Grand Central Sanitary Landfill, Inc. 910 W. Pennsylvania Avenue Pen Argyl, PA 18072

APPLICATION FOR MINOR PERMIT MODIFICATION

Facility No. 100265

Plainfield Township Northampton County, PA

March 2018





PENNSYLVANIA

P.O. Box 468 Pipersville, PA 18947 215.766.1211

WEST VIRGINIA

P.O. Box 794 Morgantown, WV 26505 304.212.6866

800.264.4553

March 14, 2018

Mr. Roger Bellas Permits Chief Northeast Regional Office PA Department of Environmental Protection 2 Public Square Wilkes-Barre, PA 18701-1906

RE: Minor Permit Modification

Grand Central Sanitary Landfill, Inc.

Facility No. 100265

Plainfield Township, Northampton County, PA

EarthRes Project No. 151014,004

Dear Mr. Bellas:

On behalf of Grand Central Sanitary Landfill, Inc. (GCSL), EarthRes Group, Inc. hereby submits an original and two (2) copies of a minor permit amendment application for the proposed Slate Belt Heat Recovery Center (SBHRC). The facility will be developed by Slate Belt Heat Recovery Center, LLC on a parcel on GCSL's site within the landfill permit boundary and adjacent to the Green Knight Economic Development Corporation (GKEDC) landfill gas-to-energy plant (LFGTE). The SBHRC facility will beneficially use waste heat from the GKEDC LFGTE facility to dry dewatered biosolids and produce a Class A biosolid product.

A check made payable to Commonwealth of Pennsylvania in the amount of \$300.00 is included for the application fee. Please contact me with any questions, or if you require additional information

Sincerely,

EarthRes Group, Inc.

Thomas G. Pullar, P.E.

Senior Project Manager

Enclosures: As Stated

cc: John Goodwin, SBHRC (w/ enclosure)

Glenn Kempa, GCSL (w/ enclosure)

Tom Petrucci, Plainfield Township (w/enclosure)

Carlton Snyder, GKEDC (w/ enclosure)

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SECTION 1.0 INTRODUCTION AND CHECKLIST



1.0 INTRODUCTION

Grand Central Sanitary Landfill, Inc. (GCSL), facility Permit No. 100265, hereby submits an application for minor permit modification to allow the construction and operation of the Slate Belt Heat Recovery Center (SBHRC) at its municipal waste landfill property located in Plainfield Township, Northampton County, PA. The application has been prepared and submitted to the Pennsylvania Department of Environmental Protection (PA DEP) pursuant to PA Code Title 25 Environmental Protection, Municipal Waste Regulations, Chapters 271 through 285. Modifications to the GCSL permit for the proposed SBHRC facility are described herein.

GCSL owns and operates an approximate 205.5-acre permitted area located on a 805.4-acre site in Plainfield Township, Northampton County, Pennsylvania. GCSL is permitted by PA DEP under Solid Waste Management Permit No. 100265 to receive municipal, commercial, residual, industrial, construction/demolition waste, and special handling wastes approved by the PA DEP.

The SBHRC will be developed by Slate Belt Heat Recovery Center, LLC on a separate parcel leased from GCSL and within the landfill permit boundary. The site is adjacent to the existing Green Knight Economic Development Corporation (GKEDC), a landfill gas-to-energy (LFGTE) plant (Figure 1, Form 3). SBHRC is a separate entity from GCSL and GKEDC.

The proposed SBHRC will dry dewatered biosolid to produce a Class A biosolid product that can be used as a fertilizer blending agent, soil conditioner, and/or a renewable fuel product. The proposed project location was chosen based on the heat source provided by the GKEDC. SBHRC may use landfill or natural gas (when available, see Form K) to supplement the drying process thermal loop.

The SBHRC facility will consist of a main dryer building, separate offices and supporting maintenance areas. Ancillary equipment and structures located around the main building include mechanical equipment, truck tipping equipment, a biosolid receiving unit, odor control equipment, and finished product storage silos. Additional required processes located on the property include waste heat recovery units at GKEDC thermal oil heater, and a process wastewater storage tank. The facility features are shown on Figure 2 – Site Plan of Form 3 as they relate to the GCSL permit boundary. Sediment Basin #2 will be modified to manage the stormwater runoff from the SBHRC parcel (see Form I).

Incoming vehicles transporting dewatered biosolids will access the facility using the existing GCSL entrance on S.R. 512. The vehicles will proceed to the GCSL scales, pass the radiation monitors and follow the GCSL radiation action plan as required, and weigh in. After weighing,



the SBHRC vehicles will proceed down the landfill access road and enter the SBHRC facility from the east. At the SBHRC site, the vehicle will check-in and, if in compliance with all Form R1 requirements, back onto the truck tipping equipment to unload into the enclosed receiving unit. After unloading, the empty vehicle will travel back to the scales at GCSL and weigh out. If the vehicle is scheduled to backhaul process wastewater for offsite disposal, the vehicle will return to the SBHRC site and park on the unloading pad to be filled with process wastewater for offsite disposal. A flow meter will be utilized to eliminate the need for the truck to be weighed before leaving the Site for its final destination. Process wastewater that is not backhauled by SBHRC vehicles will be hauled and disposed of by approved contract haulers in the same manner and location described previously.

Received biosolids are dried to produce a Class A biosolid product using waste heat from the GKEDC LFGTE facility. The final product is stored in silos before being loaded onto trailers for transportation to the end user. Product vehicles will be weighed upon arrival and as they leave the site. Records of material received and shipped from SBHRC will be recorded and provided to SBHRC by GCSL. Material shipments will not be included in the daily waste totals for GCSL; however, truck trips will be monitored and included in the daily counts.



COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

CHECKLIST ~ MINOR MODIFICATION TO A MUNICIPAL WASTE LANDFILL PERMIT OR A RESIDUAL WASTE LANDFILL OR IMPOUNDMENT PERMIT

This checklist is to assist the Department and the Applicant in assuring that all the forms, notices, documentation and fees required for an application for a minor modification to a municipal or residual waste landfill permit or residual waste impoundment permit have been addressed. This checklist should be signed by the Applicant and submitted to the Department as part of the application package. Failure to do so may cause the application to be administratively incomplete and ineligible for Permit Decision Guarantee (PDG).¹

This checklist will be utilized by the Department and Applicant during the pre-application meeting to indicate the forms and other information which must be included in the application and public notifications that are needed. The Department will check the appropriate box in the first two columns to indicate the forms and information required ("Req") or not applicable ("N/A"). The Applicant will then ensure the required forms and information are included in the application by checking the corresponding box in the third column.

In cases where no pre-application meeting is held, the Applicant will indicate what forms are included in the application by checking the appropriate boxes in the third column.

The most current version of the forms found on the Department's online eLibrary should be utilized.

Name of Applicant or Permittee Grand Central Sanitary Landfill, Inc.

Permit No. (if applicable) 100265

Links to the Department Websites for All Permit Application Forms:

. j U	nicipal Waste	http://www.portal.state.pa.us/portal/server.pt?open=514&objID=589662&mode=2]
	sidual Waste	http://www.portal.state.pa.us/portal/server.pt?open=514&objID=589687&mode=2	1

Standard Permit Forms

1 4 7 5 7 10 10 5 2 7	' <u></u>			Fo (Residual)
		GIF - General Information Form	1300-PM-BIT0001	1300-PM-BIT0001
	\boxtimes	Form A - Application	2540-PM-BWM0357	2540-PM-BWM0357
		Form B - Professional Certification	2540-PM-BWM0358	2540-PM-BWM0358
		Form B1 - Application for Certification	2540-PM-BWM0359	2540-PM-BWM0359

¹DISCLAIMER: The process and procedures outlined in this Checklist are intended to supplement existing requirements. Nothing in the Checklist shall affect regulatory requirements.

The process, procedures and interpretations herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in this Checklist that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant

DEP reserves the right to supplement the list of forms and information included on this Checklist at any time during the permit review process. This Checklist should not be construed as an exhaustive list of forms and information to be submitted by the Applicant.

Standard Permit Forms (cont.)

Req.	N/A	1	Name	Form No. (Municipal)	Form No. (Residual)
	\boxtimes		Form C1 - Compliance History Certification ²	2540-PM-BWM0351	2540-PM-BWM0351
		×	Form HW-C - Compliance History ²	2540-FM-BWM0058	2540-FM-BWM0058

²Either Form C1 OR Form HW-C should be submitted depending on the modification requested.

Additional Forms Required Based on the Modification Requested

Req.	N/A	1	Name	Form No. (Municipal)	Form No. (Residual)
			Form F - Soils Information - Phase I	2540-PM-BWM0371	2540-PM-BWM0371
			Form G (A) - Air Resource Protection	2540-FM-BWM0391a	2540-FM-BWM0391a
			Form G(B) - Non Methane Organic Compounds (NMOC) Emissions Estimate	2540-FM-BWM0391b	2540-FM-BWM0391b
			Form H - Revegetation Plan	2540-PM-BWM0375	2540-PM-BWM0375
		×	Form I - Soil Erosion and Sedimentation Control	2540-PM-BWM0390	2540- PM- BW M 0390
	\boxtimes		Form J - Soils Phase II	2540-PM-BWM0376	2540-PM-BWM0376
		\boxtimes	Form K - Gas Management	2540-PM-BWM0379	2540-PM-BWM0379
			Form L - Contingency Plan	2540-PM-BWM0384	2540-PM-BWM0384
	×	0	Form Q - Equivalency Review Request ³	2540-PM-BWM0386	2540-PM-BWM0386
	\boxtimes		Form R - Waste Analyses/Classification	2540-PM-BWM0396	2540-PM-BWM0396
	×		Form R1 - Waste Analysis and Classification	2540-PM-BWM0001	2540-PM-BWM0001
	\boxtimes		Form V - Storage Impoundment Application Form		4000-FM-DFO0019
	\boxtimes		Form X - Radiation Protection Action Plan	2500-FM-BWM0430	2500-FM-BWM0430
	\boxtimes		Form 1 - Facility Plan	2540-PM-BWM0170	
	\boxtimes		Form 1R - Facility Plan		2540-PM-BWM0355
			Form 2 - Map Requirement - Phase I	2540-PM-BWM0173	

³A request for a new equivalency review is a major modification to the facility permit; see Checklist for Major Modification to a Municipal Waste Landfill Permit or a Residual Waste Landfill or Impoundment Permit.

Additional Forms Required Based on the Modification Requested (cont.)

Req.	N/A	V	Name	Form No. (Municipal)	Form No. (Residual)
	\boxtimes		Form 2R - Map Requirements, Phase I		2540-PM-BWM0360
			Form 3 - Map Requirement - Phase II	2540-PM-BWM0007	
			Form 3R - Map Requirement – Phase II		2540-PM-BWM0361
	\boxtimes		Form 5 - Map Requirements	2540-PM-BWM0154	
	\boxtimes		Form 5R - Map Requirements		2540-PM-BWM0363
	\boxtimes		Form 8 - Baseline Groundwater Analysis, Phase I	2540-PM-BWM0178	
	\boxtimes		Form 8R - Baseline Groundwater Analysis		2540-PM-BWM0367
	\boxtimes		Form 12R - Operation Plan		2540-PM-BWM0081
			Form 13R - Water Quality Monitoring System, Phase II		2540-PM-BWM0372
		⊠	Form 14 - Operation Plan	2540-PM-BWM0011	
	×		Form 14R - LFs and Impoundments Water Quality Analyses Quarterly/Annually		2540-PM-BWM0373
			Form 16R - Liner System		2540-PM-BWM0393
	\boxtimes		Form 17R - Leachate Management		2540-PM-BWM0378
	\boxtimes		Form 18 - Water Quality Monitoring System, Phase II	2540-PM-BWM0040	
	×		Form 18R - Closure-Post Closure Land Use Plan		2540-PM-BWM0385
	\boxtimes		Form 21R - Groundwater Assessment Plan		2540-PM-BWM0388
	M		Form 23R - Control Plans		2540-PM-BWM0392
	\boxtimes		Form 24 - Liner System, Phase II	2540-PM-BWM0150	
			Form 24R - Residual Waste Disposal Impoundments		2540-PM-BWM0500
			Form 25 - Leachate Management, Phase II	2540-PM-BWM0152	
			Form 25R - Source Reduction Strategy		2540-PM-BWM0349

Additional Forms Required Based on the Modification Requested (cont.)

					en de la companya de La companya de la co
			Form 28 - Closure-Post Closure Land Use Plan	2540-PM-BWM0153	
			Form 51 - Municipal Waste Landfill Groundwater Assessment Plan	2540-PM-BWM0005	
			Form 54 - Background Meteorological Monitoring	2540-PM-BWM0503	
Bondin	g Worksh	eets			
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			Bonding Worksheet Instructions	2540-FM-BWM0580	2540-FM-BWM0580
	\boxtimes		Landfills and Disposal Impoundments	2540-FM-BWM0581	2540-FM-BWM0581
			under 25 Pa. Code Chapters 271.5 an Confidential Information Requests" d		of Waste Management's
	×		If proposed by the applicant, a dem regulatory requirements for confidential		information satisfies the
Registra	ition with	Pennsyl	vania Department of State		
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	<u> </u>	X	Minor Modification		\$300
Addition	al Applic	ation Co	pies		
			One original and 2 additional copies of t	he application	
Notes/A	dditional	Commen	its		
		<u> </u>			

Checklist Major		
Signature of Applicant or Authorized Representative:	Ham Kypa	Date: 3/13/18
	·	
Printed Name: Glenn Kempa	Title: Senior District Manag	er

2540-PM-BWM0357b-1 Rev. 8/2014

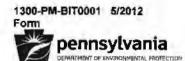
SECTION 2.0 APPLICATION FORMS



Grand Central Sanitary Landfill, Inc. Application for Minor Permit Modification March 2018

GENERAL INFORMATION FORM (GIF)





COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

GENERAL INFORMATION FORM - AUTHORIZATION APPLICATION

Before completing this General Information Form (GIF), read the step-by-step instructions provided in this application package. This version of the General Information Form (GIF) must be completed and returned with any program-specific application being submitted to the Department.

	Related ID#	s (If Known)			DE	P USE O	NLY	
Client ID#	298835	APS ID#			Date Rec	eived & Ge	neral Note	es
Site ID# 256036		Auth ID#						
Facility ID#								
		CLIENT IN	FORMA	TION				
DEP Client ID#		Client Type / Code						
298835		PACOR						
	lame or Registere Sanitary Landfill, Ind	d Fictitious Name c.		Employer 23-204933		Dun &	Bradst	reet ID#
Individual Last	Name	First Name		MI	Suff	ix SSI	1	
Additional Indi	vidual Last Name	First Name		MI	Suff	ix SSN	1	
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Client Contact	Last Name	First Nar		100/12	MI		S	uffix
Kempa		Glenn						
Client Contact	Title				Phone		E	ct
District Manage					610-863	-2401		
Email Address					FAX			
kempa@wm.co	om				610-863	-6881		
		SITE INF	ORMAT	ION				
DEP Site ID#	Site Name Grand Central	Sanitary Landfill						
EPA ID#		Estimated Number	of Emplo	oyees to be l	resent at	Site	30	
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Municipal Solid								
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Northampton		lainfield						PA
County Name	W	unicipality			City	Boro	Twp	State
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District Manager				Central Sanita		, Inc.		
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\vdash	Coal Ash Beneficial U. Coal Mining Operation				Municipal Waste			GCSL 100265
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1300-PM-BIT0001 5/2012

Project Consultant Title Senior Project Manager Mailing Address Line 1				Consulting Firm EarthRes Group, Inc.				
				Mailing Address Line 2				
PO I	Box 468							
	rees Last Line – (ersville	City		State PA	ZJP+- 1894			
Pho		Ext	FAX	Email Address				
_	766-1211	119	215-766-1245	tpullar@earthres.com				
N/A	e Schedules	Project N/A	Milestone (Optional)				_	
1.				nunity and addressed any		Yes		No
2.			ing the application to state or federal grant:			Yes		No
3.	Grant Son Grant Con Grant Exp Is this applicat Policy? (For attached to GIF Note: If "No" to If "Yes" to	ntact Person piration Date ion for an referenced instruction Question 3, Question 3,	authorization on A list, see Appendix ns) the application is not subject	ppendix A of the Land Use A of the Land Use Policy ect to the Land Use Policy. It to this policy and the Applicant sh		Yes	⊠ e additio	No onal
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				INFORMATION				
	 Applicants are e comprehensive plant 			cal land use approvals or other	evide	ence of	compli	ance with
1.	Is there an adop	ted count	y or multi-county coπ	prehensive plan?		Yes		No
2.				al comprehensive plan?		Yes		No
3.	ordinance or joi Note: If the Application the Application	nt municip dicant answer	pal zoning ordinance? ers "No" to either Questio t need to respond to ques	ns 1, 2 or 3, the provisions of the				
4.	does the propose received, attach do	sed project ocumentation	t have zoning approv	s of the zoning ordinance or rai? If zoning approval has been		Yes		No
5.	Have you attach	ed Munici	pal and County Land	Use Letters for the project?		Yes		No

<u>Note</u>: The PA Historical and Museum Commission must be notified of proposed projects in accordance with DEP Technical Guidance Document 012-0700-001 and the accompanying Cultural Resource Notice Form.

If the activity will be a mining project (i.e., mining of coal or industrial minerals, coal refuse disposal and/or the operation of a coal or industrial minerals preparation/processing facility), respond to questions 1.0 through 2.5 below.

If the a	ctivity will not be a mining project, skip questions 1.0 through 2.5 and begin wit	h que	stion 3.	0.	
1.0	is this a coal mining project? If "Yes", respond to 1.1-1.6. If "No", skip to Question 2.0.		Yes		No
1.1	Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be equal to or greater than 200 tons/day?		Yes		No
1.2	Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be greater than 50,000 tons/year?		Yes		No
1.3	Will this coal mining project involve coal preparation/ processing activities in which thermal coal dryers or pneumatic coal cleaners will be used?		Yes		No
1.4	For this coal mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?		Yes		No
1.5	Will this coal mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?		Yes		No
1.6	Will this coal mining project involve underground coal mining to be conducted within 500 feet of an oil or gas well?		Yes		No
2.0	Is this a non-coal (industrial minerals) mining project? If "Yes", respond to 2.1-2.6. If "No", skip to Question 3.0.		Yes		No
2.1	Will this non-coal (industrial minerals) mining project involve the crushing and screening of non-coal minerals other than sand and gravel?		Yes		No
2.2	Will this non-coal (industrial minerals) mining project involve the crushing and/or screening of sand and gravel with the exception of wet sand and gravel operations (screening only) and dry sand and gravel operations with a capacity of less than 150 tons/hour of unconsolidated materials?		Yes		No
2.3	Will this non-coal (industrial minerals) mining project involve the construction, operation and/or modification of a portable non-metallic (i.e., non-coal) minerals processing plant under the authority of the General Permit for Portable Non-metallic Mineral Processing Plants (i.e., BAQ-PGPA/GP-3)?		Yes		No
2.4	For this non-coal (industrial minerals) mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?		Yes		No
2.5	Will this non-coal (industrial minerals) mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?		Yes		No

3.0	Will your project, activity, or authorization have anything to do with a well related to oil or gas production, have construction within 200 feet of, affect an oil or gas well, involve the waste from such a well, or string power lines above an oil or gas well? If "Yes", respond to 3.1-3.3. If "No", skip to Question 4.0.		Yęs	8	No
3.1	Does the oil- or gas-related project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?		Yes		No
3.2	Will the oil- or gas-related project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or storm water system? If "Yes", discuss in Project Description.		Yes		No
3.3	Will the oil- or gas-related project involve the construction and operation of industrial waste treatment facilities?		Yes		No
4.0	Will the project involve a construction activity that results in earth disturbance? If "Yes", specify the total disturbed acreage. 4.0.1 Total Disturbed Acreage 6.3 acres	B	Yes		No
5.0	Does the project involve any of the following? If "Yes", respond to 5.1-5.3. If "No", skip to Question 6.0.	Ø	Yes		No
5.1	Water Obstruction and Encroachment Projects — Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water? Modify GCSL Sediment Basin #2	X	Yes		No
5.2	Wetland Impacts — Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a wetland?		Yes	Ø	No
5.3	Floodplain Projects by the commonwealth, a Political Subdivision of the commonwealth or a Public Utility – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a floodplain?		Yes		No
6.0	Will the project involve discharge of stormwater or wastewater from an industrial activity to a dry swale, surface water, ground water or an existing sanitary sewer system or separate storm water system? Stormwater runoff into GCSL Sediment Basin #2; SBHRC will obtain individual NPDES permit.	N	Yes		No
7.0	Will the project involve the construction and operation of industriel waste treatment facilities? SBHRC will obtain general permit for biosolids processing.	Ø	Yes		No
8.0	Will the project involve construction of sewage treatment facilities, sanitary sewers, or sewage pumping stations? If "Yes", indicate estimated proposed flow (gal/day). Also, discuss the sanitary sewer pipe sizes and the number of pumping stations/treatment facilities/name of downstream sewage facilities in the <i>Project Description</i> , where applicable. 8.0.1 Estimated Proposed Flow (gal/day) 1,120 conveyed to PAMA be	⊠ ov SÐI	Yes HRC.		No
9.0	Will the project involve the subdivision of land, or the generation of 800 gpd or more of sewage on an existing parcel of land or the generation of an additional 400 gpd of sewage on an already-developed parcel, or the generation of 800 gpd or more of industrial wastewater that would be	* <u>×</u>	Yes		No
	discharged to an existing sanitary sewer system? 9.0.1 Was Act 537 sewage facilities planning submitted and approved by DEP? If "Yes" attach the approval letter. Approval required prior to 105/NPDES approval.		Yes	×	No
10.0	is this project for the beneficial use of biosolids for land application within Pennsylvania? If "Yes" indicate how much (i.e. gallons or dry tons per year).		Yes	<u> </u>	No
	10.0.1 Gallons Per Year (residential septage) Covered under separat				
	10.0.2 Dry Tons Per Year (blosolids) Covered under separat	e app	roval.		

11.0	Does the project involve construction, modification or removal of a dam? if "Yes", identify the dam. 11.0.1 Dam Name		Yes	X	No
12.0	Will the project interfers with the flow from, or otherwise impact, a dam? If "Yes", identify the dam. 12.0.1 Dam Name		Yes	Ø	No
13.0	Will the project involve operations (excluding during the construction period) that produce air emissions (i.e., NOX, VQC, etc.)? If "Yes", identify each type of emission followed by the amount of that emission. 13.0.1 Enter all types & amounts Air permit application submitted und	der se	Yea parate :	cover b	No Y
	of emissions; separate SBHRC. each set with semicolons.				
14.0	Does the project include the construction or modification of a drinking water supply to serve 15 or more connections or 25 or more people, at least 60 days out of the year? If "Yes", check all proposed sub-facilities. 14.0.1 Number of Persons Served		Yes	8	No -
	14.0.2 Number of Employee/Guests 14.0.3 Number of Connections				
	14.0.4 Sub-Fac: Distribution System		Yes		No
	14.0.5 Sub-Fac: Water Treatment Plant		Yes		No
	14.0.6 Sub-Fac: Source		Yes		Nρ
	14.0.7 Sub-Fac: Pump Station	Д	Yes		Nα
	14.0.8 Sub Fac: Transmission Main 14.0.9 Sub-Fac: Storage Facility	А	Yes Yes		Na No
15.0	Will your project include infiltration of storm water or waste water to		Yes		No
	ground water within one-half mile of a public water supply well, spring or infiltration gallery?				
16.0	Is your project to be served by an existing public water supply? If "Yes", indicate name of supplier and attach letter from supplier stating that it will serve the project. 16.0.1 Supplier's Name Pennsylvania American Water Co.	⊠ í	Yes		No
	16.0.2 Letter of Approval from Supplier is Attached		Yes		Na
17.0	Will this project involve a new or increased drinking water withdrswal		Yes	Ø	No
***************************************	from a stream or other water body? If "Yes", should reference both Water Supply and Watershed Management. 17.0.1 Stream Name		<u> </u>		
19.0	Will the construction or operation of this project involve treatment, storage, reuse, or disposal of waste? If "Yes", indicate what type (i.e., hazardous, municipal (including infectious & chemotherapeutic), residual) and the amount to be treated, stored, re-used or disposed. 18.0.1 Type & Amount SBHRC to produce Class A Biosolid: 84 dry ton (30,660 dry ton/year) (400 wet ton/day)	⊠ /day	Yes		No
19.0	Will your project involve the removal of coal, minerals, etc. as part of any		Yes	X	No
20,0	earth disturbance activities? Does your project involve installation of a field constructed underground	<u> </u>	Yes	\boxtimes	No
20,0	storage tank? If "Yes", list each Substance & its Capacity. Note: Applicant may need a Storage Tank Site Specific Installation Permit. 20.0.1 Enter all substances & capacity of each; separate each set with semicolons.	□	163	Δ	140
21.0	Does your project involve installation of an aboveground storage tank greater than 21,000 gallone capacity at an existing facility? If "Yes", list each Substance & its Capacity. Note: Applicant may need a Storage Tank Site Specific Installation Permit. 21.0.1 Enter all substances & capacity of each; separate each set with semicolons.	L	Yes		No

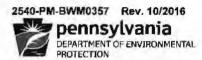
1300-PM-BIT0001 5/2012

22.0	Does your project involve installation of which will contain a highly hazardous Regulated Substances List, 2570-BK Substance & its Capacity. Note: Applic Specific Installation Permit. 22.0.1 Enter all substances & capacity of each; separate each set with semicolons.	s substance as defined in DEP's -DEP2724? If "Yes", list each		Yes	IXI	No
23.0	Does your project involve installation of with a total AST capacity greater than Substance & its Capacity. Note: Applic Specific Installation Permit.	21,000 gallona? If "Yes", list each	×	Yes		No
	23.0.1 Enter all substances &	· · · · · · · · · · · · · · · · · ·				
	capacity of each; separate each set with semicolons.	300,000 gal wastewater tank 5,000 gal sulfurio acid (H2SO4) (Ad	rid\ tai	nk		
		3,000 gal sodium hydroxide (NaOH 5,000 gal sodium hypochlorite (NaO) (Cau	ustic) tai		
24.0	Will the intended activity involve the use			Yes	M	No
V.	CEF	RTIFICATION				
that ti	fy that I have the authority to submit this he information provided in this applicationation. or, Print Name / Glenn Kempa					
X	10 4	Senior District Manager		3/.	13/18	9
Signat	ture 0	Title		- 6	ate	

FORM A

APPLICATION FOR MUNICIPAL OR RESIDUAL WASTE PERMIT





COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

Coordination #

FORM A APPLICATION FOR MUNICIPAL OR RESIDUAL WASTE PERMIT

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided herein. Replacement/substitution of or attachment to this form is prohibited. Improperly completed forms may be rejected by the Department, may be considered to be violations of the Department's Rules and Regulations, and may result in assessment of fines and penalties.

	SECTION A. APPLICANT IDENTIFIE	ER (C	heck one of the	boxes a	and iden	tify bot	h)				
○ Owner	Owner Name: Grand Central Sanitary Landfill, Inc.						Phone #: 1-800-621-2100				
Address: 910 W. Pennsylvania Avenue						kempa(@wm.com				
Operator	Name: Grand Central Sanitary Landfill, I	nc.	-		Phone #	t: 610-86	53-2401				
	Address: 910 W. Pennsylvania Avenue				Email: g	kempa(@wm.com				
	SECTION B	. TYI	PE OF FACILITY	1							
Municipal Was	te Landfill		Residual Waste I	_andfill							
Construction/D	emolition Waste Landfill		Class I								
Municipal Wast	te Composting Facility		Class II				************************				
Municipal Wast	te Incinerator or Resource Recovery Facility		Class III								
Municipal Wast	te Demonstration Facility		Residual Waste [Disposal Ir	mpoundm	nent					
Municipal Wast	te Transfer Facility		Class I		************						
Municipal Wast	le Processing Facility		Class II				*****				
Other, Specify			Residual Waste (Compostin	g Facility	·					
			Residual Waste [Demonstra	ation Faci	lity	4 > P 4 4 4 4 P & & \ 4 = \ \ - \ \ +				
			Residual Waste	Transfer F	acility						
			Residual Waste I	ncinerator	or Other	Process	ing Facility				
			Residual Waste	Agricultur	al Utilizati	ion	***************************************				
			Residual Waste I	and Reck	amation						
			Oil and Gas Was	tewater St	torage Im	poundme	ent				
			Other, Specify								
	SECTION	C. M	AP LOCATION								
U.S.G.S. Map L	ocation of Facility (attach the map and identify	location	on on the USGS m	іар)							
7.5" Map Name	Wind Gap										
Center of Facilit	ty:										
Latitude 40	° 50 ' 58 "		Longitude	-75	<u> </u>	15	41				
	SECTION D. G	ENE	RAL INFORMAT	ION							
Number of New	Acres Proposed for Permit (Issued)		Number of Acres	Proposed	for Perm	it (New)					
	0 *						0.*				
Total Acres of th	ne Property										
	805 • 4										
Number of Prev	iously Permitted Acres		Current Permit ID	Number(:	s) 100265	5					

					SECTION E. AFFIDAVIT
СО	мм	ONWE	EALTH/STAT	E OF P	ennsylvania
СО	UNT	Y OF	Lackar	s <u>vani</u>	s: γα
		and su Mar	Shark		ne this
				NC	My Commission Expires My Commission Expires My Commission Expires MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES
Prin Dat		type r	name to be S	igned: <u>(</u>	Glenn Kempa Date 3/13/2018
I,		Sli	(Signatur	re of Applic	do hereby certify pursuant to the penalties of 18 Pa. C.S.A.
and	cor	rect a	ınd is in con	forman	nowledge, information, and belief that the information contained in this application is true ce with 25 PA. Code Chapters 271 or 287, whichever is applicable, of the rules and Environmental Protection.
				- 100	SECTION F. APPLICATION FEE
Α.	Мι	ınicipa	al Facilities		
	i.	-		w perm	nit, or repermitting. (ref. 271.128)
			\$18,500	· _	Municipal Waste Landfill
		$\overline{\Box}$	\$19,250	_	Construction/Demolition Waste Landfill
		П	\$4,400	_	Transfer Facility
			\$1,900	_	Incinerator or Resource Recovery Facility
			\$4,000	_	Other Municipal Waste Processing Facility, including Composting Facility
			\$17,300	_	Demonstration Facility
	ii.	Appl	lication for a r	major p	ermit modification.
			\$300	_	Addition of types of waste not approved in the permit
			\$7,800	_	Municipal Waste Landfill and Construction/Demolition Waste Landfill
			\$700	_	Transfer Facility
			\$1,500	_	Incinerator or Resource Recovery Facility
			\$700	_	Other Municipal Waste Processing Facility, including Composting Facility
			\$6,700	_	Demonstration Facility
	iii.		\$300		Permit Reissuance
	iv.		\$300	_	Permit Renewal
	٧.	\boxtimes	\$300	_	Minor Permit Modification

					SECTION F. APPLICATION FEE (Continued)
A.	Re	esidu	al Facilitie	s	
	į,	App	plication fo	or nev	v permit, or repermitting. (ref. 287.141)
			\$25,900	_	Residual Waste Landfill
			\$8,500	_	Residual Waste Disposal Impoundment
			\$5,200	-	Residual Waste Transfer Facility
			\$8,300	_	Residual Waste Noncaptive Incinerator
			\$2,200	_	
			\$5,200	_	Other Waste Processing Facility, including Composting Facility
			\$8,500	_	Residual Waste Demonstration Facility
			\$5,100	_	Residual Waste Land Reclamation
			\$5,100	_	Residual Waste Agricultural Utilization
			\$8,500	_	
	ű.	App	olication fo	ram	ajor permit modification.
			\$600	-	Addition of types of waste not approved in the permit
			\$7,800	-	Residual Waste Landfill
			\$600	_	Residual Waste Agricultural Utilization
			\$1,900	_	Residual Waste Land Reclamation
			\$1,500	-	Residual Waste Incinerator Facility
			\$700	_	Residual Waste Transfer or Other Processing Facility, including Composting Facility
			\$5,800	_	Residual Waste Demonstration Facility
			\$4,600	_	Residual Waste Disposal Impoundment
			\$4,600	-	Oil and Gas Wastewater Storage Impoundment
	iii.		\$400	_	Residual Waste Permit Reissuance
	iv.		\$300	_	Residual Waste Permit Renewal
	٧.		\$300	_	Residual Waste Minor Permit Modification
			SECTIO	N G.	PUBLIC NOTICE - SECTION 271.141 (MUNICIPAL), 287.151 (RESIDUAL) N/A
					rmit modification, permit renewal, permit reissuance, and submission of a closure plan, attach each of the following: Not Applicable
1.	New	spap	er - Attach	the	name of the newspaper, circulation location, copies of the notice, and dates of publication.
2.			lity - Attaci nail signat		pies of the written notices sent to the host township and host county, and copies of the returned ards.
3.			us Landov nail signat		s - Attach copies of the written notice(s) sent to each landowner and copies of the returned ards.
			SE	CTK	ON H. MUNICIPAL WASTE MANAGEMENT PLANS AND PERMITS N/A
rec	overy	facil	ity permit,	is the	mit modification, permit renewal, or permit reissuance of a municipal waste landfill or resource e proposed facility located in a county that has an approved municipal waste management plan 13 of Act 101? Yes \(\square\$ No \(\square\$ No \(\square\$ Not Applicable \)
			answer is rmits.	"yes"	, the applicant must complete form 46 - Relationship between Municipal Waste Management

NOTE. For each permit application, please submit the original (mark as such) and additional copies as requested by the Department's regional office.

FORM B PROFESSIONAL CERTIFICATION



2540-PM-BWM0358 6/2005

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised March 2018

DEP USE ONLY

Date Received

FORM B PROFESSIONAL CERTIFICATION

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form B, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

	revised on this page.	
General R	References: Section 271.122, 287.	122
		SECTION A. SITE IDENTIFIER
Applicant	permittee: Grand Central Sa	niary Landfill, Inc.
Site Name	e: Grand Central Sanitary La	ndfill
Facility ID	(as issued by DEP): 100265	
	SECTION	B. REGISTERED PROFESSIONAL ENGINEER
i, Thomas	G, Pullar, P.E.	
		(Engineer's Name – Print or Type)
specification accordance indicated in	ions, and reports has been prepar be with the Rules and Regulation in the following paragraphs prepar	ation, and belief that the information contained in the accompanying application, plans ed in accordance with accepted practice of engineering, are true and correct, and are in soft the Department of Environmental Protection. I also certify that those individuals that this application under my supervision. I am aware that there are significant penalties a possibility of fines and imprisonment. Date
License No	umber PE033923E	Expiration Date <u>09/30/2019</u>
Address	EarthRes Group, Inc. PO Box 468 Pipersville, PA 18947	AEGISTERED AEGISTERED Professionellal
Telephone	No. <u>(215) 766-1211</u>	THOMAS G. PULLAR ENGINEER PE033923E

SECTION C. S	OIL SCIENTIST PROVIDING SOILS INFORMA	ATION
I, <u>N/A</u>	(Soil Scientists Name - Print or Type)	do hereby certify
accordance with accepted practices of soil	and belief that the soils information contained in this science and in accordance with the Rules and linere are significant penalties for submitting false info	Regulations of the Department of
Signature		
Telephone No. ()		
SECTION D	. REGISTERED PROFESSIONAL GEOLOGIS	эт
I, <u>N/A</u>	(Hydrogeologist's Name – Print or Type)	being a
to the best of my knowledge, information, a prepared in accordance with the accepted p	ice with the Pennsylvania Professional Geologists Re and belief that the hydrogeology information conta tractices of hydrogeology and in accordance with a aware that there are significant penalties for submit	ined in this application has been the Rules and Regulations of the
Signature	Date	-
License Number	Expiration Date	 Professional Seal
		-
Telephone No. ()		

FORM B1 APPLICATION FORM CERTIFICATION





COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised March 2018

DEP USE ONLY

Date Received

FORM B1 APPLICATION FORM CERTIFICATION

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form B1, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

prepared/revised" on this page.
SECTION A. SITE IDENTIFIER
Applicant/permittee: Grand Central Sanitary Landfill, Inc.
Site Name: Grand Central Sanitary Landfill
Facility ID (as issued by DEP): 100265
SECTION B. CERTIFICATION
Professional Engineer
I, Thomas G. Pullar, P.E.
(Engineer's Name -Print or Type)
being a Registered Professional Engineer in accordance with the Pennsylvania Professional Engineer's Registration Law, do hereby certify that the forms used in the accompanying application have been reproduced under my supervision and have the same exact content and the same format as the forms prepared by the Department. I am aware that there are significant penalties for altering the content of the Department's forms, including the possibility of fines and imprisonment.
Signature Thomas O. Pullar Date 03/14/2018
License Number PE033923E Expiration Date 09/30/2019 Expiration Date 09/30/2019
Address EarthRes Group, Inc.
PO Box 468 THOMAS G. PULLAR
Piperville, PA 18947
Telephone No. (215) 766-1211

FORM HW-C COMPLIANCE HISTORY





COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

FORM HW-C COMPLIANCE HISTORY

Fully and accurately provide the following information, as specified. Attach additional sheets as necessary. Type of Form HW-C Submittal (check all that apply); Original Filing Amended Filing Date of Last Filing June, 2017 Type of Permit or License Submittal: ○ Other New Renewal Annual Update Minor permit modification to allow SBHRC **Application** to build a biosolids drying operation within Grand Central's permitted area. (specify) A. General Applicant Information: NAME OF PERMIT OR LICENSE APPLICANT/PERMITTEE/LICENSEE ("applicant") (non-corporations attach documentation of legal name); Grand Central Sanitary Landfill, Inc. - Grand Central Landfill ADDRESS: 910 West Pennsylvania Avenue Pen Argyl, PA 18072 TELEPHONE NUMBER: 610-863-2413 TAXPAYER ID#: 23-2049337 PERMIT, LICENSE OR APPLICATION ID#: 100265 2. Identify the form of management under which the applicant conducts its business (check appropriate box) and describe the type(s) of business activities performed: Individual Fictitious Name Municipality Partnership **Proprietorship** Limited Partnership Public Corporation Government Agency **Private Corporation** Joint Venture Syndicate Association Municipal Authority Other Type of Business (specify) 3. Type of permit, license or application (check all that apply): ☐ Hazardous Waste Permit ☐ Hazardous Waste Transporter License Municipal Waste Permit Regulated Medical, Chemotherapeutic Waste Transporter License Residual Waste Permit Other (specify)

^{**} This filing supplements and refers to the Annual Submission filed with the Department in June, 2017 which contains the complete 10-year Compliance History for all Pennsylvania subsidiaries of Waste Management, Inc. Interested parties may review the full 10-year history at each of the DEP's regional offices.

B. General Information Regarding "Related Parties"

- Applicants which are a corporation or a division of a corporation, provide the following information:
 - a. The principal shareholders or stockholders who own, hold, or control stock of five percent (5%) or more of a publicly held corporation or ten percent (10%) or more of a privately held corporation.

 See Schedule B.1.a and Note 3 to Annual Submission.
 - b. State the names, principal places of business and taxpayer ID numbers of all domestic and foreign parent corporations (including ultimate parent corporations), and all domestic and foreign subsidiary corporations of the applicant, as well as the subsidiary corporations of the ultimate parent corporation. Include unincorporated divisions and private corporations. A diagram of corporate structure may be provided to illustrate corporate relationships.

See Schedule B.1.b and Note 3 to Annual Submission.

- c. List all principals of the corporation that have also been principals of other corporations which have committed any violation of the Environmental Protection Acts. (See Instructions, Items 2 and 6.)

 See Schedule B.1.c and Note 3 to Annual Submission.
- 2. Provide the names and addresses of all principals, corporate officers, general and limited partners, directors, other persons performing a function similar to a director, and other persons or related parties of the applicant (see Instructions, Items 4 and 5). The relationship to the applicant must be clearly described.

See Schedule B.2 and Note 4 to Annual Submission.

 Provide the names and addresses, or IRS tax identification numbers¹ and affiliation of other persons or related parties having or exercising control over any aspect of the proposed facility or activity that is regulated by the Department, including but not limited to, associates, agents, contractors, subcontractors, and property owners.

See Schedule C.1 and Note 5 to Annual Submission.

 Provide the names and addresses of all owners of record of surface and subsurface areas within and contiguous to the proposed permit area. (Not applicable to transporter license applicants.)

See Schedule B.4 to Annual Submission.

5. Provide the names and addresses of all holders of record to a leasehold interest of surface and subsurface areas within and contiguous to the proposed permit area.

See Schedule B.4 and Note 6 to Annual Submission.

- 6. If the applicant, or other related party to the applicant, has a beneficial interest in, or otherwise manages or controls any other person, municipality or other related party (as described in Sections A and B) engaged in the business of solid waste collection, transportation, storage, processing, treatment, or disposal, provide the following information:
 - a. The name, address and tax identification number or employer identification number of the corporation, other person, municipality, or other entity, in which the applicant or other related party has a beneficial interest, manages, or controls as described above.

See Schedule B.1.b and Note 7 to Annual Submission.

 The nature of the relationship or participation with the corporation, other person, municipality, or other related party.

See Schedule B.1.b and Note 7 to Annual Submission.

¹ Failure to provide all applicable numbers may delay processing of the application.

C.	Specific information Regarding	the Applicant ar	nd Its	Related Parties
•	opeonio information regarding	i me ubbiiomii ai	10 100	Ligitari birico

1. List the name and location of all of the applicant's and related party's places of business and terminals where municipal, residual and/or hazardous waste activities are conducted. Such activities include, but are not limited to generation, processing, collection, transportation and storage, treatment or disposal of solid waste, except that locations that generate only municipal waste need not be listed.

See Schedule C.1 and Note 8 to Annual Submission.

2. List all **permits or licenses issued** by the Department or any other state or federal agency under the Environmental Protection Acts to the applicant or any other persons or related parties identified in Sections A or B, that are currently in effect or have been in effect at any time in the ten years previous to the date on which this form is notarized. This list is to include the type of permit or license, permit or license number, location, address, issuance date and expiration date.

See Schedule C.2 and Note 9 to Annual Submission.

3. List all permit or license denials issued by the Department or any other state or federal agency under the Environmental Protection Acts to the applicant or any other person or related party identified in Section A or B, within ten years previous to the date on which this form is notarized. Include the type of permit or license, permit or license number, location, denial date and reason for denial.

See Schedule C.3 and Note 9 to Annual Submission.

4. List all persons or related parties identified in Sections A or B which have filed for or been discharged from **bankruptcy** within 10 years previous to the date on which this form is notarized. Specify the circumstances of bankruptcy including those for which the debtor sought to abandon property or to be discharged from any environmental liability subject to the Environmental Protection Acts. Include the name of the bankruptcy court, docket number and description and location of any property involved.

None.

D. Compliance Background:

(Note: Copies of specific documents must be made available to the Department upon its request)

Compliance History: See attached Supplemental Schedule D.2.

List all "Enforcement Actions" issued by the Department or any other state or federal or county agency to the applicant or those persons or related parties identified anywhere in response to Sections A, B or C using the following format grouped by state and location in chronological order.

		Permit/		Type			Dollar
		License/	lssuing	of	Nature of		Amount
Date	Location	EPA ID#	Agency	Action	Violation	Disposition	of Penalty

Enforcement actions include but are not limited to:

All **notices of violation (NOVs)**, issued by any regulatory agency to the applicant or those persons or related parties identified anywhere in Sections A, B or C concerning the Environmental Protection Acts, or any other environmental statute, regulation or ordinance.

All administrative orders, civil penalties, permit or license suspensions/revocations, bond forfeiture actions, and civil penalty actions adjudicated by any judicial body against the applicant or those persons or related parties identified anywhere in Sections A, B or C concerning the Environmental Protection Acts, or a regulation or order or a condition of a permit or license.

All consent orders, consent adjudications, consent decrees or monetary settlements (settlement agreements, letter agreements, settlement letters or consent assessments) between the applicant or those persons or related parties identified anywhere in Sections A, B or C and any state, federal or county agency regarding the Environmental Protection Acts, or any other environmental statute, regulations or ordinance.

All court proceedings in which those persons or related parties identified anywhere in Sections A, B or C have been involved in relation to the Environmental Protection Acts.

All summary, misdemeanor, or felony convictions, or pleas of guilty or no contest that have been obtained against the applicant or those persons or related parties identified anywhere in Sections A, B or C, pursuant to the Environmental Protection Acts, or for any acts involving the generation, storage, treatment, transportation, processing, or disposal of municipal, residual or hazardous waste.

For all persons and municipalities identified in Section A, B or C, indicate all violations committed and any subsequent enforcement actions taken regarding the facility or activity not previously listed in this section, concerning the Environmental Protection Acts.

State the reasons for suspension, revocation, or denial of any permit/permit application or license/license application filed by the applicant or any related party concerning the Environmental Protection Acts. Provide the date, location and nature of the violations, type of action, issuing agency, dollar amount of any monetary penalty associated with the action and permit, license, EPA ID# or other identifying number if applicable.

I hereby certify that I have the authority to respond to information provided herein is true and correct to the best of	the above question my knowledge, in	ons on behalf of the applicant, and that the formation and belief: (Signature)
	Name:	Rafael E. Carrasco
		(Print or Type Name)
	Title:	President and Director (Print or Type Title)
Sworn to and subscribed before me this	Name:	(Signature) Thomas Utermark (Print or Type Name) /ice President and Assistant Secretary (Print or Type Title)
Sworn to and subscribed before me this		
day of February, 2018.		
Adele M Sulia Notary Public		
ADELL M. SULIA NOTARY PUBLIC OF NEW JERSEY TO # 2425187 My Commission Expires 9/18/2022		See Annual Submission Attach copy of Articles of Incorporation

(For Corporations, see the Instructions, Item 9, regarding signatures and submission of Articles of Incorporation.)

Supplemental Schedule D.2 Compliance History Summary Report for the Waste Management Facilities located within Pennsylvania June 1, 2017 to February 5, 2018

Legal Entity	Facility Name	Date of Violation	Issuing Agency	Type of Action	Nature of Violation	Disposition	Fine or Penalty
Waste Management of Pennsylvania, Inc.	Allentown Transfer Kutztown, PA	06/23/17	PADEP	Notice of Violation	It is alleged the site did not conduct daily radiation source checks or monitor incoming waste in accordance with their approved Radiation Protection, Action and Monitoring Plan.	Corrective and preventive actions taken, no further regulatory action taken at this time.	\$0.00
Waste Management of Pennsylvania, Inc.	Apex Waste Services, Inc Dunmore, PA	12/21/17	PA State Police	Non-traffic Citation/Summons	It is alleged the vehicle had a leaking load.	Corrective action taken, no further regulatory action taken at this time.	\$0.00
Waste Management of Pennsylvania, Inc.	Apex Waste Services, Inc Dunmore, PA	09/08/17	PA State Police	Non-traffic Citation/Summons	It is alleged the vehicle had a leaking load.	Corrective action taken, no further regulatory action taken at this time.	\$0.00
Arden Landfill, Inc.	Arden Landfill Washington, PA	12/22/2017	PADEP	Notice of Violation	It is alleged the site did not pay Title V emissions fees for calendar year 2016 within the required timeframe.		\$0.00
Waste Management of Pennsylvania, Inc.	Delaware Valley South Primos, PA	11/27/17	PADEP	Notice of Violation	it is alleged the facility had a vehicle that was leaking.		\$0.00
	Gilbertsville Hauling Gilbertsville, PA	06/02/17	PADEP	Notice of Violation	It is alleged the site did not pay the annual Notice of Intent fee for their stormwater permit, due on 5/1/17.	Issue brought up to the accounts payable department since the original invoice was sent to them back in February. Payment Sent	\$0.00
Waste Management Disposal Services of Pennsylvania, Inc.	GROWS Landfill Morrisville, PA	01/23/18	DELCORA	Notice of Violation	It is alleged the site had exceedances of DELCORA water quality standards for leachate disposal.		\$0.00
Waste Management Disposal Services of Pennsylvania, Inc.	GROWS Landfill Morrisville, PA	07/21/17	DELCORA	Notice of Violation	It is alleged the site had an Arsenic Daily Maximum exceedance.		\$0.00
Waste Management Disposal Services of Pennsylvania, Inc.	GROWS Landfill Morrisville, PA	06/28/17	PADEP	Notice of Violation	It is alleged the site exceeded Sulfur Oxide (SOx) emissions from the backup enclosed flare during a performance test on 5/24/17.		\$0.00
Waste Management Disposal Services of Pennsylvania, Inc.	GROWS Landfill Morrisville, PA	06/02/17	DELCORA	Notice of Violation	It is alleged the site had an Arsenic Daily Maximum exceedance.		\$0.00
Waste Management of Pennsylvania, Inc.	Lake View Landfill Erie, PA	09/05/17	PADEP	Consent Assessment of Civil Penalty	See Notice of violation dated 4/28/2017, regarding edge of liner marking and cover.	Corrective actions taken, penalty paid.	\$5,500.00
Waste Management of Pennsylvania, Inc.	North Huntingdon North Huntingdon, PA	12/14/17	PADEP	Consent Assessment of Civil Penalty	Consent Assessment of Civil Penalty executed to resolve Act 90 matters of leaking loads, first aid kit, and PPC plan from 2016 through 2017.	Corrective actions taken, penalty paid.	\$7,500.00

The information contained above is part of a Compliance History submission made by the Pennsylvania subsidiaries of Waste Management, Inc., to the Commonwealth of Pennsylvania. Any use of this information without reference to the entire submission would be materially misleading.

Supplemental Schedule D.2 Compliance History Summary Report for the Waste Management Facilities located within Pennsylvania June 1, 2017 to February 5, 2018

Legal Entity	Facility Name	<u>Date of</u> <u>Violation</u>	Issuing Agency	Type of Action	Nature of Violation	<u>Disposition</u>	Fine or Penalty
Waste Management of Pennsylvania, Inc.	North Huntingdon North Huntingdon, PA	06/12/17	PADEP	Notice of Violation	It is alleged the facility had two vehicles that did not have the address of the person owning the vehicle, and one vehicle with a leaking load.	Corrective actions taken, see Consent Assessment of Civil Penalty dated 12/14/17.	\$0.00
Waste Management Disposal Services of Pennsylvania, Inc.	Northwest Sanitary Landfill West Sunbury, PA	12/21/17	PADEP	Notice of Violation	It is alleged the site had treated leachate disposed off- site from an unpermitted discharge point.	Corrective and preventive actions taken, no further regulatory action taken at this time, no penalty assessed.	\$0.00
Waste Management of Pennsylvania, Inc.	Philadelphia Hauling - Delaware Valley North Bristol, PA	11/27/17	PADEP	Notice of Violation	It is alleged the facility had a vehicle that was leaking.		\$0.00
Phoenix Resources, Inc.	Phoenix Resources Landfill	10/19/2017	PADEP		It is alleged the site had several containers that exceeded the 80-day slorage time limit.	Corrective action laken, no further regulatory action taken at this time.	\$0.00
Southern Alleghenies Landfill, Inc.	Southern Alleghenies Landfill	10/19/2017	PADEP	Notice of Violation	It is alleged the site had DMR reports from November 2015 to August 2017 that exceeded certain effluent limitations.		\$0.00
Waste Management of Pennsylvania, Inc.	Telford Hauling Telford, PA	11/27/17	PADEP	Notice of Violation	It is alleged the site had a hole in a roll-off can.	Corrective actions laken, no further regulatory action taken to date.	\$0.00
Waste Management of Pennsylvania, Inc.	Telford Hauling Telford, PA	06/26/17	PA State Police	Notice of Violation	It is alleged the vehicle transported waste in equipment that was not maintained to prevent the leakage of waste during transport.	Corrective actions taken, no further regulatory action taken to date.	\$0 .00
Waste Management of Pennsylvania, Inc.	Telford Hauling Telford, PA	06/02/17	PADEP		It is alleged the site did not pay their Annual Notice of Intent Fee, for their stormwater permit. Fee was due 5/1/17.	Issue brought up to the accounts payable department since the original invoice was sent to them back in February. Payment Sent	\$0.00
Waste Management of Pennsylvania, Inc.	Tullytown Resource Recovery Facility Tullytown, PA	08/21/2017	DELCORA	Notice of Violation	It is alleged the site had an exceedance of Arsenic related to wastewater discharged from the leachate storage tank.		\$0.00
Waste Management of Pennsylvania, Inc.	WM Butter Hauling West Sunbury, PA	08/31/17	PADEP	Consent Assessment of Civil Penalty	See Notice of Violation dated 6/7/17, regarding leaking loads.	Corrective actions taken, Consent Assessment of Civil Penalty executed, penalty paid.	\$4,750.00
Waste Management of Pennsylvania, Inc.	WM Butler Hauling West Sunbury, PA	06/07/17	PAOEP	Notice of Violation	It is alleged that the facility had three trucks that had leaking loads and another truck that was improperly enclosed.	Corrective actions taken, See Consent Assessment of Civil Penalty dated 8/31/17.	\$0.00
Waste Management of Pennsylvania, Inc.	WM of Pittsburgh / Hauling Ambridge, PA	12/14/17	PADEP	Consent Assessment of Civil Penalty	Consent Assessment of Civil Penalty executed to resolve Act 90 matters of leaking loads, tarping, and properly charged fire extinguisher from 2016 through 2017.	Corrective actions taken, penalty paid.	\$3,500.00

The information contained above is part of a Compliance History submission made by the Pennsylvania subsidiaries of Waste Management, Inc., to the Commonwealth of Pennsylvania. Any use of this information without reference to the entire submission would be materially misleading.

Supplemental Schedule D.2 Compliance History Summary Report for the Waste Management Facilities located within Pennsylvania June 1, 2017 to February 5, 2018

Legal Entity	Facility Name	Date of Violation	Issuing Agency	Type of Action	Nature of Violation	Disposition	Fine or Penalty
of Poppediania Inc.	WM of Pittsburgh South Elizabeth, PA	12/14/17	PADEP	Consent Assessment of Civil Penalty	Consent Assessment of Civil Penalty executed to resolve Act 90 matters of leaking loads, signage, and PPC plan from 2016 through 2017.	Corrective actions taken, penalty peid.	\$2,500.00
of Donositivania Inc.	WM of Pittsburgh South Elizabeth, PA	06/12/17	PADEP	Notice of Violation	It is alleged the facility had two vehicles with leaking loads.	Corrective actions taken, see Consent Assessment of Civil Penalty dated 12/14/17.	\$0.00
Waste Management of Pennsylvania, Inc.	Washington Hauling Washington, PA	12/14/17	PADEP	Consent Assessment of Civil Penalty	Consent Assessment of Civil Penalty executed to resolve Act 90 matters of leaking loads, first aid kit, and PPC plan from 2016 through 2017.	Corrective actions taken, penalty paid.	\$7 ,500.00
Waste Management of Pennsylvania, Inc.	Washington Hauling Washington, PA	06/12/17	PADEP	Notice of Violation	It is alleged that the facility had a vehicle that was teaking.	Corrective actions taken, see Consent Assessment of Civil Penalty dated 12/14/17.	\$0.00
Waste Management of Fairless, LLC	Waste Management of Fairless Hills Landfill Morrisville, PA	11/27/2017	PADEP	Notice of Violation	It is alleged the site accepted the disposal of HAZ Solar Panels.	Matter was self reported, corrective and preventive actions taken, no further regulatory action taken at this time.	\$0.00
Waste Management of Fairless, LLC	Waste Management of Fairless Hills Landfill Morrisville, PA	8/17/2017	PADEP	Notice of Violation	It is alleged the site 1) failed to conduct testing of stormwater from the major drainage areas in 20/2017 and to submit stormwater analytical results to PADEP 2) failed to sample influent leachate from Tank 300 for the annual parameters during the annual monitoring collection program conducted 20/2017.	WM has submitted a letter to PADEP dated 9/26/17 with technical justification, requesting that that the NOV be rescinded.	\$9.00

The information contained above is part of a Compliance History submission made by the Pennsylvania subsidiaries of Waste Management, Inc., to the Commonwealth of Pennsylvania. Any use of this information without reference to the entire submission would be materially misleading.

FORM I

EROSION AND SEDIMENTATION CONTROL



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Form I - Erosion and Sedimentation Control

Narrative

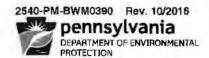
Attachment I-1 - Act 167 Stormwater Management Plan

Attachment I-2 - Channels

Attachment I-3 - Relocated Inlet Storm Pipe

Attachment I-4 - Erosion & Sedimentation Control Plans





COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised March 2018

DEP USE ONLY

Date Received

FORM I SOIL EROSION AND SEDIMENTATION CONTROLS

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form I, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: 273.151, 275.205, 277.151, 279.232, 281.132, 283.106, 288.151, 289.252, 291.205, 293.232, 295.132, 297.106

SECTION A. SITE IDENTIFIER

Applicant/permittee: Grand Central Sanitary Landfill, Inc.

Site Name: Grand Central Sanitary Landfill

Facility ID (as issued by DEP): 100265

SECTION B. EROSION AND SEDIMENT CONTROL

Provide a plan for the control of erosion and sedimentation on land within the permit area, all borrow areas and adjacent areas to be disturbed by construction activities. Include a narrative describing the implementation of the plan, its relationship to the overall staging of earth moving activities, and detailed design and construction plans and specifications for each structure or facility used in the plan. The plan must be site specific for each phase of construction. Include design assumptions, runoff calculations, channel profiles, cross sections, channel linings, and applicable details on attached Data Sheet for all collection and interceptor ditches. Provide documentation on the capacity of existing drainage system and the effect that storage or disposal activities will have on the drainage. Show discharge points to natural drainageways and all culverts that carry drainage away from the site. Plans and maps shall contain all details necessary for construction of the structures.

SECTION C. DIVERSION CONTROLS

Provide a plan for the collection and conveyance to a natural drainageway of the runoff from up slope undisturbed areas. Include design calculations, profiles, cross sections, and applicable details for each structure, ditch, or channel used for diverting runoff. The diversion control and erosion and sedimentation control plan shall be based on the requirements of Chapter 102 (Erosion and Sedimentation Control) of the Department's regulations. Calculations indicating water quantities shall be based on a 24-hour precipitation event with a frequency of once in 25 years. More stringent criteria may be required by the Department based on the most recent edition of the USDA-SCS. Engineering Field Manual for conservation Practices, or as otherwise determined necessary by the Department.

SECTION D. ACCESS ROADS (Residual Waste Facilities Must Submit Form 23R)

Access roads shall have drainage system that is compatible with the natural contours, structurally stable, and capable of passing safely the peak flow from a 25-year, 24-hour precipitation event.

Provide the following information for each haul road to be used in the operation. See attached narrative and drawings.

- Show the location on the application's topographic maps;
- Description and typical cross sections showing the construction of each access road including existing and proposed contours, grades, slopes, culvert locations, outlet protection, and other drainage control;
- c) Measures to control and prevent erosion and sedimentation; include proposed spacing of sediment traps, turnouts, cross drains, culverts, check dams, stabilized ditches, erosion resistant surfacing, etc.;
- d) Plan for reclamation after the operation is completed;

FORM I DIVERSION/COLLECTION DITCH DATA SHEET

Title:					Site:														
Prepa	Prepared by: Telephone Number:						Date:	Date: Sheet of											
Estir	nated P	eak Sto	rm Int	ensity: _			_ (in./hr.))	D	esign (Calcula	tions:							
St	ation																W	ith Freebo	ard
Start End	Elevation	Drainage Area (acres)	Design Storm (yrs.)	Average Watershed Slope %)	Peak Discharge Q (cfs)	Channel Bed Slope (%)	Freeboard (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft.)	Channel Side Slopes (%)	Flow Area (sq. ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (ft./sec.)	Q Available (cfs)	Channel Depth (ft.)	Top Channel Width (ft.)	Q Availab (cfs)
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SECTION E. SEDIMENTATION PONDS - See Attached Forms

Sedimentation ponds and other impoundments must be constructed in accordance with the requirements of Chapter 102 and this permit before any earthmoving activities start in the drainage area. Each impoundment must be inspected during construction by or under the supervision of a registered professional engineer, licensed in Pennsylvania, and certified by the Department upon completion of construction.

Any enlargement, reduction in size, reconstruction, or other modification that may affect the stability or operation must be approved by the Department. Ponds must be certified and approved by the Department prior to the start of storage or disposal activities.

Or Location from E HYDRQLOGY: Dr	gle Wind Gap, PA Location: Latitude 40° 10' 6" Sottom Right corner of U.S.G.S. Quadrangle; inches North:	inches West:
Embankment	Top Width (Minimum) Outside Slope (Maximum) Inside Slope (Maximum) Top Elevation Upstream Toe Elevation Liner Material (earthen, synthetic, etc.)	11 ft. 1:25 H : 1V 1:25 H : 1V 706.95 696.79 ft. (permanent pool elevation) Earthen
Impoundment Dimensions and Capacities	Length at Bottom Width at Bottom Length at Crest of Principal Spillway Width at Crest of Principal Spillway Depth from Crest of Principal Spillway Length at Crest of Emergency Spillway Width at Crest of Emergency Spillway Volume at Crest of Principle Spillway	unknown unknown N/A N/A N/A 90 ft. 20 ft. N/A
Principal Spillway	Time of Detention Maximum Sediment Storage Volume Shape (Circular, semi-circular, trapezoid, etc.) Dimensions (W x H x L) Inlet Elevation Slope and Length Discharge Elevation Spillway Capacity Construction Material	See Hydrograph 16,687 CF (Sed. Trap No. 2) N/A N/A N/A N/A N/A N/A N/A N/A N/A
Dewatering Device	Type/Size Inlet Elevation Discharge Controls (i.e. self -draining or -valved) Discharge Capacity (maximum) Time to Dewater Full Pond	N/A N/A N/A N/A
Emergency Spillway	Shape Dimensions (W x H x L) Slope Discharge Elevation Type of Lining/Protection Spillway Capacity (provide design calculations)	Trapezoidal 20' x 1' x 90' 1.0 % 704.0' Grass (lined with NAG P330) 268.67 cfs

	SECTION F. STORMWATER
1.	Does the host county or municipality have any stormwater ordinance or requirements?
	If "yes," attach a copy of the ordinance or requirements.
2.	Are stormwater controls located in a Special Protection Watershed?
	If "yes," attach a copy of relevant ordinances or requirements.
3.	Does the receiving waterway have any designated use? ☐ Yes ☐ No
4.	Does the facility have an NPDES Permit or Stormwater NPDES General Permit?
	If "yes," attach a copy of the permit and a drawing showing how the regulated controls are related to the permitted discharge permit.

FORM I - EROSION AND SEDIMENTATION CONTROLS NARRATIVE

INTRODUCTION

Prior to any disturbances in the Sediment Basin No. 2 area, soil erosion and sedimentation control structures will be constructed in accordance with the plans, details, schedules, and specifications provided within this form. All structures have been designed under the direction of a Pennsylvania registered Professional Engineer in accordance with the requirements of the March 2012 PA DEP Erosion & Sedimentation Control Plan Development Checklists, Standard Worksheets, Details and Notes, Chapters 102 and 105 of the PA DEP Regulations, Act 167 as required by Plainfield Township Ordinance, and Form I.

The plan modifies the existing erosion and sedimentation plan for GCSL by providing an additional channel, volume reduction of existing Sediment Basin No. 2, and relocating an inlet storm pipe and emergency spillway of existing Sediment Basin No. 2. The design and construction information for these new structures and necessary modifications to existing structures are included. All other existing stormwater features will continue to function as designed, no changes to the contributing stormwater runoff flows and means of conveyance from the landfill are proposed. Existing Sediment Trap No. 2 will not be modified and will continue to function as designed.

The Slate Belt Heat Recovery Center, LLC (SBHRC) will be responsible for the construction and maintenance of all erosion and sedimentation control structures as outlined in this application. Additional measures not included in this application may be implemented by GCSL/SBHRC if necessary to control erosion and sedimentation.

EROSION AND SEDIMENTATION CONTROLS

This plan will provide for the control of erosion and sedimentation on land to be disturbed by the reduction of Sediment Basin No.2 and construction of the proposed SBHRC. Implementation of this plan will require that SBHRC construct all proposed control structures at the locations shown on EarthRes Drawing No. C-06 and according to the details provided on EarthRes Drawing No. C-12 and the construction sequence provided below. Construction quality assurance (CQA) regarding control structures will include inspections by SBHRC contractors experienced with the construction of such structures, surveying of structures throughout construction to ensure grades and dimensions are completed according to specifications and inspection by the design engineer and/or designated personnel. Completed construction will be certified by a registered professional engineer.



The revision to the existing site erosion and sedimentation control plan is the volume reduction of Sediment Basin No. 2. Sediment Basin No. 2 is a zero-discharge basin located at the Doney 2 reclaimed Quarry and will continue to be able to contain the 100-year storm event runoff volume with the reduced basin volume and the increased impervious area provided by the proposed SBHRC.

As filling of Sediment Basin No. 2 nears completion, the proposed swale can be constructed. This swale is designed to collect the runoff from the SBHRC and provide an isolated sampling point. The sampling point will be part of the facility's Individual NPDES Permit Associated with Industrial Activities.

Surface area contributing to Sediment Basin No. 2 was divided into individual drainage areas based upon the drainage divides shown on Figure No. 1 – Stormwater Management Plan Proposed Drainage Areas included in Attachment I-1. Pre-development and post-development runoff quantities were originally calculated using the Virginia Tech – Penn State Urban Hydrology Model (VTPSUHM). The post-development hydrograph was remodeled in Hydraflow Hydrographs for the purpose of this analysis. The SCS TR-55 Method was used and curve numbers (CN) were weighted for each drainage area using the information provided in the Bushkill Creek, Martins/Jacoby Creek and Delaware River Sub-Basin 1 Watersheds Act 167 Stormwater Management Ordinance. All values were used based on the assumption that each represented conservative "worst case" situations to provide an overall conservative erosion and sedimentation control plan and be consistent with previously approved designs for Sediment Basin No. 2.

Pre and post development drainage area peak flow calculations and hydraulic analyses were categorized into four (4) different cover types with the associated curve number (CN). Impervious areas were assigned a CN of 98, gravel areas 85, and vegetated areas (including the landfill) were assigned a 72. Using the Hydraflow software and SCS Tabular Method, the peak 2-year, 5-year, 10-year, 25-year, and 100-year 24-hour storm event flows for the drainage area were calculated with the appropriate time of concentration and hydrologic curve number.

Channel Construction

- 1. The channels were designed based on a trapezoidal shape with 2:1 (H:V) side slopes.
- 2. The channels were designed to provide a minimum of six (6) inches of freeboard.
- 3. The Rational Method was used to estimate stormwater runoff flow for sizing.
- 4. The proposed swale was designed to capture runoff from the SBHRC.
- 5. The proposed swale will have a vegetated lining with temporary erosion and sedimentation matting.



6. The 100-year storm event inflow rate was utilized for designing the modified emergency spillway.

Relocated Inlet Storm Pipe

- 1. Culvert construction materials specified on the design worksheets and drawings will consist of high density polyethylene (HDPE) of specified diameter.
- 2. Inlet/outlet protection (concrete head walls, end walls, debris screens, etc.) will be constructed according to the construction details provided on the plans to reduce scouring and prevent accelerated erosion.
- 3. Design values for Manning's "n" are HDPE=0.013.
- 4. Culverts will be installed with a 1.5-foot cover (min.).
- 5. Inlet structures will be constructed with the piping at the locations shown on EarthRes Drawing No. C-06 and according to the details on EarthRes Drawing No. C-12.

Sedimentation Basins and Sediment Traps

- 1. The reduction of Sediment Basin No. 2 was designed in accordance with the requirements outlined in the PA DEP Erosion and Sedimentation Control Plan Development Checklists, Standard Worksheets, Details and Notes, Chapters 102 and 105 of the PA DEP Regulations and Act 167 as required by Plainfield Township Ordinance. Sediment Basin No. 2 is a non-discharge basin. Design details are indicated on EarthRes Drawing No. C-17, C-18, and C-19. Please note that EarthRes Drawing No.s C-17, C-17, and C-19 were prepared prior to the incorporation of the SBHRC and submitted to LVPC and Plainfield Township as part of the Preliminary Land Development Plan set.
- 2. Sediment Trap No. 2 (prior to Basin No. 2) and was designed in accordance with standards presented in *Erosion and Sediment Pollution Control Program Manual* (March 2012) published by the PA DEP. No changes to the existing design criteria are proposed.

All erosion and sedimentation control structures must be regularly inspected and properly maintained until construction is complete and permanent stabilization has been achieved in all disturbed areas. All controls, including both temporary and permanent structures, will be inspected weekly and after each storm event. Inspection will consist of visually observing all structures for stability and effective operational capabilities (i.e. clear culverts, unobstructed trash rack, and intact swale protection).

Routine and periodic maintenance items including clearing obstructions from the culverts stormwater channel, and other associated piping and appurtenances; maintaining the structural integrity of the sedimentation basin and sediment trap as well as the swale (repairing washouts); and sediment removal from behind silt fences and the basin. Cleanout of the sedimentation basin



and sediment trap will be performed when the sediment levels have reached the cleanout elevation, as indicated on cleanout stakes located within the structure. Following sediment removal, the stakes will be surveyed and adjusted as needed to indicate the proper cleanout elevations.

All preventive and remedial maintenance and remedial work, including but not limited to cleanout, repair, replacement, regrading, reseeding, and remulching must be completed within forty-eight (48) hours of completion of a storm event.



ATTACHMENT I-1 ACT 167 STORMWATER MANAGEMENT PLAN



Stormwater Management Plan

Proposed Slate Belt Heat Recovery Center

Slate Belt Heat Recovery Center, LLC Plainfield Township, Northampton County, Pennsylvania

EarthRes Project # 151014.003

February 2018

Prepared for:

Slate Belt Heat Recovery Center, LLC 452 Williams Court, Suite 100 Baltimore, MD 21220

Prepared by:

EarthRes Group, Inc. 6912 Old Easton Road, Pipersville, PA 18947 Phone: (215) 766-1211 DAVID F.

ENGINEER PE075102

Dave F. Alten P. F.

Dave F. Atten, P.E. License No. PE075102

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1.0 INTRODUCTION

Slate Belt Heat Recovery Center, LLC (SBHRC) proposes to permit and construct a biosolids facility which is contained within a 12.05 acre proposed parcel of land owned by Grand Central Sanitary Landfill (GCSL) and situated adjacent to Green Knight Economic Development Corporation (GKEDC) facilities in Plainfield Township, Northampton County, PA. The process involves drying dewatered biosolid cake to produce a Class A biosolid product that will be used as a fertilizer blending agent, soil conditioner, and/or a renewable fuel product.

2.0 ACT 167 STORMWATER PLAN

All stormwater runoff that occurs within the proposed site area will drain to existing Basin No. 2 located on the GCSL property. The proposed facility is located within the watershed of Bushkill Creek and the drainage area of the Little Bushkill Creek which discharges to the Bushkill Creek. The Little Bushkill Creek is designated by Chapter 93 as a High Quality (HQ), Cold Water Fishery (CWF) and Migratory Fishes (MF). The Bushkill Creek ultimately discharges to the Delaware River.

Sediment Basin No. 2 will be partially filled in as a component of the facility's construction, while remaining zero-discharge. Sediment Basin No. 2 will be used to control sediment and stormwater runoff. Despite the depth of the basin, only elevations above the permanent pool elevation of 696.79 ft. are accounted for as stormwater storage in this analysis. Existing Sediment Trap No. 2 will continue to function in its current capacity, receiving the majority of runoff before discharging to Basin No. 2, no changes are proposed. The sedimentation basin will be converted to a permanent stormwater detention basin during the closure of the landfill.

All of the supporting calculations for the proposed site are included as Appendixes B, C, and D of this report. The design details for the support areas described above are subject to the Land Development Plan review by Plainfield Township. All areas proposed for development as part of this project were included in the Act 167 analysis.

3.0 PRE AND POST-DEVELOPMENT RUNOFF CALCULATIONS

Pre-development and post-development runoff quantities were originally calculated using the Virginia Tech – Penn State Urban Hydrology Model (VTPSUHM). The post-development hydrograph was remodeled in Hydraflow Hydrographs for the purpose of this analysis. The SCS TR-55 Method was used and curve numbers (CN) were weighted for each drainage area using the information provided in the Bushkill Creek, Martins/Jacoby Creek and Delaware River Sub-Basin 1 Watersheds Act 167 Stormwater Management Ordinance. A summary of the pre and



post-development peak discharge rates are shown below. As illustrated below with the stormwater controls in place, there will be no increase in stormwater runoff resulting from this project.

Pre-Development (No Change from Approved)

Little Bushkill Creek Tributary to Bushkill Creek

Storm	Existing Basin No. 2 Peak Flow
2-year	0.00 cfs
10-ye ar	0.00 c fs
25-year	0.00 cfs
100-year	$0.00 \mathrm{\ cfs}$

Post-Development

Little Bushkill Creek Tributary to Bushkill Creek

Storm	Modified Basin No. 2 Peak Flow
2-year	0.00 cfs
10-year	0.00 cfs
25-year	0.00 cfs
100-year	0.00 cfs

In order to comply with Act 167, the release rate for the 2-year storm post-development peak flow was set at 30% of the pre-development peak flow. The release rates for the 10, 25 and 100-year storm events were set at 100% of the pre-development peak flows. Basin No. 2 is non-discharging; therefore, no flow is included in the Act 167 Post-Development total.

Act 167 Allowable Discharge

Peak 2-year storm event = $(0.00cfs) \times 0.30 = 0.00 cfs$

Peak 10-year storm event = 0.00 cfs

Peak 25-year storm event = 0.00 cfs

Peak 100-year storm event = 0.00 cfs



-2-

Post-Development Discharge vs. Act 167 Allowable Discharge

Peak 2-year storm event = 0.00 cfs < 0.00 cfs Acceptable Peak 10-year storm event = 0.00 cfs < 0.00 cfs Acceptable Peak 25-year storm event = 0.00 cfs < 0.00 cfs Acceptable Peak 100-year storm event = 0.00 cfs < 0.00 cfs Acceptable

The post-development discharges meet the Act 167 discharge requirements.

4.0 PEAK FLOW CALCULATIONS – STORMWATER CHANNELS, INLETS, CULVERTS, AND PIPES

Emergency Spillway

The proposed basin is designed to contain the 2, 5, 10, 25, 50, and 100-year, 24-hour storm events without discharging any flow. As a precaution, a one-foot deep emergency spillway channel will be installed at an elevation of 704.0 ft. See the emergency spillway design information below:

Emergency Spillway Channel:

Grass (B Retardance)

Length = 90 ft.

Spillway Channel Inlet Invert Elevation = 704.0 ft.

Spillway Channel Outlet Invert Elevation = 702.65 ft.

Slope = 1.0%

Flow Capacity = 277.83 cfs

100-Year Storm Flow = 268.67 Adequate

Basin No. 2 Swale

Using the Rational Method, the peak stormwater runoff flow was calculated to be 7.76 cfs.

$$Q = CIA$$

Where:

Q = runoff (cfs)

C = runoff coefficient

I = rainfall intensity (in.)

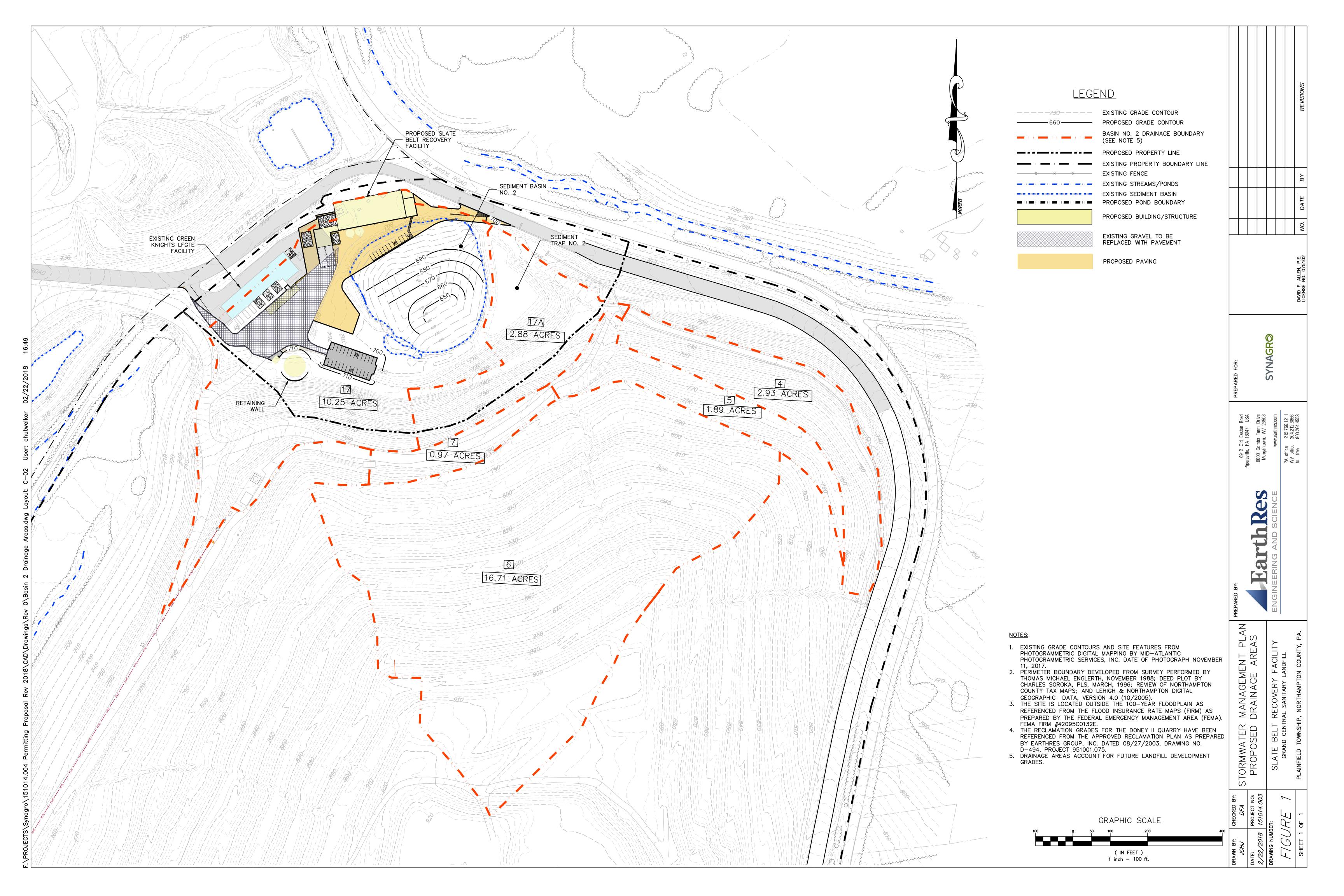
A = area (acres)

 $Q = 0.95 \times 5.79 \times 1.41 = 7.76 \text{ cfs}$



APPENDIX A FIGURES





APPENDIX B STORMWATER CALCULATIONS





SLATE BELT HEAT RECOVER CTR, LLC. PROJECT SLATE BELT HEAT RECOVERY CENTER BASIN NO. 2 REDUCTION SENSITIVITY ANALYSIS

PROJ	ECT NO.	151014.003			
BY	<u>JC</u> HJ	DATE	2/20/17		
CHK_	TJM	_DATE	2/20/17		
Page	1	of	2		

TASK:

To determine a percentage in size that Basin No. 2 can be decreased without discharging the 100year storm event runoff volume.

REFERENCES:

1. Hydraflow Hydrographs extension for AutoCAD® Civil 3D® 2016, Version 10.5, by AutoDesk, Inc.

VARIABLES/ASSUMPTIONS:

696.79' W.S.E. is assumed to be the highest level in the basin.

CALCULATIONS:

Per the permit application, water elevation in the basin for the 100-year storm event is 702.07' and the spillway crest is at 704'. The basin can be reduced as long as the storage below the spillway crest elevation is adequate for the 100-year storm volume.

Permitted Southern Expansion Sediment Basin 2 Storage Volume Table

Elevation	Plan Area	Average Area	Elevation Difference	Incremental Volume	Cumulative Volume
ft.	SF	SF	ft.	CF	CF
696.79	101,353				
698.0	10 3,071	102,211	1.21	123,675	123,675
700. 0	111,695	107,354	2.0	214,708	214,708
702.0	152,993	131, 8 04	2.0	263,608	478,316
704.0	172,699	162,747	2.0	325,494	80 3, 8 10

Per the storage volume table from the approved permit application, the volume at the 100-year peak flow of 702.07' is 490,097 CF.

A reduction of 39% to all plan areas provides enough storage for the runoff without discharging.

Southern Expansion Basin 2 Storage Volume Table - 39% Reduction

Elevation	Plan Area	Average Area	Elevation Difference	Incremental Volume	Cumulative Volume
ft.	SF	SF	ft.	CF	CF
696.79	61,8 2 5				
698.0	62,873	6 2 ,349	1.21	75,442	75,442
700.0	68,134	6 5,486	2.0	130,972	130,972



CLIENT

SLATE BELT HEAT RECOVER CTR, LLC. PROJECT SLATE BELT HEAT RECOVERY CENTER SUBJECT BASIN NO. 2 REDUCTION SENSITIVITY ANALYSIS

PROJ	ECT NO.	151014.003				
BY	JCHJ_	DATE	2/ 20/17			
CHK	TJM_	DATE	2/20/17			
Page	2	of	2			

Southern Expansion Basin 2 Storage Volume Table - 39% Reduction

	Plan				
Elevation	Area	Average Area	Elevation	Incremental	Cumulative
702.0	93,326	80,400	2.0	160,801	29 1,773
704.0	105,347	99,276	2.0	198,551	490,324

As a check, the basin plan areas were modeled in Hydraflow Hydrographs to provide a more accurate volume and the hydrograph used in the original VTPSUHM basin calculations was imported. This analysis provided more available storage, therefore decreasing the 100-year storm water elevation and allowing for a greater decrease in basin size. Using this software, a 45% size decrease will adequately store the 100-year storm runoff volume without discharging. The 100-year elevation with the revised basin size is 703.78' and the volume used is 490,098 CF. See attached Hydraflow output for details.

CONCLUSION:

The existing Basin No. 2 can be reduced in size by approximately 39-45% without discharging the 100-year storm event runoff volume.



SLATE BELT HEAT RECOVERY CTR, LLC PROJECT SLATE BELT HEAT RECOVERY CENTER MANAGEMENT PLAN COMPLIANCE

PROJECT NO.		151014.003	
BY	JCHJ	DATE	2/6/18
CHK_	DFA	DATE	2/6/18
Page_	l	_of	2

TASK:

To evaluate the post-development discharge of Sediment Basin No. 2 at Grand Central Sanitary Landfill (GCSL) per the Act 167 Stormwater Management Plan for the Bushkill Creek Watershed.

REFERENCES:

- 1. Bushkill Creek Watershed Act 167 Storm Water Management Plan Executive Summary, Joint Planning Commission Lehigh-Northampton Counties, May 1992.
- 2. "Stormwater Management Plan", Southern Expansion Application, prepared by EarthRes and revised February 2008.
- 3. "Final Grade Plan," EarthRes Drawing Nos. E-287 and E-288 and Figure 1.
- 4. NOAA Atlas 14 Point Precipitation Frequency Estimates
- 5. Hydraflow Hydrographs Extension, Version 12, by Autodesk, Inc.
- 6. Sediment Basin No. 2 calculations as prepared by EarthRes dated 2/6/2018.

REQUIREMENTS:

Based on Reference No. 1, the Act 167 requirements are as follows:

- 1. For the subarea in which GCSL is located, the release rate for the 2-year storm postdevelopment peak flow is 30% of the pre-development peak flow. (See Plate I - Release Rate Map, Reference 1)
- 2. The release rate for the 10, 25, and 100-year storm events is 100%.

ASSUMPTIONS:

- 1. Sediment Basin No. 2 will serve as a post-development stormwater detention basin after landfill closure.
- 2. Rainfall per Reference 4:

2-year, 24-hour storm event = 3.1 inches

10-year, 24-hour storm event = 4.9 inches

25-year, 24-hour storm event = 5.5 inches

100-year, 24-hour storm event = 6.9 inches

3. Post-development flows for the 2, 10, 25, and 100-year, 24-hour storm events were determined using VTPSUHM.

CALCULATIONS:

The existing Sediment Basin No.2 is a non-discharge basin. The proposed basin is designed to contain the 2-, 10-, 25-, and 100-year, 24-hour storm events. As a precaution, a discharge culvert is



SLATE BELT HEAT RECOVERY CTR, LLC SLATE BELT HEAT RECOVERY CENTER ACT 167 STORMWATER MANAGEMENT PLAN COMPLIANCE

PROJ	ECT NO.	151014.003	
BY	JCHJ	DATE	2/6/18
CHK	DFA _	DATE	2/6/18
Page _	2	of	2

installed at an elevation above the maximum basin elevation for the 100-year, 24-hour storm event. Please refer to the attached basin routings, hydrographs, and Figure No. 1.

1. Post-Development

Sediment Basin No. 2 will serve as a post-development stormwater detention basin after landfill closure. The 2-, 10-, 25-, and 100-year storm events were routed through the post-development Basin No. 2. The peak discharges from the basin are as follows:

2-year storm event = 0 cfs 10-year storm event = 0 cfs 25-year storm event = 0 cfs 100-year storm event = 0 cfs

2. Since the existing Sediment Basin No.2 is a non-discharge basin, the pre- and post- development discharge requirements of Act 167 cannot be met. The proposed design of Sediment Basin No. 2 is adequate to control stormwater.



SLATE BELT HEAT RECOVERY CTR LLC PROJECT SLATE BELT HEAT RECOVERY CENTER **CALCULATIONS**

PROJECT NO.		151014.003	
BY	JCHJ	DATE	2/6/18
CHK_	<u>D</u> FA	DATE	2/6/18
Page _	1_	of	2

TASK:

To verify the design of reduced-volume Sediment Basin No. 2 is adequate for controlling runoff from the Proposed Slate Belt Heat Recovery Center and Grand Central Sanitary Landfill.

REFERENCES:

- 1. Erosion and Sediment Pollution Control Program Manual, PADEP, March 2012.
- 2. Point Precipitation Frequencies Estimates from NOAA Atlas 14.
- 3. USDA Web Soil Survey (WSS) Soil Report.
- 4. 2018 AutoCAD® Civil 3D®, Autodesk, Inc.
- 5. Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018, by AutoDesk, Inc., Version 12.
- 6. "Final Grade Plan," EarthRes Drawing Nos. E-287 and E-288.

REQUIREMENTS:

Based on Reference No. 1, the design requirements for a sedimentation basin are as follows:

1. Sediment storage volume must be equal to the total contributing drainage area 1,000 cubic feet per disturbed acre within the watershed of the basin.

ASSUMPTIONS:

- 1. The location of the Sediment Basin No. 2 is the reclaimed Doney No. 2 Quarry. The approved post-miming land use of the quarry is for a water impoundment.
- 2. The permanent pool elevation is equal to the existing water elevation 696.79 ft. The bottom elevation of the inactive quarry is unknown.
- 3. The proposed basin is designed to contain the 2, 10, 25 and 100-year, 24-hour storm events without discharging any flow.
- 4. An emergency spillway channel is installed at an elevation above the 100-year, 24-hour storm event maximum basin elevation (See calculations below).
- 5. The drainage area is 35.61 acres, all of which is considered a disturbed area (Refer to Reference No. 7).
- 6. A sediment trap (Sediment Trap No. 2) is constructed adjacent to the basin to pre-treat incoming water and facilitate cleanout of accumulated sediment.
- 7. Maintain Sediment Basin No. 2 as a zero-discharge facility in order to maintain compliance with Act 167.
- 8. Although the basin routing only accounts for the upper level of the basin, there is sufficient storage volume.

CALCULATIONS:

1. Sediment Basin Dewatering Volume



CLIENT SLATE BELT HEAT RECOVERY CTR LLC PROJECT SLATE BELT HEAT RECOVERY CENTER SUBJECT SEDIMENT BASIN NO. 2 CALCULATIONS

PROJECT NO.		151014.003	
BY	JC HJ	DATE	2/6/18
CHK_	DFA	DATE	2/6/18
Page _	2	of	2

Per Reference No. 1, the required basin dewatering volume = 35.61 acres (disturbed) x 5,000 cf/acre = 178,050 cf

Minimum depth to achieve 178,050 cf = 178,050 cf / 70,668 sf = 2.52 ft

Since the sediment basin is required to be a minimum of 4 feet deep (1 foot depth for sediment zone and 3 foot depth for dewatering zone), the proposed basin has ample storage capacity.

2. Pre and Post Development Conditions

Pre and post development drainage area peak flow calculations and hydraulic analyses were categorized into four (4) different cover types with the associated curve number (CN). Impervious areas were assigned a CN of 98, gravel areas 85, and vegetated areas (including the landfill) were assigned a 72. Using the Hydraflow software and SCS Tabular Method, the peak 2-year, 5-year, 10-year, 25-year, and 100-year 24-hour storm event flows for the drainage area were calculated with the appropriate time of concentration and hydrologic curve number.

3. 25-year, 24-hour Storm Routing

Refer to the attached Appendix B for the Hydraflow Hydrograph outputs for the rating table, hydrographs, and routings.

25-yr, 24-hr storm event peak inflow = 173.73 cfs

25-yr, 24-hr storm event elevation = 701.25'

25-yr, 24-hr storm event peak discharge = 0 cfs

4. Emergency Spillway

The proposed basin is designed to contain the 2, 5, 10, 25, 50, and 100-year, 24-hour storm events without discharging any flow. As a precaution, a one-foot deep emergency spillway channel will be installed at an elevation of 704.0 ft. See the emergency spillway design information below:

Emergency Spillway Channel:

Grass (B Retardance)

Length = 90 ft.

Spillway Channel Inlet Invert Elevation = 704.0 ft.

Spillway Channel Outlet Invert Elevation = 702.65 ft.

Slope = 1.0%

Flow Capacity = 277.83 cfs

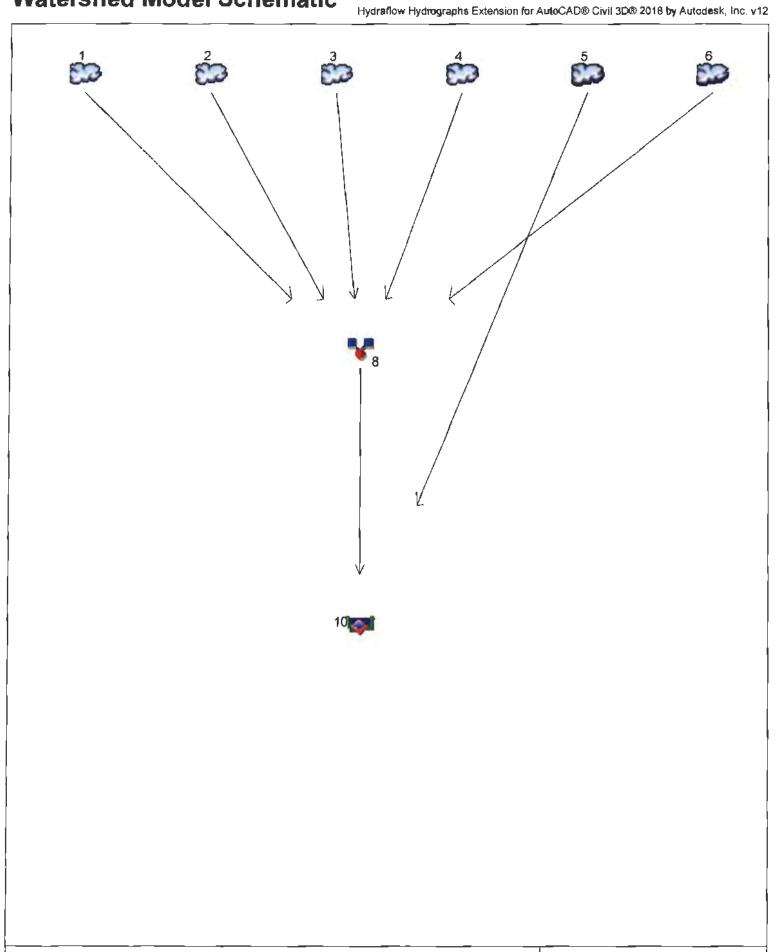
100-Year Storm Flow = 268.67 Adequate

Outlet Protection: The emergency spillway channel lining will be grass overlayed with North American Green P330.

Watershed Model Schematic

Project: Basin 2 Rev DAs.gpw

Thursday, 02 / 22 / 2018



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

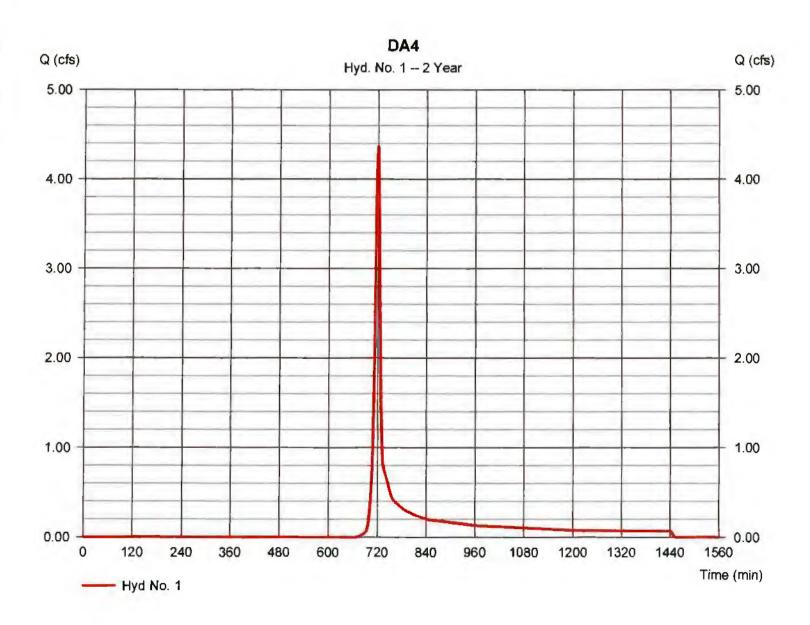
Friday, 02 / 16 / 2018

Hyd. No. 1

DA4

Hydrograph type	= SCS Runoff	Peak discharge	= 4.374 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 10,219 cuft
Drainage area	= 2.930 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.94 min
Total precip.	= 3.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 2.930



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

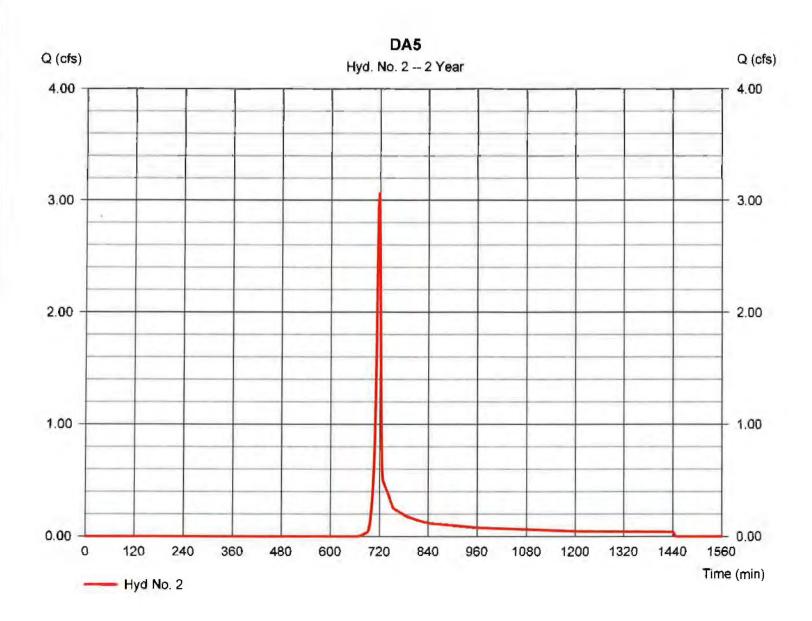
Friday, 02 / 16 / 2018

Hyd. No. 2

DA₅

Hydrograph type	= SCS Runoff	Peak discharge	= 3.068 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 6,180 cuft
Drainage area	= 1.890 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 1.890



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

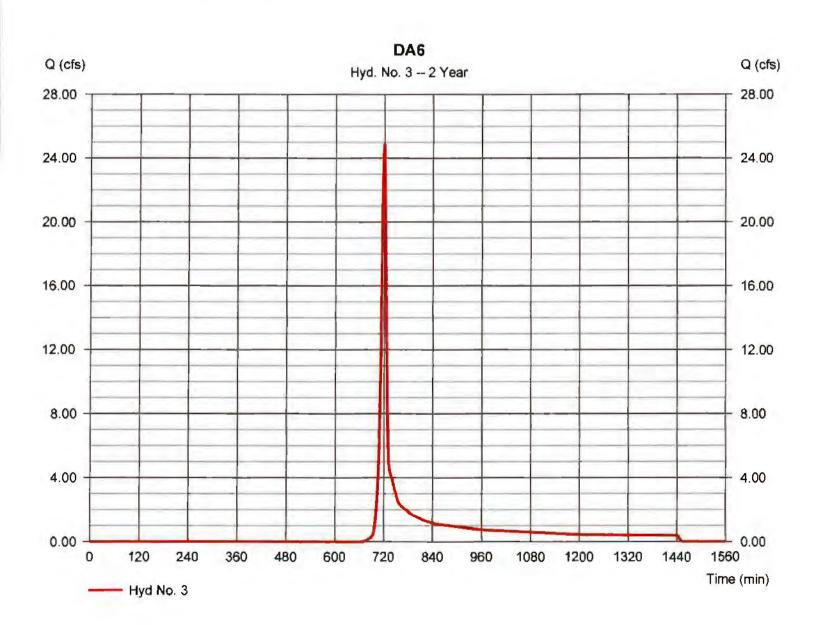
Friday, 02 / 16 / 2018

Hyd. No. 3

DA6

Hydrograph type = SCS Runoff Peak discharge = 24.95 cfsStorm frequency Time to peak = 2 yrs = 720 min Time interval = 2 min Hyd. volume = 58,281 cuft Drainage area = 16.710 ac Curve number = 72* Basin Slope = 0.0 %Hydraulic length = 0 ftTc method Time of conc. (Tc) = User $= 6.71 \, \text{min}$ Total precip. = 3.25 inDistribution = Type II Storm duration = 24 hrs Shape factor = 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 16.710



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

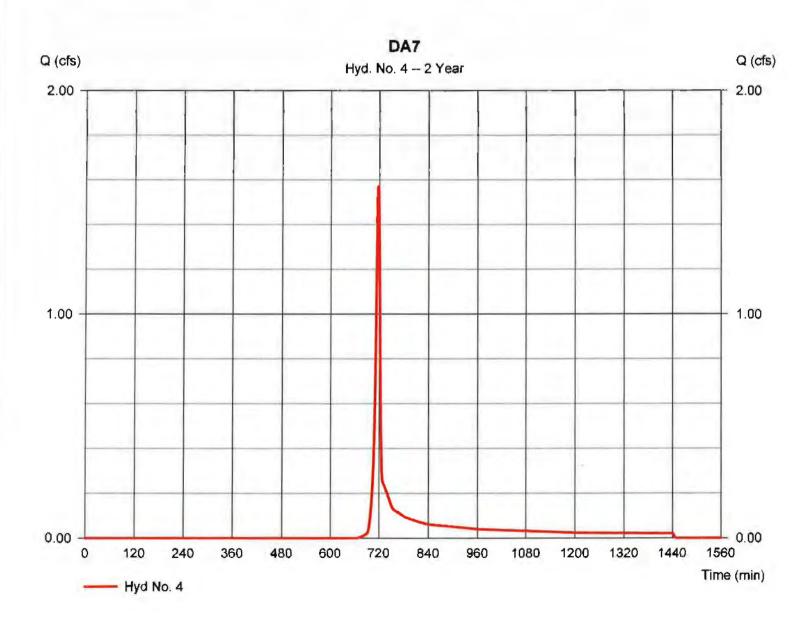
Friday, 02 / 16 / 2018

Hyd. No. 4

DA7

Hydrograph type	= SCS Runoff	Peak discharge	= 1.575 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 3,172 cuft
Drainage area	= 0.970 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 0 970



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

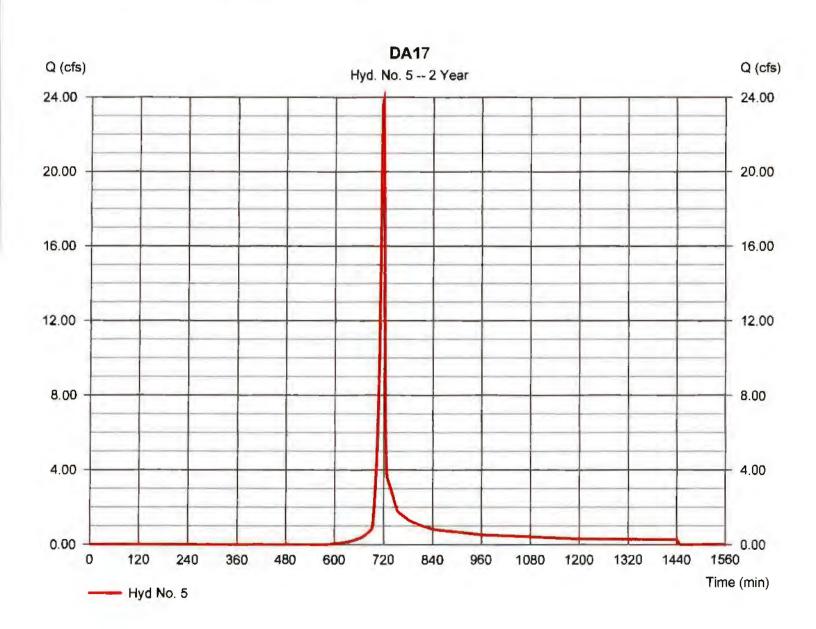
Friday, 02 / 16 / 2018

Hyd. No. 5

DA17

Hydrograph type = SCS Runoff Peak discharge = 23.84 cfsStorm frequency = 2 yrs Time to peak = 718 min Time interval = 2 min Hyd. volume = 47.801 cuftDrainage area = 10.220 ac Curve number = 79* Basin Slope = 0.0 %Hydraulic length = 0 ftTc method = User Time of conc. (Tc) = 5.00 min Total precip. = 3.25 inDistribution = Type II Storm duration = 24 hrs Shape factor = 484

^{*} Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 85)] / 10.220



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

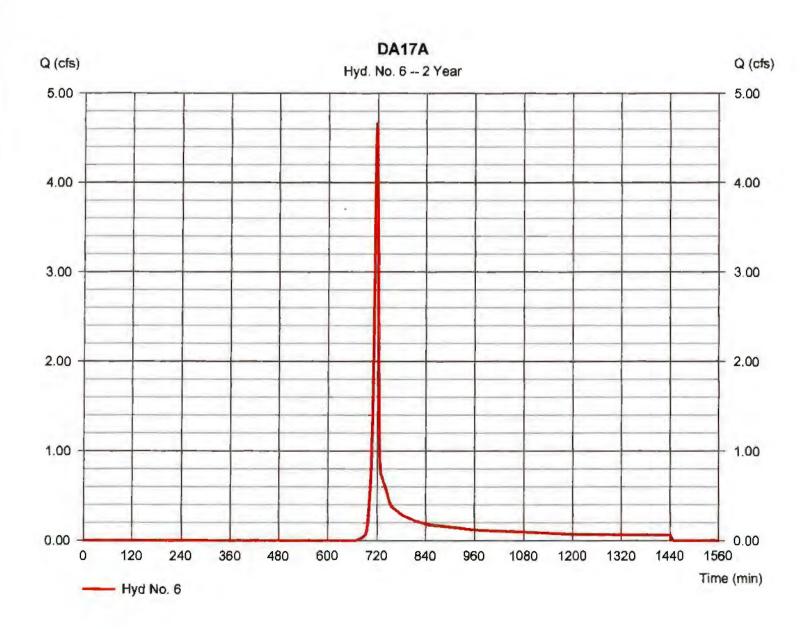
Friday, 02 / 16 / 2018

Hyd. No. 6

DA17A

Hydrograph type = SCS Runoff = 4.676 cfsPeak discharge Storm frequency = 2 yrsTime to peak = 718 min Time interval = 2 min Hyd. volume = 9,417 cuft Drainage area = 2.880 ac Curve number = 72* Basin Slope = 0.0 %Hydraulic length = 0 ftTc method = User Time of conc. (Tc) = 5.00 min Total precip. = 3.25 inDistribution = Type II Storm duration = 24 hrs Shape factor = 484

^{*} Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 85)] / 2.880



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Friday, 02 / 16 / 2018

Hyd. No. 8

Combine

Hydrograph type Storm frequency Time interval Inflow hyds. = Combine = 2 yrs

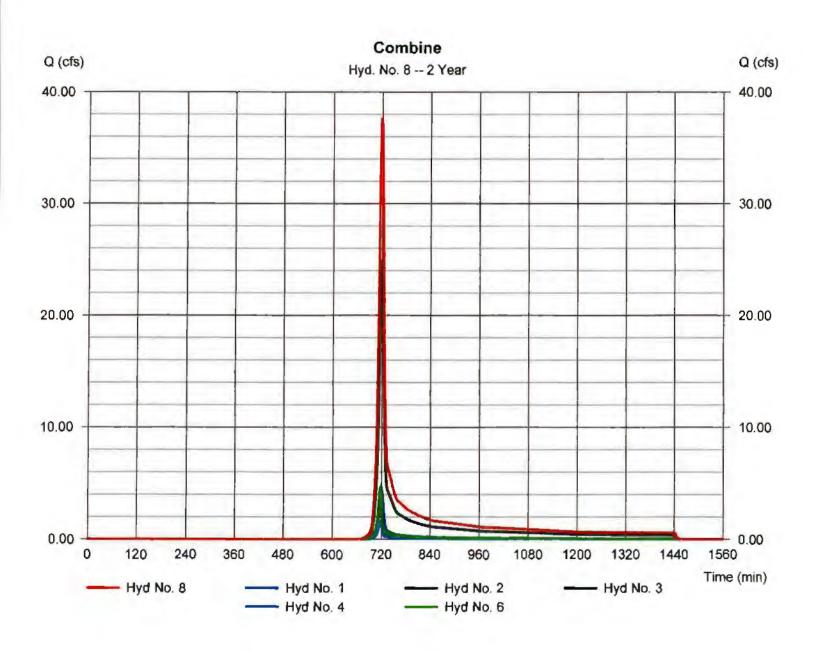
= 2 min = 1, 2, 3, 4, 6 Peak discharge Time to peak = 37.70 cfs = 718 min

Hyd. volume

= 87,268 cuft

Contrib. drain. area

= 25.380 ac



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2D18 by Autodesk, Inc. v12

Friday, 02 / 16 / 2018

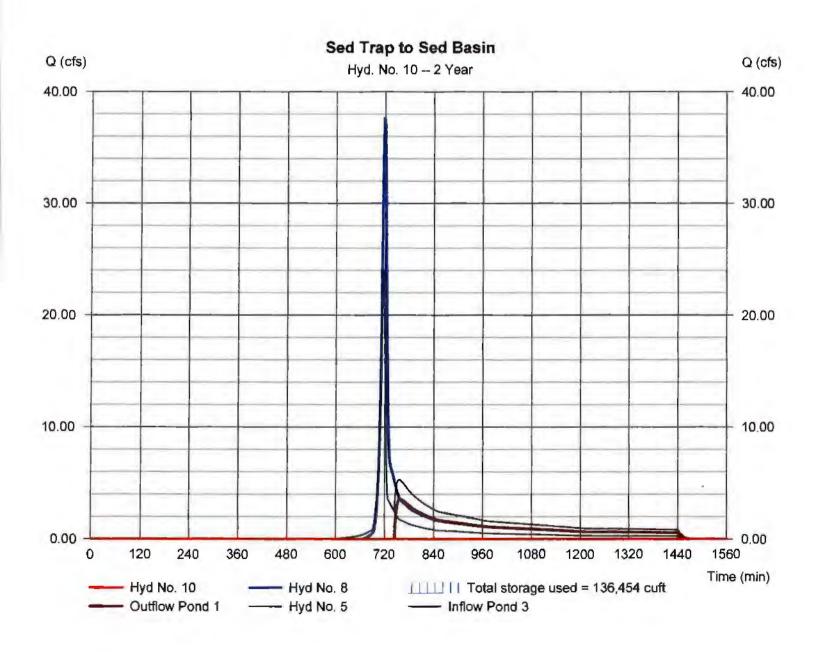
Hyd. No. 10

Sed Trap to Sed Basin

Hydrograph type= Reservoir (Interconnected)Peak discharge= 0.000 cfsStorm frequency= 2 yrsTime to peak= n/aTime interval= 2 minHyd. volume= 0 cuft

Upper Pond = Sediment Trap Lower Pond = Basin 2 Reduced Other Inflow hyd. Inflow hyd. = 8 - Combine = 5 - DA17 Max. Elevation $= 704.07 \, \text{ft}$ Max. Elevation $= 698.10 \, \text{ft}$ Max. Storage = 41,103 cuft Max. Storage = 95,351 cuft

Interconnected Pond Routing. Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Friday, 02 / 16 / 2018

Pond No. 1 - Sediment Trap

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 701.10 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	701.10	00	0	0
0.90	702.00	15,670	4,701	4,701
2.90	704.00	19,419	35,019	39,719
3.90	705.00	19,419	19,417	59,136
4.90	706.00	24,043	21,687	80,823

Culvert / Orifice Structures

Weir Structures

	[A]	[B]	[C]	[PrfRsr]		[A]	[B]	[C]	[D]
Rise (in)	Inactive	Inactive	Inactive	Inactive	Crest Len (ft)	= 47.54	290.00	Inactive	Inactive
Span (in)	= 0.00	0.00	0.00	0.00	Crest El. (ft)	= 704.00	705.00	0.00	0.00
No. Barrels	= 0	0	0	0	Weir Coeff.	= 3.33	3.33	3.33	3.33
Invert El. (ft)	= 0.00	0.00	0.00	0.00	Weir Type	= Rect	Rect		
Length (ft)	= 0.00	0.00	0.00	0.00	Multi-Stage	= No	No	No	No
Slope (%)	= 0.00	0.00	0.00	n/a					
N-Value	= .013	.013	.013	n/a					
Orifice Coeff.	= 0.60	0.60	0.60	0.60	Exfil.(in/hr)	= 0.000 (by)	Contour)		
Multi-Stage	= n/a	No	No	No	TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s)

	-												
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Cly B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D	Exfil cfs	User cfs	Total cfs
	Cuit	••	015	Cig	413	CIG	0.0	013	013	0.0	0.0	0.0	0.0
0.00	0	701.10		*		***	0.00	0.00	~~~				0.000
0.09	470	701.19					0.00	0.00	***				0.000
0.18	940	701.28					0.00	0.00					0.000
0.27	1,410	701.37					0.00	0.00					0.000
0.36	1.880	701.46					0.00	0.00	***				0.000
0.45	2,350	701.55		-			0.00	0.00	~~~				0.000
0.54	2,820	701.64					0.00	0.00					0.000
0.63	3,290	701.73			***		0.00	0.00					0.000
0.72	3,761	701.82					0.00	0.00					0.000
0.81	4,231	701.91				228	0.00	0.00	***				0.000
0.90	4,701	702.00				***	0.00	0.00	***				0.000
1.10	8,203	702.20					0.00	0.00	***				0.000
1.30	11,704	702,40	***		***		0.00	0.00					0.000
1.50	15,206	702.60					0.00	0.00	***				0.000
1.70	18,708	702.80					0.00	0.00					0.000
1.90	22,210	703.00					0.00	0.00					0.000
2.10	25,712	703.20	***				0.00	0.00					0.000
2.30	29,214	703.40					0.00	0.00					0.000
2.50	32,716	703.60					0.00	0.00	***				0.000
2.70	36,217	703.80	***		***		0.00	0.00					0.000
2.90	39,719	704.00	***				0.00	0.00					0.000
3.00	41,661	704.10		***	_	***	5.00	0.00		***			5.004
3.10	43,603	704.20				***	14.16	0.00					14.16
3.20	45,544	704.30			***		26.00	0.00					26.00
3.30	47,486	704.40					40.03	0.00		***			40.03
3.40	49,428	704.50		**-			55.95	0.00					55.95
3.50	51,369	704.60		_			73.56	0.00					73.56
3.60	53,311	704.70	P-0-0				92.68	0.00					92.68
3.70	55,252	7 04 .80		***			113.23	0.00					113.23
3.80	57,194	704.90					135.12	0.00					135.12
3.90	59,136	705.00					158.31	0.00					158.31
4.00	61,305	705.10	***				182.63	30.53					213.16
4.10	63,473	705.20					208.10	86.38					294.49
4.20	65,642	705.30					234.63	158.62					393.25
4.30	67,811	705.40			***		262.21	244.22					506.43
4.40	69,979	705.50			***		290.80	341.30					632.10
4.50	72,148	705.60					320.37	448.72					769.09
4.60	74,317	705.70	***				350.84	565.37					916.21
											Continue		.4

Continues on next page...

Sediment Trap

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	CIV A CFB	Civ B cts	Clv C cfa	Priffsr ¢f6	Wr A cfs	Wr B c/s	Wr C ¢fs	₩£ D cfa	Ea[il cfs	Uger cfs	Total cls
4.70	76,496	705.80	•••	***	***		382.24	690.75		***		***	1072. 9 9
4.80	78,654	70 5,90	200	***	HCH000		414.53	824,23		***	wanag	40KW	1238,76
4.90	60,823	706.00	****		4	*****	447,72	985.52					1413.24

...End

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Friday, 02 / 16 / 2019

Pond No. 3 - Basin 2 Reduced

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 696.79 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	696.79	70,668	0	0
1,21	698.00	74,014	87,516	87,516
3.21	700.00	77,019	151,008	239,524
5.21	702.00	80,412	157,403	395,927
7.21	704.00	83,933	164,316	560,243
9.21	706.00	83,933	167,949	728,092

Culvert / Orifice Structures

Weir Structures

	[A]	[B]	[C]	[PrfRsr]		[A]	[B]	[C]	[D]
Rise (in)	= 0.00	0.00	0.00	0.00	Crest Len (ft)	= 90.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00	Crest El. (ft)	= 704.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0	Weir Coeff.	= 2.60	3.33	3.33	3.33
Invert Ei. (ft)	= 0.00	0.00	0.00	0.00	Weir Type	= Broad			
Length (ft)	= 0.00	0.00	0.00	0.00	Multi-Stage	= No	No	No	No
Slope (%)	= 0.00	0.00	0.00	n/a					
N-Value	= .013	.013	.013	n/a					
Orifice Coeff.	= 0.60	0.60	0.60	0.60	Exfil.(in/hr)	= 0.000 (by	Contour)		
Multi-Stage	= n/a	No	No	No	TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s)

Stage / 8	Storage	/ Discharge	Table
-----------	---------	-------------	-------

Stage ft	Storage cuft	Elevation ft	CIv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	696.79					0.00			***			0.000
0.12	8,752	696.91					0.00		***				0.000
0.24	17,503	697.03					0.00				-		0.000
0.36	26,255	697.15	***		***		0.00						0.000
0.48	35,006	697.27			•		0.00						0.000
0.61	43,758	697.39					0.00		***				0.000
0.73	52,510	697.52					0.00		***				0.000
0.85	61,261	697.64					0.00						0.000
0.97	70,013	697.76					0.00						0.000
1.09	78,764	697.88					0.00			***			0.000
1.21	87,516	698.00	_			***	0.00		***				0.000
1.41	102,617	698.20					0.00						0.000
1.61	117,718	698.40				_	0.00						0.000
1.81	132,818	698.60					0.00						0.000
2.01	147,919	698.80	_	***			0.00						0.000
2.21	163,020	699.00					0.00	07-1					0.000
2.41	178,121	699.20					0.00	***					0.000
2.61	193,222	699.40					0.00			***			0.000
2.81	208,322	699.60					0.00						0.000
3.01	223,423	699.80					0.00						0.000
3.21	238,524	700.00					0.00						0.000
3.41	254.264	700.20					0.00			***			0.000
3.61	270,005	700.40		***		***	0.00		P				0.000
3.81	285,745	700.60			****		0.00						0.000
4.01	301.485	700.80	41-4		-		0.00						0.000
4.21	317,226	701.00		***			0.00						0.000
4.41	332,966	701.20				***	0.00		R-d-to				0.000
4.61	348,706	701.40					0.00	***					0.000
4.81	364,447	701.60	-				0.00			***			0.000
5.01	380,187	701.80		700			0.00						0.000
5.21	395.927	702.00				-	0.00		400	_			0.000
5.41	412,359	702.20					0.00						0.000
5.61	428,790	702.40					0.00			***			0.000
5.81	445,222	702.60		***			0.00						0.000
6.01	461,653	702.80					0.00		***				0.000
6.21	478,085	703.00			***		0.00	***					0.000
6.41	494,517	703.20					0.00						0.000
<u> </u>	70-1,011	, 00.20	-		•		3.00					30 OF CAY	

Continues on next page...

Basin 2 Reduced Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Civ B cfs	Clv C	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
6.61	510,948	703.40	***				0.00						0.000
6.81	527,380	703.60				***	0.00						0.000
7.01	543,811	703.80					0.00						0.000
7.21	560,243	704.00					0.00						0.000
7.41	577,028	704.20			***		20.93				***		20.93
7.61	593,813	704.40		***			59.20				P		59,20
7.81	610,598	704.60				***	108.75						108.75
8.01	627,383	704.80				•••	167.43						167.43
8.21	644,168	705.00					234.04						234.04
8.41	660,953	705.20	***	***			307.63				***		307.63
8.61	677,738	705.40	***		•		387.66				***		387,66
8.81	694,523	705.60					473.63						473,63
9.01	711,308	705.80					565.15						565.15
9.21	728,092	706.00					661.85						661.8 5

...End

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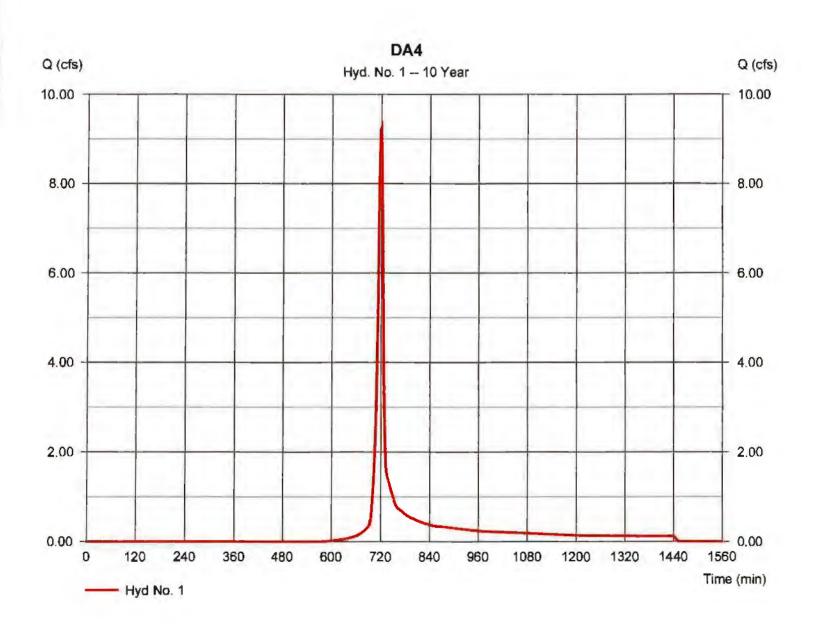
Friday, 02 / 16 / 2018

Hyd. No. 1

DA4

= SCS Runoff Hydrograph type Peak discharge = 9.258 cfsStorm frequency Time to peak = 720 min = 10 yrsTime interval = 2 min Hyd. volume = 21.187 cuft Drainage area = 2.930 acCurve number = 72* Basin Slope = 0.0 %Hydraulic length = 0 ft= User Tc method Time of conc. (Tc) = 7.94 min Total precip. = 4.73 inDistribution = Type II Storm duration = 484 = 24 hrs Shape factor

^{*} Composite (Area/CN) = [(2.930 x 72)] / 2.930



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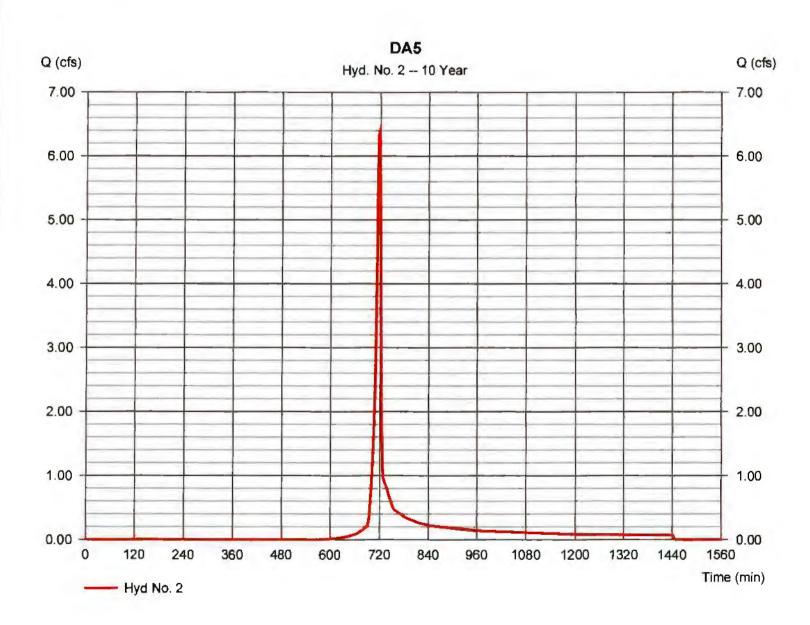
Friday, 02 / 16 / 2018

Hyd. No. 2

DA₅

Hydrograph type = SCS Runoff Peak discharge = 6.390 cfsStorm frequency = 10 yrsTime to peak = 718 min Time interval = 2 min Hyd. volume = 12.813 cuft Drainage area = 1.890 ac = 72* Curve number Basin Slope = 0.0 %Hydraulic length = 0 ft Tc method = User Time of conc. (Tc) $= 5.00 \, \text{min}$ Total precip. = 4.73 inDistribution = Type II Storm duration = 24 hrs Shape factor = 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 1,890



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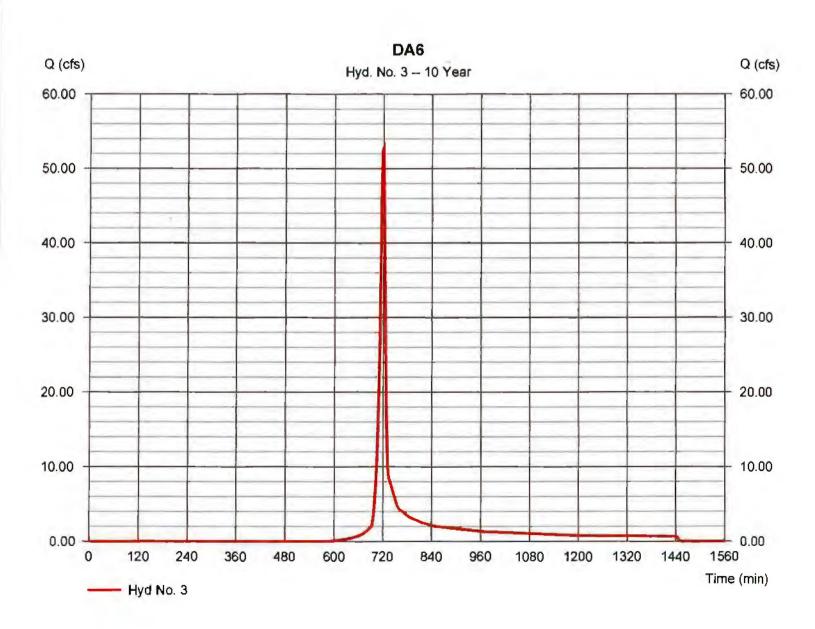
Friday, 02 / 16 / 2018

Hyd. No. 3

DA₆

Hydrograph type = SCS Runoff Peak discharge = 52.80 cfsStorm frequency = 10 vrsTime to peak = 720 min Time interval = 2 min Hyd. volume = 120,834 cuft Drainage area = 16.710 ac Curve number = 72* Basin Slope = 0.0 %Hydraulic length = 0 ftTc method = User Time of conc. (Tc) $= 6.71 \, \text{min}$ = 4.73 inTotal precip. Distribution = Type II Storm duration = 24 hrs = 484 Shape factor

^{*} Composite (Area/CN) = [(2.930 x 72)] / 16.710



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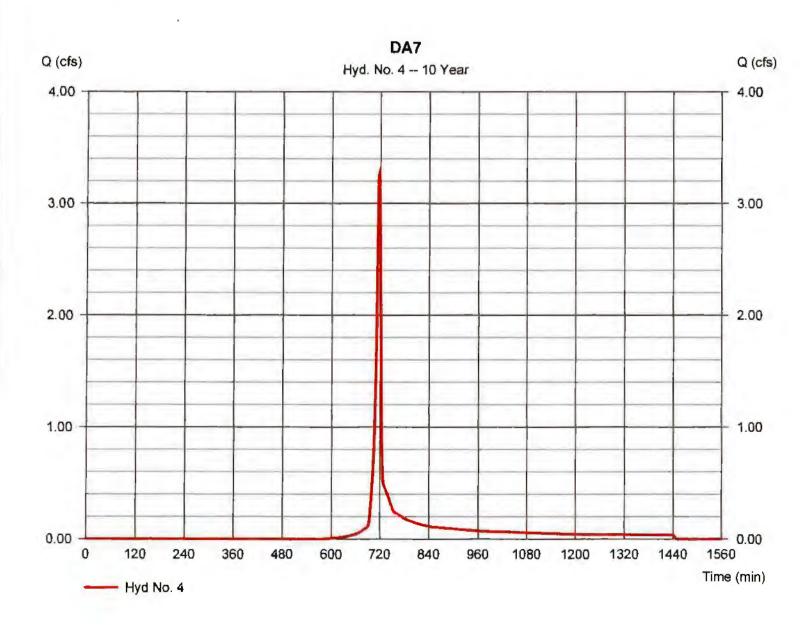
Friday, 02 / 16 / 2018

Hyd. No. 4

DA7

Hydrograph type	= SCS Runoff	Peak discharge	= 3.280 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 6,576 cuft
Drainage area	= 0.970 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.73 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 0.970



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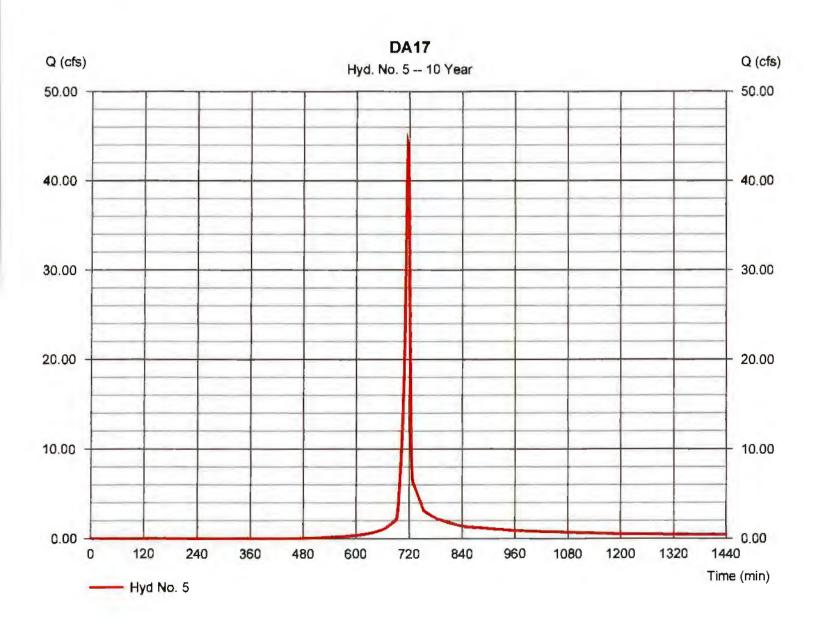
Friday, 02 / 16 / 2018

Hyd. No. 5

DA17

= 44.14 cfsHydrograph type = SCS Runoff Peak discharge Storm frequency = 10 yrsTime to peak = 716 min Time interval = 2 min Hyd. volume = 89,409 cuft = 10.220 ac Curve number = 79* Drainage area Hydraulic length Basin Slope = 0.0 %= 0 ftTc method $= 5.00 \, \text{min}$ = User Time of conc. (Tc) Total precip. = 4.73 inDistribution = Type II Storm duration = 24 hrs Shape factor = 484

^{*}Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 85)] / 10.220



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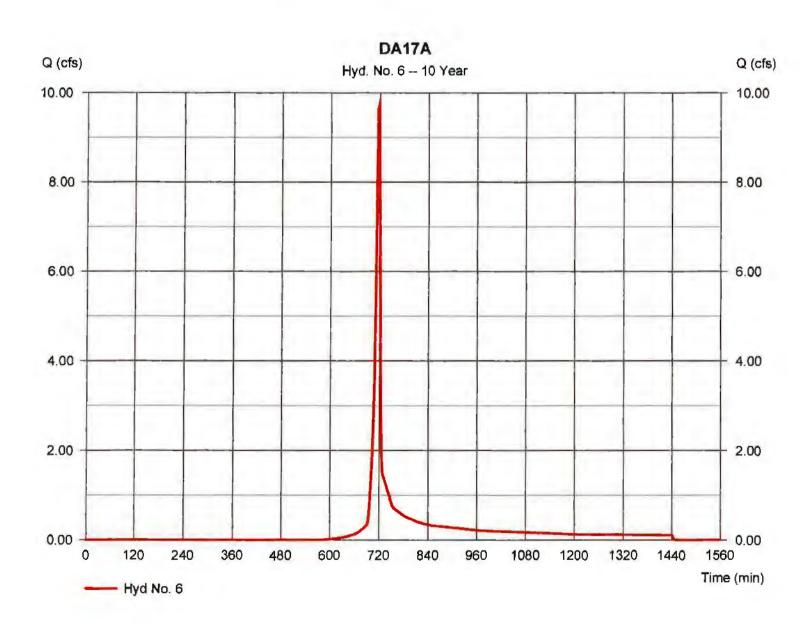
Friday, 02 / 16 / 2018

Hyd. No. 6

DA17A

Hydrograph type = SCS Runoff Peak discharge = 9.738 cfsStorm frequency Time to peak = 10 yrs $= 718 \, \text{min}$ Time interval = 2 min Hyd. volume = 19.524 cuft Drainage area = 2.880 ac Curve number = 72* Basin Slope = 0.0 %Hydraulic length = 0 ftTime of conc. (Tc) Tc method = User = 5.00 min Total precip. = Type II = 4.73 inDistribution Storm duration = 24 hrs Shape factor = 484

^{*} Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 85)] / 2.880



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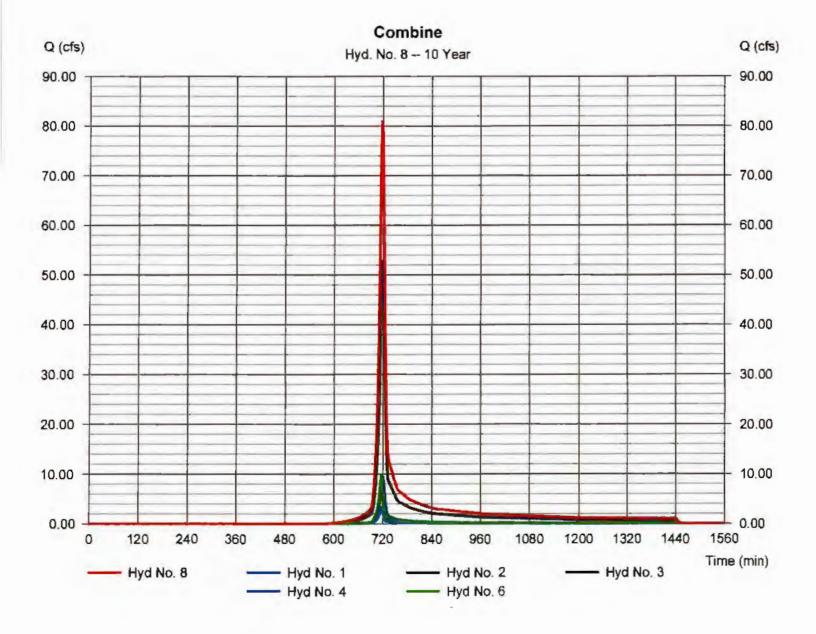
Friday, 02 / 16 / 2018

Hyd. No. 8

Combine

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 2 min
Inflow hyds. = 1, 2, 3, 4, 6

Peak discharge = 81.10 cfs
Time to peak = 718 min
Hyd. volume = 180,934 cuft
Contrib. drain. area = 25.380 ac



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Friday, 02 / 16 / 2018

Hyd. No. 10

Sed Trap to Sed Basin

Hydrograph type Storm frequency Time interval = Reservoir (Interconnected)

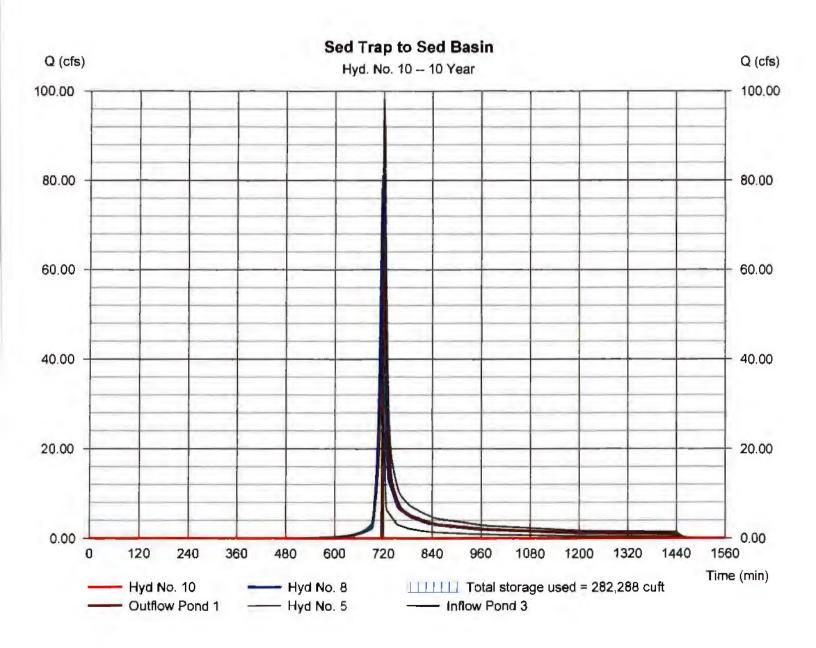
= 10 yrs = 2 min

Upper Pond = Sediment Trap Inflow hyd. = 8 - Combine Max. Elevation = 704.59 ft Max. Storage = 50,851 cuft Peak discharge = 0.000 cfs Time to peak = n/a

Hyd. volume = 0 cuft

Lower Pond = Basin 2 Reduced
Other Inflow hyd. = 5 - DA17
Max. Elevation = 699.91 ft
Max. Storage = 231,437 cuft

Interconnected Pond Routing. Storage Indication method used.



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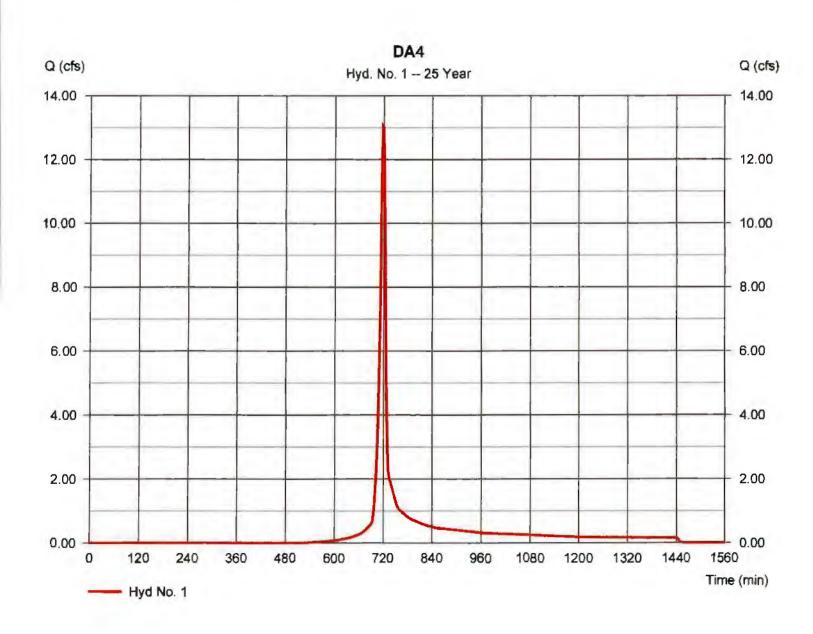
Friday, 02 / 16 / 2018

Hyd. No. 1

DA4

= 13.04 cfsHydrograph type = SCS Runoff Peak discharge Storm frequency = 25 vrs Time to peak $= 718 \, \text{min}$ Time interval = 2 min Hvd. volume = 29,847 cuft = 2.930 ac = 72* Drainage area Curve number Basin Slope = 0.0 %Hydraulic length = 0 ftTc method Time of conc. (Tc) $= 7.94 \, \text{min}$ = User Total precip. = 5.77 inDistribution = Type II Storm duration = 24 hrs Shape factor = 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 2.930



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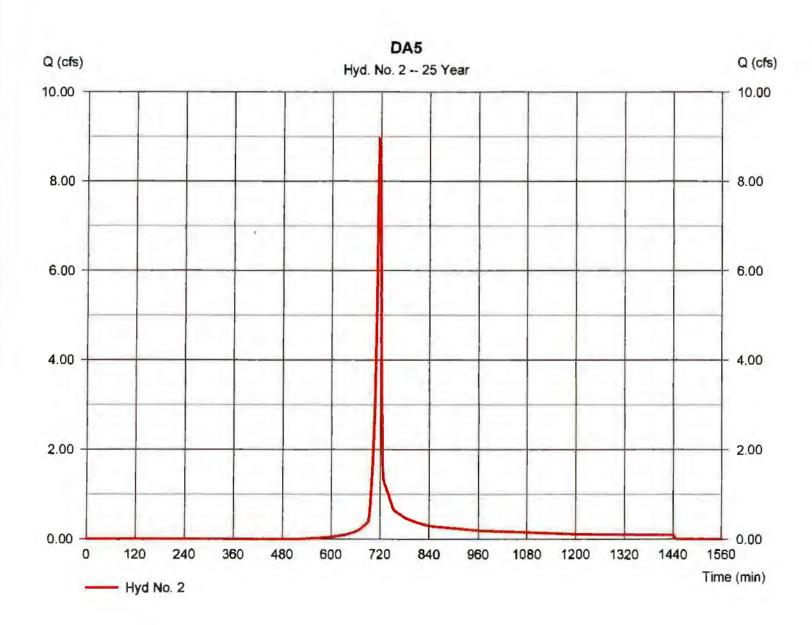
Friday, 02 / 16 / 2018

Hyd. No. 2

DA₅

Hydrograph type = SCS Runoff Peak discharge = 8.939 cfsStorm frequency = 25 yrs Time to peak = 716 min Time interval = 2 min Hyd. volume = 18.049 cuft Drainage area = 1.890 ac Curve number = 72* Basin Slope = 0.0 %Hydraulic length = 0 ftTc method = User Time of conc. (Tc) = 5.00 min Total precip. = 5.77 inDistribution = Type II Storm duration = 24 hrs = 484 Shape factor

^{*} Composite (Area/CN) = [(2.930 x 72)] / 1.890



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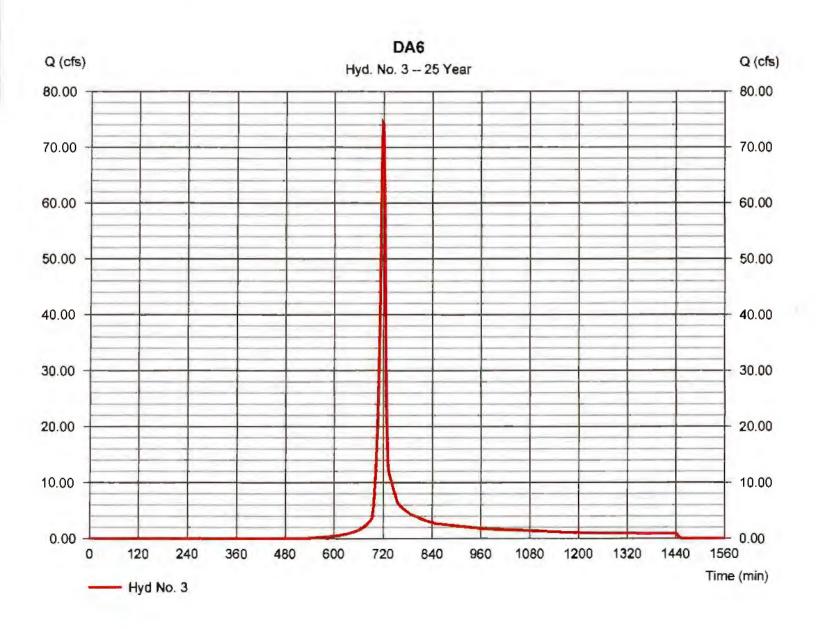
Friday, 02 / 16 / 2018

Hyd. No. 3

DA₆

= SCS Runoff Hydrograph type = 74.39 cfsPeak discharge Storm frequency Time to peak = 718 min = 25 yrsTime interval Hyd. volume = 2 min = 170,217 cuft Curve number Drainage area = 16,710 ac = 72* Basin Slope Hydraulic length = 0.0 %= 0 ftTc method = User Time of conc. (Tc) $= 6.71 \, \text{min}$ Total precip. Distribution = Type II = 5.77 inShape factor Storm duration = 24 hrs = 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 16.710



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

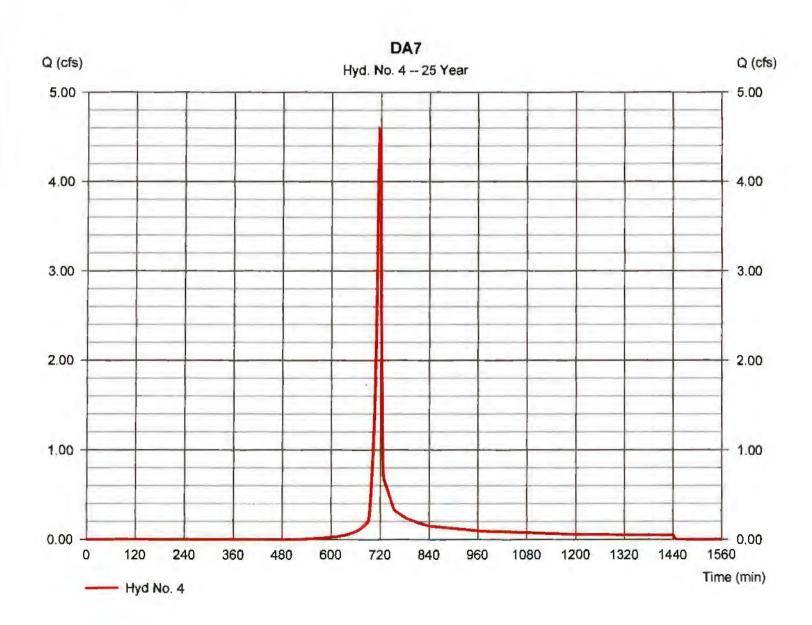
Friday, 02 / 16 / 2018

Hyd. No. 4

DA7

Hydrograph type	= SCS Runoff	Peak discharge	= 4.588 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd, volume	= 9,263 cuft
Drainage area	= 0.970 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 0.970



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v12

Friday, 02 / 16 / 2018

= 484

Hyd. No. 5

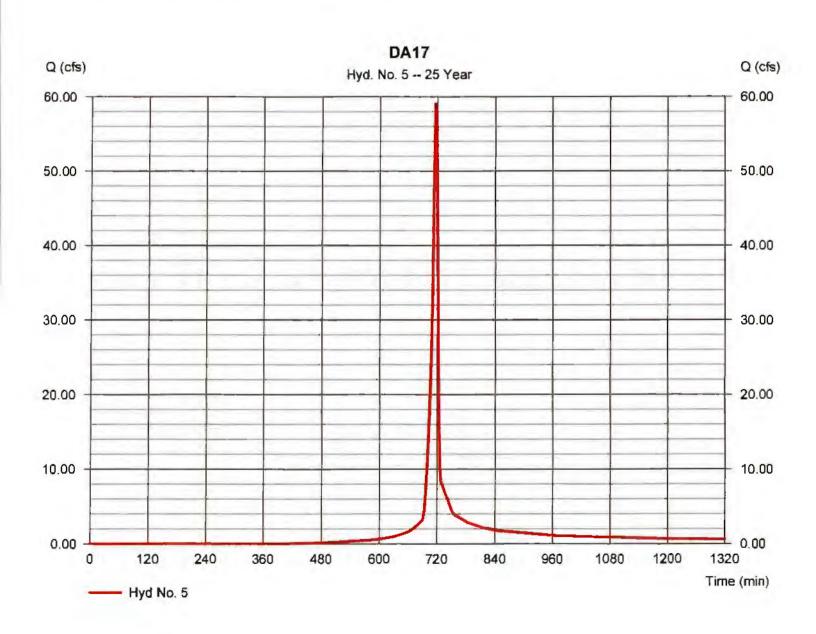
Storm duration

DA17

Hydrograph type = SCS Runoff Peak discharge = 59.20 cfsStorm frequency = 25 yrs Time to peak $= 716 \, \text{min}$ Time interval Hyd. volume = 120.859 cuft = 2 min = 79* Drainage area = 10.220 ac Curve number Basin Slope = 0.0 %Hydraulic length = 0 ft Tc method = User Time of conc. (Tc) $= 5.00 \, \text{min}$ Distribution = Type II Total precip. = 5.77 in

Shape factor

= 24 hrs



^{*} Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 85)] / 10.220

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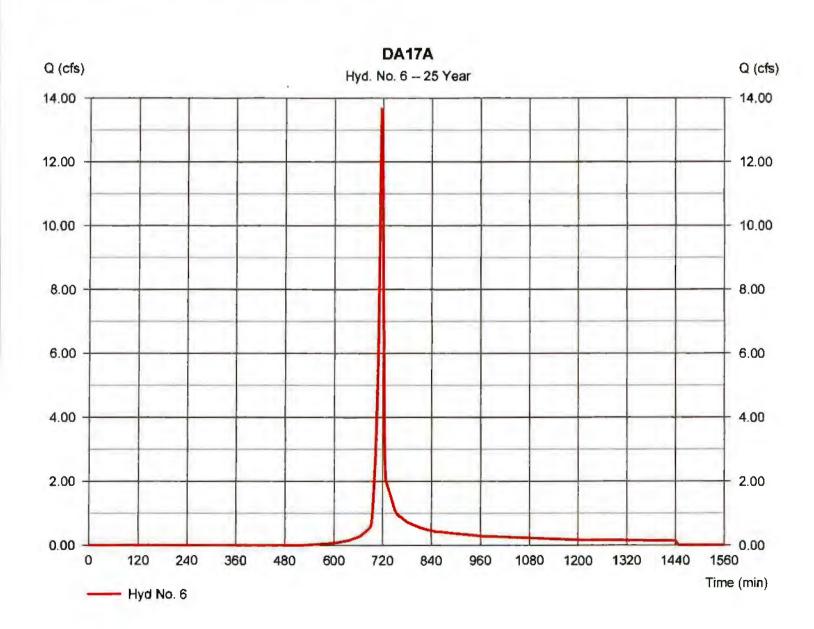
Friday, 02 / 16 / 2018

Hyd. No. 6

DA17A

Hydrograph type = SCS Runoff Peak discharge = 13.62 cfsStorm frequency Time to peak = 716 min = 25 yrs Time interval = 2 min Hyd. volume = 27.504 cuft = 72* Drainage area = 2.880 ac Curve number Basin Slope = 0.0 %Hydraulic length = 0 ft = User Tc method Time of conc. (Tc) $= 5.00 \, \text{min}$ Distribution = Type II Total precip. = 5.77 inStorm duration = 24 hrs = 484 Shape factor

^{*} Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 65)] / 2.880



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Friday, 02 / 16 / 2018

Hyd. No. 8

Inflow hyds.

Combine

Hydrograph type Storm frequency Time interval = Combine = 25 yrs

> = 2 min = 1, 2, 3, 4, 6

Peak discharge

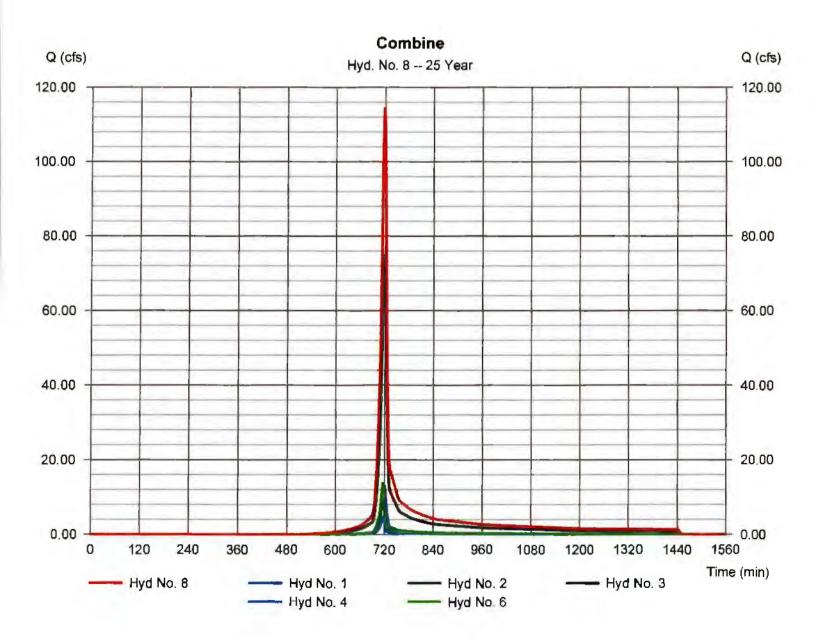
= 114.53 cfs = 718 min

Time to peak
Hyd. volume

= 254,880 cuft

Contrib. drain. area

= 25.380 ac



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Friday, 02 / 16 / 2018

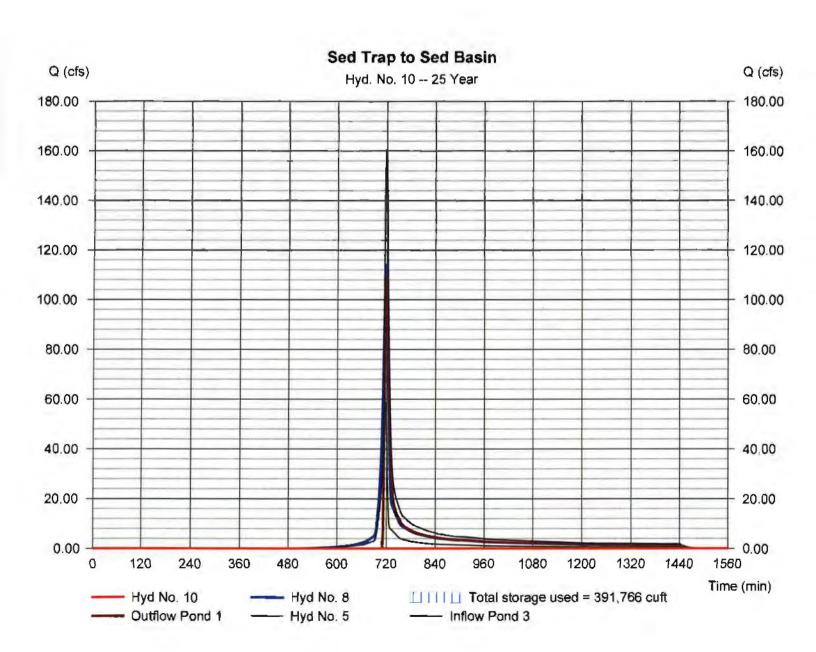
Hyd. No. 10

Sed Trap to Sed Basin

Hydrograph type= Reservoir (Interconnected)Peak discharge= 0.000 cfsStorm frequency= 25 yrsTime to peak= n/aTime interval= 2 minHyd. volume= 0 cuft

Upper Pond = Basin 2 Reduced = Sediment Trap Lower Pond Inflow hyd. Other Inflow hyd. = 8 - Combine = 5 - DA17Max. Elevation $= 704.78 \, \text{ft}$ Max. Elevation $= 701.25 \, ft$ Max. Storage = 54.914 cuft Max. Storage = 336,852 cuft

Interconnected Pond Routing, Storage Indication method used.



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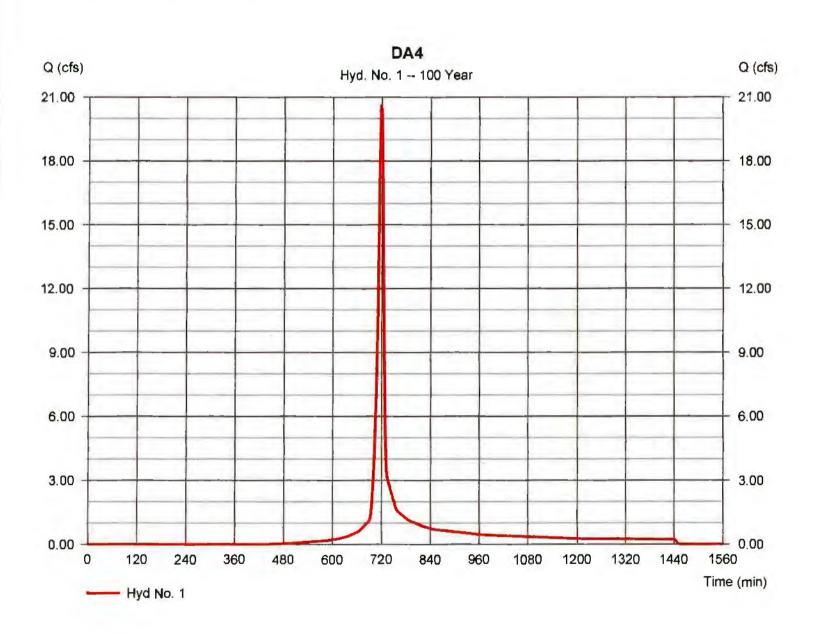
Friday, 02 / 16 / 2018

Hyd. No. 1

DA4

Hydrograph type = SCS Runoff Peak discharge = 20.66 cfsStorm frequency Time to peak $= 718 \, \text{min}$ = 100 yrsTime interval = 2 min Hyd. volume = 47.418 cuft Drainage area Curve number = 72* = 2.930 ac Basin Slope = 0.0 %Hydraulic length = 0 ftTc method = User Time of conc. (Tc) $= 7.94 \, \text{min}$ Total precip. Distribution = Type II = 7.73 inStorm duration Shape factor = 484 = 24 hrs

^{*} Composite (Area/CN) = [(2.930 x 72)] / 2.930



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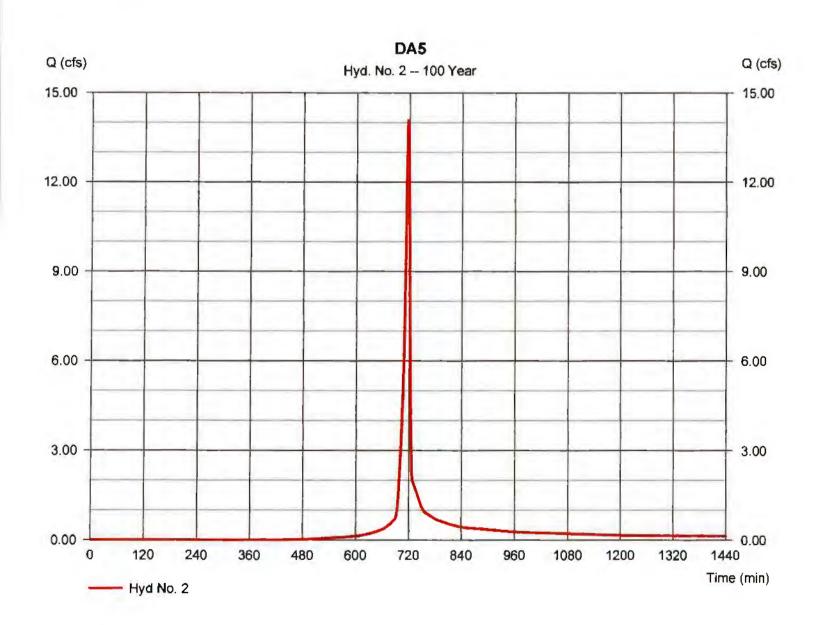
Friday, 02 / 16 / 2018

Hyd. No. 2

DA₅

Hydrograph type = SCS Runoff Peak discharge = 14.10 cfs Storm frequency = 100 yrsTime to peak $= 716 \, \text{min}$ Time interval = 2 min Hyd. volume = 28.676 cuft Drainage area = 1.890 ac Curve number = 72* Basin Slope = 0.0 %Hydraulic length = 0 ftTc method = User Time of conc. (Tc) = 5.00 min Total precip. = 7.73 inDistribution = Type II Storm duration = 24 hrs Shape factor = 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 1.890



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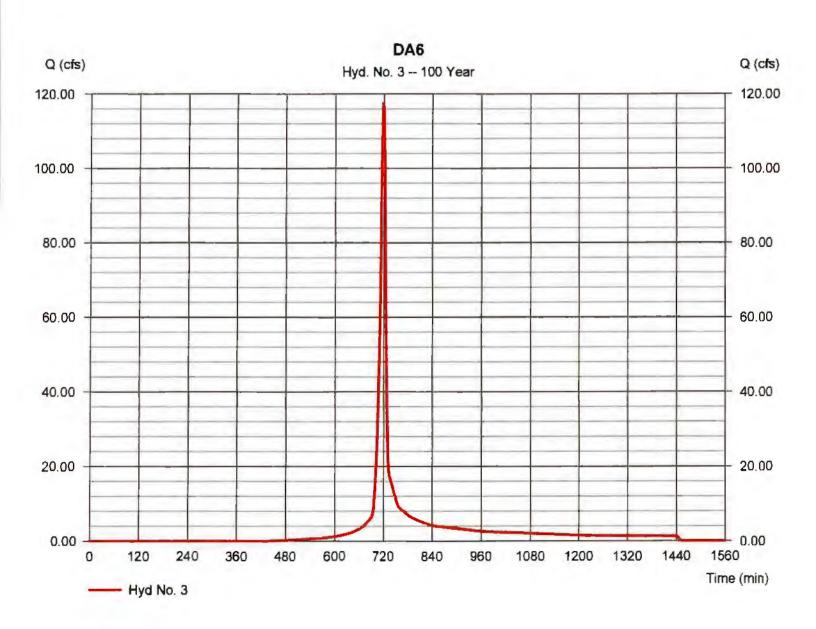
Friday, 02 / 16 / 2018

Hyd. No. 3

DA₆

Hydrograph type = SCS Runoff Peak discharge = 117.80 cfsStorm frequency $= 100 \, \text{yrs}$ Time to peak = 718 min Time interval = 2 min Hyd. volume = 270,431 cuft = 72*Drainage area = 16.710 ac Curve number Basin Slope Hydraulic length = 0 ft= 0.0 %Tc method = User Time of conc. (Tc) $= 6.71 \, \text{min}$ = Type II Total precip. = 7.73 inDistribution Storm duration Shape factor = 484 = 24 hrs

^{*} Composite (Area/CN) = [(2.930 x 72)] / 16.710



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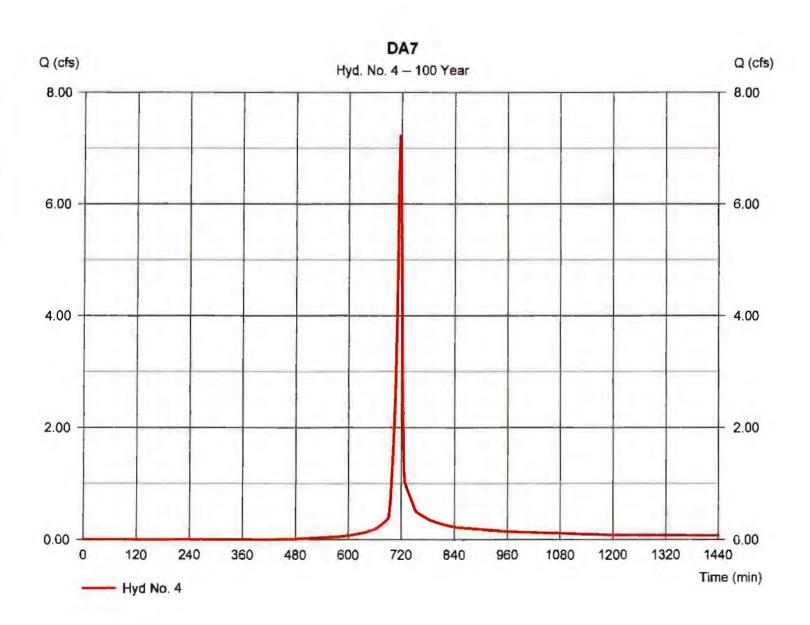
Friday, 02 / 16 / 2018

Hyd. No. 4

DA7

Hydrograph type	= SCS Runoff	Peak discharge	= 7.237 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 14,717 cuft
Drainage area	= 0.970 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.73 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

^{*} Composite (Area/CN) = [(2.930 x 72)] / 0.970



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

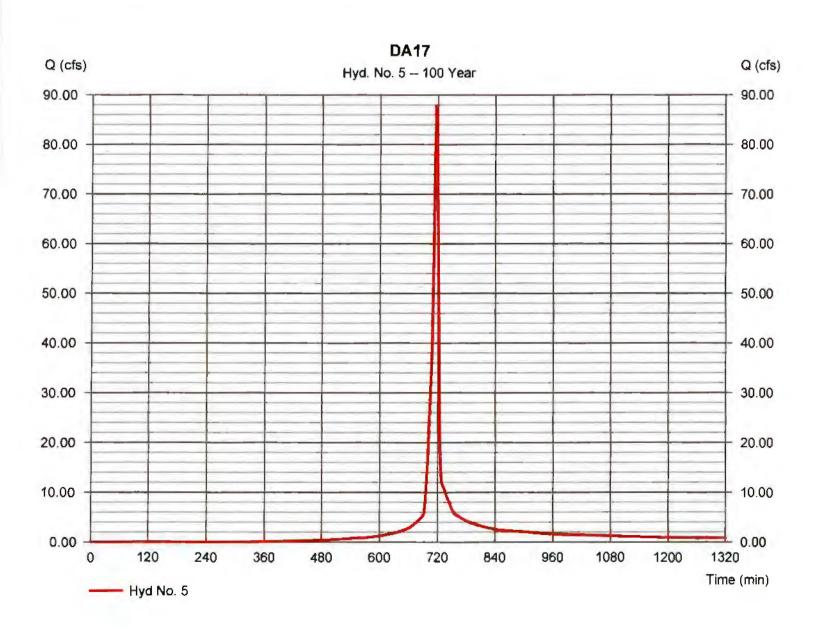
Friday, 02 / 16 / 2018

Hyd. No. 5

DA17

Hydrograph type = SCS Runoff Peak discharge = 88.03 cfsStorm frequency = 100 yrsTime to peak = 716 min Time interval Hyd. volume = 2 min = 182,839 cuft Drainage area = 10.220 ac Curve number = 79* Basin Slope = 0.0 %Hydraulic length = 0 ft Time of conc. (Tc) Tc method = User $= 5.00 \, \text{min}$ Total precip. Distribution = 7.73 in= Type II Storm duration = 24 hrs Shape factor = 484

^{*}Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 85)] / 10.220



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

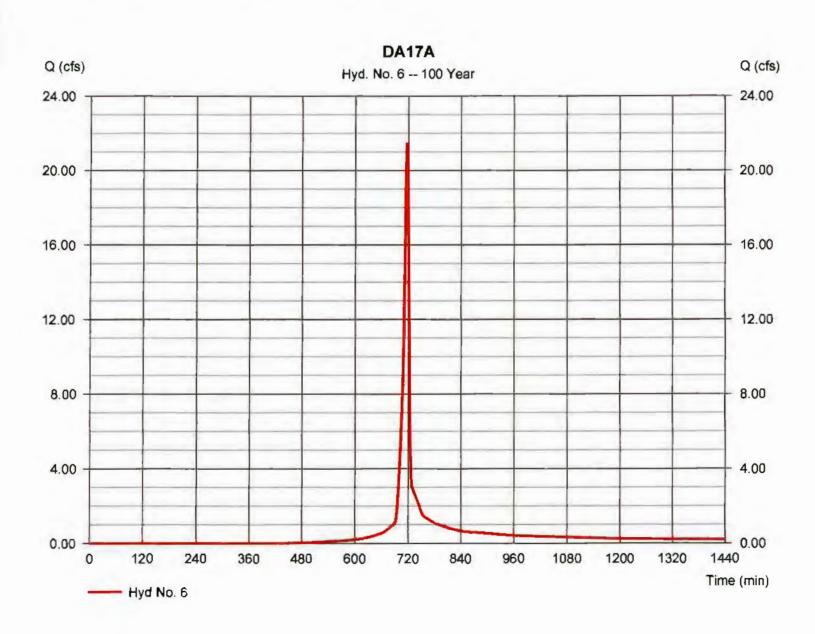
Friday, 02 / 16 / 2018

Hyd. No. 6

DA17A

Hydrograph type = SCS Runoff Peak discharge = 21.49 cfsStorm frequency = 100 yrs Time to peak = 716 min Time interval = 2 min Hvd. volume = 43,696 cuft = 72* Drainage area = 2.880 ac Curve number Basin Slope = 0.0 % Hydraulic length = 0 ftTc method = User Time of conc. (Tc) = 5.00 min Distribution = Type II Total precip. = 7.73 inShape factor = 484 Storm duration = 24 hrs

^{*} Composite (Area/CN) = [(3.730 x 98) + (5.250 x 69) + (1.240 x 85)] / 2.880



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Friday, 02 / 16 / 2018

Hyd. No. 8

Inflow hyds.

Combine

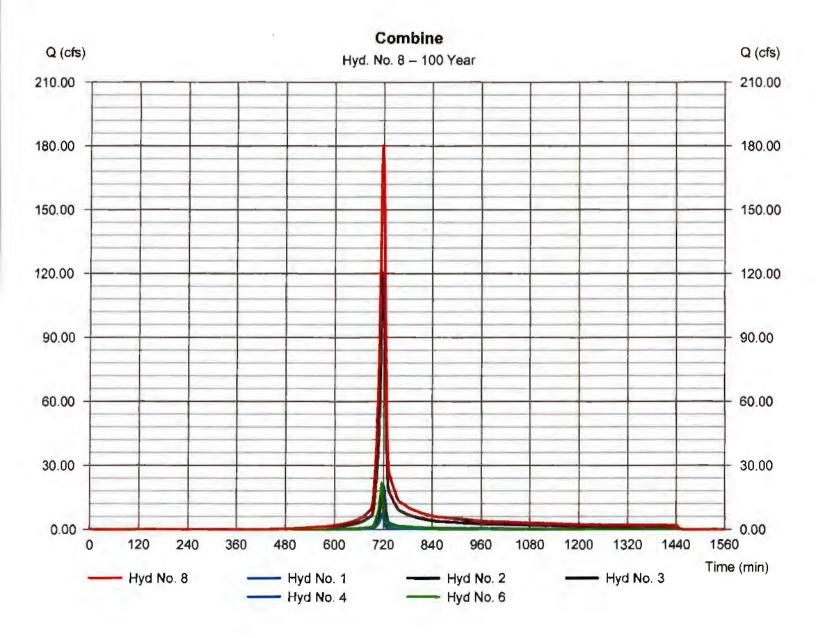
Hydrograph type Storm frequency Time interval = Combine = 100 yrs

= 2 min = 1, 2, 3, 4, 6 Peak discharge Time to peak = 180.84 cfs = 718 min

Hyd. volume

= 404.938 cuft

Contrib. drain. area = 25.380 ac



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Friday, 02 / 16 / 2018

Hyd. No. 10

Sed Trap to Sed Basin

Hydrograph type Storm frequency Time interval

= Reservoir (Interconnected)

= 100 yrs= 2 min

= Sediment Trap = 8 - Combine

Inflow hyd. Max. Elevation Max. Storage

Upper Pond

 $= 705.27 \, \text{ft}$

= 62,311 cuft

Peak discharge $= 0.000 \, \text{cfs}$

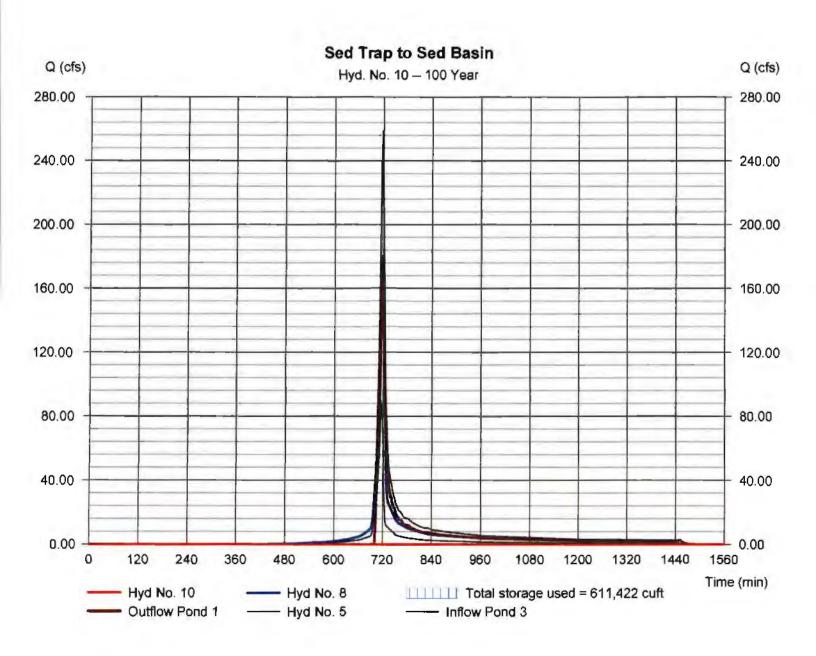
= n/a

Time to peak Hyd. volume = 0 cuft

Lower Pond Other Inflow hyd. = Basin 2 Reduced = 5 - DA17

Max. Elevation $= 703.86 \, \mathrm{ft}$ Max. Storage = 549,111 cuft

Interconnected Pond Routing. Storage Indication method used.



APPENDIX C

STORMWATER CONVEYANCE CALCULATIONS





SLATE BELT HEAT RECOVERY CTR, LLC SLATE BELT HEAT RECOVERY CENTER SWALE DESIGN CALCULATIONS

 PROJ NO.
 151014,003

 BY
 JCHJ
 DATE
 2/6/18

 CHK
 DFA
 DATE
 2/6/18

 Page
 1
 of
 1

TASK:

To design a stormwater channel to convey runoff from the proposed Slate Belt Recovery Facility to Sediment Basin No. 2.

REFERENCES:

- 1. "Erosion and Sediment Pollution Control Program Manual", Pennsylvania Department of Environmental Protection, March 2012.
- 2. Hydraflow Express Extension, Version 12, by Autodesk, Inc.
- 3. Point Precipitation Frequencies Estimates from NOAA Atlas 14.

ASSUMPTIONS:

- 1. The channel will be designed to convey the 25-year, 24-hour storm event runoff from the proposed Slate Belt Recover Facility with a minimum of six inches of freeboard.
- 2. For Pen Argyl Township, the 25-year, 24-hour storm events is 5.79 inches, based on Reference 3.
- 3. Drainage areas which contribute flow to the channel are assumed to be impervious. A rational coefficient value of 0.95 was used for the rational equation, reference 1.

CALCULATIONS:

1. Using the Rational Method (Reference 1), the stormwater runoff flow was calculated to be 7.76 cfs.

Rational Method

Q = CIA

Where:

Q = runoff (cfs) C = runoff coefficient I = rainfall intensity (in.) A = area (acres)

 $Q = 0.95 \times 5.79 \times 1.41 = 7.76 \text{ cfs}$

Reference 2 was then used calculate capacity of the proposed channel. See attached output.

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Friday, Feb 16 2018

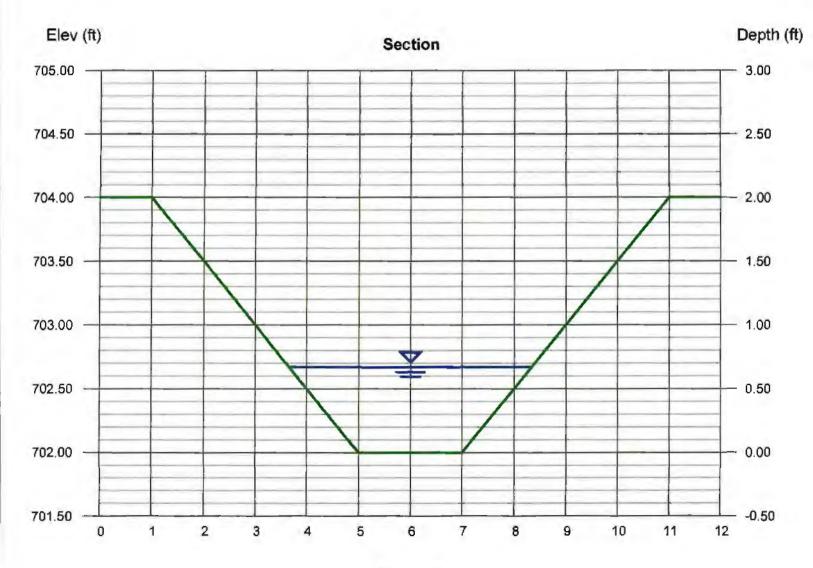
Basin No. 2 Swale

Trapezoidal	
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 702.00
Slope (%)	= 4.00
N-Value	= 0.050

Calculations

Compute by: Known Q Known Q (cfs) = 7.76

Highlighted		
Depth (ft)	=	0.67
Q (cfs)	=	7.760
Area (sqft)	=	2.24
Velocity (ft/s)	=	3.47
Wetted Perim (ft)	=	5.00
Crit Depth, Yc (ft)	=	0.63
Top Width (ft)	=	4.68
EGL (ft)	=	0.86



Reach (ft)

APPENDIX D PREVIOUS APPROVALS





LEHIGH VALLEY PLANNING COMMISSION

961 MARCON BOULEVARD, SUITE 310, ALLENTOWN, PENNSYLVANIA 18109 610-264-4544 FAX 610-264-2616 TOLL FREE 888-627-8808

TERRY J. LEE Chair

STEVEN L. GLICKMAN Vice Chair

ARTHUR F. BARWICK Treasurer

MICHAEL N. KAISER Executive Director March 14, 2008

Ms. Joyce A. Lambert, Secretary Plainfield Township Municipal Building 6292 Sullivan Trail Nazareth, PA 18064

Re: Grand Central Landfill Southern Expansion Revised

Plans Revised December 18, 2007
Plainfield Township
Northampton County

Dear Ms. Lambert:

The storm drainage concept presented in the plans revised December 18, 2007; stormwater management report revised July 2007; response letter with attachments dated October 4, 2007; response letter with attachments dated February 21, 2008, and supplemental material in a PDF file e-mailed on March 14, 2008, was reviewed for consistency with the Martins/Jacoby Creeks Watershed Act 167 Stormwater Management Ordinance, February 1996; and the Bushkill Creek Watershed Act 167 Stormwater Management Ordinance, May 1992. The supplemental material showed the revision of the emergency spillway crest for Basin 7 from 706.5' to 707.0'. A checklist of the Act 167 review items is attached for your information. As indicated on the checklist, each item of the Drainage Plan has been reviewed for consistency with the Act 167 Ordinance. A brief narrative of the review findings is as follows:

The portion of the site that flows east toward Pen Argyl Road and contains the proposed truck wash is located within Drainage District 46 of the Martins/Jacoby Creeks Watershed as delineated in the Act 167 Plan. The portion of the site that flows west toward the Bushkill Creek is located in Drainage Districts 66 and 67 of the Bushkill Creek Watershed as delineated in the Act 167 Plan. In all subareas, the release rate requirement is an overall 30% release rate for the 2-year storm, with no individual point of discharge exceeding a 100% release rate, and a 100% release rate for the 10-, 25-, and 100-year return period storm events. Based on independent review calculations, the Drainage Plan meets the required release rates for all of the required storms in Drainage District 46 of the Martins Creek. In Drainage Districts 66 and 67 of the Bushkill Creek, the Drainage Plan meets the required release rates for all of the required storms based on a review of the applicant's calculations. Based on the above, the Drainage Plan has been found to be consistent with the Act 167 Ordinance.

Ms. Joyce A. Lambert, Secretary Plainfield Township Municipal Building March 14, 2008 Page Two

Note that only those details of the Drainage Plan included on the checklist have been covered by this review. Therefore, notable portions of the Drainage Plan not reviewed include any aspect of the post-construction stormwater management plan concerning water quality, the details and design of any proposed water quality BMPs, the Erosion and Sedimentation Control Plan and the details of the runoff collection system (piping). These items are reviewed by the municipal engineer and/or others, as applicable.

Please call me with any questions regarding these comments.

Sincerely yours,

Geoffrey A. Reese, P.E.

Assistant Director

cc: Michael J. Kukles, Keystone Consulting Engineers, Inc.

Jan C. Hutwelker, EarthRes Group

David P. Berryman Allen R. O'Dell

LVPC ACT 167 REVIEW CHECKLIST

Development Name: Grand Central Landfill (Southern Expansion) Revised Municipality: Plainfield Township Date: March 14, 2008					Watershed:		Bushkill Creek/Martins/Jacoby Creeks	
			Reviewer:		Allen R. O'Dell, P.E.			
Date,	141	arcii 14, 2006			_ Cliecken o	y		
Ordinance		¥0			Consistent	nce	Commont	
Reference		<u>Item</u>			Yes No 1	N/A	Comment	
301.A-G.	General storm v	vater management requi	irements	•••••	<u>X / /</u>	 -		
Н.	Consideration o	f volume controls		• • • • • • • • • • • • • • • • • • • •	<u>X / /</u>	, ——	Portion of site runoff retained by diversion into former quarry.	
302. A.B.	Applicable Stor	m Water Management	Provisions					
2021, 1,27	Subarea	Martins	Bushkill 66	Bushkill 67				
	Criteria	30/100% RR	30/100% RR	30/100% RR		_	1	
	Criteria Key: I	RR = release rate; CNI	DI = conditional r	to detention I; CNI	DII = condino	onal n	io detention ii	
303. A.	Degian consists	ncy with applicable ma	magement ntovisio	ns from 302. A. and	1B. X /	/		
B.	Marming of Sto	rm Water Management	t District Boundarie	S	/ /	X.		
C.	Dougatrann or	pocity analysis			[]	/ X		
D.	Madeinla disaba	ean eniete within a circ	ale enharea		/ /	/ X		
E,F.	Multiple discha	roe points within multi	nle subareas		X. /	/		
J.	Documentation	of no increase in nea	k or volume		/ /	X		
K.	Documentation	of ∏no harm∏ downs	tream		/ /	_X		
L.	Danisanton	hearingal detention or	alveie		/ /	/ X		
M.	Capacity impr	ovements analysis			<u> </u>	<u>X</u>		
304.A.	Commutation	nethod (rational or soi	il-cover-complex).		X /		Rational Method and TR-55 used.	
В.		And the second s			X /	- 1		
C.						1		
E.	Soil-cover-cor	nplex method design i	ainfall	*******	····· <u>A /</u>	/		
F.	Rainfall intens	sities for rational meth			····· <u>A /</u>	'		
G.	Curve Number	rs for soil-cover-comp	olex memod		····· <u>X</u> /	' /		
H.	Runoff coeffic	cients for the rational	тещоц	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	X/	1		
Į.	Volume contr	ol storage volume	*		X /	-		
ј. К.	Manning equa	e of concentration	rcourse capacity		X /	7_		
403.		1 Contents						
TUJ.	D1011/1650 1 100							

SEDIMENTATION BASIN NO. 2



SECTION E. SEDIMENTATION PONDS

Sedimentation ponds and other impoundments must be constructed in accordance with the requirements of Chapter 102 d this permit before any earthmoving activities start in the drainage area. Each impoundment must be inspected during construction by or under the supervision of a registered professional engineer, licensed in Pennsylvania, and certified by the Department upon completion of construction.

Any enlargement, reduction in size, reconstruction, or other modification that may affect the stability or operation must be approved by the Department. Ponds must be certified and approved by the Department prior to the start of disposal activities.

		
U.S.G.S. Quadran Or Location from <u>E</u>	mentation Basin No. 2 gle <u>Wind Gap, PA</u> Location: Letitude <u>40° 5</u> Bottom Right corner of U.S.G.S. Quadrangle; inches North	h: inches West:
	ainage area <u>35.42</u> acres; Design Storm <u>25-</u> ad Quarry Soil Type <u>Crus hed slate/shale</u> Curve Nu	wear, 24-hour Average Watershed Slope<33.3% Peak Discharge 0 cfs
Embankment	Top Width (Minimum) Outside Slope (Maximum) Inside Slope (Maximum) Top Elevation Upstream Toe Elevation Liner Material (earthen, synthetic, etc.)	11 ft, 1.25 H : 1 V 1.25 H : 1 V 706.5' 696.79 ft. (permanent pool elevation Earthen
Impoundment Dimensions and Capacities	Length at Bottom Width at Bottom Length at Crest of Principal Spillway Width at Crest of Principal Spillway Depth from Crest of Principal Spillway Length at Crest of Emergency Spillway Width at Crest of Emergency Spillway Volume at Crest of Principle Spillway	unknown Unknown N/A N/A N/A 454 ft. 418 ft.
Principal Spillway	Time of Detention Maximum Sediment Storage Volume Shape (Circular, semi-circular, trapezoid, etc.) Dimensions (W x H x L) Inlet Elevation Slope and Length Discharge Elevation Spillway Capacity Construction Material	See Hydrograph 16,867 C.F. (Sed. Trap No. 2) N/A N/A N/A N/A N/A N/A N/A N/A N/A
Dewatering Device	Type/Size Inlet Elevation Discharge Controls (i.e. self draining or valved) Discharge Capacity (maximum) Time to Dewater Full Pond	N/A N/A N/A N/A
Emergency Spillway	Shape Dimensions (W x H x L) Slope Discharge Elevation Type of Lining/Protection Spillway Capacity (provide design calculations)	Trapezoidal 20' bottom width, 2.5' deep, 135' long 1.0 % 704.0 ft. Grass (lined with Miramat) 200.93 cfs @ 706.0 ft.

CLIENT	GRAND CENTRAL	SUBJECT	SEDIMENTATION	PROJECT NO. 951001.078
	SANITARY LANDFILL		BASIN NO. 2	BY <u>AJT</u> DATE <u>12/14/07</u>
PROJECT	APPLICATION FOR MAJOR	•	CALCULATIONS	CHK <u>TJM</u> DATE <u>12/14/07</u>
	PERMIT MODIFICATION			Page 1 of 2

<u>TASK:</u> To verify the design of proposed Sedimentation Basin No. 2 required for the Proposed Southern Expansion at Grand Central Sanitary Landfill.

REFERENCES:

- 1. "Erosion and Sediment Pollution Control Program Manual," Pennsylvania Department of Environmental Protection, April 2000.
- 2. Virginia Tech Penn State Urban Hydrology Model (VTPSUHM), Water Resources Program, Department of Civil Engineering, Pennsylvania State University.
- 3. "Final Grade Plan," ERG Drawing Nos. E-287 and E-288.

REQUIREMENTS:

Based on Reference No. 1, the design requirements for a sedimentation basin are as follows:

1. Sediment storage volume must be equal to the total contributing drainage area 1,000 cubic feet per disturbed acre within the watershed of the basin.

ASSUMPTIONS:

- 1. The location for the proposed Sedimentation Basin No. 2 is the reclaimed Doney No. 2 Quarry. The approved post-mining land use of the quarry is for a water impoundment.
- 2. The permanent pool elevation is equal to the existing water elevation 696.79 ft. The bottom elevation the inactive quarry is unknown.
- 3. The proposed basin is designed to contain the 2, 10, 25 and 100-year, 24-hour storm events without discharging any flow.
- 4. An emergency spillway channel will be installed at an elevation above the 100-year, 24-hour storm event maximum basin elevation (See calculations below).
- 5. The drainage area is 35.42 acres, which includes 6.35 acres of disturbed area (Refer to Reference No. 3).
- 6. A sediment trap (Sediment Trap No. 2) will be constructed adjacent to the basin to pre-treat incoming water and facilitate cleanout of accumulated sediment. Refer to attachment I-3 for sediment trap No. 2 design and calculations

CALCULATIONS:

1. Sediment Storage Volume

Required sediment storage volume = 6.35 acres (disturbed) \times 1,000 cf/acre = 6.350 cf

Sediment Trap No. 2 will handle the sediment storage volume requirements (refer to the attached Sediment Trap No.2 Calculations). However, there is sufficient volume within the basin to meet this requirement as well.

GRAND CENTRAL SANITARY LANDFILL SOUTHERN EXPANSION

Proposed Sedimentation Basin 2 Storage Volume Table

Elevation	Plan Area	Average Area	Elevation Difference	Incremental Volume	Cummulative Volume
ft.	SF	SF	ft.	CF	CF
696,79	101,353				
698.0	103,071	102,211	1.21	123,675	123,675
700.0	111,695	107,354	2.0	214,708	214,708
702.0	152,993	131,804	2.0	263,608	478,316
704.0	172,699	162,747	2.0	325,494	803,810

Note:

Average area calculated as follows: [A+B+sqrt(A*B)]/3

By: HAH

Date: 10/15/2006

Summary for Drainage Area 5

Segment 1: Overland Flow L = 75 ft, S = 0.333 ft/ft, n = 0.15, P(2yr/24hr) = 3.1 inTravel Time = 2.6 minutes

Segment 2: Channel Flow A = 6.47 sq. ft, P = 17.39 ft, L = 40 ft, S = 0.03 ft/ft, n = 0.035 Travel Time = 0.2 minutes

Segment 3: Channel Flow A = 6.47 sq. ft, P = 17.39 ft, L = 540 ft, S = 0.06 ft/ft, n = 0.035 Travel Time = 1.7 minutes

Segment 4: Channel Flow A = 12 sq. ft, P = 12.65 ft, L = 75 ft, S = 0.15 ft/ft, n = 0.045 Travel Time = 0.1 minutes

Total Travel Time = 4.51 Minutes

Summary for Drainage Area 7

Segment 1: Overland Flow L = 35 ft, S = 0.333 ft/ft, n = 0.15, P(2yr/24hr) = 3.1 in Travel Time = 1.4 minutes

Segment 2: Channel Flow A = 12 sq. ft, P = 12.65 ft, L = 360 ft, S = 0.078 ft/ft, n = 0.035 Travel Time = 0.5 minutes

Total Travel Time ≈ 1.92 Minutes

Curve Number Weighting

Description: Drainage Area 17

Landuse	Soil Group	CN	Area (acres)	% Total Area	
Impervious	В	98.0	2.5	19.5	
Vegetated (Fair)	В	69.0	10,4	80.5	
Weighted Result		74.7	12,9	100.0	

Summary for Drainage Area 5 Travel Time

Segment 1: Channel Flow A = 1.77 sq. ft, P = 4.71 ft, L = 60 ft, S = 0.06 ft/ft, n = 0.013 Travel Time = 0.1 minutes

Segment 2: Channel Flow A = 12 sq. ft, P = 10.94 ft, L = 34 ft, S = 0.157 ft/ft, n = 0.0523 Travel Time = 0 minutes

Segment 3: Channel Flow A = 16 sq. ft, P = 12.94 ft, L = 45 ft, S = 0.109 ft/ft, n = 0.0532 Travel Time = 0.1 minutes

Segment 4: Channel Flow A = 16 sq. ft, P = 12.94 ft, L = 250 ft, S = 0.12 ft/ft, n = 0.0535 Travel Time = 0.4 minutes

Total Travel Time = 0.55 Minutes

Watershed Title: Sedimentation Basin 2

25 Year Type II Storm: Precipitation = 5.6 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	12.860	75	0.123	2.83	3.970	6.000	0.000	0,000
2	0.840	72	0.141	2.59	1.920	6.000	0.570	0.000
3	16.860	72	0.141	2.59	6.710	6.000	0.570	1.260
4	1.970	72	0.141	2.59	4.510	6.000	0.550	0.000
5	2.890	72	0.141	2.59	7.940	6.000	0.450	2.400
Composite	35.420	73		2.68				

Basin Storage/Elevation Input

Elevation (ft)	Storage (acre-ft)
696,79	0.0000
698.00	2.8390
700.00	4.9290
702.00	10.9810
704.00	18.4530

Basin Water Elevation	Basin Outflow (cfs)	Riser Box Water Elevation	Tailwater Elevation (ft)	Outfall Culvert Control	Outfall Culvert Override?
703.54	0.00	N/A	N/A	N/A	N/A
703.69	0.00	N/A	N/A	N/A	N/A
703.84	0.00	N/A	N/A	N/A	N/A
703.99	0. 00	N/A	N/A	N/A	N/A
704.14	3.14	N/A	N/A	N/A	N/A
704.29	9.37	N/A	N/A	N/A	N/A
704.44	17.51	N/A	N/A	N/A	N/A
704.59	27.19	N/A	N/A	N/A	N/A
704.74	38.19	N/A	N/A	N/A	N/A
704.89	50,38	N/A	N/A	N/A	N/A
705.04	63.64	N/A	N/A	N/A	N/A
705.19	77.89	N/A	N/A	N/A	N/A
705.34	93.07	N/A	N/A	N/A	N/A
705.49	109.13	N/A	N/A	N/A	N/A
705.64	126.01	N/A	N/A	N/A	N/A
705.79	143.69	N/A	N/A	N/A	N/A
705.94	162,13	N/A	N/A	N/A ·	N/A

Modified Puls Routing

Inflow Hydrograph: F:IPROJECTSIGCSLISouthern Expansioni2007 October Southern Expansion RevisioniForm N-218asin 718asin7_15YR.HYD
Storage/Elevation Curve: F:IPROJECTSIGCSLISouthern Expansioni2007 October Southern Expansion RevisioniForm N-218asin 718asin7.ES

Basin Bypass Capacity = 0,00 cfs Starting Pool Elevation = 696,79 feet Time Interval = 0.100 hours

_	Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)	······································
	0,00	2,90	2.90	0.0000	696.79	0.00	0.00	
	0.10	3,30	3,30	0.0256	696.80	0,00	0.00	
	0.20	3.70	3.70	0.0545	696.81	0.00	0.00	
	0.30	4.10	4.10	0.0868	698.83	0.00	0.00	
	0.40	4.85	4.85	0.1238	696.84	0.00	0.00	
	0.50	5.60	5.60	0.1 66 9	696.96	0,00	0,00	
	0.60	6.35	6.35	0.2163	690.00	0.00	00,0	
	0.70	18.02	18.02	0.3170	696.93	0.00	0,00	
	0.80	29.70	29,70	0.5142	697.01	0.00	0,00	
	0.90	41,37	41.37	0.8079	697.13	0.00	0,00	
	1.00	86.35	86.35	1,3357	697.36	0.00	0.00	
	1.10	138.37	138.37	2.2643	697.76	0.00	0.00	
	1,20	94.66	94.6 6	3.2272	698.37	0.00	0.00	
	1,30	40.97	40,97	3,7876	698,91	0,00	0,00	
	1.40	26.59	26. 5 9	4.0668	699,17	0.00	0.00	
	1,50	20.73	20.73	4,2624	699,36	0.00	0,00	
	1.60	16.97	16.97	4.4181	699.51	0,00	0.00	
	1,70	13.97	13.97	4.5460	699,63	0.00	0.00	
	1.90	12.22	12.22	4.6542	699.74	0.00	0,00	
	1.90	11,34	11.34	4,7516	699.83	0.00	0.00	
	2.00	10,47	10,47	4.8417	699.92	0.00	0.00	
	2.10	9.77	9.77	4,9253	700.00	0,00	0.00	
	2.20	9.07	9.07	5.0032	700.02	0,00	0.00	
	2.30	8,59	8.59	5.0762	700,05	0.00	0.00	
	2.40	8.11	8.11	5.1452	700.07	0.00	0 .00	
	2.50	7. 72	7,72	5.2108	700.09	0.00	0 .00	
	2.60	7,33	7.33	5.2728	700.11 700.13	0, 00 0, 00	0.00 0.00	
	2.70	7.01	7.01	5.3320		0.00	00.0	
	2.80	6.69	6.69	5,3886 5,4426	700.15 700.17	0.00	0.00	
	2.90	6,38 6,08	6.38 6.08	5,4 9 41	700.17	0.00	0.00	
	3.00 3.10	5,86	5.8 6	5,4 64 1 5,5435	700.19	0.00	0.00	
	3.10 3.20	5.65	5.65	5,5433 5,5910	700.22	0.00	0.00	
	3.30	5.43	5.43	5.6368	700.22	0.00	0.00	
	3.40	5.33	5.33	5,6 813	700.25	0.00	0.00	
	3.50	5,22	5, 2 2	5,7249	700.26	0.00	0.00	
	3.60	5,12	5.12	5,7676	700.28	0.00	0.00	
	3.70	5.00	5.00	5,8094	700.29	0.00	0.00	
	3.80	4.89	4.89	5,8503	700.30	0.00	0.00	
	3.90	4.77	4,77	5,8902	700.32	0.00	0.00	
	4.00	4.65	4.65	5.9291	700.33	0.00	0.00	
	4.10	4.56	4.56	5.9672	700.34	0,00	0.00	
	4.20	4.46	4.46	6.0045	700,36	0.00	0.00	
	4.30	4.37	4.37	6.0410	700.37	0.00	0.00	
	4.40	4,28	4.28	6.0767	700.38	00,0	0.00	
	4.50	4.18	4.18	6.1117	700.39	0.00	0.00	
	4,60	4.09	4.09	6.1458	700.40	0.00	0. 0 0	
	4.70	3.99	3.99	6.1792	700.41	0.00	0.00	
	4.80	3,90	3.90	6,2119	700.42	0.00	0.00	
	4.90	3,80	3.80	6,2436	700.43	0.00	0.00	

Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)	
10.80	1.97	1.97	7.5240	700.86	0.00	0.00	
10.90	1.96	1.96	7.5402	700.86	0.00	0.00	
11.00	1.96	1,96	7.5584	700.87	0.00	0.00	
11.10	1.9 1	1.91	7.5724	700.87	0.00	0.00	
11.20	1.86	1.86	7.5880	700.88	0.00	0.00	
11.30	1.81	1.81	7.6032	700.88	0.00	0.00	
11,40	1.76	1.76	7.6179	700,89	0.00	0.00	
11.50	1.71	1.71	7.6323	700.89	0.00	0.00	
11.60	1.66	1.66	7.6462	700.90	0.00	0.00	
11.70	1.61	1.61	7,6597	700.90	0.00	0.00	
11.80	1.57	1.57	7.6729	700.91	0.00	0.00	
11.90	1.52	1.52	7.6856	700.91	0,00	0.00	
12.00	1.47	1.47	7.6980	700.92	0.00	0.00	
12.10	1.42	1.42	7.7099	700.92	0.00	0.00	
12.20	1.37	1.37	7.7214	700.92	0.00	0.00	
12.30	1.32	1.32	7.7326	700.93	0.00	0.00	
12.40	1.27	1.27	7.7433	700.93	0.00	0.00	
12.50	1.22	1.22	7.7536	700.93	0.00	0.00	
12.60	1.17	1.17	7.7634	700.94	0.00	0.00	
12.70	1.13	1.13	7.7729	700.94	0.00	0.00	
12.80	1.08 1.03	1.08	7.7821	700.94	0.00	0.00 0.00	
12.90 13.00	0.98	1.03 0.98	7.7908 7.7991	700.95 700.95	0.00 0.00	0.00	
13.10	0.93	0.93	7.7991	700.95	0.00	0.00	
13.10	0.88	0.88	7.8145	700.95	0.00	0.00	
13.30	0.83	0.83	7.8215	700.96	0.00	0.00	
13.40	0.78	0.78	7.8282	700.96	0.00	0.00	
13.50	0.73	0.73	7.8344	700.96	0.00	0.00	
13.60	0.68	0.68	7.8402	700.96	0.00	0.00	
13.70	0.64	0.64	7.8457	700.96	0.00	0.00	
13.80	0.59	0.59	7.8508	700.97	0.00	0.00	
13.90	0.54	0.54	7.8555	700.97	0.00	0.00	
14.00	0.49	0.49	7.6597	700.97	0.00	0.00	
14.10	0.44	0.44	7.8636	700.97	0.00	0.00	
14.20	0.39	0.39	7,8670	700.97	0.00	0.00	
14.30	0.34	0.34	7.8700	700.97	0.00	0.00	
14.40	0.29	0.29	7.8726	700.97	0.00	0.00	
14.50	0.24	0.24	7.8748	70 0.97	0.00	0.00	
14.60	0.20	0.20	7.8766	700.97	0.00	0.00	
14.70	0.15	0.15	7.8781	700.97	0.00	0.00	
14.80	0.10	0.10	7.8791	700.97	0.00	0.00	
14.90	0.05	0.05	7.8797	700.98	0.00	0.00	
15,00	0.00	0.00	7.8799	700.98	0.00	0.00	

Basin Water Elevation	Basin Outflow (cfs)	Riser Box Water Elevation	Tallwater Elevation (ft)	Outfall Culvert Control	Outfall Culvert Override?
703.54	0.00	N/A	N/A	N/A	N/A
703.69	0.00	N/A	N/A	N/A	N/A
703.84	0.00	N/A	N/A	N/A	N/A
703.99	0.00	N/A	N/A	N/A	N/A
704.14	3.14	N/A	N/A	N/A	N/A
704.29	9.37	N/A	N/A	N/A	N/A
704.44	17.51	N/A	N/A	N/A	N/A
704.59	27.19	N/A	N/A	N/A	N/A
704,74	38.19	N/A	N/A	N/A	N/A
704.89	50.38	N/A	N/A	N/A	N/A
705.04	63.64	N/A	N/A	N/A	N/A
705.19	77.89	N/A	N/A	N/A	N/A
705.34	93.07	N/A	N/A	N/A	N/A
705.49	109.13	N/A	N/A	N/A	N/A
705.64	126.01	N/A	N/A	N/A	N/A
705.79	143.69	N/A	N/A	N/A	N/A
705.94	162.13	N/A	N/A	N/A	N/A

CLIENT GRAND CENTRAL SUBJECT ACT 167 STORMWATER PROJECT NO. 951001.078
SANITARY LANDFILL MANAGEMENT PLAN BY HAH DATE 10/18/06
PROJECT APPLICATION FOR MAJOR COMPLIANCE CHK TJM DATE 10/24/06

PERMIT MODIFICATION Page 1 of 1

TASK: To evaluate the post-development discharge of proposed Sedimentation Basin No. 2 at Grand Central Sanitary Landfill (GCSL) per the Act 167 Stormwater Management Plan for the Bushkill Creek Watershed.

REFERENCES:

- 1. Bushkill Creek Watershed Act 167 Storm Water Management Plan Executive Summary, Joint Planning Commission Lehigh-Northampton Counties, May 1992.
- 2. Virginia Tech-Penn State Urban Hydrology Model (VTPSUHM), Water Resources Program, Department of Civil Engineering, The Pennsylvania State University.
- 3. "Final Grade Plan," ERG Drawing Nos. E-287 and E-288.

REQUIREMENTS:

Based on Reference No. 1, the Act 167 requirements are as follows:

- 1. For the subarea in which GCSL is located, the release rate for the 2-year storm post-development peak flow is 30% of the pre-development peak flow. (See Plate I Release Rate Map, Reference 1)
- 2. The release rate for the 10, 25, and 100-year storm events is 100%.

SSUMPTIONS:

- 1. Sedimentation Basin No. 2 will serve as a post-development stormwater detention basin after landfill closure.
- 2. Post-development flows for the 2, 10, 25, and 100-year, 24-hour storm events were determined using VTPSUHM.

CALCULATIONS:

Proposed Basin No.2 is a non-discharge basin. The proposed basin is designed to contain the 2, 10, 25, 100-year, 24-hour storm events. As a precaution, a discharge culvert will be installed at an elevation above the maximum basin elevation for the 100-year, 24-hour storm event. Please refer to the attached basin routings, hydrographs, and Reference No. 3:

1. The post-development peak discharges from the basin are as follows:

2-year storm event = 0 cfs

10-year storm event = 0 cfs

25-year storm event = 0 cfs

100-year storm event = 0 cfs

SEDIMENTATION BASIN NO. 2 POST-DEVELOPMENT

Summary for Drainage Area 4

Segment 1: Overland Flow L = 100 ft, S = 0.333 ft/ft, n = 0.15, P(2yr/24hr) = 3.1 in Travel Time = 3.2 minutes

Segment 2: Concentrated Flow L = 100 ft, S = 0.1 ft/ft, Unpaved surface Travel Time = 0.3 minutes

Segment 3: Concentrated Flow
L = 600 ft, S = 0.02 ft/ft, Unpaved surface
Travel Time = 4.4 minutes

Total Travel Time = 7.94 Minutes

Summary for Drainage Area 6

Segment 1: Overland Flow L = 40 ft, S = 0.03 ft/ft, n = 0.15, P(2yr/24hr) = 3.1 in Travel Time = 4.1 minutes

Segment 2: Concentrated Flow
L = 140 ft, S = 0.05 ft/ft, Unpaved surface
Travel Time = 0.6 minutes

Segment 3: Channel Flow A = 11.5 sq. ft, P = 23.19 ft, L = 350 ft, S = 0.04 ft/ft, n = 0.035 Travel Time = 1.1 minutes

Segment 4: Channel Flow A = 12 sq. ft, P = 12.65 ft, L = 365 ft, S = 0.18 ft/ft, n = 0.045 Travel Time = 0.4 minutes

Segment 5: Channel Flow A = 12 sq. ft, P = 12.65 ft, L = 505 ft, S = 0.333 ft/ft, n = 0.045 Travel Time = 0.5 minutes

Total Travel Time = 6.71 Minutes

Summary for Drainage Area 17

Segment 1: Overland Flow
L = 80 ft, S = 0.075 ft/ft, n = 0.011, P(2yr/24hr) = 3.1 in
Travel Time = 0.6 minutes

Segment 2: Concentrated Flow
L = 288 ft, S = 0.13 ft/ft, Unpaved surface
Travel Time = 0.8 minutes

Segment 3: Concentrated Flow
L = 40 ft, S = 0.05 ft/ft, Unpaved surface
Travel Time = 0.2 minutes

Segment 4: Concentrated Flow
L = 80 ft, S = 0.02 ft/ft, Unpaved surface
Travel Time = 0.6 minutes

Segment 5: Concentrated Flow
L = 100 ft, S = 0.04 ft/ft, Unpaved surface
Travel Time = 0.5 minutes

Segment 6: Concentrated Flow
L = 80 ft, S = 0.025 ft/ft, Unpaved surface
Travel Time = 0.5 minutes

Segment 7: Concentrated Flow
L = 100 ft, S = 0.02 ft/ft, Unpaved surface
Travel Time = 0.7 minutes

Total Travel Time = 3.97 Minutes

Summary for Drainage Area 4 Travel Time

Segment 1: Channel Flow A = 3.14 sq. ft, P = 6.28 ft, L = 85 ft, S = 0.0118 ft/ft, n = 0.013 Travel Time = 0.2 minutes

Segment 2: Channel Flow
A = 26 sq. ft, P = 12.94 ft, L = 250 ft, S = 0.12 ft/ft, n = 0.0535
Travel Time = 0.3 minutes

Total Travel Time = 0.45 Minutes

Summary for Drainage Area 6 & 7 Travel Times

Segment 1: Channel Flow

A = 7.07 sq. ft, P = 9.42 ft, L = 50 ft, S = 0.02 ft/ft, n = 0.013 Travel Time = 0.1 minutes

Segment 2: Channel Flow

A = 12 sq. ft, P = 10.94 ft, L = 48 ft, S = 0.157 ft/ft, n = 0.0523 Travel Time = 0.1 minutes

Segment 3: Channel Flow

A = 16 sq. ft, P = 12.94 ft, L = 45 ft, S = 0.109 ft/ft, n = 0.0532 Travel Time = 0.1 minutes

Segment 4: Channel Flow

A = 16 sq. ft, P = 12.94 ft, L = 250 ft, S = 0.12 ft/ft, n = 0.0535 Travel Time = 0.4 minutes

Total Travel Time = 0.57 Minutes

Watershed Title: Sedimentation Basin 2

2 Year Type II Storm: Precipitation = 3.1 inches

Individual Subarea and Composite Hydrographs

Subarea		Time (hrs)										
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17,0	20.0	26.0
1	0.20	4.62	11.50	2.81	1,80	1.39	1.14	0.95	0.75	0.53	0.35	0.00
2	0.01	0.23	0.63	0.16	0.10	0.08	0.07	80.0	0.04	0.03	0.02	0.00
3	0.13	3.81	13.69	3.67	2.21	1.67	1.37	1.15	0.90	0.63	0.42	0.00
4	0.02	0.53	1.47	0.38	0.25	0.19	0.18	0.13	0.10	0.07	0.05	0.00
5	0.02	0.54	2.52	0.69	0.39	0.29	0.24	0.20	0.15	0.11	0.07	0.00
Composite	0.37	9.72	29.80	7.72	4.75	3.62	2.97	2,49	1.94	1.37	0.91	0.00

The peak flow is 45.54 cfs at 12.1 hrs.

Watershed Title: Sedimentation Basin 2

10 Year Type II Storm: Precipitation = 4.9 inches

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.91	14,11	28.63	6.03	3.77	2.85	2.32	1.92	1,48	1.03	0.68	0.00
2	0.05	0.78	1.68	0.36	0.23	0.17	0.14	0.12	0.09	0.06	0.04	0.00
3	0.92	13.59	36.02	6.42	4.85	3.58	2.90	2.41	1.85	1.28	0.84	0.00
4	0.11	1.84	3.90	0.65	0.54	0.41	0.33	0.28	0.21	0.15	0.10	0.00
5	0.15	2.00	6.58	1.62	0.87	0.63	0.50	0.42	0.32	0.22	0.15	0.00
Composite	2.15	32.31	76.80	17.27	10.25	7.65	6.20	5.15	3.96	2.75	1.81	0.00

The peak flow is 113.01 cfs at 12.1 hrs.

Watershed Title: Sedimentation Basin 2

25 Year Type II Storm: Precipitation = 5.5 inches

Individual Subarea and Composite Hydrographs

Subarea	1					Time	(hrs)					
	11.0	11.9	12.2	12.5	12.8	13.2	13.8	14.0	15.0	17.0	20.0	26.0
1	1.21	17.83	35.06	7.17	4.46	3.37	2.73	2.26	1.74	1.20	0.79	0.00
2	0.06	1.01	2.08	0.44	0.27	0.21	0.17	0.14	0.11	0.08	0.05	0.00
3	1.26	17.57	44.57	10.15	5.80	4.28	3.44	2.85	2.18	1.51	0.99	0.00
4	0.15	2.37	4.83	1.02	0.64	0.49	0.39	0.33	0.25	0.18	0.12	0.00
5	0.21	2.60	8.13	1.95	1.04	0.75	0.60	0.50	0.38	0.26	0.17	0.00
Composite	2.90	41.37	94.66	20.73	12.22	9.07	7.33	6.08	4.65	3.22	2.11	0.00

The peak flow is 138.37 cfs at 12.1 hrs.

Watershed Title: Sedimentation Basin 2

100 Year Type II Storm: Precipitation = 6.9 inches

Individual Subarea and Composite Hydrographs

Subarea						Time	(hrs)					
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26,0
1	1.94	27.04	50.85	9.96	6.15	4.62	3.72	3.08	2.35	1.62	1.05	0.00
2	0.11	1.59	3.05	0.61	0.38	0.29	0.23	0.19	0.15	0.10	0.07	0.00
3	2.16	27.76	65.85	14.36	8.08	5.69	4.73	3.91	2.96	2.04	1.33	0.00
4	0.26	3.72	7.16	1.44	0.89	0.67	0.54	0.45	0.34	0.24	0.15	0.00
5	0.36	4.13	11.99	2.78	1.48	1.03	0.82	0.68	0.51	0.35	0.23	0.00
Composite	4.83	64.23	138.91	29.15	16.96	12.49	10.05	8.30	6.31	4.34	2.83	0.00

The peak flow is 200.93 cfs at 12.1 hrs.

Project Files:

Outlet Structure Configuration: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form NI-2\Basic Discharge/Elevation Curve: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form NI-2\Basin 2\

Outlet Structure Configuration

Stage 1: Emergency Spillway

Crest Elevation = 704 feet Crest Length = 20 feet Discharge Coefficient = 3

Basin Rating Curve

Basin Water Elevation	Basin Outflow (cfs)	Riser Box Water Elevation	Tailwater Elevation (ft)	Outfall Culvert Control	Outfall Culvert Override?
696.79	0.00	N/A	N/A	N/A	N/A
696.94	0.00	N/A	N/A	N/A	N/A
697.09	0.00	N/A	N/A	N/A	N/A
697.24	0.00	N/A	N/A	N/A	N/A
697,39	0.00	N/A	N/A	N/A	N/A
697.54	0.00	N/A	N/A	N/A	N/A
697.69	0.00	N/A	N/A	N/A	N/A
697.84	0.00	N/A	N/A	N/A	N/A
697, 99	0.00	N/A	N/A	N/A	N/A
698.14	0.00	N/A	N/A	N/A	N/A
698,29	0.00	N/A	N/A	N/A	N/A
698.44	00.0	N/A	N/A	N/A	N/A
898.59	0,00	N/A	N/A	N/A	N/A
698.74	0.00	N/A	N/A	N/A	N/A
698,89	0.00	N/A	N/A	N/A	N/A
699.04	0.00	N/A	N/A	N/A	N/A
699.19	0.00	N/A	N/A	N/A	N/A
689.34	0.00	N/A	N/A	N/A	N/A
699,49	0.00	N/A	N/A	N/A	N/A
699.64	0.00	N/A	N/A	N/A	N/A
699.79	0.00	N/A	N/A	N/A	N /A
699.94	0.00	N/A	N/A	N/A	N/A
700.09	0.00	ŅΛ	N/A	N/A	N/A
700.24	0.00	N/A	N/A	N/A	N/A
700.39	0.00	N/A	N/A	N/A	N/A
700.54	0,00	N/A	N/A	N/A	N/A
700.69	0,00	N/A	N/A	N/A	N/A
700.64	00,0	N/A	N/A	N/A	N/A
700.9 9	0,00	N/A	N/A	N/A	N/A
701.14	0.00	N/A	N/A	N/A	N/A
701.29	0.00	N/A	N/A	N/A	N/A
701.44	0.00	N/A	N/A	N/A	N/A
701.59	0.00	N/A	N/A	NA	N/A
701.74	0,00	N/A	N/A	N/A	N/A
701.89	0.00	N/A	N/A	N/A	N/A
702.04	0.00	N/A	N/A	N/A	N/A
702,19	0.00	N/A	N/A	N/A	N/A
702.34	0,00	N/A	N/A	N/A	N/A
702.49	0.00	N/A	N/A	N/A	N/A
702.64	0.00	N/A	N/A	N/A	N/A
702.79	0.00	N/A	N/A	N/A	N/A
702.94	0.00	N/A	N/A	N/A	N/A
703.09	0.00	N/A	N/A	N/A	N/A
703.24	0.00	N/A	N/A	N/A	N/A
703.39	0,00	N/A	N/A	N/A	N/A

Modified Puls Routing Summary of Results

Inflow Hydrograph: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form \(\)\-2\Basin 2\Basin2_2\YR.HYD Storage/Elevation Curve: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form \(\)\-2\Basin 2\Basin2\Basin2\Basin2\ES

Basin Bypass Capacity = 0.00 cfs
Starting Pool Elevation = 696.79 feet
Time Interval = 0.100 hours
Total number of Inflow points = 151

	Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)
Start	0.00	0.37	0.37	0.0000	696.79	0.00	0.00
Max. Inflow	1.10	45.54	45.54	0.6131	697.05	0.00	0.00
Max. Outflow	v 15.00	0.00	0.00	2.7729	697.97	0.00	0.00
Final	15.00	0.00	0.00	2.7729	697.97	0.00	0.00

	Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cf9)	
***	······································	···						,,
	5.00	1.5 6	1.56	2.0805	697.68	0.00	0.00	
	5.10	1.54	1.54	2.0933	697.68	0,00	0.00	
	5.20	1.51	1.51	2.1080	697, 69	0.00	0.00	
	5.30	1.48	1.48	2.1183	697,69	0.00	0.00	
	5,40	1.45	1.45	2,1304	697.70	00,0	0.00 0.00	
	5,50	1.43	1.43	2,1423	697.70 697.71	0,00 0,00	0.00	
	5.60 5,70	1.41 1.40	1.41 1.40	2.1540 2.1 6 57	897,71	0.00	0.00	
	5.80	1.39	1.39	2.1772	697.72	0.00	0.00	
	5,90	1.3 0	1.38	2.1886	697.72	0.00	0.00	
	5.20 6.00	1,37	1.37	2,2000	697.73	0.00	0.00	
	6,10	1,35	1.35	2.2112	697.73	0,00	0.00	
	6.20	1,34	1.34	2,2224	697.74	0.00	0.00	
	6.30	1.32	1.32	2,2333	097.74	0.00	0.00	
	6.40	1.30	1.30	2.2442	69 7.75	0.00	0.00	
	6.50	1.29	1,29	2,2549	697 .75	0.00	0.00	
	8.60	1,28	1.28	2,2655	697.70	0.0 0	0.00	
	6.70	1.27	1.27	2.2780	697.76	0.00	0.00	
	6.80	1.25	1.25	2.2864	697,76	00,0	0.00	
	B.90	1.24	1,24	2.2967	697.77	0.00	0.00	
	7.00	1.23	1.23	2.3069	897.77	0.00	0.00	
	7,10	1.22	1.22	2.3171	697.78	0,00	0.00	
	7.20	1,20	1.20	2.3271	697.78	0.00 0.00	0.00 0.00	
	7, 3 0	1.19	1.19 1.17	2,3 3 69 2,3467	697.79 697.79	0.00	0,00	
	7,40 7,50	1. 17 1.16	1,16	2,3 56 3	697.79	0,00	0.00	
	7.60	1,14	1.14	2,3558 2,3658	897.80	0.00	0.00	
	7.70	1,13	1.13	2.3752	697.80	0.00	0.00	
	7.80	1.11	1.11	2.3845	697.81	0.00	0.00	
	7.90	1,10	1.10	2.3936	697.81	0.00	0.00	
	8,00	1.08	1.08	2.4028	697.61	0.00	0.00	
	8,10	1.06	1.06	2.4114	597.82	0.00	0.00	
	8.20	1.05	1.05	2.4202	697. 82	0.00	0.00	
	8.30	1.03	1.03	2,4288	697.83	0,00	0.00	
	8.40	1.01	1.01	2,4372	697.83	0.00	0.00	
	8.5 0	1.00	1.00	2.4455	697,83	0.00	0.00	
	8.60	0.96	0.98	2.4537	697.84	0.00	0.00	
	8.70	0.96	0.98	2.4617	897.84	0.00	0.00 0,00	
	8.80	0.95	0,95	2,4896 2,4774	697.84 697.85	0.00 0,00	0.00	
	8, 9 0 9.00	0, 93 0, 9 1	0.93 0.91	2,4774	697.85	0.00	0.00	
	9.10	0.91	0.91	2,4925	69 7.85	0.00	0.00	
	9.20	0.91	0.91	2,5000	697.86	0.00	0.00	
	9.30	0.90	0.90	2,5075	697.86	0.00	0.00	
	9,40	0.90	0.90	2.5149	697.86	0.00	0.00	
	9,50	0.90	0.90	2,5224	697.87	0.00	0.00	
	9.80	0.90	0.90	2,5298	697.87	0.00	0.00	
	9.70	0.89	0.89	2,5372	697.87	0.00	0.00	
	9.80	0.89	0.89	2.544 5	697.87	0.00	0,00	
	9.90	0.89	0.89	2.5510	697,88	0,00	00,0	
	10.00	0,88	0.88	2.5592	697.88	0.00	0.00	
	10.10	0.88	66.0	2.5665	697.88	0.00	0.00	
	10.20	0,88	0.88	2.5738	697.89	0.00	0.00	
	10.30	0.88	0.88	2.5910	697,89	0.00	0,00	
	10.40	0.67	0.87	2.5983	697.89	0.00	0.00	
	10.50	0.87	0.87	2, 595 5	697.90 607.00	0.00 0.00	0.00 0.00	
	10.60	0.87	0.87 0.87	2,6026	697.90 697.90	0.00	0.00	
	10.70	0.87	0.01	2,6098	UE, 16D	0.00	0.00	

Modified Puls Routing Summary of Results

Inflow Hydrograph: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form \(\text{N1-2\Basin 2\Basin2_10YR.HYD}\)
Storage/Elevation Curve: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form \(\text{N1-2\Basin 2\Basin 2\B

Basin Bypass Capacity = 0.00 cfs Starting Pool Elevation = 696.79 feet Time Interval = 0.100 hours Total number of Inflow points = 151

·	Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Above MSL	Basin Outflow (cfs)	Outflow Total (cfs)
Start	0.00	2.15	2.15	0.0000	696.79	0.00	0.00
Max. Inflow	1.10	113.01	113.01	1.7992	697.56	0.00	0.00
Max. Outflow	v 15.00	0.00	0.00	6.5043	700.52	0.00	0.00
Final	15.00	0.00	0.00	6.5043	700.52	0.00	0.00

Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)	
5.00	3.16	3,16	5.1308	700.07	0.00	0.00	
5.10	3.10 3.10	3.10	5.1503 5.1587	700.08	0.00	0.00	
5.20	3.04	3.04	5.1820	700.08	0.00	0.00	
5.30	2.99	2.99	5.2069	700.09	0.00	0.00	
5,40	2.93	2.93	5.2314	700.10	0,00	0.00	
5.50	2.87	2.87	5,2554	700.11	0,00	0.00	
5.60	2.85	2.85	5.2790	700.12	0.00	0,00	
5 .70	2.62	2,82	5.3024	700.12	0.00	0.00	
5.80	2,80	2,80	5.3257	700.13	0.00	0.00	
5,90	2.7 7	2.77	5,3487	700.14	0,00	0.00	
6,00	2.75	2.75	5.3715	700.15	0.00	0.00	
6.10	2.72	2.72	5.3941	700,15	0.00	0.00	
8.20	2.69	2.69	5.4164	700.16	0.00	0. 0 0 0. 0 0	
6,30	2,66 2,63	2.66	5,4386 5,4604	700,17 700,18	0.00 0.00	0. 0 0	
6,40 6,50	2.63 2.60	2.63 2.60	5,4 62 0	700.18	0.00	0.00	
6.60	2.57	2.57	5,5034	700.19	0.00	0.00	
6,70	2,55	2.55	5.5245	700.20	0.00	0.00	
6,80	2.52	2.52	5,5455	700.20	0.00	0.00	
6.90	2.50	2.50	5.5862	700.21	0.00	0.00	
7.00	2.47	2,47	5,5668	700.22	a.0 0	0.00	
7.10	2.44	2.44	5,6071	700.22	0.00	0.00	
7,20	2.40	2.40	5.6271	700.23	0 .0 0	0.00	
7.30	2.37	2.37	5,6468	700.24	0.00	0.00	
7.40	2,33	2.33	5,6662	700.24	0.00	0,00	
7.50	2,29	2.29	5,6853	700.25	0,00	0,00	
7.60	2.26	2,26	5.7041	700,26	0.00	0.00	
7.70	2.22	2.22	5,7226	700.26	0.00 0.00	0,00 0.00	
7.80 7.90	2.19 2.15	2.19 2.15	5.7408 5.7588	700.27 70 0 .27	0.00	0.00	
8.00	2.12	2.12	5.7764	700.28	0.00	0.00	
8.10	2.09	2.09	5.7938	700.29	0,00	0.00	
B.20	2.06	2.06	5,8110	700.29	0.00	0,00	
8,30	2.02	2.02	5.8278	700.30	0.00	0,00	
8.40	1.99	1.99	5.8444	700.30	0.00	0.00	
8.50	1.96	1.96	5,8607	700.31	0.00	0.00	
8,60	1.93	1.93	5.8768	700.31	0.00	0.00	
8,70	1.90	1,90	5.8926	700, 32	0,00	0.00	
8,80	1,87	1.87	5.9082	700.32	0.00	0.00	
8.90	1.84	1.84	5.9235	700.33	0.00	0.00	
9.00	1.81	1.81	5.9386	700,33	0.00 0.00	00,0 00, 0	
9.10	1.80 * 70	1.80	5.9535	700,34 700,34	0.00 00,00	0,00 0.00	
9.20 9.30	1.79 1.79	1,79 1.79	5,9683 5,9831	700,34	0,00	0.00	
9.40	1.79	1.78	5,9979	700,35	0.00	0.00	
9,50	1.77	1.77	6,0126	700,36	0.00	0.00	
9,60	1.77	1.77	8.0272	700.38	0.00	0 .00	
9.70	1.76	1.76	6,041B	700.37	0.00	0.00	
9,80	1.75	1.75	6.0563	700.37	0.00	0.00	
9.90	1.75	1.75	6.0707	700,38	0.00	00.0	
10.00	1.74	1.74	6.0852	700.38	0.00	0.00	
10.10	1.74	1.74	6.0995	700.39	0.00	0.00	
10.20	1.73	1.73	6.1139	700,39	0.00	0.00	
10.30	1.72	1.72	6.1281	700.40	0.00	0.00	
10.40	1.72	1.72	6.1424	700.40	0,00	0.00	
10.50	1.71	1.71	6,1585	700.41	0.00	0.00	
10.60	1.70	1.70	6.1706 6.4947	700.41 700.42	0.00 0.00	0,00 0 ,00	
10.70	1.70	1.70	6,1847	700,42	0.00	0,00	

Modified Puls Routing Summary of Results

Inflow Hydrograph: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form I\I-2\Basin 2\Basin2_25YR.HYD Storage/Elevation Curve: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form I\I-2\Basin 2\Basin2\Es

Basin Bypass Capacity = 0.00 cfs
Starting Pool Elevation = 696.79 feat
Time Interval = 0.100 hours
Total number of Inflow points = 151

	Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)
Start	0.00	2.90	2.90	0.0000	696.79	0.00	0.00
Max. Inflow	1.10	138.37	138.37	2.2643	697.76	0.00	0.00
Max. Outflov	v 15.00	0.00	0.00	7.8799	700.98	0.00	0,00
Final	15.00	0.00	0.00	7.8799	700.98	0.00	0.00

Event Time (hours)	Hydrograph Inflow (cfa)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outlow (cfs)	Outflow Total (cfs)	w
5.00	3.71	3.71	6,2747	700.44	0.00	0.00	
5.00 5,10	3.64	3.64	6.3050	700.45	0.00	0.00	
5,20	3,57	3. 5 7	6.3348	700,45	0.00	0.00	
5,30	3.51	3.51	6.3641	700.47	0,00	0.00	
5.40	3.44	3.44	6,3928	700.48	0.00	0.00	
5.50	3.37	3.37	6.4210	700.49	0,00	0.00	
5.60	3.34	3,34	6,4487	700.50	0.00	0,00 0,00	
5.70	3.31	3.31	6.4762 6.5034	700.51 700.52	0.00 0.00	0,00	
5,80 5.90	3.28 3.25	3.28 3.25	6.5304	700,52 700,53	0.00	0.00	
5.90 6.00	3.22 3.22	3.22	6.5571	700,54	0.00	0.00	
6.10	3.19	3,19	6,5836	700.55	0.00	0.00	
6.20	3,15	3,15	6,6098	700.56	0.00	0,00	
6,30	3.12	3,12	6.6357	7 00.56	0.00	0.00	
6,40	3.08	3.08	6.6613	700. 5 7	0.00	ФО,О ОО О	
6,50	3.05	3.05	6,6867 6,7117	700.58 700.59	00,0 00.0	0.00 0.00	
6 .6 0 6.70	3.0 2 2,99	3.02 2.99	6.7117 8.7366	700.60	0.00	0.00	
5.80	2,96	2,96	6.7612	700.61	0.00	0.00	
6.90	2.93	2,93	6,7855	700.81	0.00	0.00	
7,00	2,90	2.90	6.8096	700.62	0.00	0,00	
7.10	2.85	2.85	6.8333	700,63	0.00	0.00	
7.20	2.81	2.81	6.8567	700.64	0,00	0.00	
7.30	2.77	2.77	6.8798	700.64	0.00 0.00	0.00 0.00	
7.40 7.50	2.73 2.68	2.73 2,68	6.9025 6.9249	700.65 700.66	0.00	0.00	
7.60	2.64	2,64	6.9469	700.87	0.00	0.00	
7.70	2.60	2.60	6.9685	700.87	0,00	0,00	
7.80	2.55	2.55	8,9898	700.68	0.00	0.00	
7.90	2.51	2,51	7.0107	700.69	0 .00	0.00	
8.00	2.47	2.47	7.0313	700.69	0.00	0.00	
8.10	2.43	2.43	7.0515	700,70	0.00 0.00	0,00 00.0	
6.20	2,40 2,3 6	2.40 2.36	7.0715 7.0 0 12	700.7 1 700.71	0.00	0.00	
8.30 8.40	2.32	2.32	7,1105	700.71	0.00	0.00	
8.50	2.29	2,29	7,1295	700.73	0.00	0,00	
8,60	2.25	2.25	7.1483	700,73	0.00	0,00	
8.70	2.22	2,22	7.16 68	700.74	0.00	0.00	
8.80	2.18	2.18	7,1850	700.75	0.00	0.00	
8.90	2.14	2.14	7,2028	700.75	0.00	0.00 0.00	
9,00 9,10	2.11 2.10	2.11 2.10	7.2204 7.2378	700.76 700.78	0.00 0. 0 0	0,00	
9.10 9.20	2.09	2.09	7.2551	700.72	0.00	0.00	
9.30	2.09	2,09	7.2724	700,77	00,0	0.00	
9.40	2.08	2.08	7.2896	700,78	00,0	0.00	
9.50	2.07	2.07	7.3067	700.79	0.00	0.00	
9.60	2.06	2.06	7.3238	700.79	0.00	0.00	
9,70	2.06	2.06	7.3408	700,80	0.00	0.00	
9.80	2.05	2.05	7,3578 7,3747	700.80 700.84	00,0 00,0	0.00 0.00	
9.90 10.00	2.04 2.03	2.04 2.03	7,3747 7,3915	700.81 700.81	0.00	0.00	
10.10	2.03	2,03	7,4083	700.81 7 00.82	0.00	0.00	
10.10	2,02	2,03	7,4250	700,82	0.00	0.00	
10,30	2.01	2,01	7.4417	700,83	0.00	0.00	
10.40	2.00	2,00	7.4583	700.84	0.00	0.00	
10.50	2,00	2.00	7,4748	700.84	0.00	0.00	
10.60	1,99	1.99	7,4913	700.85	0.00	0.00	
10.70	1.98	1.98	7.5077	700,85	0.00	Q .0 0	

Modified Puls Routing Summary of Results

inflow Hydrograph: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form \text{II-2\Basin 2\Basin2_100YR.HYD} Storage/Elevation Curve: F:\PROJECTS\GCSL\Southern Expansion\2007 October Southern Expansion Revision\Form \text{II-2\Basin 2\Basin
Basin Bypass Capacity = 0.00 cfs
Starting Pool Elevation = 696.79 feet
Time Interval = 0.100 hours
Total number of inflow points = 151

	Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Above MSL	Basin Outflow (cfs)	Outflow Total (cfs)
Start	0.00	4.83	4.83	0.0000	696.79	0.00	0.00
Max. Inflow	1.10	200.93	200.93	3.4293	698.56	0.00	0.00
Max. Outflow	w 15.00	0.00	0.00	11.2511	702.07	0.00	0.00
Final	15.00	0.00	0.00	11.2511	702.07	0.00	0.00

Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)	
				704.00	0.00	0.00	***************************************
5,00	5.02	5.02	9.0957	701,38 701,39	0,00 0,00	0.00 0.00	
5.10 5.20	4.93	4.93	9. 1368	703.39 701.40	0.00	0.00	
5,20 5,20	4.83 4.74	4.83 4.74	9,1771 9,2167	701.40 701.42	0.00	0,00	
5.30 5,40	4,74 4,65	4,74 4.65	9.2555	701.42	0.00	0.00	
5,40 5,50	4.56	4.56	9.2935	701.44	0.00	0.00	
5,60	4,51	4.51	9.3310	701.45	0.00	0.00	
5 .70	4.47	4.47	9,3681	701.47	0,00	0,00	
5.80	4.43	4,43	9.4049	701.48	0.00	0.00	
5,90	4.39	4.39	9.4413	701.49	0.00	0.00	
6.00	4.34	4.34	9.4774	701.50	0.00	0.00	
6.10	4.30	4.30	9,5131	701.51	0.00	0.00	
6.20	4.25	4.25	9.5484	701.53	0.00	0,00	
6 .30	4.21	4,21	9.5834	701.54	0.00	0.00	
6.40	4,17	4.17	9.6180	701.55	0.00	0.00	
6,50	4.12	4.12	9,6523	701.58	0,00	00,00 00.0	
6.60	4.08	4.08	9,5862	701.57	0.00 0.00	0.00	
6.70	4.04	4.04	9.7197 9.75 29	701,58 701,59	0.00	0.00	
6,80 6. 9 0	3.99 3.9 5	3,99 3,95	9.78 5 7	701.55 701.61	0,00	0.00	
7.00	3,91	3.91	9.8182	701.62	0.00	0.00	
7.1 0	3.85	3.8 5	9.8502	701.63	0.00	0.00	
7.20	3.79	3.79	9.8818	701.64	0,00	0,00	
7.30	3.72	3.72	9,9129	701,65	0.00	0.00	
7.40	3.66	3.66	9,9433	701.66	0.00	0.00	
7.50	3.60	3,60	9.9733	701. 67	0.00	0.00	
7.60	3.54	3,54	10,0029	701,68	0.00	0.00	
7.70	3.48	3.48	10.0319	701,69	0.00	0.00	
7,80	3.42	3.42	10,0604	701.70	D, 00	0,00	
7.90	3.36	3.36	10.0884	701.71	0.00	0.00	
8.00	3.30	3.30	10.1159	701,71	0,00	0.00 0,00	
8,10 8,00	3.25	3.25	10.1430	701.72 701.73	0.0 0 0,00	0,00 0 ,00	
8.20	3.20	3.20 3.16	10.1 69 6 10,1959	701.73	0.00	0.00	
8.30 8,40	3.16 3.11	3,11	10,1339	701.75	0.00	0.00	
8,50	3.06	3.06	10.2473	701.78	0.00	0.00	
8,60	3,02	3.02	10,2724	701.77	0,00	0.00	
8.70	2.97	2.97	10,2972	701.77	0.00	0.00	
8.80	2.92	2.92	10.3215	701,78	0.00	0.00	
8,90	2.88	2.88	10.3455	701.79	0.00	0,00	
9.00	2.83	2.83	10.3 6 91	701.80	0.00	0.00	
9.10	2.82	2,82	10,3924	701.81	0.00	0,00	
9.20	2,81	2.81	10.4157	701.81	0.00	0.00	
9.30	2,80	2.80	10.4389	701.82	0.00	0.00	
9.40	2.79	2.79	10.4620	701.83	0.00	0.00	
9,50	2.78	2.78	10.4850	701.84	0.00	00,0	
9.60	2.76	2.76	10.5079	701.84	0,00 0,00	00,0 00.0	
9.70	2.75	2.75	10,6307 10, 553 3	701,85 701,86	0,00	0.00	
9.80	2.74	2.74	10.535	701,87	0.00	0.00	
9,90 10.00	2.73 2.72	2.73 2.72	10.5785	701.87 701.87	0.00	0.00	
10.40	2.72	2.74	10.6209	701.88	0.00	0.00	
10,10	2.70	2.70	10.6433	701.89	0.00	0.00	
10.30	2.69	2.69	10.6655	701.90	0.00	0.00	
10.40	2.68	2.68	10,6877	701.90	0.00	0.00	
10.50	2.67	2.07	10.7098	701.91	0,00	0.00	
10.60	2,66	2,66	10,7319	701.92	0.00	0.00	
10.70	2.65	2.65	10.7538	701.92	0.00	0.00	

CLIENT GRAND CENTRAL SUBJECT SEDIMENTATION PROJECT NO. 951001.078
SANITARY LANDFILL BASIN NO. 2
PROJECT APPLICATION FOR MAJOR PERMIT MODIFICATION

NUMBER OF SEDIMENTATION PROJECT NO. 951001.078

BY HAH DATE 10/15/06
CHK TJM DATE 10/24/06
Page 1 of 2

TASK: To design the inlets, culverts, and channel that discharges stormwater to Sedimentation Basin No. 2.

REFERENCES:

- 1. Autodesk Land Desktop, 2007.
- 2. "Erosion and Sediment Pollution Control Program Manual," Pennsylvania Department of Environmental Protection, April 2000.
- 3. "Final Grade Plan," ERG Drawing No. E-288.

CALCULATIONS:

1. Inlet No. 3

Inlet No. 3 will convey stormwater runoff from drainage areas 6 and 7. The combined 25-year, 24-hour storm event peak flow is 67.17 cfs. The inlet will be a double PADOT Type M inlet with a top of inlet grate elevation of 767.0 ft. (Refer to Reference No. 3 and attached Inlet No. 3 Capacity).

Inlet No. 3 Culvert (Refer to attached Culvert Calculator output)

24" reinforced concrete pipe (RCP)

Design flowrate = 67.17 cfs

Inlet Elevation of Culvert = 762.0 ft.

Outlet Elevation of Culvert = 761.0 ft.

Culvert length = 50.0 ft.

Culvert slope = 2.0%

Manning's $n \approx 0.013$

Constant tailwater = 2.0 ft. due to culvert discharging into proposed channel

Headwater = 767.57 ft.

Velocity = 14.50 ft/s

Outlet Protection

The culvert is discharging into a proposed riprap (R-5) lined channel S 2.4.

2. Inlet No. 4 (Refer to attached Inlet No. 4 Capacity)

Inlet No. 3 will convey stormwater runoff from drainage area 5. The 25-year, 24-hour storm event peak flow is 7.93 cfs. The inlet will be PADOT Type M with a top of inlet grate elevation of 748.0 ft. (Refer to Reference No. 3 and attached Inlet No. 4 Capacity).

Inlet No. 4 Culvert (Refer to attached Culvert Calculator output)

18" RCP

Design flowrate = 7.93 cfs

Inlet Elevation of Culvert = 744.0 ft.

Outlet Elevation of Culvert = 741.0 ft.

Summary for Drainage Area 4

Segment 1: Overland Flow L = 100 ft, S = 0.333 ft/ft, n = 0.15, P(2yr/24hr) = 3.1 in Travel Time = 3.2 minutes

Segment 2: Concentrated Flow
L = 100 ft, S = 0.1 ft/ft, Unpaved surface
Travel Time = 0.3 minutes

Segment 3: Concentrated Flow
L = 600 ft, S = 0.02 ft/ft, Unpaved surface
Travel Time = 4.4 minutes

Total Travel Time = 7.94 Minutes

Watershed Title: Drainage Area 4

25 Year Type II Storm: Precipitation = 5.5 inches

Individual Subarea and Composite Hydrographs

Subarea						Time	(hre)					
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.21	2.77	7.93	1.86	1.02	0.74	0.59	0.49	0.38	0.26	0.17	0.00
Composite	0.21	2.77	7.93	1.86	1.02	0.74	0.59	0.49	0.38	0.26	0.17	0.00

The peak flow is 9.77 cfs at 12.1 hrs.

SCS TR55 Tabular Method

Watershed Title: Drainage Area 5

25 Year Type II Storm: Precipitation = 5.5 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	1.970	72	0.141	2.59	4.510	6.000	0.000	0.000
Composite	1.970	72		2.59				

SCS Segmental Travel Time

Summary for Drainage Area 6

Segment 1: Overland Flow
L = 40 ft, S = 0.03 ft/ft, n = 0.15, P(2yr/24hr) = 3.1 in
Travel Time = 4.1 minutes

Segment 2: Concentrated Flow
L = 140 ft, S = 0.05 ft/ft, Unpaved surface
Travel Time = 0.6 minutes

Segment 3: Channel **Flow**A = 11.5 sq. ft, P = 23.19 ft, L = 350 ft, S = 0.04 ft/ft, n = 0.035
Travel Time = 1.1 minutes

Segment 4: Channel Flow A = 12 sq. ft, P = 12.65 ft, L = 365 ft, S = 0.18 ft/ft, n = 0.045 Travel Time = 0.4 minutes

Segment 5: Channel Flow A = 12 sq. ft, P = 12.65 ft, L = 505 ft, S = 0.333 ft/ft, n = 0.045 Travel Time = 0.5 minutes

Total Travel Time = 6.71 Minutes

SCS TR55 Tabular Method

Watershed Title: Drainage Area 6

25 Year Type II Storm: Precipitation = 5.5 inches

Individual Subarea and Composite Hydrographs

Subarea						Time	(hrs)					
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	1.28	18.72	43.20	9.55	5.66	4.22	3.41	2.83	2.17	1.51	0.99	0.00
Composite	1.28	18.72	43.20	9.55	5.66	4,22	3.41	2.83	2.17	1.51	0.99	0.00

The peak flow is 63.79 cfs at 12.1 hrs.

SCS TR55 Tabular Method

Watershed Title: Drainage Area 7

25 Year Type II Storm: Precipitation = 5.5 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff . (ln)	T¢ (min)	Adj. Tc (min)	Tt (min)	AdJ. Tt (min)
1	0.840	72	0.141	2.59	1,920	6.000	0.000	0.000
Composite	0.840	72	_	2.59				

INLET NO. J CAPACITY

PROJECT NAME: GRAND CENTRAL SANITARY LANDFILL, SOUTHERN EXPANSION

 LOCATION:
 NORTHAMPTON COUNTY, PA

 PREPARED 8Y:
 TJM
 DATE: 10/13/2006

 CHECKED 8Y:
 HAH
 DATE: 10/14/2006

WATER		Low (2)	_	FLOW (3)		.OW (4)	PIPE FLOW (5)	SYSTEM
SURFACE	<u>INL</u>	.ET	TOP O	FINLET	36"	RCP	!	CAPACITY (8)
ELEVATION (1)	HEAD	Q	HEAD	q	PIPE HEAD	Q	Q	(CFS)
<u>(F1)</u>	(FT)	(CFS)	(FT)	(CFS)	(FT)	(CFS)	(CFS) '	
767.0	0.00	0.00	0.00	0.00	3.5	61.27	94.58	0.00
_ 767.1	0.10	2.19	0.10	22,97	3.6	62.14	94.58	2,19
767.2	0.20	6.19	0.20	32,48	3.7	63,00	94.58	6.19
767.3	0.30	11.38	0.30	39.78	3,8	63.84	94.58	11,38
767.4	0.40	17.52	0.40	45,93	3.9	64,68	94.58	17.52
787.5	0.50	24.45	0.60	61,35	4	65.50	94.58	24:48
767:6	0.60	32.18	0,60	56,26	4.1	66.31	94.58	32.18
767.7	0.70	40.58	0.70	60.76	4.2	67.12_	94,58	40.56
767.8	0.80	49.55	0.80	64.95	4.3	07.91	94.58	49.55
767.9	0.90	59.13	0.90	68,90	4.4	68,70	94.58	59.13
768.0	1.00	69.25	1.00	72.63	4,5	69.47	94.58	69.25
760.1	1.10	79.89	1,10	78.17	4.6	70.24	94.58	70.24
768.2	1.20	91.03	1.20	79.58	4.7	71.00	94.56	71.00
76 8.3	1.30	102,84	1.30	82.61	4.5	71.76	94.58	71,75
768,4	1.40	114.71	1.40	65.93	4,9	72.50	94,58	72.60
768.5	1,50	127.22	1.50	88.95	5	73.23	94.58	73.23
768.6	1.60	140.16	1,60	91.67	6.1	73.96	94.58	73.96
788.7	1.70	153,49	1.70	94,69	8.2	74.68	94.58	74.68
788.8	1.80	167.24	1.80	97.44	5,3	75.40	94.58	75.40
768.9	1.90	181.36	1.90	100.11	5.4	76.10	94.58	76.10
769.0	2.00	195.87	2.00	102.71	5.5	76.81	94.58	79.81

NOTES:

110120.	
(1) Top of intel elevation, ft. =	767

(2) Weir flow, Q = CLH^1,5

Where: C = weir coefficient = 3.00

L = welr length, ft. = where Inlet dimensions = 24" x 45.25"

L = weir length, it. = 23.08

H = head over inlet, ft (See lable)
number of inlets = 2

(3) Orifice flow through top of inlet, Q = Ca(2gh)^0.5

Where: C = orffice coefficient ⇒ 0.60
a = cross-sectional flow area of felet, aq. fl. = 15.08

where inlet dimensions = 24" x 45.25" g = acceleration of gravity = 32.2 ft/sec^s h = head on top of the inlet grate (See table)

(4) Pipe flow, $Q = A[(2gh)/(1+Ke^2)]^0.5$

Where: A = cross-sectional area of pipe, sq. ft. = 7.07

g = acceleration of gravity = 32.2 ft/sec^s

H = head above centerline of outlet pipe,

Where elevation of outlet pipe = 762

Ke' = combined entrance and bend head loss coefficier

d = inside diameter of one inches = 3600

d = Inside diameter of pipe, Inches = 36.00 number of pipes = 1.00

(5) Pipe flow, Q = $(1.49/n)A[R^{(2/3)}](S^{0.5})$

Where:

Manning's "n" =	0.0130
A = cross-sectional area of pipe, sq. ft. =	7.07
d = inside diameter of pipe, inches =	38.00
R = hydraulic radius, R = A/P =	0.75
P = wetted perimeter, ft =	9,42
S = slope, ft/ft	0.0200
Inlet Invert, ft =	762
Outlet Invert, ft =	761
L = pipe length, ft. =	50
number of pipes =	1.00

(6) Least of orifice, wier, or pipe flow. (See table)

ADDITIONAL NOTES:

- 1. Inlet is standard PADOT Type M inlet.
- 2. Design flowrate is 67.17 ds.

INLET NO. 4 CAPACITY

PROJECT NAME: GRAND CENTRAL SANITARY LANDFILL, SOUTHERN EXPANSION

 LOCATION:
 NORTHAMPTON COUNTY, PA

 PREPARED BY:
 TJM
 DATE: 10/13/2006

 CHECKED BY:
 HAH
 DATE: 10/14/2006

WATER SURFACE		LOW (2)		FLOW (3)	PIPE FLOW (4) 18" RCP		PIPE FLOW (5)	SYSTEM CAPACITY (6)
ELEVATION (1)	HEAD	Q	HEAD	Q	PIPE HEAD Q			(CFS)
(FT)	(FT)	(CFS)	(FT)	(CFS)	(FT)	(CFS)	(CFS)	l ' ' _
748.0	0,00	0.00	0.00	0.00	3.3	14.76	25.80	0.00
748.1	0.10	1.09	0.10	11.48	3.35	14.99	25.80	1.09
748.2	0.20	3.10	0.20	16,24	3.45	15.21	25.80	3.10
748.3	0.30	5.69	0.30	19.89	3,55	15.43	25.80	5,69
748.4	0.40	5.78	0.40	22.97	3.65	15.84	25.80	8.76_
748.5	0.50	12.24	0.50	25,68	3,75	15.86	25.80	12.24
748.6	0.60	16.09	0.60	28.13	3.85	16.07	25.80	18.07
748.7	0.70	20.28	0.70	30.38	3.95	16.27	25,80	16.27
748.8	0.80	24,78	0.80	32.48	4,05	16.48	25.80	16,48
748.9	0,90	29.58	0.90	34.45	4.15	16.58	25,80	18,68
749.0	1.00	34,63	1.00	38,31	4.25	16,00	25.80	18.88
749.1	1.10	39.95	1.10	38,09	4.35	17.08	25.80	17.08
749.2	1.20	45.52	1.20	39.78	4,45	17.27	25.80	17,27
749.3	1.30	51.32	1.30	41.40	4,55	17.46	25.80	17,48
749.4	1.40	57.36	1.40	42.97	4.65	17.68	25.80	17.66
749.5	1.50	63,61	1.50	44,47	4.75	17.84	25.80	17.84
749.6	1.60	70.08	1.60	45.93	4.85	18.03	25.80	18.03
749.7	1,70	78.75	1.70	47.35	4.95	18.22	25.80	18.22
749.8	1.80	83.62	1.80	48.72	6.05	18.40	25,80	18,40
749.9	1.90	90.68	1,90	50.05	5,15	18.58	2 <u>5</u> .80	19:58
750.0	2.00	97.93	2.00	51.35	5.25	18.76	25.80	18.76

(f) Top of inlet elevation, ft. = 748

(2) Weir flow, Q = CLH^1.5

Where: C = weir coefficient = 3.00

L = welr length, fL = where injet dimensions ≈ 24" x 45.25"

L = weir length, fl. = 11.54

H = head over inlet, fl (See table)
number of inlets = 1

(3) Orifice flow through top of Intet, Q = Ca(2gh)^0.5

Where: C = orifice coefficient = 0.60
a = cross-sectional flow area of injet, sq. ft. = 7.54

a = cross-sectional flow area of inlet, sq. ft. = where inlet dimensions = 24° x 45.25° g = acceleration of gravity = 32.2 fVsec^s

(4) Pipe flow, Q = A((2gh)/(1+ Ke))*0.5

Where: A = cross-sectional area of pipe, sq. ft. = 1.77

h = head on top of the inlet grate (See table)

g = acceleration of gravity = 32.2 ft/sec*s
H = head above centenine of outlet pipe,
where elevation of outlet pipe = 744
Ke' = combined entrance and bend head loss coefficier
d = legicle dispreter of other techniques.

d = Inside diameter of pipe, inches ⇒ 18.00 number of pipes ⇒ 1.00

(5) Pipe flow, $Q = (1.49/n)A[R^{*}(2/3)](S^{*}0.5)$

Where:

Manning's "n" =	0.0130
A = croas-sectional area of pipe, sq. ft. =	1.77
d = inside diameter of pipe, inches =	18.90
R ≠ hydraulic radius, ft > A/P =	0,375
P = wetted perimeter, rt =	4.71
S = slope, fVft	0.0600
Iniel Invert, it =	744
Outlet invert, ft =	741
L = pipe length, fl. =	50
number of pipes =	1.00

(6) Least of orifice, wier, or pipe flow. (See table)

ADDITIONAL NOTES:

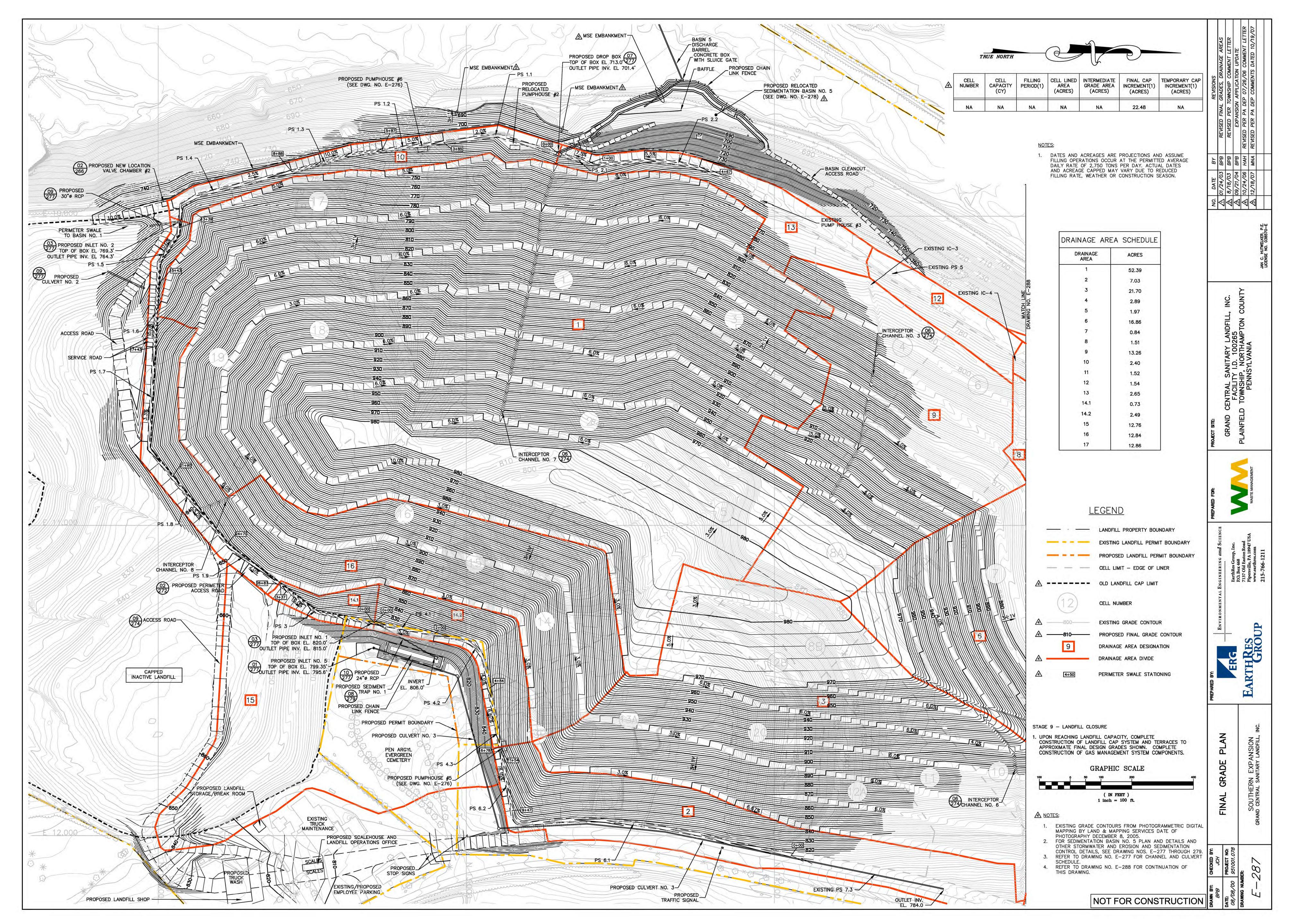
- 1. Inlet is standard PADOT Type M inlet.
- 2. Design flowrate is 7.93 cfs.

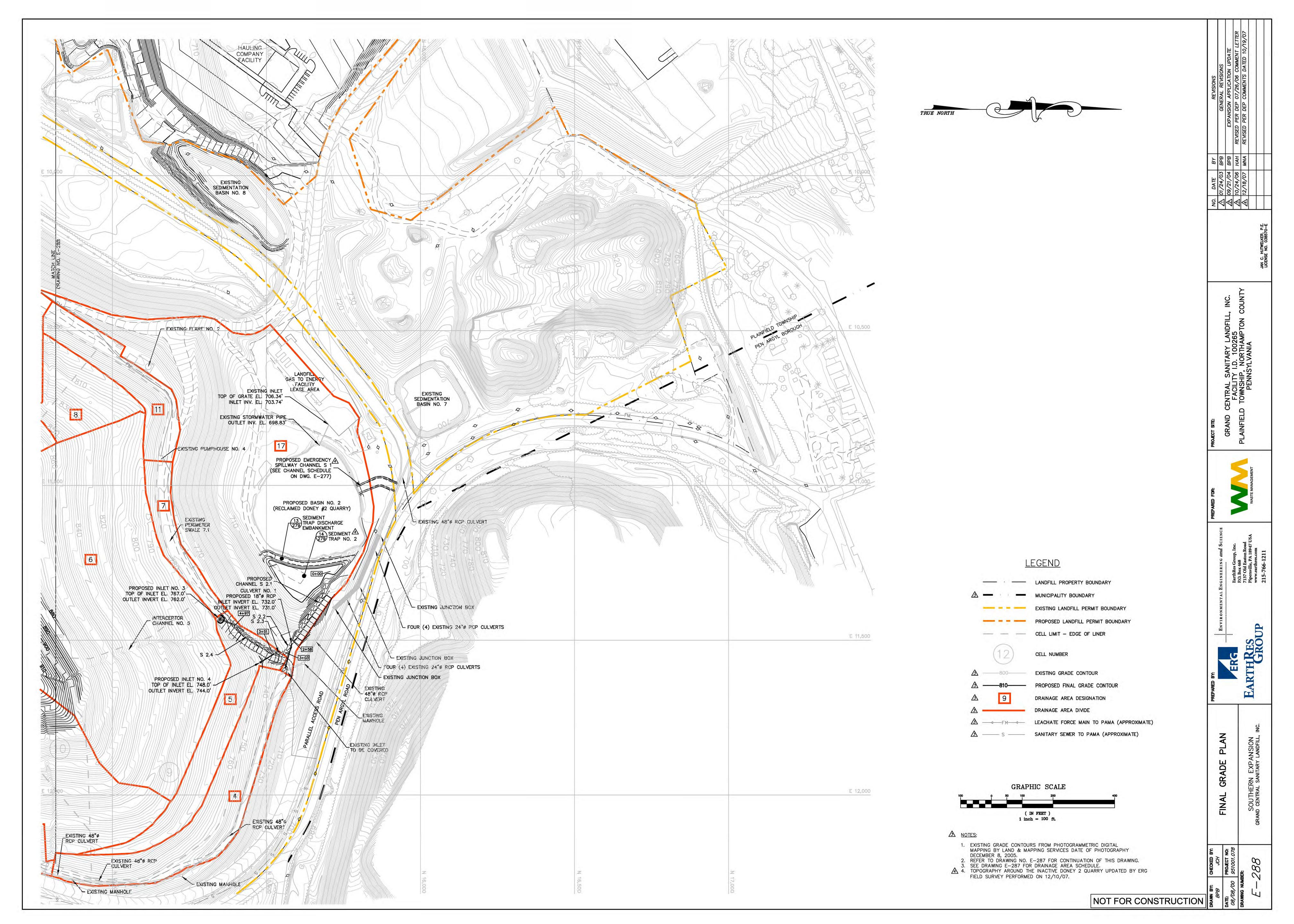
Culvert Calculator

Culvert No. 1

All calculator output should be verified prior to design use

Entered Data:	
Shape	Cincular
Number of Barrels	1
solving for	I tondustor
Solving for	
	1
Scale Number	1
Chart Description	CONCRETE PIPE CULVERT; NO BEVELED RING
ENTRANCE_	
Scale Description	SQUARE EDGE ENTRANCE WITH HEADWALL
Overtopping	off
Flowrate	9.7700 cfs
Manning's n	0.0130
Roadway Elevation	735.0000 ft
Inlet Elevation	732.0000 ft
Outlet Elevation	731.0000 ft
Diameter	2.0000 ft
Length	85.0000 ft
Entrance Loss	0.0000
Tailwater	2.0000 ft
Computed Results:	
Headwater	733.6557 ft Inlet Control
Slope	0.0118 ft/ft
Velocity	7.3784 fps





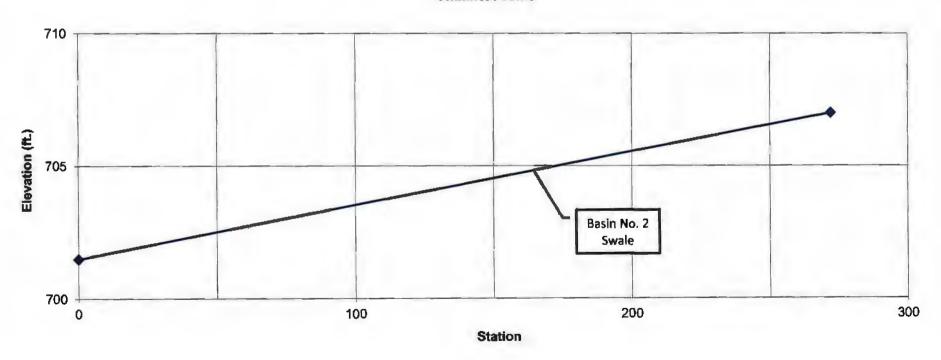
ATTACHMENT I-2 CHANNELS



Form I Diversion/Collection Ditch Data Sheet

Title:					Site: Slate Belt Heat Recovery Center					Company: Slate Belt Heat Recovery Center, LL Permit Number:									
Prepared By: EarthRes Group, Inc. Telephone Number: 215-766-1211						Date: February 28, 2018					Sheet:								
							Design	Calcula	ations : B	asin No.	2 Swale								
Sta	ation						Minim	um Requi	red Channel	Design							W	ith Freebo	ard
Start (ft.) End (ft.)	Elevation (ft.)	Drainage Area (acres)	Average Watershed Slope (%)	Curve Number	Peak Discharge Q (cfs)	Channel Bed Slope (%)	Freeboard (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes z:1	Flow Area (sq. ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (fps)	Q Available (cfs)	Channel Depth (fl.)	Top Channel Width (ft.)	Q Available (cfs)
0	702	-		-	7.76	4.0	0.50	Veg.	0.050	2.0	2	2.24	0.67	4.68	3.47	7.76	2.00	10.00	75.85
1+38	707																		

Channel Profile



ATTACHMENT I-3 RELOCATED INLET STORM PIPE





CLIENT SYNAGRO TECHNOLOGIES, INC. PROJECT SLATE BELT HEAT RECOVERY CENTER INLET STORM PIPE DESIGN CALCULATIONS

PROJ	ECT NO.	151014.003					
BY_	_ JCHJ	DATE	2/6/18				
CHK	DFA	DATE	2/6/18				
Page .	_1	fo	1				

TASK:

To determine the volume of stormwater runoff to be conveyed by the relocated inlet storm pipe that will outlet into the modified Sedimentation Basin No. 2.

REFERENCES:

- 1. "Erosion and Sediment Pollution Control Program Manual", Pennsylvania Department of Environmental Protection, March 2012.
- 2. Hydraflow Express Extension, Version 12, by Autodesk, Inc.
- 3. Point Precipitation Frequencies Estimates from NOAA Atlas 14.

ASSUMPTIONS:

- 1. The culvert will be designed to convey the 25-year, 24-hour storm event runoff from the proposed Slate Belt Recover Facility.
- 2. For Pen Argyl Township, the 25-year, 24-hour storm events is 5.79 inches, based on Reference 3.
- 3. Drainage areas which contribute flow to the culvert are assumed to be impervious. A rational coefficient value of 0.95 was used for the rational equation, reference 1.

CALCULATIONS:

1. Using the Rational Method (Reference 1), the stormwater runoff flow was calculated to be 2.81 cfs.

Rational Method

Q = CIA

Where:

Q = runoff (cfs)

C = runoff coefficient

I = rainfall intensity (in.)

A = area (acres)

 $Q = 0.95 \times 5.79 \times 0.51 = 2.81 \text{ cfs}$

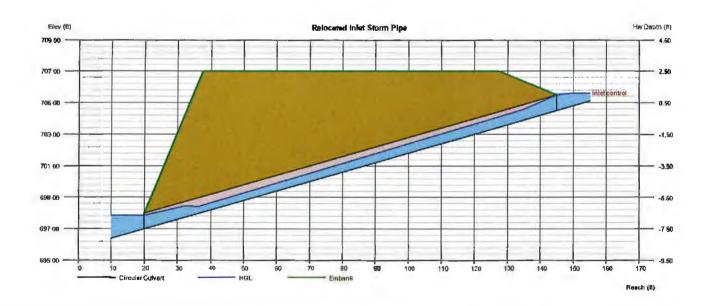
Reference 2 was then used calculate capacity of the proposed channel. See attached output.

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Wednesday, Feb 28 2018

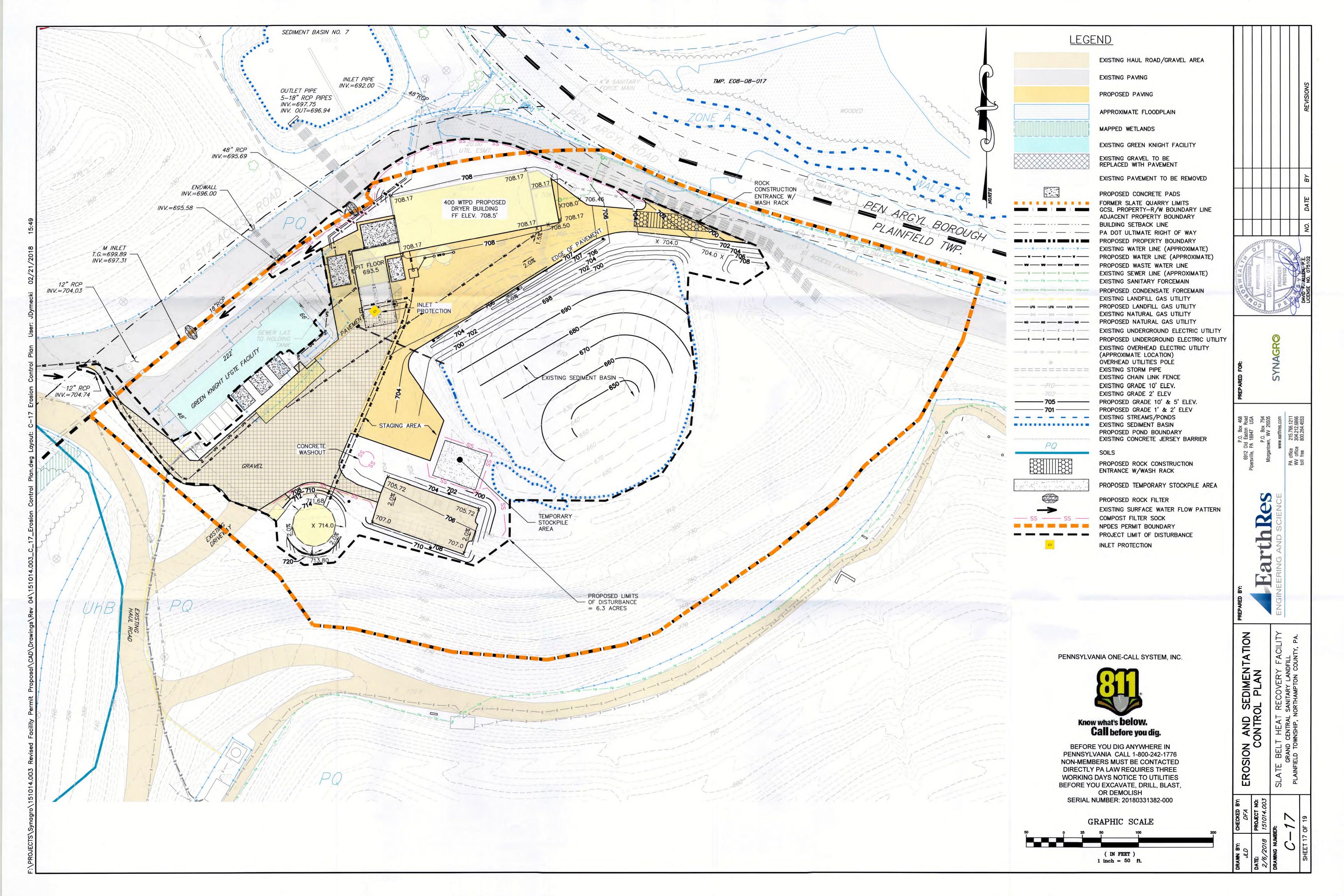
Relocated Inlet Storm Pipe

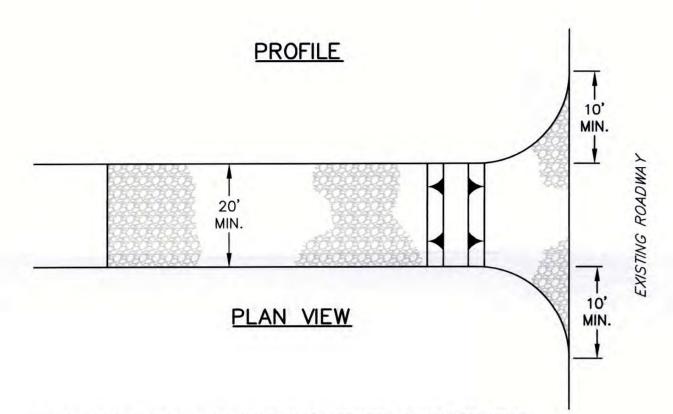
Invert Elev Dn (ft)	= 697.00	Calculations	
Pipe Length (ft)	= 125.00	Qmin (cfs)	= 2.81
Slope (%)	= 6.00	Qmax (cfs)	= 2.81
Invert Elev Up (ft)	= 704.50	Tailwater Elev (ft)	= (dc+D)/2
Rise (in)	= 12.0	, ,	,
Shape	= Circular	Highlighted	
Span (in)	= 12.0	Qtotal (cfs)	= 2.81
No. Barrels	= 1	Qpipe (cfs)	= 2.81
n-Value	= 0.013	Qovertop (cfs)	= 0.00
Culvert Type	Circular Culvert	Veloc Dn (ft/s)	= 3.91
Culvert Entrance	= Smooth tapered inlet throat	Veloc Up (ft/s)	= 4.66
Coeff. K,M,c,Y,k	= 0.534, 0.555, 0.0196, 0.9, 0.2	HGL Dn (ft)	= 697.86
		HGL Up (ft)	= 705.22
Embankment		Hw Elev (ft)	= 705.62
Top Elevation (ft)	= 707.00	Hw/D (ft)	= 1.12
Top Width (ft)	= 90.00	Flow Regime	= Inlet Control
Crest Width (ft)	= 40.00	ū	



ATTACHMENT I-4 EROSION & SEDIMENTATION CONTROL PLANS







* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

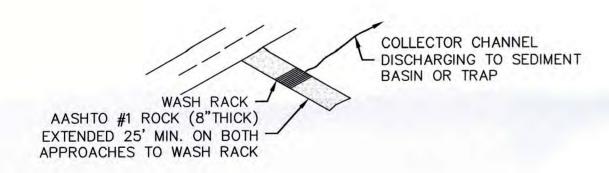
STANDARD CONSTRUCTION DETAIL #3-1 ROCK CONSTRUCTION ENTRANCE

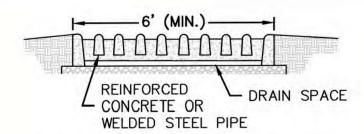
REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.

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 SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

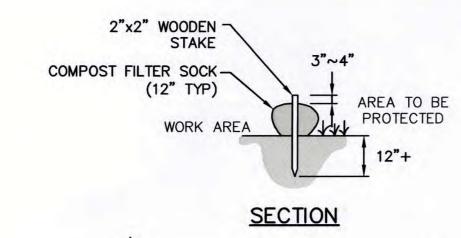


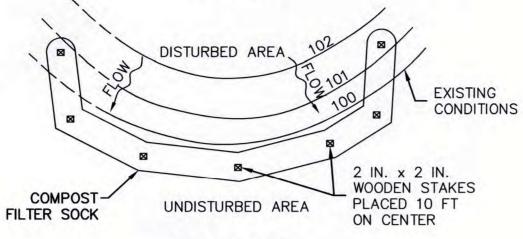


ROCK CONSTRUCTION ENTRANCE WITH WASH RACK DETAIL

NOT TO SCALE

- 1. WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS. WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE
- ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC. A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH TO WHEELS OF ALL
- VEHICLES EXITING THE SITE.
- 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. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.





COMPOST FILTER SOCK DETAIL

PLAN VIEW

NOT TO SCALE

NOTES:

1. SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP

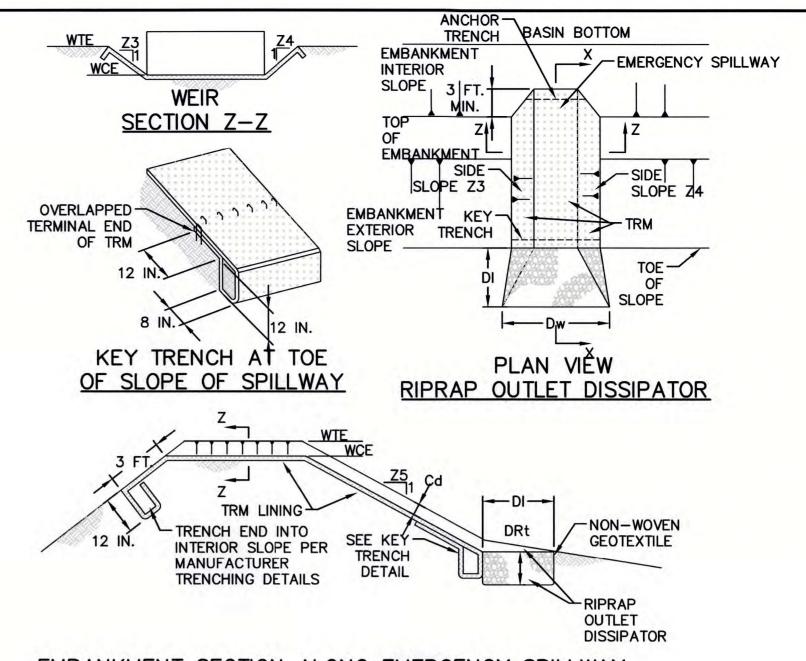
1. SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL

- COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
- TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER
- DESCRIBED ELSEWHERE IN THE PLAN. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF
- BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS: PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

	TABLE 4.1 -	- COMPOST	SOCK FABRIC	MINIMUM SPECIF	ICATIONS			
MATERIAL TYPE	3 MIL HDPE	5 MIL HDPE	5 MIL HDPE	MULTI-FILAMENT POLYPROPYLENE (MFPP)	HEAVY DUTY MULTI-FILAMENT POLYPROPYLENE (HDMFPP)			
MATERIAL	PHOTO-	PHOTO-	BIO-	PHOTO-	PHOTO-			
CHARACTERISTICS	DEGRADABLE	DEGRADABLE	DEGRADABLE	DEGRADABLE	DEGRADABLE			
SOCK DIAMETERS	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"			
MESH OPENING	3/8"	3/8"	3/8"	3/8"	1/8"			
ENSILE STRENGTH		26 PSI	26 PSI	44 PSI	202 PSI			
ULTRAVIOLET STABILITY % ORIGINAL STRENGTH (ASTM G-155)	23% AT 1,000 HR.	23% AT 1,000 HR.		100% AT 1,000 HR.	100% AT 1,000 HR.			
MINIMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS			
		TWO-PL	Y SYSTEMS					
INNER CON	ITAINMENT N	ETTING		HDPE BIAXIAL NET CONTINUOUSLY WOUND FUSION-WELDED JUNCTURES 3/4"x3/4" MAX. APERTURE SIZE				
	FILTRATION M		COMPOSITE LAYE MECHANIC 3/	POLYPROPYLENE R AND NON-WOV CALLY FUSED VIA 716" MAX. APERTI BE USED ON PRO	FABRIC (WOVEN /EN FLEECE <u>NEEDLE PUNCH)</u> URE SIZE			

TABLE 4.2 - CO	MPOST STANDARDS
ORGANIC MATTER CONTENT	25% - 100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5 - 8.5
MOISTURE CONTENT	30% - 60%
PARTICLE SIZE	30%-50% PASS THROUGH 3/8" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS/M (MMHOS/CM) MAXIMUM

ASTING 6 MONTHS OR LESS



EMBANKMENT SECTION ALONG EMERGENCY SPILLWAY SECTION X-X

			WEIR			LIN	IING	CHA	NNEL		DISSI	PATOR	
BASIN NO.	Z3 (FT)	Z4 (FT)	TOP ELEV WTE (FT)	CREST ELEV WCE (FT)	WIDTH Ww (FT)	TRM TYPE	STAPLE PATTERN	Z5 (FT)	DEPTH Cd (FT)	LENGTH DI (FT)	WIDTH Dw (FT)	RIPRAP SIZE (R)	RIPRA THICK DRt (IN)
02	3	3	706	704	90	P300	D	3	2	NA	NA	NA	NA

SEDIMENT BASIN EMERGENCY SPILLWAY WITH TRM LINING DETAIL

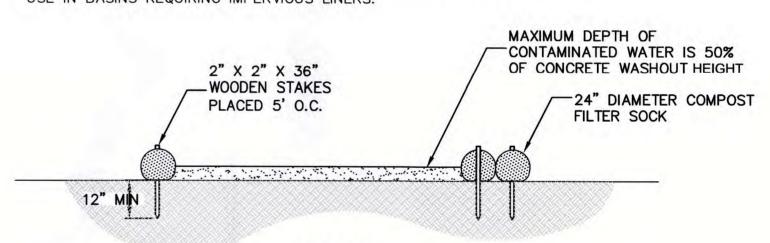
NOT TO SCALE

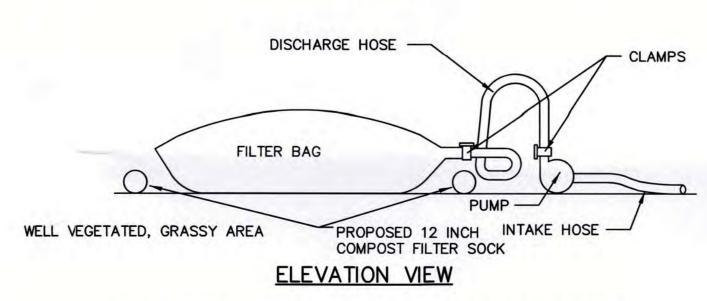
DISCHARGE HOSE

INTAKE HOSE -

1. HEAVY EQUIPMENT SHALL NOT CROSS OVER SPILLWAY WITHOUT PRECAUTIONS TAKEN TO PROTECT TRM LINING.

- 2. DISPLACED LINER WITHIN THE SPILLWAY AND/OR OUTLET CHANNEL SHALL BE
- REPLACED IMMEDIATELY. 3. RIPRAP AT TOE OF EMBANKMENT SHALL BE EXTENDED A SUFFICIENT LENGTH
- IN BOTH DIRECTIONS TO PREVENT SCOUR. 4. THE USE OF BAFFLES THAT REQUIRE SUPPORT POSTS ARE RESTRICTED FROM USE IN BASINS REQUIRING IMPERVIOUS LINERS.





PLAN VIEW

WELL VEGETATED, GRASSY AREA

HEAVY-DUTY LIFTING

STRAPS (RECOMMENDED)

FILTER BAG*

PROPOSED 12 "

COMPOST FILTER SOCK

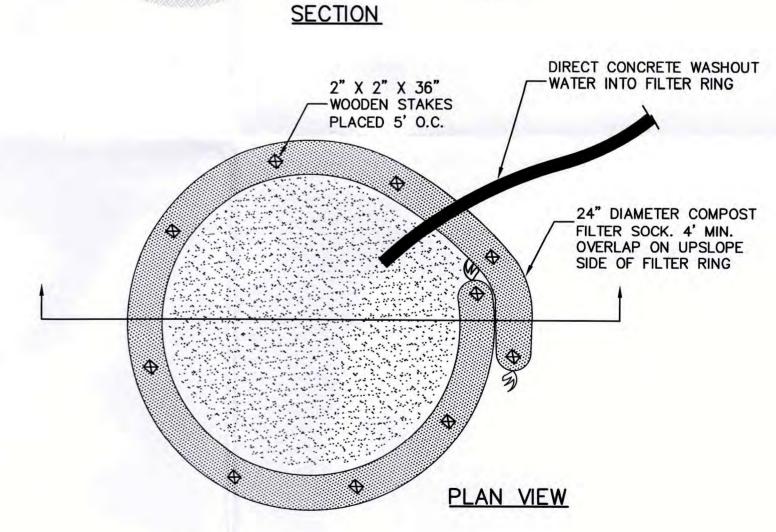
PUMPED WATER FILTER BAG DETAIL

NOT TO SCALE

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

1. FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE SEWN WITH HIGH STRENGTH, DOUBLE STITCHED 'J' TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE ABOVE STANDARDS.

- 2. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME HALF FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT. 3. BAGS SHALL BE LOCATED IN WELL VEGETATED AREAS AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. BAGS SHALL NOT BE
- PLACED ON SLOPES GREATER THAN 5%. 4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY
- 5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ONE-HALF OF THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.



TYPICAL COMPOST SOCK WASHOUT INSTALLATION

NOT TO SCALE

NOTES:

- 1. INSTALL ON FLAT GRADE FOR OPTIMUM PERFORMANCE 2. 18" DIAMETER COMPOST FILTER SOCK MAY BE STACKED IN A PYRAMIDAL CONFIGURATION FOR ADDED HEIGHT AND STABILITY.
- 3. A SUITABLE IMPERVIOUS GEOMEMBRANE SHALL BE PLACED AT THE LOCATION OF THE WASHOUT PRIOR TO INSTALLING THE SOCKS.

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GRADING SHOULD COMPLY WITH THE FOLLOWING SPECIFICATIONS FOR ALL SITES.

- 1. AREAS TO BE FILLED SHOULD BY CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.
- 2. AREAS WHICH ARE TO BE TOPSOILED SHOULD BE SCARIFIED TO A DEPTH OF 3 TO 5 INCHES, OR 6 TO 12 INCHES ON COMPACTED SOILS, PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHOULD HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHOULD HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.
- ALL EARTHEN FILLS SHOULD BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, ROADWAYS, STRUCTURES AND CONDUITS, ETC. SHOULD BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
 ALL EARTHEN FILLS SHOULD BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9
- INCHES IN THICKNESS.

 5. FILL MATERIALS SHOULD BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR
- PREVENT CONSTRUCTION OF SATISFACTORY FILLS.

 6. FROZEN MATERIALS OR SOIL, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHOULD
- FROZEN MATERIALS OR SOIL, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHOULD NOT BE INCORPORATED INTO FILLS.
- FILL SHOULD NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
 SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHOULD BE HANDLED IN ACCORDANCE WITH STANDARDS AND SPECIFICATIONS FOR SUBSURFACE DRAINS OR OTHER APPROVED METHOD.
- 9. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED.
- 10. STOCKPILES, BORROW AREAS AND SPOIL AREAS SHOULD BE SHOWN ON THE PLAN MAPS AND SHOULD BE SUBJECT TO THE PROVISIONS OF THESE STANDARDS AS WELL AS THOSE OF THE APPROVED E&S PLAN. ALL APPROPRIATE
- PERMITS/AUTHORIZATION SHOULD BE OBTAINED PRIOR TO EARTH DISTURBANCE ACTIVITIES WITHIN THESE AREAS.

 11. WHEREVER POSSIBLE, FILLS SHOULD NOT BE CONSTRUCTED FROM OR BUILT UPON
- SOILS KNOWN TO HAVE LOW SHEAR STRENGTH OR THAT HAVE BEEN IDENTIFIED AS "LANDSLIDE PRONE" UNLESS IS CAN BE SHOWN THAT IT CAN BE DONE WITH AN ACCEPTABLE SAFETY FACTOR.

 12. WHEREVER FILLS ARE TO CONSTRUCTED OUT OF OR ONTO SOILS IDENTIFIED AS
- HAVING LOW SHEAR STRENGTH OR ARE "LANDSLIDE PRONE," A REPORT SHOULD BE PREPARED BY A PROFESSIONAL GEOTECHNICAL ENGINEER OR PROFESSIONAL GEOLOGIST WHICH ADDRESSES THE FOLLOWING:
- A. THE CHARACTER OF THE BEDROCK AND ANY ADVERSE GEOLOGIC CONDITION IN THE AREA OF THE FILLS INCLUDING PREVIOUS SLOPE FAILURES.

 B. A SURVEY OF ALL SPRINGS, SEEPS, AND GROUNDWATER FLOW OBSERVED OR
- ANTICIPATED DURING WET PERIODS IN THE AREAS OF THE FILLS.

 C. THE MAXIMUM STEEPNESS OF SLOPE AND HEIGHT OF FILL TO BE CONSTRUCTED
- ON THE SITE.

 D. A STABILITY ANALYSIS INCLUDING, BUT NOT LIMITED TO, STRENGTH PARAMETERS, PORE PRESSURES, AND LONG—TERM SEEPAGE CONDITIONS. THESE DATA SHOULD BE ACCOMPANIED BY A DESCRIPTION OF ALL ENGINEERING DESIGN ASSUMPTIONS AND CALCULATIONS AS WELL AS THE ALTERNATIVES CONSIDERED IN SELECTING THE DESIGN SPECIFICATIONS AND
- TESTING METHODS.

 E. THE ESTIMATED FACTOR OF SAFETY SHOULD BE USED TO DESIGN THE SLOPES. AT A MINIMUM, THE LONG—TERM SAFETY FACTOR SHOULD BE 1.5 FOR CUTS OR FILLS WITHIN 50 FEET OF PUBLIC HIGHWAYS, RAILROADS, SURFACE WATER, OR WHERE FAILURE COULD ENDANGER PUBLIC SAFETY. THE SAFETY FACTOR
- SHOULD BE A MINIMUM OF 1.25 FOR ALL OTHER FILLS.

 13. TO AVOID ENDANGERING REGULATED WATER OF PUBLIC TRANSPORTATION FACILITIES, A MINIMUM SETBACK SHOULD BE MAINTAINED ACCORDING TO TABLE 16.1.

TABLE 16.1 — RECOMMENDED MINIMUM SETBACKS FOR FILL PLACEMENT IN

ERS, HIGHWAYS, RAILROADS, AND OTHER PORTATION FACILITIES*
MINIMUM SETBACK (FT)
10
25
50
1 FT OF SETBACK PER FT OF HEIGHT

SOIL AMENDMENT	PERMANE PER ACRE	NT SEEDING APP PER 1,000 S.F.		NOTES
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
	TEMPORA	RY SEEDING APPI	LICATION RATE	
AGRICULTURAL LIME	1 TONS	40 LB.	410 LB.	TYPICALLY NOT REQUIRED FOR TOPSOIL STOCKPILES
10–10–10 FERTILIZER	500 LB.	12.5 LB.	100 LB.	TYPICALLY NOT REQUIRED FOR TOPSOIL STOCKPILES

NOTE: A COMPOST BLANKET WHICH MEETS THE STANDARDS OF THIS CHAPTER MAY BE SUBSTITUTED FOR SOIL AMENDMENTS SHOWN IN TABLE 11.2.

			T	OLERANCE	S	MINIMUM SEED SPECIFICATIONS ₃				
SPECIES	GROWTH HABIT ₁	WET SOIL	DRY SITE	LOW FERTILITY	ACID SOIL (pH 5-5.5) ₂	PURITY (%)	READY GERM (%)	HARD SEED (%)	TOTAL GERM (%)	SEEDS/LE (1,000s)
WARM-SEASON GRASSE	S									
DEERTONGUE WEEPING LOVEGRASS	BUNCH	YES NO	YES YES	YES YES	YES YES	95 97	75 75		75 75	250 1,500
SWITCHGRASS₄ BIG BLUESTEM	BUNCH BUNCH	YES NO	YES YES	YES YES	YES YES		(60 F	,		250 1,500
COOL-SEASON GRASSE	S									
TALL FESCUE REDTOP	BUNCH SOD	YES YES	NO YES	YES YES	NO YES	95 92	80 80		80 80	227 5,000
FINE FESCUES PERENNIAL RYEGRASS	SOD BUNCH	NO YES	NO NO	YES NO	NO NO	95 95	80 85		80 85	400 227
ANNUAL RYEGRASS KENTUCKY BLUEGRASS	BUNCH SOD	YES NO	NO NO	YES NO	NO NO	95 85	85 75		85 75	227 2,200
REED CANARYGRASS ORCHARDGRASS	SOD BUNCH	YES YES	YES YES	YES YES	NO YES	95 95	70 80		70 80	520 654
TIMOTHY SMOOTH BROMEGRASS	BUNCH	YES NO	NO YES	YES YES	YES NO	95 95	80 80		80 80	1,230 136
LEGUMES5	300	NO	ILS	ILS	NO	35	00		00	130
CROWNVETCH BIRDSFOOT TREFOILs	SOD BUNCH	NO YES	YES NO	YES YES	NO YES	98 98	40 60	30 20	65 80	120 400
FLATPEA SERECIA LESPEDEZA	SOD BUNCH	NO NO	NO YES	YES YES	YES YES	98 98	55 60	20 20	75 80	10 335
CEREALS										
WINTER WHEAT WINTER RYE	BUNCH BUNCH	NO NO	NO NO	NO YES	NO YES	98 98	85 85		85 85	15 18
SPRING OATS SUNDANGRASS	BUNCH BUNCH	NO NO	NO YES	NO NO	NO NO	98 98	85 85		85 85	13 55
JAPANESE MILLET	BUNCH	YES	NO	YES	YES	98	80		80	155

- GROWTH HABIT REFERS TO THE ABILITY OF THE SPECIES TO EITHER FORM A DENSE SOD BY VEGETATIVE MEANS (STOLONS, RHIZOMES, OR ROOTS) OR REMAIN IN A BUNCH OF SINGLE PLANT FORM. IF SEEDED HEAVILY ENOUGH, EVEN BUNCH FORMERS CAN PRODUCE A VERY DENSE STAND. THIS IS SOMETIMES CALLED A SOD, BUT NOT IN THE SENSE OF A SOD FORMED BY VEGETATIVE MEANS.
- 2 ONCE ESTABLISHED, PLANTS MAY GROW AT A SOMEWHAT LOWER PH, BUT COVER GENERALLY IS ONLY ADEQUATE AT PH 6.0 OR ABOVE.
- MINIMUM SEED LOTS ARE TRULY MINIMUM, AND SEED LOTS TO BE USED FOR REVEGETATION PURPOSES SHOULD EQUAL OR EXCEED THESE STANDARDS. THUS, DEERTONGUE GRASS SHOULD GERMINATE 75% OR BETTER. CROWNVETCH SHOULD HAVE AT LEAST 40% READILY GERMINABLE SEED AND 30% HARD SEED. COMMONLY, SEED LOTS ARE AVAILABLE THAT EQUAL OR EXCEED MINIMUM SPECIFICATIONS. REMEMBER THAT DISTURBED SITES ARE ADVERSE FOR PLAN ESTABLISHMENT. READY GERMINATION REFERS TO SEED THAT GERMINATES DURING THE PERIOD OF THE GERMINATION TEST AND THE WOULD BE EXPECTED, IF CONDITIONS ARE FAVORABLE, TO GERMINATE RAPIDLY WHEN PLANTED. THE OPPOSITE OF READY GERMINATION IS DORMANT SEED, OF WHICH HARD SEED IS ONE TYPE.
- SWITCHGRASS SEED IS SOLD ONLY ON THE BASIS OF PLS.

 NEED SPECIFIC LEGUME INOCULANT. INOCULANT SUITABLE FOR GARDEN PEAS AND SWEETPEAS
- USUALLY IS SATISFACTORY FOR FLATPEA.

 BIRDSFOOT TREFOIL IS ADAPTED OVER THE ENTIRE STATE, EXCEPT IN THE EXTREME SOUTHEAST WHERE CROWN AND ROOT ROTS INJURE STANDS.

MIXTURE	SPECIES	SEEDING RATE -	- PURE LIVE SEED
NUMBER		MOST SITES	ADVERSE SITES
12	SPRING OATS (SPRING), OR ANNUAL RYEGRASS (SPRING OR FALL), OR WINTER WHEAT (FALL), OR WINTER RYE (FALL)	64	96 15 120 112
23	TALL FESCUE, OR FINE FESCUE, OR KENTUCKY BLUEGRASS, PLUS REDTOP4, OR PERENNIAL RYEGRASS	60 35 25 3 15	75 40 30 3 20
3	BIRDSFOOT TREFOIL, PLUS TALL FESCUE	6 30	10 35
4	BIRDSFOOT, TREFOIL, PLUS	6	10
	REED CANARYGRASS	10	15
5 ₈	CROWNVETCH, PLUS TALL FESCUE, OR PERENNIAL RYEGRASS	10 20 20	15 25 25
65,8	CROWNVETCH, PLUS	10	15
	ANNUAL RYEGRASS	20	25
78	BIRDSFOOT TREFOIL, PLUS	6	10
	CROWNVETCH, PLUS	10	15
	TALL FESCUE	20	30
8	FLATPEA, PLUS TALL FESCUE, OR PERENNIAL RYEGRASS	20 20 20	30 30 25
96	SERECIA LESPEDEZA, PLUS TALL FESCUE, PLUS REDTOP4	10 20 3	20 25 3
10	TALL FESCUE, PLUS	40	60
	FINE FESCUE	10	15
11	DEERTONGUE, PLUS	15	20
	BIRDSFOOT TREFOIL	6	10
127	SWITCHGRASS, OR BIG BLUESTEM, PLUS BIRDSFOOT TREFOIL	15 15 6	20 20 10
13	ORCHARDGRASS, OR	20	30
	SMOOTH BROMEGRASS, PLUS	25	35

PLS IS THE PRODUCT OF THE PERCENTAGE OF PURE SEED TIMES PERCENTAGE
GERMINATION DIVIDED BY 100. FOR EXAMPLE, TO SECURE THE ACTUAL PLANTING RATE
FOR SWITCHGRASS, DIVIDE 12 POUNDS PLS SHOWN ON THE SEED TAG. THUS, IF THE PLS
CONTENT OF A GIVEN SEED LOT IS 35%, DIVIDE 12 PLS BY 0.35 TO OBTAIN 34.3 POUNDS
OF SEED REQUIRED TO PLANT ONE ACRE. ALL MIXTURES IN THIS TABLE ARE SHOWN IN

- TERMS OF PLS.

 2 IF HIGH-QUALITY SEED IS USED, FOR MOST SITES SEED SPRING OATS AT A RATE OF 2
 BUSHELS PER ACRE, WINTER WHEAT AT 11.5 BUSHELS PER ACRE, AND WINTER RYE AT 1
 BUSHEL PER ACRE. IF GERMINATION IS BELOW 90%, INCREASE THESE SUGGESTED SEEDING
 RATES BY 0.5 BUSHEL PER ACRE.
- 3 THIS MIXTURE IS SUITABLE FOR FREQUENT MOWING. DO NOT CUT SHORTER THAN 4
- * KEEP SEEDING RATE TO THAT RECOMMENDED IN THIS TABLE. THESE SPECIES HAVE MANY SEEDS PER POUND AND ARE VERY COMPETITIVE. TO SEED SMALL QUANTITIES OF SMALL SEEDS SUCH AS WEEPING LOVEGRASS AND REDTOP, DILUTE WITH DRY SAWDUST, SAND, RICE HULLS, BUCKWHEAT HULLS, ETC.
- 5 USE FOR HIGHWAY SLOPES AND SIMILAR SITES WHERE THE DESIRED SPECIES AFTER ESTABLISHMENT IS CROWNVETCH.
- 6 USE ONLY IN EXTREME SOUTHEASTERN OR EXTREME SOUTHWESTERN PENNSYLVANIA.
- SERECIA LESPEDEZA IS NOT WELL ADAPTED TO MOST OF PENNSYLVANIA.

 7 DO NOT MOW SHORTER THAT 9 TO 10 INCHES.
- 8 SEED MIXTURES CONTAINING CROWNVETCH SHOULD NOT BE USED IN AREAS ADJACENT TO WETLANDS OR STREAM CHANNELS DUE TO THE INVASIVE NATURE OF THIS SPECIES.

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
SLOPES AND BANKS (NOT MOWED) WELL-DRAINED VARIABLE DRAINAGE	1 PLUS 1 PLUS	3, 5, 8, OR 12 ₁ 3 OR 7
SLOPES AND BANKS (MOWED) WELL-DRAINED	1 PLUS	2 OR 10
SLOPES AND BANKS (GRAZED/HAY) WELL-DRAINED	1 PLUS	2, 3, OR 13
GULLIES AND ERODED AREAS	1 PLUS	3, 5, 7, OR 12 ₁
EROSION CONTROL FACILITIES (BMPs) SOD WATERWAYS, SPILLWAYS, FREQUENT WATER FLOW AREAS DRAINAGE DITCHES	1 PLUS	2, 3, OR 4
SHALLOW, LESS THAN 3 FEET DEEP DEEP, NOT MOWED POND BANKS, DIKES, LEVEES, DAMS, DIVERSION	1 PLUS 1 PLUS	2, 3, OR 4 5 OR 7
CHANNELS, AND OCCASIONAL WATER FLOW AREAS MOWED AREAS NON-MOWED AREAS FOR HAY OR SILAGE ON DIVERSION CHANNELS AND	1 PLUS 1 PLUS	2 OR 3 5 OR 7
OCCASIONAL WATER FLOW AREAS	1 PLUS	3 OR 13
HIGHWAYS2 NON-MOWED AREAS PURE CROWNVETCH3 WELL-DRAINED VARIABLE DRAINED POORLY DRAINED AREAS MOWED SEVERAL TIMES PER YEAR	1 PLUS 1 PLUS 1 PLUS 1 PLUS 1 PLUS	5, 7, 8, 9, OR 10 3 OR 7 3 OR 4
UTILITY RIGHT-OF-WAY WELL-DRAINED VARIABLE DRAINED WELL-DRAINED AREAS FOR GRAZING/HAY	1 PLUS 1 PLUS 1 PLUS	5, 8, OR 12 ₁ 3 OR 7 2, 3, OR 13
EFFLUENT DISPOSAL AREAS	1 PLUS	3 OR 4
SANITARY LANDFILLS	1 PLUS	3, 5, 7, 11 ₁ OR 12 ₁
SURFACE MINES SPOILS, MINE WASTES, FLY ASH, SLAG, SETTLING BASIN RESIDUES AND OTHER SEVERELY DISTURBED AREAS (LIME TO SOIL TEST) SEVERELY DISTURBED AREAS FOR GRAZING/HAY	1 PLUS	3, 4, 5, 7, 9, 11 ₁ OR 12 3 OR 13

- 1 FOR SEED MIXTURES 11 AND 12, ONLY USE SPRING OATS OR WEEPING LOVEGRASS
- (INCLUDED IN MIX) AS NURSE CROP.
- 2 CONTACT THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION DISTRICT ROADSIDE SPECIALIST FOR SPECIFIC SUGGESTIONS ON TREATMENT TECHNIQUES AND MANAGEMENT
- 3 SEE MIXTURES CONTAINING CROWNVETCH SHOULD NOT BE USED IN AREAS ADJACENT TO WETLANDS OR STREAM CHANNELS DUE TO THE INVASIVE NATURE OF THIS SPECIES.

	ADD	LICATION RATE	(MINI)	
MULCH TYPE	PER ACRE		PER 1,000 S.Y.	NOTES
The second second	PER ACRE	FLN 1,000 3.1	1 LK 1,000 3.1.	
STRAW	3 TONS	140 LB.	1,240 LB.	FREE OF WEEDS, NOT CHOPPED OR FINELY BROKEN
НАҮ	3 TONS	140 LB.	1,240 LB.	TIMOTHY, MIXED CLOVER AND TIMOTHY OR OTHER NATIVE FORAGE GRASSES
WOOD CHIPS	4-6 TONS	185-275 LB.	1,650-2,500 LB.	MAY PREVENT GERMINATION OF GRASSES AND LEGUMES
HYDROMULCH	1 TONS	47 LB.	415 LB.	SEE LIMITATIONS BELOW

FIBER HYDROMULCH MAY BE APPLIED ON STEEPER SLOPES PROVIDED A TACKIFIER IS USED. THE APPLICATION RATE FOR ANY HYDROMULCH SHOULD BE 2,000 LB/ACRE AT A MINIMUM.

TABLE 11.7 — TYPICAL POLYMER STABILIZED FIBER MATRIX

APPLICATION RATES

MAXIMUM RAINFALL OF < 20"

SLOPES 6:1 5:1 4:1 3:1 2:1 1.5:1 1:1

SOIL STABILIZER (GALS/ACRE) 4 5 6 7 8 9 10

FIBER (LB/ACRE) 1,500 1,500 1,500 1,800 2,000 2,500 3,000

MAXIMUM RAINFA FOR SITE WINTER			AND
SLOPES	<5:1	4:1	>3:1
SOIL STABILIZER (GALS/ACRE)	6	8	10
TBER (LB/ACRE)	2,000	2,500	3,000

SYNAGRO

F.O. Box 400 6912 Old Easton Road Pipersville, PA 18947 USA P.O. Box 794 Morgantown, WV 26505 www.earthres.com

ENGINEERING AND SCIENCE

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FORM K GAS MANAGEMENT



2540-PM-BWM0379 6/2005

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

	Date Prepared/Revised March 2018
	DEP USE ONLY
	Date Received
-	

FORM K GAS MANAGEMENT

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form K, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

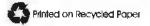
General References: 273.171, 273.292, 273.293/277.171, 277.292, 288.262, 288.263, 289.282, 289.283					
SECTION A. SITE IDENTIFIER					
Applicant/permittee: Grand Central Sanitary Landfill, Inc.					
Site Name: Grand Central Sanitary Landfill					
Facility ID (as issued by DEP): 100265					
SECTION B.					
Instructions: All questions must be answered in the columns to the right. In addition, all responses must be address narrative or on the submitted maps and/or plans. Attach appropriate documentation referencing this form number and titled to the columns of the submitted maps and/or plans.		written			
	Yes	No			
1. Is this application for:					
a landfill gas recovery wells/system					
b. landfill gas control vents					
c. landfill gas monitoring vents					
d. natural gas or oil well not associated with the landfill					
e. construction of gas vents not drilled					
2. Is the proposed gas management system for a/an:					
a. Permitted Inactive Landfill		×			
b. Permitted Active Landfill - In Compliance	×				
c. Permitted Active Landfill - Not in Compliance		\boxtimes			
d. Unpermitted Landfill					
e. New Application					
Will the well(s) intersect a workable coal seam?					
4. If the answer to 1(d) or 3 above is "yes" you must also apply to the Bureau of Oil & Gas Management. Have you done so?					
5. If the gas management operator is an entity other than the landfill permittee, a copy of the contractual agreement between the gas management operator, the solid waste permittee, and the landowner acknowledging liability for the various aspects of the project must be submitted with the application. This agreement shall clearly show that the solid waste disposal site permittee is ultimately responsible for maintaining compliance with the solid waste permit and environmental statutes at the site. The agreement shall also indicate that the parties thereto will not conduct any activities inconsistent with the DEP permit or authorizations to which the other parties are bound. Has a copy of this agreement been attached?					
Is the drilling activity limited both horizontally and vertically to the mass of the deposited waste?					

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SECTION B. (continued)						
		Yes	No			
7.	Will there be any well drilling activity adjacent to or surrounding the mass of the deposited waste?		×			
8.	Will there be any drilling activity below the mass of deposited waste? (At lined facilities, drilling below the mass of deposited waste is prohibited unless detailed assurance is provided on maintaining landfill integrity.)		⊠			
9.	Is the anticipated total depth of drilling known?					
10.	Will the well(s) be drilled through a coal seam where the coal has been removed?		×			
11.	Are there any probe holes proposed to monitor the pressure around the well during testing?					
12.	If response to item 11 is "yes", will the probe holes be capped, plugged, or sealed?					
13.	If the response to Item 12 is "yes", have procedures for plugging or pulling casings been included in this submission?					
14.	Is a schedule of long-term operation, maintenance, closure, deactivation, and plugging included herein?		×			
15.	Will the condensate and any other solid waste, liquids or gases generated as a result of drilling, venting or gas/energy recovery operations, be managed in accordance with the requirements of Act 97 and the rules and regulations of the Department listed below?					
	a. generator requirements					
	b. transporter requirements	×				
	c. processing requirements	×				
	d. treatment requirements	\boxtimes				
	e. disposal requirements					
	f. air emission requirements of the Air Pollution Control Act	\boxtimes				
	g. discharge requirements of the Clean Streams Law	Ø				
16.	Does this project address off-site gas migration problems? Explain. Not Applicable		⊠			
17.	Are any gas enhancement procedures proposed? If yes, explain in detail.					
18.	Have safety rules, procedures, or plans been developed and attached hereto for implementation at the project area?		×			

SECTION B. (continued)							
	Yes	No					
19. Will the wells or surface gas control equipment, or other structures intersect or otherwise disturb either surface or subsurface facilities or control measures on or adjacent to the solid waste facility?							
If yes, check the appropriate disturbed or modified facility/control measure:							
— сар							
- liner							
- leachate control system							
- subbase							
- renovating soil							
- critical slope							
surface water management facilities/structures							
- site access measures (roads, fences, gates etc.)							
- general, final site contours							
groundwater monitoring system							
- other (list in narrative)							
20. For all items checked "yes" in question no. 19, provide a detailed description (in the narrative and, where appropriate, in the large scale plan or cross-section) of the following:							
a. the nature of the anticipated modification or disturbance to the control measures or facilities, and							
b. how the modifications or disturbance will be implemented to assure that the landfill and drilling/gas recovery operations and all activities conducted incidental thereto are undertaken, constructed, or maintained in accordance with the provisions of Act 97 and the rules and regulations of the Department.							
21. Have all design plans or operational plans relative to this project been prepared by, or under the direction of a Pennsylvania Registered Professional Engineer? Do such documents bear the seal and signature of a Registered Professional Engineer?							
SECTION C. GAS MONITORING AND CONTROL PLAN							
The plan should address the following:							
1. Procedures to monitor and record off-site migration and gas accumulation on and off the site, including within structures.							
No changes proposed to the existing site procedures							
 2. Design drawings for the gas control system, indicating the location and scheduling of construction, and the design of vents, barriers, collection pipes, manifolds or other control measures that will be in place. 							
No changes proposed to the existing gas management system components at the landfill							
3. Analytical procedures for gases to be tested for as part of the monitoring program.							
4. The frequency of monitoring and individuals who will be responsible.							

	SECTION D. GAS RECOVERY
☑ 1.	Drawings and a narrative detailing the location and design of the proposed gas recovery system and the major on-site components of the system.
	See attached narrative and drawings. There are no changes proposed to the landfill collection devices or controls. The use
	of LFG as proposed in this application is for short-term use only when the Green Knight Energy Center is not operational.
☑ 2.	Plans and designs to address special storage, transportation, processing, treatment or disposal measures anticipated or required in the management of the generated gases, condensates or other residues. See attached narrative and drawings.
□ 3.	Plan to monitor and record off-site gas migration and gas accumulation on and off the site, including within structures. No changes proposed to the existing site procedures.



Form K - Gas Management Narrative

Introduction

Grand Central Sanitary Landfill (GCSL) is submitting a Minor Permit Modification application regarding the construction of the Slate Belt Heat Recovery Center (SBHRC) to be operated by Slate Belt Heat Recovery Center, LLC. The SBHRC will be located on 12.05 acres of land leased to SBHRC by GCSL and within the landfill permit boundary. SBHRC will utilize waste heat produced by the Green Knight Energy Development Center (GKEDC) to dry dewatered biosolids and produce a Class A biosolids product that will be used as a fertilizer blending agent, soil conditioner, and/or a renewable fuel product.

While the SBHRC will primarily utilize waste heat from the GKEDC turbine stacks to provide the necessary heat to the biosolids dryers, it will also have a thermal oil heater with the capability to use either natural gas or landfill gas (LFG). During periods when the GKEDC is not operating, the SBHRC will be able to supply LFG from GCSL in order to maintain operations. The only changes to the Gas Collection and Control System (GCCS) at GCSL will be the addition of a new tie-in location near the existing GKEDC connection point, piping to transfer LFG to the SBHRC, and the necessary control measures and equipment (flow meter) to facilitate use of LFG by the SBHRC as further outlined below. No changes are proposed to the currently existing GCCS already in place at GCSL.

Section B.

There are no changes to Section B of the current Form K proposed in this application.

Part 5 – If the gas management operator is an entity other than the landfill permittee, a copy of the contractual agreement between the gas management operator, the solid waste permittee, and the landowner acknowledging liability for the various aspects of the project must be submitted with the application.

Although SBHRC may intermittently use a portion of the site's LFG when the GKEDC is not operating, GCSL will continue to maintain full control of and responsibility for the site GCCS, and will continue to serve as the full-time operator of the system.

Part 18 – Have safety rules, procedures or plans been developed and attached hereto for implementation at the project area?

Safety rules and procedures for the gas collection system are included in the GCSL Form L Contingency Plan and is included by reference in this application. The contingency plan details



inspection procedures for various landfill systems along with health and safety rules, procedures, and training requirements.

Landfill gas system construction and operation entails working with and around a combustible gas and a gas containing potentially dangerous compounds. In addition to usual construction safety practice, special precautions must be taken by all personnel.

Some of the hazards associated with landfills include the potential for fires to start in exposed waste, fires or explosions from methane gas, and oxygen deficiency in enclosed spaces such as knock-outs, flares, trenches, vaults and structures. Methane, which is a component of landfill gas, is flammable and is explosive at concentrations of 5 percent in air. Methane is odorless and may only be detected with a combustible gas detector.

Hydrogen sulfide may also be present in landfill environments. It is a flammable gas that has an offensive odor like rotten eggs and can be highly toxic at concentrations greater than 1 in 400. The odor of hydrogen sulfide is detectable at concentrations much less than toxic levels but higher concentrations can instantly deaden the sense of smell. High concentrations can cause death within seconds.

General Safety Guidelines

The following general guidelines will be observed when working at or in the vicinity the landfill site and the GCCS:

- 1. Test the atmosphere
 - Test the atmosphere for the presence of combustible gas and hydrogen sulfide Before entering any confined space test the air with a gas detector instrument. Check for combustible gases first, then check toxic gases and oxygen deficiency. An oxygen deficiency can indicate the presence of undetected gases such as carbon monoxide, carbon dioxide or hydrogen sulfide.
- 2. Ventilate confined areas
 - To prevent the accumulation of confined spaces while occupied, thoroughly ventilate the area prior to and during occupation of the space by personnel. Keep blowers upwind of area so that exhausted gas is not ignited.
- 3. Use appropriate safety equipment:
 - Hard hats, gloves and appropriate shoes or boots
 - First aid kit
 - Fire extinguishers multi-purpose dry UL Class 20A-20B/C kept within 20 feet of all excavations
 - Personnel harnesses for work around deep excavations, wells, etc.
 - Combustible gas / oxygen detector



- Hydrogen sulfide detector
- Barriers and barricades
- Rigid covers to cover excavations when unattended
- 4. Provide back-up safety personnel
 Personnel shall follow all applicable OSHA regulations for confined space entry.
 At least two (2) people should be present at all times when monitoring for combustible gas concentrations. One person remains outside attending a safety line and providing supplies while the work is in progress.

A copy of the LFG safety data sheet (SDS) is included at Attachment K-1.

Section C. Gas Monitoring and Control Plan

There are no changes to Section C of the current Form K proposed in this application.

Section D. Gas Recovery

The thermal oil heater will be located near the GKEDC turbine exhaust stacks. The heater will be used to provide supplemental heat to the primary thermal oil heat source which utilizes heat exchangers to transfer heat from the turbine exhaust stacks to the thermal oil. When the GKEDC is operating, supplemental heat will be generated from the thermal oil heater using natural gas as needed. When the GKEDC is not operating, the thermal oil heater will have the ability to function using LFG as the fuel source via a connection near the GKEDC LFG connection point adjacent to the condensate pump station CPS-7B. LFG will be transferred from the landfill GCCS via a Flare #3 blower or using a dedicated vacuum blower and condensate knockout/demister pad located adjacent to the thermal oil heater.

Proposed blower skid equipment will be protected from the elements with a roof structure. The sides will be open for ventilation and ease of access for maintenance. It is anticipated that the thermal oil heater will use approximately 1,200 cubic feet per minute (cfm) when operating solely on LFG.

The GCCS, specifically Flare #3 or the candlestick flare, will be used to maintain a constant wellfield vacuum consistent with current GKEDC operational practices. Flare #3 or the candlestick flare will thermally destruct the remainder of the generated LFG while the GKEDC is not operating. The LFG flow rate to the thermal oil heater will be continuously recorded for site monitoring and compliance reporting purposes. The operations, including the flow meter, will be integrated and controlled through the use of GCSL's existing supervisory control and data acquisition (SCADA) system and a local programmable logic controller (PLC). It should be



noted that the proposed LFG use as a supplemental thermal heater fuel, while having the capability to be automated, will be discretionary based on the proposed duration of the GKEDC shutdown. GCSL's GCCS system will continue to operate in accordance with the current standard operating procedures when the GKEDC is not operating or operating at a reduced capacity and SBHRC does not transition to LFG utilization.

Condensate collected in the LFG conveyance system to the thermal unit heater will be routed back to CPS-7B for management at GCSL's leachate treatment plant (LTP). No other residues will be generated through the use of LFG as a supplemental fuel source. Air emissions associated with the operation of the thermal unit heater are summarized in SBHRC's Air Quality Plan Approval Application.





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SAFETY DATA SHEET (SDS)

MSW Landfill Gas

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: MSW Landfill Gas COMPANY NAME: Waste Management Affiliates

PRODUCT CODE: WM-LFG-001 EMERGENCY TELEPHONE NUMBER: (800) 424-9300

CHEMICAL NAME AND SYNONYMS: LFG, Biogas INFORMATIONAL TELEPHONE NUMBER: (713) 328-7333

LANDFILL NAME: Grand Central Senitary Landfill LANDFILL TELEPHONE NUMBER: (610) 863-2400

ADDRESS: 910 West Pennsylvania Avenue CITY: Pen Argyl STATE: PA ZIP CODE: 18072

SECTION 2 - HAZARDS IDENTIFICATION

PRIMARY ROUTES OF EXPOSURE:

Inhalation

ADDITIONAL ROUTES OF EXPOSURE:

Skin and/or eye contact

EYE CONTACT:

Hydrogen Sulfide can cause conjunctivitis with pain and vision disturbance at concentrations above 50 ppm.

Erosion of the comea may occur with very high exposures but is usually reversible.

SKIN CONTACT:

INHALATION:

May result in irritation, severe pain, itching and erthema.

Simple asphyxiants. Most of the MSW tendfill gas can create an asphyxiation hazard when present at typical tendfill gas concentrations because these gases reduce the concentration of oxygen inhaled. Depending on the concentrations of the landfill gas in the air that is inhaled symptoms may include nausea, headache, accelerated heartbeat, intermittent respiration, rapid fatigue, poor muscle coordination, vomiting, spasmatic breathing, convulsive movements, unconsciousness, or death in minutes.

Methane

Simple asphyxiant - see above.

Carbon Dioxide

Simple asphyxiant – see above. In addition, lower concentrations may cause dizziness, mental depression, visual disturbances, or shaking. See Section 3 for IDLH concentration.

Nitrogen

Simple asphyxiant – see above. In addition, severe cases abnormally low blood pressure, apnea, and cardiac arrest develop. Various disturbances including mood disturbances, numbness of the extremities, sleepiness, mental confusion and memory loss may occur. Prolonged or severe hypoxia results in unconsciousness. Prolonged asphyxia may produce CNS injury. Cerebral edema with brainstern hemilation may occur.

Oxygen

Atmospheres with oxygen concentrations below 19.5 percent can have adverse physiological effects, fatigue, faster and deep breathing, dizziness, buzzing in the ears, or rapid heartbeat. Atmospheres with less than 16 percent oxygen can become life threatening, loss of consciousness with prolonged exposure, convulsive movements, or death.

Hydrogen Sulfide

Inhalation of hydrogen sulfide may result in upper alrway imitation at concentrations above 5 ppm. Low-level exposure can cause eye pain and redness, dizzlness, nausea, and headache. Exposure to 50 ppm or higher may cause pulmonary edema or bronchitis. Exposure to 100 ppm is immediately dangerous to life and health. Exposure to high levels of hydrogen sulfide may cause convulsions, respiratory arrest, permanent brain damage, heart failure, or immediate death. In addition, cardiac effects including bradycardia, myocarditis, and conductive defects have been reported. Amnesia, delirium and hallucinations may also occur after exposure to high levels. See Section 3 for IDLH concentration.

NA- Not Applicable

NE- Not Established

UN-Unavailable

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SAFETY DATA SHEET (SDS)

MSW Landfill Gas

ORAL:

NA (Is a gas at room temperature, making ingestion unlikely).

NFPA HAZARDOUS MATERIALS RATINGS (For Methane):

Flammability Ratings:

Health: 1

FIRE: 4

Reactivity: 0

Hazard Ratings:

Health: 3

Fire: 4

Reactivity: 0

HCS Pictogram:



Hazard: Flemmable.

CARCINOGENICITY:

This product does not contain any carcinogens (in concentrations of 0.1% or greater) as defined by IARC,

NTP, or OSHA.

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS NO.	INGREDIENT	Vol.% (a)	W L% (a)	(in ppm)	EXPÓSURE LIMITS						
						TWA		STEL		Ceiling	
			_		[ppm	mg/m³	ррт	mg/m³	ppm	mg/m³
74-82-8	Methane	40-70	15-40	-	OSHA				_		-
					NIOSH	-			-		-
					ACGIH	(b)			-	-	-
124-38-9	Carbon Dioxide	30-60	40-70	40,000	OSHA	5,000	9,000		-		
1					NIOSH	5,000	9,000	30,000	54,000	-	_
					ACGIH	5,000	9,000	30,000	54,000	-	-
7727-37-9	Nitrogen	10-30	10-30	-	OSHA	-				-	-
					NIOSH	-	•	_		-	-
					ACGIH	-		(b)		_	
7782-44-7	Oxygen	1-5	1-5	-	OSHA	•	_			_	
					NIOSH		•		-	-	
	_			<u> </u>	ACGIH		-	-	-		-
7783-06-4	Hydrogen Sulfide	<0.1	<0.1	100	OSHA	-	-		-	20 (c)	-
					NIOSH	<u>.</u>	-	_	_	10 (d)	15
		<u> </u>		<u> </u>	ACGIH	1	1.4	5	7.0		-

⁽a) Landfill Gas may contain trace quantities (<0.01% by volume) of various gases not listed above. Sampling results indicate that this product does not contain any hazardous ingredients in regulated quantities. Absolute concentrations vary by site and with time.

(d) Ceiling limits have a 10 minute maximum peak.

⁽b) Simple asphyxiant, the minimal oxygen content should be 18% (ACGIH) or 19.5% (OSHA and NIOSH) under normal atmospheric pressure.

⁽c) Per OSHA Standard 29 CFR 1910.1000 Table Z-2, acceptable maximum peak above ceiling limit during an 8-hour shift is 50 ppm for 10 minutes (once only) If no other measureable exposure occurs.



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SAFETY DATA SHEET (SDS)

MSW Landfill Gas

SECTION 4 - FIRST-AID MEASURES

INHALATION: Remove victim to fresh eir. Perform cardio-pulmonary resuscitation (CPR) if patient is not breathing or if there is no

pulse by trained personnel. Administer oxygen by trained personnel. Seek medical attention if patient is/has been

unconscious or experience difficulty in breathing.

SKIN CONTACT: Wash with soap and water. Contact a physician if imitation persists or later develops.

EYE CONTACT: Immediately flush eye(s) with plenty of clean water for at least 15 minutes, while holding eyelid(s) open. Occasionally lift

the eyelid(s) to ensure thorough rinsing. Beyond flushing, do not attempt to remove material from the eye(s). Contact a

physician if imitation persists or later develops.

INGESTION: NA, is a gas at room temperature.

SECTION 5 - FIRE-FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA:

SPECIFIC FIRE HAZARDS:

FIRE FIGHTING PROCEDURES:

FLASH POINT (CLOSED CUP):

FLAMMABILITY LIMITS (% as Methane):

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Dioxide or Dry Chemical

May reignite explosively if fire is extinguished before stopping leak.

Use water spray or fog to cool fire-exposed containers.

NA, material is a gas

LEL: 5 UEL: 15

None

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED:

Evacuate immediate area.

Remove all ignition sources and stop leak if you can do so from a safe area without risk.

If possible, provide explosion-proof ventilation from a safe area.

Do not approach the area of the leak unless testing shows that the oxygen concentration is greater than 19.5%, the methane concentration is less than 10% of the LEL, and the concentrations of the indicated compounds are less than their respective exposure limits. Do not rely on a sense of smell for hydrogen sulfide release.

Wear a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) and other protective equipment where concantrations exceed the exposure limit for the indicated compounds, when the oxygen content is below 19.5%, or when working in unknown atmospheres. Place SCBA in positive pressure mode if the hydrogen sulfide concentration exceeds 100 PPM or the concentration is unknown. Do not rely on a sense of smell for hydrogen sulfide release.

Use only non-sparking tools and intrinsically safe or explosion proof (Class I, Div. I, Group D) equipment in areas where the methane concentration is unknown or greater than 10% of the LEL (See Section 5).

Test atmosphere periodically in the area of the leak and adjust use of PPE as detailed above until the leak is repaired and the area is determined by testing to be safe. Do not rely on sense of smell for hydrogen sulfide release.

NA- Not Applicable

NE- Not Established

UN-Unavailable

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Issue Date: 01/22/2018

SAFETY DATA SHEET (SDS)

MSW Landfill Gas

METHODS FOR CLEANING UP:

Burn through a flare stack or vent in accordance with Federal, State, and Local regulations.

SECTION 7 - HANDLING AND STORAGE

Follow the personal protection and control measures set forth in Section 8 of this SDS when handling this product.

HANDLING:

Bond and ground all lines and equipment used with gas to prevent static sparks. Keep away from heat,

sparks, and flames. Use only in well ventilated area.

STORAGE:

Do not smoke where landfill gas is present or potentially present. Avoid accidental release. Test atmosphere periodically for oxygen, methane, carbon dioxide, and hydrogen sulfide.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

LOCAL EXHAUST:

GENERAL VENTILATION:

Use adequate ventilation to maintain oxygen concentration above 19.5%, methane concentration less than 10% of the LEL (See Section 5), and other exposure to below the

exposure limit. Supervisory or Health/Safety personnel should address specific needs.

PERSONAL PROTECTIVE EQUIPMENT:

EYE PROTECTION:

SKIN AND BODY PROTECTION: RESPIRATORY PROTECTION:

Wear protective eyewear. Avoid direct contact with eyes.

Wear gloves and protective clothing to prevent skin contact. Avoid direct physical contact.

Test atmosphere periodically. Wear a NIOSH/OSHA approved self-contained breathing apparatus (SCBA) and other protective equipment where concentrations exceed the exposure limit for the indicated compounds, when the oxygen content is below 19.5%, or when working in unknown atmospheres. Place SCBA in positive pressure mode if the hydrogen sulfide concentration exceeds 100 PPM or the concentration is unknown. Do not

rely on a sense of smell for hydrogen sulfide release.

TOOLS/EQUIPMENT:

Use only non-sparking tools and intrinsically safe or explosion proof (Class I, Div. I, Group D)

equipment in areas where the methane concentration is unknown or is greater than 10% of the LEL (See Section 5).

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FQRM:

COLOR:

Gas Coloriess

ODOR:

Characteristic Odor

ODOR THRESHOLD:

Characteristic odor, Hydrogen Sulfide has a "rotten egg" odor

pH:

BOILING POINT (AT 760 MM HG):

NA. < -50 °F

FLASHPOINT:

NA

FLAMMABILITY: **EXPLOSION PROPERTIES:** Flammable / Explosive Limits (% as Methane): LEL; 5.0 UEL: 15.0

Methane is highly explosive when mixed with air at a volume between its LEL and UEL.

At concentrations below 5% and above 15%, methane is not explosive. NE.

VAPOR PRESSURE (AT 100°F):

VAPOR DENSITY:

0.89 - 1.09

NA- Not Applicable

NE- Not Established

UN-Unavailable

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SAFETY DATA SHEET (SDS)

MSW Landfill Gas

DENSITY:

SOLUBILITY IN WATER (%):

SPECIFIC GRAVITY (AT 77°F/25°C):

VISCOSITY (AT 77°F/25°C): FREEZING / MELTING POINT:

EVAPORATION RATE: % VOLATILE by VOLUME: PARTITION COEFFICIENT:

AUTO-IGNITION TEMPERATURE: DECOMPOSITION TEMPERATURE: 0,086 lb/cu ft.

Appreciable 0.0014 g/cc

NA NA

NA 100%

NA NA NA

SECTION 10 - STABILITY AND REACTIVITY

CHEMICAL STABILITY: CONDITIONS TO AVOID:

MATERIALS TO AVOID:

HAZARDOUS DECOMPOSITION

PRODUCTS:

Normally stable. Avoid heat, sparks and open flame.

Dangerous near organic materials.

Oxidizers.

Combustion may produce carbon monoxide, carbon dioxide, ethylene, and acetylene.

SECTION 11 - TOXICOLOGICAL INFORMATION

This product is a mixture of components. See Section 3 for composition percentages and exposure limits, Section 2 for exposure effects.

ACUTE TOXICITY:

CAS No.	Ingredient	Vol. %	Wt. %	LCLo- Lowest Published Lethal Concentration	Other
74-82-8	Methane	40-70	15-40	NE	Simple asphyxiant
124-38-9	Carbon Dioxide	30-60	40-70	90,000 ppm/5M	Simple asphyxiant
7727-37-9	Nitrogen	10-30	10-30	NE	Simple asphyxlant
7782-44-7	Oxygen	1-5	1-5	100 pph/14H	NA NA
7783-06-4	Hydrogen Sulfide	<0.1	<0.1	600 ppm/30M	NA

LOCAL EFFECTS

MUTAGENICITY:

NE - Not Established

CARCINOGENICITY:

This product does not contain any carcinogens (in concentrations of 0.1% or greater) as defined by IARC,

NTP, or OSHA.

NA- Not Applicable

NE- Not Established

UN-Unavailable

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SAFETY DATA SHEET (SDS)

MSW Landfill Gas

SECTION 12 - ECOLOGICAL INFORMATION No ecological data available. SECTION 13 - DISPOSAL CONSIDERATIONS PRODUCT DISPOSAL: Burn through a flere stack or vent in accordance with Federal, State and local approvals. SECTION 14 - TRANSPORT INFORMATION

DOT Information (49CFR 172.101)

PROPER SHIPPING NAME:

Gas sample, non-pressurized, flammable, n.o.s. (Landfill Gas Sample).

HAZARD CLASS:

2.1

UN / NA NUMBER:

UN3167

PACKING GROUP:

QUANTITY LIMITATIONS:

Passenger Aircraft/Rail - 1L; Cargo Aircraft only - 5L

VESSEL STORAGE REQUIREMENTS:

D- the material must be stowed "on deck only"

PACKAGING REQUIREMENTS:

This material requires the following to comply with the DOT Hazardous Materials Regulations (49 CFR Subpart C) general requirements for packaging and shipping of hazardous materials and/or dangerous goods:

- Must be shipped in a UN certified container (fiberboard box):
- Hazard label (placard) must be displayed on the box:
- Packaging orientation labels must be applied on two (2) opposite vertical sides of the box; and
- Box must carry the NAME and ADDRESS of the shipper and cosignee of the dangerous goods shipping application.

SECTION 15 - REGULATORY INFORMATION

US FEDERAL REGULATIONS:

Occupational Health and Safety Administration (OSHA)

This product does not contain any carcinogens (at 0.1% or greater) as defined by IARC, NTP or OSHA. Toxic Substance Control Act (TSCA)

TSCA Status: No components found in this product are considered new substances under TSCA. This product is not subject to EPA TSCA premanufacture notice (PMN) and/or reporting requirements. Superfund Amendments and Reauthorization Act (SARA) Title III

Section 302/304



Issue Date: 01/22/2018

SAFETY DATA SHEET (SDS)

MSW Landfill Gas

These sections require emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) of 'Extremely Hazardous Substances' (EHS) listed in Appendix A of 40 CFR 355.

 Chemical
 CAS No.
 Wt.%
 RQ (lbs)
 TPQ (lbs)

 Hydrogen Sulfide
 7783-06-4
 <0.1%</td>
 100
 500

Section 311/312

SARA Title III (EPCRA), Section 311 requires reporting of safety data sheets (SDS) or a list of covered chemicals to the state emergency response commission (SERC), local emergency planning committee (LEPC), and local fire department. Section 312 requires reporting of the Tier I/Tier II - Emergency and hazardous chemical inventory form. Minimum thresholds for reporting under Sections 311 and 312 are as follows: For Extremely Hazardous Substances (EHS) designated under Section 302 of Title III, the reporting threshold is 500 pounds (or 227 kg) or the threshold planning quantity (TPQ), whichever is lower. For all other hazardous chemicals for which facilities are required to have or prepare a SDS, the minimum reporting threshold is 10,000 pounds (or 4,540 kg).

Section 313

This material contains the following toxic chemicals that may be subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act:

Chemical CAS No. Wt.% Hydrogen Sulfide 7783-06-4 <0.1%

Note: This material does contain trace quantities of certain chemicals that appear on the Section 313 list. However, these trace quantities are significantly lower than the Section 313 reporting thresholds and do not trigger reporting requirements. The applicability of this material to Section 313 reporting is evaluated annually to ensure reporting is not required.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

Releases of CERCLA hazardous substances, in quantities equal to or greater than their reportable quantity (RQ), are subject to reporting to the National Response Center under CERCLA. Such releases are also subject to state and local under Section 304 of SARA Title III (EPCRA). This material contains the following components and RQs on the CERCLA hazardous substance list.

Chemical Wt. % Reportable Quantity (RQ) in pounds Amount of Release to equal RQ in pounds
Hydrogen Sulfide <0.1% 100 100,000

US STATE REGULATIONS:

Pennsylvania State Right-to-Know Regulations

Pennsylvania has promulgated State Right-to-Know regulations with chemical listing requirements which include the following chemicals contained in this material.

Chemical	Vol.%	Wt.%	CAS No.
Methane	40-70	15-40	74-82-8
Carbon Dioxide	30-60	40 -70	124-38-9
Nitrogen	10-30	10-30	7727-37-9
Oxygen	1-5	1-5	7782 -4 4-7
Hydrogen Sulfide	<0.1	<0.1	7783-06-4

Landfill Gas may contain trace quantities (<0.1%) of various gases not listed above. Absolute concentrations vary by site and with time.

Other State Listings

NA- Not Applicable NE- Not Established UN-Unavailable PAGE 7 OF 8



Issue Date: 01/22/2018

SAFETY DATA SHEET (SDS)

MSW Landfill Gas

California Proposition 65

The Safe Drinking Water and Toxic Enforcement Act of 1986, commonly known as Proposition 65, is a California law which requires any manufacturer, packager, or producer who conducts business in California to comply with the provisions of Proposition 65 by adding specific warnings to products and shipments that are sent to California.

Chemical

Wt. %

None

Note: No Section 2 components of this material appear on the California Proposition 65 list (last updated December 29, 2017). Trace quantities of other components which appear on the list are not believed to trigger the warning requirements for exposure under Proposition 65.

Delaware Air Quality Management List

The following Section 2 components are listed under Delaware's Reporting of a Discharge or Air Contaminant (7 Del. C., Section 6028) regulation for reporting the discharge of a pollutant or air contaminant meeting or exceeding a "Delaware Reportable Quantity" (DRQ).

Chemical Wt.% Delaware Reportable Quantity (lbs)

 Methane
 15-40
 F1000**

 Hydrogen Sulfide
 <0.1</td>
 100

New Jersey TCPA EHS List

The following Section 2 components are listed under New Jersey's Toxic Catastrophe Prevention Act (TCPA) (N.J.S.A. 13:1K-19 et seq.). The TCPA verifies compliance with state and federal accidental release prevention (ARP) requirements including requirements to have a DEP approved risk management program (RMP) if an extraordinarily hazardous substance (EHS) if handled, used, manufactured, stored, or generated over the specific quantities listed below.

ChemicalWt.%NJ Threshold (lbs)EPA Threshold (lbs)StatusMethane15-4010,00010,000Regulated flammable substanceHydrogen Sulfide<0.1</td>1,00010,000Regulated toxic substance

SECTION 18 - OTHER INFORMATION

Note: The recipient of this material should be aware of the possible existence of additional local regulations which may be applicable to this material. These data are offered in good faith as typical values and not as a product specification. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

^{**} F = Flammable substance - DRQ applies for short term releases (Immediate to one hour)

FORM 14 OPERATION PLAN – PHASE II





COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised March 2018

DEP USE ONLY

Date Received

FORM 14 OPERATION PLAN - PHASE II

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14, reference the item number and identify the date prepared. The "date prepared/revised" on this page.

The "date prepared/revised" on any attached sheets should match the "date prepared/revised" on this page.			
General References: Chapters 273 and 277			
SECTION A. SITE IDENTIFIER			
Applicant/permittee: Grand Central Sanitary Landfill, Inc.			
Site Name: Grand Central Sanitary Landfill			
Facility ID (as issued by DEP): 100265			
SECTION B. TYPE OF FACILITY			
SECTION C. GENERAL OPERATING DESCRIPTION			
Based on the required maps and grids for a facility of this type, describe the:			
See attached narrative for excerpts relevant to SBHRC			
 Proposed landfill method and procedures that are to be established and followed for the life of the proposed site. Include daily procedures, inspection and monitoring of incoming waste, and daily closing procedures. 			
2. Sequence of landfilling activity, including the proposed filling schedule.			
3. Type of landfill activity to be conducted at the proposed site.			
4. Proposed engineering techniques.			
SECTION D. SPECIFIC FEATURES			
Describe the method and schedule for construction, operation, modification, use, maintenance and removal of the following unless their retention is proposed for postclosure land use:			
 Dams, embankments, ditches and other impoundments that are to be located on the proposed site, and adjacent total property owned by the applicant. 			
2. Borrow pits, soil storage and handling areas and structures that are to be located on the proposed site, total property or adequate properties off-site,			
3. Scales and weigh stations, if required for municipal waste landfills.			
4. Water and air pollution control facilities that are in any way related to the proposed facility.			
5. Erosion control facilities to minimize the discharge of sediment from the proposed permitted site, total property, or associated properties off-site.			
6. Equipment storage, maintenance, and other buildings.			
 Access roads that are to be located on the proposed permitted site, total property or associated properties off-site. See attached narrative for excerpts relevant to SBHRC 			
SECTION E. PERSONNEL TRAINING			
Describe training procedures to be conducted for the handling and disposal of special handling waste.			
No changes proposed			
and distributed by a based of			

SECTION F. CONSTRUCTION SCHEDULE

Describe the construction schedule in relation to the grid coordinate system for signs and markers, For a municipal waste landfill, also describe the sequence of operation relating to the grid coordinate system. Explain where uniform permanent physical markers will be placed, how these physical markers will be maintained and of what materials the markers will be constructed. Further, explain how the proposed disposal area perimeter will be distinguished from the perimeter of the total property. What will be written on the required sign, what will it be constructed of, and where will it be located?

No changes proposed

SECTION G. SITE PREPARATION

Describe the site preparation plan/schedule for disposal of solid waste at the proposed facility. Include the following:

See attached narrative for excerpts relevant to SBHRC

- Identify the maximum and average daily weight or volume of waste to be accepted at the proposed site, and a detailed justification
 of these volumes.
- 2. For a municipal waste landfill, describe the method of compliance relating to measurement of waste. If 30,000 or more cubic yards of solid waste is expected to be accepted in a calendar year by this proposed facility for disposal, it must be weighed. The operator of this scale must be a licensed public weighmaster. Explain how the scale will be inspected and maintained to assure accuracy. If the proposed facility is not required to have a scale, explain how the waste will be accurately measured when it is received at the proposed facility.
- For a demolition/construction waste landfill, describe the method of compliance relating to measurement of waste. Explain how this waste type will be accurately measured by weight or volume prior to unloading.

SECTION H. WATER QUALITY PROTECTION

- 4. How will the operator prevent hazardous and explosive wastes, and liquids from being accepted and disposed of at the site?

What is ultimate disposition of leachate?

SECTION I. OPERATING HOURS

Provide the proposed operating hours of the facility.

See attached narrative for excerpts relevant to SBHRC

SECTION J. ACCESS PLAN		
Describe the Access Road Plan, including designs, cross sections and specifications. Indicate design load limits, and identify maximum anticipated loading to be encountered. +		
	See attached narrative for excerpts relevant to SBHRC	
1.	Explain how the access roads and parking and maneuvering areas will be designed, constructed and maintained to prevent erosion and sediment to streams or runoff.	
2.	Will streams or waterways be crossed? ☐ Yes ☐ No	
	If yes, explain how the requirements of Chapter 105 will be met.	
	Has an application been filed for a Chapter 105 permit? ☐ Yes ☐ No	
3.	Describe the drainage system for temporary and permanent roads and parking and maneuvering areas to be located at the proposed facility.	
4.	Describe the materials to be used on permanent or temporary roads and parking and maneuvering areas at the proposed facility: paved asphalt gravel cinders	
	other equivalent material - explain:	
	Will the grade of any access road be greater than 12% Yes No If yes, explain.	
5.	Describe the locations, widths and methods of maintenance for <u>all</u> access roads to be located on the proposed permitted facility, and on the entire property.	
SECTION K. ACCESS CONTROL PLAN		
Describe the Access Control Plan, including: See attached narrative for excerpts relevant to SBHRC		
1.	Use and locations of fencing and barriers to control access. Include heights, dimensions and construction materials. Fences are required around impoundments, leachate collection and treatment systems and gas processing facilities, if these facilities have not been included within the site fence.	
2.	Site security provisions.	
3.	Describe the facility sign that will be placed at the junction of each access road and public road.	
SECTION L. NUISANCE MINIMIZATION AND CONTROL PLAN		
and	scribe the Nuisance Control Plan, and include details regarding the methods by which the operator will perform regular, frequent I comprehensive inspections to evaluate the effectiveness of the plan for Vectors, Odors, Noise, Dust, Litter, and Other Public sances. The plan needs to include the following items:	
	SL follows its own approved nuisance minimization plan. SBHRC will develop a nuisance minimization plan for its facility idetails will be provided in its permit application submitted under separate cover.	
1. A	An inventory and map of areas at the facility that has the potential to cause nuisances	
	Dominate wind direction Description Description	
	 Hauling, truck staging, and radiation staging areas Leachate and gas management components 	
	 Leachate and gas management components Disposal areas, intermediate covered areas, anchor trenches, and trash relocation activities 	
	Landfill cell construction, fill and capping sequences	
	Landfill siting and position to nearby residences	

- 2. Description of nuisance related monitoring or response activities
 - Organization flow chart with each person's duties and responsibilities with regard to this plan.
 - Notification list for the facility and respective agencies
 - A description of how the facility will be operated to eliminate off-site nuisances
 - a. Monitoring frequency and locations
 - b. Inspections for odorous loads
 - c. Monitoring and inspections of the landfill's gas/odors controls
 - d. Dust suppression
 - A description of internal and external communication and alarms
- 3. Describe the facilities meteorological monitoring program
 - Meteorological weather station location
 - Data to be collected
 - Activities limited by the weather and the facilities threshold
- 4. Detailed plan for preventative maintenance and nuisance controls
 - Description and location of portable/temporary odor controls
 - Preventative nuisance measures used during the facilities construction
 - Description of the nuisance suppression program and the location of any fixed odor controls
 - Procedures for handling nuisance prone waste
 - Dust minimization plan
 - Employee and contractor training
 - Inspection frequency for odor management equipment
 - Emergency equipment
- 5. Provide specific countermeasures that will be undertaken by the facility in the event of a nulsance for:
 - Dust suppression from hauling, waste placement, or processing activities
 - Odors
 - Vectors
 - Landfill gas detection
 - Litter
 - Litter during windy conditions
- 6. Provide any additional information as requested by the Department, Host Municipality, or Host County.

SECTION M. LITTER CONTROL PLAN

Describe the Litter Control Plan, and explain how the operator will prevent litter from blowing or becoming deposited off-site, including:

- The types, locations and maintenance procedures for litter fences to be used at the proposed facility.
- 2. The frequency of litter pick up and disposal.

No changes proposed

SECTION N. SALVAGING

Explain if salvaging will occur on-site during hours of operation and non-operation. If yes, describe the methods of control over salvaging, and how salvaging will occur without interfering in the operation of the landfill. Further, describe the methods for on site movement and storage of salvaged materials, as well as off-site storage and transportation of salvaged materials.

No changes proposed

SECTION O. AIR QUALITY CONTROL

Describe the methods to control dust, and minimize and control air pollution at the proposed facility from exceeding any ambient air quality standards.

GCSL follows its own permitted plan for air quality monitoring and protection. SBHRC will develop and implement its own air resource protection plan for the SBHRC operation. Details will be provided in the SBHRC application submitted under separate cover.

SECTION P. WASTE PLACEMENT

- 1. Initial procedures for placement of waste on the liner system. No changes proposed
- An explanation of the location(s) of unloading area(s) at the proposed facility, and methods by which loaded collection vehicles
 will be directed to unload promptly at these areas. Waste cannot be unloaded where continuous or intermittent contact would
 occur with the groundwater table.
- Procedures for and the degree of compaction of solid waste. Describe the number and thickness of lifts, and explain how solid
 waste will be spread and compacted in layers.
- 4. Describe how the working face will be managed, and:
 - (i) compacted and covered on a daily basis for municipal waste landfills, and;
 - (ii) kept to a size which can easily be compacted for Construction/Demolition waste landfills;
 - (lii) how water that contacts the working face will be contained, and not combined, with surface water runoff.

SECTION Q. DAILY COVER

For a municipal waste landfill, describe the frequency of placement, composition, design requirements, storage duration and location(s), maintenance(including revegetation and erosion/sedimentation controls),and thickness of approved <u>daily cover</u> to be placed on exposed solid waste at the proposed site. Include a guality assurance plan, **No changes proposed**

SECTION R. INTERMEDIATE COVER

Describe the frequency of placement, composition, design requirements, storage duration and location(s), maintenance, and thickness of approved <u>intermediate cover</u> to be placed on partial or completed lifts at the proposed site. Explain how slopes, not to exceed 50%, will be maintained, covered, compacted, and revegetated to control erosion and sedimentation. Include a quality assurance plan and identify procedures to establish intermediate elevations.

No changes proposed

SECTION S. FINAL COVER SCHEDULE

Describe the time period that approved <u>final cover</u> will be placed on the proposed site, the methods by which final cover will be placed, and composition and design requirements, including:

No changes proposed

- A cap (comprised of a uniform and compacted one (1) foot layer of clay or synthetic type material, if approved).
- A drainage layer to prevent erosion and transmit flow of surface water.
- 3. A uniform and compacted layer of soil at least two (2) feet in thickness.

SECTION T. FINAL COVER CHARACTERIZATION			
Describe the characteristics of final cover, including: No changes proposed			
1.	physical properties of final cover,		
2.	capability of controlling fires,		
3.	load bearing capacity,		
4.	capability of supporting vegetation,		
5.	prevention of nuisances,		
6.	Include a quality assurance plan, and identify procedures to establish final elevation.		
	SECTION U. FINAL CONFIGURATION		
con	scribe the grade of the final slopes of the proposed facility, detailing design, installation, maintenance, slope stability, erosion introl, compaction, seeding, revegetation, percolation rates, and surface runoff. Leat will the maximum grade of the final surface be?		
	at will the average grade of the final surface be?		
	Are terraces to be used on the final surface?		
If yes, describe design, construction, grades and maintenance of the terraces.			
Describe the drainage ditches that will be constructed in each horizontal terrace to convey flow of surface water.			
No changes proposed			

Form K - Gas Management Narrative

Introduction

Grand Central Sanitary Landfill (GCSL) is submitting a Minor Permit Modification application regarding the construction of the Slate Belt Heat Recovery Center (SBHRC) to be operated by Slate Belt Heat Recovery Center, LLC. The SBHRC will be located on 12.05 acres of land leased to SBHRC by GCSL and within the landfill permit boundary. SBHRC will utilize waste heat produced by the Green Knight Energy Development Center (GKEDC) to dry dewatered biosolids and produce a Class A biosolids product that will be used as a fertilizer blending agent, soil conditioner, and/or a renewable fuel product.

While the SBHRC will primarily utilize waste heat from the GKEDC turbine stacks to provide the necessary heat to the biosolids dryers, it will also have a thermal oil heater with the capability to use either natural gas or landfill gas (LFG). During periods when the GKEDC is not operating, the SBHRC will be able to supply LFG from GCSL in order to maintain operations. The only changes to the Gas Collection and Control System (GCCS) at GCSL will be the addition of a new tie-in location near the existing GKEDC connection point, piping to transfer LFG to the SBHRC, and the necessary control measures and equipment (flow meter) to facilitate use of LFG by the SBHRC as further outlined below. No changes are proposed to the currently existing GCCS already in place at GCSL.

Section B.

There are no changes to Section B of the current Form K proposed in this application.

Part 5 – If the gas management operator is an entity other than the landfill permittee, a copy of the contractual agreement between the gas management operator, the solid waste permittee, and the landowner acknowledging liability for the various aspects of the project must be submitted with the application.

Although SBHRC may intermittently use a portion of the site's LFG when the GKEDC is not operating, GCSL will continue to maintain full control of and responsibility for the site GCCS, and will continue to serve as the full-time operator of the system.

Part 18 - Have safety rules, procedures or plans been developed and attached hereto for implementation at the project area?

Safety rules and procedures for the gas collection system are included in the GCSL Form L Contingency Plan and is included by reference in this application. The contingency plan details



inspection procedures for various landfill systems along with health and safety rules, procedures, and training requirements.

Landfill gas system construction and operation entails working with and around a combustible gas and a gas containing potentially dangerous compounds. In addition to usual construction safety practice, special precautions must be taken by all personnel.

Some of the hazards associated with landfills include the potential for fires to start in exposed waste, fires or explosions from methane gas, and oxygen deficiency in enclosed spaces such as knock-outs, flares, trenches, vaults and structures. Methane, which is a component of landfill gas, is flammable and is explosive at concentrations of 5 percent in air. Methane is odorless and may only be detected with a combustible gas detector.

Hydrogen sulfide may also be present in landfill environments. It is a flammable gas that has an offensive odor like rotten eggs and can be highly toxic at concentrations greater than 1 in 400. The odor of hydrogen sulfide is detectable at concentrations much less than toxic levels but higher concentrations can instantly deaden the sense of smell. High concentrations can cause death within seconds.

General Safety Guidelines

The following general guidelines will be observed when working at or in the vicinity the landfill site and the GCCS:

- 1. Test the atmosphere
 - Test the atmosphere for the presence of combustible gas and hydrogen sulfide Before entering any confined space test the air with a gas detector instrument. Check for combustible gases first, then check toxic gases and oxygen deficiency. An oxygen deficiency can indicate the presence of undetected gases such as carbon monoxide, carbon dioxide or hydrogen sulfide.
- 2. Ventilate confined areas
 - To prevent the accumulation of confined spaces while occupied, thoroughly ventilate the area prior to and during occupation of the space by personnel. Keep blowers upwind of area so that exhausted gas is not ignited.
- 3. Use appropriate safety equipment:
 - Hard hats, gloves and appropriate shoes or boots
 - First aid kit
 - Fire extinguishers multi-purpose dry UL Class 20A-20B/C kept within 20 feet of all excavations
 - Personnel harnesses for work around deep excavations, wells, etc.
 - Combustible gas / oxygen detector



- Hydrogen sulfide detector
- Barriers and barricades
- Rigid covers to cover excavations when unattended
- 4. Provide back-up safety personnel
 Personnel shall follow all applicable OSHA regulations for confined space entry.
 At least two (2) people should be present at all times when monitoring for combustible gas concentrations. One person remains outside attending a safety line and providing supplies while the work is in progress.

A copy of the LFG safety data sheet (SDS) is included at Attachment K-1.

Section C. Gas Monitoring and Control Plan

There are no changes to Section C of the current Form K proposed in this application.

Section D. Gas Recovery

The thermal oil heater will be located near the GKEDC turbine exhaust stacks. The heater will be used to provide supplemental heat to the primary thermal oil heat source which utilizes heat exchangers to transfer heat from the turbine exhaust stacks to the thermal oil. When the GKEDC is operating, supplemental heat will be generated from the thermal oil heater using natural gas as needed. When the GKEDC is not operating, the thermal oil heater will have the ability to function using LFG as the fuel source via a connection near the GKEDC LFG connection point adjacent to the condensate pump station CPS-7B. LFG will be transferred from the landfill GCCS via a Flare #3 blower or using a dedicated vacuum blower and condensate knockout/demister pad located adjacent to the thermal oil heater.

Proposed blower skid equipment will be protected from the elements with a roof structure. The sides will be open for ventilation and ease of access for maintenance. It is anticipated that the thermal oil heater will use approximately 1,200 cubic feet per minute (cfm) when operating solely on LFG.

The GCCS, specifically Flare #3 or the candlestick flare, will be used to maintain a constant wellfield vacuum consistent with current GKEDC operational practices. Flare #3 or the candlestick flare will thermally destruct the remainder of the generated LFG while the GKEDC is not operating. The LFG flow rate to the thermal oil heater will be continuously recorded for site monitoring and compliance reporting purposes. The operations, including the flow meter, will be integrated and controlled through the use of GCSL's existing supervisory control and data acquisition (SCADA) system and a local programmable logic controller (PLC). It should be



noted that the proposed LFG use as a supplemental thermal heater fuel, while having the capability to be automated, will be discretionary based on the proposed duration of the GKEDC shutdown. GCSL's GCCS system will continue to operate in accordance with the current standard operating procedures when the GKEDC is not operating or operating at a reduced capacity and SBHRC does not transition to LFG utilization.

Condensate collected in the LFG conveyance system to the thermal unit heater will be routed back to CPS-7B for management at GCSL's leachate treatment plant (LTP). No other residues will be generated through the use of LFG as a supplemental fuel source. Air emissions associated with the operation of the thermal unit heater are summarized in SBHRC's Air Quality Plan Approval Application.





COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised March 2018

DEP USE ONLY

Date Received

FORM 3 MAP REQUIREMENTS - PHASE II MUNICIPAL WASTE AND CONSTRUCTION/DEMOLITION WASTE LANDFILLS

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 3, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Sections 273.133/277.133

Instructions: Provide the following maps in the scales and contours indicated. Before each item listed below, identify the specific map or plan where the information requested can be found.

Scale: 1 inch equals no more than 200 feet with 10 foot maximum contour intervals.

Drawings shall meet the following requirements or contain:

- a. The maximum drawing size of 30" X 36".
- b. The north arrow designated as magnetic or true.
- c. Grid system tied to north arrow and on-site survey monuments.
- d. A legend of symbols.
- e. Horizontal and vertical scale.
- f. A title block which identifies the applicant, municipalities, consultant and dates of all information.
- g. Seal and signature of PA registered Professional Engineer on cover sheet of drawings and seal on all subsequent drawings in the set.

SECTION A. SITE IDENTIFIER

Applicant/permittee: Grand Central Sanitary Landfill, Inc.

Site Name: Grand Central Sanitary Landfill

Facility ID (as issued by DEP): 100265

SECTION B. TOPOGRAPHIC MAP

Topographic map of proposed permit and adjacent areas showing the following:

- Boundaries of lands proposed to be affected over the estimated total life of proposed operation and the sequence of landfilling and closure.
- 2. A change in a component of facility or feature within proposed permit area caused by proposed operation.
- 3. Buildings, utility corridors and facilities which will be used in operation.
- 4. The areas of land for which bond will be posted under Chapter 271, Subchapter D.
- 5. Solid waste storage, processing or unloading areas.
- 6. Water diversion, collection conveyance, erosion and sedimentation control, treatment, storage and discharge facilities.
- 7. Location and elevation of permanent physical markers for grid coordinate system.
- 8. Gas management, collection, and control facilities.
- 9. Boundaries of construction activities.
- 10. Barriers, fences and similar structures required by 273.212/277.212.
- 11. Sedimentation pond, permanent water impoundment, or similar facility.
- 12. Access roads to site, including slopes, grades and lengths of roads.
- 13. Monitoring wells.
- 14. Area for isolating detected radioactive waste.
- Location of radioactive monitoring equipment.
- 16. Location of meteorological equipment,

SECTION C. GRID SYSTEMS

Grid coordinate system for proposed permit area. Horizontal control system shall consist of a grid not to exceed 200 feet square sections. A permanent benchmark for horizontal and vertical control shall be shown. Grid system shall be tied to benchmark and baseline. (Two monuments should be placed on the grid to allow an instrument to be set up for horizontal and vertical control.) A minimum of two permanent monuments should be provided with coordinates, elevations, and construction details identified.

SECTION D. PLANS, DESIGNS, CROSS-SECTIONS AND MAPS

Design Items to be included:

- a. Compaction of solid waste, thickness of lift.
- b. Application of dally cover material, intermediate, final cover.
- c. Elevation and grade of final cover.
- d. Management of surface water in accordance with Chapter 102.
- e. Erosion control in accordance with Chapter 102.
- f. Schedule of filling.
- g. Site preparations.
- h. Monitoring devices.
- i. Location and limits of areas previously filled, if applicable.
- Cross sections indicating the interface details between areas previously filled and areas to be filled, where applicable.
- k. Limits of construction defined by grid controls.
- Borrow areas on-site defined by grid controls/or off site.
- m. Location of underground and surface mines on-site. (Indicate extent of mining activity)
- Cross sections shown on the plans shall be referenced to the grid system for horizontal location and permanent benchmark, whenever applicable.
- Grades required for proper drainage of lifts.
- p. The design plans shall include a cross section of the access roads and all weather roads (with associated drainage system) identifying construction materials, slopes, grades, and distances.
- q- Cross sections, grades and/or profiles of diversion ditches, capacities and calculations for ditch volume.
- A construction schedule shall be submitted by the applicant to the Department in a format established by the Department.
- s. Gas Management location of vents, flares, collection lines, recovery systems, design of system components.
- t. Layout of leachate collection and detection pipes.
- u. Liner system cross-section.
- V. Temporary erosion and sedimentation controls.
- w. Soil storage area locations.
- x. Location of collection and treatment facilities.
- y. Cross section of treatment lagoons and proposed collection facilities.
- z. Location of discharge points of treated leachate (requires industrial waste permit).
- aa. Cross sections of phases or cells.
- bb. Typical cross section showing components of landfill design.
- cc. Location of scales for weighing.
- dd. Area for isolating detected radioactive waste.
- ee. Location of radioactive monitoring equipment.
- ff. Location of meteorological equipment.

ATTACHMENT A FIGURES



FIGURE 1 SITE LOCATION MAP



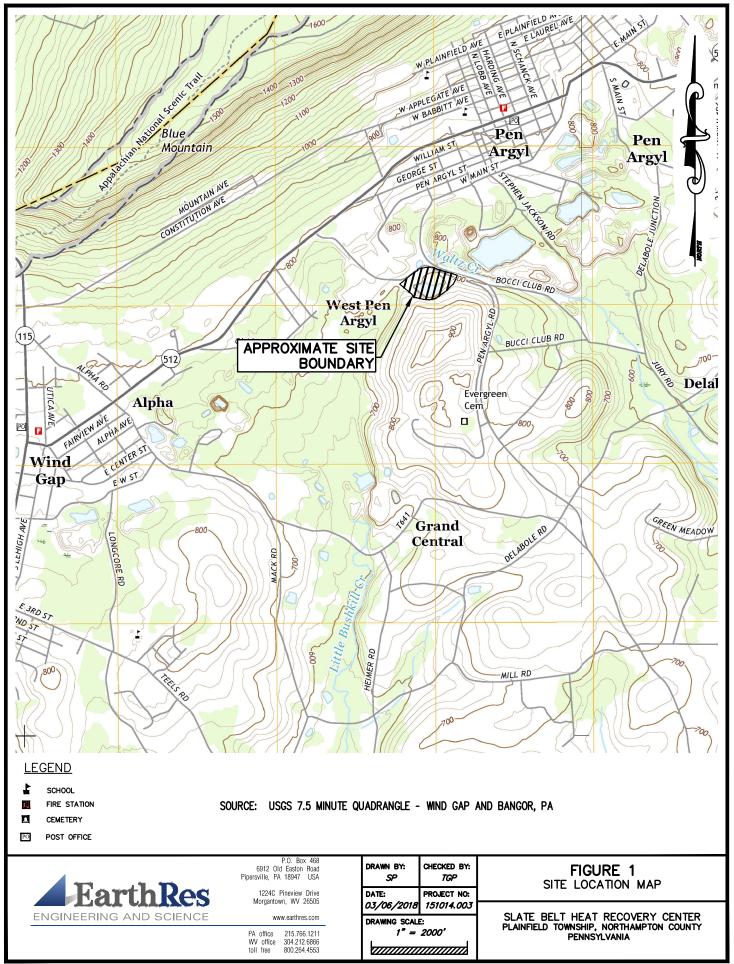


FIGURE 2 SITE PLAN



