

# UGI ENERGY SERVICES - BETHLEHEM LNG

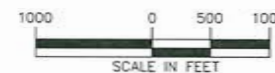
## CITY OF BETHLEHEM, NORTHAMPTON COUNTY, PENNSYLVANIA

### NPDES PERMIT DRAWINGS

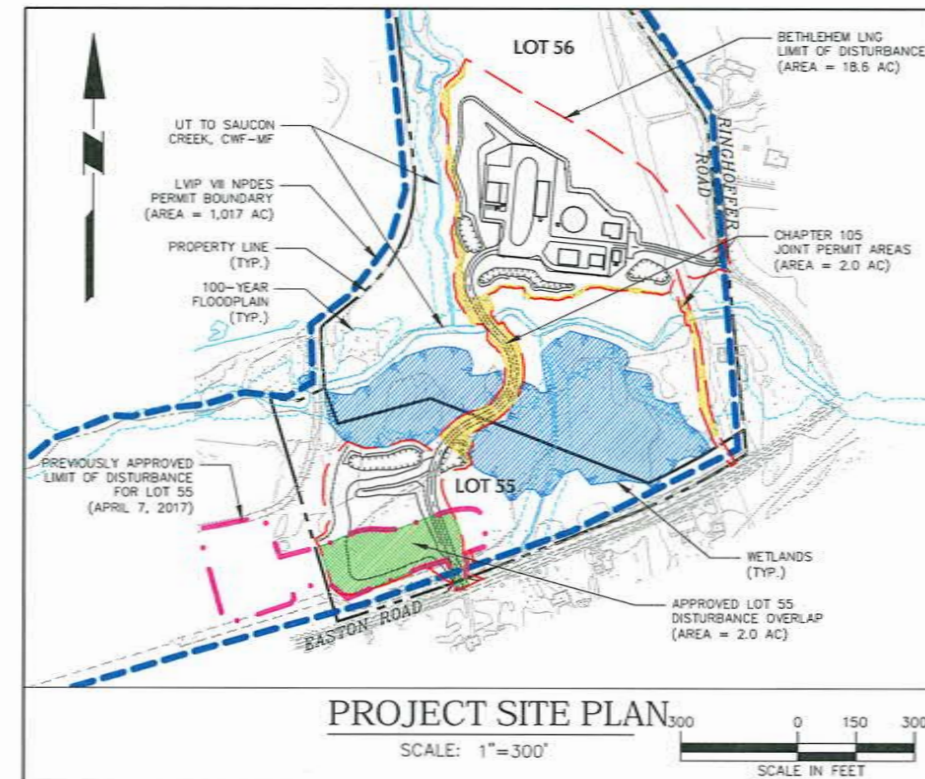


OVERALL LVIP VII SITE LOCATION PLAN

SCALE: 1"=1000'



NPDES PERMIT DRAWING LIST				
Page No.	Drawing No.	Drawing Title	Scale	Date Revised
1	CG-001	INDEX SHEET	AS SHOWN	12/15/2017
2	CG-100	MASTER POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN	1" = 200'	12/15/2017
3	CG-101	GRADING AND DRAINAGE PLAN	1" = 50'	12/15/2017
4	CG-102	GRADING AND DRAINAGE PLAN	1" = 50'	12/15/2017
5	CG-103	GRADING AND DRAINAGE PLAN	1" = 50'	12/15/2017
6	CG-401	POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN	1" = 50'	12/15/2017
7	CG-402	POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN	1" = 50'	12/15/2017
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9	CG-500	POST-CONSTRUCTION STORMWATER MANAGEMENT NOTES	N.T.S.	12/15/2017
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11	CG-502	POST-CONSTRUCTION STORMWATER MANAGEMENT DETAILS	N.T.S.	12/15/2017
12	CG-503	POST-CONSTRUCTION STORMWATER MANAGEMENT DETAILS	N.T.S.	12/15/2017
13	CG-504	POST-CONSTRUCTION STORMWATER MANAGEMENT DETAILS	N.T.S.	12/15/2017
14	CG-600	ACT 167 RELEASE RATE MAP	1" = 2500'	12/15/2017
15	CE-100	MASTER SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 1	1" = 200'	12/15/2017
16	CE-101	SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 1	1" = 50'	12/15/2017
17	CE-102	SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 1	1" = 50'	12/15/2017
18	CE-103	SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 1	1" = 50'	12/15/2017
19	CE-200	MASTER SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 2	1" = 200'	12/15/2017
20	CE-201	SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 2	1" = 50'	12/15/2017
21	CE-202	SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 2	1" = 50'	12/15/2017
22	CE-203	SOIL EROSION AND SEDIMENT CONTROL PLAN - STAGE 2	1" = 50'	12/15/2017
23	CE-301	SOIL EROSION AND SEDIMENT CONTROL STREAM CROSSINGS	1" = 20'	12/15/2017
24	CE-302	SOIL EROSION AND SEDIMENT CONTROL TEMPORARY WETLAND IMPACTS	1" = 20'	12/15/2017
25	CE-401	SOIL EROSION AND SEDIMENT CONTROL DRAINAGE AREA MAP - STAGE 1	1" = 150'	12/15/2017
26	CE-402	SOIL EROSION AND SEDIMENT CONTROL DRAINAGE AREA MAP - STAGE 2	1" = 150'	12/15/2017
27	CE-500	SOIL EROSION AND SEDIMENT CONTROL NOTES	N.T.S.	12/15/2017
28	CE-501	SOIL EROSION AND SEDIMENT CONTROL DETAILS	N.T.S.	12/15/2017
29	CE-502	SOIL EROSION AND SEDIMENT CONTROL DETAILS	N.T.S.	12/15/2017
30	CE-503	SOIL EROSION AND SEDIMENT CONTROL DETAILS	N.T.S.	12/15/2017



PROJECT SITE PLAN

SCALE: 1"=300'



#### GENERAL SITE NOTES:

- The Contractor shall furnish, install, test and complete all work to the satisfaction of the Engineer and Owner in accordance with the Contract Documents. The Contractor is solely responsible for means and methods of construction; as such, these plans do not completely represent, nor are they intended to represent, all specific instructions required for all work construction. The Contractor is responsible to construct all improvements depicted on these plans in accordance with all applicable rules, regulations and laws in effect at the time of construction.
- The Contractor shall accept the site as is. The Contractor shall assess conditions, and the kind, quality and quantity of work required. The Owner and Engineer make no guarantee in regard to the accuracy of any information that was obtained during investigations. The Contractor shall make a thorough site inspection in order to field check existing site conditions, correlate conditions with the drawings, and, resolve any possible construction conflicts with the Owner and Engineer prior to commencement of work. The Contractor shall perform additional topographic surveys if he/she deems necessary, provided they are coordinated with the Owner. Any conditions determined by the Contractor that differ from the information shown on the drawings that are not brought to the attention of the Owner and Engineer prior to the start of work shall not be considered grounds for additional payment or changes to the contract duration, or any other claims against the Owner or Owner's Engineer.
- The Contractor shall, when he/she deems necessary, provide a written Request for Information (RFI) to the Owner and/or Owner's designated representative, and Engineer prior to the construction of any specific site work item. The RFI shall be in a form acceptable to Owner and/or Owner's designated representative, and Engineer and shall allow for a minimum of three work days for a written reply. RFIs shall be numbered consecutively by date submitted. The Contractor shall be solely responsible for site work items constructed differently than intended or as depicted on the plans.
- Information related to elevations and proposed utilities (such as roadway grades, invert elevations, rim elevations, grate elevations, building finished floor elevations, etc.) may be found in more than one location in the Contract Documents. The Contractor shall sufficiently review all plans, profiles and any other information in the Contract Documents for consistency prior to bid. Any inconsistencies or discrepancies that are found by the Contractor or his assigns shall be immediately brought to the attention of the Owner and Engineer in writing, in the form of an RFI prior to bid.
- There are additional notes, specifications and requirements contained throughout the plan set as well as references to specifications from applicable governing authorities and industry standards. It is the Contractor's responsibility to obtain, review and adhere to all these documents.
- Contractor is specifically cautioned that all construction staked for this project must be completed from the site specific survey control (horizontal and vertical) upon which the design is based. The contractor should not rely on or re-establish survey control by GPS or other methods for use in construction staked out or any other purpose for this project. Any discrepancies between the existing horizontal or vertical data shown on these drawings and that encountered in the field must be reported to the design team prior to construction for resolution.

PERMIT BOUNDARY LEGEND	
APPROVED LVIP VII NPDES PERMIT BOUNDARY	---
BETHLEHEM LNG PROJECT LIMIT OF PROPOSED EARTH DISTURBANCE	---
PREVIOUSLY APPROVED EARTH DISTURBANCE FOR LOT 55 (APPROVAL LETTER DATED 4/7/2017)	---
LOT 55 APPROVED LIMIT OF DISTURBANCE OVERLAP	---
CHAPTER 105 PERMIT BOUNDARY AREA	---

BETHLEHEM LNG (LOT 55 & LOT 56 LEHIGH VALLEY INDUSTRIAL PARK) LIMIT OF DISTURBANCE TABULATION	
	AREA (ACRES)
APPROVED NPDES BOUNDARY LIMIT FOR LVIP VII	1,017
BETHLEHEM LNG PROJECT LIMIT OF EARTH DISTURBANCE	18.6
LOT 55 APPROVED DISTURBANCE OVERLAP	2.0
CHAPTER 105 PERMIT BOUNDARY	2.0
CHAPTER 105/NPDES LIMIT REMAINING	14.6

Date	Description	No.
REVISIONS		

SIGNATURE  
GREGORY M. ELKO P.E. PA Lic. No. PE-055364-E  
DATE SIGNED

**LANGAN**  
Stone Manor Corporate Center, 2700 Kelly Road, Suite 200, Warrington, PA 18978  
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Langan CE, Inc.  
Langan International LLC  
Collectively known as Langan

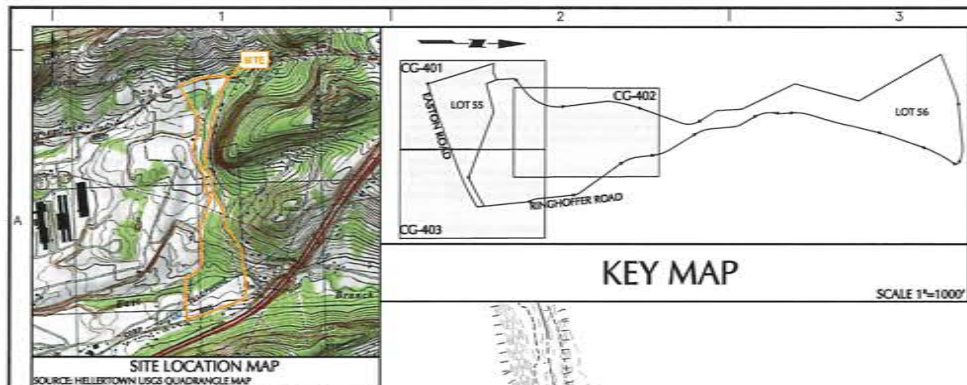
Project  
**BETHLEHEM LNG**  
TAX ID P7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM  
NORTHAMPTON COUNTY PENNSYLVANIA

Drawing Title  
**INDEX SHEET**

Project No.  
200081201  
Date  
12-15-2017  
Scale  
1"=1,000'  
Drawn By  
JLA  
Checked By  
AR  
Submission Date  
-  
Sheet 1 of 30

Drawing No.  
**CG-001**





OWNER'S ACKNOWLEDGEMENT:  
I ACKNOWLEDGE THAT ANY REVISION TO THE APPROVED DRAINAGE  
PLAN MUST BE APPROVED BY THE CITY OF BETHLEHEM AND THE  
NORTHAMPTON COUNTY CONSERVATION DISTRICT.

DESIGN ENGINEER'S SIGNATURE:  
I, GREGORY ELKO, ON \_\_\_\_\_, HEREBY CERTIFY  
THAT THE DRAINAGE PLAN MEETS ALL DESIGN STANDARDS AND  
CRITERIA OF THE SCHUYLKILL RIVER WATERSHED ACT 167  
STORMWATER MANAGEMENT ORDINANCE.

GREGORY ELKO  
PROFESSIONAL ENGINEER PA Lic. No. PE-055364-E

ACT 287 AS AMENDED

UTILITY LOCATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE AND IT IS THE  
RESPONSIBILITY OF THE CONTRACTOR, PER PA ACT 287 AS AMENDED, TO CONTACT  
THE UTILITY COMPANIES FOR MORE ACCURATE LOCATION PRIOR TO ANY EXCAVATION.

TO OBTAIN ADDITIONAL UTILITY INFORMATION OR TO ARRANGE FOR FIELD LOCATION OF  
EXISTING UTILITIES BEFORE EXCAVATION, CALL THE PENNSYLVANIA ONE CALL SYSTEM  
AT 1-800-242-1776. THE UTILITY COMPANIES SHOWN MAY OR MAY NOT HAVE UTILITY  
LINES IN THE AREA.

CALL BEFORE YOU DIG!!  
PENNSYLVANIA ONE CALL SYSTEM  
1-800-242-1776

Pennsylvania One Call System, Inc.  
1-800-242-1776



SERIAL NUMBER: 201733417223

PCSM LEGEND

NPDES BOUNDARY/LIMIT OF DISTURBANCE	---
SOIL TYPE BOUNDARY	---
SOIL TYPE	---
PROPOSED CONTOUR	---
EXISTING CONTOUR	---
DETENTION BASINS	---
SOIL AMENDMENT AREAS	---
VEGETATED SWALE AREAS	---
STREET SWEEPING AREAS	---
PROPOSED STORM PIPE	---
PROPOSED STORM MANHOLE	---
PROPOSED HEADWALL/FLARED END SECTION	---
PROPOSED BASIN OUTLET CONTROL STRUCTURE	---
WETLANDS	---
STREAM	---
100-YEAR FLOODPLAIN	---
POINT OF ANALYSIS	---

NOTE: REFER TO DRAWINGS C0500-C0504 FOR PCSM NOTES AND DETAILS.

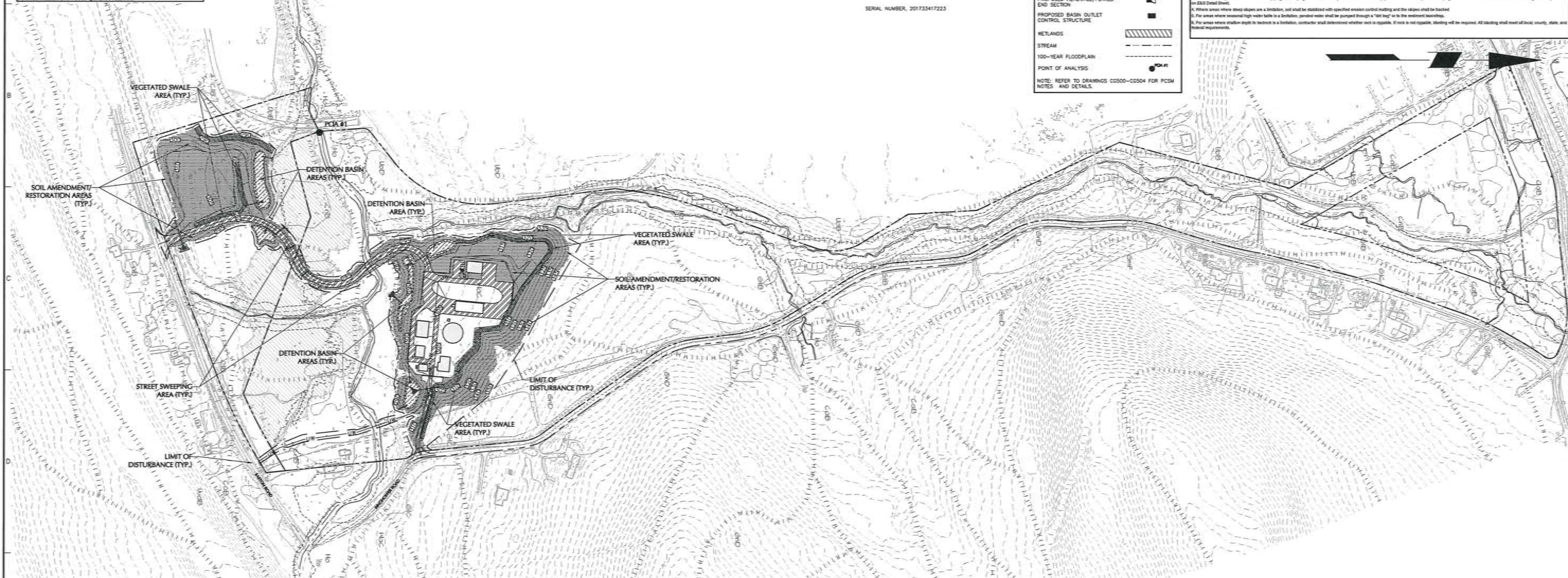
ON-SITE SOIL TYPE DESCRIPTIONS

Map Symbol	Soil	Hydrologic Soil Group	Hydric	Depth to Seasonal High Water Table (ft)	Depth to Bedrock (ft)	Soil Limitations
CdL	Calhoun loam, 1 to 3 percent slopes	D	No	0.0-3	<4	Highly erodible, low available water capacity (4.4 inches); very limited for roadways, low strength, frost action, shrink-swell
CdW	Chippewa silt loam, 0 to 2 percent slopes	D	Yes	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
Cd	Chippewa silt loam, 2 to 8 percent slopes	D	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
CdE	Chippewa silt loam, 1 to 3 percent slopes	D	Yes	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
CdG	Chippewa silt loam, 3 to 8 percent slopes	D	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
GC	Glendon gravelly loam, 3 to 8 percent slopes	B	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
GD	Glendon gravelly loam, 8 to 15 percent slopes	B	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
GHD	Glendon-Holmes gravelly loam, 15 to 25 percent slopes	A	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
Ho	Holly silt loam	BD	Yes	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdW	Udolphville, limestone, 0 to 3 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
Ud	Udolphville, limestone, 3 to 8 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdC	Udolphville, limestone, 8 to 15 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdE	Udolphville, limestone, 15 to 25 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdG	Udolphville, limestone, 25 to 35 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdH	Udolphville, limestone, 35 to 45 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdI	Udolphville, limestone, 45 to 55 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdJ	Udolphville, limestone, 55 to 65 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdK	Udolphville, limestone, 65 to 75 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdL	Udolphville, limestone, 75 to 85 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdM	Udolphville, limestone, 85 to 95 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell
UdN	Udolphville, limestone, 95 to 100 percent slopes	C	No	0.0-5	<4.67	Poorly drained, low available water capacity (5.1 inches); very limited for roadways, low strength, frost action, shrink-swell

Soil Information obtained from USDA-NRCS Web Soil Survey for Northampton County, PA, Version 1, November 16, 2016.

Revisions to Limitations:

- For areas where low strength and/or shrink-swell are a limitation, pavement design will account for low strength and shrink-swell of soil.
- For areas where frost action is a limitation, frost susceptible soils will not be used for pavement subgrade during construction.
- For areas where erosion is a limitation, erosion control measures will be used to prevent erosion. Erosion control will be installed according to detail provided on E&S Detail Sheet.
- For areas where steep slopes are a limitation, soil shall be stabilized with specified erosion control matting and the slopes shall be tracked.
- For areas where excessive water table is a limitation, ground water shall be pumped through a "bat bog" to be installed on-site.
- For areas where shallow depth to bedrock is a limitation, contractor shall determine whether rock is replaceable, if rock is not replaceable, blasting will be required. All blasting shall meet all local, county, state, and federal requirements.



LEGEND (NOT SHOWN TO SCALE)

HYDRANT	STORM DRAIN
STREET LIGHT	SANITARY LINE
AREA LIGHT	GAS LINE
SIGNAL POLE	WATER LINE
POLE	ELECTRIC LINE
ANCHOR POLE	TELEPHONE LINE
MANHOLE (TYPE AS LABELED)	COMBINED SEWER LINE
WATER VALVE	CABLE TV LINE
GAS VALVE	STEAM LINE
UNKNOWN VALVE	UNKNOWN UTILITY LINE
CATCH BASIN	OVERHEAD WIRE
SPOT ELEVATION	GUIDE RAIL (TYPE AS NOTED)
CLEAN OUT	FENCE (TYPE AS NOTED)
TREE	TREE LINE
BENCH MARK	PROPERTY/RIGHT-OF-WAY LINE
SION	CONTOUR LINE
BOLLARD	RECONSTRUCTED UTILITY LINE (TYPE AS NOTED) - PLOTTED FROM EXISTING MAPPING
METAL COVER	SOIL BOUNDARY
ELECTRIC BOX	SOIL TYPE
DOOR	EXISTING CANOPY
DOUBLE DOOR	EXISTING BUILDING
GARAGE DOOR	PROPOSED GAS LINE
PARKING METER	PROPOSED WATER LINE
BUILDING SUPPORT COLUMN	
PROPOSED OVERHEAD ELECTRIC LINE	

REVISIONS

Date	Description	No.

SIGNATURE  
GREGORY M. ELKO P.E. PA Lic. No. PE-055364-E

DATE SIGNED

**LANGAN**  
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Langan Engineering and Environmental Services, Inc.  
Langan CT, Inc.  
Langan International LLC  
Collectively known as Langan

Project  
**BETHLEHEM LNG**  
TAX ID P7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM  
NORTHAMPTON COUNTY PENNSYLVANIA

Drawing Title  
**MASTER POST CONSTRUCTION STORMWATER MANAGEMENT PLAN**

Project No.  
200081201

Date  
12-15-2017

Scale  
1" = 200'

Drawn By  
JPK

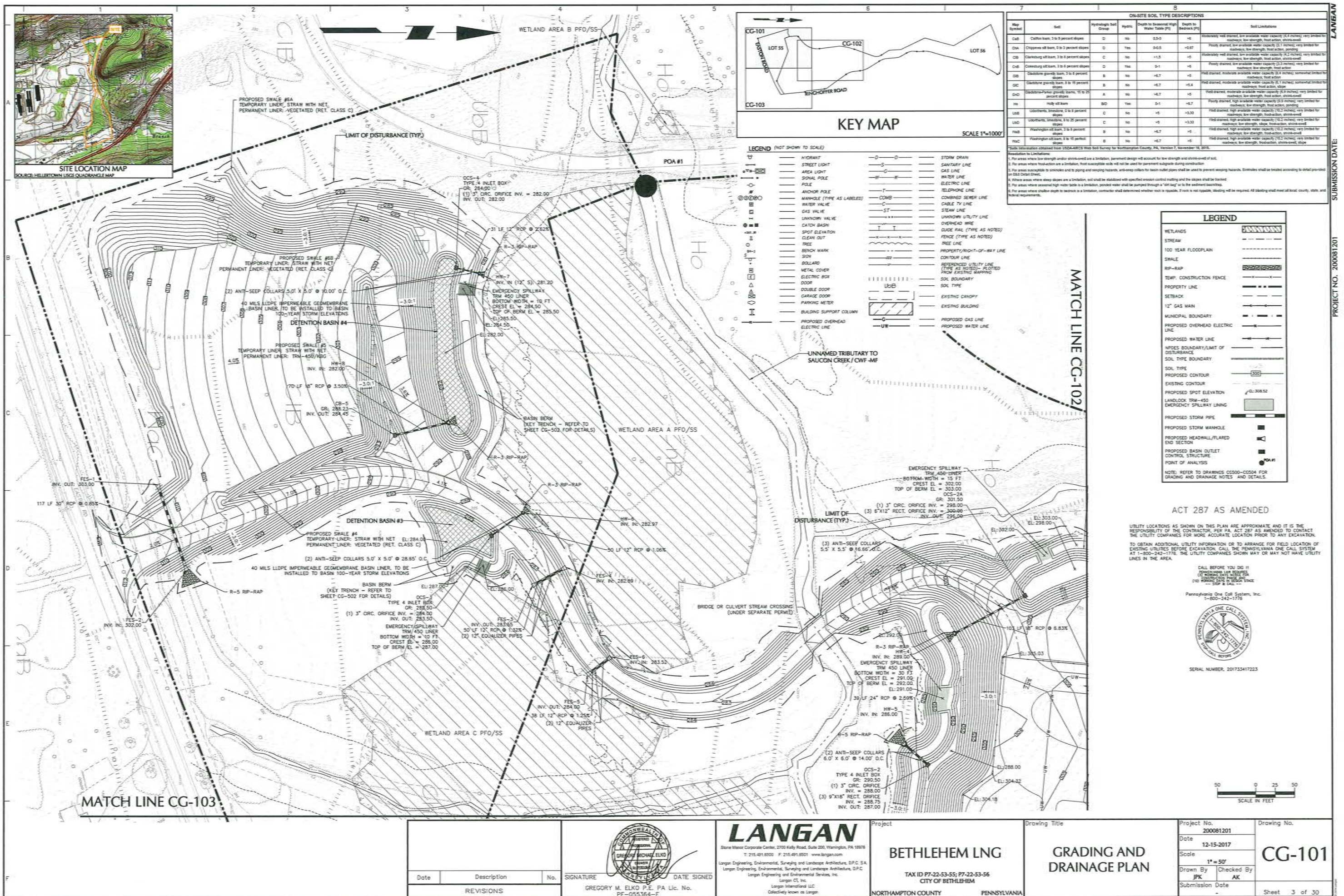
Checked By  
AR

Submission Date

Drawing No.  
**CG-100**

Sheet 2 of 30

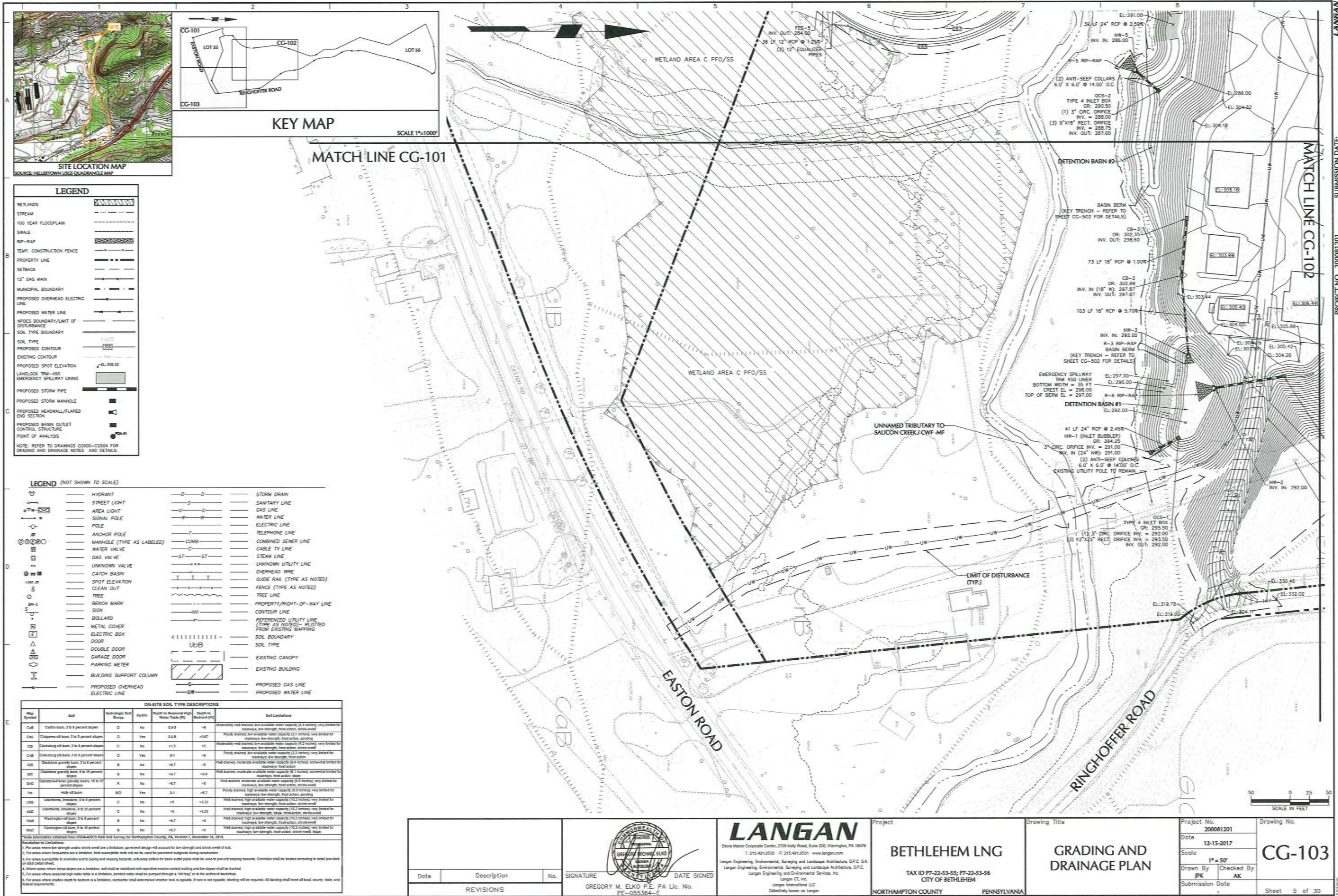




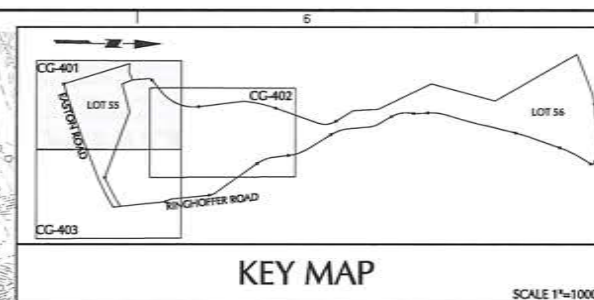






















A		B		C		D		E		F		G		H		I		J		K		L		M		N		O		P		Q		R		S		T		U		V		W		X		Y		Z		AA		AB		AC		AD		AE		AF		AG		AH		AI		AJ		AK		AL		AM		AN		AO		AP		AQ		AR		AS		AT		AU		AV		AW		AX		AY		AZ		BA		BB		BC		BD		BE		BF		BG		BH		BI		BJ		BK		BL		BM		BN		BO		BP		BQ		BR		BS		BT		BU		BV		BW		BX		BY		BZ		CA		CB		CC		CD		CE		CF		CG		CH		CI		CJ		CK		CL		CM		CN		CO		CP		CQ		CR		CS		CT		CU		CV		CW		CX		CY		CZ		DA		DB		DC		DD		DE		DF		DG		DH		DI		DJ		DK		DL		DM		DN		DO		DP		DQ		DR		DS		DT		DU		DV		DW		DX		DY		DZ		EA		EB		EC		ED		EE		EF		EG		EH		EI		EJ		EK		EL		EM		EN		EO		EP		EQ		ER		ES		ET		EU		EV		EW		EX		EY		EZ		FA		FB		FC		FD		FE		FF		FG		FH		FI		FJ		FK		FL		FM		FN		FO		FP		FQ		FR		FS		FT		FU		FV		FW		FX		FY		FZ		GA		GB		GC		GD		GE		GF		GG		GH		GI		GJ		GK		GL		GM		GN		GO		GP		GQ		GR		GS		GT		GU		GV		GW		GX		GY		GZ		HA		HB		HC		HD		HE		HF		HG		HH		HI		HJ		HK		HL		HM		HN		HO		HP		HQ		HR		HS		HT		HU		HV		HW		HX		HY		HZ		IA		IB		IC		ID		IE		IF		IG		IH		II		IJ		IK		IL		IM		IN		IO		IP		IQ		IR		IS		IT		IU		IV		IW		IX		IY		IZ		JA		JB		JC		JD		JE		JF		JG		JH		JI		JJ		JK		JL		JM		JN		JO		JP		JQ		JR		JS		JT		JU		JV		JW		JX		JY		JZ		KA		KB		KC		KD		KE		KF		KG		KH		KI		KJ		KK		KL		KM		KN		KO		KP		KQ		KR		KS		KT		KU		KV		KW		KX		KY		KZ		LA		LB		LC		LD		LE		LF		LG		LH		LI		LJ		LK		LL		LM		LN		LO		LP		LQ		LR		LS		LT		LU		LV		LW		LX		LY		LZ		MA		MB		MC		MD		ME		MF		MG		MH		MI		MJ		MK		ML		MN		MO		MP		MQ		MR		MS		MT		MU		MV		MW		MX		MY		MZ		NA		NB		NC		ND		NE		NF		NG		NH		NI		NJ		NK		NL		NM		NN		NO		NP		NQ		NR		NS		NT		NU		NV		NW		NX		NY		NZ		OA		OB		OC		OD		OE		OF		OG		OH		OI		OJ		OK		OL		OM		ON		OO		OP		OQ		OR		OS		OT		OU		OV		OW		OX		OY		OZ		PA		PB		PC		PD		PE		PF		PG		PH		PI		PJ		PK		PL		PM		PN		PO		PP		PQ		PR		PS		PT		PU		PV		PW		PX		PY		PZ		QA		QB		QC		QD		QE		QF		QG		QH		QI		QJ		QK		QL		QM		QN		QO		QP		QQ		QR		QS		QT		QU		QV		QW		QX		QY		QZ		RA		RB		RC		RD		RE		RF		RG		RH		RI		RJ		RK		RL		RM		RN		RO		RP		RQ		RR		RS		RT		RU		RV		RW		RX		RY		RZ		SA		SB		SC		SD		SE		SF		SG		SH		SI		SJ		SK		SL		SM		SN		SO		SP		SQ		SR		SS	
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PCSCM LEGEND	
NPDES BOUNDARY/LIMIT OF DISTURBANCE	_____
SOIL TYPE BOUNDARY	=====
SOIL TYPE	_____ 1500 _____
PROPOSED CONTOUR	_____ 500 _____
EXISTING CONTOUR	_____ 250 _____
DETENTION BASINS	
SOIL AMENDMENT AREAS	
VEGETATED SWALE AREAS	
STREET SWEEPING AREAS	
PROPOSED STORM PIPE	
PROPOSED STORM MANHOLE	
PROPOSED HEADWALL/FLARED END SECTION	
PROPOSED BASIN/OUTLET CONTROL STRUCTURE	
WETLANDS	
STREAM	_____
100-YEAR FLOODPLAIN	-----
POINT OF ANALYSIS	
NOTE: REFER TO DRAWINGS C0500-C0504 FOR PCSCM NOTES AND DETAILS.	

ACT 287 AS AMENDED

UTILITY LOCATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR, PER PA. ACT 287 AS AMENDED TO CONTACT THE UTILITY COMPANIES FOR MORE ACCURATE LOCATION PRIOR TO ANY EXCAVATION.

TO OBTAIN ADDITIONAL UTILITY INFORMATION OR TO ARRANGE FOR FIELD LOCATION OF EXISTING UTILITIES BEFORE EXCAVATION, CALL THE PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776. THE UTILITY COMPANIES SHOWN MAY OR MAY NOT HAVE UTILITY LINES IN THE AREA.


CALL BEFORE YOU DIG !!!  
PENNSYLVANIA LAW REQUIRES  
(1) MORNING DAYS NOTICE FOR  
CONSTRUCTION PHASE AND  
(10) MORNING DAYS IN DESIGN STAGE

Pennsylvania One Call System, Inc.  
1-800-242-1775

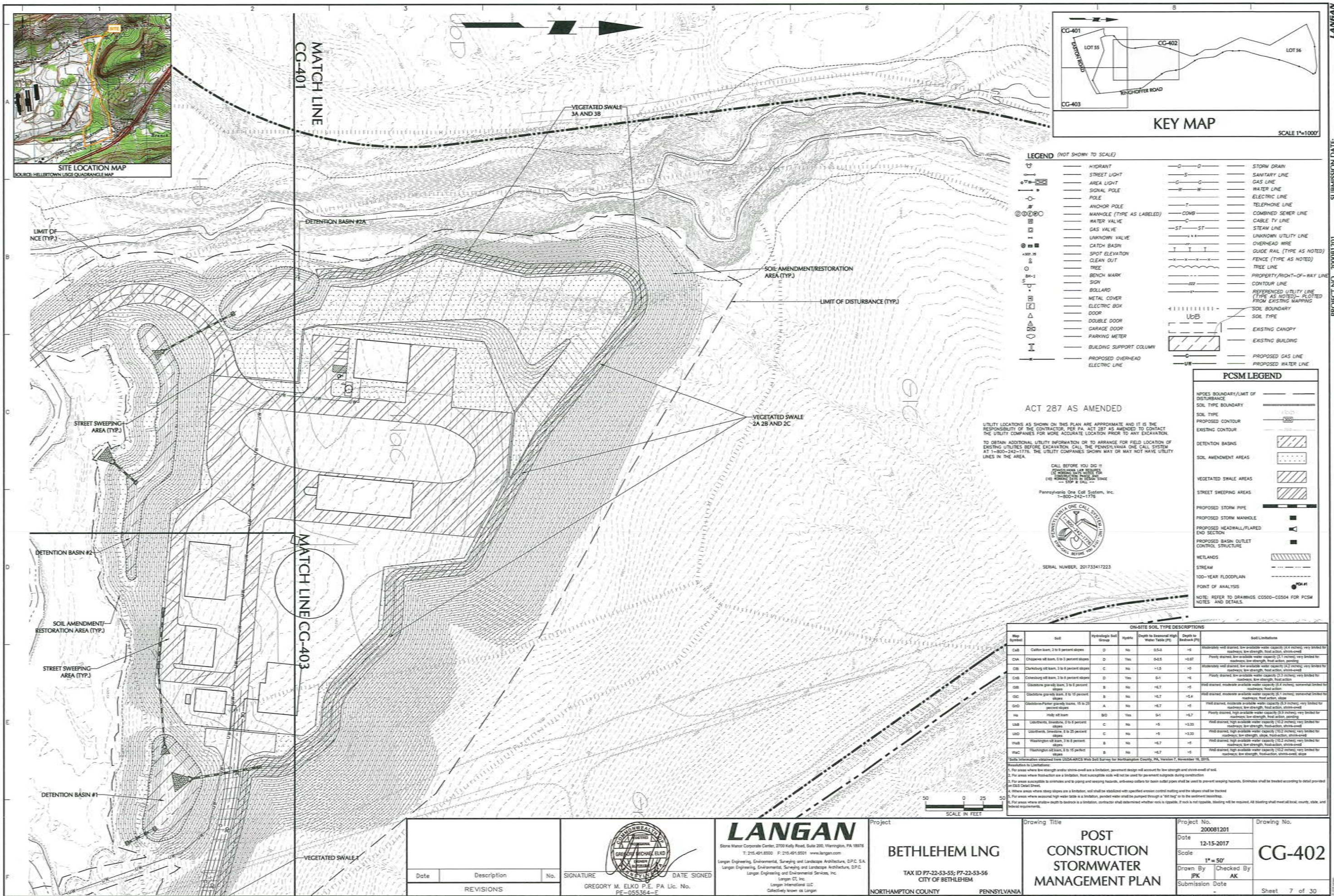


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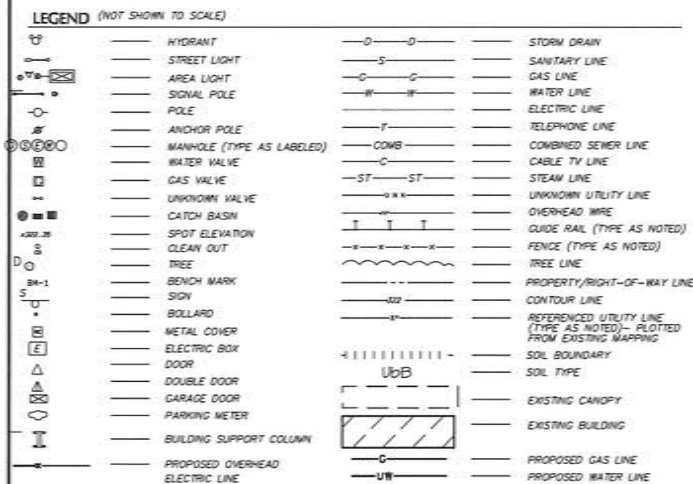
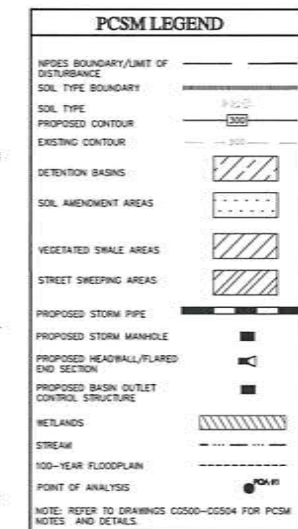
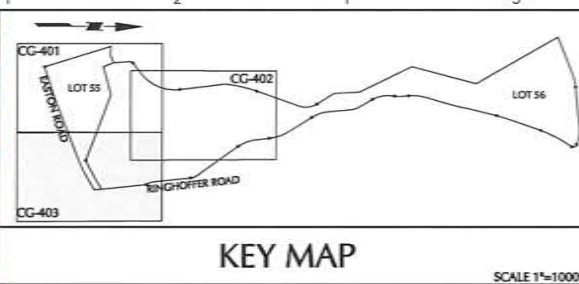


					<p><b>LANGAN</b></p> <p>Stone Manor Corporate Center, 2700 Kelly Road, Suite 200, Warminster, PA 18978 T: 215.491.6500 F: 215.491.6501 www.langan.com</p> <p>Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A. Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. Langan Engineering and Environmental Services, Inc. Langan DC, Inc. Langan International LLC Collectively known as Langan</p>		<p>Project</p> <p><b>BETHLEHEM LNG</b></p> <p>TAX ID P7-22-53-55; P7-22-53-56 CITY OF BETHLEHEM</p> <p>NORTHAMPTON COUNTY PENNSYLVANIA</p>		<p>Drawing Title</p> <p><b>POST CONSTRUCTION STORMWATER MANAGEMENT PLAN</b></p>		<p>Project No. <b>2000081201</b></p> <p>Date <b>12-15-2017</b></p> <p>Scale <b>1" = 50'</b></p> <p>Drawn By <b>JPK</b></p> <p>Submission Date -</p>		<p>Drawing No.</p> <p><b>CG-401</b></p> <p>Sheet 6 of 30</p>	
Date	Description	No.	SIGNATURE		DATE SIGNED						Checked By <b>AK</b>			
REVISIONS			GREGORY M. ELKO P.E. PA Lic. No. PE-055364-E											









ON-SITE SOIL TYPE DESCRIPTIONS						
Map Symbol	Soil	Hydrologic Soil Group	Hydric	Depth to Seasonal High Water Table (ft)	Depth to Aquifer (ft)	Soil Characteristics
CoB	Caliche loam, 3 to 8 percent slopes	D	No	<0.5	<6	Modestly well drained, low available water capacity (<0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CoC	Claypanes silt loam, 3 to 8 percent slopes	C	Yes	<0.5	<6.67	Floody drained, low available water capacity (<0.1 inches), very limited for roadways, low strength, frost action, ponding
CoE	Charleburg silt loam, 3 to 8 percent slopes	C	No	>1.5	>6	Modestly well drained, low available water capacity (<0.2 inches), very limited for roadways, low strength, frost action, shrink-swell
CoF	Charleburg silt loam, 3 to 8 percent slopes	D	Yes	0.1	<6	Floody drained, low available water capacity (<0.1 inches), very limited for roadways, low strength, frost action, shrink-swell
GoB	Gladstone gravelly loam, 3 to 8 percent slopes	B	No	<6.7	>6	Well drained, moderate available water capacity (>0.4 inches), somewhat limited for roadways, frost action, ponding
GoC	Gladstone gravelly loam, 3 to 8 percent slopes	B	No	<6.7	>6.4	Well drained, moderate available water capacity (>0.4 inches), somewhat limited for roadways, frost action, ponding
GoD	Gladstone-Park gravelly loams, 15 to 20 percent slopes	A	No	<6.7	>6	Well drained, moderate available water capacity (>0.5 inches), very limited for roadways, low strength, frost action, shrink-swell
Ho	Holly silt loam	BQ	Yes	0.1	<6.7	Floody drained, high available water capacity (>0.5 inches), very limited for roadways, low strength, frost action, ponding
LoB	Lithabene, littoraline, 3 to 8 percent slopes	C	No	>1.5	>6.33	Well drained, high available water capacity (>0.2 inches), very limited for roadways, low strength, frost action, shrink-swell
LoD	Lithabene, littoraline, 3 to 20 percent slopes	C	No	>1.5	>6.33	Well drained, high available water capacity (>0.2 inches), very limited for roadways, low strength, frost action, shrink-swell
WoB	Washington silt loam, 3 to 15 percent slopes	B	No	<6.7	<6	Well drained, high available water capacity (>0.2 inches), very limited for roadways, low strength, frost action, shrink-swell
WoC	Washington silt loam, 3 to 15 percent slopes	B	No	<6.7	<6	Well drained, high available water capacity (>0.2 inches), very limited for roadways, low strength, frost action, shrink-swell



Date	Description	No.
REVISIONS		



SIGNATURE \_\_\_\_\_ DATE SIGNED \_\_\_\_\_

GREGORY M. ELKO P.E. PA Lic. No.

**LANGAN**  
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Langan Engineering and Environmental Services, Inc.  
Langan CE, Inc.  
Langan International LLC  
Called only known as Langan

Project

**BETHLEHEM LNG**

TAX ID P7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM

NORTHAMPTON COUNTY      PENNSYLVANIA

Drawing Title

**POST  
CONSTRUCTION  
STORMWATER  
MANAGEMENT PLAN**

Project No. 200081201	Drawing No.  <b>CG-403</b>
Date 12-15-2017	
Scale 1" = 50'	
Drawn By JPK	
Checked By AK	
Submission Date	



UTILITY TRENCH EXCAVATION GUIDELINES

1. CONSTRUCTION REQUIREMENTS -
- A. LIMIT ADVANCE CLEARING AND GRUBBING OPERATIONS TO A DISTANCE EQUAL TO TWO TIMES THE LENGTH OF PIPE INSTALLATION THAT CAN BE COMPLETED IN ONE DAY.
- B. WORK CREWS AND EQUIPMENT FOR TRENCHING, PLACEMENT OF PIPE, PLUG CONSTRUCTION AND BACKFILLING WILL BE SELF CONTAINED AND SEPARATE FROM CLEARING AND GRUBBING AND SITE RESTORATION AND STABILIZATION OPERATIONS.
- C. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT, PLUG INSTALLATION AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY.
- D. TRENCH PLUGS WILL BE SPACED AND BE CONSTRUCTED OF THE MATERIALS SHOWN ON THIS SHEET.
- E. WATER WHICH ACCUMULATES IN THE OPEN TRENCH WILL BE COMPLETELY REMOVED BY PUMPING, AS REQUIRED, TO A FACILITY FOR REMOVAL OF SEDIMENT IN ACCORDANCE WITH PADEP GUIDELINES. IF POSSIBLE, THE IF POSSIBLE, THE EXCAVATION WATER WILL BE PROCESSED THROUGH THE EXISTING ON-SITE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM.
- F. ON THE DAY FOLLOWING PIPE PLACEMENT AND TRENCH BACKFILLING, THE DISTURBED AREA WILL BE GRADED TO FINAL CONTOURS AND APPROPRIATE TEMPORARY EROSION AND SEDIMENT POLLUTION CONTROL MEASURES/FACILITIES WILL BE INSTALLED. SEEDING AND MULCHING OF ALL DISTURBED AREAS WILL BE DONE AT THE END OF EACH WEEK.
2. EXCEPTIONS - IN CERTAIN CASES TRENCHES CANNOT BE BACKFILLED UNTIL THE PIPE IS HYDROSTATICALLY TESTED, OR ANCHORS AND OTHER PERMANENT FEATURES ARE INSTALLED IN THESE CASES, ALL OF THE REQUIREMENTS LISTED UNDER ITEM 1 WILL REMAIN IN EFFECT WITH THE FOLLOWING EXCEPTIONS:
- A. DAILY BACKFILLING OF THE TRENCH MAY BE DELAYED FOR SIX DAYS. ALL PRESSURE TENSING AND THE COMPLETE BACKFILLING OF THE OPEN TRENCH MUST BE COMPLETED BY THE SEVENTH WORKING DAY.
- B. IF DAILY BACKFILLING IS DELAYED, THE DISTURBED AREA WILL BE GRADED TO FINAL CONTOURS, APPROPRIATE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES/FACILITIES WILL BE INSTALLED, AND THE AREAS SEEDED AND MULCHED WITHIN THE NEXT TWO CALENDAR DAYS.

BMP CONSTRUCTION SEQUENCE

VEGETATED SWALE - CONSTRUCTION SEQUENCE

1. BEGIN VEGETATED SWALE CONSTRUCTION ONLY WHEN THE UPGRADEMENT SITE HAS BEEN SUFFICIENTLY STABILIZED AND TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES ARE IN PLACE. VEGETATED SWALES SHOULD BE CONSTRUCTED AND STABILIZED VERY EARLY IN THE CONSTRUCTION SCHEDULE, PREFERABLY BEFORE MASS EARTHWORK AND PAVING INCREASE THE RATE AND VOLUME OF RUNOFF. EROSION AND SEDIMENT CONTROL METHODS SHALL ADHERE TO THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL, MARCH 2012 OR LATEST EDITION.
2. ROUGH GRADE THE VEGETATED SWALE. EQUIPMENT SHALL AVOID EXCESSIVE COMPACTION AND/OR LAND DISTURBANCE. EXCAVATING EQUIPMENT SHOULD OPERATE FROM THE SIDE OF THE SWALE AND NEVER ON THE BOTTOM. IF EXCAVATION LEADS TO SUBSTANTIAL COMPACTION OF THE SUBGRADE (WHERE AN INFILTRATION TRENCH IS NOT PROPOSED), 18 INCHES SHALL BE REMOVED AND REPLACED WITH A BLEND OF TOPSOIL AND SAND TO PROMOTE INFILTRATION AND BIOLOGICAL GROWTH. AT THE VERY LEAST, TOPSOIL SHALL BE THOROUGHLY DEEP PLOWED INTO THE SUBGRADE IN ORDER TO PENETRATE THE COMPACTED ZONE AND PROMOTE AERATION AND THE FORMATION OF MACROPORES. FOLLOWING THIS, THE AREA SHOULD BE DISKED PRIOR TO FINAL GRADING OF TOPSOIL.
3. FINE GRADE THE VEGETATED SWALE. ACCURATE GRADING IS CRUCIAL FOR SWALES. EVEN THE SMALLEST NON-CONFORMITIES MAY COMPROMISE FLOW CONDITIONS.
4. SEED AND VEGETATE ACCORDING TO FINAL PLANTING LIST. PLANT THE SWALE AT A TIME OF THE YEAR WHEN SUCCESSFUL ESTABLISHMENT WITHOUT IRRIGATION IS MOST LIKELY. HOWEVER, TEMPORARY IRRIGATION MAY BE NEEDED IN PERIODS OF LITTLE RAIN OR DROUGHT. VEGETATION SHOULD BE ESTABLISHED AS SOON AS POSSIBLE TO PREVENT EROSION AND SCOUR.
5. ONCE ALL TRIBUTARY AREAS ARE SUFFICIENTLY STABILIZED, REMOVE TEMPORARY EROSION AND SEDIMENT CONTROLS. IT IS VERY IMPORTANT THAT THE SWALE BE STABILIZED BEFORE RECEIVING ANY FLOW. FOLLOW THE TRENCH STORMWATER FLOW FOLLOW MAINTENANCE GUIDELINES, AS DISCUSSED BELOW.
- NOTE: IF A VEGETATED SWALE IS USED FOR RUNOFF CONVEYANCE DURING CONSTRUCTION, IT MUST BE REGRADED AND RESEEDED IMMEDIATELY AFTER CONSTRUCTION AND STABILIZATION HAS OCCURRED. ANY DAMAGED AREAS MUST BE FULLY RESTORED TO ENSURE FUTURE FUNCTIONALITY OF THE SWALE.

SOIL AMENDMENT AREAS-CONSTRUCTION SEQUENCE

1. ALL CONSTRUCTION SHOULD BE COMPLETED AND STABILIZED BEFORE BEGINNING SOIL RESTORATION.
2. SOIL AMENDMENT CONSTRUCTION SHALL FOLLOW DETAIL ON SHEET CG-501.

DRY EXTENDED DETENTION BASIN - CONSTRUCTION SEQUENCE

1. INSTALL ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS. THE ARE ARE IMMEDIATELY ADJACENT TO THE BASIN MUST BE STABILIZED IN ACCORDANCE WITH THE PADEP'S EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL (2000 OR LATEST EDITION) PRIOR TO BASIN CONSTRUCTION.
2. PREPARE SITE FOR EXCAVATION AND/OR EMBANKMENT CONSTRUCTION.
- 2.1. ALL EXISTING VEGETATION SHOULD REMAIN IF FEASIBLE AND SHOULD ONLY BE REMOVED IF NECESSARY FOR CONSTRUCTION.
- 2.2. CARE SHOULD BE TAKEN TO PREVENT COMPACTION OF BASIN BOTTOM.
- 2.3. IF EXCAVATION IS REQUIRED, CLEAR THE ARE TO BE EXCAVATED OF ALL VEGETATION, REMOVE/ALL TREE ROOTS, ROCKS, AND Boulders ONLY IN EXCAVATION AREA.
3. EXCAVATE TO ELEVATION OF THE SEDIMENT BASIN AND MAINTAIN PER THE EROSION AND SEDIMENT CONTROL PLAN.
4. INSTALL SURROUNDING EMBANKMENTS AND INLET AND OUTLET CONTROL STRUCTURES.
5. CONVERT TRAPS SHOWN ON THE PLANS FROM SEDIMENT TRAPS TO DRY EXTENDED DETENTION BASINS.
6. GRADE SUBSOIL IN BOTTOM OF BASINS, TAKING CARE TO PREVENT COMPACTION. COMPACT SURROUNDING EMBANKMENT AREAS AND AROUND INLET AND OUTLET STRUCTURES.
7. APPLY AND GRADE PLANTING SOI.
8. APPLY GEO-TEXTILES AND OTHER EROSION CONTROL MEASURES.
9. SEED, PLANT AND MULCH ACCORDING TO PLANTING PLAN.

BMP MAINTENANCE PLAN

AN ANNUAL REPORT SHALL BE SUBMITTED TO THE CITY STATING THE FOLLOWING MAINTENANCE HAS BEEN PERFORMED, THE PCSM PLAN, INSPECTION REPORTS, AND MONITORING RECORDS MUST BE AVAILABLE FOR REVIEW AND INSPECTION BY THE PADEP OR CONSERVATION DISTRICT.

UGI ENERGY SERVICES, LLC, WHICH IS AN APPROPRIATE PROPERTY ENTITY FOR THE PROJECT, (OR THE PROPERTY OWNER) IS RESPONSIBLE FOR MAINTENANCE OF THE STORMWATER CONVEYANCE SYSTEM, AND ALL OTHER PROPOSED BMP'S AS THE PROPERTY OWNER.

SEDIMENT REMOVED FROM BMP'S SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES. VEHICLES SHALL NOT BE PARKED OR DRIVEN OVER INFILTRATION BMP'S.

- 1) STORMWATER CONVEYANCE SYSTEM
- CATCH BASINS, MANHOLES AND PIPES TO BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION AT LEAST TWO TIMES PER YEAR AND AFTER RUNOFF EVENTS.
  - ALL STRUCTURAL COMPONENTS MUST BE INSPECTED FOR CRACKING, SUBSIDENCE, BREACHING, WEARING, AND DETERIORATION AT LEAST ANNUALLY.
- 2) VEGETATED SWALE
- MAINTENANCE ACTIVITIES TO BE DONE ANNUALLY AND WITHIN 48 HOURS AFTER EVERY MAJOR STORM EVENT (> 1 INCH RAINFALL DEPTH).
  - INSPECT AND CORRECT EROSION PROBLEMS, DAMAGE TO VEGETATION, AND SEDIMENT AND DEBRIS ACCUMULATION (WHEN > 3 INCHES AT ANY SPOT COVERS VEGETATION).
  - INSPECT VEGETATION ON SLOPE SIDES FOR EROSION AND FORMATION OF RILLS AND GULLIES. CORRECT AS NEEDED.
  - INSPECT FOR POOLS OF STANDING WATER, DEVIATE AND DISCHARGE TO A STORM SEWER AT AN APPROVED LOCATION AND RESTORE TO DESIGN GRADE.
  - MOW AND TRIM VEGETATION TO ENSURE SAFETY, AESTHETICS, PROPER SWALE OPERATION, OR TO SUPPRESS WEEDS AND INVASIVE VEGETATION. DISPOSE OF CUTTINGS IN LOCAL COMPOSTING FACILITY. MOW ONLY WHEN SWALE IS FULL TO AVOID RUPTURES.
  - INSPECT FOR UNIFORMITY IN CROSS-SECTION AND LONGITUDINAL SLPE. CORRECT AS NEEDED.
  - INSPECT SWALE INLET (CURB CUTS, PIPES, ETC.) AND OUTLET FOR SIGNS OF EROSION OR BLOCKAGE. CORRECT AS NEEDED.
- 3) STREET SWEEPING
- THE PARKING LOT SHALL BE CLEANED A MINIMUM OF TWO TIMES PER YEAR. CLEANINGS SHALL OCCUR AROUND THE BEGINNING OF THE SPRING AND FALL SEASONS, A VACUUM COMMERCIAL CLEANING UNIT SHALL BE USED.
  - TO LIMIT THE DISRUPTION TO THE USE OF THE PROPERTY, SWEEPING SHALL OCCUR DURING OFF HOURS. TYPICALLY, THE EARLY MORNING IS THE OPTIMAL TIME FOR STREET SWEEPING.
- 4) SOIL AMENDMENT AND RESTORATION AREAS
- THE SOIL RESTORATION PROCESS MAY NEED TO BE REPEATED OVER TIME, DUE TO COMPACTION BY USE AND/OR SETTLING.
  - TEST SHALL BE PERFORMED ANNUALLY TO DETERMINE THE BULK DENSITY OF THE SOIL. AMENDED AREAS, TESTING SHALL BE PERFORMED ANNUALLY UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL. IF SOIL DENSITIES ARE OUTSIDE THE RECOMMENDED RANGE FOR SOIL AMENDED AREAS, THE RESPONSIBLE ENTITY SHALL CONSULT THE CITY AND A LICENSED PROFESSIONAL ON PROPER REMEDIATION AND FUTURE MAINTENANCE OF THIS BMP.
  - IF THE EVENT OF FAILURE OF BMP, REPEAT SOIL AMENDMENT AND RESTORATION PROCESS.
- 5) DRY EXTENDED DETENTION BASIN
- ALL BASIN STRUCTURE EXPECTED TO RECEIVE AND/OR TRAP DEBRIS AND SEDIMENT SHOULD BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION AT LEAST FOUR TIMES PER YEAR, AS WELL AS AFTER EVERY STORM GREATER THAN 1 INCH. STRUCTURES INCLUDE BASIN BOTTOMS, TRASH RACKS, OUTLET STRUCTURES, RIP RAP OR GABION STRUCTURES, AND INLETS.
  - SEDIMENT REMOVAL SHOULD BE CONDUCTED WHEN THE BASIN IS COMPLETELY DRY. SEDIMENT SHOULD BE DISPOSED OF PROPERLY AND ONCE SEDIMENT IS REMOVED, DISTURBED AREAS NEED TO BE IMMEDIATELY STABILIZED AND REVEGETATED.
  - MOVING AND/OR TRIMMING OF VEGETATION SHOULD BE PERFORMED AS NECESSARY TO SUSTAIN THE SYSTEM, BUT ALL DETRITUS SHOULD BE REMOVED FROM THE BASIN. VEGETATED AREAS SHOULD BE INSPECTED ANNUALLY FOR EROSION. VEGETATED AREAS SHOULD BE INSPECTED ANNUALLY FOR UNWANTED GROWTH OF EXOTIC/INVASIVE SPECIES. VEGETATIVE COVER SHOULD BE MAINTAINED AT A MINIMUM OF 95 PERCENT. IF VEGETATIVE COVER HAS BEEN REDUCED BY 10%, VEGETATION SHOULD BE REESTABLISHED.

NOTE: SEQUENCE OF CONSTRUCTION STEPS 1 THROUGH 14 SHALL BE REFERRED TO, AS NECESSARY, THROUGHOUT THE CONSTRUCTION PROCESS.

1. UPON INSTALLATION OR STABILIZATION OF ALL PERIMETER CONTROL BMP'S AND AT LEAST 3 DAYS PRIOR TO PROCEEDING WITH THE BULK EARTH DISTURBANCE ACTIVITIES, THE PERMITTEE OR CO-PERMITTEE SHALL PROVIDE NOTIFICATION TO THE DEPARTMENT OR AUTHORIZED CONSERVATION DISTRICT.
2. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED BY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION. EACH STEP OF THE SEQUENCE SHALL BE COMPLETED BEFORE PROCEEDING TO THE NEXT STEP, EXCEPT WHERE NOTED. CONSTRUCTION MAY OVERLAP INTO A SUBSEQUENT STAGE AS LONG AS ALL EROSION CONTROL MEASURES HAVE BEEN INSTALLED IN THE PREVIOUS STAGE.
3. ALL BLASTING ACTIVITY, IF REQUIRED, SHALL BE DONE IN ACCORDANCE WITH THE LOCAL, STATE AND FEDERAL REGULATIONS. CONTRACTOR SHALL NOTIFY OWNER AND ALL REGULATORY AGENCIES IN WRITING PRIOR AND OBTAIN ANY NECESSARY PERMITS PRIOR TO ANY BLASTING ACTIVITIES.
4. INSTALLATION OF ORANGE CONSTRUCTION FENCING TO PROTECT AREAS OF PROPOSED WETLANDS SHALL BE INSTALLED PRIOR TO ANY EARTH DISTURBANCE TO AVOID PERMANENT IMPACTS.
5. WATER PUMPING FROM WORK AREAS MUST BE TREATED FOR SEDIMENT REMOVAL PRIOR TO DISCHARGING TO A SURFACE WATER. A PUMPED WATER FILTER BAG DETAIL HAS BEEN PROVIDED ON CE-502- SOIL EROSION AND SEDIMENT CONTROL DETAILS.
6. BEFORE DISPOSING OF SOIL OR RECEIVING BORROW FOR THE SITE, THE OPERATOR MUST ASSURE THAT EACH SOIL OR BORROW AREA HAS AN EROSION AND SEDIMENT CONTROL PLAN APPROVED BY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT, AND WHICH IS BEING IMPLEMENTED AND MAINTAINED ACCORDING TO CHAPTER 102 REGULATIONS. THE OPERATOR SHALL ALSO NOTIFY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT IN WRITING OF ALL RECEIVING SOIL AND BORROW AREAS WHEN THEY HAVE BEEN IDENTIFIED.
7. LIMIT CLEARING AND GRUBBING TO ACCESS THE SEDIMENT TRAP AREAS AND DIVERSION SOCK INSTALLATION DURING THE INITIAL PROJECT CONSTRUCTION. ALL SEDIMENT TRAP AREAS MUST BE CLEARED AND GRUBBED FIRST AND THESE EROSION CONTROL MEASURES INSTALLED BEFORE THE TRIBUTARY AREAS TO THESE TRAPS CAN BE CLEARED AND GRUBBED. IF ADDITIONAL FILL IS NECESSARY FOR THE SEDIMENT TRAP INSTALLATION, THE BORROW FILL SHALL BE TAKEN FROM AREAS IMMEDIATELY UPSTREAM OF THE TRAP LOCATION IN ORDER TO MINIMIZE DISTURBANCE. CLEAR AND GRUB AREA OF PROPOSED DISTURBED AREA FOR EACH APPROPRIATE CONSTRUCTION SECTION, ONE AT A TIME.
8. SEDIMENT TRAPS SHALL REMAIN FUNCTIONAL UNTIL ALL UPSLOPE CONTRIBUTING DRAINAGE AREAS ARE STABILIZED. SEDIMENT TRAPS ARE TO BE STABILIZED AND FUNCTIONING PROPERLY PRIOR TO ANY FURTHER DISTURBANCE ACTIVITIES. UPON INSTALLATION OF THE TEMPORARY SEDIMENT TRAP RISERS, SKIMMER, OR PERMANENT OUTLET CONTROL STRUCTURE, AN IMMEDIATE INSPECTION OF THE RISER(S), SKIMMER OR OUTLET CONTROL STRUCTURE SHALL BE CONDUCTED BY A QUALIFIED SITE REPRESENTATIVE AND THE NORTHAMPTON COUNTY CONSERVATION DISTRICT SHALL BE NOTIFIED IN WRITING THAT THE PROPER EROSION CONTROL DEVICE IS INSTALLED AND SEALED. PER THE SOIL EROSION AND SEDIMENT CONTROL PLANS, SEDIMENT TRAPS MUST BE PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES. A SITE INSPECTION AND APPROVAL BY THE CONSERVATION DISTRICT IS REQUIRED PRIOR TO REMOVAL OR CONVERSION OF SEDIMENT TRAPS AND BASINS. THE SEDIMENT TRAPS WILL BE DECOMMISSIONED WHEN ALL UPSTREAM AREAS HAVE BEEN STABILIZED AND APPROVED BY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT.
9. ONCE ALL THE TEMPORARY EROSION CONTROLS HAVE BEEN CONSTRUCTED AND STABILIZED, THE CONTRACTOR CAN PROCEED WITH FURTHER CONSTRUCTION WITHIN THE CURRENT STAGE. THE CONTRACTOR CAN ONLY WORK WITHIN THE CURRENT STAGE AND THE BORROW AREA DELINEATED BY THE CURRENT STAGE BOUNDARY. IF FOR ANY REASON, EARTH DISTURBANCE IS REQUIRED WITHIN A SEPARATE STAGE, THE CONTRACTOR MUST NOTIFY THE CONSERVATION DISTRICT. ONCE THE CURRENT STAGE HAS BEEN TEMPORARILY STABILIZED, CONSTRUCTION MAY BEGIN IN THE FURTHER STAGES, WITH APPROVAL FROM THE CONSERVATION DISTRICT.
10. PLACE TOPSOIL AND EXCESS FILL MATERIAL IN AREAS DESIGNATED ON THE PLAN, WITHIN THE CURRENT STAGE BOUNDARY. INSTALL LANDLOK S-2 MATTING (OR APPROVED EQUAL) ON ALL SLOPES STEEPER THAN 3:1 IMMEDIATELY AFTER ANY GRADING STEEPER THAN 3:1 HAS BEEN COMPLETED. PERFORM TEMPORARY STABILIZATION AND/OR PERMANENT STABILIZATION PROCEDURES IMMEDIATELY AFTER ANY EARTHMOVING ACTIVITIES HAVE BEEN COMPLETED. STABILIZATION OF FILL SLOPES SHALL BE IN 15 TO 25 FOOT VERTICAL INCREMENTS, NO MORE THAN 15,000 SQUARE FEET OF DISTURBED AREA SHALL REACH FINAL GRADE BEFORE INITIATING SEEDING AND MULCHING OPERATIONS. UPON COMPLETION OR TEMPORARY CESSATION OF THE EARTH DISTURBANCE ACTIVITY THAT WILL EXCEED FOUR DAYS, OR ANY STAGE THEREOF, THE PROJECT SITE SHALL BE IMMEDIATELY STABILIZED WITH THE APPROPRIATE TEMPORARY OR PERMANENT STABILIZATION, THE UNDERGROUND UTILITIES WITHIN THE ROADWAY SHALL BE INSTALLED AT THE SAME TIME AS THE ROAD GRADING TO AVOID POTENTIAL CONFLICTS.
11. THE EARTH MOVING ACTIVITY SHALL BEGIN IN AREAS OF CUT SO THAT THE CUTS CAN BE PLACED IN AREAS OF FILL. PLACE TOPSOIL AND EXCESS FILL MATERIAL IN AREAS DESIGNATED ON THE PLAN. ANY FILL IMPORTED TO THE SITE SHALL BE PLACED IN THE AREAS DESIGNATED ON THE PLANS. IMMEDIATELY INSTALL EROSION CONTROL BLANKETS (LANDLOK S2 OR APPROVED EQUAL) IN ALL AREAS EXCEEDING 3:1 SLOPE AS SHOWN ON THE PLANS. STABILIZATION OF FILL SLOPES SHALL BE IN 15 TO 25 FOOT VERTICAL INCREMENTS. ALL UNDISTURBED AREAS SHALL BE STABILIZED IMMEDIATELY WITH TEMPORARY SEED AND MULCH AS PER NOTES ON DRAWING CE-503.
12. AS PAVED SECTIONS OF ROADWAY ARE COMPLETED THROUGHOUT THE SITE, RELOCATE THE ROCK CONSTRUCTION ENTRANCES AS NECESSARY, TO CONTAIN ANY SEDIMENT ON-SITE AND OFF OF THE FINISHED PAVEMENT SECTION TO THE GREATEST EXTENT POSSIBLE.
13. FOR ALL BMP CONSTRUCTION, REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING.
14. UPON CESSATION OF CONSTRUCTION ACTIVITIES FOR 4 DAYS OR LONGER, ALL DISTURBED AREAS SHALL BE STABILIZED ACCORDING TO THE TEMPORARY STABILIZATION METHODS AND STANDARDS PROVIDED ON CE-503.

SITE SPECIFIC SEQUENCE OF CONSTRUCTION

STAGE 1

1. INSTALL ROCK CONSTRUCTION ENTRANCE IMMEDIATELY BEFORE INITIAL DISTURBANCES AT SITE ACCESS POINT ON EASTON ROAD, AS SHOWN ON CE-100 AND TEMPORARY ROCK CONSTRUCTION ON RINGHOFFER ROAD. INSTALL FES-1 AND FES-2 AND ASSOCIATED OUTLET PROTECTION CONCURRENTLY WITH THE ROCK CONSTRUCTION ENTRANCE. TEMPORARY ROCK CONSTRUCTION ENTRANCE ON RINGHOFFER ROAD IS FOR DIVERSION SOCK/TEMPORARY PIPE BYPASS SYSTEM INSTALLATION AND UTILITY INSTALLATIONS ONLY. ROCK CONSTRUCTION ENTRANCES SHALL BE UNDERLAIN BY FILTER FABRIC AS INDICATED ON THE DETAIL. ALL CONSTRUCTION ACTIVITY SHALL USE ONLY THIS AREA OF INGRESS AND EGRESS, AS CONDITIONS WARRANT, THESE LOCATIONS MAY BE MODIFIED WITH THE PRIOR APPROVAL FROM THE NORTHAMPTON COUNTY CONSERVATION DISTRICT. NOTE: CONSTRUCTION ACCESS FROM RINGHOFFER ROAD IS PROHIBITED FOR MASS EARTHWORK OPERATIONS.
2. INSTALL COMPOST FILTER SOCKS, TEMPORARY LAYDOWN AREAS, AND SOIL STOCKPILES, WHERE SHOWN ON CE-101 - CE-103 ON LOT 55. METHOD OF INSTALLATION AND MAINTENANCE SHALL BE IN ACCORDANCE WITH PADEP REQUIREMENTS AND AS INDICATED ON THE DETAILS. THE INSTALLATION OF THE CONSTRUCTION ENTRANCE AND COMPOST FILTER SOCKS SHALL BE DONE PRIOR TO ANY OTHER EARTH DISTURBANCES.
3. EXCAVATE SEDIMENT TRAPS #1 AND #2 TO THE ELEVATIONS SHOWN ON THE PLAN. INSTALL DEWATERING FACILITIES AND CLEAN OUT STAKES AS SHOWN ON CE-101 - CE-103. ONCE COMPLETED, STABILIZE THE SEDIMENT TRAPS WITH EROSION CONTROL MATTING AS INDICATED ON THE DETAILS. THE SEDIMENT TRAPS SHALL REMAIN FUNCTIONAL UNTIL ALL UPSLOPE CONTRIBUTING DRAINAGE AREAS ARE STABILIZED.
4. INSTALL PERMANENT STORM SEWER CONVEYANCE SYSTEM AND ASSOCIATED STRUCTURES THAT WILL ACCEPT DRAINAGE FROM THE CHANNELS. CONSTRUCT PROPOSED VEGETATED SWALES #4, #5, #6A AND #6B AS SHOWN ON SHEETS CE-101 - CE-103. ALL SWALES SHALL BE INSTALLED FROM DOWNSTREAM TO UPSTREAM. INSTALL TEMPORARY CHANNEL LINERS. REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING. **PCSM CRITICAL STAGE.**
5. ROUGH GRADE THE REMAINDER OF LOT 55 AS IDENTIFIED ON DRAWING CE-101 - CE-103.
6. INSTALL COMPOST FILTER SOCKS ON LOT 56 AS SHOWN ON DRAWINGS CE-101 - CE-103. INSTALL TEMPORARY SLOPE PIPES AND TEMPORARY DIVERSION STORM SEWER PIPING FROM DOWNSTREAM TO UPSTREAM. AS CATCH BASINS ARE CONSTRUCTED, INSTALL INLET PROTECTION WHERE SPECIFIED ON SHEET CE-101 - CE-103 AND MAINTAIN AS INDICATED ON THE PLAN. ADVANCE TRENCH EXCAVATION SHALL BE LIMITED TO THE LENGTH OF PIPE THAT CAN BE COMPLETED IN THE SAME DAY.
7. INSTALL DIVERSION SOCKS FOR BYPASS AREA FROM TEMPORARY SLOPE PIPE TO UPSTREAM AREAS AS DEPICTED ON DRAWINGS CE-101 - CE-103.
8. INSTALL CULVERT CROSSING PER DETAILS ON CE-503 AND E&S PLAN DRAWING CE-301. REFER TO CULVERT STREAM CROSSING SEQUENCE OF CONSTRUCTION ON DRAWING CE-301.
9. INSTALL WATER, GAS AND ELECTRIC UTILITIES FROM LOT 56 TO EASTON ROAD INCLUDING THE WATER UTILITY STREAM CROSSING. ADVANCE TRENCH EXCAVATION SHALL BE LIMITED TO THE LENGTH OF PIPE THAT CAN BE COMPLETED IN THE SAME DAY. REFER TO STREAM CROSSING DETAILS ON CE-503 AND E&S PLAN DRAWING CE-301. REFER TO UTILITY STREAM CROSSING SEQUENCE OF CONSTRUCTION ON DRAWING CE-301.
10. PLACE GRAVEL SUBBASE AND BITUMINOUS BASE COURSE IN AREAS OF PROPOSED PAVEMENT ON-SITE UP TO THE STREAM CROSSING LOCATION.
11. INSTALL SOIL AMENDMENTS/RESTORATION ON AREAS OF EARTH DISTURBANCE ASSOCIATED WITH STAGE 1, UP TO THE STREAM CROSSING. THE CONSERVATION DISTRICT SHALL BE CONTACTED PRIOR TO PCSM BMP INSTALLATION TO CONFIRM ADEQUATE VEGETATIVE COVERAGE ON-SITE. REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING. **PCSM CRITICAL STAGE.**
12. COMPLETE FINAL SITE GRADING OF ALL APPROPRIATE AREAS ON LOT 56 AND THE PORTIONS OF THE ROADWAY ON LOT 56. STABILIZE WITH PERMANENT SEED AND MULCH AS PER NOTES ON DRAWING CE-503. REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING.
13. REMOVE TEMPORARY ROCK CONSTRUCTION ENTRANCE ON RINGHOFFER ROAD. INSTALL TEMPORARY JERSEY BARRIERS TO PREVENT ACCESS TO THE SITE FROM THIS LOCATION.

STAGE 2

14. INSTALL ADDITIONAL COMPOST FILTER SOCKS, TEMPORARY LAYDOWN AREA AND SOIL STOCKPILES, WHERE SHOWN ON CE-201 - CE-203.
15. SEDIMENT TRAPS #3, #4 AND #5 SHOULD BE EXCAVATED TO ELEVATIONS SHOWN ON DRAWING CE-201 - 203. INSTALL THE LAST SECTIONS OF THE STORM PIPE NETWORKS THAT DRAIN INTO THE SEDIMENT TRAPS ALONG WITH THE RIP RAP APRONS. INSTALL THE OUTLET PIPE BARREL AND CONNECTION TO OUTLET CONTROL STRUCTURE. INSTALL ANTISEEP COLLARS ALONG OUTLET PIPE FROM BASIN AND WATERPROOF SEALS ON ALL STRUCTURES WITHIN THE TRAP. INSTALL THE PERMANENT OUTLET STRUCTURE, THE SKIMMER SHOULD BE INSTALLED ALONG WITH THE CLEANOUT STAKE AS SHOWN ON THE DETAILS. THE SKIMMER SHALL BE ORIFICE-PLATED TO THE PERMANENT OUTLET CONTROL STRUCTURE. THE CLEANOUT STAKE SHALL BE PLACED. INSTALL BARRIES IN THE SEDIMENT TRAPS. ONCE COMPLETED, STABILIZE THE SEDIMENT TRAPS AS INDICATED ON DETAILS. THE SEDIMENT TRAPS SHALL REMAIN FUNCTIONAL UNTIL ALL UPSLOPE CONTRIBUTING DRAINAGE AREAS ARE STABILIZED. THE SEDIMENT TRAPS ARE TO
- BE STABILIZED AND FUNCTIONING PROPERLY PRIOR TO ANY FURTHER DISTURBANCE ACTIVITIES. UPON INSTALLATION OF THE SEDIMENT TRAP RISER AND SKIMMER, AN IMMEDIATE INSPECTION OF THE RISER AND SKIMMER SHALL BE CONDUCTED BY A QUALIFIED SITE REPRESENTATIVE, AND THE NORTHAMPTON COUNTY CONSERVATION DISTRICT SHALL BE NOTIFIED IN WRITING THAT THE PROPER EROSION CONTROL DEVICE IS INSTALLED AND SEALED. PER THE SOIL EROSION AND SEDIMENT CONTROL PLANS, SEDIMENT TRAPS MUST BE PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES. THE SEDIMENT TRAPS SHALL REMAIN FUNCTIONAL UNTIL ALL UPSLOPE CONTRIBUTING DRAINAGE AREAS ARE STABILIZED. A SITE INSPECTION AND APPROVAL BY THE CONSERVATION DISTRICT IS REQUIRED PRIOR TO REMOVAL OR CONVERSION OF SEDIMENT BASINS. THE SEDIMENT TRAPS WILL BE DECOMMISSIONED WHEN ALL UPSTREAM AREAS HAVE BEEN STABILIZED AND APPROVED BY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT. INSTALL PERMANENT STORM PIPE FROM HW-4 TO OCS-2A. SEAL AND MARK LOCATION FOR FUTURE USE. NOTE: THIS OUTLET IS NOT TO BE USED DURING THE TEMPORARY PHASE.
16. PERFORM SITE CLEARING AND GRUBBING ON LOT 56.
17. INSTALL TEMPORARY AND PERMANENT STORM SEWER CONVEYANCE SYSTEM AND ASSOCIATED STRUCTURES THAT WILL ACCEPT DRAINAGE FROM THE CHANNELS. CONSTRUCT PROPOSED VEGETATED SWALES #1, #2C, #2B, #2A, #3B AND #3A AS SHOWN ON SHEET CE-201 - CE-203. ALL SWALES SHALL BE INSTALLED FROM DOWNSTREAM TO UPSTREAM. INSTALL TEMPORARY SWALE LINERS. REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING.
18. INSTALL REMAINING PORTION OF THE PERMANENT STORM DRAINAGE SYSTEM. THE STORM DRAINAGE SYSTEM MUST BE INSTALLED FROM DOWNSTREAM POINT OF DISCHARGE INTO SEDIMENT TRAPS TO UPSTREAM POINTS. ADVANCE TRENCH EXCAVATION SHOULD BE LIMITED TO THE LENGTH OF PIPE THAT CAN BE COMPLETED IN THE SAME DAY. INSTALL INLET PROTECTION PER DETAIL PROVIDED ON DRAWING CE-501. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE ROADS RECEIVE THE FINAL WEARING COURSE.
19. ROUGH GRADE THE REMAINDER OF THE SITE AS IDENTIFIED ON DRAWINGS CE-201 - CE-203. BEGIN CONSTRUCTION OF PAD SITE IMPROVEMENTS AND PERIMETER FENCING.
20. CONSTRUCT THE REMAINING ON-SITE UTILITIES AS IDENTIFIED ON DRAWING CE-201 - CE-203 OF THE E&S PLANS. ADVANCE TRENCH EXCAVATION SHALL BE LIMITED TO THE LENGTH OF PIPE THAT CAN BE COMPLETED IN THE SAME DAY. ON THE DAY FOLLOWING UTILITY INSTALLATION, THE TRENCH AREA SHALL BE GRADED TO SUBGRADE ELEVATION. HYDROSEEDING AND/OR LIQUID MULCHING OF ALL DISTURBED AREAS SHALL BE COMPLETED AT THE END OF EACH WORK DAY.
21. PLACE GRAVEL SUBBASE AND BITUMINOUS BASE COURSE IN AREAS OF PROPOSED PAVEMENT ON LOT 56. CONSTRUCT BUILDINGS AND ASSOCIATED STRUCTURES.
22. INSTALL SOIL AMENDMENTS/RESTORATION ON AREAS OF EARTH DISTURBANCE. THE CONSERVATION DISTRICT SHALL BE CONTACTED PRIOR TO PCSM BMP INSTALLATION TO CONFIRM ADEQUATE VEGETATIVE COVERAGE ON-SITE. REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS, FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING. **PCSM CRITICAL STAGE.**
23. COMPLETE FINAL SITE GRADING AND LANDSCAPE OF ALL APPROPRIATE AREAS. STABILIZE WITH PERMANENT SEED AND MULCH AS PER NOTES ON DRAWING CE-503. REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING.
24. CONSTRUCTION ENTRANCE, SILT FENCE, TREE PROTECTION FENCE, INLET PROTECTION, SILT FENCE, ROCK FILTER OUTLETS, SEDIMENT TRAPS SHALL BE MAINTAINED UNTIL ALL IMPROVEMENTS TO THE SITE ARE COMPLETED. ROAD AREAS ARE PAVED, AND 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION HAS BEEN ESTABLISHED. IF SEDIMENT BASINS/TRAPS ARE CONVERTED FOR ANY REASON PRIOR TO 70% STABILIZATION, AND THE ON-LOT BMP'S BECOME THE PRIMARY BMP'S.
25. ONCE ALL PERMANENT MEASURES HAVE BEEN INSTALLED, CLEAN OUT ACCUMULATED SILT FROM THE SEDIMENT TRAPS, GRADE SEDIMENT TRAPS AND SPILLWAYS TO THE PERMANENT ELEVATIONS SHOWN ON THE PCSM PLANS. REMOVE THE CONSTRUCTION ENTRANCES, SILT FENCE, COMPOST FILTER SOCK, INLET PROTECTION, DIVERSION SOCKS AND THE ROCK FILTERS. ALL DISTURBED AREAS CAUSED BY THE REMOVAL OF TEMPORARY SEDIMENT POLLUTION CONTROL DEVICES MUST BE PERMANENTLY STABILIZED. CONTRACTOR MUST SCHEDULE A SITE INSPECTION WITH NORTHAMPTON COUNTY CONSERVATION DISTRICT PRIOR TO REMOVAL OR CONVERSION OF SEDIMENT TRAPS. THE NOTICE OF TERMINATION (N.O.T.) MUST BE SUBMITTED. REFER TO THE POST CONSTRUCTION STORMWATER MANAGEMENT PLANS, FOR SPECIFIC BMP INSTALLATION GUIDELINES AND SEQUENCING.
26. ALL PCSM BMP'S SHALL BE INSPECTED BY A LICENSED PROFESSIONAL TO ENSURE THAT THEY HAVE NOT BEEN IMPACTED BY CONSTRUCTION ACTIVITIES.
27. RESTORE TEMPORARY LAYDOWN AREAS AS SHOWN ON CE-200.
28. UPON STABILIZATION OF THE AREA DRAINING TO THE SEDIMENT TRAPS, CONVERT THE SEDIMENT TRAPS TO THE PROPOSED BASINS
- #1, #2, #2A, #3, AND #4 AS SHOWN ON THE PLANS IN ACCORDANCE WITH PADEP REQUIREMENTS. INSTALL PERMANENT RIP RAP APRONS FOR BASIN DISCHARGES AND COMPLETE CONSTRUCTION OF BASIN BERMS. THE SEQUENCE INCLUDES:
- A. PUMP REMAINING WATER FROM THE SEDIMENT TRAPS USING THE DEWATERING FACILITY AS DETAILED ON THE PLAN.
- B. REMOVE AND DISPOSE OF REMAINING SEDIMENT
- C. REMOVE CLEAN OUT STAKE AND DEWATERING FACILITY
- D. EXCAVATE TO FINAL GRADE OF PROPOSED BASIN ELEVATIONS AS SHOWN ON THE PLANS.
- E. SEED BASIN BOTTOM AND BERMS AND STABILIZE BERM SLOPES WITH EROSION CONTROL MATTING AS DETAILED ON THE PLANS.
- CONVERSION OF THE SEDIMENT TRAPS TO PERMANENT PCSM BMP'S IS A PCSM CRITICAL STAGE.**

SEEDING & STABILIZATION NOTES:

- TEMPORARY SEEDING
- A) THE FOLLOWING SURFACES OF THE SITE SHALL BE TEMPORARILY SEEDED AND
- 1) THE SURFACE OF TOPSOIL STOCKPILES.
- 2) THE SURFACE OF EXPOSED EARTH AREAS NOT SUBJECT TO CONSTRUCTION
- B) SEEDING SHALL OCCUR IMMEDIATELY AFTER THE ESTABLISHMENT OF THE TOPSOIL STOCKPILES OR RICH GRADDED AREAS. THE FOLLOWING SEED SHALL BE PLANTED:
- RYEGRASS - BLUE TAG CERTIFIED - 100% - 4 TO 5 LBS. PER 1,000 SQUARE FOOT.
- ANNUAL TYPE - TYPICAL
- PERENNIAL TYPE - NOT APPLICABLE
- C) PREPARE AREAS TO BE SEEDD AS FOLLOWS:
- 1) REMOVE ALL DEBRIS, INCLUDING LARGE STONE. TILL SOIL TO A DEPTH OF FOUR INCHES TO SIX INCHES. APPLY PULVERIZED AGRICULTURAL GRADED LIME AT A RATE OF 40 LBS. PER 1,000 SQUARE FEET.
- 2) BEFORE AUGUST, SEPTEMBER OR OCTOBER SEEDING, APPLY 12.5 LBS. OF 10-10-10 FERTILIZER PER 1,000 SQUARE FEET. BEFORE FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY OR NOVEMBER SEEDING, APPLY 40 LBS. OF 10-10-10 FERTILIZER PER 1,000 SQUARE FEET. WORK INTO TOP INCH OF SOIL.
- a) SOW SEED AT THE INDICATED RATE. DIVIDE SEED INTO TWO EQUAL LOTS. SOW ONE LOT IN ONE DIRECTION. SOW SECOND LOT AT RIGHT ANGLE TO FIRST LOT.
- b) PLACE SEEDD AREA SLIGHTLY. ROLL SURFACE LIGHTLY TO FIRM SOIL AROUND SEED.
- c) PLACE CLEAN, DRY STRAW OF ANY MULCH WITHIN 48 HOURS AFTER SEEDING. PLACE AT THE RATE OF 1,200 LBS. PER 1,000 SQUARE YARDS.

TEMPORARY MULCHING

- A) MULCH PROPOSED LANDSCAPE AREAS OR TOPSOIL STOCKPILES IF EARTHWORK IS COMPLETED OUTSIDE OF THE RECOMMENDED PLANTING SEASONS FOR TEMPORARY SEEDING OR DUE TO UNFAVORABLE WEATHER CONDITIONS.
- B) MULCH SHALL BE APPLIED IMMEDIATELY FOLLOWING THE ESTABLISHMENT OF TOPSOIL STOCKPILE OR ROUGH GRADING.
- C) MULCH WITH SUITABLE FIBROUS GROUND, SHREDDED AGED HARDWOOD, PINEWOOD BARK, STRAW, OR RICH GRADDED AND CONTINUOUSLY TO A LOOSSED DEPTH OF 3 INCHES MINIMUM. ANCHOR AS REQUIRED.
- D) COMPLETELY MAINTAIN MULCHED AREAS UNTIL PERMANENT STABILIZATION MEASURES ARE COMPLETE. REAPPLY MULCH MATERIALS WHICH BECOME DISLODGED AT INITIAL OR MODIFIED RATES AS NECESSARY. IF A SLOPE FAILURE OCCURS WHICH REQUIRES REDRESSING, EXCAVATION, OR THE ESTABLISHMENT OF A NEW SLOPE, REPLACE MULCH AS NECESSARY.

PERMANENT SEEDING

- A) PERMANENT SEEDING SHALL OCCUR IMMEDIATELY AFTER THE FINAL GRADING IS COMPLETED. THE FOLLOWING SEED SHALL BE CONSISTED UNLESS OTHERWISE SPECIFIED ON THE PLANS OR DIRECTED IN THE FIELD.
- FORMULA B, BLUE TAG CERTIFIED, STANDS OF:
- 50% KENTUCKY BLUEGRASS MIXTURE
  - 30% CREEPING RED FESCUE
  - 20% PERENNIAL RYEGRASS MIXTURE
- SPREAD AT A RATE OF 21.0 LBS. PER 1,000 SQUARE YARDS
- B) REMOVE ALL DEBRIS, INCLUDING LARGE STONES. TILL SOIL TO A DEPTH OF FOUR INCHES TO SIX INCHES. APPLY LIME AT A RATE OF 6 TONS PER ACRE. BEFORE JUNE 15, APPLY 1,000 LBS. OF 10-20-20 FERTILIZER PER ACRE. WORK FERTILIZER INTO TOP INCH OF SOIL.
- C) SEED ONLY AT THE FOLLOWING TIMES: MARCH 15 TO JUNE 1, AND AUGUST 1 TO OCTOBER 15.
- D) APPLY SEED AT A RATE OF 21.0 LBS. PER 1,000 SQUARE YARDS. DIVIDE SEED INTO TWO EQUAL LOTS. SOW ONE LOT IN ONE DIRECTION. SOW SECOND LOT AT RIGHT ANGLE TO FIRST LOT. RAKE SEEDD AREA SLIGHTLY. ROLL SURFACE LIGHTLY TO FIRM SOIL AROUND SEED.
- E) MULCH SEEDD AREAS WITH STRAW OR HAY AT THE RATE OF 3 TONS PER ACRE. ANCHOR MULCH. COMPLY WITH THE REQUIREMENTS OF SECTION B05 MULCHING, PENNDOT PUBLICATION 40B. ANCHOR MUST BE SPECIFIED.

SOIL AMENDMENT	TABLE 11.2 SOIL AMENDMENT APPLICATION RATE EQUIVALENTS				NOTES
	PER ACRE	PER 1,000 SQ. FT.	PER 1,000 SQ. YD.		
AGRICULTURAL LIME	6 TONS	240 LB	2,480 LB		OR AS PER SOIL TEST; MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS
10-10-20 FERTILIZER	1,000 LB	25 LB	210 LB		OR AS PER SOIL TEST; MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS
TEMPORARY SEEDING APPLICATION RATE					
AGRICULTURAL LIME	1 TON	40 LB	410 LB		TYPICALLY NOT REQUIRED FOR TOPSOIL STOCKPILES
10-10-20 FERTILIZER	500 LB	12.5 LB	100 LB		TYPICALLY NOT REQUIRED FOR TOPSOIL STOCKPILES

STABILIZATION METHODS AND STANDARDS

CRITICAL STAGES OF PCSM PLAN IMPLEMENTATION

THE CRITICAL STAGES OF PCSM PLAN IMPLEMENTATION ARE THE FOLLOWING. THE INSTALLATION OF THE DETENTION BASINS, SOIL AMENDMENT AREAS, VEGETATED SWALES AND ALL ASSOCIATED COMPONENTS (AND AT ALL OTHER TIMES AS DEEMED APPROPRIATE BY THE DEPARTMENT OR NORTHAMPTON COUNTY CONSERVATION DISTRICT) SHALL BE CONSTRUCTED WITH OVERSIGHT BY A LICENSED PROFESSIONAL OR THEIR DESIGNEE.

BMP FAILURE:

BMP FAILURE IS DEFINED AS WHEN THE DESIGN NO LONGER PROVIDES THE BENEFIT OR PERFORMANCE ANTICIPATED. IN THE CASE OF STORMWATER INFILTRATION BMP'S FAILURE MAY BE A REDUCTION IN THE VOLUME OF RUNOFF ANTICIPATED OR THE DISCHARGE OF STORMWATER WITH EXCESSIVE LEVELS OF SOME POLLUTANTS. FOR PREVENTATIVE AND CORRECTIVE MEASURES FOR THE SPECIFIC BMP'S SEE THE BMP MAINTENANCE PLAN ON THIS SHEET.

BMP EROSION:

ANY EROSION CAUSED BY DISCHARGES FROM BMP'S WITHIN THE SITE SHALL BE REPAIRED AND STABILIZED.

ALTERATION OF BMP NOTES:

NO PERSON SHALL MODIFY, REMOVE, FILL, LANDSCAPE, OBSTRUCT, OR ALTER ANY EXISTING STORMWATER CONTROL, OR BMP UNLESS IT IS PART OF AN APPROVED MAINTENANCE PROGRAM WITHOUT THE PRIOR WRITTEN APPROVAL OF CITY OF BETHLEHEM.

NO PERSON SHALL PLACE ANY STRUCTURE, FILL, LANDSCAPING, OR VEGETATION INTO A STORMWATER CONTROL, OR BMP OR WITHIN A DRAINAGE EASEMENT THAT WOULD LIMIT OR ALTER THE FUNCTIONING OF THE STORMWATER CONTROL OR BMP WITHOUT THE PRIOR WRITTEN APPROVAL OF CITY OF BETHLEHEM.

PRINCIPLES OF PCSM PLANNING AND DESIGN

THE MANAGEMENT OF POST CONSTRUCTION STORMWATER WILL BE UNDERTAKEN IN ACCORDANCE WITH THE FOLLOWING PRINCIPLES:

- PRESERVE THE INTEGRITY OF STREAM CHANNELS AND MAINTAIN AND PROTECT THE PHYSICAL, BIOLOGICAL AND CHEMICAL QUALITIES OF THE RECEIVING STREAM
- PREVENT ANY INCREASE IN THE RATE OF STORMWATER RUNOFF
- MINIMIZE ANY INCREASE IN STORMWATER VOLUME
- MINIMIZE IMPERVIOUS AREAS
- MAXIMIZE PROTECTION OF EXISTING DRAINAGE FEATURES AND VEGETATION
- MINIMIZE LAND CLEARING AND GRADING
- MINIMIZE SOIL COMPACTION
- UTILIZE OTHER STRUCTURAL OR NONSTRUCTURAL BMP'S THAT PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF

PROJECT WASTES

ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.14 ET SEQ. 271.1 AND 287.1 ET SEQ. THE MATERIAL SHALL ALSO BE DISPOSED OF IN ACCORDANCE WITH THE PADEP APPROVED CLEAN UP PLAN. THE CONSTRUCTION WASTES INCLUDE, BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, BUILDING MATERIALS, BUILDING MATERIALS, CONCRETE WASH WATER, SANITARY WASHES, ETC. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED OR DISCHARGED AT THE SITE.

RECEIVING WATERS AND CLASSIFICATION

RECEIVING WATER: UNIMPROVED TRIBUTARY TO SAUCON CREEK  
CLASSIFICATION: CWF, MIF

GEOLOGIC FORMATIONS AND SOIL CONDITIONS

THE SITE IS LOCATED IN AN AREA WITH KARST GEOLOGY, THEREFORE INCREASING THE POSSIBILITY OF SINKHOLES FORMING. SINKHOLE REMEDIATION DETAILS HAVE BEEN PROPOSED ON SHEET CG-501.

LAND COVER

THE EXISTING LAND COVER OF THE SUBJECT PROPERTY CONSISTS OF EXISTING WOODLANDS,



# SOIL AMENDMENT & RESTORATION SPECIFICATIONS FOR MINOR COMPACTION

THE FOLLOWING SPECIFICATIONS ARE PROVIDED FOR INFORMATION PURPOSES ONLY. THESE SPECIFICATIONS INCLUDE INFORMATION ON ACCEPTABLE MATERIALS FOR TYPICAL APPLICATIONS, BUT ARE BY NO MEANS EXCLUSIVE OR LIMITING.

- SCOPE
  - THIS SPECIFICATION COVERS THE USE OF COMPOST FOR SOIL AMENDMENT AND THE MECHANICAL RESTORATION OF COMPACTED, ERODED AND NON-VEGETATED SOILS. SOIL AMENDMENT AND RESTORATION IS NECESSARY WHERE EXISTING SOIL HAS BEEN USED UNHEALTHY IN ORDER TO RESTORE SOIL STRUCTURE AND FUNCTION, INCREASE INFILTRATION POTENTIAL AND SUPPORT HEALTHY VEGETATIVE COMMUNITIES.
  - SOIL AMENDMENT PREVENTS AND CONTROLS EROSION BY ENHANCING THE SOIL SURFACE TO PREVENT THE INITIAL DETACHMENT AND TRANSPORT OF SOIL PARTICLES.
- COMPOST MATERIALS
  - COMPOST PRODUCTS SPECIFIED FOR USE IN THIS APPLICATION ARE TO HAVE A BULK DENSITY OF LESS THAN 1.3 G/CM<sup>3</sup>, AS DESCRIBED IN TABLE 1 FOR SILT LOAMS. THE PRODUCT'S PARAMETERS WILL VARY BASED ON WHETHER VEGETATION WILL BE ESTABLISHED ON THE TREATED SLOPE.
  - ONLY COMPOST PRODUCTS THAT MEET ALL APPLICABLE STATE AND FEDERAL REGULATIONS PERTAINING TO ITS PRODUCTION AND DISTRIBUTION MAY BE USED IN THIS APPLICATION. APPROVED COMPOST PRODUCTS MUST MEET RELATED STATE AND FEDERAL CHEMICAL CONTAMINANT (E.G., HEAVY METALS, PESTICIDES, ETC.) AND PATHOGEN LIMIT STANDARDS PERTAINING TO THE FEEDSTOCKS (SOURCE MATERIALS) IN WHICH IT IS DERIVED.
  - VERY COARSE COMPOST SHOULD BE AVOIDED FOR SOIL AMENDMENT AS IT WILL MAKE PLANTING AND CROP ESTABLISHMENT MORE DIFFICULT.
  - NOTE 1 - SPECIFYING THE USE OF COMPOST PRODUCTS THAT ARE CERTIFIED BY THE U.S. COMPOSTING COUNCIL'S SEAL OF TESTING (STA) PROGRAM ([WWW.COMPOSTINGCOUNCIL.ORG](http://www.compostingcouncil.org)) WILL ALLOW FOR THE ACQUISITION OF PRODUCTS THAT ARE ANALYZED ON A ROUTINE BASIS, USING THE SPECIFIED TEST METHODS. STA PARTICIPANTS ARE ALSO REQUIRED TO PROVIDE A STANDARD PRODUCT LABEL TO ALL CUSTOMERS, ALLOWING EASY COMPARISON TO OTHER PRODUCTS.
- SUB-SOILING TO RELIEVE COMPACTION
  - BEFORE THE TIME THE COMPOST IS PLACED AND PREFERABLY WHEN EXCAVATION IS COMPLETED, THE SUBSOIL SHALL BE IN A LOOSE, FRAGILE CONDITION TO A DEPTH OF 8 INCHES BELOW FINAL TOPSOIL GRADE AND THERE SHALL BE NO EROSION RILLS OR WASHOUTS IN THE SUBSOIL SURFACE EXCEEDING 3 INCHES IN DEPTH.
  - TO ACHIEVE THIS CONDITION, SUBSOILING, RIPPING, OR SCARIFICATION OF THE SUBSOIL WILL BE REQUIRED. SUB-SOILING SHALL BE REQUIRED TO REDUCE SOIL COMPACTION IN ALL AREAS WHERE PLANT ESTABLISHMENT IS PLANNED. SUB-SOILING SHALL BE PERFORMED BY THE PRIME OR EXCAVATING CONTRACTOR AND SHALL OCCUR BEFORE COMPOST PLACEMENT.
  - SUBSOILED AREAS SHALL BE LOOSENEED TO LESS THAN 1400 KPA (200 PSF) TO A DEPTH OF 8 INCHES BELOW FINAL TOPSOIL GRADE. WHEN DIRECTED BY THE OWNER'S REPRESENTATIVE, THE CONTRACTOR SHALL VERIFY THAT THE SUB-SOILING WORK CONFORMS TO THE SPECIFIED DEPTH.
  - SUB-SOILING SHALL FORM A TWO-DIRECTIONAL GRID. CHANNELS SHALL BE CREATED BY A COMMERCIALY AVAILABLE, MULTI-SHANKED, PARALLELOGRAM IMPLEMENT (SOLID-SHANK RIPPER). THE EQUIPMENT SHALL BE CAPABLE OF EXERTING A PENETRATION FORCE NECESSARY FOR THE SITE. NO DISC CULTIVATORS, CHISEL PLOWS, OR SPRING-LOADED EQUIPMENT WILL BE ALLOWED. THE GRID CHANNELS SHALL BE SPACED A MINIMUM OF 12 INCHES TO A MAXIMUM OF 36 INCHES APART, DEPENDING ON EQUIPMENT, SITE CONDITIONS, AND THE SOIL MANAGEMENT PLAN. THE CHANNEL DEPTH SHALL BE A MINIMUM OF 8 INCHES OR AS SPECIFIED IN THE SOIL MANAGEMENT PLAN. IF SOILS ARE SATURATED, THE CONTRACTOR SHALL DELAY OPERATIONS UNTIL THE SOIL WILL NOT HOLD A BALL WHEN SQUEEZED. ONLY ONE PASS SHALL BE PERFORMED ON ERODIBLE SLOPES GREATER THAN 1 VERTICAL TO 3 HORIZONTAL. WHEN ONLY ONE PASS IS USED, WORK SHOULD BE AT RIGHT ANGLES TO THE DIRECTION OF SURFACE DRAINAGE, WHENEVER PRACTICAL.
  - EXCEPTIONS TO SUB-SOILING INCLUDE AREAS WITHIN THE DRIP LINE OF ANY EXISTING TREES OVER UTILITY INSTALLATIONS WITHIN 30 INCHES OF THE SURFACE, WHERE TRENCHING/DRAINAGE LINES ARE INSTALLED, WHERE COMPACTION IS BY DESIGN (ABUTMENTS, FOOTINGS, OR IN SLOPES), AND ON INACCESSIBLE SLOPES, AS APPROVED BY THE OWNER'S REPRESENTATIVE. IN CASES WHERE EXCEPTIONS OCCUR, THE CONTRACTOR SHALL OBSERVE A MINIMUM SETBACK OF 20 FEET OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE. ARCHAEOLOGICAL CLEARANCES MAY BE REQUIRED IN SOME INSTANCES.
- COMPOST SOIL AMENDMENT QUALITY
  - THE FINAL, RESULTING COMPOST SOIL AMENDMENT MUST MEET ALL OF THE MANDATORY CRITERIA IN TABLE 4, AND HAVE AN ORGANIC CONTENT OF AT LEAST 5 PERCENT.
- COMPOST SOIL AMENDMENT INSTALLATION
  - AFTER EXISTING TOPSOIL IS RE-SPREAD, SPREAD 2 INCHES OF APPROVED COMPOST ON EXISTING SOIL. TILL ADDED SOIL INTO EXISTING SOIL WITH A ROTARY TILLER THAT IS SET TO A DEPTH OF 6 INCHES TO ACHIEVE A MINIMUM SOIL TO COMPOST RATIO OF 2:1.

Soil Texture	Ideal Bulk Densities g/cm <sup>3</sup>	Bulk densities that may affect root growth g/cm <sup>3</sup>	Bulk densities that restrict root growth g/cm <sup>3</sup>
Sands, loamy sands	<1.60	1.69	1.8
Sandy loams, loams	<1.40	1.63	1.8
Sandy clay loams			
loams, clay loams	<1.40	1.6	1.75
Silt, silt loams	<1.30	1.6	1.75
Silt loams, silty clay loams	<1.10	1.55	1.65
Sandy clays, silty clays, some clay loams (35-45% clay)	<1.10	1.49	1.58
Clays (>45% clay)	<1.10	1.39	1.47

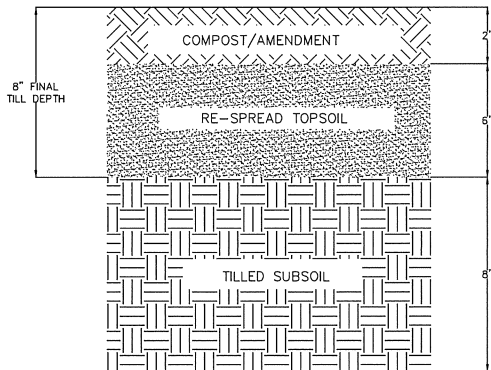
Source: Protecting Urban Soil Quality, USDA-NRCS

Table 4. Adsorbed Mass of Nutrients and Metals in Unvegetated Plot Runoff From 30-Minute, High-Intensity (100-mm/hr.) Rainstorm

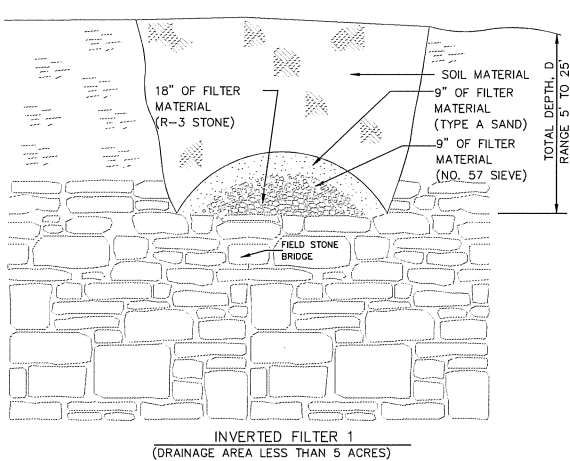
Element	Compost Treatments		Conventional Treatments	
	Biosolids	Yardwaste	Bioindustrial Compost	Compacted Subsoil
	Geometric Mean (mg)			
Chromium	0.01 <sup>b</sup>	<0.01 <sup>a</sup>	<0.01 <sup>b</sup>	0.92 <sup>c</sup>
Copper	0.02 <sup>b</sup>	<0.01 <sup>a</sup>	0.01 <sup>b</sup>	1.03 <sup>c</sup>
Nickel	<0.01 <sup>b</sup>	<0.01 <sup>a</sup>	<0.01 <sup>b</sup>	0.96 <sup>c</sup>
Lead	0.01 <sup>b</sup>	<0.01 <sup>a</sup>	<0.01 <sup>b</sup>	1.82 <sup>c</sup>
Zinc	0.10 <sup>b</sup>	<0.01 <sup>a</sup>	0.03 <sup>b</sup>	6.55 <sup>c</sup>
Nitrogen	0.47 <sup>b</sup>	<0.01 <sup>a</sup>	0.09 <sup>b</sup>	266.65 <sup>c</sup>
Phosphorus	0.45 <sup>b</sup>	<0.01 <sup>a</sup>	0.09 <sup>b</sup>	36.47 <sup>c</sup>
Potassium	0.17 <sup>b</sup>	<0.01 <sup>a</sup>	0.09 <sup>b</sup>	103.94 <sup>c</sup>

Means within the same row with different letter designations are significantly different (p<0.05).

a = lowest b = medium c = highest

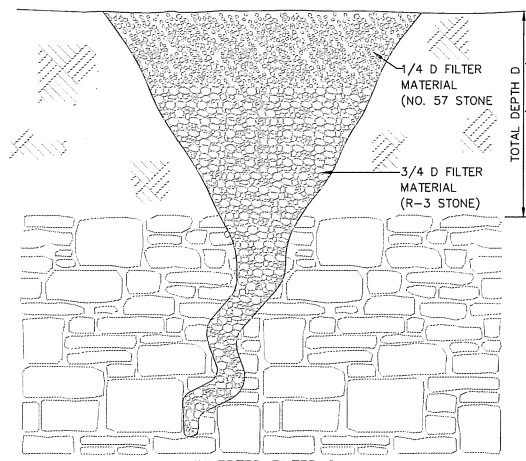


## SOIL AMENDMENT AND RESTORATION



INVERTED FILTER 1 (DRAINAGE AREA LESS THAN 5 ACRES)

NOTE: SEE SINKHOLE REMEDIATION NOTES IN EROSION AND SEDIMENT POLLUTION CONTROL REPORT PREPARED BY LANGAN ENGINEERING & ENVIRONMENTAL SERVICES.

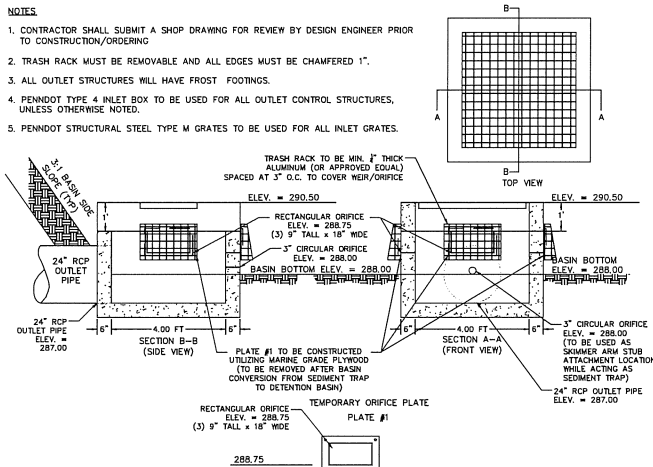


INVERTED FILTER 2 (DRAINAGE AREA 5-15 ACRES)

NOTE: SEE SINKHOLE REMEDIATION NOTES IN EROSION AND SEDIMENT POLLUTION CONTROL REPORT PREPARED BY LANGAN ENGINEERING & ENVIRONMENTAL SERVICES.

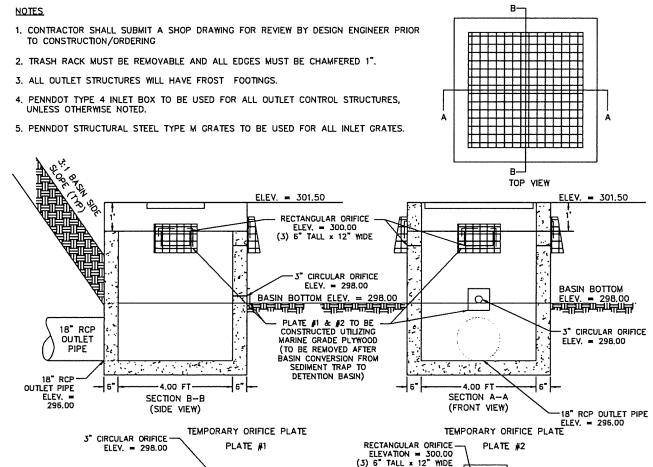
NOTE: A PROFESSIONAL ENGINEER OR GEOLOGIST WITH EXPERIENCE IN SINKHOLE REMEDIATION MUST BE CONSULTED FOR RECOMMENDATIONS FOR REMEDIATION OF SINKHOLES INVOLVING STRUCTURES, UTILITIES, OR ROADWAYS

## SINKHOLE TREATMENT



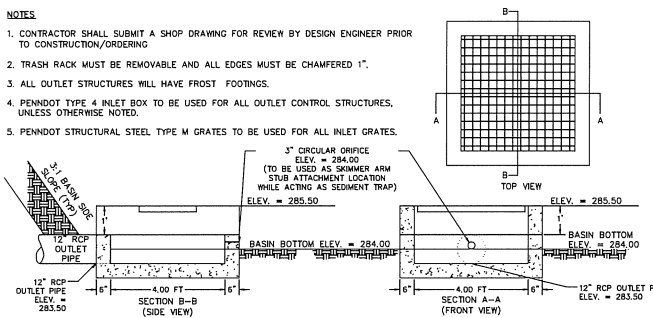
DETENTION BASIN 2 OUTLET CONTROL STRUCTURE (OCS-2)

N.T.S.



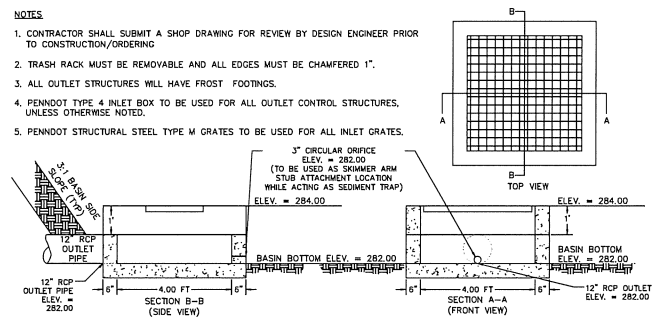
DETENTION BASIN 2A OUTLET CONTROL STRUCTURE (OCS-2A)

N.T.S.



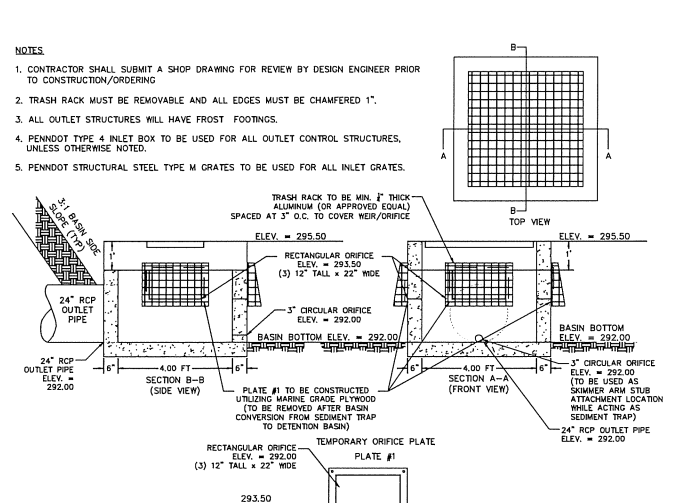
DETENTION BASIN 3 OUTLET CONTROL STRUCTURE (OCS-3)

N.T.S.



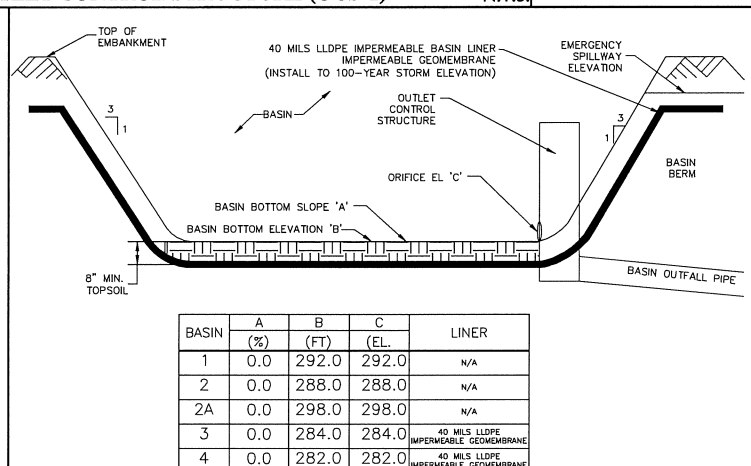
DETENTION BASIN 4 OUTLET CONTROL STRUCTURE (OCS-4)

N.T.S.



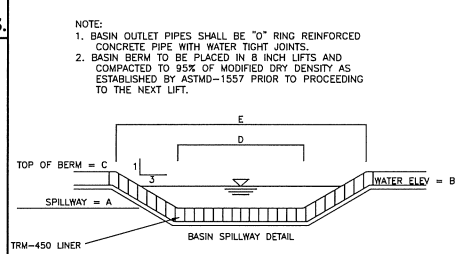
DETENTION BASIN 1 OUTLET CONTROL STRUCTURE (OCS-1)

N.T.S.

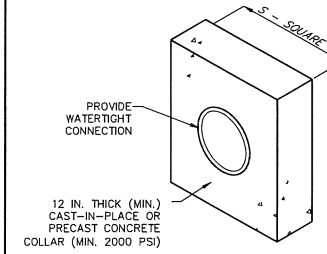


TYPICAL DETENTION BASIN CROSS SECTION

BASIN	A (%)	B (FT)	C (EL)	LINER
1	0.0	292.0	292.0	N/A
2	0.0	288.0	288.0	N/A
2A	0.0	298.0	298.0	N/A
3	0.0	284.0	284.0	40 MILS LLDP IMPERMEABLE GEOMEMBRANE
4	0.0	282.0	282.0	40 MILS LLDP IMPERMEABLE GEOMEMBRANE



EMERGENCY SPILLWAY DETAIL



BASIN NO.	PIPE SIZE (IN)	S (IN)	NO. OF COLLARS	RISER TO FIRST COLLAR (FT)	COLLAR SPACING (FT)
1	24	6.0	2	10.35	14.00
2	24	6.0	2	9.29	14.00
2A	18	5.5	3	15.17	16.66
3	12	5.0	2	8.05	28.65
4	12	5.0	2	7.99	10.00

NOTES: ALL COLLARS SHALL BE INSTALLED SO AS TO BE WATER TIGHT. COLLAR SIZE AND SPACING SHALL BE AS INDICATED WITHIN TABLE.

STANDARD CONSTRUCTION DETAIL #7-16 CONCRETE ANTI-SEEP COLLAR FOR PERMANENT BASINS OR TRAPS

## ANTI-SEEP COLLAR

Date	Description	No.
	REVISIONS	

SIGNATURE  
DATE SIGNED  
GREGORY M. ELKO P.E. PA Lic. No. PE-055364-E

**LANGAN**  
Stone Manor Corporate Center, 2700 Kelly Road, Suite 200, Warrington, PA 18976  
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Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan CT, Inc.  
Langan International LLC  
Collectively known as Langan

Project  
**BETHLEHEM LNG**  
TAX ID P7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM  
NORTHAMPTON COUNTY PENNSYLVANIA

Drawing Title  
**POST-CONSTRUCTION STORMWATER MANAGEMENT DETAILS**

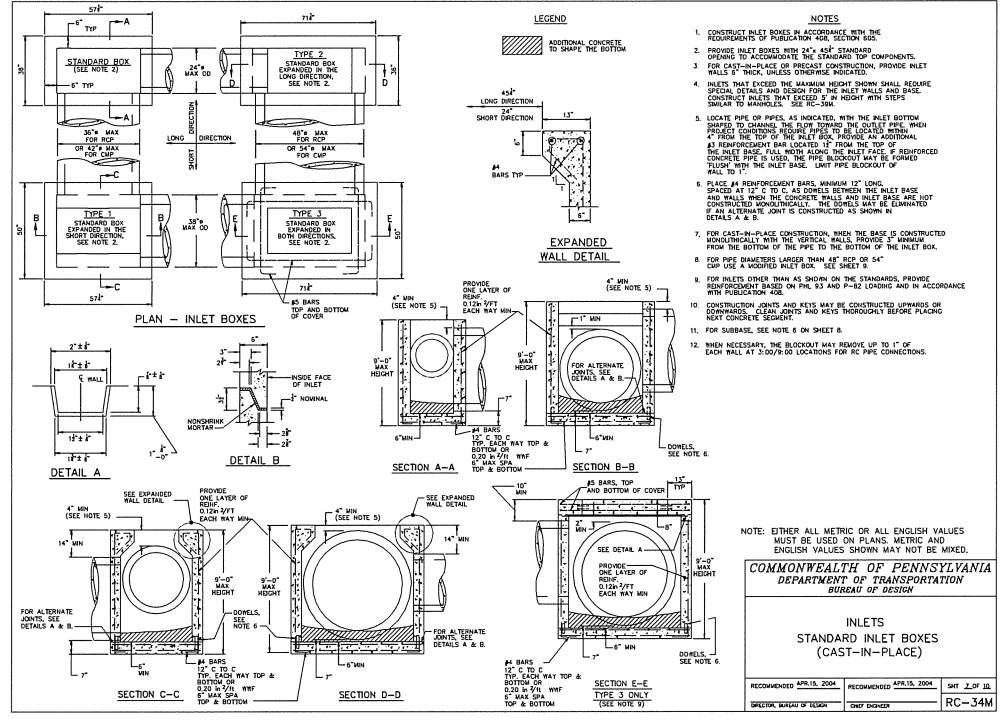
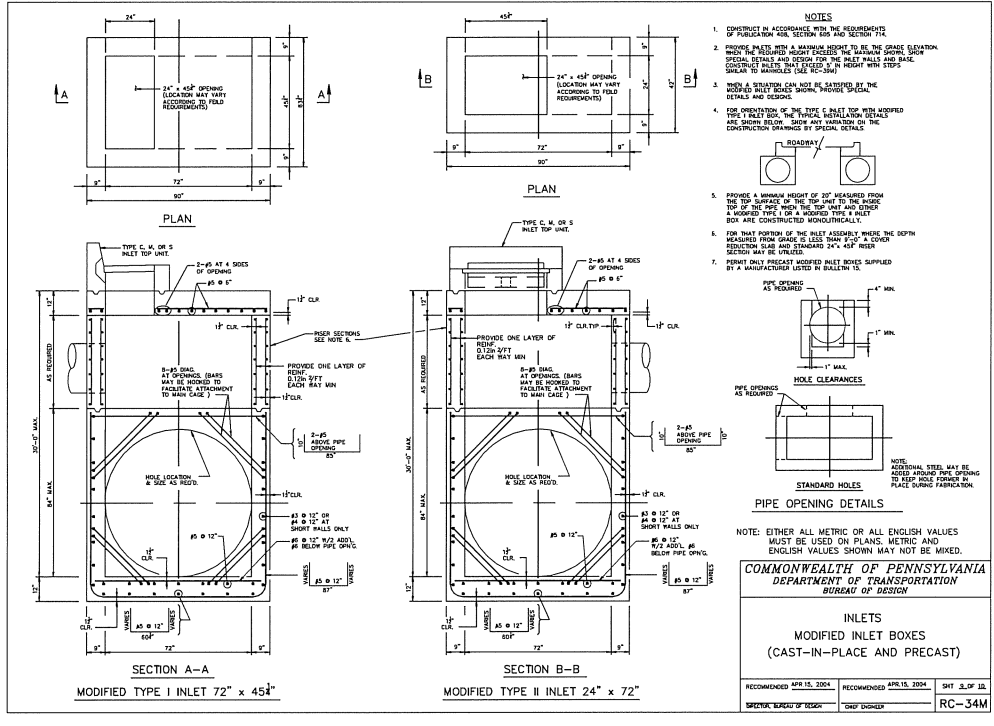
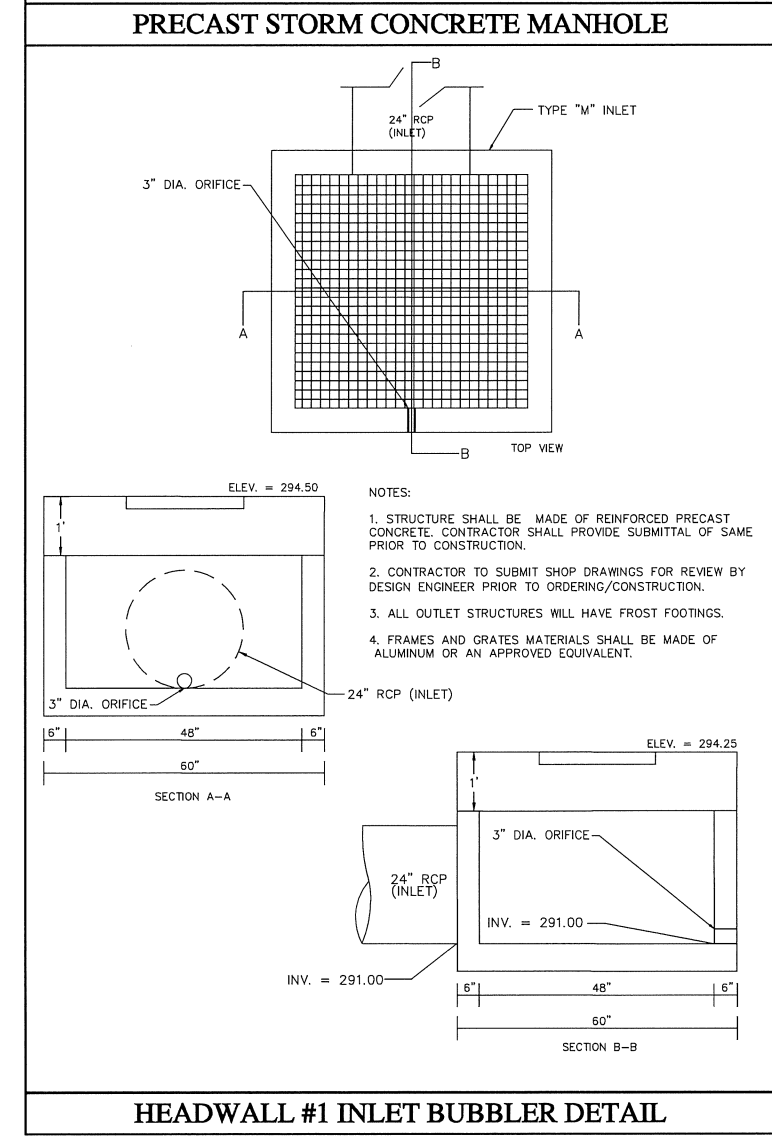
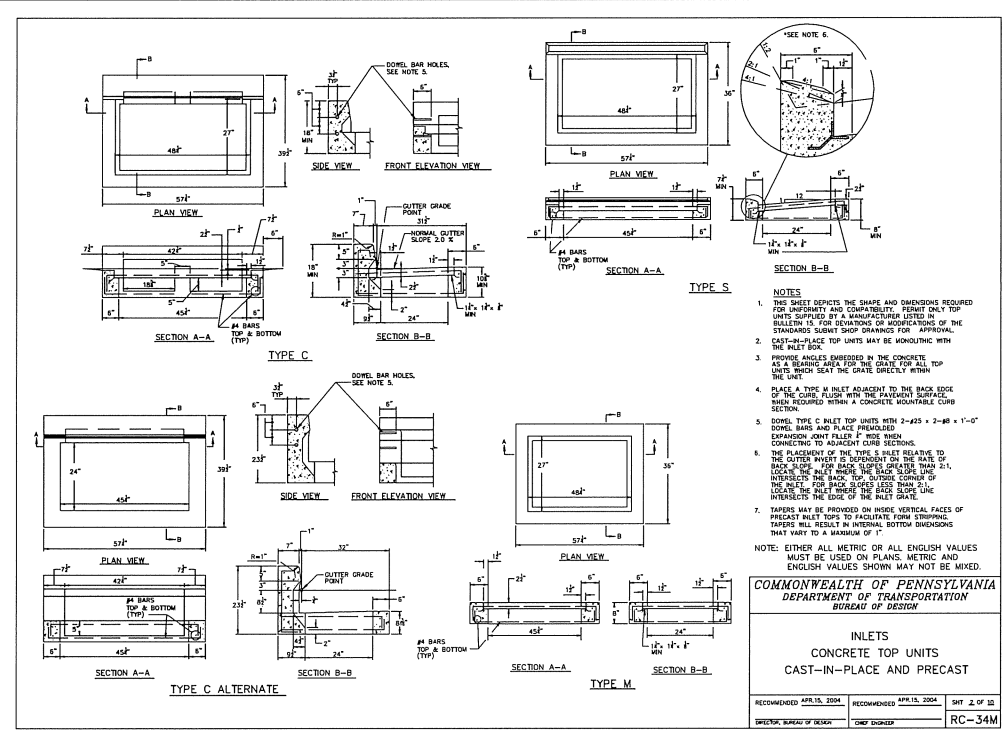
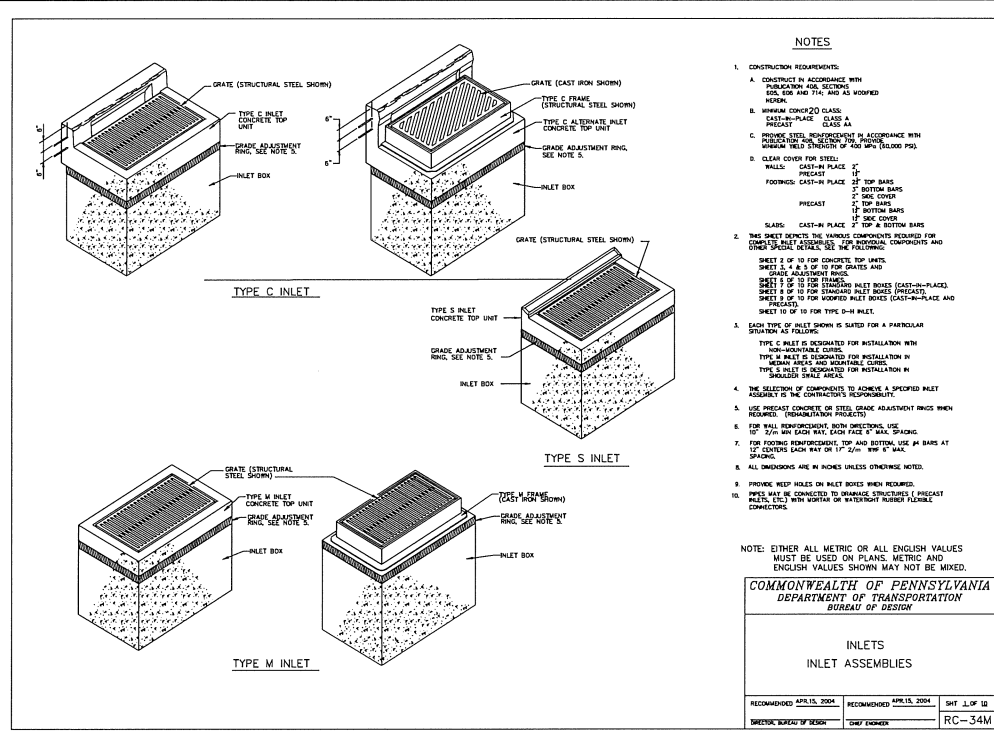
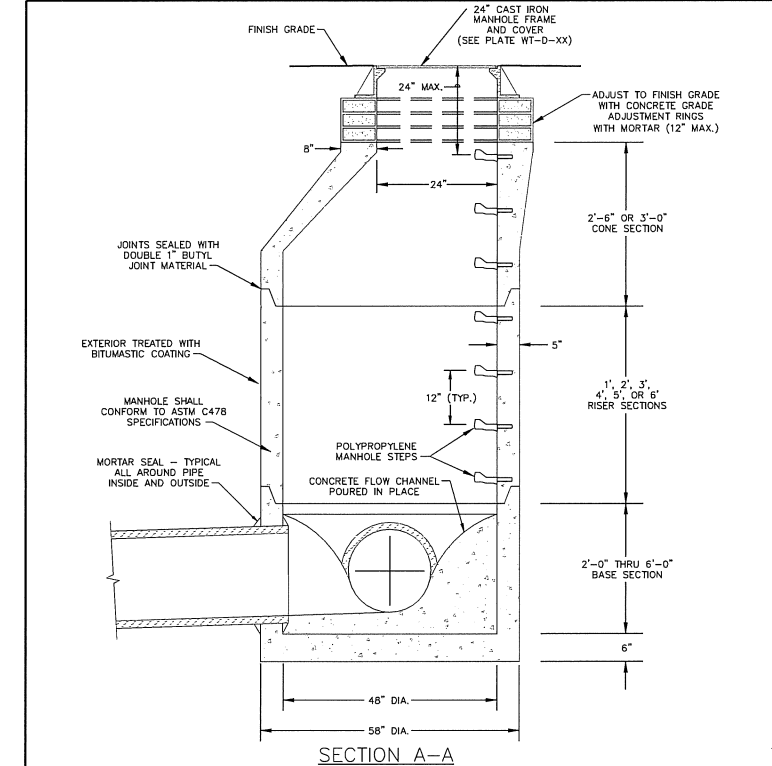
Project No.  
200081201  
Date  
12-15-2017  
Scale  
N.T.S.  
Drawn By  
JPK  
Checked By  
AR  
Submission Date  
Sheet 10 of 30

## CG-501









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<div> <p>Stone Manor Corporate Center, 2700 Kelly Road, Suite 200, Warrington, PA 18976</p> <p>T: 215.491.6500 F: 215.491.6501 www.langan.com</p> <p>Langon Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A.</p> <p>Langon Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.</p> <p>Langon Engineering and Environmental Services, Inc.</p> <p>Langon CT, Inc.</p> <p>Langon International LLC</p> <p>Collectively known as Langan</p> </div>			<div> <p>Project</p> <p><b>BETHLEHEM LNG</b></p> <p>TAX ID P7-22-53-55; P7-22-53-55</p> <p>CITY OF BETHLEHEM</p> <p>NORTHAMPTON COUNTY PENNSYLVANIA</p> </div>		
<div> <p>Date</p> <p>Description</p> <p>No.</p> <p>REVISIONS</p> </div>			<div> <p>Project</p> <p><b>POST-CONSTRUCTION STORMWATER MANAGEMENT DETAILS</b></p> </div>		
<div> <p>Signature</p> <p>DATE SIGNED</p> <p>GREGORY M. ELKO P.E. PA Lic. No. PE-055364-E</p> </div>			<div> <p>Project No.</p> <p>200081201</p> <p>Date</p> <p>12-15-2017</p> <p>Scale</p> <p>N.T.S.</p> <p>Drawn By</p> <p>JPK</p> <p>Checked By</p> <p>AR</p> <p>Submission Date</p> </div>		
<div> <p>CG-503</p> </div>			<div> <p>Sheet 12 of 30</p> </div>		



LANDLOK® 400 Product Data

Table with 4 columns: PROPERTY, TEST METHOD, ENGLISH, METRIC. Rows include Tensile Strength, Elongation, and Roll Weight.

Notes regarding material specifications and testing procedures.

Propex Engineering, Inc. 400 Landloke Ave. Suite 100, P.O. Box 2200, Chesham, NJ 07012

LANDLOK® 400 Product Data

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Propex Engineering, Inc. 400 Landloke Ave. Suite 100, P.O. Box 2200, Chesham, NJ 07012

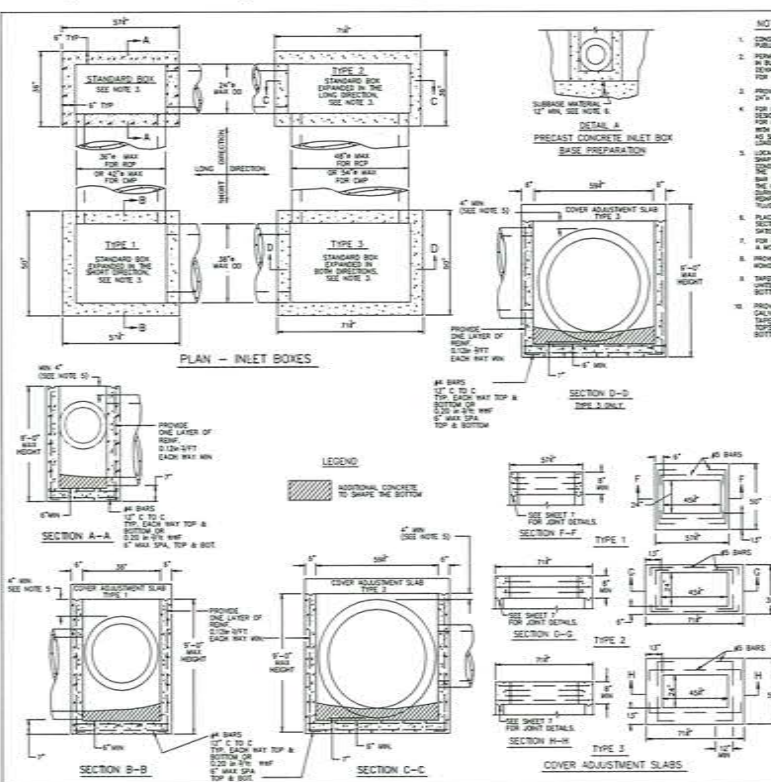
Table with 4 columns: MATERIAL, TENSILE STRENGTH, ELONGATION, and ROLL WEIGHT. Rows include LANDLOK 400, LANDLOK 200, and LANDLOK 300.

Notes regarding material specifications and testing procedures.

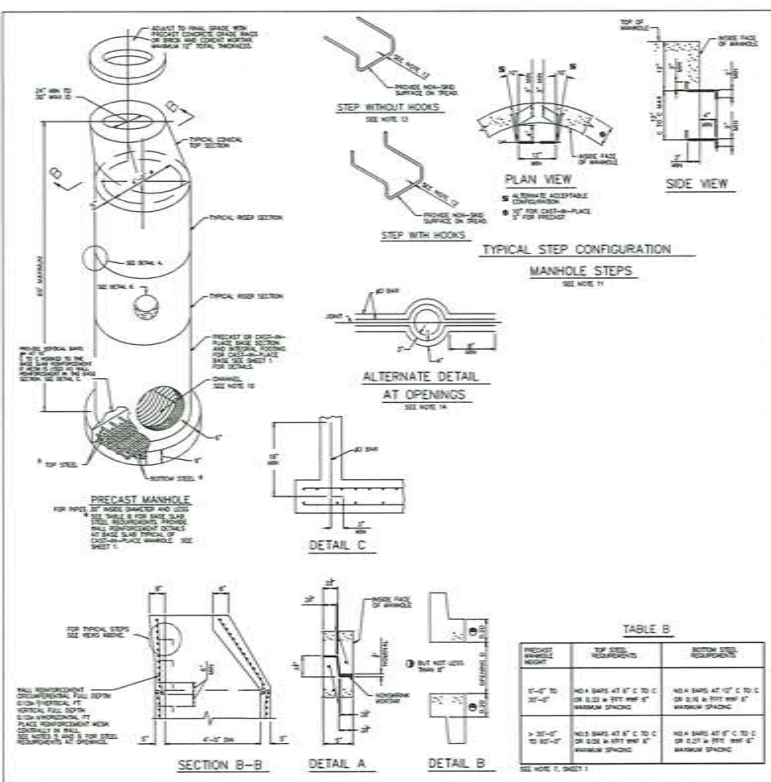
Table with 4 columns: MATERIAL, TENSILE STRENGTH, ELONGATION, and ROLL WEIGHT. Rows include LANDLOK 400, LANDLOK 200, and LANDLOK 300.

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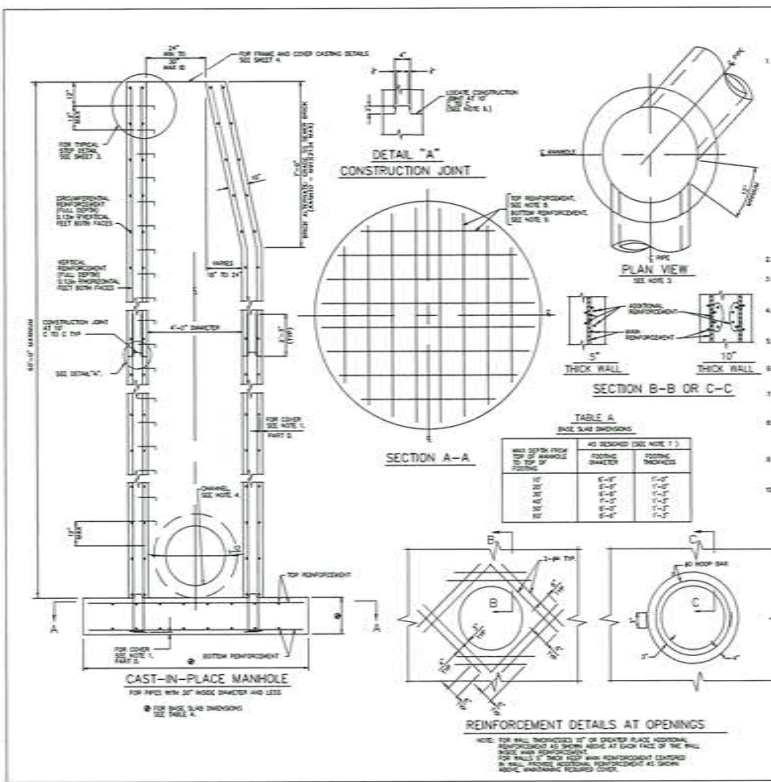
CHANNEL LINING/SPILLWAY LINING DETAIL AND SPECIFICATIONS



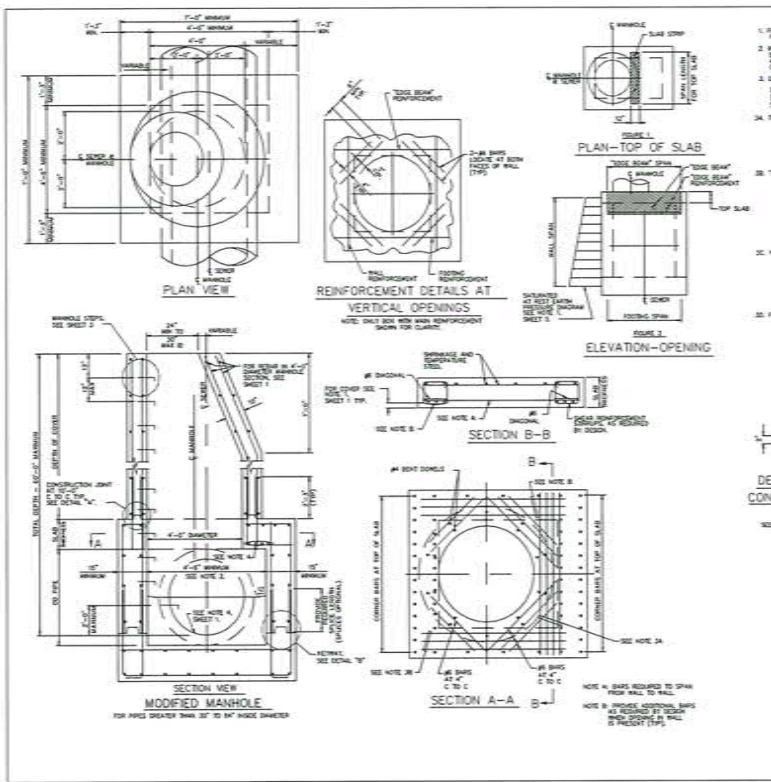
NOTES: 1. CONSTRUCTION REQUIREMENTS... 2. PRECAST INLET BOXES... 3. REINFORCEMENT DETAILS... 4. STANDARD INLET BOXES (PRECAST) RC-34M



NOTES: 1. CONSTRUCTION REQUIREMENTS... 2. PRECAST MANHOLE STEPS... 3. REINFORCEMENT DETAILS... 4. STANDARD MANHOLES (PRECAST) RC-39M



NOTES: 1. CONSTRUCTION REQUIREMENTS... 2. CAST-IN-PLACE MANHOLE... 3. REINFORCEMENT DETAILS... 4. STANDARD MANHOLES (CAST-IN-PLACE) RC-39M



NOTES: 1. CONSTRUCTION REQUIREMENTS... 2. MODIFIED MANHOLE... 3. REINFORCEMENT DETAILS... 4. STANDARD MANHOLES (MODIFIED) RC-39M

Project: BETHLEHEM LNG, TAX ID P7-22-53-55; P7-22-53-56, CITY OF BETHLEHEM, NORTHAMPTON COUNTY, PENNSYLVANIA. Drawing Title: POST-CONSTRUCTION STORMWATER MANAGEMENT DETAILS. Project No: 200081201, Date: 12-15-2017, Scale: N.T.S., Drawn By: JPK, Checked By: AR, Submission Date: [blank], Sheet 13 of 30. Langan logo and signature of Gregory M. Elko.



**RELEASE RATES**  
Saucon Creek Watershed

**LEGEND**

- 23 Subarea Boundaries
- Watershed Boundaries
- County Boundaries
- Municipal Boundaries
- Streams/Rivers
- Major Roads
- Minor/Other Roads

**RELEASE RATE SUMMARY TABLE**  
Dual Release Rate Categories (30"-) define a 30" Release Rate for the 2-Year storm and the indicated Release Rate for the 10-, 25- and 100-Year storms.

SAUCON CREEK			
Subarea	Release Rate (%)	Subarea	Release Rate (%)
1 - 2	30/90	119	30/100
3 - 5	30/100	120	30/50
6 - 7	30/80	121 - 122	30/100
8	30/90	123 - 124	30/80
9	30/80	125 - 126	30/70
10	30/90	127	30/100
11 - 12	30/80	128 - 130	30/PND*
13 - 14	30/70	131 - 132	30/100
15 - 16	30/80	133	30/80
17 - 18	30/80	134 - 136	30/70
19 - 21	30/70	137	30/PND*
22 - 23	30/90	138 - 139	30/PND*
24	30/70	140	30/100
25 - 28	30/50	141 - 142	30/80
29	30/70	143	30/90
30	30/80	144	30/70
31	30/60	145 - 146	30/80
32	30/50	147 - 148	30/50
33 - 34	30/80	150	30/100
35 - 47	30/50	151 - 152	30/PND*
48	30/70	153 - 158	30/80
49	30/80	159	30/70
50	30/70	160 - 162	30/80
51 - 54	30/60	163 - 168	30/PND*
55	30/50	169 - 172	30/70
56	30/70	173	30/60
57	30/80	174	30/90
58 - 60	30/70	175 - 178	30/70
61	30/60	179	30/60
62	30/50	180 - 181	30/70
63	30/60	182	30/60
64 - 65	30/80	183 - 184	30/50
66	30/70	185 - 187	30/100
67	30/80	188	30/50
68	30/70	189	30/100
69	30/60	190	30/PND*
70	30/70	191	30/100
71 - 74	30/60	192	30/50
75	30/70	193	30/100
76 - 78	30/60	194 - 195	30/PND*
79 - 111	30/50	196	30/100
112	30/100	197 - 199	30/PND*
113 - 118	30/50		

\*Provisional No Detention Areas do not need detention controls for the 10-, 25- or 100-year storms provided that adequate downstream capacity can be shown for increased peak flows. (See Plan Update for additional details.)

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Langan Engineering and Environmental Services, Inc.  
Langan CL, Inc.  
Langan International LLC  
Collectively known as Langan

**BETHLEHEM LNG**  
TAX ID P7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM  
NORTHAMPTON COUNTY PENNSYLVANIA

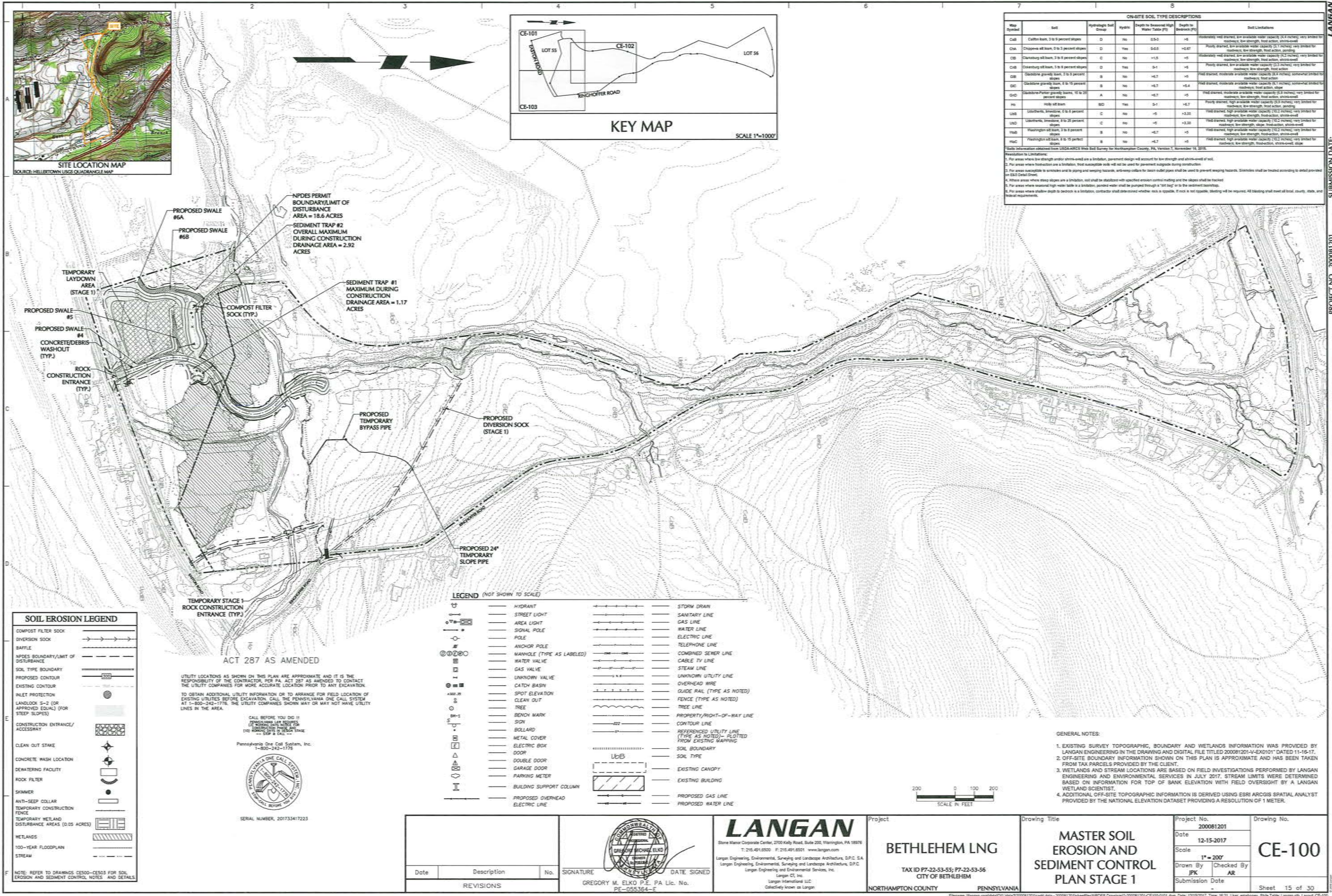
**ACT 167 RELEASE RATE MAP**

Project No. 200081201  
Date 12-15-2017  
Scale 1"=2500'  
Drawn By JLA  
Checked By GME  
Submission Date

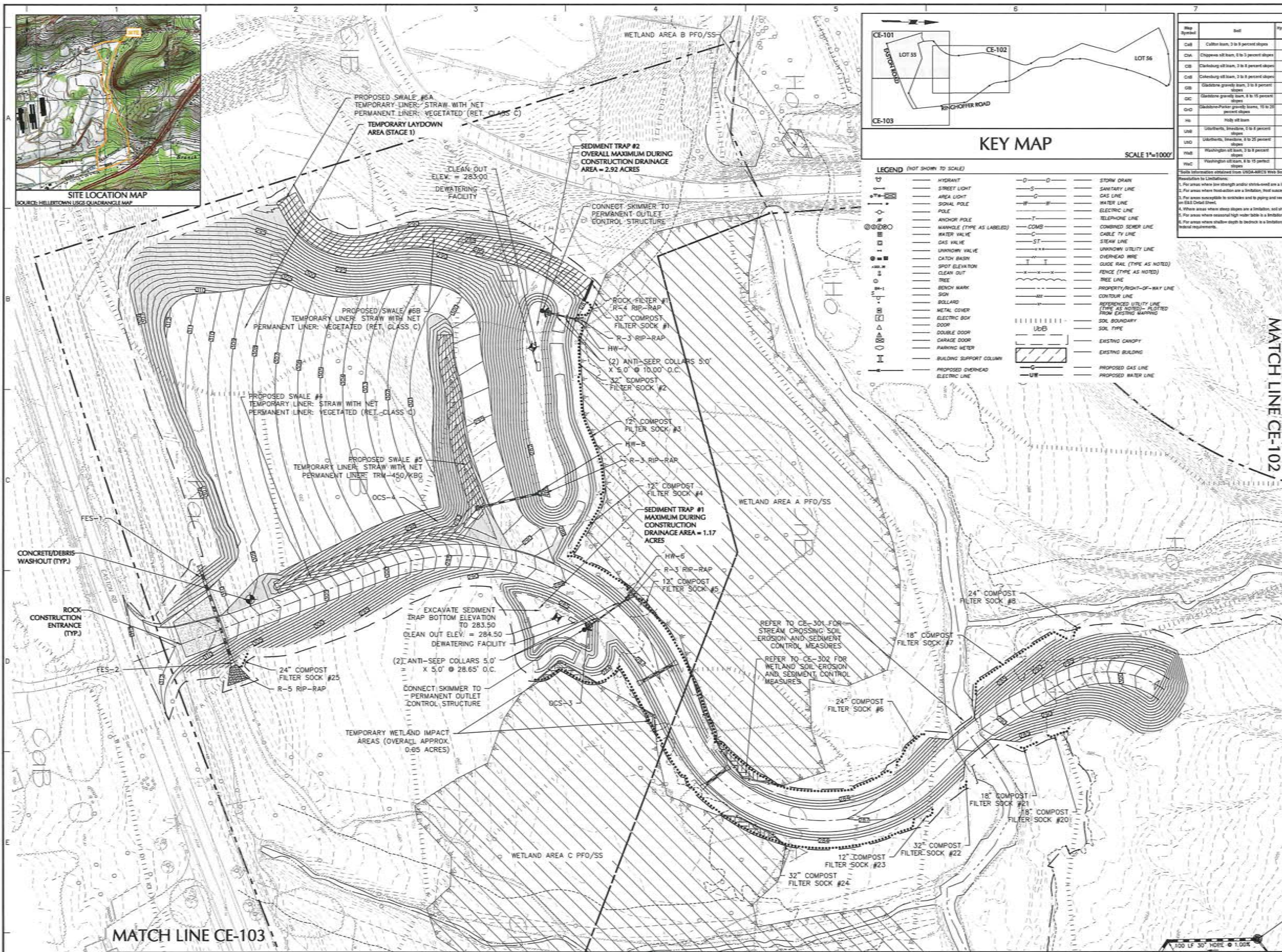
Drawing No. CG-600  
Sheet 14 of 30

RELEASE RATE SUMMARY TABLE			
Dual Release Rate Categories (30/-) define a 30% Release Rate for the 2-Year storm and the indicated Release Rate for the 10-, 25- and 100-Year storms.			
SAUCON CREEK			
Subarea	Release Rate (%)	Subarea	Release Rate (%)
1- 2	30/90	119	30/100
3- 5	30/90	120	30/95
6- 7	30/80	121- 122	30/100
8	30/90	123- 124	30/80
9	30/80	125- 126	30/70
10	30/90	127	30/100
11- 12	30/80	128- 130	30/PND*
13- 14	30/70	131- 132	30/100
15- 16	30/90	133	30/80
17- 18	30/80	134- 136	30/70
19- 21	30/70	137	30/100
22- 23	30/90	138- 139	30/PND*
24	30/70	140	30/100
25- 28	30/50	141- 142	30/80
29	30/70	143	30/90
30	30/80	144	30/70
31	30/60	145- 146	30/60
32	30/50	147- 149	30/50
33- 34	30/60	150	30/100
35- 47	30/50	151- 152	30/70*
48	30/70	153- 158	30/80
49	30/80	159	30/70
50	30/70	160- 162	30/60
51- 54	30/60	163- 168	30/PND*
55	30/50	169- 172	30/70
56	30/70	173	30/60
57	30/80	174	30/90
58- 60	30/70	175- 178	30/70
61	30/80	179	30/60
62	30/50	180- 181	30/70
63	30/60	182	30/60
64- 65	30/80	183- 184	30/50
66	30/70	185- 187	30/100
67	30/80	188	30/60
68	30/70	189	30/100
69	30/60	190	30/70*
70	30/70	191	30/100
71- 74	30/60	192	30/50
75	30/70	193	30/70
76- 78	30/80	194- 195	30/PND*
79- 111	30/50	196	30/100
112	30/100	197- 199	30/PND*
113- 118	30/50		
*Provisional No Detention Areas do not need detention controls for the 10-, 25- or 100-year storms provided that adequate downstream capacity can be shown for increased peak flows. (See Plan Update for additional details.)			









ON-SITE SOIL TYPE DESCRIPTIONS				
Map Symbol	Soil	Hydrologic Soil Group	Depth to Seasonal High Water Table (ft)	Soil Limitations
CE-101	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-102	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-103	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-104	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-105	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-106	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-107	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-108	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-109	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-110	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-111	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-112	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-113	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-114	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-115	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-116	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-117	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-118	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-119	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell
CE-120	Chert loam, 3 to 8 percent slopes	D	No	Highly erodible, low available water capacity (0.4 inches), very limited for roadways, low strength, frost action, shrink-swell

**KEY MAP**  
SCALE 1"=1000'

**LEGEND (NOT SHOWN TO SCALE)**

HYDRANT	STORM DRAIN
STREET LIGHT	SANITARY LINE
AREA LIGHT	GAS LINE
SIGNAL POLE	WATER LINE
POLE	ELECTRIC LINE
ANCHOR POLE	TELEPHONE LINE
MANHOLE (TYPE AS LABELED)	COMBINED SEWER LINE
WATER VALVE	CABLE TV LINE
GAS VALVE	STEAM LINE
UNKNOWN VALVE	UNKNOWN UTILITY LINE
CATCH BASIN	OVERHEAD WIRE
SPOT ELEVATION	GUIDE RAIL (TYPE AS NOTED)
CLEAN OUT	FENCE (TYPE AS NOTED)
TREE	TREE LINE
BENCH MARK	PROPERTY/RIGHT-OF-WAY LINE
IRON	CONTOUR LINE
BOLLARD	REFERENCED UTILITY LINE (TYPE AS NOTED)
METAL COVER	PLOTTED FROM EXISTING MAPS
ELECTRIC BOX	SOIL BOUNDARY
DOUBLE DOOR	SOIL TYPE
CARAGE DOOR	EXISTING CANOPY
PARKING METER	EXISTING BUILDING
BUILDING SUPPORT COLUMN	PROPOSED GAS LINE
PROPOSED OVERHEAD	PROPOSED WATER LINE
ELECTRIC LINE	

MATCH LINE CE-102

SOIL EROSION LEGEND	
COMPOST FILTER SOCK	*****
DIVERSION SOCK	----->
BAFFLE	-----
IMPDES BOUNDARY/LIMIT OF DISTURBANCE	-----
SOIL TYPE BOUNDARY	-----
PROPOSED CONTOUR	-----
EXISTING CONTOUR	-----
INLET PROTECTION	-----
LANDLOCK S-2 (OR APPROVED EQUAL) FOR STEEP SLOPES	-----
CONSTRUCTION ENTRANCE/ACCESSWAY	-----
CLEAN OUT STAKE	-----
CONCRETE WASH LOCATION	-----
DEWATERING FACILITY	-----
ROCK FILTER	-----
SKIMMER	-----
ANTI-SEEP COLLAR	-----
TEMPORARY CONSTRUCTION FENCE	-----
TEMPORARY WETLAND DISTURBANCE AREAS (0.05 ACRES)	-----
WETLANDS	-----
100-YEAR FLOODPLAIN	-----
STREAM	-----


**ACT 287 AS AMENDED**

UTILITY LOCATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR, PER PA ACT 287 AS AMENDED TO CONTACT THE UTILITY COMPANIES FOR MORE ACCURATE LOCATION PRIOR TO ANY EXCAVATION.


TO OBTAIN ADDITIONAL UTILITY INFORMATION OR TO ARRANGE FOR FIELD LOCATION OF EXISTING UTILITIES BEFORE EXCAVATION, CALL THE PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776. THE UTILITY COMPANIES SHOWN MAY OR MAY NOT HAVE UTILITY LINES IN THE AREA.

CALL BEFORE YOU DIG!!  
PENNSYLVANIA LAW REQUIRES  
ALL EXCAVATION OPERATIONS  
TO BE NOTIFIED BY ONE CALL  
AT LEAST 48 HOURS IN ADVANCE  
STOP & CALL

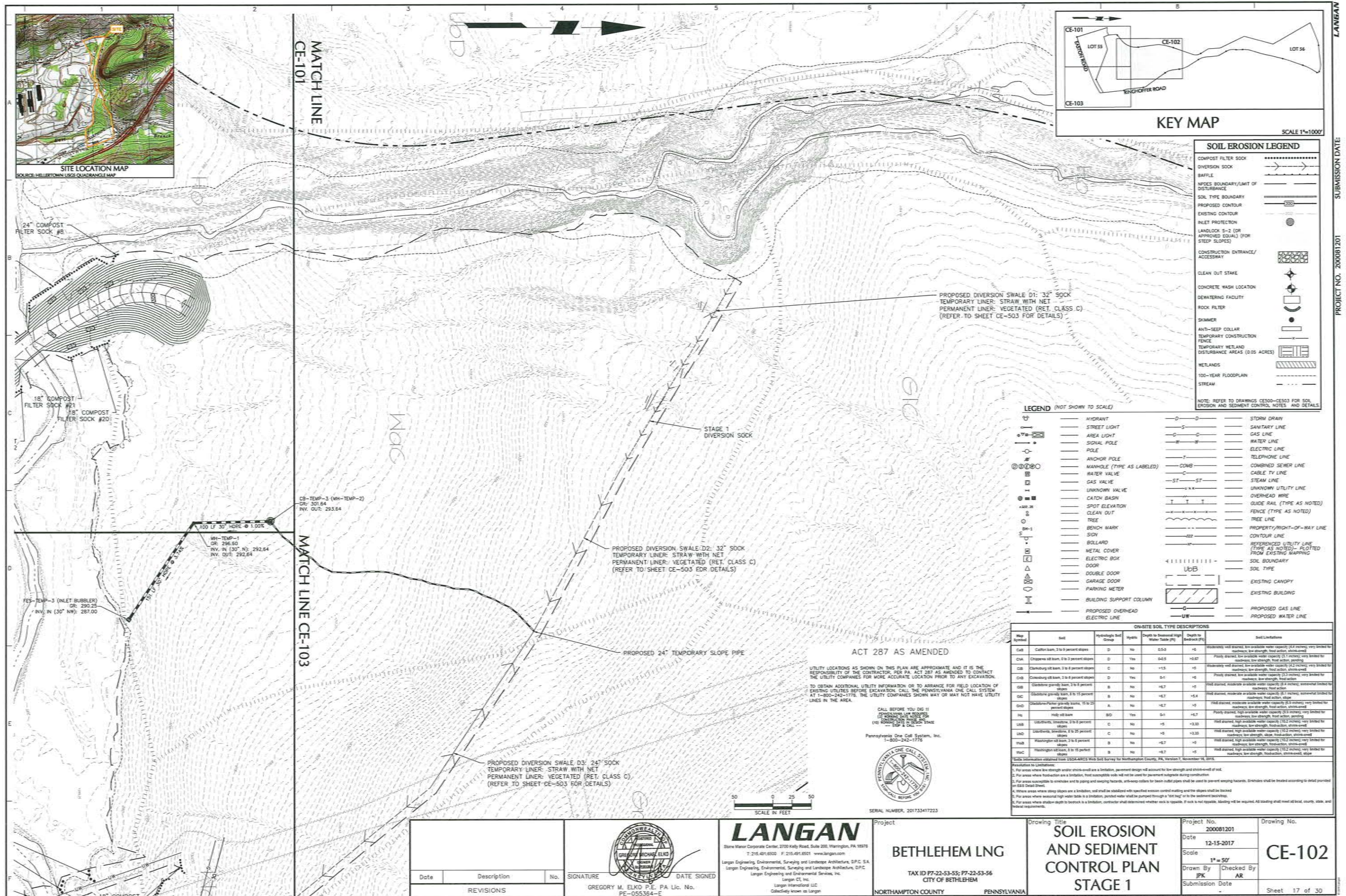
Pennsylvania One Call System, Inc.  
1-800-242-1776



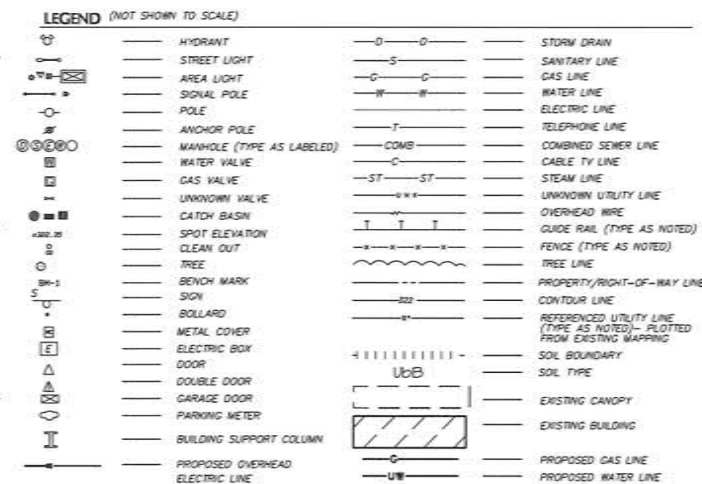
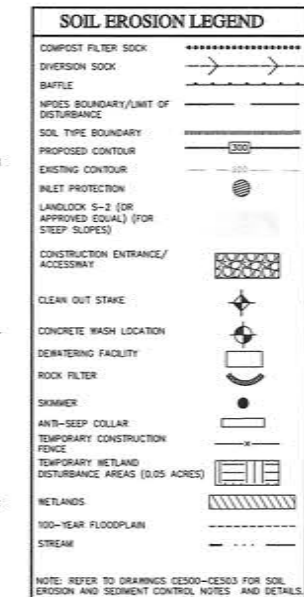
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<p>50 0 25 50 SCALE IN FEET</p>			<p><b>LANGAN</b> Stone Manor Corporate Center, 2700 Kelly Road, Suite 200, Warminster, PA 18956 T: 215.491.6500 F: 215.491.6501 www.langan.com Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A. Langan Engineering and Environmental Services, Inc. Langan CL, Inc. Langan International LLC Collectively known as Langan</p>		<p>Project: <b>BETHLEHEM LNG</b> TAX ID #P7-22-53-55; P7-22-53-56 CITY OF BETHLEHEM NORTHAMPTON COUNTY PENNSYLVANIA</p>		<p>Drawing Title: <b>SOIL EROSION AND SEDIMENT CONTROL PLAN STAGE 1</b></p>		<p>Project No.: <b>200081201</b> Date: <b>12-15-2017</b> Scale: <b>1"=50'</b> Drawn By: <b>JPK</b> Checked By: <b>GME</b> Submission Date: <b>-</b></p>		<p>Drawing No.: <b>CE-101</b> Sheet 16 of 30</p>	
<p>Date: _____ Description: _____ No. _____</p>			<p>SIGNATURE:  DATE SIGNED: _____ GREGORY M. ELKO P.E. PA Lic. No. PE-055364-E</p>		<p>REVISIONS</p>		<p>Project: <b>BETHLEHEM LNG</b></p>		<p>Drawing Title: <b>SOIL EROSION AND SEDIMENT CONTROL PLAN STAGE 1</b></p>		<p>Project No.: <b>200081201</b></p>	









ON-SITE SOIL TYPE DESCRIPTIONS						
Map Symbol	Soil	Hydrologic Soil Group	Hydric	Depth to Seasonal High Water Table (ft)	Depth to Bedrock (ft)	Soil Limitations
Cd1	Calhoun silt, 0 to 3 percent slopes	D	No	0-5.3	-6	Modestly wet, low available water capacity (0.4 inches); very limited for mow/grass, low strength, flood action, shrink-swell
Cd2	Chippewa silt, 0 to 3 percent slopes	D	Yes	0-5.5	-0.87	Flooded, drain, low available water capacity (2.1 inches); very limited for mow/grass, low strength, flood action, ponding
Cd3	Chippewa silt, 0 to 3 percent slopes	D	No	1-1.5	-5	Modestly wet, low available water capacity (0.2 inches); very limited for mow/grass, low strength, flood action, shrink-swell
Cd4	Cottingham silt, 0 to 3 percent slopes	D	Yes	0-0.1	-1.6	Flooded, drain, low available water capacity (0.3 inches); very limited for mow/grass, low strength, flood action, shrink-swell
Cd5	Glottschewitz gravelly silt, 3 to 9 percent slopes	B	No	-6-1.7	-5	Well drained, moderate available water capacity (3.4 inches); somewhat limited for mow/grass, flood action, shrink-swell
Cd6	Glottschewitz gravelly silt, 10 to 17 percent slopes	B	No	-6-1.7	-5.4	Well drained, moderate available water capacity (3.1 inches); somewhat limited for mow/grass, low strength, flood action, shrink-swell
Cd7	Glottschewitz-Arden gravelly silt, 15 to 25 percent slopes	A	No	-6-1.7	-5	Well drained, moderate available water capacity (3.0 inches); very limited for mow/grass, low strength, flood action, shrink-swell
Hs	Holly silt	B/G	Yes	0-5.1	-6.7	Flooded, drain, high available water capacity (9.3 inches); very limited for mow/grass, low strength, flood action, ponding
Ud5	Urbettchett, limestone, 0 to 3 percent slopes	C	No	-1.6	-13.33	Well drained, high available water capacity (16.2 inches); very limited for mow/grass, low strength, flood action, shrink-swell
Ud6	Urbettchett, limestone, 10 to 25 percent slopes	C	No	-1.5	-12.33	Well drained, high available water capacity (16.2 inches); very limited for mow/grass, low strength, flood action, shrink-swell
Ud8	Washington silt, 0 to 9 percent slopes	C	No	-6-1.7	-5	Well drained, high available water capacity (16.2 inches); very limited for mow/grass, low strength, flood action, shrink-swell
Ud9	Washington silt, 10 to 15 percent slopes	C	No	-6-1.7	-1.5	Well drained, high available water capacity (16.2 inches); very limited for mow/grass, low strength, flood action, shrink-swell

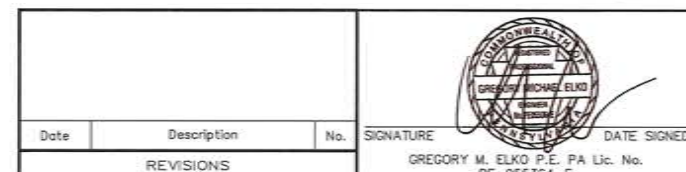
*Soils Information obtained from USDA-ARS Web Soil Survey for Worthington County, PA, Westview, November 18, 2015.*

1. For areas where low strength and/or shrink-swell are a limitation, pavement design will account for low strength and shrink-swell of soil.  
2. For areas where frost-action are a limitation, frost susceptible soils will not be used for permanent pavement during construction.  
3. For areas susceptible to subsidence and/or piling and heaving factors, soil-weak zones for base-slab cures may be used as a prevent piling factors. Subsidence shall be treated according to detailed procedures on EIR-010 Detail Form.  
4. Areas where steep slopes are a limitation, soil shall be stabilized with specified erosion control matting and the slopes shall be treated.  
5. For areas where material stability is a limitation, proper water shall be pumped through a "hot bag" or be replaced by compacted fill.  
6. For areas where shallow depth to bedrock is a limitation, contractor shall determine whether rock is rip-rap. If rock is not rip-rap, blasting will be required. All blasting shall meet all local, county, state, and federal requirements.

ACT 287 AS AMENDED

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Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan International LLC  
Langan (U.S.) Korea, Inc. (USKOR)

Project

**BETHLEHEM LNG**

TAX ID P7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM

NORTHAMPTON COUNTY      BRIDGEMAN

Drawing Title  
**SOIL EROSION  
AND SEDIMENT  
CONTROL PLAN  
STAGE 1**

Project No. 200081201		Drawing No.  <b>CE-103</b>
Date 12-15-2017		
Scale 1" = 50'		
Drawn By JPK	Checked By AR	
Submission Date		

with Aragon

PROJECT NO. 200081201 SUBMISSION DATE:

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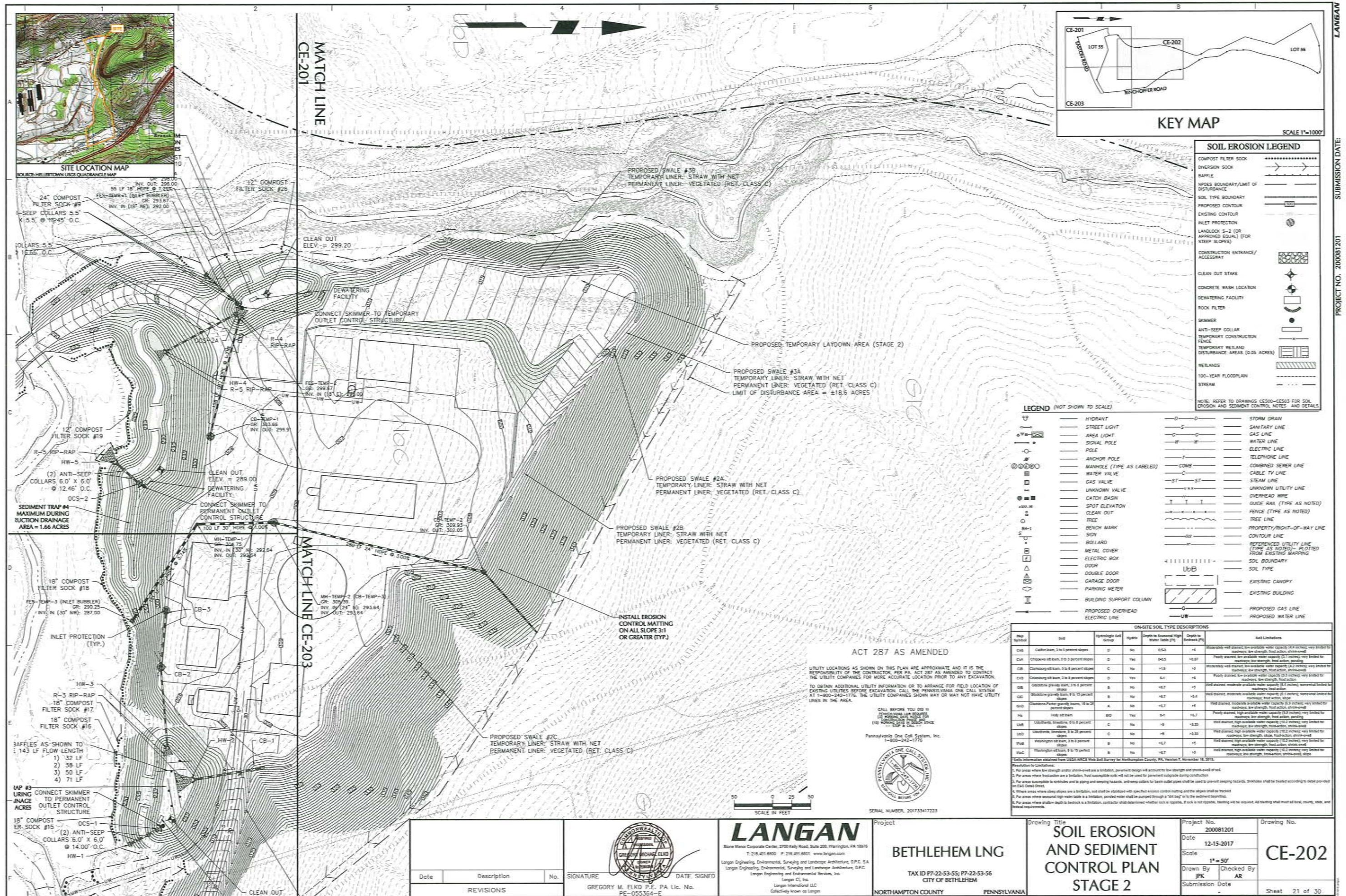




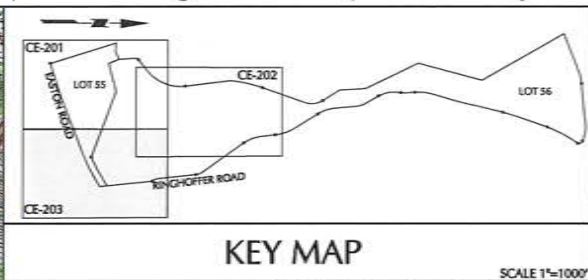












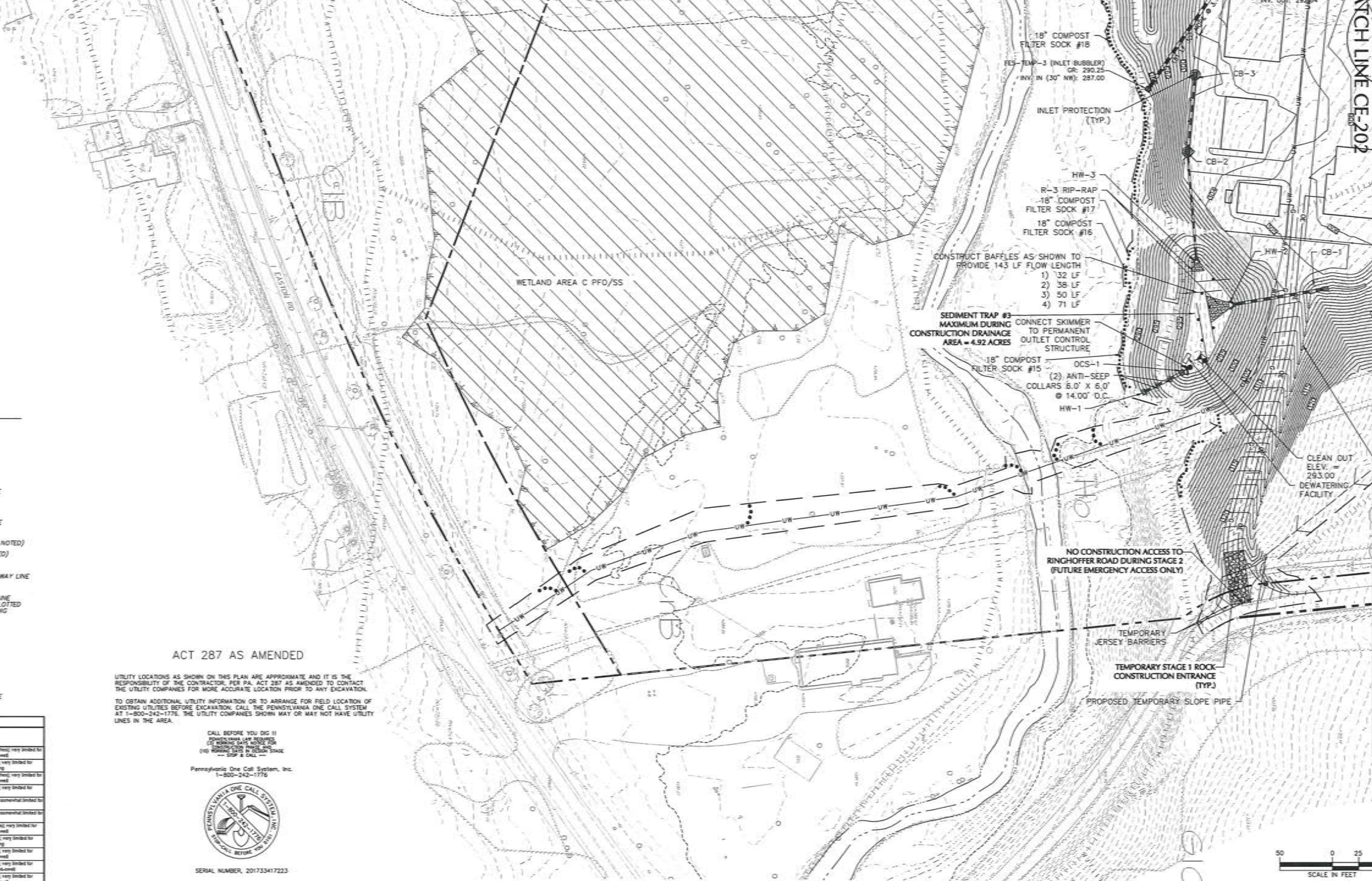
SOIL EROSION LEGEND	
COMPOST FILTER SOCK	.....
DIVERSION SOCK	.....
BAFFLE	.....
NPOES BOUNDARY/LIMIT OF DISTURBANCE	.....
SOIL TYPE BOUNDARY	.....
PROPOSED CONTOUR	.....
EXISTING CONTOUR	.....
INLET PROTECTION	.....
LANDLOCK 5-2 (OR APPROVED EQUAL) (FOR STEEP SLOPES)	.....
CONSTRUCTION ENTRANCE/ACCESSWAY	.....
CLEAN OUT STAKE	.....
CONCRETE WASH LOCATION	.....
DEWATERING FACILITY	.....
ROCK FILTER	.....
SKIMMER	.....
ANTI-SLEEP COLLAR	.....
TEMPORARY CONSTRUCTION FENCE	.....
TEMPORARY WETLAND DISTURBANCE AREAS (0.05 ACRES)	.....
WETLANDS	.....
100-YEAR FLOODPLAIN	.....
STREAM	.....

LEGEND (NOT SHOWN TO SCALE)	
HYDRANT	.....
STREET LIGHT	.....
AREA LIGHT	.....
SIGNAL POLE	.....
POLE	.....
ANCHOR POLE	.....
MANHOLE (TYPE AS LABELED)	.....
WATER VALVE	.....
GAS VALVE	.....
UNKNOWN VALVE	.....
CATCH BASIN	.....
SPOT ELEVATION	.....
CLEAN OUT	.....
TREE	.....
BENCH MARK	.....
SIGN	.....
BOLLARD	.....
METAL COVER	.....
ELECTRIC BOX	.....
DOOR	.....
DOUBLE DOOR	.....
GARAGE DOOR	.....
PARKING METER	.....
BUILDING SUPPORT COLUMN	.....
PROPOSED OVERHEAD ELECTRIC LINE	.....
STORM DRAIN	.....
SANITARY LINE	.....
GAS LINE	.....
WATER LINE	.....
ELECTRIC LINE	.....
TELEPHONE LINE	.....
COMBINED SEWER LINE	.....
CABLE TV LINE	.....
STEAM LINE	.....
UNKNOWN UTILITY LINE	.....
OVERHEAD WIRE	.....
GUIDE RAIL (TYPE AS NOTED)	.....
FENCE (TYPE AS NOTED)	.....
TREE LINE	.....
PROPERTY/RIGHT-OF-WAY LINE	.....
CONTOUR LINE	.....
REFERENCED UTILITY LINE (TYPE AS NOTED) - PLOTTED FROM EXISTING MAPPING	.....
SOIL BOUNDARY	.....
SOIL TYPE	.....
EXISTING CANOPY	.....
EXISTING BUILDING	.....
PROPOSED GAS LINE	.....
PROPOSED WATER LINE	.....

ON-SITE SOIL TYPE DESCRIPTIONS				
Map Symbol	Soil	Hydrologic Soil Group	Hydric	Depth to Seasonal High Water Table (ft)
CB	Clay loam, 3 to 8 percent slopes	D	No	6.5-8
CB	Clay loam, 8 to 12 percent slopes	D	No	6.5-8
CB	Clay loam, 12 to 18 percent slopes	D	No	6.5-8
CB	Clay loam, 18 to 24 percent slopes	D	No	6.5-8
CB	Clay loam, 24 to 30 percent slopes	D	No	6.5-8
CB	Clay loam, 30 to 36 percent slopes	D	No	6.5-8
CB	Clay loam, 36 to 42 percent slopes	D	No	6.5-8
CB	Clay loam, 42 to 48 percent slopes	D	No	6.5-8
CB	Clay loam, 48 to 54 percent slopes	D	No	6.5-8
CB	Clay loam, 54 to 60 percent slopes	D	No	6.5-8
CB	Clay loam, 60 to 66 percent slopes	D	No	6.5-8
CB	Clay loam, 66 to 72 percent slopes	D	No	6.5-8
CB	Clay loam, 72 to 78 percent slopes	D	No	6.5-8
CB	Clay loam, 78 to 84 percent slopes	D	No	6.5-8
CB	Clay loam, 84 to 90 percent slopes	D	No	6.5-8
CB	Clay loam, 90 to 96 percent slopes	D	No	6.5-8
CB	Clay loam, 96 to 100 percent slopes	D	No	6.5-8
CB	Clay loam, 100 to 106 percent slopes	D	No	6.5-8
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CB	Clay loam, 202 to 208 percent slopes	D	No	6.5-8
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CB	Clay loam, 946 to 952 percent slopes	D	No	6.5-8
CB	Clay loam, 952 to 958 percent slopes	D	No	6.5-8
CB	Clay loam, 958 to 964 percent slopes	D	No	6.5-8
CB	Clay loam, 964 to 970 percent slopes	D	No	6.5-8
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CB	Clay loam, 976 to 982 percent slopes	D	No	6.5-8
CB	Clay loam, 982 to 988 percent slopes	D	No	6.5-8
CB	Clay loam, 988 to 994 percent slopes	D	No	6.5-8
CB	Clay loam, 994 to 1000 percent slopes	D	No	6.5-8

Notes to Limitations:  
1. For areas where low strength and/or shrink-swell are a limitation, pavement design will account for low strength and shrink-swell at soil.  
2. For areas where frost action is a limitation, frost susceptible soils will not be used for pavement subgrade during construction.  
3. For areas susceptible to erosion and/or piping and seepage hazards, anti-seep collars for drain outlet pipes shall be used to prevent seepage hazards. Structures shall be located according to detail provided on S&S Detail Sheet.  
4. Where areas where steep slopes are a limitation, soil shall be stabilized with specified erosion control matting and the slopes shall be backed.  
5. For areas where seasonal high water table is a limitation, perched water shall be pumped through a "ditch" or to the sediment basin.  
6. For areas where shallow depth to bedrock is a limitation, contractor shall determine whether rock is suitable. If rock is not suitable, blasting will be required. All blasting shall meet all local, county, state, and federal requirements.

MATCH LINE CE-201



ACT 287 AS AMENDED  
UTILITY LOCATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR, PER PA ACT 287 AS AMENDED TO CONTACT THE UTILITY COMPANIES FOR MORE ACCURATE LOCATION PRIOR TO ANY EXCAVATION.  
TO OBTAIN ADDITIONAL UTILITY INFORMATION OR TO ARRANGE FOR FIELD LOCATION OF EXISTING UTILITIES BEFORE EXCAVATION, CALL THE PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776. THE UTILITY COMPANIES SHOWN MAY OR MAY NOT HAVE UTILITY LINES IN THE AREA.

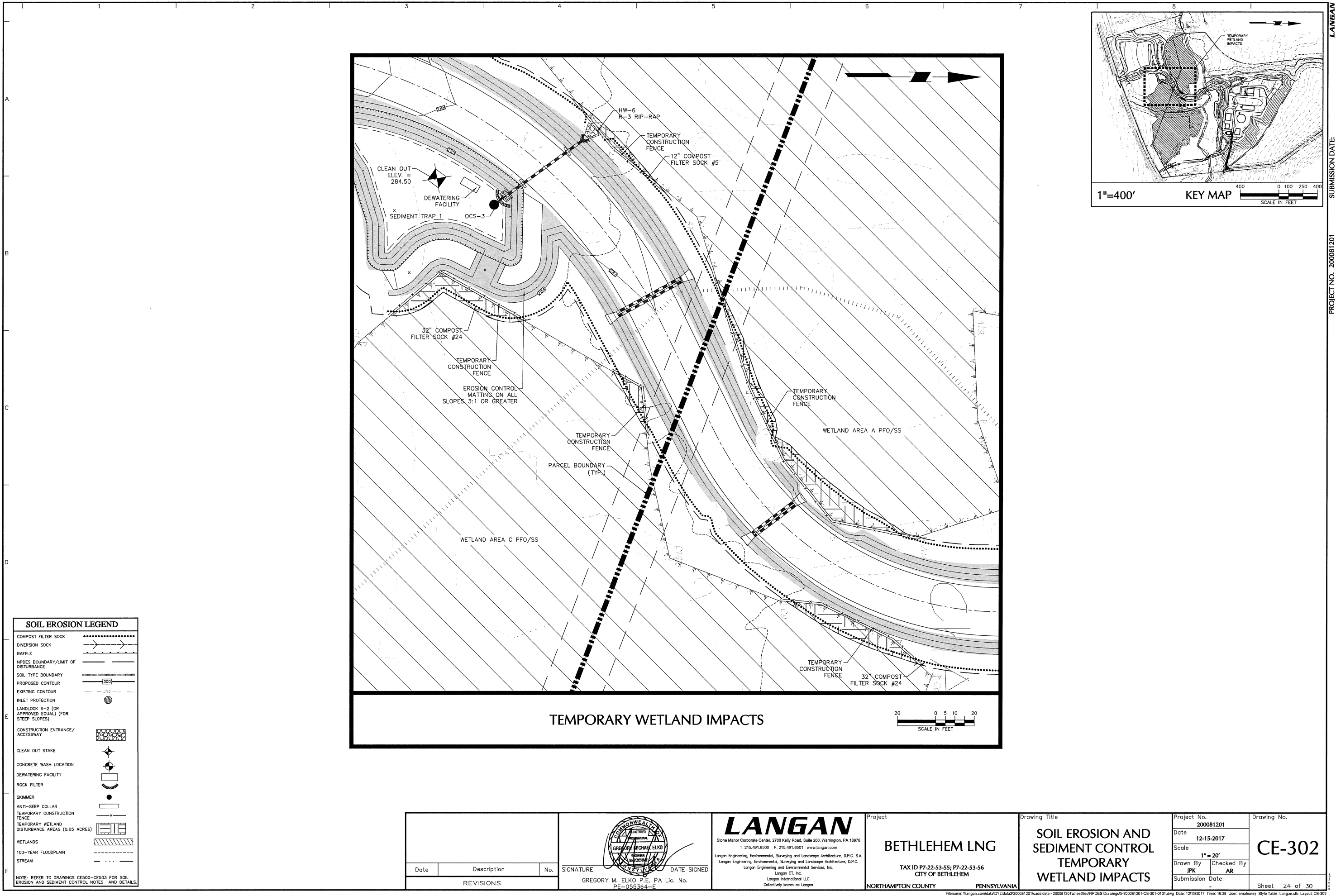


<b>LANGAN</b> Stone Manor Corporate Center, 2700 Kelly Road, Suite 200, Warminster, PA 18956 T: 215.491.6500 F: 215.491.6501 www.langan.com Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A. Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A. Langan Engineering and Environmental Services, Inc. Langan CE, Inc. Langan International LLC Collectively known as Langan			Project <b>BETHLEHEM LNG</b> TAX ID P7-22-53-55; P7-22-53-56 CITY OF BETHLEHEM NORTHAMPTON COUNTY PENNSYLVANIA		Drawing Title <b>SOIL EROSION AND SEDIMENT CONTROL PLAN STAGE 2</b>		Project No. 200081201 Date 12-15-2017 Scale 1" = 50' Drawn By JPK Checked By AR Submission Date -		Drawing No. <b>CE-203</b> Sheet 22 of 30	
Date Description No.			SIGNATURE GREGORY M. ELKO P.E. PA Lic. No. PE-055364-E		DATE SIGNED					
REVISIONS										

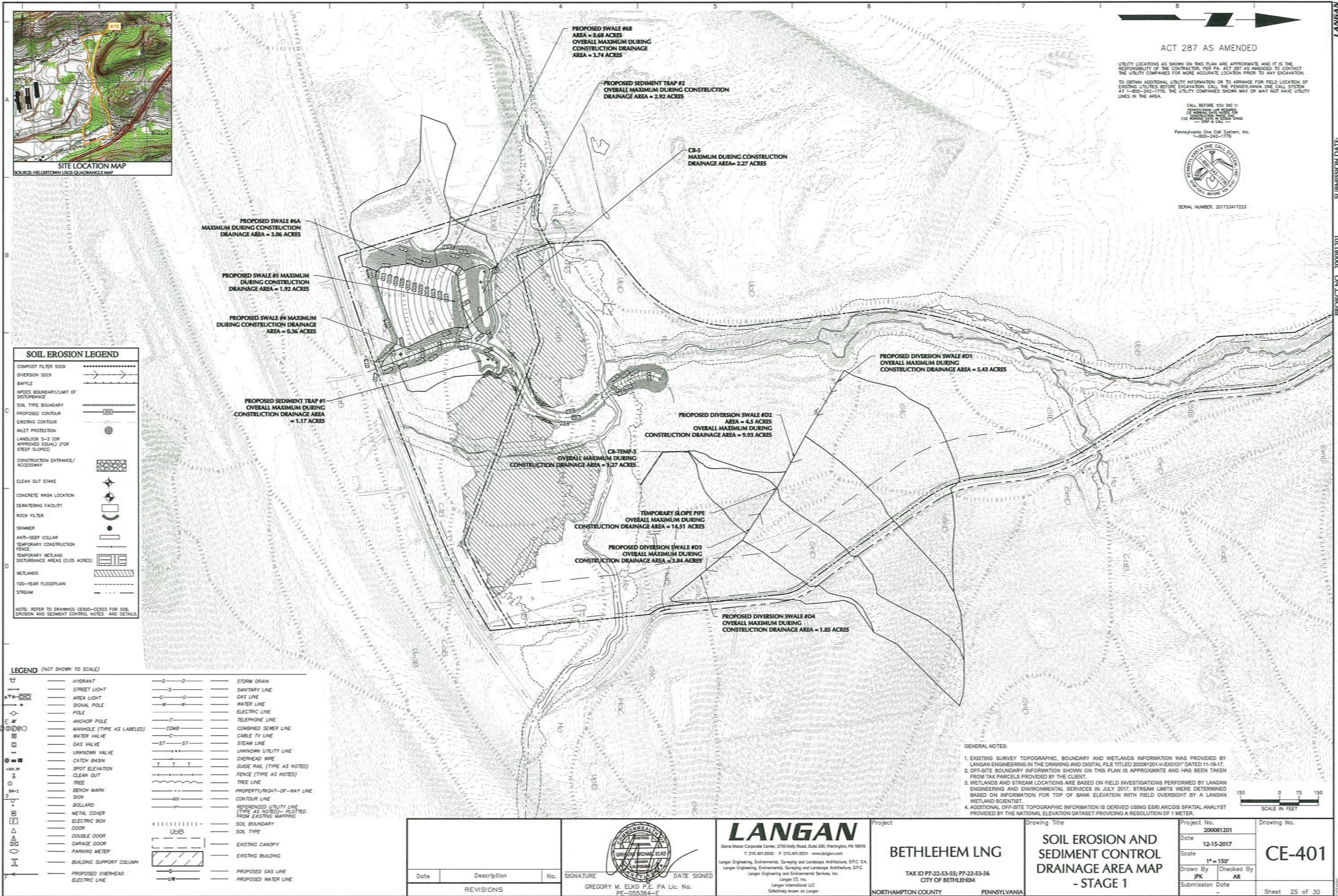














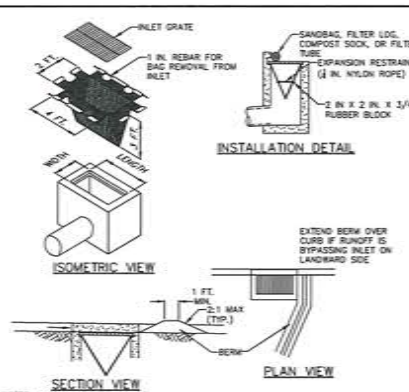


Project No. <b>200081201</b>	Drawing No.  <b>CE-402</b>
Date <b>12-15-2017</b>	
Scale <b>1" = 150'</b>	
Drawn By <b>JK</b>	
Checked By <b>AR</b>	
Submission Date	Sheet 26 of 30



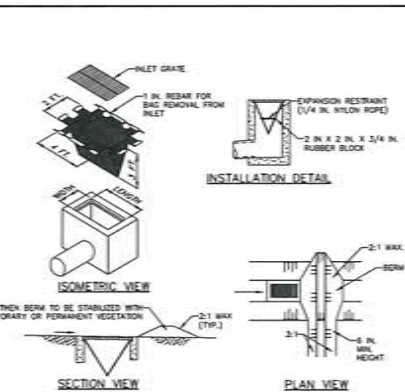
	STANDARD EROSION AND SEDIMENT CONTROL PLAN NOTES		<b>NOTE: SEQUENCE OF CONSTRUCTION STEPS 1 THROUGH 14 SHALL BE REFERRED TO, AS NECESSARY, THROUGHOUT THE CONSTRUCTION PROCESS.</b>		<b>MAINTENANCE PROGRAM</b>	
A	<div>1. ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&amp;S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION. 2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL WRITE ALL CONTRACTORS, MUNICIPAL OFFICIALS, THE E&amp;S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LOCAL CONSERVATION DISTRICT LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRECONSTRUCTION MEETING. 3. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES. 4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION. 5. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL. 6. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&amp;S BMPs SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&amp;S PLAN. 7. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN. 8. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAP(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINAL GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE FRISHED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER. 9. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT. 10. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.i ET SEQ., 271.i, AND 287.i ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, BURIED, DUMPED, OR DISCHARGED AT THE SITE. 11. ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&amp;S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED. 12. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING. 13. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN. OVER UNDISTURBED VEGETATED AREAS. 14. VEHICLES AND EQUIPMENT MAY NEVER ENTER DIRECTLY NOR EXIT DIRECTLY FROM RINGHOFFER ROAD FOR MASS EARTHWK. REFER TO THE SEQUENCE OF CONSTRUCTION FOR STAGE 1. TEMPORARY CONSTRUCTION ENTRANCE FROM RINGHOFFER ROAD FOR INSTALLATION OF DIVERSION SOCK. LIMITED UTILITY INSTALLATIONS. 15. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPs SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPs AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, RESGRADING, RESEEDING, REJULMING AND RESETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&amp;S BMPs FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPs, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED. 16. A LOG SHOWING DATES THAT E&amp;S BMPs WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION. 17. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEEP INTO ANY ADJOINING DITCH, STORM SEWER, OR SURFACE WATER. 18. SEDIMENT REMOVED FROM BMPs SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES. 19. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES - 6 TO 12 INCHES ON COMPACTED SOILS - PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL. 20. ALL FIRMS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES. 21. ALL EARTHEN FIRMS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS. 22. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROCKS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FIRMS. 23. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FIRMS. 24. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES. 25. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAM OR OTHER APPROVED METHOD. 26. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK PILLS NEED NOT BE VEGETATED. SEEDING AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN. 27. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON-GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS. 28. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS. 29. E&amp;S BMPs SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT. 30. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&amp;S BMPs. 31. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPs MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPs. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPs SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED BASINS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON. 32. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION. 33. FAILURE TO CORRECTLY INSTALL E&amp;S BMPs, FAILURE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&amp;S BMPs MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO \$10,000 PER DAY IN CIVL PENALTIES, UP TO \$10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO \$25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION. 34. CONCRETE WASH WATER SHALL BE HANDLED IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. IN NO CASE SHALL IT BE ALLOWED TO ENTER ANY SURFACE WATERS OR GROUNDWATER SYSTEMS. 35. ALL CHANNELS SHALL BE KEPT FREE OF OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO FILL, ROCKS, LEAVES, WOODY DEBRIS, ACCUMULATED SEDIMENT, EXCESS VEGETATION, AND CONSTRUCTION MATERIAL/WASTES. 36. SEDIMENT BASINS AND/OR TRAPS SHALL BE KEPT FREE OF ALL CONSTRUCTION WASTE, WASH WATER, AND OTHER DEBRIS HAVING POTENTIAL TO CLOG THE BASIN/TRAP OUTLET STRUCTURES AND/OR POLLUTE THE SURFACE WATERS. 37. SEDIMENT BASINS SHALL BE PROTECTED FROM UNAUTHORIZED ACTS BY THIRD PARTIES. 38. ANY DAMAGE THAT OCCURS IN WHOLE OR IN PART AS A RESULT OF BASIN OR TRAP DISCHARGE SHALL BE IMMEDIATELY REPAIRED BY THE PERMITTEE IN A PERMANENT MANNER SATISFACTORY TO THE MUNICIPALITY, LOCAL CONSERVATION DISTRICT, AND THE OWNER OF THE DAMAGED PROPERTY. 39. UPON REQUEST, THE APPLICANT OR HIS CONTRACTOR SHALL PROVIDE AN AS-BUILT (RECORD DRAWING) FOR ANY SEDIMENT BASIN OR TRAP TO THE MUNICIPAL INSPECTOR, LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT. 40. EROSION CONTROL BLANKETING SHALL BE INSTALLED ON ALL SLOPES 3:H V OR STEEPER WITHIN 50 FEET OF A SURFACE WATER AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS. 41. FILL MATERIAL FOR EMBANKMENTS SHALL BE FREE OF ROOTS, OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIALS.</div>	<div>1. UPON INSTALLATION OR STABILIZATION OF ALL PERIMETER CONTROL BMPs AND AT LEAST 3 DAYS PRIOR TO PROCEEDING WITH THE BULK EARTH DISTURBANCE ACTIVITIES, THE PERMITTEE OR CO-PERMITTEE SHALL PROVIDE NOTIFICATION TO THE DEPARTMENT OR AUTHORIZED CONSERVATION DISTRICT. 2. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED BY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION. EACH STEP OF THE SEQUENCE SHALL BE COMPLETED BEFORE PROCEEDING TO THE NEXT STEP, EXCEPT WHERE NOTED. CONSTRUCTION MAY OVERLAP INTO A SUBSEQUENT STAGE AS LONG AS ALL EROSION CONTROL MEASURES HAVE BEEN INSTALLED IN THE PREVIOUS STAGE. 3. ALL BLASTING ACTIVITY, IF REQUIRED, SHALL BE DONE IN ACCORDANCE WITH THE LOCAL STATE AND FEDERAL REGULATIONS. CONTRACTOR SHALL NOTIFY OWNER AND ALL REGULATORY AGENCIES IN WRITING PRIOR AND OBTAIN ANY NECESSARY PERMITS PRIOR TO ANY BLASTING ACTIVITIES. 4. INSTALLATION OF ORANGE CONSTRUCTION FENCING TO PROTECT AREAS OF PROPOSED WETLANDS SHALL BE INSTALLED PRIOR TO ANY EARTH DISTURBANCE TO AVOID PERMANENT IMPACTS. 5. WATER PUMPED FROM WORK AREAS MUST BE TREATED FOR SEDIMENT REMOVAL PRIOR TO DISCHARGING TO A SURFACE WATER. A PUMPED WATER FILTER BAG DETAIL HAS BEEN PROVIDED ON CE-602 - SOIL EROSION AND SEDIMENT CONTROL DETAILS. 6. BEFORE DISPOSING OF SOIL OR RECEIVING BORROW FOR THE SITE, THE OPERATOR MUST ASSURE THAT EACH SOIL OR BORROW AREA HAS AN EROSION AND SEDIMENT CONTROL PLAN APPROVED BY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT, AND WHICH IS BEING IMPLEMENTED AND MAINTAINED ACCORDING TO CHAPTER 102 REGULATIONS. THE OPERATOR SHALL ALSO NOTIFY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT IN WRITING OF ALL RECEIVING SOIL AND BORROW AREAS WHEN THEY HAVE BEEN IDENTIFIED. 7. LIMIT CLEARING AND GRUBBING TO ACCESS THE SEDIMENT TRAP AREAS AND DIVERSION SOCK INSTALLATION DURING THE INITIAL PROJECT CONSTRUCTION. ALL SEDIMENT TRAP AREAS MUST BE CLEARED AND GRUBBED FIRST AND THESE EROSION CONTROL MEASURES INSTALLED BEFORE THE TRIBUTARY AREAS TO THESE TRAPS CAN BE CLEARED AND GRUBBED. IF ADDITIONAL FILL IS NECESSARY FOR THE SEDIMENT TRAP INSTALLATION, THE BORROW FILL SHALL BE TAKEN FROM AREAS IMMEDIATELY UPRSTREAM OF THE TRAP LOCATION IN ORDER TO MINIMIZE DISTURBANCE. CLEAR AND GRUB AREA OF PROPOSED DISTURBED AREA FOR EACH APPROPRIATE CONSTRUCTION SECTION, ONE AT A TIME. 8. SEDIMENT TRAPS SHALL REMAIN FUNCTIONAL UNTIL ALL UPSLOPE CONTRIBUTING</div>				





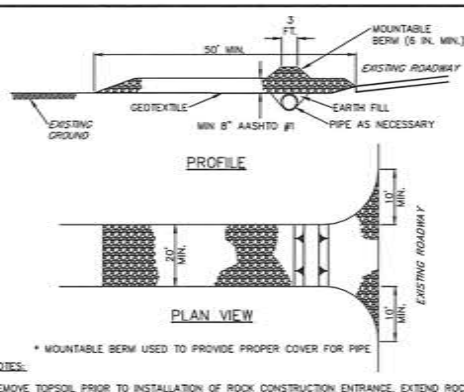
**NOTES:**  
MAXIMUM DRAINAGE AREA = 1/2 ACRE.  
INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERM SHALL BE REQUIRED FOR ALL INSTALLATIONS.  
ROLLED EARTHEN BERM SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.  
AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS. A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SEIVE.  
INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINGS OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.  
DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

**STANDARD CONSTRUCTION DETAIL #4-15**  
FILTER BAG INLET PROTECTION - TYPE C INLET



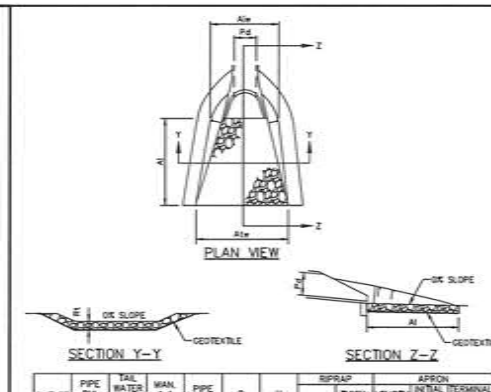
**NOTES:**  
MAXIMUM DRAINAGE AREA = 1/2 ACRE.  
INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERM SHALL BE REQUIRED FOR ALL INSTALLATIONS.  
ROLLED EARTHEN BERM IN ROADWAY SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. EARTHEN BERM IN CHANNEL SHALL BE MAINTAINED UNTIL PERMANENT STABILIZATION IS COMPLETED OR REMAIN PERMANENT.  
AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS. A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SEIVE.  
INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINGS OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.  
DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

**STANDARD CONSTRUCTION DETAIL #4-16**  
FILTER BAG INLET PROTECTION - TYPE M INLET



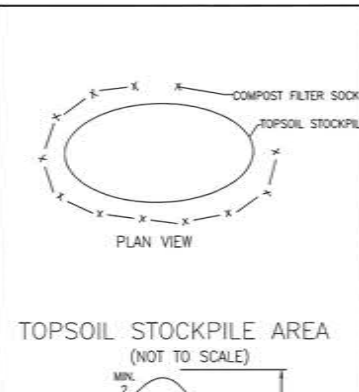
**NOTES:**  
REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.  
RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.  
MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.  
MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK, WASHING THE ROADWAY OR SHEETING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

**STANDARD CONSTRUCTION DETAIL #3-1**  
ROCK CONSTRUCTION ENTRANCE

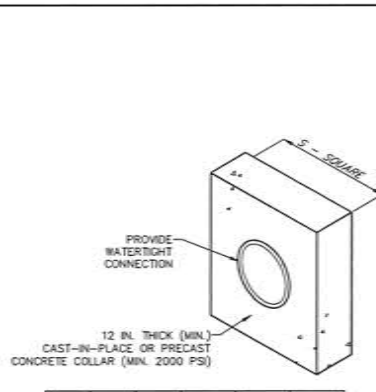


**NOTES:**  
ALL APRONS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN. TERMINAL WIDTHS SHALL BE ADJUSTED AS NECESSARY TO MATCH RECEIVING CHANNELS.  
ALL APRONS SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RUNOFF EVENT. DISPLACED RIPRAP WITHIN THE APRON SHALL BE REPLACED IMMEDIATELY.

**STANDARD CONSTRUCTION DETAIL #3-1**  
RIPRAP APRON AT PIPE OUTLET  
WITH FLARED END SECTION OR ENDWALL



**NOTES:**  
\*PENNDOT 2A STONE TO BE USED TO STABILIZE ON-SITE STAGING AREAS.  
\*18-IN COMPOST FILTER SOCK MUST BE PLACED DOWNSLOPE OF ALL STOCKPILES. IMMEDIATELY APPLY TEMPORARY SEEDING TO ALL STOCKPILES WHICH WILL REMAIN IN PLACE 20 DAYS OR MORE.



**NOTES:** ALL COLLARS SHALL BE INSTALLED SO AS TO BE WATER-TIGHT. COLLAR SIZE AND SPACING SHALL BE AS INDICATED WITHIN TABLE.

**STANDARD CONSTRUCTION DETAIL #7-10**  
CONCRETE ANTI-SEEP COLLAR FOR PERMANENT BASINS OR TRAPS

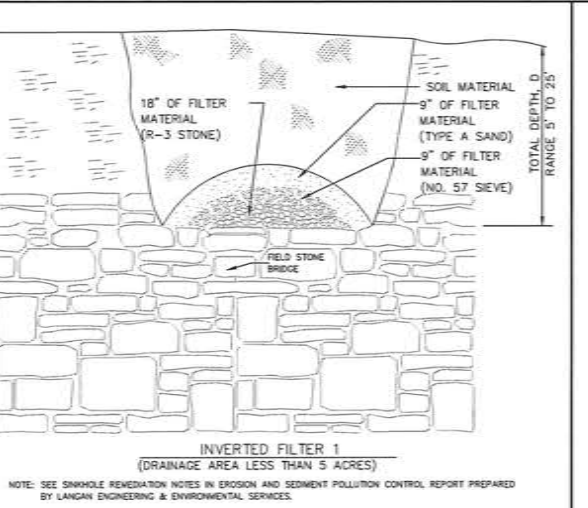
## INLET PROTECTION

## ROCK CONSTRUCTION ENTRANCE

## RIPRAP OUTLET PROTECTION

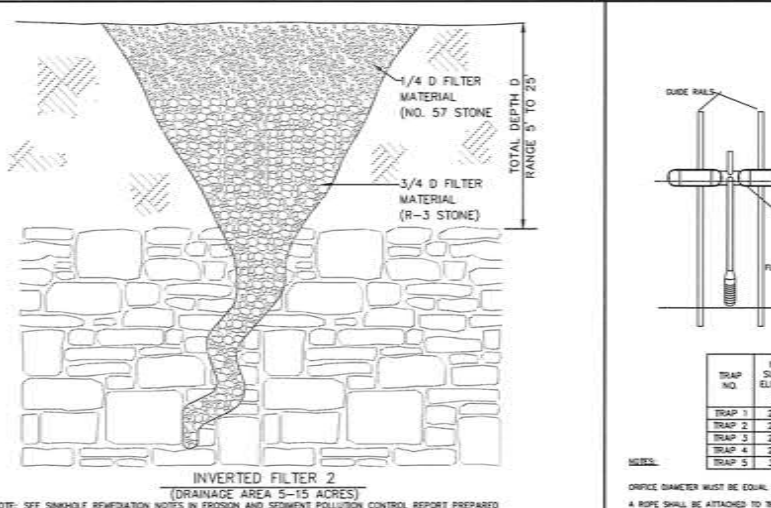
## STOCKPILE AREA DETAIL

## ANTI-SEEP COLLAR



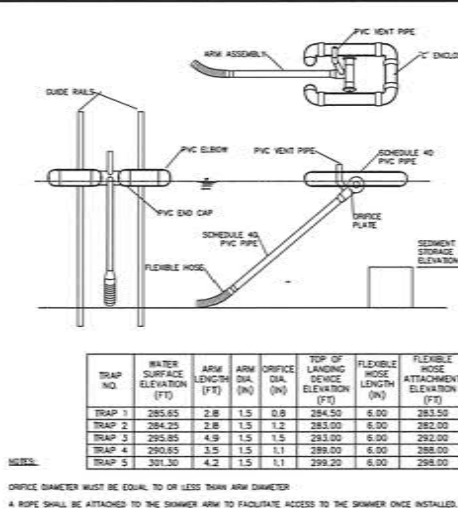
**INVERTED FILTER 1**  
(DRAINAGE AREA LESS THAN 5 ACRES)

**NOTE:** SEE SINKHOLE REMEDIATION NOTES IN EROSION AND SEDIMENT POLLUTION CONTROL REPORT PREPARED BY LANGAN ENGINEERING & ENVIRONMENTAL SERVICES.

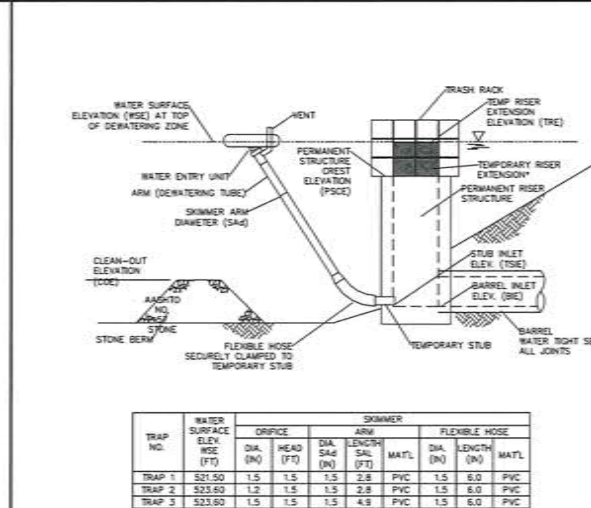


**INVERTED FILTER 2**  
(DRAINAGE AREA 5-15 ACRES)

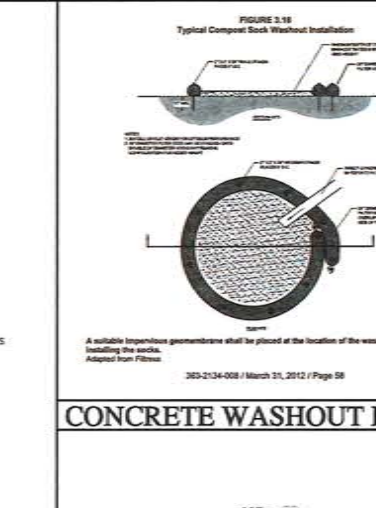
**NOTE:** SEE SINKHOLE REMEDIATION NOTES IN EROSION AND SEDIMENT POLLUTION CONTROL REPORT PREPARED BY LANGAN ENGINEERING & ENVIRONMENTAL SERVICES.



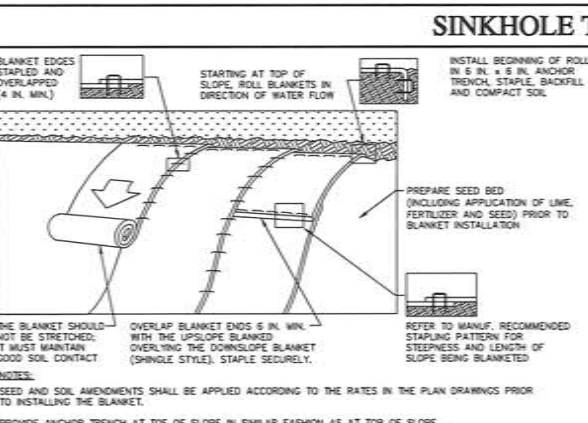
**NOTES:**  
ORIFICE DIAMETER MUST BE EQUAL TO OR LESS THAN ARM DIAMETER.  
A ROPE SHALL BE ATTACHED TO THE SKIMMER ARM TO FACILITATE ACCESS TO THE SKIMMER ONCE INSTALLED.  
SKIMMER SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.  
ANY MALFUNCTIONING SKIMMER SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF INSPECTION.  
ICE OR SEDIMENT BUILDUP AROUND THE PRINCIPAL SPILLWAY SHALL BE REMOVED SO AS TO ALLOW THE SKIMMER TO RESPOND TO FLUCTUATING WATER ELEVATIONS.  
SEDIMENT SHALL BE REMOVED FROM THE BASIN WHEN IT REACHES THE LEVEL MARKED ON THE SEGMENT CLEAN-OUT STAKE OR THE TOP OF THE STONE BERM.  
A SEMI-CIRCULAR LANDING ZONE MAY BE SUBSTITUTED FOR THE GUIDE RAILS (STANDARD CONSTRUCTION DETAIL # 7-3).



**NOTES:**  
1. ALL ORIFICES ON PERMANENT RISER BELOW TEMPORARY RISER EXTENSION SHALL HAVE WATER-TIGHT TEMPORARY SEALS PROVIDED.  
2. TEMPORARY STUB INVERT ELEVATION SHALL BE SET AT OR BELOW SEGMENT CLEAN-OUT ELEVATION.  
3. A ROPE SHALL BE ATTACHED TO THE SKIMMER ARM TO FACILITATE ACCESS TO THE SKIMMER ONCE INSTALLED.  
4. SKIMMER SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.  
5. ANY MALFUNCTIONING SKIMMER SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF INSPECTION.  
6. ICE OR SEDIMENT BUILDUP AROUND THE PRINCIPAL SPILLWAY SHALL BE REMOVED SO AS TO ALLOW THE SKIMMER TO RESPOND TO FLUCTUATING WATER ELEVATIONS.  
7. SEDIMENT SHALL BE REMOVED FROM THE BASIN WHEN IT REACHES THE LEVEL MARKED ON THE SEGMENT CLEAN-OUT STAKE OR THE TOP OF THE STONE BERM. SEE STANDARD CONSTRUCTION DETAIL #7-3 FOR CONFIGURATION OF STONE BERM.

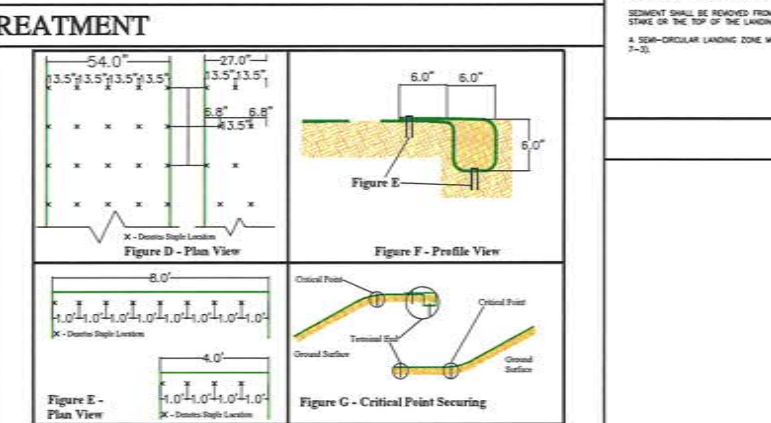


**CONCRETE WASHOUT DETAIL**

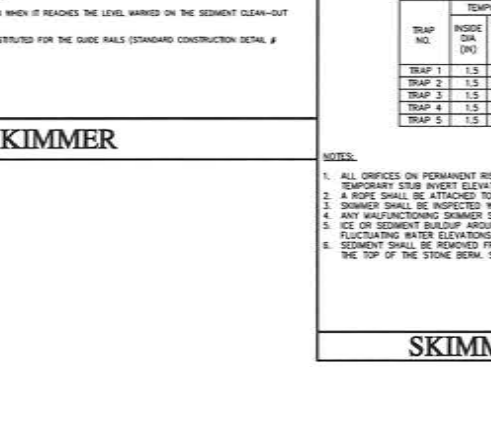


**EROSION CONTROL MATTING**

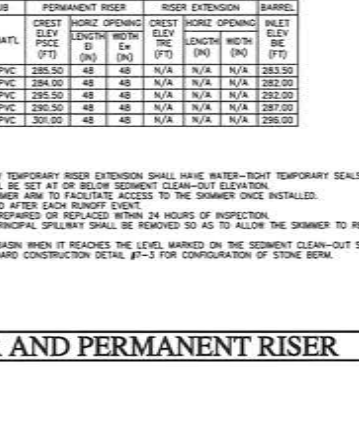
**STANDARD CONSTRUCTION DETAIL #11-1**  
EROSION CONTROL BLANKET INSTALLATION



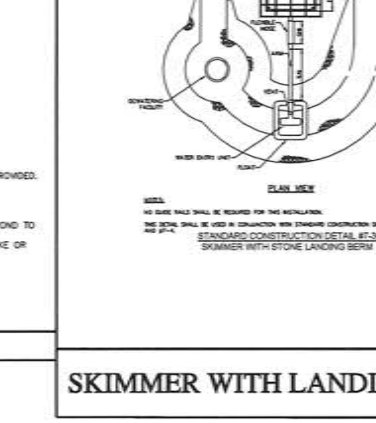
**S-2 MATTING STAPLING PATTERN**



**SKIMMER**



**SKIMMER AND PERMANENT RISER**



**SKIMMER WITH LANDING BERM**

**LANGAN**  
Stone Water Corporate Center, 2700 Kelly Road, Suite 200, Warminster, PA 18956  
T: 215.491.8500 F: 215.491.8501 www.langan.com  
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A.  
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan CL, Inc.  
Langan International LLC  
Collectively known as Langan

**BETHLEHEM LNG**  
TAX ID #7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM  
NORTHAMPTON COUNTY PENNSYLVANIA

Project  
**BETHLEHEM LNG**  
TAX ID #7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM  
NORTHAMPTON COUNTY PENNSYLVANIA

Drawing Title  
**SOIL EROSION AND SEDIMENT CONTROL DETAILS**

Project No.  
200081201  
Date  
12-15-2017  
Scale  
N.T.S.  
Drawn By  
JPK  
Checked By  
AR  
Submission Date  
Sheet 28 of 30







Figure 6.1. Engineering Design Drawing for Runoff Diversion

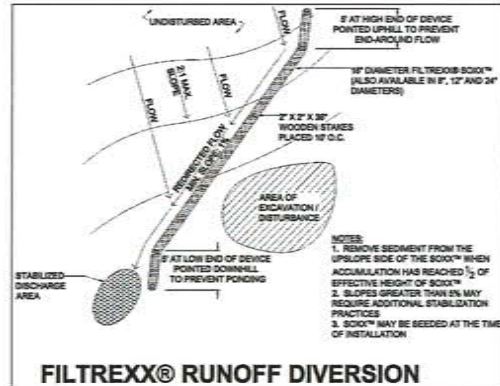


Table 6.2. Fibrex Runoff Diversion Performance and Design Specifications Summary

Design Parameter	6 in. (152mm)	8 in. (203mm)	10 in. (254mm)	12 in. (305mm)	14 in. (356mm)	Testing Lab/Reference	Publication(s)
Effective Height	6.5 in. (165mm)	8.5 in. (216mm)	10.5 in. (267mm)	12.5 in. (318mm)	14.5 in. (368mm)	AgriSource Research and Development Center	Transactions of the American Society of Agricultural and Biological Engineers, 2003
Effective Circumference	25 in. (635mm)	30 in. (762mm)	35 in. (889mm)	40 in. (1016mm)	45 in. (1143mm)		
Details	25 in. (635mm)	30 in. (762mm)	35 in. (889mm)	40 in. (1016mm)	45 in. (1143mm)	AgriSource Research and Development Center	
As Shown	Testing in Progress	Testing in Progress	Testing in Progress	Testing in Progress	Testing in Progress	AgriSource Research and Development Center	
Maximum Length	unlimited	unlimited	unlimited	unlimited	unlimited		
Maximum Weight	10 lb (4.5 kg)	15 lb (6.8 kg)	20 lb (9.1 kg)	25 lb (11.3 kg)	30 lb (13.6 kg)		
Material Requirements	1.5 in. (38mm)	1.5 in. (38mm)	1.5 in. (38mm)	1.5 in. (38mm)	1.5 in. (38mm)		
Material Requirements	1.5 in. (38mm)	1.5 in. (38mm)	1.5 in. (38mm)	1.5 in. (38mm)	1.5 in. (38mm)		
Functional Longevity	2-3 yr	2-3 yr	2-3 yr	2-3 yr	2-3 yr	AgriSource Research and Development Center	
Percent Vegetated Area	Testing in Progress	Testing in Progress	Testing in Progress	Testing in Progress	Testing in Progress	AgriSource Research and Development Center	
Effective Flow Through Rate (inches per hour)	< 1 gal./hr./sq. ft. (0.1 in/hr.)	< 1 gal./hr./sq. ft. (0.1 in/hr.)	< 1 gal./hr./sq. ft. (0.1 in/hr.)	< 1 gal./hr./sq. ft. (0.1 in/hr.)	< 1 gal./hr./sq. ft. (0.1 in/hr.)	AgriSource Research and Development Center	
Maximum Flow Rate	1 in. (25mm)	1 in. (25mm)	1 in. (25mm)	1 in. (25mm)	1 in. (25mm)	AgriSource Research and Development Center	

APPENDIX 5.26:

FILTREXX INTERNATIONAL STANDARD SPECIFICATIONS FOR GROWINGMEDIA™

GROWINGMEDIA™ COMPOSTED PRODUCTS USED FOR FILTREXX GROWINGMEDIA™ SHALL BE WIDE FREE AND DERIVED FROM A WELL-DECOMPOSED SOURCE OF ORGANIC MATTER. THE COMPOSTED PRODUCTS SHALL BE PRODUCED USING AN AEROBIC COMPOSTING PROCESS INVOLVING US EPA 504 REGULATIONS (IN CANADA W.O.D. 101, C.O.L.E. TYPE "W" AND TYPE "M" REGULATIONS, INCLUDING TIME AND TEMPERATURE DATA INDICATING EFFECTIVE WEED KILLING, PATHOGEN AND INSECT LARVAE KILLING. THE COMPOSTED PRODUCTS SHALL BE FREE OF ANY REFUSE, CONTAMINANTS OR OTHER MATERIALS TOXIC TO PLANT GROWTH. NON-COMPOSTED PRODUCTS WILL NOT BE ACCEPTED. TEST METHODS FOR THE ITEMS BELOW SHOULD FOLLOW USDC TRC002 GUIDELINES FOR LABORATORY PROCEDURES.

**SECTIONS:**

A. PH-5.8.8 IN ACCORDANCE WITH TRC002, "ELECTROMETRIC pH DETERMINATION FOR COMPOST"

B. MOISTURE CONTENT OF LESS THAN 60% IN ACCORDANCE WITH STANDARDIZED TEST METHODS FOR MOISTURE DETERMINATION.

C. GROWINGMEDIA™ TO BE USED WITH FILTREXX™ WHERE SEEDING AND/OR LIVE STAKES ARE SPECIFIED. ON LOW GRADE SLOPES WHERE VEGETATION ESTABLISHMENT IS THE PRIORITY, OR WHERE RAINWATER ABSORPTION, WATER HOLDING CAPACITY, RUNOFF REDUCTION AND WILDFIRE RESISTANCE ARE THE PRIORITY, THE FOLLOWING PARTICLE SIZE DISTRIBUTION, EXAMPLES INCLUDE RUNOFF DIVERSION SOCK™, CHANNEL SOCK™, EDGESAVE™, UNINGRAIL™, GREENCLIX™, FILTREXX FLOW DIVERSION SOCK™, COMPOST VEGETATED COVER™, COMPOST EROSION CONTROL BLANKET™, COMPOST STORM WATER BLANKET™, COMPOST ENGINEERED SOIL™, COMPOST BOREHOLE SYSTEM™, GREEN ROOF GROWINGMEDIA™.

PARTICLE SIZE: 100% PASSING A 2 IN (50mm) SIEVE, 90% PASSING A 1 IN (25 mm) SIEVE, MINIMUM OF 50% PASSING A 3/8 IN (12.5 mm) SIEVE IN ACCORDANCE WITH TRC002, "SAMPLE SIEVING FOR AGGREGATE SIZE CLASSIFICATION".

D. MATERIAL SHALL BE RELATIVELY FREE (1% BY DRY WEIGHT) OF INERT OR FOREIGN MAN MADE MATERIALS.

E. A SAMPLE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO BEING USED AND MUST COMPLY WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

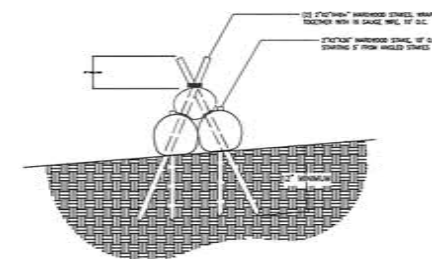
**OPTION A: EROSION CONTROL**

FOR VEGETATED NON FILTREXX™ APPLICATIONS WHERE SLOPE GRADES ARE GREATER THAN 3:1, WHERE SHEET RUNOFF RATE OR VELOCITY MAY BE HIGH, OR RAINFALL INTENSITY MAY BE HIGH.

SUBSTITUTION FOR SECTION C: PARTICLE SIZE OF FILTREXX GROWINGMEDIA™ SHALL USE THE FOLLOWING PARTICLE SIZE DISTRIBUTION SPECIFICATION: 90% PASSING A 1 IN (25 mm) SIEVE, MAXIMUM OF 50% PASSING A 2 IN (50 mm) SIEVE.

**OPTION B: NON-VEGETATED TEMPORARY EROSION CONTROL**

FOR NON-VEGETATED NON FILTREXX™ APPLICATIONS WHERE SLOPE GRADES ARE GREATER THAN 3:1, WHERE SHEET RUNOFF RATE OR VELOCITY MAY BE HIGH, OR RAINFALL INTENSITY MAY BE HIGH.



NOTE: EFFECTIVE COMPOST FILTER SOCK HEIGHT IN THE FIELD SHOULD BE AS FOLLOWS: 8" DIAMETER SEDIMENT CONTROL = 6.5" HIGH, 12" DIAMETER SEDIMENT CONTROL = 9.5" HIGH, 18" DIAMETER SEDIMENT CONTROL = 14.5" HIGH, 24" DIAMETER SEDIMENT CONTROL = 19" HIGH.

DIVERSION SOCK COMPOST STANDARDS	
Particle Size (Passing Mesh Size)	Material Passing 75 mm (3 in) - 100%
	Material Passing 50 mm (2 in) - 90%
General Particle Size	13 mm - 50 mm (0.5 in - 2 in)
Maximum Particle Length	150 mm (6 inches)

FILTREXX COMPOST FILTER SOCK DIVERSION BERM

SEEDING & STABILIZATION NOTES:

TEMPORARY SEEDING:

- THE FOLLOWING SURFACES OF THE SITE SHALL BE TEMPORARILY SEEDED AND:
  - THE SURFACE OF TOPSOIL STOCKPILES
  - THE SURFACE OF EXPOSED EARTH AREAS NOT SUBJECT TO CONSTRUCTION
- SEEDING SHALL OCCUR IMMEDIATELY AFTER THE ESTABLISHMENT OF THE TOPSOIL STOCKPILES OR ROUGH GRADED AREAS. THE FOLLOWING SEED SHALL BE PLANTED:
  - RYEGRASS - BLUE TAG CERTIFIED - 100% - 4 TO 5 LBS. PER 1,000 SQUARE FOOT.
- PERMANENT TYPE - NOT APPLICABLE
- PREPARE AREAS TO BE SEED AS FOLLOWS:
  - REMOVE ALL DEBRIS, INCLUDING LARGE STONE. TILL SOIL TO A DEPTH OF FOUR INCHES TO SIX INCHES. APPLY PULVERIZED AGRICULTURAL GRADED LIME AT A RATE OF 40 LBS. PER 1,000 SQUARE FEET.
  - BEFORE AUGUST, SEPTEMBER OR OCTOBER SEEDING, APPLY 12.5 LBS. OF 10-10-10 FERTILIZER PER 1,000 SQUARE FEET. BEFORE FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY OR NOVEMBER SEEDING, APPLY 40 LBS. OF 10-10-10 FERTILIZER PER 1,000 SQUARE FEET. WORK INTO TOP INCH OF SOIL.
    - SOW SEED AT THE INDICATED RATE. DIVIDE SEED INTO TWO EQUAL LOTS. SOW ONE LOT IN ONE DIRECTION. SOW SECOND LOT AT RIGHT ANGLE TO FIRST LOT.
    - RAKE SEEDED AREA SLIGHTLY. ROLL SURFACE LIGHTLY TO FIRM SOIL AROUND SEED.
    - PLACE CLEAN, DRY STRAW OF HAY MULCH WITHIN 48 HOURS AFTER SEEDING. PLACE AT THE RATE OF 1,200 LBS. PER 1,000 SQUARE YARDS.

TEMPORARY MULCHING:

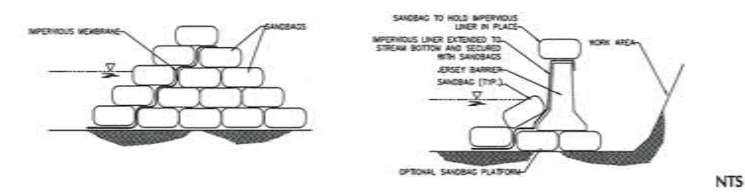
- MULCH PROPOSED LANDSCAPE AREAS OR TOPSOIL STOCKPILES IF EARTHWORK IS COMPLETED OUTSIDE OF THE RECOMMENDED PLANTING SEASONS FOR TEMPORARY SEEDING OR DUE TO UNFAVORABLE WEATHER CONDITIONS.
- MULCH SHALL BE APPLIED IMMEDIATELY FOLLOWING THE ESTABLISHMENT OF TOPSOIL STOCKPILE OR ROUGH GRADING.
- MULCH WITH SUITABLE FIBROUS GROUND, SHREDDED AGED HARDWOOD, PINEWOOD BARK, STRAW, OR HAY UNIFORM AND CONTINUOUSLY TO A LOOSED DEPTH OF 3 INCHES MINIMUM. ANCHOR AS REQUIRED.
- PROPERLY MAINTAIN MULCHED AREAS UNTIL PERMANENT STABILIZATION MEASURES ARE COMPLETE. REAPPLY MULCH MATERIALS WHICH BECOME DISLOOSED AT INITIAL OR MODIFIED RATES AS NECESSARY. IF A SLOPE FAILURE OCCURS WHICH REQUIRES REDRESSING, EXCAVATION, OR THE ESTABLISHMENT OF A NEW SLOPE, REPLACE MULCH AS NECESSARY.

PERMANENT SEEDING:

- PERMANENT SEEDING SHALL OCCUR IMMEDIATELY AFTER THE FINAL GRADING IS COMPLETED. THE FOLLOWING SEED SHALL BE PLACED UNLESS OTHERWISE SPECIFIED ON THE PLANS OR DIRECTED IN THE FIELD.
  - FORMULA B, BLUE TAG CERTIFIED, CONSISTS OF:
    - 50% KENTUCKY BLUEGRASS MIXTURE
    - 30% CREEPING RED FESCUE
    - 20% PERENNIAL RYEGRASS MIXTURE
  - SPREAD AT A RATE OF 21.0 LBS. PER 1,000 SQUARE YARDS
- REMOVE ALL DEBRIS, INCLUDING LARGE STONES. TILL SOIL TO A DEPTH OF FOUR INCHES TO SIX INCHES. APPLY LIME AT A RATE OF 4 TONS PER ACRE. BEFORE JUNE 15, APPLY 1,000 LBS. OF 10-20-20 FERTILIZER PER ACRE. WORK FERTILIZER INTO TOP INCH OF SOIL.
- SEED ONLY AT THE FOLLOWING TIMES: MARCH 15 TO JUNE 1, AND AUGUST 1 TO OCTOBER 15.
- APPLY SEED AT A RATE OF 21.0 LBS. PER 1,000 SQUARE YARDS. DIVIDE SEED INTO TWO EQUAL LOTS. SOW ONE LOT IN ONE DIRECTION. SOW SECOND LOT AT RIGHT ANGLE TO FIRST LOT. RAKE SEEDED AREA SLIGHTLY. ROLL SURFACE LIGHTLY TO FIRM SOIL AROUND SEED.
- MULCH SEEDED AREAS WITH STRAW OR HAY AT THE RATE OF 3 TONS PER ACRE. ANCHOR MULCH. COMPLY WITH THE REQUIREMENTS OF SECTION 805 MULCHING, PENNDOT PUBLICATION 408. ANCHOR MUST BE SPECIFIED.

SOIL AMENDMENT	TABLE 11.2 SOIL AMENDMENT APPLICATION RATE EQUIVALENTS			NOTES
	PER ACRE	PER 1,000 SQ. FT.	PER 1,000 SQ. YD.	
AGRICULTURAL LIME	6 TONS	240 LB	2,480 LB	OR AS PER SOIL TESTS MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS
10-20-20 FERTILIZER	1,000 LB	25 LB	230 LB	OR AS PER SOIL TESTS MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS
AGRICULTURAL LIME	1 TON	40 LB	430 LB	TYPICALLY NOT REQUIRED FOR TOPSOIL STOCKPILES
10-20-20 FERTILIZER	500 LB	12.5 LB	100 LB	TYPICALLY NOT REQUIRED FOR TOPSOIL STOCKPILES

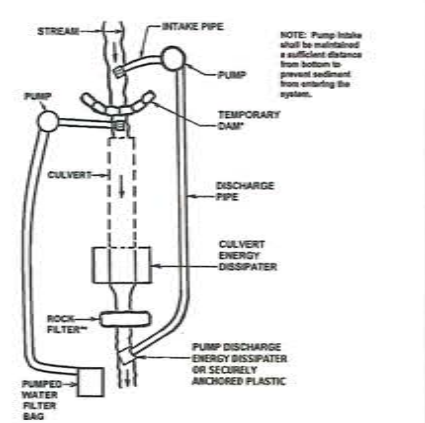
STABILIZATION METHODS AND STANDARDS



SANDBAG DIVERSION DAM

STANDARD E&S WORKSHEET # 21 Temporary and Permanent Vegetative Stabilization Specifications	
PROJECT NAME: BETHLEHEM LNG	LOCATION: COLE COUNTY, NORTHAMPTON COUNTY, PA
PREPARED BY: JPK	DATE: 12/15/2017
CHECKED BY: JPK	DATE: 12/15/2017
SPECIFICATIONS: The Department recommends the use of the Penn State publication, "Erosion Control and Conservation Plantings on Nonirrigated" as the standard to use for the selection of species, seed specifications, sowing, timing and fertilizing, time of sowing, and seedling methods. Specifications for these items may also be obtained from PennDOT's Publication # 408, Section 804 or by contacting the applicable county conservation district. Upon selection of a reference, that reference should be used to provide specifications for seeding, mulching, and soil amendments. The following specification will be used for this project:	
(TEMPORARY)	<ul style="list-style-type: none"> <li>SPECIES: RYEGRASS - BLUE TAG CERTIFIED</li> <li>% PURE LIVE SEED: 100%</li> <li>APPLICATION RATE: 21.0 LBS./ACRE</li> <li>FERTILIZER TYPE: 10-20-20</li> <li>FERTILIZER RATE: 1,000 LBS./ACRE</li> <li>LIME TYPE: 50% KENTUCKY BLUEGRASS MIXTURE</li> <li>LIME RATE: 2,480 LBS./ACRE</li> <li>MULCH TYPE: STRAW OR HAY</li> <li>MULCH RATE: 3 TONS/ACRE</li> </ul>
(PERMANENT)	<ul style="list-style-type: none"> <li>SPECIES: SEE PERMANENT SEED NOTES</li> <li>% PURE LIVE SEED: SEE PERMANENT SEED NOTES</li> <li>APPLICATION RATE: SEE PERMANENT SEED NOTES</li> <li>FERTILIZER TYPE: SEE PERMANENT SEED NOTES</li> <li>FERTILIZER RATE: SEE PERMANENT SEED NOTES</li> <li>LIME TYPE: SEE PERMANENT SEED NOTES</li> <li>LIME RATE: SEE PERMANENT SEED NOTES</li> <li>MULCH TYPE: SEE PERMANENT SEED NOTES</li> <li>MULCH RATE: SEE PERMANENT SEED NOTES</li> <li>ANCHOR MATERIAL: SEE PERMANENT SEED NOTES</li> <li>ANCHORING METHOD: SEE PERMANENT SEED NOTES</li> <li>RATE OF ANCHOR MATERIAL APPL.: SEE PERMANENT SEED NOTES</li> <li>SEEDING SEASON DATES: MARCH 15 - JUNE 1 OR AUG. 1 - OCT. 15</li> </ul>
(PERMANENT - STEEP SLOPE)	<ul style="list-style-type: none"> <li>SPECIES: SEE PERMANENT SEED NOTES</li> <li>% PURE LIVE SEED: SEE PERMANENT SEED NOTES</li> <li>APPLICATION RATE: SEE PERMANENT SEED NOTES</li> <li>FERTILIZER TYPE: SEE PERMANENT SEED NOTES</li> <li>FERTILIZER RATE: SEE PERMANENT SEED NOTES</li> <li>LIME TYPE: SEE PERMANENT SEED NOTES</li> <li>LIME RATE: SEE PERMANENT SEED NOTES</li> <li>MULCH TYPE: SEE PERMANENT SEED NOTES</li> <li>MULCH RATE: SEE PERMANENT SEED NOTES</li> <li>ANCHOR MATERIAL: SEE PERMANENT SEED NOTES</li> <li>ANCHORING METHOD: SEE PERMANENT SEED NOTES</li> <li>RATE OF ANCHOR MATERIAL APPL.: SEE PERMANENT SEED NOTES</li> <li>SEEDING SEASON DATES: MARCH 15 - JUNE 1 OR AUG. 1 - OCT. 15</li> </ul>

TABLE 11.4 Mulch Application Rates			
Mulch Type	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.
Straw	3 tons	120 lb.	1,200 lb.
Hay	3 tons	120 lb.	1,200 lb.
Wood Chips	4 tons	160 lb.	1,600 lb.
Shredded Bark	1 ton	40 lb.	400 lb.



NOTE: Pump intake should be maintained a sufficient distance from bottom to prevent sediment from entering the system.

NOTE: 1. FOR LOW GRADIENT CHANNELS, THE ROCK FILTER MAY BE REPLACED BY AN IMPERVIOUS CONCRETE DAM TO PREVENT BACKFLOW INTO THE WORK AREA.

PUMP BY-PASS



**LANGAN**  
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Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A.  
Langan Engineering and Environmental Services, Inc.  
Langan CE, Inc.  
Langan International LLC  
Collectively known as Langan

Project  
**BETHLEHEM LNG**  
TAX ID P7-22-53-55; P7-22-53-56  
CITY OF BETHLEHEM  
NORTHAMPTON COUNTY PENNSYLVANIA

Drawing Title  
**SOIL EROSION AND SEDIMENT CONTROL DETAILS**

Project No.  
**200081201**  
Date  
**12-15-2017**  
Scale  
**N.T.S.**  
Drawn By  
**JPK**  
Checked By  
**AR**  
Submission Date

Drawing No.  
**CE-503**

Sheet 30 of 30



PERMIT BOUNDARY LEGEND	
APPROVED LVIP VII NPDES PERMIT BOUNDARY	
BETHLEHEM LNG PROJECT LIMIT OF PROPOSED EARTH DISTURBANCE	
PREVIOUSLY APPROVED EARTH DISTURBANCE FOR LOT 55 (APPROVAL LETTER DATED 4/7/2017)	
LOT 55 APPROVED LIMIT OF DISTURBANCE OVERLAP	
CHAPTER 105 PERMIT BOUNDARY AREA	

BETHLEHEM LNG (LOT 55 & LOT 56 LEHIGH VALLEY INDUSTRIAL PARK) LIMIT OF DISTURBANCE TABULATION	
	AREA (ACRES)
APPROVED NPDES BOUNDARY LIMIT FOR LVIP VII	1,017
BETHLEHEM LNG PROJECT LIMIT OF EARTH DISTURBANCE	18.6
LOT 55 APPROVED DISTURBANCE OVERLAP	2.0
CHAPTER 105 PERMIT BOUNDARY	2.0
CHAPTER 102/NPDES LIMIT REMAINING	14.6

BETHLEHEM LNG  
NPDES BOUNDARY LIMITS  
DECEMBER 15, 2017

