates	Fringes
Line	Construction Equipment Operator\$ Groundman\$ Lineman & Cable Splicers\$	33.62 24.17 38.27	13.40 11.32 14.42
ELE	C0071-014 01/01/2019		
ADAM: Lick PIKE Town: Wilke	, Jefferson, Scioto & Madison (Bid (Camp Creek, Marion, Newton, S ships), SCIOTO & VINTON (Brown esville Townships)	Fownships Scioto, S , Knox, M	Franklin, Hamilton, s), LAWRENCE, MEIGS, Sunfish & Union Madison, Vinton &
	1	Rates	Fringes
Line	Construction Equipment Operator\$ Groundman\$ Lineman & Cable Splicers\$	33.62 24.17 38.27	13.40 11.32 14.42
ELE(C0082-002 11/30/2020		
CLIN (Wayı	TON, DARKE, GREENE, MIAMI, MON ne, Clear Creek & Franklin Town	IGOMERY, nships)	PREBLE & WARREN
	1	Rates	Fringes
ELEC	TRICIAN\$	32.15	20.51
ELE(C0082-006 11/26/2018		
CLIN (Wayı	TON, DARKE, GREENE, MIAMI, MON ne, Clear Creek & Franklin Town	IGOMERY, nships)	PREBLE & WARREN

	Rates	Fringes
Sound & Communication		
Technician Cable Puller	\$ 12.18	3.85
Installer/Technician	\$ 24.35	11.29
ELEC0129-003 03/01/2021		
LORAIN (Except Columbia Township) Liverpool Townships)) & MEDINA (Lit	cchfield &
	Rates	Fringes
ELECTRICIAN	.\$ 36.40	17.71
ELEC0129-004 03/01/2021		
ERIE & HURON (Lyme, Ridgefield, M Sherman, Peru, Bronson, Hartland Greenfield, Fairfield, Fitchville	Norwalk, Townse , Clarksfield, e & New London	end, Wakeman, Norwich, Townships)
	Rates	Fringes
ELECTRICIAN	.\$ 36.40	17.71
ELEC0141-003 09/01/2019		
BELMONT COUNTY		
	Rates	Fringes
CABLE SPLICER	.\$ 30.63 .\$ 30.38	25.87 25.87
ELEC0212-003 11/26/2018		
BROWN, CLERMONT & HAMILTON		
	Rates	Fringes
Sound & Communication Technician	\$ 24.35	10.99
ELEC0212-005 06/03/2020		
BROWN, CLERMONT, and HAMILTON COU	JNTIES	
	Rates	Fringes
ELECTRICIAN	.\$ 31.30	19.07
ELEC0245-001 01/01/2020		

ALLEN, HARDIN, VAN WERT & WYANDOT (Crawford, Jackson, Marseilles, Mifflin, Richland, Ridge & Salem Townships)

Rates Fringes Line Construction Equipment Operator.....\$ 32.37 25.9%+6.75 Groundman Truck Driver.....\$ 17.70 25.9%+6.75 Lineman....\$ 40.46 25.9%+6.75 FOOTNOTE: a. Half day's Paid Holiday: The last 4 hours of the workday prior to Christmas or New Year's Day _____ ELEC0245-003 01/01/2020 DEFIANCE, FULTON, HANCOCK, HENRY, HURON, LUCAS, OTTAWA, PAULDING, PUTNAM, SANDUSKY, SENECA, WILLIAMS, and WOOD COUNTIES Rates Fringes Line Construction Cable Splicer.....\$ 46.53 25.9%+6.75 Groundman/Truck Driver.....\$ 17.70 25.9%+6.75 Heli-arc Welding.....\$ 40.76 25.9%+6.75 Lineman.....\$ 40.46 25.9%+6.75 Operator - Class 1.....\$ 32.37 25.9%+6.75 Operator - Class 2.....\$ 28.32 25.9%+6.75 Traffic Signal & Lighting Technician.....\$ 36.41 25.9%+6.75 FOOTNOTE: a. 6 Observed Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; & Christmas Day. Employees who work on a holiday shall be paid at a rate of double their applicable classified straight-time rates for the work performed on such holiday. _____ ELEC0245-004 01/01/2020 ERIE COUNTY Rates Fringes Line Construction Cable Splicer.....\$ 46.53 25.9%+6.75 Groundman/Truck Driver.....\$ 17.70 25.9%+6.75 Lineman.....\$ 40.46 25.9%+6.75 Operator - Class 1.....\$ 32.37 25.9%+6.75 Operator - Class 2.....\$ 28.32 25.9%+6.75 a. 6 Observed Holidays: New Year's Day; Memorial FOOTNOTE:

Day; Independence Day; Labor Day; Thanksgiving Day; & Christmas Day. Employees who work on a holiday shall be paid at a rate of double their applicable classified straight-time rates for the work performed on such holiday.

ELEC0246-001 10/29/2018

Rates Fringes

ELECTRICIAN.....\$ 38.00 84%+a

FOOTNOTE: a. 1 1/2 Paid Holidays: The last scheduled workday prior to Christmas & 4 hours on Good Friday.

ELEC0306-005 05/28/2018

MEDINA (Brunswick, Chatham, Granger, Guilford, Harrisville, Hinckley, Homer, Lafayette, Medina, Montville, Sharon, Spencer, Wadsworth, Westfield & York Townships), PORTAGE (Atwater, Aurora, Brimfield, Deerfield, Franklin, Mantua, Randolph, Ravenna, Rootstown, Shalersville, Streetsboro & Suffield Townships), SUMMIT & WAYNE (Baughman, Canaan, Chester, Chippewa, Congress, Green, Milton, & Wayne Townships)

I	Rates	Fringes
CABLE SPLICER\$	36.87	16.56
ELECTRICIAN\$	34.54	5%+18.06

ELEC0317-002 06/01/2020

GALLIA & LAWRENCE

	Rates	Fringes
CABLE SPLICER	\$ 32.68 \$ 25.10	18.13

ELEC0540-005 12/28/2020

CARROLL (Northern half, including Fox, Harrison, Rose & Washington Townhships), COLUMBIANA (Knox Township), HOLMES, MAHONING (Smith Township), STARK, TUSCARAWAS (North of Auburn, Clay, Rush & York Townships), and WAYNE (South of Baughman, Chester, Green & Wayne Townships) COUNTIES

	Rates	Fringes
ELECTRICIAN	\$ 34.00	25.50

ELEC0573-003 05/31/2021

ASHTABULA (Colebrook, Wayne, Williamsfield, Orwell & Windsor Townships), GEAUGA (Auburn, Middlefield, Parkman & Troy Townships), MAHONING (Milton Township), PORTAGE (Charlestown, Edinburg, Freedom, Hiram, Nelson, Palmyra, Paris & Windham Townships), and TRUMBULL (Except Liberty & Hubbard Townships)

	Rates	Fringes	
ELECTRICIAN	\$ 35.60	20.18	
ELEC0575-001 11/30/2020			

ADAMS, FAYETTE, HIGHLAND, HOCKING, JACKSON (Bloomfield, Franklin, Hamilton, Jefferson, Lick, Madison, Scioto, Coal, Jackson, Liberty, Milton & Washington Townships), PICKAWAY (Deer Creek, Perry, Pickaway, Salt Creek & Wayne Townships), PIKE (Beaver, Benton, Jackson, Mifflin, Pebble, PeePee, Perry, Seal, Camp Creek, Newton, Scioto, Sunfish, Union & Marion Townships), ROSS, SCIOTO & VINTON (Clinton, Eagle, Elk, Harrison, Jackson, Richland & Swan Townships)

BUTLER and WARREN COUNTIES (Deerfield, Hamilton, Harlan,

Massie, Salem, Turtle Creek, Union & Washington Townships)

	Rates	Fringes	
CABLE SPLICER	\$ 30.50	18.23 19.85	
ELECO672 004 02/01/2020			

ASHTABULA (Excluding Orwell, Colebrook, Williamsfield, Wayne & Windsor Townships), GEAUGA (Burton, Chardon, Claridon, Hambden, Huntsburg, Montville, Munson, Newbury & Thompson Townships) and LAKE COUNTIES

	Rates	Fringes	
CABLE SPLICER	\$ 33.81 \$ 33.56	21.47 21.47	
ELEC0683-002 06/01/2020			

CHAMPAIGN, CLARK, DELAWARE, FAIRFIELD, FRANKLIN, MADISON,

PICKAWAY (Circleville, Darby, Harrison, Jackson, Madison, Monroe, Muhlenberg, Scioto, Walnut & Washington Townships), and UNION COUNTIES

	Rates	Fringes	
CABLE SPLICER	\$ 35.50 \$ 34.50	21.06 21.06	

ELEC0688-003 06/01/2020

ASHLAND, CRAWFORD, HURON (Richmond, New Haven, Ripley & Greenwich Townships), KNOX (Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown & Jefferson Townships), MARION, MORROW, RICHLAND and WYANDOT (Sycamore, Crane, Eden, Pitt, Antrim & Tymochtee Townships) COUNTIES

	Rates	Fringes	
ELECTRICIAN	\$ 30.00	19.66	
ELEC0972-002 06/01/2020			_

ATHENS, MEIGS, MONROE, MORGAN, NOBLE, VINTON (Brown, Knox, Madison, Vinton & Wilkesville Townships), and WASHINGTON COUNITES

	Rates	Fringes	
CABLE SPLICER	\$ 37.35 \$ 33.95	27.81 27.71	

ELEC1105-001 05/28/2018

COSHOCTON, GUERNSEY, KNOX (Jackson, Clay, Morgan, Miller, Milford, Hilliar, Butler, Harrison, Pleasant & College Townships), LICKING, MUSKINGUM, PERRY, and TUSCARAWAS (Auburn, York, Clay, Jefferson, Rush, Oxford, Washington, Salem, Perry & Bucks Townships) COUNTIES

 Rates
 Fringes

 ELECTRICIAN......\$ 30.95
 17.96

 ----- ENGI0018-003 05/01/2019

ASHTABULA, CUYAHOGA, ERIE, GEAUGA, LAKE, LORAIN, MEDINA, PORTAGE, and SUMMIT COUNTIES

POWER EQUIPMENT OPERATOR

GROUP	1\$	38.63	15.20
GROUP	2\$	38.53	15.20
GROUP	3\$	37.49	15.20
GROUP	4\$	36.27	15.20
GROUP	5\$	30.98	15.20
GROUP	б\$	38.88	15.20
GROUP	7\$	39.13	15.20

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker); Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradall; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24"" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; Wheel Excavator; and Asphalt Plant Engineer (Cleveland District Only).

GROUP 2 - Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring Machine More than 48""; Bulldozer; Endloader; Horizontal Directional Drill (Over 50,000 ft lbs thrust); Hydro Milling Machine; Kolman-type Loader (production type-Dirt); Lead Greaseman; Lighting & Traffic Signal Installation Equipment (includes all groups or classifications); Material Transfer Equipment (Shuttle Buggy) Asphalt; Pettibone-Rail Equipment; Power Grader; Power Scraper; Push Cat; Rotomill (all), Grinders & Planers of All types; Trench Machine (24"" wide & under); Vermeer type Concrete Saw; and Maintenance Operators (Portage and Summit Counties Only).

GROUP 3 - A-Frame; Air Compressor on Tunnel Work (low

pressure); Asphalt Plant Engineer (Portage and Summit Counties Only); Bobcat-type and/or Skid Steer Loader with or without Attachments; Highway Drills (all types); Locomotive (narrow gauge); Material Hoist/Elevator; Mixer, Concrete (more than one bag capacity); Mixer, one bag capacity (Side Loader); Power Boiler (Over 15 lbs. Pressure) Pump Operator installing & operating Well Points; Pump (4"" & over discharge); Roller, Asphalt; Rotovator (lime soil stabilizer); Switch & Tie Tampers (without lifting & aligning device); Utility Operator (Small equipment); Welding Machines; and Railroad Tie Inserter/Remover; Articulating/straight bed end dumps if assigned (minus \$4.00 per hour.

GROUP 4 - Backfiller; Ballast Re-locator; Bars, Joint & Mesh Installing Machine; Batch Plant; Boring Machine Operator (48"" or less); Bull Floats; Burlap & Curing Machine; Concrete Plant (capacity 4 yd. & under); Concrete Saw (Multiple); Conveyor (Highway); Crusher; Deckhand; Farm-type Tractor with attachments (highway); Finishing Machine; Fireperson, Floating Equipment (all types); Forklift; Form Trencher; Hydro Hammer expect masonary; Hydro Seeder; Pavement Breaker; Plant Mixer; Post Driver; Post Hole Digger (Power Auger); Power Brush Burner; Power Form Handling Equipment; Road Widening Trencher; Roller (Brick, Grade & Macadam); Self-Propelled Power Spreader; Self-Propelled Power Subgrader; Steam Fireperson; Tractor (Pulling Sheepfoot, Roller or Grader); and Vibratory Compactor with Integral Power.

GROUP 5 - Compressor (Portable, Sewer, Heavy & Highway); Drum Fireperson (Asphalt Plant); Generator; Masonry Fork Lift; Inboard-Outboard Motor Boat Launch; Oil Heater (asphalt plant); Oiler/Helper; Power Driven Heater; Power Sweeper & Scrubber; Pump (under 4"" discharge); Signalperson; Tire Repairperson; VAC/ALLS; Cranes - Compact, track or rubber under 4,000 pound capacity; fueling and greasing; and Chainmen.

GROUP 6 - Master Mechanic & Boom from 150 to 180.

GROUP 7 - Boom from 180 and over.

ENGI0018-004 05/01/2019

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LUCAS, MADISON, MARION, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, and YANDOT COUNTIES

		Rates	Fringes
POWER EQUIPMEN	T OPERATOR		
GROUP 1		\$ 37.14	15.20
GROUP 2		\$ 37.02	15.20
GROUP 3		\$ 35.98	15.20
GROUP 4		\$ 34.80	15.20
GROUP 5		\$ 29.34	15.20
GROUP 6		\$ 37.39	15.20
GROUP 7		\$ 37.64	15.20

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker); Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradall; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24"" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; and Wheel Excavator.

GROUP 2 - Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring Machine More than 48""; Bulldozer; Endloader; Hydro Milling Machine; Horizontal Directional Drill (over 50,000 ft. lbs. thrust);Kolman-type Loader (production type-Dirt); Lead Greaseman; Lighting & Traffic Signal Installation Equipment (includes all groups or classifications); Material Transfer Equipment (Shuttle Buggy) Asphalt; Pettibone-Rail Equipment; Power Grader; Power Scraper; Push Cat; Rotomill (all), Grinders & Planers of All types; Trench Machine (24"" wide & under); and Vermeer type Concrete Saw. GROUP 3 - A-Frame; Air Compressor on Tunnel Work (low pressure); Asphalt Plant Engineer; Bobcat-type and/or Skid Steer Loader with or without Attachments; Highway Drills (all types); Locomotive (narrow gauge); Material Hoist/Elevator; Mixer, Concrete (more than one bag capacity); Mixer, one bag capacity (Side Loader); Power Boiler (Over 15 lbs. Pressure) Pump Operator installing & operating Well Points; Pump (4"" & over discharge); Railroad Tie Inserter/Remover; Roller, Asphalt; Rotovator (lime soil stabilizer); Switch & Tie Tampers (without lifting & aligning device); Utility Operator (Small equipment); and Welding Machines; Artiaculating/straight bed end dumps if assigned (minus \$4.00 per hour.

GROUP 4 - Backfiller; Ballast Re-locator; Bars, Joint & Mesh Installing Machine; Batch Plant; Boring Machine Operator (48"" or less); Bull Floats; Burlap & Curing Machine; Concrete Plant (capacity 4 yd. & under); Concrete Saw (Multiple); Conveyor (Highway); Crusher; Deckhand; Farm-type Tractor with attachments (highway); Finishing Machine; Fireperson, Floating Equipment (all types); Fork Lift; Form Trencher; Hydro Hammer expect masonary; Hydro Seeder; Pavement Breaker; Plant Mixer; Post Driver; Post Hole Digger (Power Auger); Power Brush Burner; Power Form Handling Equipment; Road Widening Trencher; Roller (Brick, Grade & Macadam); Self-Propelled Power Spreader; Self-Propelled Power Subgrader; Steam Fireperson; Tractor (Pulling Sheepfoot, Roller or Grader); and Vibratory Compactor with Integral Power.

GROUP 5 - Compressor (Portable, Sewer, Heavy & Highway); Drum Fireperson (Asphalt Plant); Generator; Masonary Forklift; Inboard-Outboard Motor Boat Launch; Oil Heater (asphalt plant); Oiler/Helper; Power Driven Heater; Power Sweeper & Scrubber; Pump (under 4"" discharge); Signalperson; Tire Repairperson; VAC/ALLS; Cranes - Compact, track or rubber under 4,000 pound capacity; fueling and greasing; and Chainmen.

GROUP 6 - Master Mechanic & Boom from 150 to 180.

GROUP 7 - Boom from 180 and over.

ENGI0066-023 06/01/2017

COLUMBIANA, MAHONING & TRUMBULL COUNTIES

Rates

Fringes

POWER EQUIPMENT OPERATOR ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS

GROUP 1 - A & B\$ ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS	39.23	19.66
GROUP 2 - A & B\$ ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS	38.90	19.66
GROUP 3 - A & B\$ ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS	34.64	19.66
GROUP 4 - A & B\$ ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS	30.70	19.66
GROUP 5 - A & B\$ HAZARDOUS/TOXIC WASTE PROJECTS	27.30	19.66
GROUP 1 - C & D\$ HAZARDOUS/TOXIC WASTE PROJECTS	35.96	19.66
GROUP 2 - C & D\$ HAZARDOUS/TOXIC WASTE PROJECTS	35.66	19.66
GROUP 3 - C & D\$ HAZARDOUS/TOXIC WASTE PROJECTS	31.76	19.66
GROUP 4 - C & D\$ HAZARDOUS/TOXIC WASTE PROJECTS	28.14	19.66
GROUP 5 - C & D\$ ALL OTHER WORK	25.03	19.66
GROUP 1\$ ALL OTHER WORK	32.69	19.66
GROUP 2\$ ALL OTHER WORK	32.42	19.66
GROUP 3\$ ALL OTHER WORK	28.87	19.66
GROUP 4\$ ALL OTHER WORK	25.58	19.66
GROUP 5\$	22.75	19.66
GROUP 1 - Rig, Pile Driver or Ca	isson Type; & Rig	, Pile

Hydraulic Unit Attached

GROUP 2 - Asphalt Heater Planer; Backfiller with Drag Attachment; Backhoe; Backhoe with Shear attached; Backhoe-Rear Pivotal Swing; Batch Plant-Central Mix Concrete; Batch Plant, Portable concrete; Berm Builder-Automatic; Boat Derrick; Boat-Tug; Boring Machine Attached to Tractor; Bullclam; Bulldozer; C.M.I. Road Builder & Similar Type; Cable Placer & Layer; Carrier-Straddle; Carryall-Scraper or Scoop; Chicago Boom; Compactor with Blade Attached; Concrete Saw (Vermeer or similar type); Concrete Spreader Finisher; Combination, Bidwell Machine; Crane; Crane-Electric Overhead; Crane-Rough Terrain; Crane-Side Boom; Crane-Truck; Crane-Tower; Derrick-Boom; Derrick-Car; Digger-Wheel (Not trencher or road widener); Double Nine; Drag Line; Dredge; Drill-Kenny or Similar Type; Easy Pour Median Barrier Machine (or similar type); Electromatic; Frankie Pile; Gradall; Grader; Gurry; Self-Propelled; Heavy Equipment Robotics Operator/Mechanic; Hoist-Monorail; Hoist-Stationary & Mobile Tractor; Hoist, 2 or 3 drum; Horizontal Directional Drill Operator; Jackall; Jumbo Machine; Kocal & Kuhlman; Land-Seagoing Vehicle; Loader, Elevating; Loader, Front End; Loader, Skid Steer; Locomotive; Mechanic/Welder; Metro Chip Harvester with Boom; Mucking Machine; Paver-Asphalt Finishing Machine; Paver-Road Concrete; Paver-Slip Form (C.M.I. or similar); Place Crete Machine with Boom; Post Driver (Carrier mounted); Power Driven Hydraulic Pump & Jack (When used in Slip Form or Lift Slab Construction); Pump Crete Machine; Regulator-Ballast; Hydraulic Power Unit not attached to Rig for Pile Drillings; Rigs-Drilling; Roto Mill or similar Full Lane (8' Wide & Over); Roto Mill or similar type (Under 8'); Shovel; Slip Form Curb Machine; Speedwing; Spikemaster; Stonecrusher; Tie Puller & Loader; Tie Tamper; Tractor-Double Boom; Tractor with Attachments; Truck-Boom; Truck-Tire; Trench Machine; Tunnel Machine (Mark 21 Java or similar); & Whirley (or similar type)

GROUP 3 - Asphalt Plant; Bending Machine (Pipeline or similar type); Boring machine, Motor Driven; Chip Harvester without Boom; Cleaning Machine, Pipeline Type; Coating Machine, Pipeline Type; Compactor; Concrete Belt Placer; Concrete Finisher; Concrete Planer or Asphalt; Concrete Spreader; Elevator; Fork Lift (Home building only); Fork lift & Lulls; Fork Lift Walk Behind (Hoisting over 1 buck high); Form Line Machine; Grease Truck operator; Grout Pump; Gunnite Machine; Horizontal Directional Drill Locator; Single Drum Hoist with or without Tower; Huck Bolting Machine; Hydraulic Scaffold (Hoisting building materials); Paving Breaker (Self-propelled or Ridden); Pipe Dream; Pot Fireperson (Power Agitated); Refrigeration Plant; Road Widener; Roller; Sasgen Derrick; Seeding Machine; Soil Stabilizer (Pump type); Spray Cure Machine, Self-Propelled; Straw Blower Machine; Sub-Grader; Tube Finisher or Broom C.M.I. or similar type; & Tugger Hoist

GROUP 4 - Air Curtain Destructor & Similar Type; Batch Plant-Job Related; Boiler Operator; Compressor; Conveyor; Curb Builder, self-propelled; Drill Wagon; Generator Set; Generator-Steam; Heater-Portable Power; Hydraulic Manipulator Crane; Jack-Hydraulic Power driven; Jack-Hydraulic (Railroad); Ladavator; Minor Machine Operator; Mixer-Concrete; Mulching Machine; Pin Puller; Power Broom; Pulverizer; Pump; Road Finishing Machine (Pull Type); Saw-Concrete-Self-Propelled (Highway Work); Signal Person; Spray Cure Machine-Motor Powered; Stump Cutter; Tractor; Trencher Form; Water Blaster; Steam Jenny; Syphon; Vibrator-Gasoline; & Welding Machine

GROUP 5 - Brakeperson; Fireperson; & Oiler

IRON0017-002 05/01/2021

ASHTABULA (North of Route 6, starting at the Geauga County Line, proceeding east to State Route 45), CUYAHOGA, ERIE (Eastern 2/3), GEAUGA, HURON (East of a line drawn from the north border through Monroeville & Willard), LAKE, LORAIN, MEDINA (North of Old Rte. #224), PORTAGE (West of a line from Middlefield to Shalersville to Deerfield), and SUMMIT (North of Old Rte. #224, including city limits of Barberton) COUNTIES

Rates Fringes

IRONWORKER Ornamental, Reinforcing, & Structural.....\$ 38.03 24.72 IRON0017-010 05/01/2021

ASHTABULA (Eastern part from Lake Erie on the north to route #322 on the south to include Conneaut, Kingsville, Sheffield, Denmark, Dorset, Cherry Valley, Wayne, Monroe, Pierpont, Richmond, Andover & Williamsfield Townships)

Rates Fringes

IRONWORKER Structural, including metal building erection & Reinforcing.....\$ 38.03 24.72

IRON0044-001 06/01/2018

ADAMS (Western Part), BROWN, BUTLER (Southern Part), CLERMONT, CLINTON (South of a line drawn from Blanchester to Lynchburg), HAMILTON, HIGHLAND (Excluding eastern one-fifth & portion of county inside lines drawn from Marshall to Lynchburg from the northern county line through E. Monroe to Marshall) and WARREN (South of a line drawn from Blanchester through Morrow to the west county line) COUNTIES

	Rates	Fringes
IRONWORKER, REINFORCING		
Beyond 30-mile radius of		
Hamilton County Courthous	e\$ 28.67	21.20
Up to & including 30-mile		
radius of Hamilton County		
Courthouse	\$ 27.60	20.70

IRON0044-002 06/01/2020

CLINTON (South of a line drawn from Blanchester to Lynchburg), HAMILTON, HIGHLAND (Excluding eastern one-fifth & portion of county inside lines drawn from Marshall to Lynchburg from the northern county line through E. Monroe to Marshall) & WARREN (South of a line drawn from Blanchester through Morrow to the west county line)

	Rates	Fringes	
IRONWORKER			
Fence Erector	\$ 28.76	21.40	
Ornamental; Structural	\$ 30.27	21.40	

IRON0055-003 07/01/2019

CRAWFORD (Area Between lines drawn from where Hwy #598 & #30 meet through N. Liberty to the northern border & from said Hwy junction point due west to the border), DEFIANCE (S. of a line drawn from where Rte. #66 meets the northern line through Independence to the eastern county border), ERIE (Western 1/3), FULTON, HANCOCK, HARDIN (North of a line drawn from Maysville to a point 4 miles south of the northern line on the eastern line), HENRY, HURON (West of a line drawn from the northern border through Monroeville & Willard), LUCAS, OTTAWA, PUTNAM (East of a line drawn from the northern border down through Miller City to where #696 meets the southern border), SANDUSKY, SENECA, WILLIAMS (East of a line drawn from Pioneer through Stryker to the southern border), WOOD & WYANDOT (North of Rte. #30)

A	Rates	Fringes
IRONWORKER		
Fence Erector\$	21.30	20.92
Flat Road Mesh\$	29.77	21.30
Tunnels & Caissons Under		
Pressure\$	29.77	21.30

All Other Work.....\$ 30.38

24.40

IRON0147-002 06/01/2020

ALLEN (Northern half), DEFIANCE (Northern part, excluding south of a line drawn from where Rte. #66 meets the northern line through Independence to the eastern county border), MERCER (Northern half), PAULDING, PUTNAM (Western part, excluding east of a line drawn from the northern border down through Miller City to where #696 meets the southern border), VAN WERT, and WILLIAMS (Western part, excluding east of a line drawn from Pioneer through Stryker to the southern border) COUNTIES

	Rates	Fringes
IRONWORKER	\$ 29.58	23.27
IRON0172-002 06/01/2020		

CHAMPAIGN (Eastern one-third), CLARK (Eastern one-fourth), COSHOCTON (West of a line beginning at the northwestern county line going through Walhonding & Tunnel Hill to the southern county line), CRAWFORD (South of Rte. #30), DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, HARDIN (Excluding a line drawn from Roundhead to Maysville), HIGHLAND (Eastern one-fifth), HOCKING, JACKSON (Northern half), KNOX, LICKING, LOGAN (Eastern one-third), MADISON, MARION, MORROW, MUSKINGUM (West of a line starting at Adams Mill going to Adamsville & going from Adamsville through Blue Rock to the southern border), PERRY, PICKAWAY, PIKE (Northern half), ROSS, UNION, VINTON and WYANDOT (South of Rte. #30) COUNTIES

	Rates	Fringes
IRONWORKER	\$ 30.75	20.80
IRON0207-004 06/01/2020		

ASHTABULA (Southern part starting at the Geauga County line), COLUMBIANA (E. of a line from Damascus to Highlandtown), MAHONING (N. of Old Route #224), PORTAGE (E. of a line from Middlefield to Shalersville to Deerfield) & TRUMBULL

	Rates	Fringes	
IRONWORKER			
Layout; Sheeter	\$ 31.25	25.75	
Ornamental; Reinforcing;			
Structural	\$ 28.06	24.70	
Ornamental; Reinforcing.	\$ 30.25	25.75	
			-
* IRON0290-002 06/01/2021			

ALLEN (Southern half), AUGLAIZE, BUTLER (North of a line drawn from east to the west county line going through Oxford, Darrtown & Woodsdale), CHAMPAIGN (Excluding east of a line drawn from Catawla to the point where #68 intersects the northern county line), CLARK (Western two-thirds), CLINTON (Excluding south of a line drawn from Blanchester to Lynchburg), DARKE, GREENE, HIGHLAND (Inside lines drawn from Marshall to Lynchburg & from the northern county line through East Monroe to Marshall), LOGAN (West of a line drawn from West Liberty to where the northern county line meets the western county line of Hardin), MERCER (Southern half), MIAMI, MONTGOMERY, PREBLE, SHELBY & WARREN (Excluding south of a line drawn from Blanchester through Morrow to the western county line) COUNTIES

 Rates
 Fringes

 IRONWORKER......\$ 30.99
 23.10

______ 23.10

IRON0549-003 12/01/2020

BELMONT, GUERNSEY, HARRISON, JEFFERSON, MONROE & MUSKINGUM (Excluding portion west of a line starting at Adams Mill going to Adamsville and going from Adamsville through Blue Rock to the south border)

IRON0550-004 05/01/2021

ASHLAND, CARROLL, COLUMBIANA (W. of a line from Damascus to Highlandtown), COSHOCTON (E. of a line beginning at NW Co. line going through Walhonding & Tunnel Hill to the South Co. line), HOLMES, HURON (S. of Old Rte. #224), MAHONING (S. of Old Rte. #224), MEDINA (S. of Old Rte. #224), PORTAGE (S. of Old Rte. #224), RICHLAND, STARK, SUMMIT (S. of Old Rte. #224, Excluding city limits of Barberton), TUSCARAWAS, & WAYNE

Rates Fringes Ironworkers:Structural, Ornamental and Reinforcing.....\$ 30.17 21.08 IRON0769-004 06/01/2020

ADAMS (Eastern Half), GALLIA, JACKSON (Southern Half), LAWRENCE & SCIOTO

	Rates	Fringes
IRONWORKER	.\$ 32.75	26.34
IRON0787-003 12/01/2020		
ATHENS, MEIGS, MORGAN, NOBLE, an	d WASHINGTON COU	JNTIES
	Rates	Fringes
IRONWORKER	.\$ 30.98	22.75
LAB00265-008 05/01/2020		
	Rates	Fringes
LABORER ASHTABULA, ERIE, HURON, LORAIN, LUCAS, MAHONING, MEDINA, OTTAWA, PORTAGE, SANDUSKY, STARK, SUMMIT, TRUMBULL & WOOD COUNTIES GROUP 1 GROUP 2 GROUP 2 GROUP 3 GROUP 3 CUYAHOGA AND GEAUGA COUNTIES ONLY: SEWAGE PLANTS, WASTE PLANTS, WATER TREATMENT FACILITIES, PUMPING STATIONS, & ETHANOL PLANTS	.\$ 33.05 .\$ 33.22 .\$ 33.55 .\$ 34.00	11.25 11.25 11.25 11.25
CONSTRUCTION CUYAHOGA, GEAUGA & LAKE COUNTIES	.\$ 35.66	11.25
GROUP 1. GROUP 2. GROUP 3. GROUP 4. REMAINING COUNTIES OF OHIO GROUP 1. GROUP 2. GROUP 3. GROUP 4.	.\$ 34.28 .\$ 34.45 .\$ 34.78 .\$ 35.23 .\$ 32.62 .\$ 32.79 .\$ 33.12 .\$ 33.57	11.25 11.25 11.25 11.25 11.25 11.25 11.25 11.25 11.25 11.25

LABORER CLASSIFICATIONS

GROUP 1 - Asphalt Laborer; Carpenter Tender; Concrete Curing Applicator; Dump Man (Batch Truck); Guardrail and Fence Installer; Joint Setter; Laborer (Construction); Landscape Laborer; Mesh Handlers & Placer; Right-of-way Laborer; Riprap Laborer & Grouter; Scaffold Erector; Seal Coating; Surface Treatment or Road Mix Laborer; Sign Installer; Slurry Seal; Utility Man; Bridge Man; Handyman; Waterproofing Laborer; Flagperson; Hazardous Waste (level D); Diver Tender; Zone Person & Traffic Control

GROUP 2 - Asphalt Raker; Concrete Puddler; Kettle Man Pipeline); Machine Driven Tools (Gas, Electric, Air); Mason Tender; Brick Paver; Mortar Mixer; Power Buggy or Power Wheelbarrow; Paint Striper; Sheeting & Shoring Man; Surface Grinder Man; Plastic Fusing Machine Operator; Pug Mill Operator; & Vacuum Devices (wet or dry); Rodding Machine Operator; Diver; Screwman or Paver; Screed Person; Water Blast, Hand Held Wand; Pumps 4"" & Under (Gas, Air or Electric) & Hazardous Waste (level C); Air Track and Wagon Drill; Bottom Person; Cofferdam (below 25 ft. deep); Concrete Saw Person; Cutting with Burning Torch; Form Setter; Hand Spiker (Railroad); Pipelayer; Tunnel Laborer (without air) & Caisson; Underground Person (working in Sewer and Waterline, Cleaning, Repairing & Reconditioning); Sandblaster Nozzle Person; & Hazardous Waste (level B)

GROUP 3 - Blaster; Mucker; Powder Person; Top Lander; Wrencher (Mechanical Joints & Utility Pipeline); Yarner; Hazardous Waste (level A); Concrete Specialist; Concrete Crew in Tunnels (With Air-pressurized - \$1.00 premium); Curb Setter & Cutter; Grade Checker; Utility Pipeline Tapper; Waterline; and Caulker

GROUP 4 - Miner (With Air-pressurized - \$1.00 premium); & Gunite Nozzle Person

TUNNEL LABORER WITH AIR-PRESSURIZED ADD \$1.00 TO BASE RATE

SIGNAL PERSON WILL RECEIVE THE RATE EQUAL TO THE RATE PAID THE LABORER CLASSIFICATION FOR WHICH HE OR SHE IS SIGNALING.

PAIN0006-002 05/01/2018

ASHTABULA, CUYAHOGA, GEAUGA, LAKE, LORAIN, PORTAGE (N. of the East-West Turnpike) & SUMMIT (N. of the East-West Turnpike)

Rates Fringes

PAINTER

COMMERCIAL NEW WORK;		
REMODELING; & RENOVATIONS		
GROUP 1\$	27.90	16.16
GROUP 2\$	28.30	16.16
GROUP 3\$	28.60	16.16
GROUP 4\$	34.16	16.16
COMMERCIAL REPAINT		
GROUP 1\$	26.40	16.16
GROUP 2\$	26.80	16.16
GROUP 3\$	27.10	16.16

PAINTER CLASSIFICATIONS - COMMERCIAL NEW WORK; REMODELING; &

RENOVATIONS

GROUP 1 - Brush; & Roller GROUP 2 - Sandblasting & Buffing GROUP 3 - Spray Painting; Closed Steel Above 55 feet; Bridges & Open Structural Steel; Tanks - Water Towers; Bridge Painters; Bridge Riggers; Containment Builders GROUP 4 - Bridge Blaster PAINTER CLASSIFICATIONS - COMMERCIAL REPAINT GROUP 1 - Brush; & Roller GROUP 2 - Sandblasting & Buffing GROUP 3 - Spray Painting _____ _____ PAIN0007-002 07/01/2019 FULTON, HENRY, LUCAS, OTTAWA (Excluding Allen, Bay, Bono, Catawba Island, Clay Center, Curtice, Danbury, Eagle Beach, Elliston, Elmore, Erie, Fishback, Gem Beach & Genova) & WOOD Fringes Rates PAINTER NEW COMMERCIAL WORK GROUP 1.....\$ 27.64 17.79 GROUP 2.....\$ 27.39 17.79 GROUP 3.....\$ 27.39 17.79 GROUP 4.....\$ 27.39 17.79 GROUP 5....\$ 27.39 17.79 GROUP 6.....\$ 27.39 17.79 17.79 GROUP 7....\$ 27.39 17.79 GROUP 8.....\$ 27.39 GROUP 9.....\$ 27.39 17.79 REPAINT IS 90% OF JR PAINTER CLASSIFICATIONS GROUP 1 - Brush; Spray & Sandblasting Pot Tender GROUP 2 - Refineries & Refinery Tanks; Surfaces 30 ft. or over where material is applied to or labor performed on above ground level (exterior), floor level (interior) GROUP 3 - Swing Stage & Chair

GROUP 4 - Lead Abatement

GROUP 5 - All Methods of Spray GROUP 6 - Solvent-Based Catalized Epoxy Materials of 2 or More Component Materials, to include Solvent-Based Conversion Varnish (excluding water based) GROUP 7 - Spray Solvent Based Material; Sand & Abrasive Blasting GROUP 8 - Towers; Tanks; Bridges; Stacks Over 30 Feet GROUP 9 - Epoxy Spray (excluding water based) _____ PAIN0012-008 05/01/2019 BUTLER COUNTY Rates Fringes PAINTER GROUP 1.....\$ 21.95 10.20 10.20 GROUP 2.....\$ 25.30 GROUP 3.....\$ 25.80 10.20 GROUP 4.....\$ 26.05 10.20 GROUP 5....\$ 26.30 10.20 PAINTER CLASSIFICATIONS GROUP 1: Bridge Equipment Tender; Bridge/Containment Builder GROUP 2: Brush & Roller GROUP 3: Spray GROUP 4: Sandblasting; & Waterblasting GROUP 5: Elevated Tanks; Steeplejack Work; Bridge; & Lead Abatement _____ PAIN0012-010 05/01/2019 BROWN, CLERMONT, CLINTON, HAMILTON & WARREN Rates Fringes PAINTER HEAVY & HIGHWAY BRIDGES-GUARDRAILS-LIGHTPOLES-

STRIPING

Bridge Equipment Tender		
and Containment Builder\$	21.95	10.20
Bridges when highest		
point of clearance is 60		
feet or more; & Lead		
Abatement Projects\$	26.30	10.20
Brush & Roller\$	25.30	10.20
Sandblasting & Hopper		
Tender; Water Blasting\$	26.05	10.20
Spray\$	25.80	10.20
PAIN0093-001 12/01/2018		
ATHENS, GUERNSEY, HOCKING, MONROE, WASHINGTON COUNTIES	MORGAN, NOBLE	and
	Patag	Fringos
	ales	FIIIges
PATNTER		
Bridges; Locks; Dams;		
Tension Towers; &		
Energized Substations\$	34.04	18.50
Power Generating Facilities.\$	30.89	18.50
PAIN0249-002 06/01/2020		
CLARK, DARKE, GREENE, MIAMI, MONTG	OMERY & PREBLE	
1	Rates	Fringes
CPOUD 1 - Pruch & Pollor &	2/ 17	11 00
CPOUD 2 - Swing Scaffold	24.17	11.22
Bridges: Structural Steel:		
Open Agid Tank: High		
Tension Fleatrical		
Fauinment: & Hot Dipes	24 17	11 22
CROUD 3 - Spray:	21.1/	11.22
Sandhlast: Steamclean:		
Lead Abatement \$	24 92	11 22
CPOUD 4 - Steenlejack Work \$	24.72	11 22
CPOUD 5 - Cool Tor	25.12	11 22
CROUP 5 - COAL TAL	25.07	11.22
Tondor & or Containment		
Builder é	32 88	11 22
CROID 7 - Tanka Stacka S	52.00	11.44
Towers	27 81	11 22
GROUP 8 - Bridge Blaster	27.01	···
RiggerŚ	35.88	11.22
PAIN0356-002 09/01/2009		

KNOX, LICKING, MUSKINGUM, and PERRY

PAINTER	
Bridge Equipment Tenders and Containment Builders\$ 27.9	3 7.25
Bridges; Blasters;	0 7 25
Brush and Roller \$ 20 9	3 7 25
Sandblasting; Steam	5 1.25
and Hazardous Work \$ 25.8	2 7 25
Sprav	0 7.25
Structural Steel and Swing	
Stage\$ 25.4	2 7.25
Tanks; Stacks; and Towers\$ 28.6	3 7.25
PAIN0438-002 12/01/2018	
BELMONT, HARRISON and JEFFERSON COUNTIE	S
Rates	Fringes
PAINTER	
Bridges, Locks, Dams,	
Tension Towers & Energized	
Substations\$ 32.8	0 17.68
Power Generating Facilities.\$ 29.6	5 17.68
PAIN0476-001 06/01/2020	
COLUMBIANA, MAHONING, and TRUMBULL COUN	ITES
Rates	Fringes
PAINTER	
GROUP 1\$ 26.4	7 14.53
GROUP 2\$ 33.1	0 14.53
GROUP 3\$ 26.6	8 14.53
GROUP 4\$ 27.1	2 14.53
GROUP 5\$ 27.1	2 14.53
GROUP 6\$ 27.3	7 14.53
GROUP 7\$ 28.4	7 14.53
PAINTER CLASSIFICATIONS:	
GROUP 1: Painters, Brush & Roller	
GROUP 2: Bridges	
GROUP 3: Structural Steel	
GROUP 4: Spray, Except Bar Joist/Deck	
GROUP 5: Epoxy/Mastic; Spray- Bar Jo 50 Feet; and Swingstages	ist/Deck; Working Above
GROUP 6: Tanks; Sandblasting

GROUP 7: Towers; Stacks

PAIN0555-002 09/01/2020

ADAMS, HIGHLAND, JACKSON, PIKE & SCIOTO

	F	Rates	Fringes		
PAINTER					
GROUP	1\$	31.48	16.46		
GROUP	2\$	32.97	16.46		
GROUP	3\$	34.46	16.46		
GROUP	4\$	37.38	16.46		

PAINTER CLASSIFICATIONS

GROUP 1 - Containment Builder

GROUP 2 - Brush; Roller; Power Tools, Under 40 feet

GROUP 3 - Sand Blasting; Spray; Steam Cleaning; Pressure Washing; Epoxy & Two Component Materials; Lead Abatement; Hazardous Waste; Toxic Materials; Bulk & Storage Tanks of 25,000 Gallon Capacity or More; Elevated Tanks

GROUP 4 - Stacks; Bridges

PAIN0639-001 05/01/2011

Rates Fringes

Sign Painter & Erector.....\$ 20.61 3.50+a+b+c

FOOTNOTES: a. 7 Paid Holidays: New Year's Day; Memorial Day; July 4th; Labor Day; Thanksgiving Day; Christmas Day & 1 Floating Day b. Vacation Pay: After 1 year's service - 5 days' paid vacation; After 2, but less than 10 years' service - 10 days' paid vacation; After 10, but less than 20 years' service - 15 days' paid vacation; After 20 years' service -20 days' paid vacation c. Funeral leave up to 3 days maximum paid leave for death of mother, father, brother, sister, spouse, child, mother-in-law, father-in-law, grandparent and inlaw provided employee attends funeral

PAIN0788-002 06/01/2020

ASHLAND, CRAWFORD, ERIE, HANCOCK, HURON, MARION, MORROW, OTTAWA

(Allen, Bay, Bono, Catawba Island, Clay Center, Curtice, Danbury, Eagle Beach, Elliston, Elmore, Erie, Fishback, Gem Beach & Genoa), RICHLAND, SANDUSKY, SENECA & WYANDOT

Rates Fringes

PAINTER

Brush & Roller......\$ 24.6614.05Structural Steel.....\$ 26.2614.05

WINTER REPAINT: Between December 1 to March 31 - 90%JR

\$.50 PER HOUR SHALL BE ADDED TO THE RATE OF PAY FOR THE CLASSIFICATION OF WORK:

While working swingstage, boatswain chair, needle beam and horizontal cable. While operating sprayguns, sandblasting, cobblasting and high pressure waterblasting (4000psi).

\$1.00 PER HOUR SHALL BE ADDED TO THE RATE OF PAY FOR THE CLASSIFICATION OF WORK:

For the application of catalized epoxy, including latex epoxy that is deemed hazardous, lead abatement, or for work or material where special precautions beyond normal work duties must be taken. For working on stacks, tanks, and towers over 40 feet in height.

PAIN0813-005 12/01/2008

GALLIA, LAWRENCE, MEIGS & VINTON

	Rates	Fringes	
PAINTER			
Base Rate	\$ 24.83	10.00	
Bridges, Locks, Dams &			
Tension Towers	\$ 27.83	10.00	
PAIN0841-001 06/01/2018			

MEDINA, PORTAGE (South of and including Ohio Turnpike), and SUMMIT (South of and including Ohio Turnpike) COUNTIES

	R	lates	Fringes
Painters:			
GROUP	1\$	25.75	14.35
GROUP	2\$	26.40	14.35
GROUP	3\$	26.50	14.35
GROUP	4\$	26.60	14.35
GROUP	5\$	27.00	14.35

GROUP 6\$ GROUP 7\$	39.20 27.00	11.75 14.35
PAINTER CLASSIFICATIONS:		
GROUP 1 - Brush, Roller & Paperhan	ger	
GROUP 2 - Epoxy Application		
GROUP 3 - Swing Scaffold, Bosum Ch	air, & Window Ja	ck
GROUP 4 - Spray Gun Operator of An	y & All Coatings	
GROUP 5 - Sandblast, Painting of Scaffolds, Bridge Work and/or Op Standpipes and/or Water Towers	Standpipes, etc en Structural St	. from eel,
GROUP 6 - Public & Commerce Tran Galvanized, Bridges, Tunnels & R (concrete)	sportation, Stee elated Support I	l or tems
GROUP 7 - Synthetic Exterior, D Drywall Finisher and Follow-up M	rywall Finisher an Using Automat	and/or Taper, ic Tools
PAIN0841-002 06/01/2018		
CARROLL, COSHOCTON, HOLMES, STARK,	TUSCARAWAS & WA	YNE
	Rates F	ringes
PAINTER Bridges; Towers, Poles & Stacks; Sandblasting Steel; Structural Steel & Metalizing\$ Brush & Roller\$ Spray: Tank Interior &	22.78 21.77	13.63 13.63
Exterior\$	22.60	13.63
PAIN1020-002 07/01/2020		
ALLEN, AUGLAIZE, CHAMPAIGN, DEFIAN PAULDING, PUTNAM, SHELBY, VAN WERT	CE, HARDIN, LOGA , and WILLIAMS C	N, MERCER, OUNTIES
	Rates F	ringes
PAINTER		
Brush & Roller\$ Drywall Finishing & Taping\$ Lead Abatement\$	25.22 23.92 26.97	14.11 14.11 14.11

Swing Stage, Chair, Spiders, & Cherry Pickers...\$ 25.47 Wallcoverings.....\$ 22.82 14.11 14.11 All surfaces 40 ft. or over where material is applied to or labor performed on, above ground level (exterior), floor level (interior) - \$.50 premium Applying Coal Tar Products - \$1.00 premium _____ PAIN1275-002 06/01/2020 DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, MADISON, PICKAWAY, ROSS & UNION Rates Fringes PAINTER Bridges.....\$ 34.64 14.40 Brush; Roller.....\$ 25.16 14.40 Sandblasting; Steamcleaning; Waterblasting (3500 PSI or Over)& Hazardous Work.....\$ 25.86 14.40 Spray.....\$ 25.66 14.40 Stacks; Tanks; & Towers....\$ 28.67 14.40 Structural Steel & Swing Stage....\$ 25.46 14.40 _____ PLAS0109-001 05/01/2018 MEDINA, PORTAGE, STARK, and SUMMIT COUNTIES Rates Fringes PLASTERER.....\$ 28.86 17.11 _____ PLAS0109-003 05/01/2018 CARROLL, HOLMES, TUSCARAWAS, and WAYNE COUNTIES Rates Fringes PLASTERER.....\$ 28.21 17.11 _____ PLAS0132-002 05/01/2018 BROWN, BUTLER, CLERMONT, HAMILTON, HIGHLAND, WARREN COUNTIES Rates Fringes PLASTERER.....\$ 28.86 17.11 _____

PLAS0404-002 05/01/2018

ASHTABULA, CUYAHOGA, GEAUGA, A	AND LAKE COUI	NTIES
	Rates	Fringes
PLASTERER	\$ 29.63	17.11
PLAS0404-003 05/01/2018		
LORAIN COUNTY		
	Rates	Fringes
PLASTERER	\$ 28.86	17.11
PLAS0526-022 05/01/2018		
COLUMBIANA, MAHONING, and TRUN	MBULL COUNTI	ES
	Rates	Fringes
PLASTERER	\$ 28.86	17.11
PLAS0526-023 05/01/2018		
BELMONT, HARRISON, and JEFFERSO	ON COUNTIES	
	Rates	Fringes
PLASTERER	\$ 28.21	17.11
PLAS0886-001 05/01/2018		
FULTON, HANCOCK, HENRY, LUCAS,	PUTNAM, and	WOOD COUNTIES
	Rates	Fringes
PLASTERER	\$ 29.63	17.11
PLAS0886-003 05/01/2018		
DEFIANCE, ERIE, HURON, OTTAWA, COUNTIES	PAULDING, SA	ANDUSKY, and SENECA
	Rates	Fringes
PLASTERER	\$ 28.86	17.11
PLAS0886-004 05/01/2018		
ALLEN, AUGLAIZE, HARDIN, LOGAN	, MERCER, and	d VAN WERT COUNTIES
	Rates	Fringes
Dage $30 \text{ of } 16$		Davis Racon Waga Decision Se

PLASTERER.....\$ 28.21 17.11 ------* PLUM0042-002 07/01/2020 ASHLAND, CRAWFORD, ERIE, HURON, KNOX, LORAIN, MORROW, RICHLAND WYANDOT λr Rates Fringes Plumber, Pipefitter, Steamfitter.....\$ 34.82 24.67 _____ PLUM0050-002 07/06/2020 DEFIANCE, FULTON, HANCOCK, HENRY, LUCAS, OTTAWA, PAULDING, PUTNAM, SANDUSKY, SENECA, WILLIAMS & WOOD Rates Fringes Plumber, Pipefitter, Steamfitter....\$ 43.60 26.73 ------PLUM0055-003 05/04/2020 ASHTABULA, CUYAHOGA, GEAUGA, LAKE, MEDINA (N. of Rte. #18 & Smith Road) & SUMMIT (N. of Rte. #303, including the corporate limits of the city of Hudson) Rates Fringes PLUMBER.....\$ 37.07 27.71 _____ PLUM0083-001 07/01/2017 BELMONT & MONROE (North of Rte. #78) Rates Fringes Plumber and Steamfitter.....\$ 32.16 31.51 _____ _____ . _ _ _ _ _ _ _ _ _ _ _ _ PLUM0094-002 05/01/2020 CARROLL (Northen Half), STARK, and WAYNE COUNTIES Rates Fringes PLUMBER/PIPEFITTER.....\$ 35.78 21.44 _____ PLUM0120-002 05/03/2021 ASHTABULA, CUYAHOGA, GEAUGA, LAKE, LORAIN (the C.E.I. Power Page 40 of 46

#303) Rates Fringes PIPEFITTER.....\$ 41.72 26.30 _____ * PLUM0162-002 06/01/2021 CHAMPAIGN, CLARK, CLINTON, DARKE, FAYETTE, GREENE, MIAMI, MONTGOMERY & PREBLE Rates Fringes Plumber, Pipefitter, Steamfitter....\$ 33.40 27.09 _____ * PLUM0168-002 06/01/2021 MEIGS, MONROE (South of Rte. #78), MORGAN (South of Rte. #78) & WASHINGTON Rates Fringes PLUMBER/PIPEFITTER.....\$ 37.09 33.26 _____ PLUM0189-002 06/01/2019 DELAWARE, FAIRFIELD, FRANKLIN, HOCKING, LICKING, MADISON, MARION, PERRY, PICKAWAY, ROSS & UNION Rates Fringes Plumber, Pipefitter, Steamfitter....\$ 38.45 16.98 _____ * PLUM0219-002 06/01/2021 MEDINA (Rte. #18 from eastern edge of Medina Co., west to eastern corporate limits of the city of Medina, & on the county road from the west corporate limits of Medina running due west to and through community of Risley to the western edge of Medina County - All territory south of this line), PORTAGE, and SUMMIT (S. of Rte. #303) COUNTIES Rates Fringes Plumber and Steamfitter.....\$ 40.42 24.66 _____ PLUM0392-002 06/01/2020

House in Avon Lake), MEDINA (N. of Rte. #18) & SUMMIT (N. of

BROWN, BUTLER, CLERMONT, HAMILTON & WARREN

	Rates	Fringes
PLUMBER/PIPEFITTER	\$ 33.91	22.29
PLUM0396-001 06/01/2021		
COLUMBIANA (Excluding Washingto Liverpool Twp Secs. 35 & 36 MAHONING and TRUMBULL COUNTIES	n & Yellow C - West of Co	Creek Townships & Dunty Road #427),
	Rates	Fringes
PLUMBER/PIPEFITTER	\$ 35.35	27.01
PLUM0495-002 06/01/2018		
Townships), COLUMBIANA (Washing Liverpool Township, Secs. 35 & COSHOCTON, GUERNSEY, HARRISON, to State Rte. #78 & from McConn to the Perry County line), MUSK COUNTIES	ton & Yellow 36, West of HOLMES, JEFF elsville wes INGUM, NOBLE	Creek Townships & County Rd. #427), TERSON, MORGAN (South st on State Rte. #37 C, and TUSCARAWAS
	Rates	Fringes
Plumber, Pipefitter, Steamfitter	\$ 38.24	23.09
PLUM0577-002 06/01/2019		
ADAMS, ATHENS, GALLIA, HIGHLAND SCIOTO & VINTON), JACKSON, I	AWRENCE, PIKE,
	Rates	Fringes
Plumber, Pipefitter, Steamfitter	\$ 34.90	24.11
PLUM0776-002 07/01/2020		
ALLEN, AUGLAIZE, HARDIN, LOGAN, COUNTIES	MERCER, SHE	LBY and VAN WERT
	Rates	Fringes
Plumber, Pipefitter, Steamfitter	\$ 37.63	25.58
Page 42 of 46		Davis Bacon Wage Decision S

TEAM0377-003 05/01/2021

STATEWIDE, EXCEPT CUYAHOGA, GEAUGA & LAKE

Rates Fringes

TRUCK DRIVER

GROUP	1\$	29.74	15.70
GROUP	2\$	30.16	15.70

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Asphalt Distributor; Batch; 4- Wheel Service; 4-Wheel Dump; Oil Distributor & Tandem

GROUP 2 - Tractor-Trailer Combination: Fuel; Pole Trailer; Ready Mix; Semi-Tractor; & Asphalt Oil Spraybar Man When Operated From Cab; 5 Axles & Over; Belly Dump; End Dump; Articulated Dump; Heavy Duty Equipment; Low Boy; & Truck Mechanic

TEAM0436-002 05/01/2021

CUYAHOGA, GEAUGA & LAKE

Rates Fringes

TRUCK DRIVER

GROUP	1\$	30.65	16.95
GROUP	2\$	31.15	16.95

GROUP 1: Straight & Dump, Straight Fuel

GROUP 2: Semi Fuel, Semi Tractor, Euclids, Darts, Tank, Asphalt Spreaders, Low Boys, Carry-All, Tourna-Rockers, Hi-Lifts, Extra Long Trailers, Semi-Pole Trailers, Double Hook-Up Tractor Trailers including Team Track & Railroad Siding, Semi-Tractor & Tri-Axle Trailer, Tandem Tractor & Tandem Trailer, Tag Along Trailer, Expandable Trailer or Towing Requiring Road Permits, Ready-Mix (Agitator or Non-Agitator), Bulk Concrete Driver, Dry Batch Truck, Articulated End Dump

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION"

SINGLE PHASE DIESEL-ENGINE-DRIVEN GENERATOR SETS 26 32 13.50

PART ONE – GENERAL

1.01 Summary

- A. Contractor shall supply all equipment, materials and labor for the complete installation of Single-Phase Diesel-Engine-Driven Generator sets.
- B. Two (2) Single-Phase 120/240VAC Diesel-Driven-Generator sets are needed for this project.
 - 1. Wastewater Treatment Plant
 - 2. Palestine Pump Station
- C. This section includes the following items from a single supplier:
 - 1. Diesel-Engine-Driven Generator Set.
 - 2. Noise Reduction Enclosure
 - 3. Automatic Transfer Switches
 - 4. Related Accessories as specified
- D. The diesel backup generator is one of the most expensive, single pieces of equipment at the facilities, therefor the initial up-front purchase, installation cost, overall performance cost, and all-around lifecycle cost shall be taken into consideration.
- E. It is the intent of this specification to secure an engine-driven generator set that has been prototype tested, factory built, production-tested, and site-tested together with all accessories necessary for a complete installation as shown on the plans and drawings and specified herein.
- F. It is the intent of this specification to secure a generator set system that has been tested during design verification, in production, and at the final job site. The generator set will be a commercial design and will be complete with all of the necessary accessories for complete installation as shown on the plans, drawings, and specifications herein. The equipment supplied shall meet the requirements of the National Electrical Code and applicable local codes and regulations.
- G. All equipment shall be new and of current production by an international, power system manufacturer of generators, transfer switches, and paralleling switchgear. The manufacturer shall be a supplier of a complete and coordinated system. There will be single-source responsibility for warranty, parts, and service through a factory-authorized representative with factory-trained technicians.

1.02 References and Standards

- A. The generator set covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards below:
 - 1. EN61000-6

- 2. EN55011
- 3. FCC Part 15 Subpart B
- 4. ISO8528
- 5. IEC61000
- 6. UL508
- 7. UL2200
- 8. UL142
- 9. Designed to allow for installed compliance to NFPA 37, NFPA 70, NFPA 99 and NFPA 110

1.03 Related Work

- A. 03 30 00 Cast-in-Place Concrete
- B. 26 36 23.10 Automatic Transfer Switches
- C. 26 05 00 Basic Electrical Requirements

1.04 Work Included

- A. Installation
 - 1. The work includes supplying and installing a complete integrated generator system. The system consists of a diesel generator set with related component accessories and automatic transfer switches specified under a separate section.
- B. Fuel System
 - 1. The CONTRACTOR shall provide a full tank of diesel fuel for each unit at the completion of all testing.
- C. System Test
 - 1. A complete system load test shall be performed after all equipment is installed. Guidelines in the Start-up Section.
- D. Requirements, Codes and Regulations
 - 1. The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO9001 certified.

1.05 Substitution

- A. Proposed deviations from the specifications shall be treated as follows:
- B. This specification is based on the diesel-driven-generator being listed in PART TWO PRODUCTS of this Specification.

- C. Substitution Comparison Requirements
 - 1. Comparison shall be made against the Named Make and Model listed in Part Two Products of this Specification.
 - 2. Only Domestic Diesel Engine manufactures shall be accepted, Caterpillar, John-Deere, Detroit, International and Cummins.
 - 3. The comparison shall be based on the following criteria for 30-year Present Worth: (ISO-8528-1)
 - a. 200 running hours per year
 - 1. Fuel Usage at 25%, 50%, 75% and 100% loading
 - b. Average U.S. Fuel Cost as of 23 July 2021 = \$2.33 per/gal, Off -Road
 - c. 30-year useful life expectancy
 - d. Add \$1,200.00 per year for general O&M cost (\$36,000).
- D. Substitution Time Requirement
 - 1. Requests for substitutions shall be made a minimum of ten (10) days prior to bid date. Manufacturers catalog data shall accompany each request and authorized acceptance shall be addenda only.
- E. Substitution Responsibility
 - 1. The power system has been designed to the specified electrical requirements of the project.
 - 2. The equipment sizing, spacing, amounts, electrical wiring, ventilation equipment, fuel, and exhaust components have all been taken into consideration and designed around supplied equipment. Should any substitutions be made, the CONTRACTOR shall bear responsibility for the installation, coordination and operation of the system as well as any engineering and redesign costs, which may result from such substitutions.
- F. Related Requirements
 - 1. The diesel engine shall be of domestic manufacture such as Caterpillar, John Deere, International, Detroit or a pre-approved alternative. All basic O&M parts such as oil & fuel filters, drive belts and hoses shall be available from local third parties such as farm, truck or machinery parts suppliers without special ordering.
 - 2. It is the intent of this specification to secure an engine-driven generator set that has been prototype tested, factory built, production-tested, and site-tested together with all accessories necessary for a complete installation as shown on the plans and drawings and specified herein.
 - 3. Any exceptions to the published specifications shall be subject to the approval of the engineer and submitted minimum 10 days prior to the closing of the bid with a line-by-line summary description of all the items of compliance, any items that have been are omitted or have been taken exception to, and a complete description of all deviations.

- 4. It is the intent of this specification to secure a generator set system that has been tested during design verification, in production, and at the final job site. The generator set will be a commercial design and will be complete with all of the necessary accessories for complete installation as shown on the plans, drawings, and specifications herein. The equipment supplied shall meet the requirements of the National Electrical Code and applicable local codes and regulations.
- 5. All equipment shall be new and of current production by an international, power system manufacturer of generators, transfer switches, and paralleling switchgear. The manufacturer shall be a supplier of a complete and coordinated system. There will be single-source responsibility for warranty, parts, and service through a factory-authorized representative with factory-trained technicians.

1.06 Submittals

- A. All submittals to follow Specifications Section 01 33 00 Submittals & Substitutions.
 - 1. Product Data
 - a. The submittal shall include prototype test certification and specification sheets showing all standard and optional accessories to be supplied; schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number each required interconnection between the generator set, the transfer switch, and the remote annunciator panel if it is included elsewhere in these specifications.
 - 2. Shop Drawings
 - 3. All submittals and alternatives must be submitted with fuel usage at 25%. 50%, 75% and 100% loading.
- B. Informational Submittal
 - 1. Certificates
 - a. The generator set shall be listed to UL 2200 or submitted to an independent third-party certification process to verify compliance as installed.
 - 2. Test and Evaluation Reports
 - 3. Manufacturer's Instruction
 - 4. Source Quality Control Submittals
 - 5. Field or Site Quality Control
 - 6. Manufacturer's Report
 - 7. Special Procedure Submittal
 - 8. Qualification Statement
- C. Closeout Submittal
 - 1. Operation and Maintenance Data
 - 2. Bonds
 - 3. Warranty Documentation
 - 4. Record Documentation
 - 5. Software

D. Maintenance Material Submittals

1.07 Quality Assurance

- A. Regulatory Agency
 - 1. The generator set shall conform to the requirements of the following codes and standards:
 - a. EN50082-2, Electromagnetic Compatibility-Generic Immunity Requirements, Part 2: Industrial.
 - b. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
 - c. IEC8528 part 4, Control Systems for Generator Sets.
 - d. IEC Std 61000-2 and 61000-3 for susceptibility, 61000-6 radiated and conducted electromagnetic emissions.
 - e. IEEE446 Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
 - f. NFPA 70, National Electrical Code, Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
 - g. NFPA 99, Essential Electrical Systems for Health Care Facilities.
 - h. NFPA 110, Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1 prototype tests required by this standard shall have been performed on a complete and functional unit. Component level type tests will not substitute for this requirement.
 - 2. Qualifications:
 - a. The equipment shall be produced by a manufacturer who is ISO 9001 certified for the design, development, production and service of its complete product line.
 - b. The power system shall be produced by a manufacturer who has produced this type of equipment for a period of at least 10 years and who maintains a service organization available twenty-four hours a day throughout the year.
 - 3. Manufacturers:
 - a. The power system shall be furnished by a single manufacturer who shall be responsible for the design, coordination, and testing of the complete system. The entire system shall be installed as shown on the plans, drawings, and specifications herein.

1.08 Field or Site Conditions

- A. Ambient Conditions
 - 1. The Diesel-Driven-Generator set shall operate in the following conditions without any damage to the unit or its loads.
 - a. Ambient Temperature: 110 °F
 - b. Altitude:

	i.	WWTP	1137 ft
	ii.	Palestine	1100 ft
c.	Relative Hum	idity: 95%	

1.09 Warranty or Bond

- A. Two Year Standby (ISO 8528-1: ESP) Generator Set Warranty
 - 1. The manufacturer's standard warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall be limited to 500 hours annually for the system warranty by both the manufacturer and servicing distributor. Submittals received without written warranties as specified will be rejected in their entirety.

PART TWO – PRODUCTS

2.01 Equipment – Palestine Pump Station

Palestine Power Load Schedule - 240V, 1ø												
	Control Type	Generator Start-up	Ma	tor	Þ	Amps	90% F Fac	ower tor	Total	Amps	Most Likely Generator	
Pump Station	Control	Generator									Load	ling
Pump 1	VFD	Step 2	23	ΗP	51	Amp	88.3	Amp				-
Pump 2	VFD		23	ΗP	51	Amp	88.3	Amp				
Pump Panel		50.0%			30	Amp	16.5	Amp				
									193	Amp	96.58	Amp
Stepdown Power Transformer		50.0%			0	KVA	0	Amp	0	Amp	0	Amp
		0.0%			0	Amp	0	Amp	0	Amp	0	Amp
		0.0%			0	Amp	0	Amp	0	Amp	0	Amp
		0.0%			0	AMP	0	Amp	0	Amp	0	Amp
		0.0%			0	Amp	0	Amp	0	Amp	0	Amp
				Тс	otal	Amps			193	.164	96.5	82
		System Voltage Total Watts						24 46,	40 359	24 23,1	0 .80	
		Syster	n To	otal	Kilo	watts			4	6	23	3

A. Loading Chart to Base Generator Sizing

- B. Equipment
 - 1. Basis of design is a Kohler model 100REOZJF with a 4R12X alternator. It shall provide 91.00 kVA and 91.00 kW when operating at 120/240 volts, 60 Hz, 0.80 power factor. The generator set shall be capable of a 130°C Standby rating while operating in an ambient condition of less than or equal to 110 °F and a maximum elevation of 1110 ft above sea level. The standby rating shall be available for the duration of the outage.
- C. Engine
 - 1. The minimum 4.5-liter displacement engine shall deliver a minimum of 158 HP at a governed engine speed of 1800 rpm, and shall be equipped with the following:
 - a. Electronic isochronous governor capable of 0.25% steady-state frequency regulation.
 - b. 12-volt positive-engagement solenoid shift-starting motor.
 - c. 65-ampere automatic battery charging alternator with a solid-state voltage regulation.
 - d. Positive displacement, full-pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain.
 - e. Dry-type replaceable air cleaner elements for normal applications.
 - f. Engine-driven or electric fuel-transfer pump including fuel filter and electric solenoid fuel shutoff valve capable of lifting fuel.
 - g. The turbocharged engine shall be fueled by diesel.
 - h. The engine shall have a minimum of 4 cylinders and be liquid-cooled.
 - i. The engine shall be EPA certified from the factory.
 - j. APM402 Controller (or equal)
 - 2. The generator must accept rated load in one-step.

2.02 Equipment – Wastewater Treatment Plant

A. Loading Chart to Base Generator Sizing (see next page)

Palestine / Hollansb	ourg W	WTP Pc	ower	Lo	ad S	Sche	dule	- 24(⊃V, 1ø		Most Like	-1.
	Control Type	Generator Start-up	Mot	or	Ar	nps	90% F Factor	ower r (1Ph)	Total A	mps	Generat	aly or
Headworks Panel	Control	Generator									Startup Loa	ding
Screen	LS	Step 2	2	HP	3.4	Amp	5.89	Amp				
		50.0%			20	Amp	11	Amp				
									16.889	Amp	11.3888	Amp
Plant Pump Panel												
Plant Pump 1	VFD	Step 2	5	HP	14	Amp	24.2	Amp				
Plant Pump 2	VFD		5	HP	14	Amp	24.2	Amp				
Mixer	VFD	Step 2	2	HP	3.4	Amp	5.89	Amp				
Pump Panel		50.0%			20	Amp	11	Amp				
SAGR Blower Panel									65.385	Amp	35.6368	Amp
Rlower 1	VFD	Step 3	75	НР	11	Δmn	19 1	Δmn				
RIOWER 2	VED		7.5	нр	11	Δmn	19.1	Δmn				
RIOWER 2	VED		7.5	нр	11	Δmn	19.1	Δmn				
Blower 4	VED	Sten 4	7.5	нр	11	Amn	10.1	Amn				
Plower 5	VED	Step -	7.5	нр	11	Amn	10.1	Amn				
Blower Danal	VID		1.5	f iF	20	Amp	11	Amp				
		50.076			20	Ашр	11	Ашр	106.26	Amp	62.656	Amp
Post Treatment Panel												
Post Treatment Panel					20	Amp	22	Amp				
Flex Filter	LS	Step 1	5	HP	14	Amp	15.4	Amp				
UV	LS	Step 1	0	HP	20	Amp	22	Amp				
Building Lighting Panel		50.0%			100	Amp	55	Amp				
Non-Potable Pump	LS		3	HP	17	Amp	29.4	Amp				
									143.81	Amp	116.31	Amp
Stepdown Power Transformer		50.0%			0	KVA			0	Amp	0	Amp
		0.0%			0	Amp	0	Amp	0	Amp	0	Amp
		0.0%			0	Amp	0	Amp	0	Amp	0	Amp
		0.0%			0	^ \\.P		1 mp	0	1r		/
		0.070			0	Alvir	0	Amp	0	Amp	U	Amp
		0.0%			0	Amp	U	Amp	U	Amp	0	Amp
				T	[otal	Amps			332.3	436	225.991	6
			S	yste	em Vo	oltage			24	0	240	
l					otal	Watts	ļ		79,7	62	54,238	
		System Total Kilowatts						80)	54		

B. Equipment

 The generator set shall be a Kohler model 125REOZJG with a 4T13X alternator. It shall provide 125.00 kVA and 125.00 kW when operating at 120/240 volts, 60 Hz, 0.80 power factor. The generator set shall be capable of a 130°C Standby rating while operating in an ambient condition of less than or equal to 110 °F and a maximum elevation of 1110 ft above sea level. The standby rating shall be available for the duration of the outage.

- C. Engine
 - 1. The minimum 4.5-liter displacement engine shall deliver a minimum of 197 HP at a governed engine speed of 1800 rpm, and shall be equipped with the following:
 - a. Electronic isochronous governor capable of 0.25% steady-state frequency regulation.
 - b. 24-volt positive-engagement solenoid shift-starting motor.
 - c. 60-ampere automatic battery charging alternator with a solid-state voltage regulation.
 - d. Positive displacement, full-pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain.
 - e. Dry-type replaceable air cleaner elements for normal applications.
 - f. Engine-driven or electric fuel-transfer pump including fuel filter and electric solenoid fuel shutoff valve capable of lifting fuel.
 - g. The turbocharged engine shall be fueled by diesel.
 - h. The engine shall have a minimum of 6 cylinders and be liquid-cooled.
 - 2. The generator must accept rated load in one-step.

2.03 EPA Certified

A. The engine shall be EPA certified from the factory.

2.04 Additional Standards for all Generator Sets

- A. Cooling System
 - 1. The generator set shall be equipped with a rail-mounted, engine-driven radiator with blower fan and all accessories or equal. The cooling system shall be sized to operate at full load conditions and ambient air entering the room or enclosure. The generator set supplier is responsible for providing a properly sized cooling system based on the enclosure static pressure restriction.
- B. Battery
 - 1. A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Battery voltage shall be compatible with the starting system.
- C. Housing/Enclosure
 - 1. The complete generator set enclosed in a factory assembled, sound & weather protective enclosure.
 - a. A weather resistant enclosure of steel with electrostatically applied powder coated baked polyester paint or equal. Sound enclosure shall have a maximum sound level of 73.6 dB for the WWTP Genset and 69.8 dB Palestine Genset, both @ 23 feet running at full load.

- D. Fuel System (Sub-base fuel tank)
 - 1. The engine fuel system shall be designed for operation on No. 2 diesel fuel. A secondary fuel filter, water separator, manual fuel priming pump, fuel shutoff solenoid and all fuel lines must be installed at the point of manufacture.
 - Sub-base mounted fuel oil tank shall be double wall constructed of steel plate of thickness required by applicable standards and shall be UL listed 142 or UL 2085 protected tank and constructed per NFPA requirements. The sub-base fuel tank shall have a minimum capacity for a running time of 48 hours without refueling (at full load).
 - a. Tank shall include necessary vents, fill, fuel level gauge, low, high and critical high-level sensors, supply and return openings, piping and accessories. Provide vent lines to outside with approved cast iron screened rain shield; install with proper clearance from all building openings.
 - b. Provide an intertank leak detector and alarm contact; connect alarm contact to control panel for local and remote annunciation.
 - c. Base tank shall be fabricated separately from the base; after fabrication, tank shall be bolted to its base to form a complete unit that mates to the generator skid. Base tank shall not interfere with access to engine and generator for maintenance and shall be mounted to allow minimum 2 inches air space between bottom of tank and concrete floor.
 - d. Complete assembly shall be prime and finish painted to match color of engine generator set.
 - e. Fuel Tank Capacity; (24 hours @ 100% Loading) 1.WWTP 316 Gallons 2.Palestine P.S. 215 Gallons
- E. Generator Overcurrent and Fault Protection
 - 1. The generator shall be provided with a factory installed; 100% rated line circuit breaker rated at 125.00 amperes at Palestine Lit Station and 200 amp at the WWTP that is UL489 listed. Line circuit breakers shall be sized for the rated ampacity of the loads served by the breaker per the NEC.
- F. Alternator
 - The alternator shall be salient-pole, brushless, 2/3-pitch, with 4 bus bar provision for external connections, self-ventilated, with drip-proof construction and amortisseur rotor windings, and skewed for smooth voltage waveform. The ratings shall meet the NEMA standard (MG1-32.40) temperature rise limits. The insulation shall be class H per UL1446 and the varnish shall be a vacuum pressure impregnated, fungus resistant epoxy. Temperature rise of the rotor and stator shall be limited to 130°C Standby. The PMG based excitation system shall be of brushless construction controlled by a digital, three phase sensing, solid- state, voltage regulator. The AVR shall be capable of proper

operation under severe nonlinear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operations. The AVR shall be protected from the environment by conformal coating. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full rated load. The TIF factor shall not exceed 50.

- 2. The alternator shall have a maintenance-free bearing, designed for 40,000-hour B10 life. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
- 3. The generator shall be inherently capable of sustaining at least 300% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices
- 4. Motor starting performance and voltage dip determinations shall be based on the complete generator set.
 - i. <u>Palestine Pump Station:</u> The generator set shall be capable of supplying 224.00 LRKVA for starting motor loads with a maximum instantaneous voltage dip of 35%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115.
 - ii. <u>Wastewater Treatment Plant:</u> The generator set shall be capable of supplying 437.00 LRKVA for starting motor loads with a maximum instantaneous voltage dip of 35%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115.
 - iii. Motor starting performance and voltage dip determination that does not account for all components affecting total voltage dip, i.e., engine, alternator, voltage regulator, and governor will not be acceptable. As such, the generator set shall be prototype tested to optimize and determine performance as a generator set system.
- G. Vibration Isolation
 - 1. Vibration isolators shall be provided between the engine-alternator and heavyduty steel base.
- H. Controller
 - 1. Advanced Power Management 402 (APM402) Generator Set Controller
 - a. The generator set controller shall be a microprocessor-based control system that will provide automatic starting, system monitoring, and protection.
 - b. The controller shall be mounted on the generator set and shall have integral vibration isolation. The controller shall be prototype and reliability tested to ensure operation in the conditions encountered.
 - 2. Codes and Standards
 - a. The generator set controller shall meet NFPA 110 Level 1 requirements and shall include an integral alarm horn as required by NFPA.
 - b. The controller shall meet NFPA 99 and NEC requirements.
 - c. The controller shall be UL 508 recognized.

- 3. Applicability
 - a. The controller shall be a standard offering in the manufacturer's controller product line.
 - b. The controller's environmental specification shall be: -40°C to 70°C operating temperature range and 5-95% humidity, non-condensing.
- 4. Controller Buttons, Display, and Components
 - a. The generator set controller shall include the following features and functions:
 - i. Master Control Push Buttons the buttons shall be tactile-feel membrane with an indicator light to initiate the following functions:
 - a. Run Mode when in Run mode the generator set shall start.
 b. Off/Reset Mode when in Off/Reset mode, the generator set shall not accept any remote start commands and shall be capable of resetting all faults, allowing for the restarting of the generator set after a shutdown.
 - c. Auto Mode when in Auto mode, the generator set shall be ready to accept a signal from a remote device.
 - ii. Emergency Stop Switch the latch type stop switch shall be red in color with a "mushroom" type head. Depressing the stop button will immediately stop the generator set and lockout the generator set for any automatic remote starting.
 - iii. Alarm Horn the horn sounds when any faults or warnings are present. The horn shall also sound when the controller in not in the Auto mode.
 - iv. Push Button/Rotary Selector Dial the dial shall be used for selection of all menus and sub-menus. Rotating the dial moves through the menus, pushing the dial selects the menu and function/features in the menu.
 - v. Display the digital display shall be alphanumeric, with 2 lines of data and approximately 24 characters. The display shall have back lighting for ease of operator use in high and low light conditions. The display shall enter a sleep mode to reduce the demand on the battery when the generator set is not running, and the rotary dial is not in use for a period of time. The generator will wake up from sleep mode when the generator set starts, or the rotary dial is in use.
 - vi. Fault Light the controller shall have an annunciator fault light that glows red for faults and yellow for warnings. The warning light will also illuminate when not in Auto.
 - vii. Alarm Silence/Lamp Test Button when this button is held, it shall test all controller lamps. This button will also silence the alarm horn when the unit is not Auto or has a fault.
 - viii.Mini-USB Connection the controller shall have a mini-USB connection port for a PC connection that is accessible on the front of the control panel without having to open any electrical enclosure panels on the generator. This connection shall allow a certified technician to service the generator controller using a dedicated PC program. The program shall allow for servicing of generator set parameters, faults diagnostics and viewing of controller information. The program shall

allow for uploading of software and firmware as well as downloading of parameter settings and the event log.

- 5. Controller Engine Control Features and Functions
 - a. User-programmable time delay for engine start.
 - b. User-programmable time delay engine cool down.
 - c. Capability to start and run at user-adjustable idle speed during warm-up for a selectable time-period until engine reaches preprogrammed temperature.
 - d. The idle function including engine cooldown at idle speed.
 - e. Output with adjustable timer for an ether injection starting system.
 - f. Programmable cyclic cranking that can adjust on time, off time, and number of cycles.
- 6. Controller Alternator Control Features and Functions
 - a. Patented High-speed RMS Digital Voltage Regulation the system shall have integral microprocessor-based voltage regulator system that provides + 0.5% voltage regulation no-load to full load with three phase sensing. A separate voltage regulator is not acceptable. The digital voltage regulator shall be applicable to single- or three-phase systems. The system shall be prototype tested and control variation of voltage to frequency. The voltage regulator shall be adjustable at the controller with maximum + 10% adjustable of nominal voltage.
 - b. Alternator Thermal Overload Protection the system shall have integral alternator overload and short circuit protection matched to each alternator for the particular voltage and phase configuration.
- 7. Other Control Features and Functions
 - a. Event Logging the controller keeps a record of up to 1,000 events with date and time locally for warning and shutdown faults. This event log can be downloaded onto a PC through the service program.
- 8. Control Monitoring Requirements
 - a. The generator controller shall display and monitor the following engine and alternator functions.
 - i. The following generator set functions shall be monitored:
 - 1. All output voltages single phase, three-phase, line to line, and line to neutral
 - 2. All single phase and three phase currents
 - 3. Output frequency
 - 4. kVA total and per phase
 - 5. kW hours
 - ii. Engine parameters listed below shall be monitored (engine dependent):
 - 1. Engine Speed
 - 2. Oil Pressure
 - 3. Coolant Temperature
 - 4. Battery Voltage
 - 5. Runtime Hours

- 6. Fuel Pressure or Level
- 7. Fuel Consumption Rate
- iii. Operational records shall be stored in the control beginning at system startup
 - 1. Total Run Time Hours
 - 2. Total Loaded Hours
 - 3. Total kW Hours
 - 4. Number of Starts
- iv. For maintenance and service purposes, the controller shall store and display on demand the information:
 - 1. Generator Model
 - 2. Generator Serial Number
 - 3. Controller Serial Number
- 9. Generator Set Warning, Shutdown Alarm and Status
 - a. The generator set shall have alarms and status indication lamps that show Non-Automatic Status, Warning, and Shutdown conditions. The controller shall indicate with a warning lamp and/or alarm, and on the digital display screen any shutdown, warning, or engine fault condition that exists in the generator set system.
 - b. Conditions, as a minimum, resulting in generator shutdown (engine dependent):
 - i. AC Sensing Loss
 - ii. Alternator Protection
 - iii. ECM Address Conflict
 - iv. ECM Communications Loss
 - v. ECM DTCs
 - vi. Emergence Stop
 - vii. Overspeed
 - viii. Underspeed
 - ix. High Coolant Temperature
 - x. kW Overload
 - xi. Locked Rotor
 - xii. Loss of Fuel
 - xiii. Low Coolant Level
 - xiv. Low Engine Oil Level
 - xv. Low Fuel Level
 - xvi. Low Oil Pressure
 - xvii. No Coolant Temperature Signal
 - xviii. No Oil Pressure Signal
 - xix. Overcrank
 - xx. Overfrequency
 - xxi. Underfrequency
 - xxii. Overvoltage
 - xxiii. Undervoltage
 - c. Conditions, as a minimum, resulting in generator warning (generator will continue to operate) (engine dependent):

- i. AC Sensing Loss (short period of time)
- ii. Battery Charger Communication Loss
- iii. Battery Charger Fault
- iv. Battery Fault
- v. Critical High Fuel Level
- vi. High Fuel Level
- vii. Low Fuel Level or Pressure
- viii. Fuel Tank Leak
- ix. Ground Fault
- x. High Battery Voltage
- xi. Low Battery Voltage
- xii. Low Cranking Voltage
- xiii. High Coolant Temperature
- xiv. Low Coolant Temperature
- xv. Low Engine Oil Level
- xvi. Low Oil Pressure
- xvii. Not in Auto
- xviii. Speed Sensor Fault
- xix. ECM DTCs
- 10. Inputs and Outputs
 - a. Standard Dedicated User Inputs the controller shall have dedicated inputs for:
 - i. Two-Wire Input
 - 1. Remote Engine Start
 - ii. Digital Input Fixed
 - 1. Auxiliary Fault (Shutdown)
 - 2. Remote Emergency Stop
 - iii. Digital Input Programmable
 - 1. 3 Dry Contact
 - b. Standard Dedicated User Outputs the controller shall have dedicated outputs for:
 - i. Relay Driver Output Programmable
 - 1. 1 Relay
 - c. Optional Configurable User Inputs and Outputs
 - i. User Configurable Inputs
 - 1. 2 Dry Contact Digital
 - ii. User Configurable Relay Outputs
 - 1. 5 NO/NC Relays

PART THREE – EXECUTION

3.01 Ohio Fire Marshal Permit

A. Contact to Engineer within 60 days of generator startup to acquire a State Fire Marshal permit.

B. The permits are only valid for 180 days from the date of issue. There is no cost to the contractor.

3.02 Installation

A. Install equipment in accordance with manufacturer's recommendations, the project drawings and specifications, and all applicable codes.

3.03 Start-Up and Testing

- A. Coordinate all start-up and testing activities with the Engineer and Owner.
- B. To ensure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer and/or local representative shall be responsible for three separate tests: design prototype tests, final production tests, and site tests.
 - 1. Design Prototype Tests. Components of the emergency system, such as the engine/generator set, transfer switch, and accessories, shall not be subjected to prototype tests because the tests are potentially damaging. Rather, similar design prototypes and preproduction models shall be subject to the following tests:
 - a. Maximum power (kW)
 - b. Maximum motor starting (kVA) at 35% instantaneous voltage dip.
 - c. Alternator temperature rise by embedded thermocouple and/or by resistance method per NEMA MG1-32.6.
 - d. Governor speed regulation under steady-state and transient conditions.
 - e. Voltage regulation and generator transient response.
 - f. Harmonic analysis, voltage waveform deviation, and telephone influence factor.
 - g. Three-phase short circuit tests.
 - h. Alternator cooling air flow.
 - i. Torsional analysis to verify that the generator set is free of harmful torsional stresses.
 - j. Endurance testing.
 - 2. Final Production Tests. Each generator set shall be tested under varying loads with guards and exhaust system in place. Tests shall include:
 - a. Single-step load pickup
 - b. Safety shutdown device testing
 - c. Rated Power @ 0.8 PF
 - d. Maximum power
 - e. Upon request, a witness test, or a certified test record sent prior to shipment.
 - 3. Site Tests. The manufacturer's distribution representative shall perform an installation check, startup, and building load test. The engineer, regular operators, and the maintenance staff shall be notified of the time and date of the site test. The tests shall include:
 - a. Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations, under the environmental

conditions present and expected.

- b. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include: block heaters, battery chargers, alternator strip heaters, remote annunciators, etc.
- c. Generator set startup under test mode to check for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during operation, normal and emergency line-to-line voltage and frequency, and phase rotation.
- d. Automatic start by means of a simulated power outage to test remoteautomatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination. Engine coolant temperature, oil pressure, and battery charge level along with generator set voltage, amperes, and frequency shall be monitored throughout the test.

3.04 Operation and Maintenance Manuals

A. Provide two (2) sets of operation and maintenance manuals covering the generator, switchgear, and auxiliary components. Include final as-built wiring interconnect diagrams and recommended preventative maintenance schedules.

3.05 Training

- A. On-Site Training
 - 1. Provide on-site training to instruct the owner's personnel in the proper operation and maintenance of the equipment. Review operation and maintenance manuals, parts manuals, and emergency service procedures.

3.06 Maintenance Contracts

- A. Only after the Generator and the Automatic Transfer Switch has been successfully started and accepted shall maintenance contacts be introduced to the owner.
- B. It is well understood and well known in the industry that suppliers of generators have maintenance services.
- C. Circumventing of the Project Engineer to force inferior or less efficient equipment for the sole purpose of obtaining lucrative maintenance contracts will be grounds to disqualify.

End of Section

PACKAGE LIFT STATION (ALTERNATE) 33 32 20

PART ONE – GENERAL

1.01 Description

- A. This specification details the requirements of the alternate bid item for a packaged lift station at the Palestine & Glen Karn collection system lift stations. No other lift stations on this project are applicable to this specification. All deviations to the plans in order to accommodate packaged lift station appurtenances shall be included within the alternate bid cost on the bid sheet (i.e. wire sizing, generator sizing, etc.).
- B. The contractor shall furnish and install an automatically controlled duplex pumping unit capable of handling raw unscreened sewage. The pumps and mechanical accessories shall be installed in the precast concrete vessel as shown on the project plans.
- C. The principal items of equipment shall include two submersible pumps; automatic disconnect base elbow with double guide rails; pump hoisting cable, and anchor bolts; pump control panel and liquid level control system to provide for a complete working system.

1.02 Applicable Standards

- A. International Organization for Standardization (ISO)
- B. The American National Standards Institute (ANSI)
- C. The American Society for Testing and Materials (ASTM)
- D. The American Water Works Association (AWWA)
- E. The Hydraulic Institute Standards
- F. The Institute of Electrical and Electronics Engineers (IEEE).
- G. The National Electrical Manufacturers Association (NEMA)
- H. The "Recommended Standards for Wastewater Facilities" and its related standards as modified by the state regulatory agency.

1.03 Submittals

A. The contractor shall submit to the Engineer for his review as defined in Section 01 33 00 Submittals and Substitutions of the Contract Documents.

PART TWO - PRODUCTS

2.01 **Operating Conditions**

- A. Pumps
 - 1. Each submersible pump shall have the necessary characteristics and be selected to perform in accordance with, and subject to, the provisions of the paragraph hereafter titled "Pumps".
- B. System Power Characteristics

1. Electrical power to be furnished to the site will be 1 phase, 60 Hertz, 240 volts, maintained within plus/minus 10%. Variable frequency drives shall be used to convert single phase to three phase. Pump motors shall be 3 phase, 240 volts, 60 Hz.

2.02 Hydraulic Components and Solids Handling

- A. The pump casing shall be of gray iron with a gray iron or ductile iron slide rail guide shoe attached to the discharge flange as an integral assembly. Casing shall be easily removable from the motor for full inspection of impeller.
- B. All pump openings and passages shall be of adequate size to pass 3.15-inch diameter spheres (minimum) and any trash or stringy material, which can pass through an average house collection system. The impeller shall be recessed into the pump casing and shall not require flow of the liquid through the impeller. The impeller and seal housing shall incorporate auxiliary vanes to hydraulically reduce pressure on the primary seal and force fibrous materials and solids away from the close axial clearance on the backside of the impeller. No impeller clearance adjustment or wear rings shall be required.
- C. The impeller shall be a multi-vane vortex type with integral winglets on each vane. The winglet shall form an L-shaped cross section at the face of the vane for improved hydrodynamic efficiency. Impeller shall be of ductile iron and precision balanced. Balancing shall not deform or weaken the impeller. The impeller shall have a tapered locking fit onto the shaft and further be secured by a key and locking bolt. Impeller fasteners shall be non-corroding.

2.03 Pumps

- A. Description
 - 1. Pumps shall be submersible pumps, designed for pumping unscreened raw sewage.
- B. Size
 - 1. 4" pumps shall have 4" discharge connection for contractor connection.
- C. Components
 - 1. All other major pump components such as stator housing, seal housing, and bearing brackets must be of structural grade steel or gray iron-Class 30. A coal tar based epoxy coating of 8 mils minimum thickness shall protect all external surfaces coming into contact with sewage. All exposed fasteners and lock washers shall be of 304 stainless steel.
- D. Shaft Seal
 - 1. On pump applications below 13 horsepower, a mechanical-double faced seal with combined spring system for the upper and lower portion shall seal the pump shaft against leakage. The lower wearing faces shall be silicon carbide. The upper faces shall be carbon and hardened stainless steel. Elastomers shall be viton.
 - 2. On pump applications above 13 horsepower, two separate mechanical seals shall be provided, arranged in tandem. The upper seal shall have a hardened stainless steel rotating face and carbon stationary face. The lower seal shall incorporate silicon carbide on both

the rotating and stationary faces. Cage and springs shall be of stainless steel and elastomers of viton.

- 3. Each silicon carbide or stainless steel seal face shall be lapped to a flatness tolerance not to exceed one-half light band or 5.8 millionths of an inch, as measured by an optical flat and monochromatic light. The rotating faces must be of double floating and self-aligning design to insure full-face contact at all times, even during periods of shock loads that will cause deflection, vibration and axial or radial movement of the pump shaft.
- 4. The rotating seal faces shall be lubricated from an oil filled reservoir between pump and motor; the oil serving as both lubricating and a cooling media. The reservoir shall have separate oil fill and drain plugs to insure accuracy when measuring lubricant level and for ease of maintenance.
- 5. Seal shall require no special maintenance or routine adjustment; however, shall be easily inspected or replaced. No seal damage shall result from operating the pump for short periods of time without liquid.
- E. Pump Performance
 - 1. Each pump shall have the necessary characteristics and be properly selected to perform under the following operations:
 - 2. Palestine Lift Station: 80 100 gpm, 165' total dynamic head
 - 3. Glen Karn Lift Station: 50 gpm, 30' total dynamic head
- F. Pump Motor
 - 1. The submersible pump motor shall operate in accordance with the electrical power indicated above. The motor and pump must be connected to form an integral unit. Motor shall be a squirrel-cage, induction type in an air-filled watertight enclosure. The motor shall conform to NEMA design Class B, and incorporate Class F insulation materials to withstand a continuous operating temperature of 155°C (311°F). The pump and motor shall be capable of handling liquids with a maximum temperature of 40°C (104°F).
 - 2. Motor shall be capable of sustaining a minimum of 10 starts per hour. The motor shall operate while only partially submerged and not require a cooling jacket or any other means of auxiliary cooling during normal continuous operation.
 - 3. Motor housing shall be of cast iron. The stator shall consist of copper windings with copper connectors applied to high-grade electrical steel laminations. The stator shall be held securely in place by a heat-shrink fit into the motor housing. Any other means of securing the stator, which would require penetration of the motor housing, shall not be considered acceptable.
 - 4. Rotor shall be solid cast and dynamically balanced for vibration-free operation. Rotor end bars and short circuit rings shall be of aluminum. The pump shaft shall be of AISI type 329 stainless steel (or hardened alloy steel with protective stainless steel shaft sleeve which prevents contact of the shaft with the liquid). The shaft shall be machined with shoulders or snap ring grooves for positive placement of bearings. The upper and lower bearing shall be of heavy-duty design, capable of supporting the shaft and rotor while under maximum radial and trust loads. The bearings shall be permanently grease lubricated and sealed at the time of installation.
- G. Water-Tight Integrity
 - 1. All static seals at watertight mating surfaces shall be of nitrile "O" ring type. Use of auxiliary sealing compounds shall not be required. The power and control cables shall enter

the motor through a terminal housing. The entrance shall be sealed with a rubber grommet and clamp set which when compressed longitudinally causes a radial watertight seal. The clamp set shall prevent all slippage and rotation of cable while engaged, yet may be easily removed and reused during routine maintenance. Any other cable entrance design requiring use of epoxies, silicones, or similar caulking materials shall be considered unacceptable.

- 2. The pump and electrical cables shall be capable of continuous submergence without loss of waterproof integrity to a depth of 65 feet.
- 3. The watertight integrity of the motor housing and shaft seal shall be tested during manufacture by pressurizing the motor cavity and submerging in water with motor operating. A separate performance test shall also be conducted on each fully assembled pump to verify published head/capacity and power input.
- H. Motor Protection
 - 1. The motor shall be protected from thermal and moisture damage. Thermal protection shall consist of three separate thermostatic switches embedded into the stator windings. Each switch shall open independently and terminate motor operation, if temperature of the protected winding reaches the high temperature set point. Any moisture in the motor housing shall be detected by a mechanically activated moisture-sensing micro-switch. The switch shall be sensitive enough to detect air-borne moisture and terminate operation of motor before liquid enters the cavity. Use of probes or floats that rely on the presence of liquid to initiate signal shall not be considered acceptable. The contractor shall connect the thermal and moisture sensing devices to the pump control panel.

2.04 Automatic Discharge Connection

- A. Description
 - 1. Each pump shall be furnished with a submersible discharge connection system to permit removal and installation of the pump without the necessity of an operator entering the wet well. The design must insure an automatic and firm connection of the pump to the discharge piping when lowered into place.
- B. Base plate
 - 1. A gray iron cast base with integral guide rail pilots shall be provided along with all hardware and anchor bolts required for permanent installation to the wet well floor. The base shall be designed with an integral 900 elbow, or adapt to a commercially available elbow for connection to the vertical discharge piping utilizing standard ANSI 125 lb. flanges. The base shall be coated with coal tar epoxy for corrosion resistance. The manufacturer shall provide all necessary drawings to insure proper installation and alignment of base plate within the sump.
- C. Discharge Connection
 - 1. Each pump shall be provided with a replaceable ductile iron slide rail guide shoe attached to pump discharge flange. A replaceable neoprene seal shall be provided as an integral part of the guide shoe to form a seal with the base plate connection and eliminate the possibility of leakage and erosive wear during operation. The seal shall contact mating faces in a static

position and shall have adequate flexibility to flex under pumping pressure to increase seal efficiency. Metal-to-metal contact at the discharge connection shall not be acceptable.

- 2. The contractor shall provide two lengths of 1 1/2-inch, schedule 40 stainless steel guide rail pipe for each pump.
- 3. Upper guide rail pilots and a lifting cable shall be furnished for each pump. Bottom pilots shall be an integral part of the base plate for ease of installation and proper alignment.
- D. Guide Rail System and Method of Operation
 - 1. The guide shoe shall direct the pump down two vertical guide rails and onto the discharge connection in a simple lineal movement. The buildup of sludge and grease on guide rails shall not present problems during the lifting operation. The guide shoe shall be designed with integral hooks at the top to transmit full weight of the pump to the base plate flange. No portion of the pump shall be supported directly on the bottom of the wet well, guide rails, or lifting cable.
 - 2. The lifting cable shall consist of a stainless steel braided wire cable attached to the pumplifting ball. An eyelet shall be provided at the upper end of this cable for attaching to the wet well access frame.
 - 3. All bolts, machine screws, nuts, washers, and lock washers for complete assembly of access cover, guide rails, and discharge elbow shall be 304 stainless steel.

2.05 Accessories

- A. Piping
 - 1. Shall be in accordance with Section 33 31 00 Sanitary Utility Sewerage Piping with OEPA Notes.
- B. Check Valves
 - 1. Shall be in accordance with Section 40 23 37, Valves.
- C. Gate Valves
 - 1. Shall be in accordance with Section 40 23 37, Valves.
- D. Precast Concrete Vessel & Valve Pit
 - 1. Shall be in accordance with Section 33 39 13 Sanitary Utility Sewerage Manhole Frames and Covers and more particularly as shown on the detail plans.

2.06 Panel Construction

A. The electrical control equipment shall be mounted within a NEMA 3R stainless steel dead front type control enclosure. The enclosure door shall be hinged and sealed with a neoprene gasket. It shall include a removable steel back panel on which control components shall be mounted. Back panel shall be secured to enclosure with collar studs. Operator controls shall be mounted on a steel inner swing panel. The control panel shall be equipped with vapor emission type corrosion inhibitors.

2.07 Motor Branch Components

- A. Component Mounting
 - 1. All motor branch circuits shall be of the highest industrial quality, securely fastened to a removable sub-plate with screws and lock washers. The sub-plate shall be tapped to accept all mounting screws. Self-tapping screws shall not be used to mount any component. All operating controls and instruments shall be securely mounted and shall be clearly labeled to indicate function.
- B. Main Connections
 - 1. A main terminal block and ground bar shall be furnished for field connection of the electrical supply. The connections shall be designed to accept copper conductions of sufficient size to serve the pump station loads. The main terminal block shall be mounted to allow incoming wire bending space in accordance with Article 373 of the National Electric Code (NEC).
- C. Circuit Breakers and Operating Mechanisms
 - 1. A properly sized heavy-duty air circuit breaker shall be furnished for each pump motor, and shall have a symmetrical RMS interrupting rating as required. The manufacturer shall seal all circuit breakers after calibration to prevent tampering. A padlock operating mechanism shall be installed on each motor circuit breaker. Operator handles for the mechanisms shall be located on the inner door, with interlocks which permit the inner door to be opened only when circuit breakers are in the "OFF" position.
- D. Single Phase to Three Phase Conversion
 - 1. Motors for both lift station shall be three phase, 240 volt from a single phase service. Panel to be equipped with variable frequency drives capable of making this conversion. Pumps to be run through use of a variable frequency drive. See Variable Frequency Drive specification for requirements on variable frequency drives.
- E. Overload Relays
 - 1. Overload relays shall be of block-type, utilizing melting alloy type spindles, and shall have visual trip indication with trip free operation. Pressing the overload-reset lever shall not actuate the control contact until such time as the overload spindle has reset. Resetting of the overload-reset lever will cause a snap-action control contact to reset, thus re-establishing a control circuit. Overload relays shall be of manual reset only and not convertible to automatic reset. Trip settings shall be determined by the heater element only and not by adjustable settings. Heater elements shall provide NEMA Class 10 trip times and shall be selected in accordance with the actual motor nameplate data. An overload reset pushbutton shall be mounted through the door of the control panel in such a manner as to permit resetting the overload relays without opening the control panel door.
- F. Pump Motor Protection

1. The pump control panel shall be equipped to terminate pump operation due to high motor winding temperature or moisture in the motor housing and shall utilize the contacts in the pump motor. If either event should occur, the motor starter will drop out and a mechanical indicator, visible on the inner door, shall indicate the pump motor has been shutdown. The pump motor shall remain locked out until the condition has been corrected and manually reset.

2.08 Other Control Components

- A. Control Circuit
 - 1. The control circuit shall be protected by a normal duty thermal-magnetic air circuit breaker, which shall be connected in such a manner as to allow control power to be disconnected from all control circuits.
- B. Pump Mode Selection
 - 1. Pump mode selector switches shall be connected to permit manual start and manual stop for each pump individually, and to select automatic operation of each pump under control of the liquid level control system. Manual operation shall override the liquid level control system. Selector switches shall be heavy duty, oil-tight design, with contacts rated NEMA A300 minimum.
- C. Alternator Relay
 - 1. Pump alternator relay contacts shall operate after pump shutdown. Relay contacts shall be rated 10 amperes minimum at 120 volts non-inductive.
- D. Pump Run Indicators
 - 1. Control panel shall be equipped with oil-tight pilot light for each pump motor. Light shall be wired in parallel with the related pump motor starter to indicate that the motor is on or should be running. Run lights shall be equipped with led lamps providing a minimum of 15,000 hours.
- E. Elapsed Time Indicators
 - 1. Six-digit elapsed time indicators (non-reset type) shall be connected to each motor starter to indicate the total running time of each pump in "hours" and "tenth of hours."
- F. Sequence Selector Switch
 - 1. A switch shall be provided to permit the station operator to select automatic alternation of the pumps, to select pump number one to be the lead pump for each pumping cycle or to select pump number two to be the lead pump for each pumping cycle. Selector switch shall be heavy duty, oil-tight design, with contacts rated NEMA A300 minimum.
- G. Wiring
- 1. The control panel, as furnished by the manufacturer, shall be completely wired. The contractor shall field connect the power feeder lines to the main terminal block, final connections to the remote alarm devices, and the connections between the pump and the pump motor control. All wiring, workmanship, and schematic wiring diagrams shall be in compliance with applicable standards and specifications set forth by the National Electric Code (NEC).
- 2. All user serviceable wiring shall be type MTW or THW, 600 volts, and shall be color-coded as follows:
 - a. Line and Load Circuits, AC or DC power Black
 - b. AC Control Circuit Less than Line Voltage Red
 c. DC Control Circuit Blue
 d. Interlock Control Circuit, from External Source ... Yellow
 e. Equipment Grounding Conductor Green
 f. Current Carrying Ground White
 - g. Hot With Circuit Breaker Open Orange
- H. Wire Identification and Sizing
 - 1. Control circuit wiring inside the panel, with the exception of internal wiring or individual components, shall be of 16-gauge minimum, type MTW or THW, 600 volts. Power wiring shall be 14-gauge minimum.
 - 2. The ampacity of motor branch conductors and other power conductors shall not exceed the temperature rating of the connecting terminals. Wires shall be clearly numbered at each end in accordance with the electrical diagrams. All wires on the sub-plate shall be bundled and tied.
- I. Wire Bundles
 - 1. Wires connected to components mounted on the enclosure door shall be bundled and tied in accordance with good commercial practice. Bundles shall be made flexible at the hinged side of the enclosure. Adequate length and flex shall be provided to allow the door to swing to its full open position without undue stress or abrasion on the wire or insulation. Bundles shall be held in place on each side of the hinge by mechanical fastening devices.

2.09 Conduit

- A. Conduit Requirements
 - 1. All conduit and fittings shall be UL listed.
 - 2. Liquid-tight flexible metal conduit shall be constructed of smooth, flexible galvanized steel core with smooth abrasion resistant, liquid tight, polyvinyl chloride cover.
 - 3. Conduit shall be supported in accordance with articles 345, 347, and 350 of the National Electric Code.
 - 4. Conduit shall be sized according to the National Electric Code.
- B. Grounding

- 1. The control manufacturer shall provide a common ground bar mounted on the enclosure back plate. The mounting surface of the ground bar shall have any paint removed before making final connections.
- 2. The contractor shall make the field connections to the main ground lug and each pump motor in accordance with the National Electric Code.
- C. Equipment Marking
 - 1. A permanent, corrosion-resistant name plate(s) shall be attached to the control and include the following information:
 - a. Equipment serial number
 - b. Supply voltage, phase, and frequency
 - c. Current rating of the minimum main conductor
 - d. Electrical wiring diagram number
 - e. Motor horsepower and full load current
 - f. Motor overload heater element
 - g. Motor circuit breaker trip current rating
 - h. Name and location of equipment manufacturer
 - 2. Control components shall be permanently marked using the same identification shown on the electrical diagram. Identification label shall be mounted adjacent to the device.
 - 3. Switches, indicators, and instruments shall be plainly marked to indicate function, position, etc. Marking shall be mounted adjacent to and above the device.

2.10 Liquid Level System (Level Transmitter)

- A. Functional Description
 - 1. The level control system shall start and stop the pump motors in response to changes in wet well level, as set forth herein.
- B. Level Devices
 - 1. Manufacturer: Flowline or approved equal
 - a. Purpose or Use
 - i. Measure the water level in the pump station wet wells
 - b. Ultrasonic Sensors
 - i. Model LU28-01
 - 1. Range, 26.2'
 - Contractor to supply the following accessories

 LI99-1001, Flowline Fob USB adapter
 - b. 1-copy of WEBCAL software
- C. Palestine & Glen Karn Pump Station Sequence of Operation (from 33 32 19 Facility Lift Stations)
 - 1. The pumps shall restart after power failure.
 - 2. The pumps shall utilize the Soft-Start feature available within the VFD for starting and stopping.
 - 3. The operation of the pumps shall be a traditional float-based system. This shall be accomplished using a 6-float system:

- a. High Water Alarm
- b. Lag Pump On
- c. Pump On
- d. Pumps Off
- e. All Pumps Off (Redundant)
- f. High Water Alarm (in EQ Basin)
- 4. The transducer shall indicate the wetwell water level.
- 5. This pump station shall be equipped with two identical pumps, with an alternator.
- 6. Each pump to have a Hand-Off-Auto selector switch.
- 7. Other Signals to be monitored:
 - a. Seal Leak Probe: detects water in motor windings.
 - b. Motor Temperature: detects the internal temperature of the motor.
- This pump station shall be equipped with a RTU for remote operator alarm notification.
 a. See specification section 28 50 00 Wireless Real-Time Alarm, Monitoring, and Remote Control for specific information.
 - b. The web-based online interface shall indicate the following alarms or information.
 1.Digital Inputs:
 - i. Loss of House Power (Source -ATF)
 - ii. Pump 1 Running(VFD DI1)
 - iii. Pump 2 Running (VFD DI1)
 - iv. Pump Station High Water Alarm (Source Wetwell Float Switch)
 - v. Pump Station General Alarm (Pump Station Alarm Contact)
 - vi. Pump 1 Seal Fail or Over Temp
 - vii. Pump 2 Seal Fail or Over Temp
 - 2. Analog Inputs:
 - i. Flow Meter (GPM) Only at Palestine Lift Station
 - ii. Wetwell Elevation (ft)
- D. Automatic Pump Alternation
 - 1. The level control system shall utilize the alternator relay to select first one pump, and then the second pump, to run as lead pump for a pumping cycle. Alternation shall occur at the end of a pumping cycle.

2.11 System Components

- A. Float Switches
 - 1. The control manufacturer shall furnish three float switch assemblies for installation by the contractor. Each switch assembly shall contain a mercury-type switch sealed in a polypropylene housing, and not less than 15 feet of cable. The control manufacturer shall also furnish polypropylene mounting hardware for switch assemblies. The pump supplier shall furnish sufficient length of stainless steel chain with epoxy-coated anchor (min. 15 lbs) for mounting switch assemblies in the wet well.
- B. Circuit Design
 - 1. Circuit design in which the application of power to the lag pump motor starter is contingent upon completion of the lead pump circuit shall not be acceptable.

- C. Alarm Light & Horn (External)
 - 1. The control system shall be supplied with one 115-volt AC alarm light in a vapor-tight fixture with red globe, guard, conduit box, and mounting fixtures. Alarm light and mounting fixtures shall be designed to permit mounting in such a manner that rain water cannot stand or collect in the gasketed area of the fixture, between the base and globe.
 - 2. The control system shall be supplied with one 115-volt AC weatherproof alarm horn with projector, conduit box, and mounting fixtures. Alarm horn and mounting fixtures shall be designed to permit mounting in such a manner that rainwater cannot stand or collect in the projector.
 - 3. Note: The alarm light and horn shall be supplied with a battery backup. Battery shall be gel-cell 12VDC 10 HR, discharge life and shall be mounted as designated by the Owner.
- D. Convenience Outlet
 - 1. A duplex ground fault indicating utility receptacle providing 115 VAC, 60 hertz, singlephase current, shall be mounted through the inner swing panel of the control enclosure. Receptacle circuit shall be protected by a 15-ampere thermal-magnetic circuit breaker.

PART THREE - EXECUTION

3.01 Manufacturer's Responsibilities

- A. Detailed Drawings
 - 1. Before manufacture, the Contractor shall submit as defined in Section 01 33 00, Submittals and Substitutions, detailed drawings of the proposed equipment for the Engineer's review.
- B. Start Up
 - 1. The Contractor shall include in the cost for the above specified equipment all the time necessary for the manufacturer's field engineer or qualified representative to check the installation after erection, be on hand for initial start-up of the equipment, and to provide training for the operation of the equipment. Training shall also be provided in the area of effective operation of this plant.
- C. Service Manual
 - 1. The equipment manufacturer shall provide service manuals as defined in Section 01 33 00, Submittals and Substitutions, describing the equipment items, their lubrication, operation, care, and maintenance. Three manuals shall be furnished to the installing contractor and three to the Owner's selected plant operator. The equipment manufacturer shall also provide a parts list for replacement of worn parts by the owner.
 - 2. Operations and maintenance instructions, which are limited to a collection of component manufacturer literature without overall equipment instructions, shall not be acceptable. Operation and maintenance instructions shall be specific to the equipment supplied in accordance with these specifications. Instruction manuals applicable to many different configurations and which require the operator to selectively read portions of the instructions shall not be acceptable.

D. Certification

- 1. Within ten (10) days after the final inspection of the completed installation, the manufacturer's representative shall furnish a detailed report jointly to the Engineer and contractor which shall list any deficiencies found in the work and which shall recommend corrective action for each deficiency. Upon completion of any corrective action required, the manufacturer shall furnish a letter certifying that the equipment is now properly installed and ready for operation and beneficial use by the Owner.
- E. Manufacturer's Abilities
 - 1. Upon request from the Engineer, the equipment manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery. Upon request from the Engineer, the equipment system manufacturer shall also demonstrate proof or evidence of facilities, equipment, and skills required to produce the equipment specified herein.
- F. Manufacturer's Warranty
 - 1. The equipment, apparatus, and parts furnished shall be warranted for a period of one (1) year. The equipment manufacturer shall be solely responsible for the warranty. Components failing to perform as specified by the Engineer, or as represented by the manufacturer, or as proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the manufacturer without cost of parts, labor, and freight to the owner.
 - 2. Effective date: The warranty shall become effective upon acceptance by the Owner or the Owner's authorized agent.
 - 3. Any conflict in the specific terms of the warranty as specified herein shall be brought to the attention, in writing, to the Engineer prior to the placement of a purchase order. Manufacturer must explain to the Engineer's satisfaction, why any change in the terms of specified warranty is required.

G. Manufacturer

- 1. The specifications and project drawings depict equipment as manufactured by The Gorman-Rupp Pump Company, Barnes Pump Inc., Hydromatic Pentair Pump Group, Technical Solutions, Inc. or pre-approved equal, which are deemed most suitable for the service anticipated. It is not intended, however, to eliminate other products of equal quality and performance. If the bidder wishes to offer equipment and materials differing from what is specified, the following criterion must be met:
- a. The bidder must submit in writing 10 days prior to the bid date a request for the Engineer to consider alternative equipment. The submittal shall be in accordance with and include all items contained in these specifications.
- b. The bidder shall also submit 10 days prior to the bid date a sample operations and maintenance manual from another installation that contains all items.
- c. The bidder shall submit 10 days prior to the bid date a letter that shows specifically what areas of this specification the proposed equipment and materials differ. This shall not be a sample specification that requires the Engineer to determine which areas they differ. Any areas not addressed shall be assumed to be exactly as this specification defines.
- d. The bidder shall also supply the Engineer a computer disk showing all views of the drawings as depicted in the detail construction plans using AUTOCAD by AutoDesk.

- e. Should the bidder meet all of the qualifications depicted in Parts 1 4 to the Engineer's satisfaction, an addendum shall be issued to the contract documents for the differing equipment and materials. Should the addendum not be issued, all bids shall be based on the equipment and materials specified in this specification.
- H. Substitutions
 - 1. After execution of the contract, the contractor may offer substitutions to the specified equipment for consideration in accordance with Part G. It will be assumed that if the cost of the contractor is less for the proposed substitution, then an amount equal to the savings shall reduce the contract price.
 - 2. In event the contractor obtains the Engineer's approval for equipment substitution, the contractor shall, at his own expense, make all resulting changes to the enclosures, buildings, piping, and electrical systems as required to accommodate the proposed equipment. Revised detail drawings illustrating the substituted equipment shall be submitted to the Engineer.

End of Section

ELECTRICALLY-OPERATED PRIMARY CONTROL VALVES 40 92 13.13

PART ONE – GENERAL

1.01 Requirements Included

A. Contractor to supply all labor and materials for the complete installation of the dilution water control valve as shown on the construction drawings.

1.02 Standards

- A. All valve actuators shall conform the following standards per application requirements.
 - 1. ISO 5210
 - 2. ISO 5211
 - 3. CE98/37/EC
 - 4. IP 65 (IEC)
 - 5. UL 1277
 - 6. UL 1569
 - 7. IEEE 1202
 - 8. IEEE 383
 - 9. ICEA S-95-658

1.03 Actuator Control

A. Input Signals shall be: 4-20 mA/DC, 0-10 VDC, 2-10 VDC, 0-5 VDC

1.04 Hazardous Locations

A. All hazardous location enclosure shall be UL certified to Class I, DIV 1 & 2, Group C, D, Class II, DIV 1 & 2, Group E, F, G hazardous locations.

1.05 Waterproof

A. The waterproof enclosure shall be certified to UL, CSA and CE (NEMA 4, 4X and IP 65) waterproof standards.

PART TWO – PRODUCTS

2.01 Products and Manufacturer

- A. Approved Manufacture(s):
 - 1. Auma
 - 2. A-T Controls
 - 3. Bray

2.02 Basic Design Requirements

- A. Actuators shall be designed for valve operation to ensure proper function in accordance to EN 15714-2:2010 electric actuators for industrial valves - basic requirements. Depending on application actuators shall be designed for ON-OFF, short-time duty (S2-15min) respectively Class A and B according to EN 15714-2 or MODULATING, intermittent duty (S4-25%) respectively Class C with up to 1.200 starts per hour; no. of starts depending on actuator size and output speed.
- B. Actuator shall have a design life of 10.000 OPEN-CLOSE-OPEN cycles, each consisting of 30 turns per sense of rotation and must be suitable for operating in any mounting position. Actuator design must provide simple setting, testing, maintenance and repair.
- C. Actuator settings shall be performed non-intrusive via push-buttons at motor control without special tools or instruments (e.g. battery backed setting tool). A wireless Bluetooth interface shall be available. Microsoft Windows® based software running on a conventional computer shall be available to allow actuator set-up and diagnoses.
- D. Electrical connection of actuators to be multi pin plug and socket connector, allowing quick disconnection in case of maintenance or repair. In order to prevent loss of screws during commissioning or maintenance, all covers shall be fixed with captive screws. In order to minimize the amount of spare parts required, parts such as covers, plug and sockets, parts must be interchangeable throughout all model sizes.
- E. Torque-transmitting housings must be made of cast iron, except motor housing. No plastic parts of any type shall be used, except for electric / electronic components, operating knobs / levers, indicator mechanism and sealing elements as far as applicable.
- F. Depending on valve application, actuators shall be self-locking. Self-locking shall remain active if actuator is switched to hand-operation-mode. For non-self-locking actuators with high output speeds a mechanical anti-back drive device shall be provided attached to the actuator.
- G. Valve mounting dimensions shall be according to ISO 5210 with use of a plug sleeve connection adapting to valve shaft. For rising stem applications, actuator design must allow actuator removal from output drive without disturbing the valve function.

2.03 Electric Motors

- A. Motors must be suitable for operating at the indicated power supply indicated on the engineering drawing.
- B. Motors operating at 120 VAC or 220 VAC (230 VAC compatible) 60 Hz as specified.
- C. Motors must be totally separated from lubricant-filled gearing of actuator, allowing replacement of motor without loss of lubricant regardless of mounting position. Motors shall have a dog coupling as mechanical connection to actuators worm shaft.

D. Actuator motors must develop full torque when power is turned on. All motors shall be of high starting torque type to facilitate 'unseating' of the valve. Each motor shall have a rating plate marked in accordance with IEC 34.1 as far as applicable.

2.04 Sizing

- A. One actuator size (same outside dimensions) shall be available covering output speeds from 4 to 180 rpm for a given torque range, to avoid over sizing and unnecessary weight load on valve stem, flange and yoke. An increase of actuator size caused by higher actuator output speed is not acceptable to avoid weight over sizing of actuators. Actuators must be selected to provide sufficient torque required for safe valve operation. Actuator output torque must be available at 90 % of nominal voltage.
- B. In order to enable proper sizing of applicable electric equipment, actuator supplier has to disclose current value at maximum setting torque. Actuator shall be capable of opening and closing the valve against full differential pressure within specified time on valve data sheet.

2.05 Limit and Torque Monitoring

- A. No battery backed limit sensing shall be used to avoid actuator malfunction in case of power failure. Actuators shall have a hall sensor principle based absolute encoder for limit sensing with a resolution of 3° or better. Actuator shall not be equipped with a battery.
- B. Torque sensing shall be of mechanical sliding worm principle with torque values independently setable for 'OPEN' and 'CLOSE' direction. No electronic torque sensing derived from motor current or piezo-electric torque sensing at worm shaft. Torque setting shall be possible for 40% to 100% of rated torque.

2.06 Diagnosis

A. Actuators installed in critical applications, shall be optionally equipped with a sensor package, consisting of torque, temperature and vibration diagnosis. In this case actuators shall also have a real time clock for event recording to support asset management functions and life cycle analysis. Display indications shall follow NAMUR recommendations with simplified status indications, operation log and torque curves.

2.07 Motor and Local Controls

- A. Integral motor controls shall be microprocessor based and include mechanically and electrically interlocked reversing contactors for ON-OFF duty and solid state contacts (thyristors) for MODULATING duty actuators.
- B. Local controls shall consist of motor controls, push buttons OPEN-STOP-CLOSE-RESET, lockable selector switch LOCAL-OFF-REMOTE.
- C. Depending on detailed project design, actuator version shall be as follows:

- 1. ON-OFF, short-time duty S2-15min with hard wired signals OPEN-STOP-CLOSE, including a 4-20mA output signal, internally powered. Detailed wiring diagram to be supplied with submittal documents.
- 2. MODULATING, intermittent duty S4-25% with hard wired communication via 4-20mA input signal, including a 4-20mA output signal, internally powered. Detailed wiring diagram to be supplied with submittal documents.
- D. Detailed wiring diagram shall show all relevant signals such as valve position, end positions (OPEN/CLOSE), selector switch position and high torque alarm in OPEN/CLOSE direction. In addition to this, actuator must provide a dedicated fault signal if there is a phase failure, motor protection tripped and/or high torque in OPEN/CLOSE direction or if hand wheel is engaged.
- E. All control signals, communication signals as well as main power supply must be wired to a multi pin plug and socket for customer connection. Terminal compartment shall provide sufficient space to accommodate the possible maximum number of incoming wires. A minimum of three cable entries must be provided for motor power cable and digital/ analogue inputs and outputs. Each cable entry shall be properly sealed by cable glands during site installation. Cable glands shall be chosen by contractor, responsible for wiring during commissioning phase.
- F. Each actuator shall provide an adequately sized internal and external connection for grounding.

2.08 Anti-Condensation Heater

A. In order to prevent condensation, a heater must be installed inside the actuator, suitable for continuous operation. Actuator must provide an alarm signal in case of failure of anti-condensation heater.

2.09 Enclosures

A. Protection class of actuator, including motor, shall be IP 68, according to EN 60529 against submersion up to 8 m head of water for at least 96 hours. During submersion it must be possible to operate the actuator at least 10 times.

2.10 Hand Wheel

- A. Actuators must be equipped with a hand wheel for manual operation. Clockwise operation of hand wheel shall cause clockwise movement of output drive. Hand wheel shall be clearly marked with an arrow and the word 'CLOSE'.
- B. Hand wheel engagement shall be of spring loaded push mechanism type and required manual declutching. Actuator must provide a switch signal when in manual mode.
- C. Under manual operation, hand wheel shall drive the worm shaft. Self-locking shall be maintained in hand operation. Motor must be disengaged during manual operation. Hand wheel shall automatically disengage when the electric motor is energized.

D. Hand wheel must be sized allowing easy manual operation of output drive. The over torque indication shall be active in manual operation as well as motor operation, thus allowing a signal to be provided when the set-torque has been reached.

2.11 Bearings and Gears

A. Bearings shall be of antifriction or self-lubricating type. Bearings shall not require any maintenance between general overhauls. Power gears shall be made from heat treated steel. Worm-wheels shall be made of bronze material. Actuator gear housing shall be filled with an adequate quantity of lubricant. Re-lubrication between general overhauls shall not be required.

2.12 Noise Level

A. Under all operating conditions the noise level of actuators shall not exceed 75 dB(A) at 1 m.

2.13 Name Plates

A. Two nameplates, made of aluminum, shall be attached to each actuator; one on the motor housing, showing all relevant motor data, one on the actuator housing showing all relevant actuator data. Special information, such as valve tag no., shall be shown if required. Nameplates shall be securely fixed to actuator and motor, so that they cannot be removed or scratched off during shipment, installation, operation or maintenance.

2.14 Painting and Corrosion Protection

A. Actuator corrosion protection shall fulfill the requirements of EN ISO 12944-2, classification of environments C4 with a specified salt spray test of 720h. Actuator painting must be performed in such a way, that no corrosion takes place under ambient conditions as specified. All outside screws or bolts shall be made of stainless steel (A2). Actuators shall be corrosion protected with a primer coating and a two layer powder coating consisting of an epoxy coating and a polyurethane top coating with a total film thickness of at least 140µm.

2.15 Inspection and Testing at Manufacturer's Work

A. Each actuator shall be factory tested. Tests shall be performed in accordance with IEC standards as far as applicable. A final inspection record shall be supplied with each actuator showing general actuator data, nominal current, no load current, starting current, power factor at rated torque, output speed, torque setting, limit setting (turns/stroke), high voltage test, functional test (including all options) and visual test.

2.16 Duty Cycle

- A. Manufacture shall insure the specific purpose of each valve actuator.
- B. 25% for Intermittent Operation
- C. 100% for Continuous Operation

2.17 Documentation

A. Supplier to provide storage, installation and operation instruction as well as electric wiring diagram, dimensional drawings and technical data sheet including motor data as per manufacturer standard.

PART THREE – EXECUTION

3.01 Installation

- A. Install the valve and actuator as indicated in the drawings in accordance with the manufacturer's instructions.
- B. Keep units dry, closed, and sealed to prevent internal moisture damage during construction.
- C. If required, provide additional hangers and supports for actuators which are not mounted vertically over the valve or which may impose an eccentric load on the piping system.

3.02 Field Testing of Motor Actuators

- A. Test motor actuators as installed by measuring the current drawn (in amperes) by each motor for unseating, seating, and running conditions. The measured current shall not exceed the current measurement recorded during the factory performance test.
- B. If the measured current drawn exceeds the above value, provide a larger motor or gear drive or adjust the actuator so that the measured amperage does not exceed the value.
- C. Assure that limit switches are placed at their correct settings. Open and close valves twice and assure that limit switches function.

3.03 Warranty

A. As per General Conditions

3.04 Certification

A. Provide a written certification from the equipment manufacturer that the equipment has been properly installed according to the plans, specifications and manufacturer's specifications, and that the equipment is operating normally. Make all necessary corrections and adjustments at no additional cost to the Owner.

End of Section

Soil Study for Proposed Wastewater Treatment Lagoons Hollansburg-Arcanum Road, Hollansburg, Ohio

Submitted For:

Palestine-Hollansburg Joint Sewer District Attn: Mr. Matthew Harrison P.O. Box 117 Palestine, Ohio 45342

> Report No. 183404-0718-134 July 30, 2018

BOWSER MORNER.

4518 Taylorsville Road—Dayton, Ohio 45424—937.236.8805 www.bowser-morner.com



July 30, 2018

Palestine-Hollansburg Joint Sewer District P.O. Box 117 Palestine, Ohio 45352

Attention: Mr. Matthew Harrison

Re:

Report No. 183404-0718-134; Soil Study for Proposed Wastewater Treatment Lagoons, Hollansburg-Arcanum Road, Hollansburg, Ohio

Dear Mr. Harrison:

Bowser-Morner, Inc. is pleased to submit our report of the soil study for the above-referenced project. The purpose of this study is to determine the physical characteristics of the soil strata and recommendations for the construction of proposed lagoon system. Also noted are other conditions that could affect the design and/or construction of the lagoons and the installation of the sanitary sewer.

The samples collected that were not used to perform the laboratory tests will be kept in our laboratory for 30 days unless you advise us otherwise. If you have any questions or if we can help you in any way on this project or future work, please call us.

> Sincerely, BOWSER-MORNER, INC.

"This document was originally issued by Richard J.Y. Tseng, Ph.D., P.E. and Chris R. Ryan, M.S.C.E., P.E. on July 30,2018. This document is not considered a sealed document."

> Chris R. Ryan, M.S.C.E., P.E. Geotechnical Engineer

Richard J.Y. Tseng, Ph.D., P.E. **Chief Geotechnical Engineer**

CRR/RJYT/ccs 2-Client 2- Mote and Associates Attn: Mr. Dave Mathews 2-File

> Geotechnical, Civil, Environmental, Materials and Testing Consultants Committed to Excellence Since 1911

All Reports Remain The Confidential Property of BOWSER-MORNER And No Publication Or Distribution Of Reports May Be Made Without Our Express Written Consent, Except As Authorized By Contract.

TABLE OF CONTENTS

<u>SECTION</u> PAGE				
I	техт			
1.0	INTR	ODUCTION1		
2.0	WOR	RK PERFORMED1		
	2.1	FIELD WORK1		
	2.2	LABORATORY WORK		
3.0	SOIL	AND GROUNDWATER CONDITIONS		
	3.1	LAGOON SITE4		
	3.2	SANITARY SEWER ROUTE4		
4.0	DISC	USSION AND RECOMMENDATIONS6		
	4.1	PROJECT DESCRIPTION		
	4.2	LAGOON SUBGRADE CONDITIONS AND RECOMMENDATIONS7		
	4.3	SANITARY SEWER SUBGRADE AND RECOMMENDATIONS12		
5.0	CLOS	SURE16		
	5.1	BASIS OF RECOMMENDATIONS		
	5.2	LIMITATIONS AND ADDITIONAL SERVICES17		
	5.3	WARRANTY		

- II SUGGESTED SPECIFICATIONS CLEARING AND GRADING
- III BORING LOG TERMINOLOGY, BORING LOGS, LABORATORY DATA, AND PRINTS



Text

1.0 INTRODUCTION

A lagoon system will be constructed near Hollansburg, Ohio, on the southwest side, and a section of sewer in Hollansburg, Ohio to handle the wastewater. A vicinity map (Figure 1) is included in Section III of this report. Our findings on the subgrade soil conditions and groundwater levels with respect to the potential lagoon construction problems, and recommendations for the excavation of the lagoons and for the installation of the sanitary sewer are given in this report.

The initial authorization to proceed with this soil study was given by Palestine-Hollansburg Joint Sewer District in a signed Proposal Acceptance Sheet dated January 16, 2018. The work was to proceed in accordance with our proposal and agreement, Quotation No. 18-2771-002 dated January 2, 2018 for a total of 9 borings to extend to depths between 10 and 15 feet. Three additional borings were requested by Mote and Associates to be performed along the sanitary sewer route.

After our preliminary report was issued, the constructability of the lagoon system at the original proposed site was vetted. As a result, five additional, borings were requested by Mote and Associates for the determination of the subgrade soils to the north and east of the original site. The authorization to proceed with five additional borings was given by Mote and Associates in an email dated May 8, 2018. This report discusses a total of 17 borings made for this project

The draft soil boring logs and preliminary foundation recommendations were distributed to Mr. Matthew Harrison of Palestine-Hollansburg Joint Sewer District and Mr. Dave Mathews of Mote and Associates on March 21, 2018.

2.0 WORK PERFORMED

2.1 Field Work

A total of 17 soil borings were made at the locations shown on the boring location plan, Figure 2 in Section III. Fourteen borings were performed in the proposed lagoon sites and three borings were performed along the proposed sanitary sewer route. The boring logs and boring location plan are included in Section III. The borings were made with a boring rig mounted on an all-terrain vehicle (ATV) using hollow-stem augers and standard penetration resistance methods. The standard penetration tests were performed in accordance with ASTM D1586, which includes a 140-pound hammer, 30-inch drops, and two-inch-O.D. split-spoon samplers driven at maximum depth intervals of five feet or at major changes in stratum, whichever occurred first. The disturbed split-spoon samples were visually classified, logged, sealed in moisture-proof jars, and taken to the Bowser-Morner, Inc. laboratory for study. The depths where these "A"-type split-spoon samples were collected are noted on the corresponding boring logs.



2.2 Laboratory Work

Three Unified Soil Classification soil classification tests were performed in accordance with ASTM D422, D2216, D2487, and D4318. The purpose of this type of test is to determine parameters that aid in the evaluation of the general behavior of the soils.

Three Atterberg limits tests were performed in accordance with ASTM D4318 to determine the liquid and plastic limits on the most visibly plastic cohesive soil or as needed for soil classification. In addition, 56 moisture content determinations were made in accordance with ASTM D2216. The moisture contents ranged from 11.6% to 28.5% for the brown lean clay with sand, from 9.6% to 14.0% for the brown, sandy lean clay, from 10.4% to 15.4% for the gray, sandy lean clay, from 12.0% to 25.0% for the brown clayey sand with gravel, from 16.0% to 16.6% for the brown silty sand with varying amounts of gravel, and from 17.1% to 21.8% for the brown sand with varying amounts of gravel. The moisture content for the undocumented fill was 10.5%. The moisture content for the gray lean clay with sand was 29.0%. The results of the laboratory tests are summarized in Table 2-1 and included in Section III of this report.

		Moisture				Atte	erberg Lir	nits
Boring No.	Depth (ft.)	Content (%)	% Gravel	% Sand	% Fines	LL	PL	PI
1	1.0 – 2.5	28.5						
	6.0 – 7.5	9.6						
2	3.5 – 5.0	13.9						
	6.0 – 7.5	12.0	31.8	39.5	28.7	22	17	5
	8.5 - 10.0	14.3						
3	1.0 – 2.5	20.2						
	6.0 – 7.5	10.9						
	8.5 - 10.0	12.9						
4	3.5 – 5.0	22.0						
	6.0 – 7.5	14.0				31	17	14
	8.5 – 10.0	13.1						
5	1.0 – 2.5	24.3						
	6.0 – 7.5	11.4						
	13.5 – 15.0	12.8						
6	1.0 – 2.5	25.2						
	3.5 – 5.0	26.3						
	8.5 - 10.0	11.5						
7	1.0 – 2.5	16.4						
	6.0 – 7.5	16.0	7.8	76.3	15.9	N	on-Plasti	с
	8.5 - 10.0	13.8						
	13.5 – 15.0	14.0						
8	3.5 – 5.0	22.8						
	8.5 – 10.0	15.4						

Table 2-1. Summary of Laboratory Test Results



		Moisture				Atte	erberg Lin	nits
Boring No.	Depth (ft.)	Content (%)	% Gravel	% Sand	% Fines	LL	PL	PI
9	1.0 – 2.5	25.1						
	6.0 – 7.5	11.4				20	13	7
10	3.5 – 5.0	13.7						
	8.5 – 10.0	14.3						
	18.5 – 20.0	11.1						
	28.5 – 30.0	12.3						
11	1.0 – 2.5	10.5						
	6.0 – 7.5	10.7						
	13.5 – 15.0	10.6						
	23.5 – 25.0	10.4						
12	3.5 – 5.0	12.4						
	8.5 - 10.0	12.5						
	18.5 – 20.0	17.1						
	28.5 – 30.0	11.3						
13	1.0 – 2.5	15.7						
	6.0 – 7.5	14.9						
	8.5 – 10.0	21.8	4.1	80.3	15.6	Ν	Ion-Plasti	C
	18.5 – 20.0	14.0						
14	1.0 – 2.5	21.3						
	6.0 – 7.5 (A)	11.6						
	6.0 – 7.5 (B)	25.0						
	8.5 – 10.0	12.9						
	18.5 – 20.0	15.4						
15	1.0 – 2.5	29.0						
	6.0 – 7.5	15.8						
	13.5 – 15.0	12.1						
16	3.5 – 5.0	19.1						
	6.0 – 7.5 (A)	16.6						
	6.0 – 7.5 (B)	10.4						
	18.5 – 20.0	12.9						
17	1.0 - 2.5	16.4				33	18	15
	6.0 - 7.5	12.1						
	13.5 – 15.0	10.9						

Table 2-1. Summary of Laboratory Test Results



3.1 Lagoon Site

Borings 1 through 9 and 13 through 17 were performed in the proposed lagoon areas. Based on the information from these fourteen borings, the subgrade soil conditions are described in descending order below:

- Six to fourteen inches of topsoil.
- Below the topsoil, 0.5 to eight feet of very-soft-to-stiff, brown or gray lean clay with sand.
- In Borings 2, 3, 6, 14, and 15 and below the lean clay with sand layer, 0.5 to six feet of very-loose-to-medium-dense, brown clayey sand with gravel.
- In Borings 7, 8, and 16 and below the lean clay with sand layer, one to seven feet of very-loose-to-medium-dense, brown silty sand with varying amounts of gravel.
- In Borings 1, 4, and 5 and below the lean clay with sand layer, in Boring 3 and below the clayey sand with gravel layer, and in Boring 16 and below the silty sand with gravel layer, two to 6.5 feet of very stiff, brown, sandy lean clay.
- In Borings 5 and 16 and below the sandy, lean clay layer, and in Boring 13 and below the lean clay with sand layer, 1.5 to 3.5 feet of medium dense brown sand with varying amounts of gravel.
- In Boring 17 and below the lean clay with sand layer, five feet of hard, brown and gray, sandy lean clay.
- In Borings 1, 3, and 4 and below the brown, sandy lean clay layer, in Borings 2, 6, 14, and 15 and below the brown clayey sand with gravel layer, in Borings 5, 13, and 16 and below the brown sand with gravel layer, in Borings 7 and 8 and below the brown silty sand layer, in Boring 9 and below the brown lean clay with sand layer, and in Boring 17 and below the brown and gray, sandy lean clay layer, medium-stiff-to-hard, gray, sandy lean clay extending to the bottoms of these borings at depths of 10 to 20 feet.

3.2 Sanitary Sewer Route

Borings 10, 11, and 12 were performed along the proposed sanitary sewer route. Based on the information from these three borings, the subgrade soil conditions are described in descending order below:

• 1.5 to 3.5 feet of undocumented and uncontrolled fill consisting of asphalt pavement, granular base, and gray lean clay with sand.



- Below the fill layer, ten to twelve feet of medium-stiff-to-hard, brown, sandy lean clay.
- In Borings 10 and 12 and below the brown, sandy lean clay layer, three to five feet of very-loose-to-medium-dense, brown silty sand.
- In Boring 12 and below the brown silty sand layer, 3.5 feet of medium dense brown sand with gravel.
- In Boring 10 and below the brown silty sand layer, in Boring 11 and below the brown, sandy lean clay layer, and in Boring 12 and below the brown sand with gravel layer, more than eight to 15 feet of stiff-to-hard, gray, sandy lean clay. The gray, sandy lean clay extended to the bottoms of Borings 10 and 12 at a depth of 30 feet.
- In Boring 11 and below the gray, sandy lean clay layer, very dense, gray clayey sand with gravel extending to the bottom of this boring at a depth of 30 feet.

Free groundwater was encountered during the advancement of the borings at the depths and elevations summarized in Table 3-1.

Doring	Depth Groundwater		Groundwater Observation		Groundwater Observation After		ion After
воппе	FIRSUODS					me interval (it, i	
NO.	Depth	Elevation	Depth	Elevation	Depth	Elevation	Time
1	No V	Vater	No \	Nater		Not Applicable	
2	4.5	1127.9	5.0	1127.4		Not Applicable	
3	3.5	1128.2	2.6	1129.1	0.5	1131.2	24
4	6.0	1128.3	10.8	1123.5	1.3	1133.0	24
5	6.8	1127.8	2.9	1131.7	0.8	1133.8	24
6	3.5	1130.1	2.2	1131.4	1.2	1132.4	24
7	6.0	1129.6	2.8	1132.8	1.7	1133.9	24
8	6.0	1128.7	3.5	1131.2	1.8	1132.9	2.5
9	6.0	1128.1	7.5	1126.6	2.6	1131.5	1.5
10	14.2	79.0*	23.0	70.2*		Not Applicable	
11	28.5	71.6*	28.0	72.1*		Not Applicable	
12	13.5	88.1*	13.0	88.6*		Not Applicable	
13	6.0	1132.0	7.0	1131.0	3.8	1134.2	7
14	6.7	1133.3	7.0	1133.0	6.5	1133.5	5
15	6.0	1130.5	5.2	1131.3	2.3	1134.2	3
16	6.0	1131.9	7.5	1130.4	4.3	1133.6	2
17	No V	Water	No \	Water		Not Applicable	

Table 3-1. Summary of Groundwater Observations

*Refers to an assumed elevation of 100.0 feet for the benchmark shown on the boring location plan.



Free groundwater is defined as water that seeps into an open borehole before it is backfilled. Groundwater observations were made during the boring operations by noting the depth of water on the boring tools and in the open boreholes following withdrawal of the boring augers. However, it should be noted that short-term water level readings are not necessarily a reliable indication of the groundwater level and that significant fluctuations may occur due to variations in rainfall and other factors. For specific questions on the soil conditions, please refer to the individual boring logs in Section III.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 **Project Description**

The Palestine-Hollansburg Joint Sewer District proposes to construct a lagoon system near Hollansburg, Ohio, on the southwest side, and a section of sewer in Hollansburg, Ohio to handle the wastewater.

Based on the initial boring location plan provided by Mr. Dave Mathews of Mote and Associates, three ponds will be constructed on the east bank of Middle Fork East Whitewater River on the southeast side of Hollansburg-Arcanum Road near Hollansburg, Ohio. The proposed Ponds 1 and 2 will be on the east side of the complex and the storage pond will be on the west side of the complex and east of the river.

The proposed lagoon site is a cultivated field with the existing ground surface at elevations between 1131 and 1140 feet as shown on the topographic map provided by Mr. Dave Mathews of Mote and Associates.

Mr. Mathews stated in his letter dated December 21, 2017, Ponds 1 and 2 will have a designed water depth of 10 feet. The bottoms of these ponds will be at an elevation of 1129 feet. The tops of the berms will be at an elevation of 1142 feet, which is about 6 feet higher than the existing ground surface at an approximate elevation of 1136 feet.

The storage pond will be a large, triangle-shaped pond. As stated in the letter, the designed water depth will be 12 feet. The bottom elevation will be at an elevation of 1127 feet. The top of the berm will be at an elevation of 1142 feet, which is about 7 feet higher than the existing ground surface at an approximate elevation of 1135 feet.

Again, after our preliminary report was issued, the constructability of the lagoon system at the original proposed site was vetted. As a result, five additional, borings were requested by Mote and Associates for the determination of the subgrade soils to the north and east of the original site.

Additionally, an "L"-shaped section of sanitary sewer will be installed along Union and Main Streets in Hollansburg, Ohio. The invert of the proposed sewer was not provided.

The following recommendations are based on this information. If the above statements are incorrect or changes are made, Bowser-Morner, Inc. should be notified so that the new data can be reviewed and additional recommendations and services can be given if required to meet the needs of your project.



4.2 Lagoon Subgrade Conditions and Recommendations

Borings 1 through 9 and 13 through 17 were performed in three proposed lagoon sites. Based on the information from these fourteen borings, the proposed lagoon sites are covered by a layer of topsoil that extends to the approximate depths and elevations outlined in Table 4-1.

Boring No.	Depth to Bottom of Topsoil (ft)	Elevation at Bottom of Topsoil (ft)
1	0.8	1132.9
2	1.2	1131.2
3	0.8	1130.9
4	1.1	1133.2
5	0.6	1134.0
6	0.7	1132.9
7	1.0	1134.6
8	0.5	1134.2
9	0.7	1133.4
13	0.7	1137.3
14	0.6	1139.4
15	0.9	1135.6
16	0.7	1137.2
17	0.7	1138.8

Table 4-1. Depths to Bottoms of Topsoil

Based on the initial design, the bottom elevation of Ponds 1 and 2 (Borings 6 through 9) will be at 1129 feet and the bottom elevation of the triangle-shaped pond (Borings 1 through 5) will be at an elevation of 1127 feet. Based on the soil conditions indicated in nine borings made for the initial study, the bottoms of the lagoons will be on brown or gray sandy, lean clay layer, with the exception of Borings 2, 5, 6, and 7. Based on our experience, the sandy, lean clay type of soil will have a relatively low permeability and will detain the water.

The bottoms of the Lagoon 2 and the storage pond, in the vicinity of Borings 2, 5, 6, and 7 will be in the sand and gravel layers. Sand layers were also encountered in Borings 13 through 16 at depths of 6 to 8.5 feet below the existing grade. Any sand with gravel or the pockets of sand with gravel encountered at the bottoms of the excavation will have a higher permeability. The sides or the bottoms of the lagoon excavations over the sand with gravel layer will leak. We recommend that the excavation of the lagoons or pond in any sand with gravel layer should be extended at least two feet below the proposed final grade. The removed brown or gray lean clay or sandy lean clay can be used as backfill for the construction of clay liner over any sand with gravel layer. A minimum of two feet of compacted clay liner should be constructed over the sand with gravel layer.



4.2.1 SUBGRADE SOIL CLASSIFICATION FOR LAGOON EXCAVATIONS

Based on Occupational Safety and Health Administration (OSHA) Subpart P-Excavations (29 CFR PART 1926), cohesive soil with an unconfined compressive strength of 3,000 pounds per square foot (psf) or greater can be classified as Type "A" soil. Cohesive soil with an unconfined compressive strength greater than 1,000 psf but less than 3,000 psf can be classified as Type "B" soil, and cohesive soil with an unconfined compressive strength of 1,000 psf or less can be classified as Type "C" soil. Dense or very dense granular soil with no water can be classified as Type "B" soil; the other granular soils should be classified as Type "C" soil. Previously disturbed soil (fill) should not be classified as Type "A" soil. Soil that is fissured shall not be classified as Type "A" soil.

Based on the standard penetration test (SPT) results from this study, the subgrade soils at this site are classified in accordance with OSHA trench excavation regulations as shown in Table 4-2.

		OSHA Soil
Boring No.	Depth (ft.)	Туре
1	0.0 – 3.5	В
	3.5 - 10.0	А
2	0.0 - 4.0	В
	4.0 - 9.0	С
	9.0 - 10.0	А
3	0.0 - 3.5	В
	3.5 – 4.0	С
	4.0 - 10.0	А
4	0.0 - 6.0	В
	6.0 - 15.0	А
5	0.0 - 3.5	В
	3.5 – 7.0	А
	7.0 – 9.5	С
	9.5 - 15.0	А
6	0.0 - 4.0	В
	4.0 - 6.0	С
	6.0 - 10.0	А
7	0.0 - 1.5	В
	1.5 - 8.5	С
	8.5 - 15.0	А
8	0.0 - 6.0	В
	6.0 - 9.5	С
	9.5 - 10.0	А
9	0.0 - 5.0	В
	5.0 - 10.0	А

Table 4-2. Lagoon Subgrade Soil Classification (OSHA)



		OSHA Soil
Boring No.	Depth (ft.)	Туре
13	0.0 - 8.5	В
	8.5 - 10.0	С
	10.0 - 20.0	А
14	0.0 – 3.5	В
	3.5 – 6.5	А
	6.5 – 12.5	С
	12.5 – 18.5	В
	18.5 – 20.0	А
15	0.0 - 6.0	В
	6.0 - 12.0	С
	12.0 - 20.0	А
16	0.0 - 6.0	В
	6.0 - 7.0	С
	7.0 – 13.5	А
	13.5 – 17.0	С
	17.0 - 20.0	А
17	0.0 – 3.5	В
	3.5 – 20.0	А

Table 4-2. Lagoon Subgrade Soil Classification (OSHA)

If weaker soil is encountered below stronger soil, the classifications of all of the stronger soil above the weaker soil layer will have to be lowered to the weaker soil classification.

Based on OSHA excavation regulations, for any excavation that will extend more than a depth of 20 feet below the grade, the stability of the excavations should be evaluated by a geotechnical engineer. The pond or lagoon excavations will be less than 10 feet deep below the existing grade, between 3 and 7 feet below the existing grade for those lagoons and the storage pond. However, for any excavations to be more than 20 feet deep and the sloping-benching methods for excavations are selected as the construction method, a registered professional engineer should analyze the slope stability of each of trench excavations. While the engagement of a geotechnical engineer during the construction is beyond the scope of this study, we will be glad to provide assistance during the construction as a separate study at your request.

For excavations less than 20 feet deep, the maximum allowable slopes for excavations should be maintained in accordance with OSHA excavation regulations for stability and for safety of the worker. For Type "A" soil, a side slope of 3/4 (horizontal) to 1 (vertical) should be provided; for Type "B" soil, a side slope of 1 (horizontal) to 1 (vertical) should be provided; and for Type "C" soil, a side slope of 1-1/2 (horizontal) to 1 (vertical) should be provided.



Based on our experiences, a maximum side slope of 3 (horizontal) to 1 (vertical) should be provided for stability, since the lagoon will be filled with wastewater and the pond embankment will be saturated. The water level will fluctuate during the filling and emptying of the lagoon. The side slopes will be in a "rapid draw-down" condition of the saturated, cut soil-slopes. Additionally, the top of the pond embankment should be protected with riprap against the wave action. Otherwise, the pond embankments will be eroded by water in the pond.

The slope stability study is beyond the scope of this soil study. We will be glad to analyze the stability of the slope as a separate study, at your request.

At the time of our study, free groundwater was encountered in Borings 2 through 9 and 13 through 16 at depths of 0.5 to 10.8 feet below the existing ground surface. Free groundwater was not encountered in Borings 1 and 17 during the boring operations. The groundwater should be lowered to at least three feet below the bottom of the maximum excavation in sand and gravel layers and to the bottom of the maximum excavation in lean, clay soil layers using sumps and pumps. Otherwise, the bottoms of the excavation will be very soft due to the groundwater seepage. All submerged soil or soil from which water is freely seeping should be classified as Type "C" soil.

Due to the spacing of the borings, the type of subgrade soil may vary between the soil borings made for this study. During the excavations, the subsurface conditions should be verified. A "competent person" as defined by OSHA should be present throughout the excavations to verify the soil types and soil conditions. The sloping and benching design should be adjusted with changes in the subgrade soil in accordance with OSHA regulations.

4.2.2 LAGOON COMPACTION REQUIREMENTS

Any structural fill to be placed for the construction of the embankment and as the clay liner over the sand layers should be compacted to at least 90% of the maximum dry-unit weight with moisture contents between the optimum and/or less than 2% above the optimum moisture content as determined by the standard Proctor test (ASTM D-698). The compaction should be accomplished by placing the fill in successive, horizontal, approximately six- to eight-inch-thick loose lifts and mechanically compacting each lift to at least the specified minimum dry density. Field-density tests should be performed at a minimum rate of one per 2,500 square feet of fill area and for each lift to verify that adequate compaction is achieved. After the backfill is placed and compacted over the sand layer, the cut slopes can be graded with earth-moving equipment for the construction of the lagoons.

It must be emphasized that the excavation and compaction of soil fill are highly influenced by weather conditions. Performing the earthwork under wet and frozen conditions is generally very difficult, if not impossible. The preparation of the pond embankment should avoid by using wet silty and clayey soil as backfill and during wet and frozen conditions because the wet soil cannot be compacted to the required unit weight without drying or other soil stabilization methods. Consequently, the construction of the lagoons and the storage pond should be



performed in favorable weather. The construction should not be performed in the winter and wet weather conditions. The soil removed from the site to be reused as backfill should be covered or the top of the soil stockpile should be graded to drain and should be compacted to provide a seal layer to prevent the soil from being saturated by rain. Water should not be allowed to pond next to the soil stockpile to increase the moisture contents in the stockpiled soil backfill material.

Puddling or jetting of the backfill material, including the utility trenches, should not be allowed as a compaction method.

4.2.3 LAGOON EXCAVATIONS

During the excavations, the subsurface conditions should be verified. If it is necessary, any major changes in subsurface conditions other than what are shown on the boring logs warrant additional subsurface investigation.

The excavations should be observed to ensure that the loose, soft, or otherwise undesirable materials are removed and that the bottoms of the excavations are directly on an acceptable surface. At the time of this observation, it may be verified with a hand penetration device in the base of the excavation to ensure that the soils immediately below the bottom of the excavation are satisfactorily prepared to support any additional soil fill, if needed. Please note that such shallow observations do not replace an adequate deep-boring program and structural fill compaction QA/QC records. The overall performance of the lagoon is governed by the soils on the sides of the excavation and below the bottom of the excavation.

If pockets of soft, loose, or otherwise unsuitable materials are encountered at the bottom of the excavation, the proposed bottom of the lagoon elevations may be reestablished by backfilling after the undesirable materials have been removed. The excavation should extend to suitable soils. The unsuitable materials can be removed and replaced with well-compacted, engineered fill. Special care should be taken to remove the sloughed, loose, or soft materials near the base of the excavation slopes. Extra care should also be taken to tie-in the compacted fill with the excavation slopes, with benches as necessary, to ensure that no pockets of loose or soft materials are left along the excavation slopes below the bottoms of the lagoon excavation level. The contractor should maintain temporary cut slopes in accordance with the current OSHA regulations governing trenching and slope stability.

Soils exposed at the bases of satisfactory excavations should be protected against any detrimental change in condition such as from construction disturbances, rain, and freezing. Surface runoff should be drained away from the excavation and not allowed to pond in the excavations. It must be emphasized that all excavations must conform to all state, federal, and local regulations relative to slope geometry.



4.2.4 LAGOON CONSTRUCTION DEWATERING

At the time of our study, free groundwater was encountered in Borings 2 through 9 and 13 through 16 at depths of 0.5 to 10.8 feet below the existing ground surface. Free groundwater was not encountered in Borings 1 and 17 during the boring operations. As a result, groundwater will be encountered during the lagoon excavation. The bottoms of the excavations should be sloped to one corner in each of the pond excavations. The slump can be located at the lowest corner of the excavations. The groundwater should be lowered to at least three feet below the bottom of the maximum excavation in sand and gravel layers and to the bottom of the maximum excavation in lean, clay soil layers using sumps and pumps.

Sumps can consist of perforated pipes or drums installed vertically in the relatively permeable granular soils and surrounded with free-draining sand and gravel. The perforations of the pipe should be covered with a layer of filter fabric to keep silt and fine sand from pumping through the sumps. Care must be exercised when pumping from sumps that extend into silts or other granular soils since general deterioration of the bearing soils and a localized "quick" condition could result. The groundwater should be kept at a level below the fill operation during the placement and compaction of the backfill materials during the construction of any foundations.

The amount and type of dewatering required during construction will depend on the weather and groundwater levels at the time of construction, and the effectiveness of the contractor's techniques in preventing surface runoff from entering open excavations. Typically, groundwater levels are highest during winter and spring, and lower in summer and early fall.

4.3 Sanitary Sewer Subgrade Conditions and Recommendations

Borings 10 through 12 were performed over the street pavement along the proposed sanitary sewer route on Union and Main Streets. Based on the information from these three borings, the proposed sewer alignment is covered by a layer of undocumented fill that extends to the approximate depths and elevations outlined in Table 4-3.

Boring No.	Depth to Bottom of Topsoil (ft)	Elevation* at Bottom of Topsoil (ft)
10	3.5	89.7
11	3.5	96.6
12	1.5	100.1

Table 4-3.	Depths to	Bottoms	of Fi	ll Layer
------------	-----------	---------	-------	----------

*Refers to an assumed elevation of 100.0 feet for the benchmark shown on the boring location plan.

The streets are covered with 3 to 7 inches of asphalt pavement, 3.5-to-13-inch-thick of granular base, and gray lean clay. We assume that the invert of the sewer will be more



than 4 feet below the top of street pavement. The bottoms of the sewer trench excavations will have to be extended below the existing fill layer.

4.3.1 SUBGRADE SOIL CLASSIFICATION FOR TRENCH EXCAVATION

Again, based on Occupational Safety and Health Administration (OSHA) Subpart P-Excavations (29 CFR PART 1926), cohesive soil with an unconfined compressive strength of 3,000 pounds per square foot (psf) or greater can be classified as Type "A" soil. Cohesive soil with an unconfined compressive strength greater than 1,000 psf but less than 3,000 psf can be classified as Type "B" soil, and cohesive soil with an unconfined compressive strength of 1,000 psf or less can be classified as Type "C" soil. Dense or very dense granular soil with no water can be classified as Type "B" soil; the other granular soils should be classified as Type "C" soil. Previously disturbed soil (fill) should not be classified as Type "A" soil. Soil that is fissured shall not be classified as Type "A" soil.

Based on the standard penetration test (SPT) results from this study, the subgrade soils along the proposed sewer line route can be classified as shown in Table 4-4.

		OSHA Soil
Boring No.	Depth (ft.)	Туре
10	0.0 - 3.5	C
	3.5 – 14.0	А
	14.0 - 17.0	C
	17.0 - 30.0	А
11	0.0 – 3.5	В
	3.5 – 28.5	А
	28.5 - 30.0	С
12	0.0 – 3.5	В
	3.5 – 13.5	А
	13.5 – 22.0	С
	22.0 - 30.0	А

Table 4-4. Sewer Subgrade Soil Classification (OSHA)

If weaker soil is encountered below stronger soil, the classifications of all of the stronger soil above the weaker soil layer will have to be lowered to the weaker soil classification. Any groundwater encountered should be lowered to at least three feet below the bottom of the maximum excavation during the installation of the sewer line. Otherwise, the bottoms of the trench excavation will be very soft due to the groundwater seepage. All submerged soil or soil from which water is freely seeping should be classified as Type "C" soil.

The side slopes of the trench excavations should be maintained in accordance with OSHA trench excavation regulations for stability and for safety of the worker. The sloping and benching method can be used during the installation of the utility line. For type "A" soil, a side slope of 3/4 (horizontal) to 1 (vertical) should be provided; For type "B" soil, a side slope of 1 (horizontal) to 1 (vertical) should be



provided; and For type "C" soil, a side slope of 1-1/2 (horizontal) to 1 (vertical) should be provided.

The maximum allowable slopes outlined above, apply only to excavations less than 20 feet deep. For excavations greater than 20 feet deep, sloping or benching for excavations should be designed, and the slope stability of each trench excavation should be analyzed and designed by a registered professional engineer.

Alternatively, a trench box can be used to keep the sidewalls from caving in and for the safety of the workers. The trench box should be rated in accordance with OSHA regulations. Tabulated data for the trench box that identify the registered professional engineer who approved the data should be kept on the job site. For more detailed information on the OSHA regulations, please refer to OSHA Subpart P-Excavations (29 CFR PART 1926).

During the trench excavations, the subsurface conditions should be verified. A "competent person" as defined by OSHA should be present throughout the sewer line trench excavations to verify the soil types and soil conditions. The sloping and benching or trench box design should be adjusted with changes in the subgrade soil in accordance with OSHA regulations.

4.3.2 COMPACTION REQUIREMENTS

Structural fill placed below any manhole foundations or any other structure foundation bearing elevation should be compacted to at least 95% of the maximum dry unit weight with a moisture content within 2% of the optimum moisture content as determined by the modified Proctor test (ASTM D1557). Fill placed above the bottoms of the sewer pipes as the subgrade soil for the pavement should be compacted to at least 90% of the maximum dry unit weight with a moisture content within 2% of the optimum moisture content as determined by the modified Proctor test (ASTM D1557). To minimize the settlement potential of the backfill, the backfill in unpaved areas should be compacted to at least 85% of the maximum dry-unit weight as determined by the modified Proctor test (ASTM D-1557). Otherwise, the backfill will settle with time, and the ground surface along the trench will be lower than the adjacent area. The compaction should be accomplished by placing the fill in successive, horizontal, approximately six- to eight-inch-thick loose lifts and mechanically compacting each lift to at least the specified minimum dry density. Field density tests should be performed at a minimum rate of one per 2,500 square feet of fill area or at a minimum rate of one per 300 linear feet of trench excavation and for each lift to verify that adequate compaction is achieved. Backfill for utility trenches, foundation excavations, etc., within structures or paved areas, is considered structural fill and should be placed in accordance with these recommendations.

It must be emphasized that the excavation and compaction of soil fill are highly influenced by weather conditions. Performing the earthwork under wet and frozen conditions is generally very difficult. As a result, compaction of wet silty and clayey soil should be avoided during wet and frozen conditions because the



wet soil cannot be compacted to the required unit weight without drying or other soil stabilization methods. Alternatively, granular soil can be used as backfill to facilitate the backfilling and compaction work during winter and wet weather. The construction cost during the winter and wet weather conditions will be higher due to the need to purchase the granular soil.

Puddling or jetting of the backfill material, including the utility trenches, should not be allowed as a compaction method. Silty or clayey soils encountered above foundation depth will often soften, and the bearing capacity may be reduced if water ponds in the excavation.

4.3.3 TRENCH EXCAVATIONS

During the trench excavations, the subsurface conditions should be verified. Changes in subsurface conditions other than what are shown on the boring logs warrant additional subsurface investigation before the manhole foundation and pipe foundation are constructed.

The trench excavations should be observed to ensure that the loose, soft, or otherwise undesirable materials are removed and that any foundations will be supported directly on an acceptable surface. At the time of this observation, it may be necessary to use a hand penetration device in the base of the trench excavation to ensure that the soils immediately below the foundation base are satisfactorily prepared to support the foundations. Please note that such shallow observations do not replace an adequate deep-boring program and structural fill compaction QA/QC records. The overall performance of the foundations is governed by the soils below the bottom of the foundation.

If pockets of soft, loose, or otherwise unsuitable materials are encountered at the bottom of the trench excavation, the proposed sewer line elevations may be reestablished by backfilling after the undesirable materials have been removed. The excavation should extend to suitable soils, and the base of the excavation should extend one lateral foot for every foot of excavation below the bottom of the foundation. The entire excavation should then be refilled with well-compacted, engineered fill. Special care should be taken to remove the sloughed, loose, or soft materials near the base of the excavation slopes. Extra care should also be taken to tie-in the compacted fill with the excavation slopes, with benches as necessary, to ensure that no pockets of loose or soft materials are left along the excavation slopes below the foundation bearing level. The contractor should maintain temporary cut slopes in accordance with the current OSHA regulations governing trenching and slope stability.

Soils exposed at the bases of satisfactory foundation excavations should be protected against any detrimental change in condition such as from construction disturbances, rain, and freezing. Surface runoff should be drained away from the excavation and not allowed to pond. It must be emphasized that all excavations must conform to all state, federal, and local regulations relative to slope geometry.



4.3.4 TRENCH DEWATERING

Based on the information from the three borings made along the proposed sewer route, groundwater was encountered at depths of 13 to 28.5 below the existing grade during the time of this study. If groundwater is encountered, the sewer line pipes, fittings, and manhole structures should be designed with watertight connections to reduce the amount of groundwater seeping into the sewer line pipe or manhole. The manhole structures in this area should also be designed against floatation by the groundwater.

Any groundwater encountered should be lowered to at least three feet below the bottom of the maximum excavation in sand and gravel layers or to the bottom of the maximum excavation in silt and clay layers using sumps and pumps. Sumps can consist of perforated pipes installed vertically in the relatively permeable granular soils and surrounded with free-draining sand and gravel. The perforations of the pipe should be covered with a layer of filter fabric to prevent silt and fine sand from pumping through the sumps. Care must be exercised when pumping from sumps that extend into silts or other granular soils since general deterioration of the bearing soils and a localized "quick" condition could result. The groundwater should be kept at a level below the fill operation during the placement and compaction of the backfill materials during the construction of the foundations.

The amount and type of dewatering required during construction will depend on the weather and groundwater levels at the time of construction, and the effectiveness of the contractor's techniques in preventing surface runoff from entering open excavations. Typically, groundwater levels are highest during winter and spring, and lower in summer and early fall.

5.0 CLOSURE

5.1 Basis Of Recommendations

The evaluations, conclusions, and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the exploration, our understanding of the project and our experience with similar sites and subsurface conditions. Data used during this exploration included, but were not necessarily limited to:

- A total of 17 exploratory borings performed during this study.
- Observations of the project site by our staff.
- The results of the laboratory soil tests.
- The site plan provided by Mote and Associates.
- Limited interaction with Mr. Matthew Harrison of Palestine-Hollansburg Joint



Sewer District, and Mr. Dave Mathews, Mr. Mike Bruns, Ms. Susan Laux, and Mr. Corey Bremigan of Mote and Associates.

• Published soil or geologic data of this area.

In the event that changes in the project characteristics are planned, or if additional information or differences from the conditions anticipated in this report become apparent, Bowser-Morner, Inc. should be notified so that the conclusions and recommendations contained in this report can be reviewed and, if necessary, modified or verified in writing.

5.2 Limitations And Additional Services

The subsurface conditions discussed in this report and those shown on the boring logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Regardless of the thoroughness of a subsurface exploration, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by designers, or that the construction process has altered the soil conditions. As variations in the soil profile are encountered, additional subsurface sampling and testing may be necessary to provide data required to reevaluate the recommendations of this report. Consequently, after submission of this report, it is recommended that Bowser-Morner, Inc. be authorized to perform additional services to work with the designer(s) to minimize errors and omissions regarding the interpretation and implementation of this report.

Before construction begins, we recommend that Bowser-Morner, Inc.:

- Work with the designers to implement the recommended geotechnical design parameters into plans and specifications.
- Consult with the design team regarding interpretation of this report.
- Establish criteria for the construction observation and testing for the soil conditions encountered at this site.
- Review final plans and specifications pertaining to geotechnical aspects of design.

During construction, we recommend that Bowser-Morner, Inc.:

- Observe the construction, particularly the site preparation, fill placement, and any foundation or trench excavation.
- Perform in-place density testing of all compacted fill.
- Perform materials testing of soil and other materials as required.



• Consult with the design team to make design changes in the event that differing subsurface conditions are encountered.

If Bowser-Morner, Inc. is not retained for these services, we shall assume no responsibility for construction compliance with the design concepts, specifications or recommendations.

5.3 Warranty

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, express or implied, is made.

The scope of this study did not include an environmental assessment for the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater or air, on, within or beyond the site studied. Any statements in the report or on the boring logs regarding odors, staining of soils or other unusual items or conditions observed are strictly for the information of our client.

To evaluate the site for possible environmental liabilities, we recommend an environmental assessment, consisting of a detailed site reconnaissance, a record review, and report of findings. Additional subsurface drilling and sampling, including groundwater sampling, may be required. Bowser-Morner, Inc. can provide this service and would be pleased to provide a cost proposal to perform such a study, if requested.

This report has been prepared for the exclusive use of Palestine-Hollansburg Joint Sewer District for specific application to the lagoons on Hollansburg-Arcanum Road in Hollansburg, Ohio (see Figure 1 in Section III of this report). Specific design and construction recommendations have been provided in the various sections of the report. The report shall therefore, be used in its entirety. This report is not a bidding document and shall not be used for that purpose. Anyone reviewing this report must interpret and draw their own conclusions regarding specific construction techniques and methods chosen. Bowser-Morner, Inc. is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.



Section II

Specifications

CLEARING AND GRADING SPECIFICATIONS

I. <u>GENERAL CONDITIONS</u>

The contractor shall furnish all labor, materials, and equipment, and perform all work and services necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction and grading as shown on the plans and as described therein.

This work shall consist of all clearing and grading, removal of existing structures unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

This work is to be accomplished under the constant and continuous supervision of the Owner or his designated representative.

In these specifications the terms "approved" and "as directed" shall refer to directions to the Contractor from the Owner or his designated representative.

II. <u>SUBSURFACE CONDITIONS</u>

Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work. Borings and/or soil investigations shall have been made. Results of these borings and studies will be made available by the Owner to the Contractor upon his request, but the Owner is not responsible for any interpretations or conclusions with respect thereto made by the Contractor on the basis of such information, and the Owner further has no responsibility for the accuracy of the borings and the soil investigations.

If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the Owner can investigate the condition.

III. SITE PREPARATION

Within the specified areas, all trees, brush, stumps, logs, tree roots, and structures scheduled for demolition shall be removed and disposed of.

All cut and fill areas shall be properly stripped. Topsoil will be removed to its full depth and stockpiled for use in finish grading. Any rubbish, organic and other objectionable soils, and other deleterious material, shall be disposed of off the site, or as directed by the Owner or his designated representative if on site disposal is provided. In no case shall such objectionable material be allowed in or under the fill unless specifically authorized in writing.
Prior to the addition of fill, the original ground shall be compacted to job specifications as outlined below. Special notice shall be given to the proposed fill area at this time. If wet spots, spongy conditions, or ground water seepage is found, corrective measures must be taken before the placement of fill.

IV. FORMATION OF FILL AREAS

Fills shall be formed of satisfactory materials placed in successive horizontal layers of not more than eight (8) inches in loose depth for the full width of the cross section. The depth of lift may be increased if the Contractor can demonstrate the ability to compact a larger lift. If compaction is accomplished using hand-tamping equipment, lifts will be limited to 4-inch lose lifts.

All material entering the fill shall be free of organic matter such as leaves, grass, roots, and other objectionable material.

The operations on earth work shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing weather, or other unsatisfactory conditions. The Contractor shall keep the work areas graded to provide the drainage at all times.

The fill material shall be of the proper moisture content before compaction efforts are started. Wetting or drying of the material and manipulation to secure a uniform moisture content throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work on all portions of the embankment thus affected shall be delayed until the material has dried to the required moisture content. The moisture content of the fill material should be no more than two (2) percentage points higher or lower than optimum unless otherwise authorized. Sprinkling shall be done with equipment that will satisfactorily distribute the water over the disced area.

Compaction operations shall be continued until the fill is compacted to not less than 90% above foundation elevation and 95% below foundation elevation, of the maximum density as determined in accordance with the latest ASTM D-1557 (Modified). Any areas inaccessible to a roller shall be consolidated and compacted by mechanical tampers. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of filled areas, starting layers shall be placed in the deepest portion of the fill, and as placement progresses, additional layers shall be constructed in horizontal planes. If directed, original slopes shall be continuously, vertically benched to provide horizontal fill planes. The size of the benches shall be formed so that the base of the bench is horizontal and the back of the bench is vertical. As many benches as are necessary to bring the site to final grade shall be constructed. Filling operations shall begin on the lowest bench, with the fill being placed in horizontal eight (8) inch loose lifts unless otherwise authorized. The filling shall progress in this manner until the entire first bench has been filled, before any fill is placed on the succeeding benches. Proper drainage shall be maintained at all times during benching and filling of the benches, to insure that all water is drained away from the fill area.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the areas. Stones or fragmentary rock larger than four (4) inches in their greatest dimensions will not be allowed in the fill unless specifically authorized in writing. Rock fill shall be brought up in layers as specified or as directed, and every effort shall be exerted to fill the voids with the finer material to form a dense, compact mass. Rock or boulders shall be disposed of as deleterious material per Item III.

Frozen material shall not be placed in the fill nor shall the fill be placed upon frozen material.

The Contractor shall be responsible for the stability of all fills made under the contract, and shall replace any portion, which in the opinion of the Owner or his designated representative, has become displaced due to carelessness or negligence on the part of the Contractor. Fill damaged by inclement weather shall be repaired at the Contractor's expense.

V. <u>SLOPE RATIO AND STORM WATER RUN-OFF</u>

Slopes shall not be greater than 2 (horizontal) to 1 (vertical) in both cut and fill, and storm water shall not be drained over the slopes.

VI. <u>GRADING</u>

The Contractor shall furnish, operate, and maintain such equipment as is necessary to construct uniform layers, and control smoothness of grade for maximum compaction and drainage.

VII. <u>COMPACTING</u>

The compaction equipment shall be approved equipment of such design, weight, and quantity to obtain the required density in accordance with these specifications.

VIII. <u>TESTING AND INSPECTION SERVICES</u>

Testing and inspection services will be provided by the Owner.

IX. SPECIAL CONDITIONS

Section III

Boring Log Terminology, Boring Logs, Laboratory Data, And Prints

BORING LOG TERMINOLOGY

Stratum Depth:

Distance in feet and/or inches below ground surface.

Stratum Elevation:

Elevation in feet below ground surface elevation.

Description of Materials:

Major types of soil material existing at boring location. Soil classification based on one of the following systems: Unified Soil Classification System., Ohio State Highway Classification System, Highway Research Board Classification System, Federal Aviation Authority Classification System, Visual Classification.

Sample No.:

Sample numbers are designated consecutively, increasing with depth for each boring.

Sample Type:

- "A" Split spoon, 2" O.D., 1-3/8" I.D., 18" in length.
- "B" Rock Core
- "C" Shelby Tube 3" O.D. except where noted
- "D" Soil Probe
- "E" Auger Cuttings
- "F" Sonic

Sample Depth:

Depth below top of ground at which appropriate sample was taken.

Blows per 6" on Sampler:

The number of blows required to drive a 2" O.D., 1-3/8" I.D., split spoon sampler, using a 140 pound hammer with a 30-inch free fall, is recorded for 6" drive increments. (Example: 3/8/9).

"N" Blows/Ft.:

Standard penetration resistance. This value is based on the total number of blows required for the last 12" of penetration. (Example: 3/8/9: N = 8 + 9 = 17)



Water Observations:

Depth of water recorded in test boring is measured from top of ground to top of water level. Initial depth indicates water level during boring, completion depth indicates water level immediately after boring, and depth after "X" number hours indicates water level after letting water rise or fall over a time period. Water observations in pervious soil are considered reliable ground water levels for that date. Water observations in impervious soils can not be considered accurate ground water measurements for that date unless records are made over several days' time. Factors such as weather, soil porosity, etc., will cause the ground water level to fluctuate for both pervious and impervious soils.

SOIL DESCRIPTION

Color:

Dense

Very Dense

When the color of the soil is uniform throughout, the color recorded will be such as brown, gray, or black and may be modified by adjectives such as light and dark. If the soil's predominant color is shaded by a secondary color, the secondary color precedes the primary color, such as: gray-brown, yellow-brown. If two major and distinct colors are swirled throughout the soil, the colors will be modified by the term mottled, such as: mottled brown and gray.

Particle Size	Visual	Soil C	Components
Boulders	Larger than 8"	Major Component:	Minor Component Term
Cobbles	8" to 3"	Gravel	Trace 1-10%
Gravel - Coarse	3" to 3/4"	Sand	Some 11-35%
– Fine	2 mm. To 3/4"	Silt	And 36-50%
Sand – Coarse	2 mm. – 0.6 mm.	Clay	
	(Pencil lead size)		
– Mediur	n 0.6 mm. – 0.2mm.	Moist	ure Content
	Table sugar and salt size)	Term	Relative Moisture
– Fine	0.2 mm. – 0.06 mm.	Dry	Powdery
	(Powdered sugar and	Damp	Moisture content
	human hair size)		below plastic limit
Silt	0.06 mm. – 0.002 mm.	Moist	Moisture content
Clay	0.002 and smaller		above plastic limit
	(Particle size of both		but below liquid
	Silt and Clay not visible		limit
	To naked eye	Wet	Moisture content
			Above liquid limit
Condition of	Soil Relative to Compactness	Condition of Soil Rela	tive to Consistency Cohesive
0		I	14101141
Very Loose	5 blows/ft. or less	Very Soft	3 blows/ft. or less

Soft

Stiff

Hard

Very stiff

Medium Stiff

GI		
Very Loose	5 blows/ft. or less	
Loose	6 to 10 blows/ft.	
Medium Dense	11 to 30 blows/ft.	

30 to 50 blows/ft.

51 blows/ft. or more

3 blows/ft. or less 4 to 5 blows/ft. 6 to 10 blows/ft. 11 to 15 blows/ft. 16 to 30 blows/ft. 31 blows/ft. or more



UNIFIED CLASSIFICATION SYSTEM

	MAJOR DIVISIONS		GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
	GRAVEL AND	CLEAN GRAVELS		GW	WELL-GRADED GRAVEL WELL-GRADED GRAVEL WITH SAND
	GRAVELLY SOILS	(LITTLE OR NO FINES)		GP	POORLY GRADED GRAVEL POORLY GRADED GRAVEL WITH SAND
COARSE GRAINED	MORE THAN 50% OF COARSE	GRAVELS WITH FINES		GM	SILTY GRAVEL SILTY GRAVEL WITH SAND
SULS	RETAINED ON NO. 4 SIEVE	APPRECIABLE AMT. OF FINES)		GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
MORE THAN 50% OF MATERIAL IS	SAND AND	CLEAN SAND		SW	WELL-GRADED SAND WELL-GRADED SAND WITH GRAVEL
NO. 200 SIEVE SIZE	SANDY SOILS	FINES)		SP	POORLY GRADED SAND POORLY GRADED SAND WITH GRAVEL
	MORE THAN 50% OF COARSE	SANDS WITH FINES		SM	SILTY SAND SILTY SAND WITH GRAVEL
	PASSING NO. 4 SIEVE	(APPRECIABLE AMT. OF FINES)		SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
				ML	SILT, SILT WITH SAND, SANDY SILT GRAVELLY SILT, GRAVELLY SILT WITH SAND
	SILT AND CLAYS	LIQUID LIMIT <u>LESS</u> THAN 50		CL	LEAN CLAY WITH SAND, SANDY LEAN CLAY GRAVELLY LEAN CLAY WITH SAND
SOILS MORE THAN 50%				OL	ORGANIC CLAY, SANDY ORGANIC CLAY ORGANIC SILT, SANDY ORGANIC SILT WITH GRAVEL
SMALLER THAN NO. 200 SIEVE				МН	ELASTIC SILT WITH SAND, SANDY ELASTIC SILT GRAVELLY ELASTIC SILT WITH SAND
OILL	SILT AND CLAYS	LIQUID LIMIT <u>GREATER</u> <u>THAN 50</u>		СН	FAT CLAY WITH SAND, SANDY FAT CLAY GRAVELLY FAT CLAY WITH SAND
				ОН	ORGANIC CLAY WITH SAND, SANDY ORGANIC CLAY, ORGANIC SILT, SANDY ORGANIC SILT
	HIGHLY ORG	ANIC SOILS		PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
60 50	For classification of fine and fine-grained fractic grained soils.	e-grained soils on of coarse-			
لَمَ 40	Equation of "A" - line Horizontal at PI=4 to L then PI=0.73 (LL-20)	L=25.5,		OH	"ALLINE
× INDEX	Equation of "U" - line Vertical at LL=16 to PI then PI=0.9 (LL-8)	=7,	/ (5th Of	
ASTICIT 20					
<u>ح</u> 10		C ^V		MH	
74		ML OR	OL		
	10 16 20	30 40	50 LIQUID LIN	60 7 1IT (LL)	70 80 90 100 110





STANDARD PENETRATION RESISTANCE (ASTM D1586)

The purpose of this test is to determine the relative consistency of the soils in a boring, or from boring over the site. This method consists of making a hole in the ground and driving a 2-inch O.D. split spoon sampler into the soil with a 140-pound hammer dropped from a height of 30 inches. The sampler is driven 18 inches and the number of blows recorded for each 6 inches of penetration. Values of standard penetration (N) are determined in blows per foot, summarizing the flows required for the last two 6-inche increments of penetration.

Example : 2-6-8; N = 14

THIN-WALLED SAMPLER (ASTM D1587)

The purpose of the thin-walled sampler is to recover a relatively undisturbed soil sample for laboratory tests. The sampler is a thin-walled seamless tube with a 3-inch outside diameter, which is hydraulically pressed into the ground, at a constant rate. The ends are then sealed to prevent soil moisture loss, and the tube is returned to the laboratory for tests.





UNCONFINED COMPRESSION OR TRIAXIAL TESTS (ASTM D 2166)



The unconfined compression test and the triaxial tests are performed to determine the shearing strength of the soil, to use in establishing its safe bearing capacity. In order to perform the unconfined compression test, it is necessary that the soil exhibit sufficient cohesion to stand in an unsupported cylinder. These tests are normally performed on samples which are 6.0 inches in height and 2.85 inches in diameter. In the triaxial test, various lateral stresses can be applied to more closely simulate the actual field conditions. There are several different types of triaxial tests. These are, however, normally performed on constant strain apparatus with a deformation rate of 0.05 inches per minute.

CONSOLIDATION TEST (ASTM D 2435)



The purpose of this test is to determine the compressibility of the soil. This test is performed on a sample of soil which is 2.5 inches in diameter and 1.0 inch in height, and been trimmed from relatively has "undisturbed" samples. The test is performed with a lever system or an air activated piston for applying load. The loads are applied in increments and allowed to remain on the sample for a period of 24 hours. The consolidation of the sample under each individual load is measured and a curve of void ratio vs. Pressure is obtained. From the information obtained in this manner and the column loads of the structure, it is possible to calculate the settlement of each individual building column. This information, together with the shearing strength of the soil, is used to determine the safe bearing capacity for a particular structure.



REVISED TO ASTM D4318 ATTERBERG LIMITS (ASTM D423 AND D424)

These tests determine the liquid and plastic limits of soils having a predominant percentage of fine particle (silt and clay) sizes. The liquid limit of a soil is the moisture content expressed as a percent at which the soil changes from a liquid to a plastic state, and the plastic limit is the moisture content at which the soil changes from a plastic to a semi-solid state. Their difference is defined as the plasticity index (P.I. = L.L. - P.L.), which is the change in moisture content required to change the soil from a "semi-solid" to a liquid. These tests furnish information about the soil properties which is important in determining their relative swelling potential and their classifications.



MECHANICAL ANALYSIS (ASTM D422)

This test determines the percent of each particle size of a soil. A sieve analysis is conducted on particle sizes greater than a No. 200 sieve (0.074 mm), and a hydrometer test on particles smaller than the No.200 sieve. The gradation curve is drawn through the points of cumulative percent of particle size, and plotted on semi-logarithmic paper for the combined sieve and hydrometer analysis. This test, together with the Atterberg Limits tests, is used to classify a soil.





NATURAL MOISTURE CONTENT (ASTM D2216)

The purpose of this test is to indicate the range of moisture contents present in the soil. A wet sample is weighed, placed in the constant temperature oven at 105° for 24 hours, and re-weighed. The moisture content is the change in weight divided by the dry weight.



PROCTOR TESTS

The purpose of these tests is to determine the maximum density and optimum moisture content of a soil. The Modified Proctor test is performed in accordance with ASTM D1557. The test is performed by dropping a 10-pound hammer 25 times from an 18-inch height on each of 5 equal layers of soil in a 1/30 cubic foot mold, which represents a compaction effort of 56,250 foot pounds per cubic foot. The moisture content is then raised, and this procedure is repeated. A moisture density curve is then plotted, with the density on the ordinate axis and the moisture on the abscissa axis. The moisture content at which the maximum density requirement can be achieved with a minimum compactive effort is designated as the optimum moisture content (O.M.C.). The Standard Proctor test is performed in accordance with ASTM D698. This test is similar to the Modified Proctor test and is performed by dropping a 5.5 pound hammer 25 times from a height of 12 inches on 3 equal layers of soil in a 1/30 cubic foot mold, which represents a compaction effort of 12,375 foot pounds per cubic foot. This test gives proportionately lower results than the Modified Proctor test.

		PROCTOR	TEST	REP	ORT			
15	"" H		ΠΠ	ΠN	III	TT	m	
	114		\rightarrow	$\langle \rangle$				
tys set	118				//			
Try and	for the					X		
1.	104						\mathbf{X}	Mr tor
Tes	t gancif (narts	10 12.0 Milte mi ASTre D Diss-et a	15 rr pastier inthad (),	17.5		22	<u></u>	
Class? Depth	Citize Vieta	ANDITO	Molat.	\$x.0.	34	91	3/8 10	1 ÷
_	-	HET HERATS			1	ATENTAL	NO.	Tim
2	Sectional d		par :		-	n tean	CLAY als	n-
Truit Fruit	er so. 12545 er: 20 er: Los ter 1518 forr	Clief) Business i atime Designation me - TP1, 32, 4.01	4.0		8 0 1 1 0 1	finally Facility	aa) /11-	CN-87
					1.00			





ſ	CLIEN	Т						JOB	NO.										
	Palest	ine	-He	oll	ansł	burg Joint Sewer District					1834	104							
╞	PROJE	СТ						BOF STA	RING <u>RTED</u>	2/	28/1	8	BORII COMI	NG PLETI	ed 2	2/28	/18		1
	Soil S	tud	y fo	or	Pro	posed Wastewater Treatment Lagoons,		DRI	LLER		(łc	METH	10D 3	1/4'	" H	SA	Bor	ing No.
	Holla	nsb	urg	g- A	Arca	inum Road, Hollansburg, Ohio		TYP	ED BY	7					1, 1		511	Sheet	- 1 of 1
ł						PROJECT LOCATION				ME								Sheet	
			Ш		7 D	LAT. 39°59'51" LONG. 84°47'37"		S			IN IS								
	Ŧ	NO.	TYP	RY	LOC	SURFACE ELEVATION 1133.7'		TNU											KS
	HLGE	PLE	ER	OVE	HIC	As shown on Boring Location Plan.		COI											1AR
	DI	AM	MPI	SEC	RAP	It has been necessary to interpolate between samples. Therefore, the contacts between		ΜQ											REN
		N	SA		5	the various soil strata should not be taken as		BI		_		N	ALU	E, blo ☆—	ws/fi	t.			
				-	A. 1. 1	VISUAL CLASSIFICATION OF THE MATERIAL			10) 2	20 3	0	40 5	<u>50 e</u>	60	70	80	90	
	-	-			<u>, </u>											_			
	1.0-					gravel) - moist	2	`											
	2.0-						'	3	\diamond^6										
	3.0-	-																	
	4.0	-				Very stiff brown sandy lean CLAY (trace gravel)	8									+			
	4.0	2A				- moist	1	1			22								
	5.0-	-									ľ								
	6.0-	-					6												
	7.0-	3A					•	7			16								
	-	-						9		\diamond									
	8.0-	-				Vary stiff gray sandy lean CLAV (trace gravel)													
	9.0-	4A				moist	⁵	7			16								
	10.0-					Bottom of boring at 10.0 feet		9		\diamond						_			
	- 11.0-	-																	
7/30/18	12.0-	-																	
Printed:	13.0-	-																	
Date F		-																	
GIN.GD	15.0-	-																	
NEWLO	- 16.0	-																	
e Used:	- 17.0-	-																	
<u>Γemplat</u> €	- 18.0-	-																	
GINT	- 19.0-	-																	
404.GP	20.0-	-																	
0.: 183	21.0-	-																	
eport N	22.0-	-																	
GIN R		<u> </u>		_ L		±	<u></u>		⊥ _ ⊥		J	·	· 上	±		_ [1
				W	ATE	R LEVEL MEASUREMENTS		A	-SPL	IT S	SPO0	N				E	Bowser-	Morner, Inc	 c.
ed: NE								B	-RO								Tele	ephone:	
ort Us			I	NI	ΓΙΑΙ	DEPTH DATE NONE		ט L מ	—SHE —SOI	L PF	r IUE ROBF	ε					PO	hax:	D
VT Rep	AT	CON	льг.	ET	ION	NONE ¥ 2/28/2018		Ē	—AU	GER	CUT	TINC	S		3	× .	MO	RNE	R
Ð			(DTF	HER	N/A 및 0.5HRS		: F	-so	NIC									

Γ	CLIEN	Т							JOB	NO.										
1	Palest	ine-	Но	llans	burg Joint	Sewer Distri	ct					1834	04							
	PROIE	СТ							BOR STA	ING RTED	2/2	27/18	BC B CO	ORINO OMPL	G ETEL	o 2/2	7/18			2
	Soil St	tudv	v fo	r Pro	posed Was	stewater Tre	atment Lago	ons,	DRI	LLER	_, .	<u>ь</u>	M	ETHC)D 3 1/	4.1.1			Rori	$\frac{2}{ng No}$
Î	Holla	nsbi	urg-	Arca	anum Road	, Hollansbur	g, Ohio	,	TYP	ED BY	r	a	c		31/	4 1	пза		DOII	
												c	r					S	heet	1 of 1
					LAT 39	PROJECT LOC 9°59'51'' LOI	CATION NG 84°47'3	57"		COM	IMEN	VTS								
		j.	YPE	0G	SURFACE E	LEVATION	1132	.4'	NTS											S
	HT	E N	R T	CL	A1	BORING LOC	ATION		no											RK
	DEP	MPL	PLE	DHH	It has been	necessary to in	terpolate betwe	en	A C											EMA
		SAI	AM	GRA	samples. T	herefore, the co	ontacts between		TO				N VA	LUE,	blows	s/ft.				RI
			S		absolute.	son suata snot		as	щ	10	_			$-\diamond$				-		
				<u>x 1/</u> .	VISUAL CL	<u>ASSIFICATION</u> [14")	OF THE MATE	RIAL		10) 2	0 30) 4(<u>) 50</u>	60	70) 80	90)	
	- 1.0-			<u>17</u> . <u>x 1</u>	Ś	· ·														
	-	14			Medium sti	ff brown lean CL	AY with sand (tr	ace	3											
	2.0-				graver) - m	5151			.4		5									
	3.0-																			
	-								4											
	4.0-	2A			Loose brow	n clayey SAND	with gravel (trace	:	4	~8	3									¥
	5.0-								4											Ā
	- 60-						6.00													
		3.4			(Becomes r	nedium dense at	5.0')		5											
	7.0-								, 10		\diamond	[7								
	8.0-																			
	-								7											
	9.0-	4A			Very stiff g	ray sandy lean C	LAY (trace grave	1) -	9			_23								
	10.0-				E	Bottom of boring	at 10.0 feet		14						-	-				
	- 11.0-																			
/30/18	-																			
ed: 7	12.0-																			
e Print	13.0-																			
DT Date	- 14.0 -																			
OGIN.G	15.0-																			
: NEWL	- 16.0-																			
ate Usec	17.0-																			
T Templ	18.0-																			
-) GIN	19.0-																			
3404.GI	20.0-																			
lo.: 16	21.0-																			
port N	- 22 0																			
N Re	-2.0	L_	LL	L	⊥							[[
				(X/ A TT	PIEVEI M				Δ	-SPI	IT S	POON	1] [Bows	er-Mor	ner. Inc	
- NEV				WAII	SK LEVEL IVIE	ASUKEIVIEN IS	,		B	-R00	СКС	ORE	-						,	
t Usec					DEPTH	DATE	<u>.</u>		⊠ c	—SHE	ELBY	TUB	Ξ				Т	elepho Fax:	ne:	
Repon		<u>~~</u> .		IITIAL	4.5	_ <u><u></u><u>2/27/20</u></u>)18		D	-SOI		OBE					B	DW	SE	R
GINT	AI	CON	nPLE O	THER	<u> </u>	<u>≭_∠ı∠ı/20</u> ⊈ N/A	10	[:	F	-SOI		0011	1100			1	M	OR	NE	R.

Γ	CLIEN	T							JOB	NO.										
	Palest	ine	-Ho	lle	ansb	ourg Joint S	Sewer District		BOR	ING		1834	04 B	ORIN	G			_		
	PROJE	CT							STA	RTED	2/	27/1	8 <u>C</u>	OMPL	LETE	D 2/2	27/18	_		3
	Soil St Hollar	tud	y fo urg	r]	Proj	posed Wast num Road	ewater Treatn Hollansburg	nent Lagoons, Obio	DRI	LLEK		d		ETH	<u>3</u> 1	/4"]	HSA		Bori	ng No.
	1101141	130	urg		ii ca	num Koau,	fionansburg,	Ollio	TYP	ED B	Y	C	r					S	heet	1 of 1
						IAT 39	PROJECT LOCAT	TON 84°47'37''		CON	(ME)	NTS								
		.	YPE	Х	OG	SURFACE EL	EVATION	1131.7'	STV											Ø
	HT	E N	RT	VER	ICL	As shown or	BORING LOCAT	ION Plan	L NO											ARK
	DEF	MPI	IPLE	20	APH	It has been n	ecessary to interp	olate between	D M O											EM/
		SA	SAN	Z	GR	the various s	oil strata should r	not be taken as	BLC				N VA	ALUE	, blov	vs/ft.				К
						absolute. VISUAL CLA	SSIFICATION OF	THE MATERIAL		1	0 2	0 3	0 40	-0) 6	0 7	0 80	- 9(0	
	-			<u>\</u>		TOPSOIL (1	0")													Ţ
	1.0-					Medium stiff gravel) - mo	f brown lean CLAY ist	with sand (trace	3											
	2.0-	1A							4		>10									_
	3.0-																			Ŧ
	-					Medium den	se brown clayey SA	ND with gravel	12											Ā
	4.0	2A				Very stiff bro	s) - wet own sandy lean CLA	AY (trace gravel)	10			23								
	5.0-					- moist (Sand seam a	at 4.6')													
	6.0-					Very stiff gra	ay sandy lean CLAY	Y (trace gravel) -	8											
	7.0-	3A				moist (Sand seam a	at 7 0')		7			21								
	- 8.0-					(Build Bouili						ř								
	-								8											
	9.0-	4A				(Sand seam a	at 9.0')		9			20								
	10.0-			_/	<u> </u>	Bo	ttom of boring at 10	0.0 feet				ř								
8	11.0-																			
7/30/	- 12.0																			
rinted:	- 13.0-																			
Date F	- 14.0																			
GIN.GD	- 15.0 -																			
NEWLO	- 16.0 <i>-</i>																			
Osea: I	- 17.0																			
emplate	- 18.0-																			
	- 19.0																			
14.GLJ	- 20.0																			
18340	_0.0 - 21.0_																			
OLL NO.	- 21.0																			
N Kep	22.0-	Ľ_				l											L			
				W	ATF	R LEVEL MEA	SUREMENTS		A	—SP	LIT S	POOI	N				Bows	er-Mor	ner, Inc.	
									В	-RO	СКС	ORE					т	elepha	one:	
ort Us(лт	ΊΔΙ	DEPTH	DATE ∇ 2/27/2018		C ח	—SH —S∩	ELBN II PF		E				D.	Fax:		D
II Kep	AT	CON	льгі	ETI	ION	2.6	<u><u> </u></u>	_	E	-AU	GER	CUTI	INGS	5			M	OR	NE	R.
ЧЫ			С	T⊦	IER	0.5	I 24HRS		F	-so	NIC									0.27



CLIEN	Т				JOB	NO.									
Palest	ine-	Hol	lans	burg Joint Sewer District			1	834	04						
PROIF	СТ				- BOR STA	LING RTED	2/2	7/18		RING MPLE	fed 2	2/27/1	18		5
Soil S	tudy	y for	Pro	pposed Wastewater Treatment Lagoons,	DRI	LLER		h	ME	THOD	R 1/A	" нс	٨	Bor	J ing No
Holla	nsbi	ırg-	Arc	anum Road, Hollansburg, Ohio	TYP	ED BY		u		•	, 1/4	115	A		1 . 6 1
						1		c	r					Sheet	I of I
				LAT 39°59'51" LONG 84°47'37"			MEN	TS							
	j.	YPE	0G	SURFACE ELEVATION 1134.6'	STN										S
HT	E N	R T VER	CL	BORING LOCATION	UO										. RK
DEP	MPL	PLE	Ηď	It has been necessary to interpolate between	ΝC										EMA
	SAI	AM	GRA	samples. Therefore, the contacts between	TO				N VAL	UE, bi	lows/f	t.			RI
		S		absolute.	щ					-\$-					
			<u>x 1/</u>	VISUAL CLASSIFICATION OF THE MATERIAL		10	20	30	<u>) 40</u>	50	60	70	80	90	
1.0-			////	Medium stiff brown lean CLAY with sand (trace							+				Ţ
-	1 1			gravel) - moist	3										
2.0-					4										
3.0-															¥
-			////	Very stiff brown sandy lean CLAY (trace gravel)	7		_	-+		+	+	_			
4.0-	2A			- moist	, 9		1	7							
5.0-					8		\diamond	,							
-															
6.0-					6										_
7.0-	3A			(Becomes gray at 6.5) Medium dense brown SAND with gravel (some	<u>-13</u> 13			\wedge^2	6						¥
80				clay, some silt) - wet	10			Ť							
- 8.0)	(Trace exhibits at 9.5')	10										
9.0-	4A				9		15								
10.0-				Stiff gray sandy lean CLAY (trace gravel) -	6		\diamond^{1}	,							
-															
11.0-															
12.0-															
-															
13.0-				(December 4) (Sect 12, 5)	-										
14.0-	5A			(Becomes very suif at 13.5)	5 7										
15.0-					. 9		$\diamond^{\mathbf{I}}$	3							
				Bottom of boring at 15.0 feet											
16.0-															
17.0-															
-															
18.0-															
19.0-															
20.0-															
- 20.0															
21.0-															
22.0-															
	L _		L	→		∟_⊥.		1_					· 上	⊥	l
		v	VATI	ER LEVEL MEASUREMENTS	A	—SPLI	IT SF	200				Во	wser-N	lorner, Inc	2.
		•			В	-ROC	кс	ORE					Tolor	hono	
				DEPTH DATE	∑ c	-SHE	LBY	TUBI	Ξ				Fa	ax:	
	~~•			$\begin{array}{c c} 6.8 \\ \hline 2.0 \\ \hline \end{array} 2/27/2018 \\ \hline \end{array}$	D ∎ ⊏			OBE	INCS			E	301	NSE	R
	CON	IFLE OT	HER	$\begin{array}{c c} 2.3 \\ \hline 0.8 \\ \hline \end{array} \begin{array}{c} 24 \\ \hline \end{array} \begin{array}{c} 24 \\ \hline \end{array} \begin{array}{c} 1 \\ \hline \end{array} \end{array} \begin{array}{c} 1 \\ \hline \end{array} \begin{array}{c} 1 \\ \hline \end{array} \end{array} \end{array} \end{array} \begin{array}{c} 1 \\ \hline \end{array} \end{array} \end{array} \end{array} \begin{array}{c} 1 \\ \hline \end{array} \end{array} \end{array} \end{array} \end{array} \end{array} \end{array} \begin{array}{c} 1 \\ \hline \end{array} \end{array}$.■」 ⊑ 333 F	-SON		1100			-	N	10	RNE	R.

NEWLOGIN.GDT Date Printed: 7/30/18 ato la m 183404 GP.I GINT Te

GINT Report Used: NEWLOGIN Report No.

ſ	CLIEN	Т					JOB	NO.										
	Palest	ine	-Ho	llan	sb	ourg Joint Sewer District	Don	nic		1834	104							
$\left \right $	PROJE	CT					BOR STA	RING RTEE	b 2/	27/1	8 C	COMP	IG LETE	ED 2/2	27/18			6
	Soil St	tudy	y fo	r Pı	.ol	posed Wastewater Treatment Lagoons,	DRI	LLER		(ic N	/IETH	OD 31	1/4"	HSA		Bori	ing No.
	Holla	nsb	urg	-Are		num Road, Hollansburg, Ohio	TYP	ED B	Y		er					s	heet	1 of 1
F						PROJECT LOCATION		CON	MME	NTS	-							
			ΒE	Ċ	,	LAT. 39°59'51" LONG. 84°47'37"	IS											
	H	NO S	TY			BORING LOCATION	NN.											RKS
	EPT	4PLF	LER			As shown on Boring Location Plan.	A CC											MAJ
	Ц	SAN	AMF	RA		samples. Therefore, the contacts between	TOV				N V	ALUF	Ebloy	vs/ft.				RE
			S		,	absolute.	щ					<	>			-	_	
ŀ				<u>st 1</u> ,	. <u>'</u> .	VISUAL CLASSIFICATION OF THE MATERIAL TOPSOIL (8")			0 2	20 3	0 4	05	06	0 7	0 80) 9	0	
	1.0-					Stiff brown lean CLAY with sand (trace gravel) -	5											¥
	- 20-	1A				moist	5		11									-
	2.0						6		¢''									Ŧ
	3.0-																	∇
	4.0-	24		<i>[]]</i>	Ŋ	(Becomes soft at 3.5') Very loose brown clayey SAND (trace gravel) -	3											-
	- 50-	2A				wet	23	$ \diamond^5$										
	- 5.0																	
	6.0-	2.				Very stiff gray sandy lean CLAY (trace gravel) - moist	5											
	7.0-	JA				(Sand seam at 6.6')	11			\diamond^{22}								
	8.0-					(Recomes hard at 8.5')	10											
	9.0-	4A				(Decomes hard at 0.57)	16					36						
	10.0-				///	Bottom of boring at 10.0 feet												
)/18	11.0-																	
d: 7/30	12.0-																	
e Printe	- 13.0																	
DT Dat	- 14.0 –																	
OGIN.G	15.0-																	
INEWI	- 16.0-																	
te Used	- 17.0-																	
Templa	- 18.0-																	
J GINT	- 19.0-																	
3404.GP	20.0-																	
o.: 183	- 21.0																	
eport N	- 22.0																	
GIN R		<u> </u>	<u> </u>	· L			·	L	L	J	·	L	L	J	LL			
EWLO				WAT	Έŀ	R LEVEL MEASUREMENTS	A	—SP	LIT S	POO	N				Bows	er-Mor	ner, Inc	
sed: N							В			ORE					I	elepho	one:	
port U.			١N	IITIA	L			—SC		ROBE	· L				B		ISE	R
NT Re	AT	CON	/IPLE	TIO	N	<u>2.2</u> <u>1</u> <u>2/27/2018</u>	E	-AU	IGER	CUT	TING	S			M	OR	NE	R.
Ξ			0	THE	R	1.2 ¥ 24HRS	🔆 🔆 F	-sc	NIC						128	100	12.7	100

Γ	CLIEN	Т					JOB	NO.										
1	Palest	ine	-Ho	llans	sbu	rg Joint Sewer District				1834	04							
		СТ					BOR STA	ING RTFF	2/	27/1	8 B C	ORINO OMPL	G ETE	р 2 /2	27/18			7
5	Soil St	cı tud	v fo	r Pr	on	osed Wastewater Treatment Lagoons.	DRI	LLER	, _,	<u> </u>		ETHC				-	Dori	$\frac{1}{n \alpha N \alpha}$
Ĩ	Holla	nsb	urg	-Arc	an	um Road, Hollansburg, Ohio	TYP	ED B	Y	(31	./4	HSA	-	DOII	ng No.
										(er					Sh	ieet	1 of 1
					Т	PROJECT LOCATION 39°59'51'' LONG 84°47'37''		CON	AME	NTS								
			YPE	0G K	s	SURFACE ELEVATION $1135.6'$	STV											ζ Λ
	ΗT	E N	L	CL		BORING LOCATION	U U											RK
	DEP	MPL	PLE	DHI T	Ī	t has been necessary to interpolate between	A C											EMA
	Γ	SAI	AM	GRA GRA	S	amples. Therefore, the contacts between	TO				N VA	ALUE.	blow	vs/ft.				RI
			S	Ĭ	a	bsolute.	щ		_			$-\diamond$				-		
			+	<u>714</u>	1	/ISUAL CLASSIFICATION OF THE MATERIAL TOPSOIL (12")		1	0 2	0 3	0 4	0 50	6	0 7	0 80	90		
	- 10-			1/ 1/	·/,·													
	-	1 1				Medium stiff brown lean CLAY with sand (trace gravel) - moist	3		_									¥
	2.0-					Loose brown silty SAND (some clay, trace	4	\diamond	8									
	3.0-					gravel) - moist												Ā
	-					(Becomes medium dense at 3.5')	7											
	4.0-	2A					7		1	6								
	5.0-						9		\$'									
	-																	∇
	6.0-					(Becomes wet at 6.0')	5											- <u>¥</u> -
	7.0-	3A					8 0		\diamond	17								
	-						5		~									
	8.0-				··· //	Vous stiff may and loss CLAV (turse mays)	-											
	9.0-	4A				moist	11											
	- 10.0-					(Sand seam at 9.5')	15			\diamond^{\prime}	.0							
	-																	
18	11.0-																	
7/30	12.0-																	
inted:	-																	
ate Pr	13.0-																	
ŭ L	14.0-	54				(Sand seam at 14.0')	6 9			0.1								
SIN.GI	-	511				(12			\diamond^{21}								
MLOG	- 15.0					Bottom of boring at 15.0 feet												
NE	16.0-																	
Usec	17.0-																	
nplate	-																	
T Ten	18.0-																	
UU	19.0-																	
4.GP,	- 20.0																	
18340	- 20.0																	
No	21.0-																	
eport	22.0-																	
N N N		L _			⊥-		I <u> </u>	L	L	I <u> </u>	L I				L L			
				WAT	ER	LEVEL MEASUREMENTS	A	—SP	LIT S	POO	N] [Bows	er-Morn	er, Inc.	
in S S							В	-RC	оск с	ORE					-	olonha		
t Use						DEPTH DATE	∑ c	—SH	ELBY	(TUB	Е					Fax:	ю.	
Repor		~~·	11			$6.0 \qquad \qquad$	D	-SC		ROBE					B	WC	SE	R
GINT -	AI	CON	/IPLE 0		יי_ ז	<u></u> <u></u> <u></u> <u></u> <u></u> <u>_</u> <u>_</u> <u>_</u> <u>_</u> <u>_</u> <u></u>	F	-SC		001	invG2	,		1	M	OR	NE	R

Γ	CLIEN	Г					JOB	NO.										
	Palest	ine	-Ho	lla	nsł	burg Joint Sewer District				1834	<u>404</u>							
-	PROIF	СТ					BOF STA	RING RTED	2/	28/1	8	SORIN COMP	IG LETE	ED 2 /2	28/18	;		8
	Soil St	tud	y fo	r l	Pro	posed Wastewater Treatment Lagoons,	DRI	LLER			de N	AETH	OD 3	1/4"	нял		Bori	o ing No.
	Hollaı	nsbi	urg	-A	rca	num Road, Hollansburg, Ohio	TYP	ED B	Y				5	1/7	115A		bon	1 of 1
						DROJECT LOCATION			0.07		cr					3	neet	1 01 1
			[1]			LAT. 39°59'51 " LONG. 84°47'37 "			/IME	NIS								
		ġ.	LI N	Ż	00	SURFACE ELEVATION 1134.7'	Ĩ											S
	PTH	LEJ	ER	ΛE	IIC	As shown on Boring Location Plan.	COL											AR
	DE	MP	APL	Э Ц	APF	It has been necessary to interpolate between	M M											REM
		S	SA	×	GR	the various soil strata should not be taken as	BL(N V	ALUE	E, blov	ws/ft.				Н
						absolute. VISUAL CLASSIFICATION OF THE MATERIAL		1	0 2	20 3	30 4	$\frac{1}{10}$	$\rightarrow - 6$	50 7	0 80	-) 9	0	
	-					TOPSOIL (6") Medium stiff brown lean CLAX with sand (trace												
	1.0-					gravel) - moist	4											
	2.0-	1A					4		10									¥
	-						6											
	3.0-																	Ā
	4.0-	2A					3 4		8									
	- 5.0-						4	\diamond	0									
	-																	∇
	6.0-					Very loose brown silty SAND (trace clay, trace	1											Ŧ
	7.0-	3A					1	\diamond^5										
	- 8.0-																	
	-					(Becomes medium dense at 8.5')	3											
	9.0-	4A					5		. 12									
	10.0-			4	////	Stiff gray sandy lean CLAY (trace gravel) -	7		\diamond									
	- 11 0					Bottom of boring at 10.0 feet												
30/18																		
// :pe	12.0-																	
Printe	13.0-																	
Date	- 14.0																	
IN.GD	- 15.0-																	
-MLOC	-																	
sed: NE	16.0-																	
plate U	17.0-																	
AT Tem	18.0-																	
PJ GIN	19.0-																	
3404.G	20.0-																	
0.: 18	21.0-																	
sport N	- 22.0-																	
SIN R		L _				·	I <u></u>			J	L		L	J	L		L]	
				W	ATF	R LEVEL MEASUREMENTS	A	—SP	LIT S	SPO0	N				Bows	er-Mo	rner, Inc	
d: NE				1			В	-RO	CK	CORE					-	Falant	one.	
rt Use								-SH	ELB	Y TUE	BE					Fax	:	23
Repo	ΔΤ	CON	ᅨ	Tוע דו	IAL ON	$\begin{array}{c c} \underline{0.0} & \neq \underline{2/28/2018} \\ 3.5 & \mathbf{V} & 2/28/2018 \end{array}$	D F	—SO —AU	IL PF GER		TING	S		\mathbf{x}	B	ON	ISE	R
GINT	AI		0 - LE	- 11 TH	IER	1.8 ¥ 2.5HRS	F	—so	NIC			-		1	M	OR	NE	R.

ſ	CLIEN	T								JOB	NO.										
	Palest	tine	-H	oll	ans	burg Joint	Sewer Dis	strict					1834	104							
	PROIE	CT								BOF STA	RING RTEI	2	/28/1	8	BORIN COMPI	'G LETEI	d 2 /2	28/18	3		0
	Soil S	tud	v f	or	Pro	posed Wa	stewater T	reatment l	Lagoons,	DRI	LLER				METH		///!!	пет		Bor	9 ing No
	Holla	nsb	urg	g-A	Arca	anum Road	l, Hollansk	ourg, Ohio	8 ,	TYP	ED B	Y				31	/4	пза	-	DOI	
ł						_								er					S	heet	I of I
						LAT 3	PROJECT I 9°59'51'' 1	LOCATION	°47'37''		CO	MME	NTS								
		0	YPE	Х	OG	SURFACE I	ELEVATION		1134.1'	STN											S
	HT	E N	L L	VER	CL	A a al arm	BORING L	OCATION		l IO											. RK
	DEP	IdW	PLE	00	Ηď	It has been	necessary to	interpolate	between	M C											EMÆ
		SAJ	MM	RF	GRA	samples. T	herefore, the	e contacts be	tween	3LO				N V	ALUE	, blow	/s/ft.				RI
					-	absolute.								0	-	\rightarrow	. 7	0 0		0	
ł					<u>x 1/.</u> .	VISUAL CL	<u>ASSIFICATI</u> (8")	ON OF THE N	MATERIAL			0 2	20 3		10 5	0 60	0 7) 9	0	
	1.0-]				Stiff brown	lean CLAY	with sand (trac	e gravel) -	4											
	-	- 1 A			///	moist				4		11									
	2.0-									6		\Diamond^{11}									T
	3.0-	-																			
	-					(Becomes)	nedium stiff a	ut 3.5')		2											
	4.0-	2A				(Sand sean	n at 3.7')			4_		9									
	5.0-	-				Very stiff g	gray sandy lear	n CLAY (trace	e gravel) -	5											
	6.0-					moist				5											Ā
	7.0-	3A								7 10		\diamond	17								¥
	8.0-	-																			-
	9.0-	4A				(Becomes s) (Sand sean	stiff at 8.5') 1 at 9.0')			4		1	4								
	10.0-			F			Rottom of bori	ng at 10.0 feet		8		\diamond^{1}	ľ								
	- 11.0-	-						ing ut 10.0 ieet	, ,												
7/30/1	- 12.0																				
Printed:	- 13.0	-																			
T Date	- 14.0 -	-																			
GIN.GD	15.0-	-																			
NEWL(16.0-	-																			
e Used:	- 17.0-	-																			
Templat	18.0-	-																			
J GINT	19.0-	-																			
404.GP,	20.0-	-																			
lo.: 183	21.0-	-																			
Report h	22.0-										L										
NOGIN																					
				W	ATE	ER LEVEL M	EASUREMEN	NTS		A	-SP	PLITS	SPOO	N				Bows	ser-Mor	ner, Inc	
sed: N										B	-RC								Telepho	one:	
Sort U.				INI	TIAL	0EPTH	⊿ 2/28 ⊻	√1E /2018			-SC		ROBE	, _				P	C M	SE	P
IT Rep	AT	COI	ΛPL	.ET	ION	7.5	⊻ 2/28	/2018		E	—AL	JGER	CUT	TING	S			M	OR	NE	R.
UD			(ЭΤΙ	HER	2.6	⊻ 1.5	HRS		::::: F	-sc	ONIC									



Γ	CLIEN	Т					JOB	NO.										
]	Palest	tine	-Ho	olla	anst	ourg Joint Sewer District	BOR	ING		1834()4 BC	RINO	ĩ					
	PROJE	CT					STA	RTED	3/	2/18		MPL THO	ETE	D 3/2	2/18			10
	Soil S' Hollai	tud nsb	y fe urg	or 5-A	Proj Arca	posed Wastewater Treatment Lagoons, num Road, Hollansburg, Ohio	TYP	ED BY	v	de	c Ni		31	/4"	HSA		Bor	ng No.
							111		1	CI	r					S	heet	2 of 2
			ш			PROJECT LOCATION LAT. 39°59'51'' LONG. 84°47'37''	70	CON *Su	AMEI rfac	NTS :e elev	vatio	n rei	fers	to a	ın as	sum	ed	
	Η	NO.	TYP	£RΥ	LOG	SURFACE ELEVATION 93.2'*	INU	elev shov	atio wn d	on of 1 on the	100.0 Bor	' for ing	: the Loc	e bei atio	nchn n Ple	nark an.		KS
	EPT	IPLE	LER	IVOC	PHIC	As shown on Boring Location Plan.	V CO	~										MAR
	Ц	SAN	AMF	REC	GRA]	samples. Therefore, the contacts between	BLOV]	N VA	LUE,	blow	vs/ft.				RE
					-	absolute.	Н	1(0 2	20 30	40	$-\diamondsuit_{50}$	6	0 7	0 8	0 9	0	
	23.0-	-				Very stiff gray sandy lean CLAY (trace gravel) - moist								<u> </u>				Ā
	- 24 0	-					7											
	21.0	7A					12 13			\diamond^{25}	;							
	-25.0	-																
	26.0-	-																
	27.0-	-																
	28.0-	-																
	29.0-	8A				(Becomes hard at 28.5')	10 17					42						
	30.0-				/////	Bottom of boring at 30.0 feet	25				(`	>~~						
	- 31.0	-																
	- 32.0-	-																
	- 33.0-	-																
0/18	- 34.0-	-																
ed: 7/3	25.0-	-																
te Print		-																
DT Da	36.0-	-																
DGIN.G	37.0-	-																
NEWLO	38.0-	-																
Used:	39.0-	-																
mplate	40.0-	-																
INT Te	41.0-	-																
GPJ G	42.0-	-																
183404	- 43.0-	-																
t No.:	- 44 0	-																
Repor		-																
login	45.0-	-																
d: NEW	46.0-	-																
ort Use	47.0-	-																
VT Rep(48.0-	L_	L			II				[L	$-\bot$			L	L		
Б																		



Γ	CLIEN	CLIENT Palestine-Hollanshurg Joint Sewer District																
	Palest	tine	-Ho	lla	ansb	ourg Joint Sewer District	DOD	NIC		1834	04 D	ODIN	G					
	PROJE	СТ					STA	ING <u>RTED</u>	3/	1/18		OMP	LETE	D 3/	1/18			11
	Soil S Hollai	tud nsb	y fo urg	or -A	Proj	posed Wastewater Treatment Lagoons, num Road, Hollansburg, Ohio	DRI	LER	*	d		IETH	3 1	l/ 4''	HSA		Bor	ing No.
					ii cu	num rouu, ronnissurg, omo	ТҮР	ED BA	(c	r					S	heet	2 of 2
						PROJECT LOCATION		CON *Sur	(ME) rfac	NTS	vati	on re	ofore	to a	in ac	sum	ha	
		j.	YPE	ž	DOG	SURFACE ELEVATION 100.1'*	NTS	elev	atio	n of	100.	0' fo	r th	e bei	nchm	ark	cu	S
	HTG	DLE	ER J	OVEI	HIC I	BORING LOCATION As shown on Boring Location Plan.	COL	snov	wn (on th	е во	ring	Loc	atio	n Pla	ın.		IAR
	DE	IMA	MPL	RECO	RAPI	It has been necessary to interpolate between samples. Therefore, the contacts between	MO							(0)				REN
			SA		0	the various soil strata should not be taken as absolute.	BI		_		N VA	alue ──<	> —	vs/ft.		_		
┢	-	-		-	<u> </u>	VISUAL CLASSIFICATION OF THE MATERIAL Very stiff gray sandy lean CLAY (trace grayel) -		10) 2	0 30) 4	0 5	0 6	0 7	0 8	09	0	
	23.0-	-				moist	C											
	24.0-	7A					0 10			22								
	25.0-	-					12			\upharpoonright								
	26.0-	-																
	27.0-	-																
	- 28.0	-																Ţ
	- 29.0-	8				Very dense gray clayey SAND with gravel (trace silt) - wet	17											¥
	- 30.0					Dettern of basics at 20.0 fast	50/5"									\diamond	87	
	- 31.0-	-				Bottom of boring at 50.0 feet												
		-																
		-																
)/18		-																
ed: 7/3(34.0 - 35.0-	-																
ate Print		-																
GDT D	37.0-	-																
VLOGIN	- 38.0-	-																
ed: NE/	- 39.0	-																
plate Us	- 40.0-	-																
NT Tem	- 41.0-	-																
3PJ GI	- 42.0	-																
183404.(- 43.0	-																
rt No.: 1	- 44.0	-																
N Repo	- 45.0-	-																
EWLOGI	- 46.0-	-																
Jsed: NE	- 47.0-	-																
Report (- 48.0-	· 																
GINT																		



GINT Report Used: NEWLOGIN Report No.: 183404.GPJ GINT Template Used: NEWLOGIN.GDT Date Printed: 7/30/18

Γ	CLIEN	Ţ				JOI	3 NO.									
	Palest	ine	-Hol	llan	sburg Joint Sewer District	BO	RING	18	3404	BORIN	١G		1/10			
	PROJE Soil S	CT tud	v fo	r Pr	onosed Wastewater Treatment Lagoons.	DR	ARTEE ILLER	3/1/ 1	18 da	<u>COMP</u> METH	OD	<u>D 3/</u>	1/18 115 A	-	1 Dorir	2
	Holla	nsb	urg-	Arc	anum Road, Hollansburg, Ohio	TY	PED B	Y	dc or		3	l/4''	HSA	SI	borii heet	1g NO. 2 of 2
F					PROJECT LOCATION		CON	MMENT	S							2 01 2
		0.	YPE	- DO	LAT. 39°59'51" LONG. 84°47'37" SURFACE ELEVATION 101.6'*	STV	*Su elev	rface over	elevat of 100	tion r).0' fo	efers or th	s to a e bei	n as nchm	sume ark	d	
	HTT	LE N	ERT	HCL	BORING LOCATION As shown on Boring Location Plan.	coul	sho	wn on	the B	oring	g Loc	catio	n Pla	n.		IARK
	DE	SAMI	AMPL	RAPI	It has been necessary to interpolate between samples. Therefore, the contacts between	LOW			N N	74111	E blor	ve/ft				REM
			S/		the various soil strata should not be taken as absolute.	B B		0 20	20	/ALUI	\rightarrow	x 5/11.	10 81			
	23.0-				Very stiff gray sandy lean CLAY (trace gravel) -					40 3				<u> </u>	,	
	- 24.0-					10										
		7A				9 10		\diamond^{19})							
		-														
	20.0 -															
	27.0-															
	28.0-				(Becomes hard at 28.5')	10										
	29.0-	8A				16			\diamond	34						
	30.0-				Bottom of boring at 30.0 feet											
	31.0-	-														
	32.0-															
ω	33.0-															
: 7/30/1	34.0-	-														
Printed	35.0-	-														
T Date	36.0-															
GIN.GD	37.0-															
VEWLO	38.0-	-														
Used: 1	39.0-															
emplate	40.0-															
GINT Te	41.0-															
4.GPJ	42.0-	-														
18340	43.0-															
ort No.:	- 44.0	-														
IN Rep	- 45.0-															
EWLOG	- 46.0	-														
Jsed: N	- 47.0-	-														
Report L	- 48.0-															
GINT	-		_												_	

CLIE	NT					JOB	NO.										
Pales	stine	-H	oll	anst	ourg Joint Sewer District	DOD	nic		1834	104 D		<u> </u>					
PROJ	ECT					BOR	ING RTEI	5	22/1	8 C	OMPL	G JETE	D 5/	22/18	3		13
Soil	Stud	y f	or	Pro	posed Wastewater Treatment Lagoons,	DRI	LLER	-		dc ^N	1ETHC	DD 31	l/4"	HSA		Bor	ing No.
попа	ansu	ur	g- <i>P</i>	агса	num Road, Honansburg, Omo	TYP	ED B	Y		er					S	heet	1 of 1
					PROJECT LOCATION		CO	MME	NTS	ľ					·		
		ΡH		Ŋ	LAT. 39°59'51" LONG. 84°47'37"	TS											
H			ER	CLC	BORING LOCATION												RKS
DEPT		PLEI	COV	PHI	As shown on Boring Location Plan. It has been necessary to interpolate between	N CC											MA
	SAN	AM	RE	GRA	samples. Therefore, the contacts between the various soil strata should not be taken as	3LO'				N V.	ALUE	, blov	ws/ft.				RE
					absolute.		1	0 -	20 3	0 4	-)	0 7	10 81		0	
	_			<u>7, 1</u> 7 - 77	TOPSOIL (8")		1) ()			9		
1.0	-				Stiff brown lean CLAY with sand (trace gravel) -	3											
2.0	1A				mont	5		11									
2.0	-					6		Ý									
3.0	-				(Becomes medium stiff at 3.5')	3											T
4.0	2A				(Beomes medium sum at 5.5)	2		5									Ŧ
5.0	-					4	^`										
6.0	_																¥
7.0	3A					3		7									Ţ
×.0	-					4											
8.0	-				Medium dense brown SAND (trace gravel) - wet	15											
9.0	4A					17				28							
10.0	_				Very stiff gray sandy lean CLAY (trace gravel) -												
8 11.0	_				inoist												
12.0	-																
all 13.0	-																
	- - 5 A					4			17								
15.0	-					10			u /								
16.0	_																
17.0	_																
emplat 18.0	_																
19.0	-					5											
20.0					Rottom of boring at 20.0 feet	12			\diamond^{21}								
21 0	_				Bottom of borning at 20.0 feet												
	-																
ada 22.0 ≚ ≤	-L_	L	ΤI		Ⅰ		L	L		L							
WATER LEVEL MEASUREMENTS						A-SPLIT SPOON Bowser-						ser-Mo	rner, Inc	:.			
													one:				
ort Us			INI	τιδι	DEPTH DATE 6.0 ⊻ 5/22/2018	C [<u>×</u>	–S⊦ –s∩	IELB'		BE				P	Fax	100	D
A A	гсо	MPL	_E7		7.0 ¥ <u>5/22/2018</u>	E	-AL	JGER	CUT	TING	5			M	OR	NF	R
GIN	OTHER 3.8 ▼ 7HRS F - SONI																











GRAIN SIZE DISTRIBUTION TEST DATA

Client: Palestine-Hollansburg Joint

Project: Soil Study - Water Treat Lagoons

Project Number: 183404

Location: B-2

Depth: 6.0' - 7.5'

Material Description: brown silty, clayey SAND with gravel

Liquid Limit: 22

USCS Classification: SC-SM

Testing Remarks: As Received

Moisture Content: 12.0%

Sample Number: S-3

Plastic Limit: 17 **AASHTO** Classification: A-2-4(0)

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
911.10	232.13	0.00	1.50	0.00	100.0	0.0
			1.00	25.52	96.2	3.8
			0.75	25.52	96.2	3.8
			0.50	77.43	88.6	11.4
			0.375	115.44	83.0	17.0
			#4	215.69	68.2	31.8
			#10	302.34	55.5	44.5
49.87	0.00	0.00	#20	9.46	44.9	55.1
			#40	13.88	40.0	60.0
			#60	17.75	35.7	64.3
			#100	20.84	32.3	67.7
			#200	24.06	28.7	71.3
			Hyd	rometer Teel I	Delle i	

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 55.5

Weight of hydrometer sample =50.02

Hygroscopic moisture correction:

Moist weight and tare = 46.29

Dry weight and tare = 46.24

Tare weight = 31.21

Hygroscopic moisture = 0.3% Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = -5.5 Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 152H

Hydrometer effective depth equation: L = 16.294964 - 0.164 - 0.164 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	к	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.5	29.0	23.8	0.0134	29.0	11.5	0.0455	26.5	73.5
2.00	21.5	26.0	20.8	0.0134	26.0	12.0	0.0329	23.1	76.9
5.00	21.5	23.0	17.8	0.0134	23.0	12.5	0.0212	19.8	80.2
15.00	21.5	19.0	13.8	0.0134	19.0	13.2	0.0126	15.3	84.7
30.00	21.5	17.0	11.8	0.0134	17.0	13.5	0.0090	13.1	86.9
60.00	21.5	15.0	9.8	0.0134	15.0	13.8	0.0064	10.9	89.1
120.00	21.0	13.5	8.2	0.0135	13.5	14.1	0.0046	9.1	90.9
250.00	21.0	12.0	6.7	0.0135	12.0	14.3	0.0032	7.4	92.6
1440.00	21.0	10.5	5.2	0.0135	10.5	14.6	0.0014	5.8	94.2

BOWSER-MORNER, INC.

4/12/2018

Cabbles		Grave				Sand				Fines		
Copples	Coarse	Fine	Tota	l Coa	rse Me	dium	Fine	Total	Silt	Clay	Total	
0.0	3.8	28.0	31.8	12	7 1	5.5	11.3	39.5	19.2	9.5	28.7	
	L		<u></u>		<u> </u>]					
D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	Dàn	Daz	
D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	Dgo		

Fineness Modulus	cu	C _c
3.35	513.19	0.65

BOWSER-MORNER, INC.




GRAIN SIZE DISTRIBUTION TEST DATA

Client: Palestine-Hollansburg Joint Project: Soil Study - Water Treat Lagoons

Project Number: 183404

Location: B-7

Depth: 6.0' - 7.5'

Material Description: gray silty SAND

Liquid Limit: NV

USCS Classification: SM

Testing Remarks: As Received

Moisture Content: 16.0%

Sample Number: S-3

Plastic Limit: NP AASHTO Classification: A-1-b

Dry Sample Ind Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
046.20	226.55	0.00	0.75	0.00	100.0	0.0
			0.50	8.58	99.0	1.0
			0.375	19.97	97.6	2.4
			#4	64.07	92.2	7.8
			#10	163.53	80.0	20.0
104.84	0.00	0.00	#20	27.22	59.3	40.7
			#40	55.10	38.0	62.0
			#60	72.17	24.9	75.1
			#100	79.88	19.1	80.9
			#200	84.06	15.9	84.1

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 80.0

Weight of hydrometer sample =105.05

Hygroscopic moisture correction:

Moist weight and tare = 58.25

Dry weight and tare = 58.20

Tare weight =28.22Hygroscopic moisture =0.2%

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = -5.5

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 152H

Hydrometer effective depth equation: L = 16.294964 - 0.164 - 0.164 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	к	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.0	24.0	18.9	0.0133	24.0	12.4	0.0468	14.4	85.6
2.00	22.0	22.0	16.9	0.0133	22.0	12.7	0.0335	12.9	87.1
5.00	22.0	20.0	14.9	0.0133	20.0	13.0	0.0215	11.4	88.6
15.00	21.5	16.5	11.3	0.0134	16.5	13.6	0.0127	8.6	91.4
30.00	21.5	14.0	8.8	0.0134	14.0	14.0	0.0092	6.7	93.3
60.00	21.5	12.0	6.8	0.0134	12.0	14.3	0.0065	5.2	94.8
120.00	21.5	11.0	5.8	0.0134	11.0	14.5	0.0047	4.4	95.6
250.00	21.5	10.0	4.8	0.0134	10.0	14.7	0.0032	3.7	96.3
1440.00	21.0	9.0	3.7	0.0135	9.0	14.8	0.0014	2.8	97.2

4/12/2018

Cabbles		Grave				Sand				Fines	
	Coarse	Fine	Tota	l Coa	rse Me	dium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.8	7.8	12.	2 4	2.0	22.1	76.3	11.3	4.6	15.9
D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus	Cu	Cc	
2.63	53.90	7.13	

BOWSER-MORNER, INC. _





GRAIN SIZE DISTRIBUTION TEST DATA

Client: Palestine-Hollansburg Joint

Project: Soil Study - Water Treat Lagoons

Project Number: 183404

Location: B-13

Depth: 8.5' - 10.0'

Material Description: brown silty SAND

Liquid Limit: NV

USCS Classification: SM

Testing Remarks: As Received

Moisture Content: 21.8%

Sample Number: 4A

Plastic Limit: NP **AASHTO Classification:** A-2-4(0)

Dry Sample nd Tare grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained	
474.84 118.66	118.66	0.00	0.75	0.00	100.0	0.0	
		0.50	10.76	97.0	3.0		
			0.375	12.19	96.6	3.4	
			#4	13.57	96.2	3.8	
			#10	14.72	95.9	4.1	
124.91	0.00	0.00	#20	1.44	94.8	5.2	
			#40	10.08	88.1	11.9	
			#60	39.72	65.4	34.6	
			#100	81.41	33.4	66.6	
			#200	104.58	15.6	84.4	

Hydrometer test uses material passing #4

Percent passing #4 based upon complete sample = 96.2

Weight of hydrometer sample =125.03

Hygroscopic moisture correction:

Moist weight and tare = 51.87 Dry weight and tare = 51.84

Tare weight = 31.65

Hygroscopic moisture = 0.1%

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = -6.5

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 152H

Hydrometer effective depth equation: L = 16.294964 - 0.164 - 0.164 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	к	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.0	21.0	14.9	0.0133	21.0	12.9	0.0477	11.5	88.5
2.00	22.0	20.0	13.9	0.0133	20.0	13.0	0.0340	10.7	89.3
5.00	22.0	17.0	10.9	0.0133	17.0	13.5	0.0219	8.4	91.6
15.00	22.0	15.0	8.9	0.0133	15.0	13.8	0.0128	6.9	93.1
30.00	22.0	14.0	7.9	0.0133	14.0	14.0	0.0091	6.1	93.9
60.00	21.5	12.0	5.8	0.0134	12.0	14.3	0.0065	4.5	95.5
120.00	21.5	11.0	4.8	0.0134	11.0	14.5	0.0047	3.7	96.3
250.00	21.5	10.0	3.8	0.0134	10.0	14.7	0.0032	2.9	97.1
1440.00	21.0	10.0	3.7	0.0135	10.0	14.7	0.0014	2.8	97.2

6/29/2018

Deuldora	Cabbles		Grav	el			Sand	_		Fines	
Boulders	iders Cobbies		e Fine	e Tot	al Co	arse	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	4.1	4.	1 7	7.8	72.5	80.3	11.8	3.8	15.6
									·		
					U	L			· · · · ·	·	1
D _{5.}	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus	с _u	Cc
1.14	7.95	2.94







Moisture Content of Soil

ASTM (D-2216)



Client: Palestine-Hollansburg Joint SD Project: Soil Study - Water Treat Lagoons

Work Order No.: 183404 Date: 04/12/18

Boring	Sample			
Number	Number	Depth, (ft)	Depth, (m)	Moisture Content, (%)
B-1	1	1.0 - 2.5	0.3 - 0.8	28.5
	2	3.5 - 5.0	1.1 - 1.5	Not Tested
	3	6.0 - 7.5	1.8 - 2.3	9.6
	4	8.5 - 10.0	2.6 - 3.0	Not Tested
B-2	1	1.0 - 2.5	0.3 - 0.8	Not Tested
	2	3.5 - 5.0	1.1 - 1.5	13.9
	3	6.0 - 7.5	1.8 - 2.3	12.0
	4	8.5 - 10.0	2.6 - 3.0	14.3
B-3	1	10-25	03-08	20.2
D	2	35-50	11 - 15	Not Tested
	3	6.0 - 7.5	18 - 23	10.9
	4	8.5 - 10.0	2.6 - 3.0	12.9
B-4	1	10 - 25	03-08	Not Tested
	2	35-50	11 - 15	22.0
	3	60 - 75	18 - 23	14 0
	4	85 - 100	26 - 30	13.1
	5	13.5 - 15.0	4.1 - 4.6	Not Tested
B-5	1	10-25	03-08	24.3
	2	3.5 - 5.0	1.1 - 1.5	Not Tested
	3	6.0 - 7.5	1.8 - 2.3	11.4
	4	8.5 - 10.0	2.6 - 3.0	Not Tested
	5	13.5 - 15.0	4.1 - 4.6	12.8
B-6	1	1.0 - 2.5	0.3 - 0.8	25.2
	2	3.5 - 5.0	1.1 - 1.5	26.3
	3	6.0 - 7.5	1.8 - 2.3	Not Tested
	4	8.5 - 10.0	2.6 - 3.0	11.5
B-7	1	1.0 - 2.5	03-08	16.4
	2	3.5 - 5.0	11 - 15	Not Tested
	3	6.0 - 7.5	1.8 - 2.3	16.0
	4	8.5 - 10.0	2.6 - 3.0	13.8
	5	13.5 - 15.0	4.1 - 4.6	14.0
B-8	1	1.0 - 25	0.3 - 0.8	Not Tested
- •	2	3.5 - 5.0	1.1 - 1.5	22.8
	3	6.0 - 7.5	1.8 - 2.3	Not Tested
	4	8.5 - 10.0	2.6 - 3.0	15.4

Page 1

Moisture Content of Soil

ASTM (D-2216)



BOWSER MORNER

Client: Palestine-Hollansburg Joint SD Project: Soil Study - Water Treat Lagoons

Work Order No.: 183404 Date: 04/12/18

Boring	Sample		 Contraction from the second sec	
Number	Number	Depth, (ft)	Depth, (m)	Moisture Content, (%)
B-9	1	1.0 - 2.5	0.3 - 0.8	25.1
	2	3.5 - 5.0	1.1 - 1.5	Not Tested
	3	6.0 - 7.5	1.8 - 2.3	11.4
	4	8.5 - 10.0	2.6 - 3.0	Not Tested
B-10	1	1.0 - 2.5	0.3 - 0.8	Not Tested
	2	3.5 - 5.0	1.1 - 1.5	13.7
	3	6.0 - 7.5	1.8 - 2.3	Not Tested
	4	8.5 - 10.0	2.6 - 3.0	14.3
	5	13.5 - 15.0	4.1 - 4.6	Not Tested
	6	18.5 - 20.0	5.6 - 6.1	11.1
	7	23.5 - 25.0	7.2 - 7.6	Not Tested
	8	28.5 - 30.0	8.7 - 9.1	12.3
B-11	1	1.0 - 2.5	0.3 - 0.8	10.5
	2	3.5 - 5.0	1.1 - 1.5	Not Tested
	3	6.0 - 7.5	1.8 - 2.3	10.7
	4	8.5 - 10.0	2.6 - 3.0	Not Tested
	5	13.5 - 15.0	4.1 - 4.6	10.6
	6	18.5 - 20.0	5.6 - 6.1	Not Tested
	7	23.5 - 25.0	7.2 - 7.6	10.4
	8	28.5 - 30.0	8.7 - 9.1	Not Tested
B-12	1	1.0 - 2.5	0.3 - 0.8	Not Tested
	2	3.5 - 5.0	1.1 - 1.5	12.4
	3	6.0 - 7.5	1.8 - 2.3	Not Tested
	4	8.5 - 10.0	2.6 - 3.0	12.5
	5	13.5 - 15.0	4.1 - 4.6	Not Tested
	6	18.5 - 20.0	5.6 - 6.1	17.1
	7	23.5 - 25.0	7.2 - 7.6	Not Tested
	8	28.5 - 30.0	8.7 - 9.1	11.6

Moisture Content of Soil

ASTM (D-2216)



Client: Palestine-Hollansburg Joint SD Project: Soil Study - Water Treat Lagoons

Work Order No.: 183404 Date: 06/29/18

Boring	Sample			
Number	Number	Depth, (ft)	Depth, (m)	Moisture Content, (%)
B-13	1	1.0 - 2.5	0.3 - 0.8	15.7
	2	3.5 - 5.0	1.1 - 1.5	Not Tested
	3	6.0 - 7.5	1.8 - 2.3	14.9
	4	8.5 - 10.0	2.6 - 3.0	21.8
	5	13.5 - 15.0	4.1 - 4.6	Not Tested
	6	18.5 - 20.0	5.6 - 6.1	14.0
B-14	1	1.0 - 2.5	0.3 - 0.8	21.3
	2	3.5 - 5.0	1.1 - 1.5	Not Tested
	3	6.0 - 7.5	1.8 - 2.3	11.6
	3			25.0
	4	8.5 - 10.0	2.6 - 3.0	12.9
	5	13.5 - 15.0	4.1 - 4.6	Not Tested
	6	18.5 - 20.0	5.6 - 6.1	15.4
B-15	1	10-25	03-08	20.0
210	2	35 - 50	11 - 15	Not Tested
	3	60 - 75	18 - 23	15.8
	4	85 - 100	26 - 30	Not Tested
	5	135 - 150	41-46	12.1
	6	18.5 - 20.0	56 - 61	Not Tested
	Ŭ	10.0 20.0	0.0 0.1	Not rested
B-16	1	1.0 - 2.5	0.3 - 0.8	Not Tested
	2	3.5 - 5.0	1.1 - 1.5	19.1
	3	6.0 - 7.5	1.8 - 2.3	16.6
	3			10.4
	5	13.5 - 15.0	4.1 - 4.6	Not Tested
	6	18.5 - 20.0	5.6 - 6.1	12.9
B-17	1	1.0 - 2.5	0.3 - 0.8	16.4
	2	3.5 - 5.0	1.1 - 1.5	Not Tested
	6	6.0 - 7.5	1.8 - 2.3	12.1
	4	8.5 - 10.0	2.6 - 3.0	Not Tested
	5	13.5 - 15.0	4.1 - 4.6	10.9
	6	18.5 - 20.0	5.6 - 6.1	Not Tested





S91.51	137.9' ×1142.8 ×1141.8		3 136.5 × 1137.5 N
BORING LOCATION PLAN		PROJECT NO. 183404	
Soil Study for Proposed Watewater Treatment Lagoons, Hollansburg-Arcanum Road, Hollansburg, Ohio		SCALE GRAPHIC	
Client: Palestine-Hollansburg Joint Sewer District	3-18/SR	FIGURE NO.	BOWSER



ENGINEERING & ENVIRONMENTAL SERVICES:

Geotechnical Engineering Subsurface Exploration Civil Engineering Environmental Services Due Diligence Permitting

LABORATORY SERVICES:

Geotechnical Laboratories Construction Materials Laboratories Mineral Aggregates Concrete Stone & Masonry Asphalt Analytical Services Laboratories Industrial Minerals Product Testing Mechanical/Metallurgical Testing Calibration Services Chemistry Laboratory Consulting Geology Radon Reference Laboratory

CONSTRUCTION SUPPORT SERVICES:

General Construction Construction Quality Assurance Building Code Special Inspections Transportation Projects:

- Contractor QA/QC
- Material Supplier QA/QC

- Owner Quality Assurance

Materials Consulting:

- Construction Engineering



Palestine-Hollansburg Joint Sewer District Centralized Wastewater System Pre-Bid Meeting Notes – July 20, 2021

- I. The sign-in sheet of attendance is attached hereto.
- II. Project Overview:
 - 1. Mike Bruns, Engineer of Mote & Associates, Inc. reviewed the project scope and mentioned the following:
 - a. The project consists of three separate gravity sanitary collection systems (Palestine, Glen Karn & Hollansburg) along with two lift stations and a force main system to collect and transport all wastewater to the treatment facility located on the southwest side of Hollansburg. This work is contained in Contract A.
 - b. The treatment facility consists of an influent pump station with screening device, two lagoon structures, a SAGR filtering system and then UV disinfection prior to flows being transported through a storm sewer to outlet into an adjacent stream. This work is contained in Contract B.
 - d. Engineer is responsible to obtain all permits and they will be paid for by Owner with the exception of the plumbing permit that must be obtained by a Licensed Plumber.
 - e. Darke Rural Electric will be building the electric service to the wastewater treatment plant site. Dayton Power & Light will provide service at the two lift stations and appurtenances are already in place. Any cost related to the providing the electric service to the sites will be paid for by the Owner.
- III. Bidding Overview:
 - 1. Susan Laux of Mote & Associates, Inc. reviewed the bidding documents as follows:
 - a. The bids will be received at the office of Mote & Associates, Inc. on Thursday, August 12, 2021 until 1:00 PM at which time they will be opened and read aloud. The office is located at 214 West Fourth Street, Greenville, Ohio.
 - b. The project is bidding with three contracts 'A', 'B' and 'C'. Contract A includes the following:
 - Palestine sanitary gravity collection system and force main within the same trench and within the corporation limits;
 - Directional drilling of force main and gravity pipe under Spring Branch Creek in Palestine;
 - > Force main system from the Palestine corporation limit to Glen Karn;
 - Glen Karn sanitary gravity collection system and force main to be in the same trench;
 - Exploratory excavation in Glen Karn at the crossings of utility pipe lines along with crossing of same will consist of gas pipe lines (4) that cross in the vicinity of Glen Karn to determine the actual depth. This work shall be required to be completed prior to providing submittals showing structures, etc. and the ordering of materials in case they are significantly different in depth than the

Pipe Line Companies anticipate. A 72-hour notification to the utility companies is required when working in the vicinity of the pipe line crossings.

- Hollansburg sanitary gravity collection system and force main extension from the Glen Karn lift station to entry into the Hollansburg collection system;
- Installation of two lift stations, one at Palestine and one at Glen Karn and all related appurtenances to make them fully operational;
- Three Alternate bids that allow for a deduct to take all clean spoils to the WWTP versus only those needed to build the basins; cost to utilize 4" C900 DR14 pipe in lieu of 4" HDPE pipe; and use of a package lift station and all related appurtenances to make fully operational in lieu of the facility lift station. These Alternate Bids are optional and not required for a bid to be responsive.
- c. Contract 'B' will include all work located at the wastewater treatment facility site. Two Alternate bids are requested with one for construction of an effluent building and the second for the inclusion of a compressive media filter should the building be chosen for completion. These Alternate Bids are required to be submitted with all Contract 'B' bids and the bid will be considered non-responsive without these options being provided.
- d. Contract 'C' will include all work in both Contract 'A' and 'B' along with optional bids for Alternate Bids #1 through #3 and required bids for Alternates #4 and #5. Contractors can choose to bid only one Contract option, or both options, or all three options. The Owner will evaluate all bids received to determine which combination is the most advantageous for the project in regards to being the lowest and best.
- e. The substantial completion dates are as follows:
 - ➤ Contract A May 31, 2023
 - ➢ Contract B − July 31, 2023
 - Contract C July 31, 2023
- f. The Proposal Forms includes all documents that are required to be submitted in the Bid Packet.
- g. The Measurement & Payment Specification 01 20 00 provides an item-by-item description of the bid items along with what is to be included with each unit price bid.
- h. The project includes American Iron and Steel requirements as well as goals for use of MBE and WBE firms for materials and services.
- i. The project requires use of Davis-Bacon prevailing wages that are included in the Contract Documents Manual.
- j. A tentative Bid Award is anticipated to occur on July 17th in order to facilitate the submittals needed to meet funding requirements.
- IV. Addendums/Comments:
 - Susan commented that Addendum No. 1 will be distributed the week of July 26th and will include the Pre-Bid Meeting Notes and Sign-in Sheet along with the available Geotechnical Report and the Package Lift Station Technical Specification.

- V. Contractor Questions/Additional Comments:
 - 1. Traffic requirements for closure of US Route 36 through Palestine are still pending with ODOT. Further information will be supplied when known.
 - 2. Storm water permits will be required with both Contracts and are the responsibility of the Contractor to obtain and comply.
 - 4. Excavation work completed within the right-of-way/easement of the Texas Eastern Pipeline will require use of a smooth-nose bucket.
 - 5. Pressure laterals crossing County roads shall be required to be bored.
 - 6. The trench backfill detail reflects the thickness of the county road trench as shown on the plans which is different from that within either community.



Engineering, Land Surveying Serving your engineering and surveying needs since 1972

PRE-BID MEETING

Palestine-Hollansburg Joint Sewer District Centralized Wastewater System

Sign-In Sheet

Date: Tuesday, July 20, 2021

Time: 1:00 P.M.

	Attendees:	Representing:	Email Address:
1.	Mike Bruns, P.E., SI	Mote & Associates, Inc.	mbruns@moteassociates.com
2.	Susan Laux	Mote & Associates, Inc.	slaux@moteassociates.com
3.	Heath Riffell	Mote & Associates, Inc	hriffell@moteassociates.com
4.	Aaron Bath	VTF	aaronbath everteenvation, con
5.	MARTI DAVIDSA	BL ANDERSOLS	MARTY BLANDERSON, COL
6.	Ben Call	Building Crafts, Inc.	bcall@buildingcrafts.com
7.	StateSweet	COBALT CIVIL UC	55WEER CUBALTCIVIC. CONT
8.	Gavin Bixler	Brumbay 1 Contraction	gavin@brembergh contractorecom
9.	JOE RATERMAN	BRUMBAUGH CONSTRUCTION	joe@brumbay hconstructions.com
10.	Bret Liming	Toms Construction	bliming.tome Constabright.net
11.			
12.			
13.			

214 West Fourth Street, Greenville, Ohio 45331 • (937) 548-7511 • Fax: (937) 548-7484