APPENDIX C
STORMWATER EVALUATION REPORT

STORMWATER EVALUATION REPORT
POWERTRAIN PN64026 PROJECT

CORPUS CHRISTI ARMY DEPOT, TEXAS

Prepared for

U.S. ARMY CORPS OF ENGINEERS TULSA DISTRICT
Contract No. W912BV-10-D-1004
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and

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LIST OF ACRONYMS

AU	assessment unit
avg	average
AVGAS	aviation gasoline
BMPs	best management practices
BOD_5	5-Day Biochemical Oxygen Demand
$CBOD_5$	5-Day Carbonaceous Biochemical Oxygen Demand
CBQ	combined bachelor quarters
CCAD	Corpus Christi Army Depot
CEP	Central Energy Plant
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CFU	Colony Forming Units
COA	City of Austin
COC	constituents of concern
COCC	City of Corpus Christi
COD	Chemical Oxygen Demand
CWA	Clean Water Act
DCRF	Dynamic Component Repair Facility
DOD	Department of Defense
DPDO	Defense Property Disposal Office
EA	Environmental Assessment
ECM	Environmental Criteria Manual
EMC	Event Mean Concentration
EPA	United States Environmental Protection Agency
ERDC	United States Army Engineer Research and Development Center
FFTA	firefighter training area
ft	feet
GAC	granular activated carbon/ charcoal
GIS	geographic information system
GPS	global positioning system
in	inch
IRP	Installation Restoration Program
JFK	John F. Kennedy
JP-4	Jet Fuel (mixture)
L	liter
lb or lbs	pound /pounds

LIST OF ACRONYMS (CONT.)

lb/acre	pounds per acre
LEED	Leadership in Energy & Environmental Design
LID	Low-Impact Development
MCM	minimum control measures
MGD or 10^6	million gallons per day
mg/L	milligrams per liter
mL	milliliter
MSGP	Multi-Sector General Permit
MS4	Municipal Separate Storm Sewer System
NASCC	Naval Air Station Corpus Christi
NAVFAC	Naval Facilities Engineering Command Southeast
NEPA	National Environmental Policy Act
nf	non-fertilized
NFAA	Navy Field Activity Area
NIPMP	Navy Integrated Pest Management Plan
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
PCBs	polychlorinated biphenyls
PCLs	protective concentration limits
PPS	Powertrain Process Shops
RCRA	Resource Conservation and Recovery Act
SCS	Soil Conservation Services
SOP	Standard Operating Procedures
SOW	Statement of Work/ Scope of Work
SPCCP	Spill Prevention, Control, and Countermeasures Plan
SWMM	Stormwater Management Model
SWMP	Stormwater Management Plan
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
SWPPT	Stormwater Pollution Prevention Team
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TN	Total Nitrogen
TP	Total Phosphorus
TPDES	Texas Pollutant Discharge Elimination System
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture

LIST OF ACRONYMS (CONT.)

VOCs	volatile organic compounds
WESTON	Weston Solutions, Inc.
WWTP	Wastewater Treatment Plant

1. INTRODUCTION

Weston Solutions, Inc. (WESTON®) was contracted by the United States Army Corps of Engineers (USACE) Tulsa District to perform work for the Corpus Christi Army Depot (CCAD), Environmental Division under Contract No. W912BV-10-D-1004, Task Order No. 0012, awarded September 2014. This Stormwater Evaluation was conducted to support preparation of a National Environmental Policy Act (NEPA) Environmental Assessment (EA) for the construction of the proposed Powertrain Process Shops (PPS) and the Central Energy Plant (CEP) sites as part of the Powertrain PN64026 Project at CCAD on the Naval Air Station Corpus Christi (NASCC). The task was initially described in the 5 August 2014 scope of work (SOW), further refined during the 25 September 2014 kick-off meeting, the 23 October 2014 site visit, the 6 November 2014 stormwater refinement call with USACE and CCAD personnel, and the 17-19 November 2014 stormwater site visit; and is further detailed in the November 2014 Work Plan.

1.1 PURPOSE

WESTON performed this stormwater evaluation to characterize the effects that could result from proposed construction and stormwater conveyance alterations associated with construction and operation of the Powertrain PN64026 Project. A systematic approach was developed through review and consideration of existing site conditions and available data. Changes to stormwater quantity and quality were evaluated to assess potential impacts to receiving waters from new construction, a temporary 3.6-acre stormwater infiltration detention pond, and swale system. Figure 1-2 shows the existing stormwater infrastructure and temporary stormwater pond. The proposed new construction includes filling and raising the elevation of area within the footprint of the existing 11.54-acre-ft. temporary stormwater pond and thereby reducing the size of the temporary stormwater pond down to 1.1 acre-ft. Based on this evaluation, a stormwater model was developed and recommendations have been established to minimize and/or prevent potential negative stormwater impacts that could be anticipated to result from the proposed project.

1.2 OBJECTIVES

This report describes the findings and evaluations of the data collected, including the estimated increase of stormwater runoff to Laguna Madre that would result due to the increase in impermeable surface area drainage after construction. Section 4 of this report includes recommendations for BMPs to mitigate stormwater impacts and recommendations for impact management for the proposed increase in stormwater runoff.

To support the development of this Stormwater Evaluation, WESTON reviewed the following documents provided by CCAD and NASCC:

- CCAD and NASCC Stormwater Pollution Prevention Plans (SWPPPs) and Drawings
- NASCC Stormwater Management Plan
- Industrial Stormwater Reports prepared by WESTON under previous Task Orders
- CCAD harvested rainwater capture plans and other planned stormwater best management practices (BMPs),
- NASCC Integrated Pest Management Plan (NIPMP)
- NASCC stormwater sampling data
- NASCC Installation Restoration Program (IRP) site information
- EPA 303[d] List for the State of Texas (EPA, 2013)

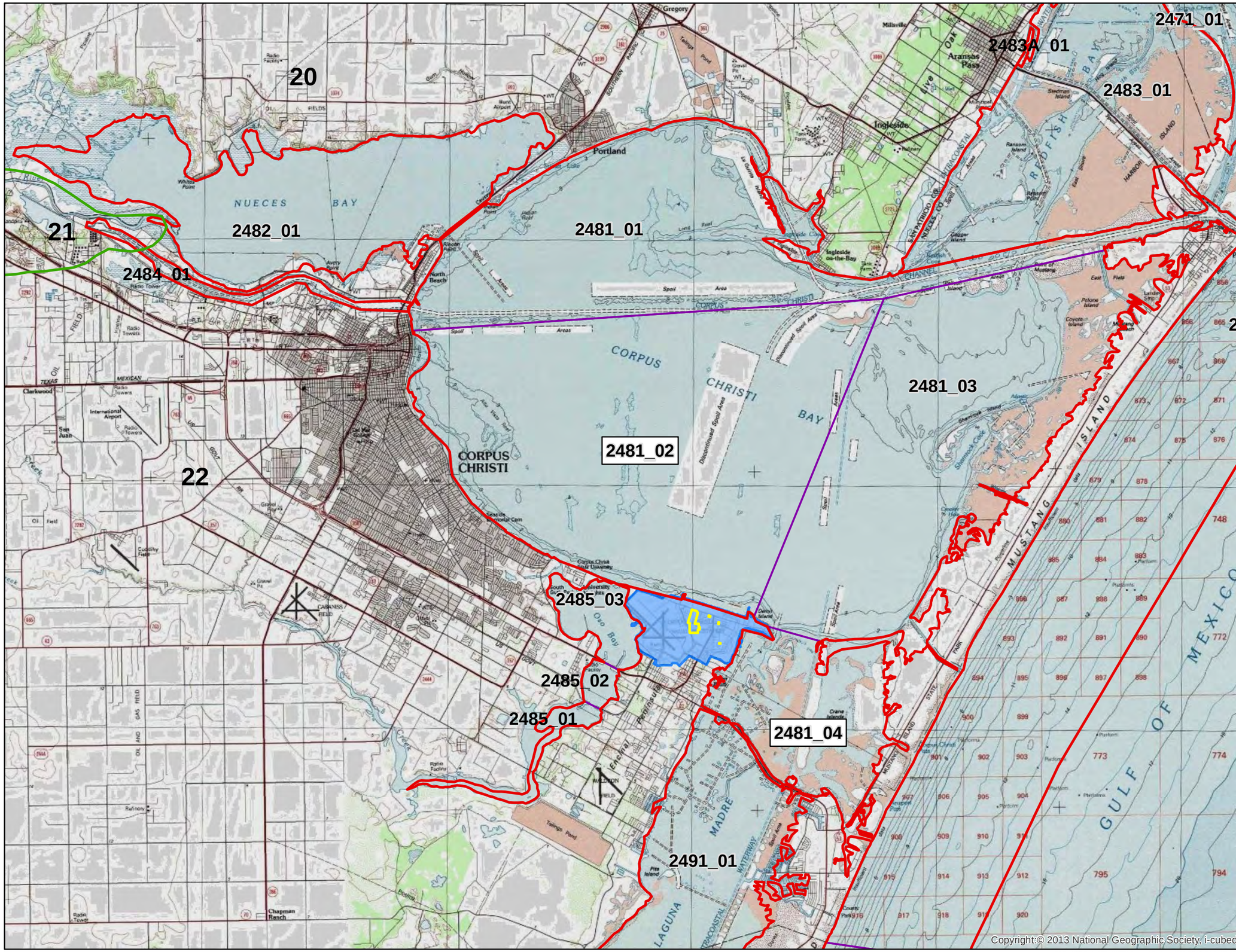
1.3 LOCATION

NASCC is located within the Nueces-Rio Grande Coastal Basin bounded to the north and east by Corpus Christi Bay, to the west by Oso Bay, and to the southeast by a water body commonly referred to as Laguna Madre. However, the Texas Commission on Environmental Quality (TCEQ) identifies this portion of the water body to the southeast of NASCC and northwest of the JFK Causeway, as part of the Corpus Christi Bay (TCEQ, 1999) and AU2481-04. The Laguna Madre and AU2481-04 designation will be carried forward for the purposes of this report.

WESTON conducted a site visit of the proposed PPS and CEP sites to verify the existing boundaries and conditions associated with the proposed construction site. Global Positioning System (GPS) coordinates were collected for the proposed temporary 3.6-acre stormwater

infiltration detention pond and proposed stormwater drainages leading to the Laguna Madre. In addition, existing stormwater containment features, drainage structures, and maintenance conditions of the existing stormwater system were documented with written field notes, GPS coordinates, and photographs.

Figure 1-1 presents the location of the Powertrain PN64026 Project area as well as TCEQ identification numbers assigned to classified basins, segments, and assessment units (AUs) surrounding NASCC. Figure 1-2 presents the Powertrain PN64026 Project area, including the entirety of the proposed stormwater conveyance and the existing temporary 11.54 acre-ft. temporary stormwater pond overlaid with a geographic information system (GIS) depiction of existing stormwater infrastructure on NASCC.



LEGEND

- NASCC Boundary
- TCEQ Classified Segment
- TCEQ AU Division
- Texas River Basins
- Powertrain PN64026 Project Area

Basins	
ID	Name
20	San Antonio-Nueces Coastal Basin
21	Nueces River Basin
22	Nueces-Rio Grande Coastal Basin
24	Bays and Estuaries

Source: TCEQ, 1999

Bays and Estuaries		
Segments		Assessment Unit IDs
ID	Name	
2481	Corpus Christi Bay	2481-01
		2481-02
		2481-03
		2481-04
2482	Nueces Bay	2482-01
2484	Corpus Christi Inner Harbor	2484-01
2485	Oso Bay	2485-01
		2485-02
		2485-03
2491	Laguna Madre	2491-01

Source: TCEQ, 1999

Notes:
1. Bays and Estuaries table not inclusive of all segments or assessment units mapped.
2. AU = Assessment Unit

N

0 2 4
Miles

SOURCE:
1. (c) 2010 Microsoft Corporation and its data suppliers
2. TCEQ. 2000. Atlas of Texas Surface Waters. [Online] Accessed 8 August 2012 http://www.tceq.texas.gov/publications/gi/gi-316/index.html.

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FIGURE 1-1

LOCATION MAP AND SURFACE WATERS

CORPUS CHRISTI ARMY DEPOT
CORPUS CHRISTI, TEXAS

DATE	PROJECT NO	SCALE
JANUARY 2015	03886.544.012.0002	AS SHOWN

FILE: I:\GIS Project Files\03886_Corps of Engineers\544_CCAD_EA And Eng Support\mxd\Figure 1-1 Location Map and Surface Waters.mxd 1:35:59 PM 1/23/2015 bondp

Figure 1-2

STORMWATER INFRASTRUCTURE MAP

This figure has been redacted from the public release of this report. Figures depicting the location of the utilities are not included in this report, as this information has been deemed critical to mission operation, safety, and success.

2. SITE CONDITIONS

To assess stormwater quantity and quality in the stormwater evaluation area, existing and proposed site conditions must be considered. The stormwater evaluation area includes the stormwater runoff from the areas in the Powertrain PN64026 Project area, the northwestern portion of the Navy Field Activity Area (NFAA) (*i.e.* golf course), existing drainage areas west of First St, and drainage areas that discharge into the Navy Ditch that runs along the southern edge of the CCAD boundary.

2.1 WATER RESOURCES

Corpus Christi Bay is located at the confluence of three Texas river basins: the San Antonio-Nueces Coastal Basin, the Nueces River Basin, and the Nueces-Rio Grande Coastal Basin (TCEQ, 1999). The bay is bounded by Redfish Bay to the northeast, Nueces Bay to the northwest, Oso Bay and Laguna Madre to the south, and barrier islands of the Gulf of Mexico to the southeast.

TCEQ identifies Corpus Christi Bay as Segment 2481 and recognizes four AUs within Corpus Christi Bay. As depicted in Figure 1-1, three of the four AUs bound NASCC; however, only two of them receive surface water runoff from the study area and are highlighted in Figure 1-1 by the addition of a white background. Table 2-1 summarizes the designated uses and attainment status of these two AUs. Stormwater north of Avenue D discharges into AU2481-02. In accordance with the National Pollutant Discharge Elimination System (NPDES) program and the Clean Water Act (CWA), neither of the AUs, AU 2481-02 or AU2481-04, is impaired based on their attainment status.

Table 2-1
Corpus Christi Bay Designated Uses and Attainment Status

AU ID	Designated Use	Designated Use Group	Attainment Status
2481-02	Aquatic Life	Fish, Shellfish, And Wildlife Protection And Propagation	Good
	Fish Consumption	Aquatic Life Harvesting	Not Assessed
	General	Fish, Shellfish, And Wildlife Protection And Propagation	Good
	Primary Recreation/ Swimming	Recreation	Good
2481-04	Aquatic Life	Fish, Shellfish, And Wildlife Protection And Propagation	Not Assessed
	Fish Consumption	Aquatic Life Harvesting	Not Assessed
	General	Fish, Shellfish, And Wildlife Protection And Propagation	Good
	Primary Recreation/ Swimming	Recreation	Good

Source: TCEQ, 2013.

The Corpus Christi Bay and Oso Bay receive surface water runoff directly from NASCC. Existing site stormwater infrastructure is depicted on Figure 1-2.

Review of the proposed actions presented in the 9 May 2014 MilCON PN64026 FYDP 2016 presentation, indicates that the direction of stormwater conveyance north of Avenue D diverts all stormwater runoff to the existing stormwater and wastewater conveyances. The stormwater infrastructure for the both the existing and proposed storm sewer system was designed and installed during the construction of the Dynamic Component Repair Facility (DCRF) to manage runoff and sheet flow from parking lots and areas South of Avenue D, and parking areas adjacent to the west of the existing DCRF, excluding elevated areas and any unconnected roof drains. The stormwater flow from the elevated areas and any unconnected roof drains is currently diverted to the existing 11.54-acre-ft. temporary stormwater pond attached to a conveyance ditch south of the DCRF building. An overflow culvert inlet directs flow into the existing infrastructure that discharges to AU2481-02. Stormwater flow in other parts of evaluation area south of the Powertrain PN64026 Project area, include the existing stormwater conveyance system enters a slough system that discharges from the site along the southern boundary of the NASCC. The slough continues east from the site boundary and ultimately disperses flow into a wetland area

adjacent to Laguna Madre (AU2481-04). Laguna Madre receives the surface water runoff indirectly via the wetland area southwest of NASCC.

2.2 SITE CHARACTERIZATION

To assess stormwater quantity and quality in the stormwater evaluation area, the following physical characteristics of the site were considered: land use, IRP sites, topography, soils, and hydrogeology. Three WESTON employees, from the Houston and Corpus Christi offices, visited the site on 17-18 November 2014 with GPS equipment and took field notes to document existing conveyance and surface structure locations and existing site conditions, respectively.

2.2.1 Land Use

The NASCC 2013 SWPPP divides NASCC into 42 separate drainage basins and 4 different Multi-Sector General Permit (MSGP) sector activities that include industrial, administrative, commercial, and housing areas. Additional land-use designations at NASCC are identified as airfield, training, depot maintenance operations, industrial, medical, administration, community support, combined bachelor quarters (CBQ), housing, recreational, and open space. The stormwater evaluation area and Powertrain PN64026 Project area includes depot maintenance operations, administration, recreational, community support, training, industrial, and open space land-use designations (NASCC, 2013).

2.2.2 Installation Restoration Program Sites

Three IRP sites are located on NASCC. The Department of Defense (DOD) developed the IRP to identify, investigate, and remove or remediate contamination on installations. Figure 2-1 presents the location of the IRP sites within and around the stormwater evaluation area. IRP Sites 1, 3, and 4 are Solid Waste Management Units (SWMUs). As defined by the United States Environmental Protection Agency (EPA), to support the Resource Conservation and Recovery Act (RCRA), a SWMU is “any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste (EPA, 2011).”

IRP Site 1, or SWMU 04, is a grassy 13-acre historic Defense Property Disposal Office (DPDO) landfill that operated between 1949 and the early 1960s for disposal of bulk chemical waste

generated by CCAD. Previous studies including environmental sampling have confirmed releases of volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) to groundwater at SWMU 04 (NAVFAC, 2001). Remediation of SWMU 04 is currently underway via natural attenuation monitored by annual groundwater sampling (NASCC, 2011).

IRP Site 3, or SMWU 02, is a grassy 15-acre historic liquid waste disposal landfill that was active between 1960 and 1982 for primary disposal of bulk chemical waste generated at CCAD. Previous studies including environmental sampling have confirmed releases of VOCs, PCBs, and metals to groundwater at SWMU 02 (NAVFAC, 2001). Remediation of SWMU 02 is currently underway via natural attenuation monitored by annual groundwater sampling (NASCC, 2011).

IRP Site 4, or SMWU 01, is a circular, sandy, gravel, firefighter training area (FFTA), approximately 17,000 square feet, which operated from the 1960s until 1991. Training activities included discharging and igniting waste fuel, a mixture of jet fuel (JP-4) and aviation gasoline (AVGAS), to allow firefighters to practice extinguishing the blaze. The area was unlined until 1973, when a clay liner and berm were reportedly installed. A previous study conducted in 1993 confirmed the presence of trichloroethylene and tetrachloroethylene in groundwater at SWMU 01 (NAVFAC, 2001). Remediation of SWMU 01 is currently underway via natural attenuation monitored by annual groundwater sampling (NASCC, 2011).

As seen on Figure 2-1, a drainage channel is located on the northwestern and southern edges of the IRP Sites. The IRP Sites are actively monitored for natural attenuation of impacted soils and groundwater. A groundwater interceptor trench, to be activated when nearby surface drainage ditches have standing water in them, was built and went into operation in 2004. For a brief time, groundwater from this interceptor trench was pumped through the granular activated charcoal (GAC) treatment unit, and then through the base sanitary sewer treatment system (NAVFAC, 2014). However, this system is no longer in use (NASCC, 2013). Low-levels of chlorobenzene; 1, 3 dichlorobenzene; cis 1, 2 dichloroethene; benzene; and vinyl chloride have been detected in wells located in the NFAA along First Street. Based on analytical results from groundwater sampling activities conducted in 2011, 2012, and 2013, low levels of these constituent of concern (COCs) were detected, but none were above the protective concentration limits (PCLs) (NAVFAC, 2014).

2.2.3 Topography

Topographic contours provided by NASCC were developed from elevation data collected in 1997 by aerial survey. Based on this data, elevations at NASCC vary little, resulting in relatively flat topography. The northern, eastern, and western boundaries are on average about 10 feet above sea level and adjacent water bodies, while high points found on-site are no more than 23 feet above sea level.

2.2.4 Soils

Three soil units exist at NASCC: the Galveston-Mustang soil series, Ijam Clay Loam, and Tidal Flats (USDA, 1986). The Galveston-Mustang soil series is most commonly found at NASCC and occupies a majority of stormwater evaluation area. Ijam Clay Loam soils are found in the northwest corner and east shore of NASCC, and do not occur in the stormwater evaluation area. Two small areas on the eastern side of NASCC consist of Tidal Flats, including a small portion of the eastern most portion of the stormwater drainage located outside of NASCC (USDA, 1986). The stormwater evaluation area associated with the proposed Powertrain PN64026 Project is heavily disturbed and is comprised of man-made developed areas built up with fill materials (WESTON, 2013).

Most of the region was assumed to be in the Type A hydrologic soil group, sandy soils with a high infiltration rate, based on United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) 2009 soil data, with the exception of the areas within NASCC occupied by a clay cap. Type A soils are less stable than solid-rock soils but provide more stability than types B and C. Type A includes clay, sandy clay, silty clay, loamy clay and often sandy-clay loam and silty-clay loam soils. This region with a clay cap was assumed to be comparable to Type D hydrologic soil group, representing formed soils with a low permeability (NRCS, 2014).

2.2.5 Hydrogeology

The Gulf Coast Aquifer is located beneath NASCC. It parallels the Texas coast from Louisiana to Mexico and vertically consists of the Chicot, Evangeline, and Jasper aquifers (TWDB, 2011). The Chicot Aquifer is the shallowest unit consisting of the Willis Sand, Bentley, and Montgomery

formations; Beaumont Clay; and alluvial deposits at the surface. The Evangeline Aquifer lies just beneath and is made up of the Goliad Sand. The deepest aquifer is the Jasper Aquifer that consists of the Oakville Sandstone and Flemming formations (TWDB, 2006).

Shallow groundwater in the NASCC area can be found mostly below 4 feet and is subject to saltwater intrusion due to proximity to saline and hypersaline water bodies (NASCC, 2006; USACE, 2009). The flow direction is generally toward Corpus Christi Bay and Laguna Madre (USACE, 2009).

2.3 NAVY FIELD ACTIVITY AREA MAINTENANCE PLAN

The maintenance plan for the NFAA was provided by the golf/grounds superintendent, including a summary of supporting activities that occur at the NFAA, such as irrigation, fertilizer application, and grooming. The NFAA is made up of approximately 3% greens, 4% tees, 30% fairways, and 63% rough and natural vegetation. The NFAA maintenance plan identified two seasons for the purposes of NFAA maintenance; April through October is identified as the growing season, while November through March is the non-growing season (WESTON, 2012a).

2.3.1 Irrigation

At the NFAA, irrigation events occur daily during the growing season and once a week on average during the remainder of the year. Depth of water applied during one irrigation event in the growing season is approximately 2/10 of an inch, whereas only 1/10 of an inch is applied per event for the remainder of the year. Table 2-2 presents the estimated annual depth of irrigation based on irrigation event frequency and depths (NASCC, 2012c; WESTON, 2012a).

Table 2-2
Annual Irrigation Depth

Season	Annual Events	Event Depth inches (in)	Annual Depth	
			in	feet (ft.)
Growing (April through October)	214.00	0.20	42.80	3.57
Other (November through March)	22.00	0.10	2.20	0.18
		Total	**45.00**	**3.75**

Source: NASCC, 2012c; WESTON, 2012a

The NFAA (including the portion within the Stormwater Evaluation area), is irrigated with reclaimed water provided by the City of Corpus Christi (COCC) Laguna Madre Wastewater Treatment Plant (WWTP). On 21 July 2005, TCEQ issued COCC a permit (EPA I.D. No. TX00047104; State Permit No. WQ0010401008) under the Texas Pollutant Discharge Elimination System (TPDES) program and Chapter 26 of the Texas Water Code: Water Quality Control, authorizing treatment and discharge of wastes from Laguna Madre WWTP directly to the Corpus Christi Bay. The permit was renewed on 2 August 2010 and will expire on 1 April 2015. Table 2-3 presents the effluent limitations established by TX00047104 (TCEQ, 2010a).

Table 2-3

TPDES Permit No. TX00047104 Effluent Limitations

Effluent Characteristic	Daily Avg.	7-Day Avg.	Daily Max.	Single Grab
5-day Biochemical Oxygen Demand (BOD_5) (mg/L; lb/day)	20; 500	30	45	65
Total Suspended Solids (TSS) (mg/L)	20; 500	30	45	65
Enterococci (CFU or MPN/100 mL)	35	N/A	89	N/A

Source: TCEQ, 2010a

Additionally, *Title 30, Chapter 210, Subchapter C, Rule §210.32* of the *Texas Administrative Code (TAC)* defines the use of reclaimed water at the NFAA as Type II. According to a COCC representative, effluent from the Laguna Madre WWTP meets the Type II reclaimed water quality standards outlined in *Title 30, Chapter 210,* of the *TAC* and summarized below in Table 2-4 (WESTON, 2012b).

Table 2-4
Type II Reclaimed Water Quality Standards, 30-Day Average

Constituent	Maximum Concentration
BOD_5	20 mg/L
5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	15 mg/L
Fecal coliform or *E. Coli*	200 CFU/100 mL*
Fecal coliform or *E. Coli*	800 CFU/100 mL**
Enterococci	35 CFU/100 mL*
Enterococci	89 CFU/100 mL**

* 30-day geometric mean
** maximum single grab sample
Source: 30 TAC §210.33(2)(A)

The above standards provide maximum concentrations of bacteria that may be found in the reclaimed water used at the NFAA; however, there are no reclaimed water quality standards for nutrients such as nitrogen and phosphorous at this time. A previous study (Weston, 2012a), assessed these parameters. A sample was collected from the reclaimed water pond on the NFAA on 6 August 2012 and sent for laboratory analysis. Table 2-5 summarizes the analytical results returned.

Table 2-5
Nutrient Concentrations in the Reclaimed Water Pond

Constituent	Concentration
Orthophosphate as P	2.97 mg/L
Nitrate Nitrite as N	3.64 mg/L, J
Nitrogen, Kjeldahl	24 mg/L

Note: J indicates the concentration is an approximate value.
Source: Test America, 2012; Weston, 2012a

2.3.2 Fertilizer Application

The NFAA annual fertilizer loads were considered in the water quality analysis discussed in Section 3.2. Figure 2-1 identifies the portion of the total stormwater sheet flow volume from the NFAA (golf course) that is within the site evaluation area. Site drainage for the NFAA areas was

determined based on historical topographical files, survey observations and the GPS coordinates logged during the November 2014 site visit. There is potential for discharge into existing and proposed stormwater swales along First Street from the western drainage areas on the golf course (holes immediately south of the existing DCRF). The drainage areas adjacent to First Street also have the potential currently to discharge through the existing pond and slough conveyance to Laguna Madre, AU2481-04. Fertilizer used at the NFAA consists of approximately 55% nitrogen, 27% potassium, and 18% phosphorous. This balance is applied to distinct sections of the NFAA at different loads, as presented in Table 2-6 (NASCC, 2012c; WESTON, 2012a).

Table 2-6

Estimated Annual Fertilizer Loads

	Area		Annual Loading Rate (lb/acre)			Annual Load (lb)		
	acres	%	N	P	K	N	P	K
Greens	2.10	3.0	174.24	58.08	87.12	365.90	121.97	182.95
Tees	2.80	4.0	174.24	58.08	87.12	487.87	162.62	243.94
Fairways	21.00	30.0	174.24	58.08	87.12	3,659.04	1,219.68	1,829.52
Rough	44.10	63.0	21.78	7.26	10.89	960.50	320.17	480.25
Total	70.00	100.0	544.50	181.50	272.25	38,115.00	12,705.00	19,057.50

Source: NASCC, 2012c; WESTON, 2012a

Total Nitrogen (TN) and Total Phosphorus (TP) from the golf course were simulated in the Storm Water Management Model (SWMM) program for this report. The pollutants available for wash-off by the design storms were based on the fertilizer application rates in Table 2-6 of the Draft Stormwater Evaluation Report. The annual values in the table were divided by an application period of 7 months. One month of pollutant build-up was specified to be available for wash-off by the design storms. The data in Table 2-6 were area-weighted to determine the loading rates for TN and TP for a Golf Course land-use type.

2.3.3 Grooming

Turf mowing at the NFAA occurs according to the following schedule:

- Greens are mowed daily.
- Tees are mowed twice a week.

- Fairways are mowed twice a week.
- The rough is mowed weekly.

Frequency of mowing is reduced as appropriate outside of the growing season (NASCC, 2012c; WESTON, 2012a).

2.4 STORMWATER MANAGEMENT

Stormwater is managed at NASCC with a storm sewer system in compliance with local government standards and criteria and the TCEQ TPDES program. The storm sewer system conveys surface water runoff to outfalls located in the Corpus Christi Bay where discharge is permitted and regulated by the TCEQ TPDES program. Sections 2.4.1 and 2.4.2 further discuss how the storm sewer system and TPDES program facilitate stormwater management at NASCC and the NFAA.

2.4.1 Storm Sewer System

At NASCC, a majority of stormwater is collected by a storm sewer system consisting of approximately 195,000 linear feet of storm sewer pipe, over 463 manholes, 210 junction inlets, 225 area inlets, and 265 curb inlets. Other stormwater on the installation is conveyed overland or by sheet flow to open channels (SPCCP NAFAC, 2014). Figure 1-2 presents the layout of the existing storm sewer system in the stormwater evaluation area.

In the NFAA, a portion of the stormwater flows overland to surrounding storm sewer inlets and is carried to outfalls that discharge into the portion of Corpus Christ Bay southeast of NASCC and north of the JFK Causeway known as AU2481-04, Figures 1-1 and 1-2. The northern-most side of the NFAA drains to a separate part of the storm sewer system that transports stormwater to outfalls that discharge to Corpus Christi Bay AU2481-02, north of NASCC.

The stormwater north of Avenue D, containing the footprint of CCAD Building 8, drains into this existing stormwater infrastructure and discharges into AU2841-02. The parking south of Avenue D and north and east of the existing DCRF building currently diverts flow via swales into a temporary 11.54-acre-ft infiltration pond that borders the east and south side of the building. The current stormwater drainage from the DCRF roof drains flow into the same 11.54-acre-ft infiltration pond from the south side of the DCRF building. Stormwater runoff from the west

parking areas of the DCRF building south of Avenue D and east of First Street currently flows into recently constructed storm sewer inlets and also discharges into the 11.54-acre-ft infiltration pond from the south side of the DCRF building.

The proposed Powertrain PN64026 Project increases the size of the DCRF building structure by the addition of the Powertrain Process Shops (PPS) and the construction of the Central Energy Plant (CEP), and reduces the size of the existing temporary stormwater pond from 11.54-acre-ft down to 1.1-acre-ft. to allow for the new phases of the building on top of the footprint of the existing pond. A new overflow outlet is proposed on the outlet of the 1.1-acre-ft temporary stormwater pond at the southwest corner along First Street between First Street and the golf course, discharging water into a shallow swale system. A shallow swale channel is proposed for construction to avoid additional runoff from flooding on First Street (Powertrain Facility Stormwater Management Plan, 2014). For additional stormwater storage a temporary 3.6-acre stormwater infiltration detention pond is proposed that will be located in the footprint of the existing Building 1746.

2.4.2 Stormwater Management and Other Discharges

The NPDES program, authorized by the CWA and regulated by the EPA, controls pollutant discharges into waters of the U.S. In Texas, the EPA has granted TCEQ federal regulatory authority to administer the NPDES under the TPDES program. The following permits have been authorized at NASCC for compliance with the TPDES program:

- Small MS4 General Permit (TXR040000)
- Multi-Sector General Permit (TXR050000)
- Permit to Discharge Wastes

Associated plans and practices developed at NASCC to comply with the permits listed above and the TPDES program include:

- Stormwater Management Plan (SWMP)
- Stormwater Pollution Prevention Plan (SWPPP)
- Stormwater Best Management Practices (BMPs)
- Stormwater and Outfall Monitoring

The following sections summarize the permits, plans, and practices in place at NASCC associated with the TPDES program.

2.4.2.1 Small MS4 General Permit (TXR040000)

The storm sewer system at NASCC is a Phase II, or Small, Municipal Separate Storm Sewer System (MS4) as defined by Title 40 of the Code of Federal Regulations (CFR), Part 122.26: Storm Water Discharges. On 3 June 2009, TCEQ authorized NASCC to discharge stormwater under TPDES Small MS4 General Permit TXR040000 with authorization number TXR040329. The TCEQ TXR040000 was reissued on December 13, 2013.

TXR040000 requires development, implementation, and evaluation of a SWMP by the permittee. The Small MS4 is given five years to fully implement their SWMP from the date of issue. The SWMP must include the first six of the following minimum control measures (MCMs), while the seventh is optional:

1. Public education and outreach on stormwater impacts
2. Public involvement/participation
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction stormwater management in new development and redevelopment
6. Pollution prevention/good housekeeping for municipal operations
7. Authorization for municipal construction activities

Further details of these MCMs can be found within TXR040000. In addition, documentation associated with the SWMP must include at minimum:

- A list of any public or private entities assisting with the development or implementation of the SWMP;
- A list of all BMPs and measurable goals for each of the MCMs;
- A schedule for the implementation of all SWMP requirements;
- A description of how each measurable goal will be evaluated;
- A rationale statement that addresses the overall program, including how the BMPs and measurable goals were selected; and
- If applicable, a list of all MS4 operators contributing to the development and implementation of the SWMP, including a clear description of the contribution.

More specific recordkeeping and reporting requirements are described within TXR040000 (TCEQ, 2013).

TXR040000 authorizes discharge of stormwater runoff from each construction activity performed by the Small MS4 resulting in land disturbance greater than or equal to one (1) acre by one of the following two alternatives:

1. Obtain authorization under TPDES General Permit TXR050000 for construction sites that discharge stormwater associated with construction activity; or
2. Include the seventh MCM listed above in the SWMP and provide appropriate notification.

Under either of these options, a SWPPP must be developed for and implemented prior to commencing construction activities. Further details of SWPPP requirements including preparation, compliance, and contents are included within TXR040000 (TCEQ, 2007).

While no construction is currently underway in the stormwater evaluation area, construction preparation activities will shortly begin to occur that may potentially contribute to sediment loading in the stormwater evaluation areas. BMPs for handling location and storage of construction materials on-site should be included as part of the construction SWPPP.

2.4.2.2 Multi-Sector General Permit (TXR050000)

On 16 April 2002, TCEQ authorized NASCC to discharge stormwater associated with industrial activity under TPDES Multi-Sector General Permit TXR050000 with authorization number TXR05P596. The permit authorization was renewed on 30 January 2012 and will expire on 14 August 2016 (TCEQ, 2011).

The TPDES Multi-Sector General Permit TXR050000 requires development and implementation of a SWPPP by the permittee prior to applying for authorization (TCEQ, 2012). At NASCC, a SWPPP is maintained in compliance. The three key objectives of the Draft 2011 NASCC SWPPP include:

1. Identification and monitoring of potential stormwater pollution sources
2. Description of BMPs to be implemented
3. Compliance with Multi-Sector General Permit TXR050000 (NAVFAC, 2013)

To fulfill these objectives, the SWPPP establishes:

- Industrial activities, associated sectors, and potential pollutant sources found at NASCC;
- Required visual and analytical stormwater monitoring;
- Special requirements of industrial sectors found at NASCC;

- Illicit discharge investigation findings and corrections;
- Construction activity requirements; and
- BMPs evaluation and implementation (NAVFAC, 2013).

In addition, the SWPPP identifies a Stormwater Pollution Prevention Team (SWPPT) and associated roles and responsibilities, summarizes other existing and related environmental management plans, and provides guidelines for required personnel training, reporting, and recordkeeping (NAVFAC, 2013).

TXR050000 defined industrial sectors found at NASCC include the following:

- K - Hazardous Waste Treatment, Storage, and Disposal Facilities
- L - Landfills and Land Application Sites
- P - Vehicle Maintenance and Equipment Cleaning Operations
- S - Vehicle Maintenance Areas, Equipment Cleaning Areas, or Deicing Areas Located at Air Transportation Facilities
- T - Wastewater Treatment for Domestic and Industrial Sewage
- AA - Fabricated Metal Products (NAVFAC, 2013)

None of the industrial sectors defined by TXR050000 apply to NFAA because activities performed are not considered industrial. However, the DCRF, recently constructed north of the NFAA and east of First Street, and Building 8, located north of Avenue D between 3rd Street and 4th Street, fall under Sectors AA and K. Both of these buildings are found within the Powertrain PN64026 Project area.

Monitoring of stormwater at NASCC is a requirement of the TPDES program, associated permits, and the SWPPP. Regular assessment of stormwater quality allows for continual evaluation of the effectiveness of stormwater management. Stormwater monitoring for compliance with the TPDES program is not required in the NFAA. However, routine monitoring required in areas of NASCC and CCAD with industrial activity includes:

- Quarterly visual inspections of industrial sites and associated stormwater discharge outfalls;
- Annual analytical sampling of stormwater discharge at outfalls associated with industrial sites for comparison with daily maximum effluent limits; and
- Semi-annual analytical sampling of stormwater discharge at outfalls associated with sector-specific industrial sites for comparison with benchmark values (NAVFAC, 2013).

Documentation of quarterly inspections is kept in Appendix G of the SWPPP. Annual and semi-annual samples are collected at appropriate stormwater discharge points throughout NASCC. Historical analytical sample reports can be found in Appendix H of the SWPPP, and the following Table 2-7 presents results, from industrial outfall samples collected on 20 March 2012, in comparison with the daily maximum effluent limitations established in TXR050000 (NAVFAC, 2013).

Semi-annual analytical sample results can be found in Appendix H of the SWPPP. Table 2-8 presents results, from samples collected on 20 March 2012, in comparison with the benchmark established in TXR050000 (NAVFAC, 2013).

Table 2-7

TPDES Permit No. TX050000 Effluent Limitations and Analytical Results

Parameter	Discharges to Inland Waters	Discharges to Tidal Waters	Monitoring Frequency	Industrial Outfall Sample Results (mg/L)				
				Q-5	H-3	A-1	C-5	H-1
Arsenic	0.3	0.3	1/year	<0.010	<0.010	<0.010	<0.010	<0.010
Barium	4.0	4.0	1/year	0.016	0.031	0.064	0.066	0.013
Cadmium	0.2	0.3	1/year	0.008	<0.005	<0.005	<0.005	<0.005
Chromium	5.0	5.0	1/year	<0.010	<0.010	0.011	0.012	0.024
Copper	2.0	2.0	1/year	<0.020	<0.020	<0.020	0.024	0.041
Lead	1.5	1.5	1/year	0.04	<0.01	0.02	0.06	<0.01
Manganese	3.0	3.0	1/year	1.78	1.78	0.07	0.03	<0.01
Mercury	0.01	0.01	1/year	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	3.0	3.0	1/year	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	0.2	0.3	1/year	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	0.2	0.2	1/year	0.061	<0.010	<0.010	<0.010	<0.010
Zinc	6.0	6.0	1/year	0.061	1.33	0.117	0.213	0.084

Source: TCEQ, 2011 and NASCC, 2012a

Table 2-8

TPDES Permit No. TX050000 Benchmark Values and Analytical Results

Pollutant	Benchmark Value	Analytical Sample Results				
		Q-5	H-3	A-1	C-5	H-1
Aluminum, total	1.2	-	**2.33**	-	**1.31**	0.1
Ammonia-nitrogen	2.5	-	<1.00	-	-	-
Arsenic, total	0.01	-	<0.010	-	-	-
BOD5	30	-	-	**35.3**	-	-
Cadmium, total	0.001	-	<0.005	-	-	-
COD	60	-	**54.6**	-	-	-
Cyanide, total	0.02	-	<0.020	-	-	-
Iron, total	1.3	0.33	**1.62**	-	**1.49**	<0.050
Lead, total	0.010	-	<0.01	-	-	-
Magnesium, total	1.4	-	**1.78**	-	-	-
Mercury, total	0.0002	-	<0.00002	-	-	-
Nitrate-nitrite, nitrogen	0.68	-	<1.0	-	<1.0	<1.0
Selenium, total	0.01	-	<0.01	-	-	-
Silver, total	0.002	-	<0.010	-	-	-
Total Suspended Solid (TSS)	100[2]	41	-	-	-	-
Zinc, total	0.16	-	0.133	-	**0.0213**	0.084

Notes:
1. All benchmark values and analytical sample results provided in milligrams per liter (mg/L).
2. The TSS benchmark value is 50 mg/L for Sector AA.
3. Bold analytical sample results exceed benchmark value.

Source: TCEQ, 2011 and NASCC, 2012b

As shown in the Table 2-8 above, some analytical sample results exceeded benchmark values. While this is not a violation of the permit, these exceedances should be investigated to determine if a modification of the SWPPP is necessary (NAVFAC, 2013).

Investigations conducted at NASCC in the mid-1990s for illicit discharges revealed 26 connections with the potential to discharge pollutants to the storm sewer system. In 1995, a report was prepared documenting the investigation procedures, findings, and recommended corrective actions. Recommendations were implemented and incorporated into the 2011 SWPPP and updated again in the 2013 SWPPP (NAVFAC, 2011 and 2013).

Construction activities are addressed by the Multi-Sector General Permit TXR050000 in a similar manner as the Phase II or Small MS4 General Permit TXR040000. Authorization for discharge of stormwater associated with construction activity must be obtained under TPDES General Permit TXR150000, and a separate construction-specific SWPPP must be developed (NAVFAC, 2013).

A number of structural and non-structural BMPs have been implemented throughout NASCC and are documented in Section 4 of the 2013 NASCC SWPPP. Most of the existing housekeeping and BMPs are non-structural and take the form of standard operating procedures (SOPs) to reduce the potential for exceeding permit limits and benchmark values. Figure 2-1 identifies the areas where permanent BMPs, a swale treatment system to collect and treat stormwater, is considered for the proposed project, along the east side of First Street, between the 1.1 acre-ft. temporary stormwater pond and the culvert under First Street. Section 4.3 of the 2013 NASCC SWPPP, Erosion and Sedimentation Control Measures, does specifically address that BMPs and construction site controls should be used. Additional specifics regarding the level of control for construction activities that should be developed based on the phase and type of construction project activity are not addressed.

2.4.2.3 Permit to Discharge Wastes

On 29 July 2005, TCEQ issued NASCC a permit (EPA I.D. No. TX0007889; State Permit No. WQ0002317000) under the TPDES program and Chapter 26 of the Texas Water Code: Water Quality Control, authorizing treatment and discharge of wastes directly to the Corpus Christi Bay through associated Outfalls 001 and 101. The permit was renewed on 27 May 2010 and will expire on 1 April 2015. Outfall 001 is located approximately 800 feet northeast of the North Gate (Ocean Drive) entrance and discharges treated domestic wastewater effluent. Outfall 101 is located approximately 700 feet northeast of the North Gate (Ocean Drive) entrance and discharges treated industrial wastewater effluent. Table 2-9 presents the effluent limitations and monitoring requirements established by TX0007889 (TCEQ, 2010b). These discharge limits were developed to be protective of the receiving water body, AU2481-04.

Table 2-9

TPDES Permit No. TX0007889 Effluent Limitations

Effluent[5] Characteristics	Outfall 001 Discharge Limitations			Outfall 101 Discharge Limitations			Min. Self-Monitoring[1]	
	Daily Avg.	Daily Max.	Single Grab	Daily Avg.	Daily Max.	Single Grab	Frequency	Type
Flow, Million Gallons per Day (MGD)	1.5	3.75	N/A	0.5	1.0	N/A	continuous	meter
	lbs/day	lbs/day	mg/L	lbs/day	lbs/day	mg/L		
CBOD[6], 5-day	250, 20 mg/L	563	60	N/A	N/A	N/A	1/week	composite
Chemical Oxygen Demand (COD)	N/A	N/A	N/A	751	1,168	350	1/week	composite
Oil and Grease	N/A	N/A	N/A	23.4	45.62	18	1/week	Grab[3,4]
Total Suspended Solids (TSS)	250	563	60	29.5	57.1	93	1/week	composite
Total Cadmium	0.55	1.16	0.22	0.21	0.56	0.78	1/week	composite
Total Chromium	N/A	N/A	N/A	1.38	2.24	5.13	1/week	composite
Hexavalent Chromium	N/A	N/A	N/A	0.263	0.55	0.2	1/week	composite
Total Copper	0.22	0.47	0.08	0.42	0.83	0.3	1/week	composite
Cyanide (amenable to chlorination)	0.07	0.15	0.02	0.21	0.42	0.15	1/week	composite
Total Lead	1.28	2.70	0.50	0.35	0.56	1.29	1/week	composite
Total Nickel	1.14	2.41	0.444	1.92	3.22	7.14	1/week	composite
Total Silver	0.38	0.77	0.2	0.19	0.35	0.72	1/week	composite
Total Zinc	2.04	4.31	0.795	1.20	2.11	4.44	1/week	composite
Ammonia Nitrogen	12 mg/L	N/A	36 mg/L	N/A	N/A	N/A	1/week[2]	composite

Notes:

1. Report daily average and daily maximum.
2. At Outfall 001, the permittee shall maintain a minimum of at least 1.0 mg/L after a detention time of at least 20 minutes, based on peak flow. Total residual chlorine shall be monitored at the discharge from the chlorination unit at a frequency of 1/week, by grab sample.
3. The pH shall not be less than 6.0 standard units or greater than 9.0 standard units and shall be monitored 1/day by grab sample.
4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.
5. Effluent monitoring samples shall be taken at the following locations: Outfall 001 and 101 prior to discharge into Corpus Christi Bay.
6. CBOD stands for Carbonaceous Biochemical Oxygen Demand.

Source: TCEQ, 2010b

2.5 PROPOSED IMPROVEMENTS

The Powertrain PN64026 Project, as depicted on Figure 2-3, includes the demolition of portions of existing CCAD Building 8 that have been replaced by the DCRF; demolition and relocation of NASCC facilities; and construction of two new buildings, and associated facilities and utilities. The proposed facilities and utilities include four fiber optic cable conduits, two electrical lines, a natural gas line, water and wastewater lines, and stormwater improvements.

Completion of the DCRF at a 7-foot grade elevation, east of First Street and north of the NFAA, required the development and installation of an 11.54-acre-ft temporary stormwater pond and sediment catchment basin located just east and south of the construction site. As part of the proposed Powertrain PN64026 Project, the 11.54-acre-ft temporary stormwater pond, as designed, will be reduced in size from 11.54-acre-ft to 1.1-acre-ft. The portion of the existing temporary sediment catchment basin east of DCRF is designed to be brought up to the 7-foot grade and the PPS constructed east of the DCRF. As part of this proposed Powertrain PN64026 Project construction activity, a portion of Building 8 is to be demolished and several buildings razed including buildings 358, 362, 1152, 1209, 1219, 1277, 1713, 1737, 1738, 1743, and 1746.

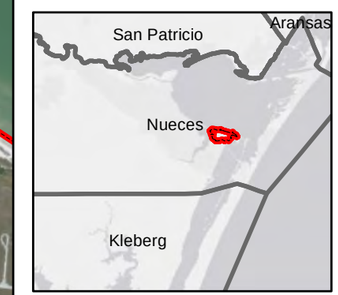
A 3.6-acre temporary stormwater infiltration detention pond with 4-foot berms at a 1:1 slope is designed to be constructed in the footprint of Building 1746 to collect stormwater runoff from the non-permeable areas. The 3.6-acre temporary stormwater infiltration detention pond is also designed to serve as a collection point for stormwater as buildings are under construction and until roof drains are connected to the proposed swale system. During stormwater modeling, based on the assumptions provided in Appendix A, stormwater precipitation volume did not exceed the detention and infiltration capacity of the temporary 3.6-acre stormwater infiltration detention pond. The model required assumptions for the disposition of the excess flow, was shown to overflow at a height of 4 feet and transport stormwater through the infiltration basin and swale systems. Modeling up to a 100-year storm event indicated that the water would not reach a height requiring flow out of the 3.6-acre temporary stormwater infiltration basin. It is estimated that this temporary detention pond will initially provide approximately 14.4-acre-ft of stormwater storage. The temporary detention pond will potentially be filled in during preparation of future construction (NASCC, 2014). Aside from this temporary water quality

feature and the 1.1-acre-ft sediment catchment basin, no other structural stormwater BMPs would exist within the footprint of the proposed Powertrain PN64026 Project area. Additional stormwater infiltration and conveyance to Laguna Madre (AU2481-04), via a swale system, is proposed south of the project area extending south along First Street, and enlargement of the existing culvert structures to maximize drainage of water from the site during high-volume rain events is also under evaluation to minimize flooding potential. The total flow currently going to AU2481-02 is potentially reduced by the redirection of stormwater flow from parking and areas south of Avenue D away from AU2481-02 to a new discharge location in the wetlands and tidal area adjacent to AU2481-04.

Based on the preliminary plans provided by CCAD, it is anticipated, that stormwater improvements will include construction of a 3.6-acre, low-impact development (LID) stormwater feature, [identified as a temporary stormwater infiltration and detention pond on the Figure 2-2] under the present footprint of building 1746, and a swale system to treat and convey stormwater to an existing outfall on the southeast side of NASCC into the Laguna Madre. This swale is designed to provide additional infiltration capacity to the existing storm sewer system and relief of runoff from northwestern and western portions of the NFAA along First Street.

LEGEND

- Outfall Location
- Proposed Stormwater Conveyance
- Existing Stormwater Conveyance
- Proposed Underground Electrical Line
- Powertrain PN64026 Project Area
- NASCC Boundary



Note:
Project areas in this figure depict the action area for the specific project construction and/or operational activities. This project area represents the study area for many resources in this EA, including but not limited to: biological resources, cultural resources, and geology. Study areas may vary by resource (such as for air quality or stormwater) and could include areas immediately around the project area, in the general vicinity of the project, or include a regional setting. Study Areas for each resource will be discussed in Section 3.0 of this EA.

N

0 1,000 2,000

Feet

SOURCE: Aerial provided by ESRI

WESTON SOLUTIONS

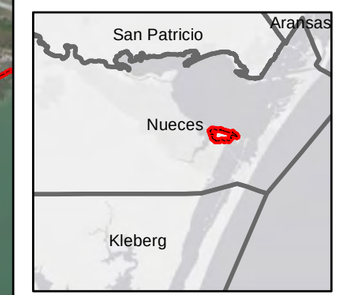
FIGURE 2-1
POWERTRAIN PN64026
PROJECT AREA
CORPUS CHRISTI ARMY DEPOT
CORPUS CHRISTI, TEXAS

DATE	PROJECT NO	SCALE
JANUARY 2015	03886.544.012.0002	AS SHOWN

FILE: I:\GIS Project Files\03886_Corps of Engineers\544_CCAD_EA And Eng Support\mxd\Figure 2-1 Powertrain Project Area 20141223.mxd 1:38:52 PM 1/23/2015 bondp

LEGEND

- Outfall Location
- Proposed Stormwater Conveyance
- Existing Stormwater Conveyance
- Proposed Underground Electrical Line
- Drainage Areas
- Powertrain PN64026 Project Area
- Detention/Retention Areas
- NASCC Boundary



Note:
Project areas in this figure depict the action area for the specific project construction and/or operational activities. This project area represents the study area for many resources in this EA, including but not limited to: biological resources, cultural resources, and geology. Study areas may vary by resource (such as for air quality or stormwater) and could include areas immediately around the project area, in the general vicinity of the project, or include a regional setting. Study Areas for each resource will be discussed in Section 3.0 of this EA.

N

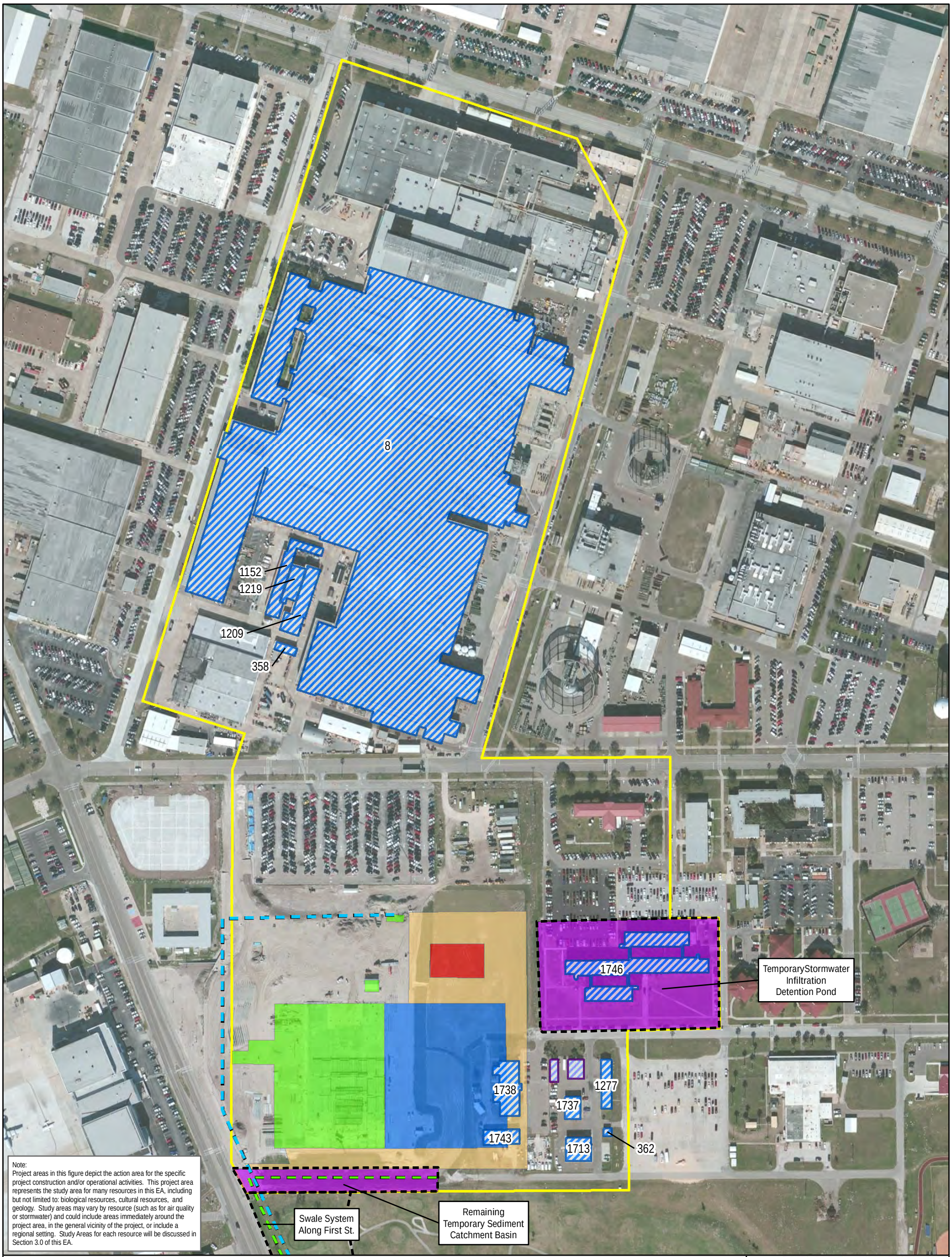
0 800 1,600
Feet

SOURCE: Aerial provided by ESRI

FIGURE 2-2
PROPOSED STORMWATER DRAINAGE MAP
CORPUS CHRISTI ARMY DEPOT
CORPUS CHRISTI, TEXAS

DATE	PROJECT NO	SCALE
JANUARY 2015	03886.544.012.0002	AS SHOWN

FILE: I:\GIS Project Files\03886_Corps of Engineers\544_CCAD_EA And Eng Support\mxd\Figure 2-2 Proposed Stormwater Drainage Map.mxd 1:39:32 PM 1/23/2015 bondp



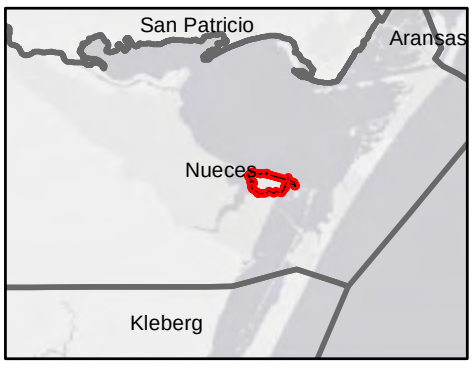
Note:
Project areas in this figure depict the action area for the specific project construction and/or operational activities. This project area represents the study area for many resources in this EA, including but not limited to: biological resources, cultural resources, and geology. Study areas may vary by resource (such as for air quality or stormwater) and could include areas immediately around the project area, in the general vicinity of the project, or include a regional setting. Study Areas for each resource will be discussed in Section 3.0 of this EA.

LEGEND

- Proposed Underground Electrical Line
- Proposed Stormwater Conveyance
- Powertrain PN64026 Project Area
- Buildings to be Demolished
- Covered Parking to be Demolished
- NASCC Boundary
- Existing Dynamic Component Rebuild Facility
- Proposed Central Energy Plant
- Proposed Powertrain Process Shops
- Proposed Pavement
- Detention/Retention Areas
- Drainage Areas

N

0 250 500
Feet



WESTON SOLUTIONS

FIGURE 2-3
POWERTRAIN PN64026
PROPOSED ACTION
CORPUS CHRISTI ARMY DEPOT
CORPUS CHRISTI, TEXAS

DATE	PROJECT NO	SCALE
JANUARY 2015	03886.544.012.0002	AS SHOWN

FILE: I:\GIS Project Files\03886_Corps of Engineers\544_CCAD_EA And Eng Support\mxd\Figure 2-3 Powertrain Proposed Action_20141222.mxd 1:40:35 PM 1/23/2015 bondp

3. STORMWATER ANALYSIS

Two separate analytical approaches were developed to estimate changes to stormwater quantity and quality in the proposed project area. Stormwater quantity was assessed through the development of a customized stormwater system design model using the November 2014 version of the SWMM Program, Build 5.1.006, developed for the EPA. Stormwater quality for the existing and proposed conditions was assessed using both the SWMM model and methods developed during the 2013 Stormwater Evaluation studies conducted in Austin, Texas. The City of Austin (COA) developed the results of these studies into design criteria published in their Environmental Criteria Manual (ECM). The Draft City of Corpus Christi Drainage Master Plan relies heavily on designs developed by the COA and other Texas municipalities. The following subsections provide further details and results of the stormwater quantity and quality analyses.

3.1 STORMWATER QUANTITY

The EPA SWMM is a dynamic hydrology-hydraulic and water quality simulation model. SWMM can perform single event or long-term (continuous) simulation of runoff quantity and quality from primarily urban areas. The runoff component operates on a collection of sub-catchment areas that receive precipitation and generate runoff and pollutant loads. The routing portion transports runoff through a system of pipes, channels, and storage/treatment devices.

SWMM tracks the quantity and quality of runoff generated by each sub-catchment. It tracks the flow rate, flow depth, and quality of water in each pipe and channel during a simulation period made up of multiple calculation time steps. SWMM 5 has the capability to model the hydrologic performance of specific types of LID controls.

SWMM uses the following parameters to perform the hydrologic analysis:

- Precipitation depth, duration, and storm distribution
- Surface depression storage for both impervious and pervious areas
- Sub-catchment topography and shape
- Soil infiltration
- LID controls (EPA, 2014)

The precipitation data is shown in Table 3-1. The hydrologic parameters were input to SWMM for the each portion of the evaluation area, depicted on Figure 2-2 and identified in Table 3-2.

Different sub-catchment and topographical conditions were assumed to calculate stormwater quantity for existing and proposed infrastructure under varying vegetative conditions. These values were then compared to provide an estimate of stormwater quantity changes that can be anticipated as a result of the proposed Powertrain PN64026 Project.

3.1.1 Model Inputs

Precipitation data for Nueces County were obtained from the NEI 2010 and are presented in Table 3-1. A Natural Resource Conservation Service (NRCS) Type III distribution was applied to 24-hour design storms for the 2-, 25-, and 100-year return interval events. The 24-hour 500-year return was not considered in this analysis as the catastrophic nature of such an event would likely result in widespread level of destruction and installation wide system failures..

Table 3-1
Design Precipitation Events

Storm Frequency	Total Precipitation (inches of stormwater)
2-Year	4.09
25-Year	8.94
100-Year	12.18

Source: NEI, 2010 24-hour design storms

As previously discussed in Section 2.5, during construction, stormwater in the Powertrain PN64026 Project is designed to flow overland to either the temporary 3.6-acre stormwater infiltration detention pond or the 1.1-acre-ft sediment catchment basin and swale system to convey stormwater to Laguna Madre, AU2481-04. Figure 2-2 shows proposed drainage areas that contribute to discharge on the southeast side of NASCC at the new outfall and Table 3-2 presents the corresponding model inputs included in the stormwater quantity analysis for existing conditions including the drainage area permeability assumptions that were made as part of the SWMM model development.

The NRCS curve number method was used to estimate losses within the sub-catchments. Type A soils are less stable than solid-rock soils but provide more stability than types B and C. Type A includes clay, sandy clay, silty clay, loamy clay and often sandy-clay loam and silty-clay loam soils. Most of the region was assumed to be in the Type A hydrologic soil group, sandy soils

with a high infiltration rate, based on USDA NRCS 2009 soil data, with the exception of the areas within NASCC occupied by a clay cap. This region with a clay cap was assumed to be comparable to Type D hydrologic soil group, representing soils with a low permeability (NRCS, 2014). The percent of each sub-catchment occupied by connected impervious area was measured using GIS.

Table 3-2
Drainage Area Summary

Drainage Area	Area (Acres)	% Impervious	Land Use
Powertrain PN64026 Project Area (S7, S22, S23, S24)	46.82	84.96	Industrial
Temporary Stormwater Infiltration Detention Pond (S6)	4.91	100.00	Infiltration/ Detention
Golf Course East of First Street (S25, S26)	21.65	7.30	Recreational
Navy East IR-Site-1 (S3, S10, S11, S12, S13)	35.69	20.44	Industrial/Open Space
Navy West Air Field (S1, S4, S8, S15, S16 , S21)	51.98	16.12	Depot Maintenance Operations/ Air Field
Navy Ditch (S2, S5, S17, S18, S19, S20)	85.96	10.00	Open Space

Source: Storm Water Management Model (SWMM), Build 5.1.006, developed for the EPA 2014

Notes:

1. The SWMM assumes and calculates ponds and water bodies as 100% permeable, to avoid overestimating the infiltration capability of the Temporary 3.6-acre Stormwater Infiltration Detention Pond, the soil percent impervious was set to 100%.

The SWMM model generates runoff from each sub-catchment using topography, drainage pathways, land cover, and soil characteristics. Stormwater management features such as LID infiltration basins and vegetative swales, culverts, open ditches, and piping structures can be entered into the model to simulate stormwater treatment, ponding, retention, infiltration, and transport. Other factors considered by SWMM in estimating overland flow are depression storage and infiltration on pervious and impervious surfaces, evaporative losses, and surface roughness specified using the Manning's coefficient (n) (EPA SWMM, 2014). Existing standing water in the swales was observed during the 17-19 November site visit. Therefore, standing water, culvert elevations, and groundwater infiltration was simulated by setting the starting water

depth to 2.5-ft in the appropriate channels and setting a tail-water elevation to 12-ft at the outfall. The model was run to simulate three different scenarios: (1) current conditions, (2) proposed drainage pathways with no vegetation control (rough), and (3) proposed drainage pathways with ditches containing only maintained grass (smooth).

The SWMM model was built using a series of sub-catchments, detention ponds, and links (stormwater conveyances). The sub-catchment areas and drainage patterns were developed based on field observations, GPS surveying, and knowledge of site history and planned future improvements to the stormwater control and treatment system. Vegetative conveyance links were developed in the SWMM using existing ditches that were surveyed using GPS and planned swales along First Street.

The temporary 3.6-acre stormwater infiltration detention pond was based on design drawings provided by CCAD and designed to be infiltration only. As explained in Section 2.4, the model required assumptions for the disposition of the excess flow. This was approximated in the model as a link between the temporary 3.6-acre stormwater infiltration pond to the 1.1-acre-ft stormwater catchment area and swale system to account for overflow the containment parameters and stormwater transport (Figure 2-3). The links are a combination of ditches and vegetative swales that allow for infiltration. Vegetation in the links was modeled based on field observations (rough) and planned maintenance activities (smooth).

3.1.2 Model Results

The 2-, 25-, and 100-year storms were each simulated in the model for the existing conditions and for the proposed conditions with (rough) and without (smooth) vegetation. Table 3-3 summarizes the model results for stormwater discharge to an outfall located on Laguna Madre, AU2481-04. Table 3-4 summarizes the model results for flow depth in the culvert below First Street.

Table 3-3 includes flow data for the three model scenarios as discussed in Section 3.1.1. Both of the proposed model data runs (rough and smooth) show increased drainage flow and volume compared to the current model run results. The increases primarily are attributed to the assumption the overall drainage area increasing in size by approximately 45 acres due to the redirection of stormwater in the Powertrain PN64026 Project area south of Avenue D to Laguna

Madre, AU2481-04 and the reduction in the total upstream containment volume. Comparisons between the two proposed model results show that vegetation control allows for a more rapid (approximately 50% higher) transportation of water through the drainage system.

Flow rates presented in Table 3-3 affect the potential for erosion and flooding upstream. The high velocities seen in the storm events modeled indicate that water is rapidly exiting the drainage areas and minimizing potential for flooding. However, these high velocities have shown the potential for downstream erosion in the drainage channels. These competing factors must be considered as a part of any design change.

Table 3-3

Outfall Flow Rate Summary

Outfall at Laguna Madre	2-Year Storm			25-Year Storm			100-Year Storm		
	Current	Proposed (Rough)	Proposed (Smooth)	Current	Proposed (Rough)	Proposed (Smooth)	Current	Proposed (Rough)	Proposed (Smooth)
Average Flow cubic feet per second (cfs)	13.41	16.86	21.83	31.17	36.14	46.61	40.26	45.76	61.60
Max Flow (cfs)	60.60	73.35	109.51	184.21	193.21	309.60	222.30	222.19	427.05
Total Volume (MGD)	7.35	9.56	9.67	20.15	24.28	28.19	27.34	31.82	39.58

Table 3-4

Maximum Water Depth Summary at Culvert under First Street

Storm Frequency	Site Condition	Water Depth (ft)
2-Year Storm	Current	2.57
	Proposed (Rough)	3.76
	Proposed (Smooth)	2.93
25-Year Storm	Current	4.48
	Proposed (Rough)	6.83
	Proposed (Smooth)	6.31
100-Year Storm	Current	5.31
	Proposed (Rough)	>7.80
	Proposed (Smooth)	>7.80

Notes:
Calculations based on City of Austin Environmental Criteria Manual guidance.

Based on the model results summarized in Table 3-4, water depths increase with both proposed conditions at the culvert under First Street as compared to current conditions. This was expected based on the increases in the total drainage area. Flooding is minimized in the model by reducing the roughness factor in ditches which is correlated to a reduction in vegetative mass.

Data presented in Table 3-5 indicate the temporary 3.6-acre stormwater infiltration detention pond does not have the potential to flood during a 100-year storm event, based on the model assumptions outlined in Appendix A. Each model simulation is based on dry pond conditions at the start of each storm event. Therefore, if detention ponds are not emptied between storm events, the possibility of flooding during smaller storms is elevated. Complete model results can be found in Appendix A.

Table 3-5
Water Depth in Temporary 3.6-acre Stormwater Infiltration Detention Pond

Storm Event	Water Depth (ft)
2-Year Storm	0.62
25-Year Storm	1.99
100-Year Storm	3.10

Stormwater improvements proposed to be implemented during the Powertrain PN64026 Project include options for minor improvements easily incorporated into a stormwater management budget as standard best management practices (BMPs) such as maintenance of existing drainage areas, litter collection and street sweeping to minimize sediment in swales and culverts, and scheduled ditch and culvert cleaning. More moderate programs include contracting for management and landscaping, including vegetation removal of invasive flora (as needed) within the extensive swale management system that conveys stormwater to Laguna Madre. Swales often provide more capacity than the traditional closed pipe conveyance systems and provide additional relief of runoff from the existing sheet-flow areas. Corresponding increases in the area and depth of the designed swale increases the volume of on-site stormwater containment, directly impacting the quantity and treatment quality of the water discharged. Section 4 includes recommendations that could minimize storm sewer overloading.

3.2 STORMWATER QUALITY

Methods outlined in the COA ECM were used to evaluate stormwater quality in the area associated with the Powertrain PN64026 Project. The 1990 COA study: *Stormwater Pollutant Loading Characteristics for Various Land Uses in the Austin Area*, was used to develop pollutant loading equations for the ECM (COA ECM, 2012).

Land within the stormwater evaluation area was classified into categories that take into account land-use, percent impervious cover, and lawn maintenance practices such as fertilizer application and irrigation. Figure 3-1 shows water quality areas, while Tables 3-2 show land-use

characteristics and Table 3-5 present the annual loading used in the stormwater quality analysis for the three models: existing, proposed rough, and proposed smooth conditions respectively.

All stormwater in the evaluation area south of Avenue D that previously discharged to the Corpus Christi Bay via storm sewers to outfalls on the north shore of NASCC, will ultimately be re-routed through the proposed 1.1-acre-ft sediment catchment basin and swale drainage system to detention, infiltration catchments with a final disposition into Laguna Madre. The proposed drainage swale associated with the Powertrain PN64026 Project would reroute and provide a polishing step, area for nutrient uptake, for the flow from these water quality areas.

It is anticipated that the NFAA golf course would continue to be maintained as it is currently. Fertilizers would continue to be applied as they are. Based on pollutant loads in Table 3-6 and irrigation rates in Table 2-2, TN and TP from the golf course were simulated in the SWMM model. The annual values in the table were divided by an application period of 7 months. One month of pollutant build-up was specified to be available for wash-off by the design storms. The data in Table 3-6 are shown time-weighted and area-weighted to determine the loading rates for TN and TP for a Golf Course land-use type.

Pollutant wash off was simulated using event mean concentration (EMC) data from the US Army Engineer Research and Development Center (ERDC) publication entitled, *Review of Published Export Coefficient and Event Mean Concentration Data*, Jeff P. Lin, September, 2004. Table 8 in the ERDC publication contains EMC data for a Golf Course land-use type derived from observations in the Upper Neuse River Basin, North Carolina. The values for nitrate nitrogen and total kjeldahl nitrogen (ammonia, organic and reduced nitrogen) were added together to obtain a value for total nitrogen.

Table 3-7 presents estimates of annual pollutant loads in stormwater discharges at outfalls found on the southeast shore of NASCC and the portion of Laguna Madre known as AU2481-04 for the current and both proposed conditions. The proposed stormwater improvements indicate both an increase in volume and a corresponding increase in pollutant loads to the AU2481-04 on the southeast shore of NASCC. Modifications to the slough to reduce the roughness show an additional increase in volume and corresponding increase in pollutant load.

Table 3-6
Modeled Annual[1] Pollutant Loads[3]

Pollutant	Total Load (lbs)[1,2]
Total Phosphorous (TP)	817.21
Total Nitrogen (TN)	2,188.23

Note:
1. Time-weighted, based on an application period of 7 months.
2. Calculations based on COA Environmental Criteria Manual guidance.
3. All proposed water quality areas modeled drain to the southeast.

Table 3-7
Outfall Pollutant Loading

Storm Frequency	Site Condition	Total Phosphorous (lbs)	Total Nitrogen (lbs)
2-Year	Current	1.63	11.97
	Proposed (Rough)	3.14	23.06
	Proposed (Smooth)	3.58	26.36
25-Year	Current	9.92	72.98
	Proposed (Rough)	13.02	95.76
	Proposed (Smooth)	15.65	115.13
100-Year	Current	16.55	121.76
	Proposed (Rough)	18.94	136.89
	Proposed (Smooth)	24.49	176.77

Notes:
Calculations based on City of Austin Environmental Criteria Manual guidance.

4. CONCLUSIONS AND RECOMMENDATIONS

This stormwater evaluation was performed to determine the effects that could result from proposed stormwater improvements associated with the Powertrain PN64026 Project. Stormwater quantity and quality were evaluated using approaches developed by review and consideration of all relevant, available data and documentation, and changes to stormwater quantity and quality have been estimated to assess expected impacts to receiving waters. Based on this evaluation, conclusions and recommendations have been established and provided to minimize or prevent the anticipated stormwater impacts resulting from the proposed project.

4.1 STORMWATER QUANTITY

The EPA SWMM was used to evaluate stormwater quantity in the area associated with the Powertrain PN64026 Project. Based on model results, Table 4-1 summarizes changes to outfall flow resulting from associated stormwater improvements.

Table 4-1
Comparison of Changes to Outfall Flow

Storm Frequency	Model Scenario	Average Flow (cfs)	Max Flow (cfs)	Total Volume (MGD)
2-Year	Proposed (Rough)	+26%	+21%	+30%
	Proposed (Smooth)	+63%	+81%	+32%
25-Year	Proposed (Rough)	+16%	+5%	+20%
	Proposed (Smooth)	+50%	+68%	+40%
100-Year	Proposed (Rough)	+14%	0%	+16%
	Proposed (Smooth)	+53%	+92%	+45%

Notes:
1. Calculations based on City of Austin Environmental Criteria Manual guidance

Overall, based on the assumptions provided, this modeling data indicates that the Laguna Madre, AU2841-04, discharge outfall would receive increased flow from the design storms as currently proposed. Increased flows at the confluence of the proposed swale system along First Street, the

golf course pond discharge, and the inlet to the culverts under First Street are a result of the increased drainage area that previously discharged to AU2841-02.

Appropriate structural and non-structural BMPs should be considered when designing stormwater improvements to reduce flows that could cause on- and off-site erosion. High velocities occur in the southern downstream portion of the slough under existing conditions. Velocity increases due to the proposed development can be addressed with energy dissipaters, detention ponds, step pools, swale design, and practices supporting flood control. These are just a few examples of structural BMPs that may be incorporated. Administrative requirements of the stormwater permits such as the SWMP, periodic inspections, and maintenance, are examples of non-structural BMPs that help control stormwater quantity. Based on the modeling results and profession judgment, WESTON recommends the following:

- Include flow direction modifiers and elevation changes within the proposed swale to be constructed along First Street, to reduce the velocity of runoff.
- CCAD should continue coordination with NASCC regarding NASCC adherence to BMPs, required in the 2013 SWPPP and inspected annually via the Annual Comprehensive Site Compliance Inspection Checklist, to ensure the structural sediment/control or vegetative measures are maintained and functioning properly. (NAVFAC 2013). BMPS implemented by NASCC should include routine mowing of hydrophytic vegetation removal of invasive vegetation (non-hydrophytic) and trees from the existing swales, slough and conveyance culverts as needed to maintain the integrity of the existing stormwater drainage system.
- Several Leadership in Energy & Environmental Design (LEED) prerequisites and credits apply to stormwater and could result in reduced stormwater quantity impacts from the proposed project. Although not required, *SS Credit 6.1: Stormwater Design – Quantity Contro*l yields 1 point toward LEED certification and is intended to preserve natural hydrology considering impervious cover, infiltration, and stormwater pollution (USGBC, 2012).
- Installation of sculpted culvert elevation drops at outlet structures, such as a weir or raised culvert, may also provide additional aeration, control the flow discharged, and provide energy dissipation. The use of appropriate structural controls also has the potential to act as a spill control barrier in the event of a spill or release of contamination from an upstream location.

Regardless of the flow control measures installed, balance should be maintained between flow reduction and flooding potential.

4.2 STORMWATER QUALITY

The COA ECM was used to evaluate stormwater quality in the area associated with the Powertrain PN64026 Project. Based on SWMM model results, Table 4-2 summarizes changes to pollutant loads resulting from associated stormwater improvements.

Table 4-2

Changes to Annual Pollutant Loads at Outfall[1]

Storm Frequency	Model Scenario	Change in TP (lbs)		Change in TN (lbs)	
		Mass (lbs)	Percent	Mass (lbs)	Percent
2-Year	Proposed (Rough)	+1.51	+93%	+11.09	+93%
	Proposed (Smooth)	+1.95	+120%	+14.39	+120%
25-Year	Proposed (Rough)	+3.1	+31%	+22.78	+31%
	Proposed (Smooth)	+5.73	+58%	+42.15	+58%
100-Year	Proposed (Rough)	+2.39	+14%	+15.13	+12%
	Proposed (Smooth)	+7.94	+48%	+55.01	+45%

Notes:

1. Calculations based on City of Austin Environmental Criteria Manual guidance.

Based on model assumptions, both proposed project scenarios may result in an increase in the total mass of TP and or TN into Laguna Madre compared against the current model scenario. This is primarily a result of the redirection of stormwater and loading assumptions. Values are a delta between the proposed model and current conditions. Precipitation loading rates during events influence the velocity of the water through the slough. The timing and percent of the nutrient uptake is greater the slower the velocity and the longer the runoff is held up by the system's storage capacity allowing infiltration to occur.

Design of stormwater quality controls has potential to offset pollutant loading. The model shows a larger increase in nutrient loading in the scenario with less vegetation. The primary source of nutrients is reclaimed water and fertilizers used on NFAA, which is consistent across all three scenarios.

Currently, the preliminary plans for the Powertrain PN64026 Project include the design of a swale system for water quality controls. Additional water quality controls such as meandering the proposed swale along First Street and incorporating elevation changes for increased residence

time and nutrient uptake or aeration and or elevation controls should be considered as part of the final design to further reduce loading at AU2481-04.

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APPENDIX A

SWMM MODEL RESULTS

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Current Conditions

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 18
Number of nodes 24
Number of links 23
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	2yrSCS_24h_Type_III_4.09in	INTENSITY	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5

S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S25	16.66	300.00	2.00	0.5000	RG1	J8
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	
J19	JUNCTION	10.66	8.00	0.0	
J20	JUNCTION	10.00	8.00	0.0	
J21	JUNCTION	12.83	3.53	0.0	
J22	JUNCTION	12.83	3.07	0.0	
J23	JUNCTION	10.74	9.67	0.0	
J24	JUNCTION	13.50	2.50	0.0	
J25	JUNCTION	12.97	6.00	0.0	
OF1	OUTFALL	9.50	5.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness

C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67

C17	TR2	5.00	162.68	3.35	72.00	1	221.24

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459
0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2
Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910

```
        0.8308    0.8716    0.9134    0.9562    1.0000
Hrad:
        0.0293    0.0577    0.0854    0.1123    0.1384
        0.1639    0.1887    0.2129    0.2365    0.2595
        0.2820    0.3040    0.3254    0.3464    0.3670
        0.3871    0.4068    0.4260    0.4449    0.4635
        0.4248    0.3988    0.3814    0.3701    0.3633
        0.3600    0.3594    0.3609    0.3642    0.3688
        0.3957    0.4220    0.4480    0.4742    0.5009
        0.5281    0.5561    0.5848    0.6143    0.6448
        0.6765    0.7092    0.7428    0.7771    0.8124
        0.8484    0.8852    0.9227    0.9610    1.0000
Width:
        0.1677    0.1687    0.1697    0.1707    0.1717
        0.1727    0.1737    0.1747    0.1757    0.1767
        0.1777    0.1787    0.1798    0.1808    0.1818
        0.1828    0.1838    0.1848    0.1858    0.1868
        0.2216    0.2564    0.2912    0.3260    0.3608
        0.3956    0.4303    0.4651    0.4999    0.5347
        0.5590    0.5833    0.6076    0.6319    0.6562
        0.6806    0.7049    0.7292    0.7535    0.7778
        0.8000    0.8222    0.8444    0.8667    0.8889
        0.9111    0.9333    0.9556    0.9778    1.0000


**********************
Control Actions Taken
**********************


**************************        Volume        Depth
Runoff Quantity Continuity     acre-feet       inches
**************************    ---------       -------
Total Precipitation ......        64.840        4.089
Evaporation Loss .........         0.000        0.000
Infiltration Loss ........        38.208        2.410
Surface Runoff ...........        22.948        1.447
Final Surface Storage ....         3.722        0.235
Continuity Error (%) .....        -0.059


**************************      nitrogen     potassium   phosphorous
Runoff Quality Continuity           lbs           lbs           lbs
**************************    ----------    ----------    ----------
Initial Buildup ..........       186.114        61.982        93.140
Surface Buildup ..........         0.000         0.000         0.000
Wet Deposition ...........         0.000         0.000         0.000
Sweeping Removal .........         0.000         0.000         0.000
Infiltration Loss ........         0.000         0.000         0.000
BMP Removal ..............         0.000         0.000         0.000
Surface Runoff ...........        18.191         0.000         2.473
Remaining Buildup ........       167.899        61.982        90.664
Continuity Error (%) .....         0.013         0.000         0.003
```

```
**************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------      ---------
Dry Weather Inflow .......        0.000          0.000
Wet Weather Inflow .......       22.901          7.463
Groundwater Inflow .......        0.000          0.000
RDII Inflow ..............        0.000          0.000
External Inflow ..........        0.001          0.000
External Outflow .........       22.561          7.352
Internal Outflow .........        0.000          0.000
Storage Losses ...........        0.000          0.000
Initial Stored Volume ....        1.833          0.597
Final Stored Volume ......        2.201          0.717
Continuity Error (%) .....       -0.111


**************************      nitrogen     potassium   phosphorous
Quality Routing Continuity          lbs           lbs           lbs
**************************    ----------    ----------    ----------
Dry Weather Inflow .......        0.000         0.000         0.000
Wet Weather Inflow .......       18.142         0.000         2.467
Groundwater Inflow .......        0.000         0.000         0.000
RDII Inflow ..............        0.000         0.000         0.000
External Inflow ..........        0.000         0.000         0.000
Internal Flooding ........        0.000         0.000         0.000
External Outflow .........       11.972         0.000         1.628
Mass Reacted .............        0.000         0.000         0.000
Initial Stored Mass ......        0.000         0.000         0.000
Final Stored Mass ........        8.235         0.000         1.120
Continuity Error (%) .....      -11.386         0.000       -11.386


*************************
Highest Continuity Errors
*************************
Node J7 (5.30%)
Node J4 (1.28%)
Node J5 (1.07%)


***************************
Time-Step Critical Elements
***************************
Link C1_3 (39.81%)
Link C13 (4.07%)


********************************
Highest Flow Instability Indexes
********************************
Link C15 (6)
Link C14 (5)
Link C10_3 (5)
```

Link C16 (4)
Link C10_4 (3)

****
Routing Time Step Summary
****

Minimum Time Step : 0.50 sec
Average Time Step : 4.42 sec
Maximum Time Step : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	4.09	0.00	0.00	0.95	2.98	1.06	23.48	0.729
S4	4.09	0.00	0.00	1.97	1.89	0.54	10.10	0.462
S10	4.09	0.00	0.00	1.52	2.32	0.57	11.17	0.567
S11	4.09	0.00	0.00	3.18	0.68	0.08	1.14	0.167
S12	4.09	0.00	0.00	1.52	2.32	0.22	4.41	0.568
S13	4.09	0.00	0.00	1.52	2.33	0.38	7.65	0.569
S21	4.09	0.00	0.00	2.92	0.94	0.16	2.12	0.231
S15	4.09	0.00	0.00	3.23	0.64	0.08	1.59	0.156
S25	4.09	0.00	0.00	3.18	0.62	0.28	1.78	0.150
S1	4.09	0.00	0.00	1.16	2.71	1.77	33.80	0.663
S2	4.09	0.00	0.00	2.92	0.96	0.19	3.04	0.234
S5	4.09	0.00	0.00	2.92	0.96	0.11	1.84	0.234
S8	4.09	0.00	0.00	2.92	0.96	0.07	1.15	0.235
S16	4.09	0.00	0.00	2.92	0.94	0.09	1.17	0.229
S17	4.09	0.00	0.00	2.92	0.93	1.20	13.52	0.227
S18	4.09	0.00	0.00	2.92	0.93	0.37	4.27	0.227
S19	4.09	0.00	0.00	2.92	0.95	0.26	3.88	0.233
S20	4.09	0.00	0.00	2.92	0.96	0.05	0.86	0.235

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000

S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S25	18.191	0.000	2.473
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
System	18.191	0.000	2.473

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	1.37	3.36	14.63	0 12:43
J3	JUNCTION	1.06	3.07	14.67	0 12:44
J4	JUNCTION	0.67	2.64	14.71	0 12:46
J5	JUNCTION	0.53	2.24	14.76	0 12:48
J6	JUNCTION	0.36	1.93	14.77	0 12:48
J7	JUNCTION	0.80	2.57	14.77	0 12:48
J8	JUNCTION	0.16	0.32	15.32	0 13:04
J11	JUNCTION	0.28	1.14	14.64	0 12:41
J12	JUNCTION	1.62	3.60	14.59	0 12:40
J1	JUNCTION	1.88	3.81	14.51	0 12:41
J13	JUNCTION	1.41	2.63	13.48	0 12:54
J14	JUNCTION	1.83	3.62	14.30	0 12:45
J15	JUNCTION	1.76	3.42	14.11	0 12:48
J16	JUNCTION	1.56	2.99	13.78	0 12:52
J17	JUNCTION	0.36	1.85	13.85	0 12:50
J18	JUNCTION	0.67	2.38	14.18	0 12:46
J19	JUNCTION	1.81	3.52	14.18	0 12:47
J20	JUNCTION	2.26	3.48	13.48	0 12:54
J21	JUNCTION	0.26	1.68	14.51	0 12:39
J22	JUNCTION	0.40	2.56	15.39	0 12:29
J23	JUNCTION	1.84	3.80	14.55	0 12:39
J24	JUNCTION	0.14	1.14	14.64	0 12:42
J25	JUNCTION	0.26	1.67	14.64	0 12:42
OF1	OUTFALL	2.50	2.50	12.00	0 00:00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
J2	JUNCTION	2.12	26.12	0 12:29	0.162	2.846
J3	JUNCTION	9.24	14.06	0 12:47	0.462	1.591
J4	JUNCTION	4.41	9.47	0 12:48	0.220	1.134
J5	JUNCTION	11.24	12.46	0 12:15	0.613	0.983
J6	JUNCTION	0.00	14.87	0 12:15	0.000	0.421
J7	JUNCTION	0.00	16.33	0 12:17	0.000	0.342
J8	JUNCTION	1.78	1.78	0 12:29	0.277	0.277
J11	JUNCTION	23.48	23.48	0 11:59	1.054	1.054
J12	JUNCTION	11.16	29.73	0 12:43	0.564	3.351
J1	JUNCTION	0.00	52.20	0 12:30	0.000	5.209
J13	JUNCTION	0.86	61.34	0 12:43	0.050	7.354
J14	JUNCTION	13.51	62.15	0 12:30	1.195	6.397
J15	JUNCTION	4.27	61.04	0 12:32	0.369	6.939
J16	JUNCTION	3.88	64.43	0 12:32	0.263	7.329
J17	JUNCTION	1.84	3.55	0 12:14	0.114	0.135
J18	JUNCTION	3.03	3.03	0 12:29	0.186	0.192
J19	JUNCTION	0.00	59.67	0 12:31	0.000	6.581
J20	JUNCTION	0.00	60.90	0 12:48	0.000	7.353
J21	JUNCTION	1.17	1.17	0 12:29	0.094	0.094
J22	JUNCTION	33.79	33.79	0 11:59	1.770	1.770
J23	JUNCTION	0.00	53.89	0 12:29	0.000	5.116
J24	JUNCTION	1.15	1.95	0 12:14	0.068	0.069
J25	JUNCTION	0.00	3.81	0 11:56	0.000	0.087
OF1	OUTFALL	0.00	60.62	0 12:54	0.000	7.352

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J18	JUNCTION	1.42	0.383	4.817
J22	JUNCTION	0.42	0.556	0.514

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.91	13.41	60.62	7.352	11.973	0.000	1.628
System	99.91	13.41	60.62	7.352	11.973	0.000	1.628

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	23.19	0 12:00	1.45	0.02	0.37
C2	CHANNEL	15.00	0 12:57	0.28	0.07	0.64
C3	CHANNEL	10.21	0 12:59	0.25	0.05	0.57
C4	CHANNEL	7.61	0 12:58	0.26	0.04	0.49
C5	CHANNEL	10.39	0 12:18	0.68	0.05	0.42
C6	CONDUIT	15.42	0 12:17	3.61	0.33	0.98
C7	CONDUIT	1.51	0 13:04	0.29	0.00	0.24
C1_1	CHANNEL	24.22	0 12:55	0.37	0.12	0.70
C10	CONDUIT	2.65	0 12:14	3.26	0.04	0.70
C1_2	CHANNEL	30.32	0 12:48	0.40	0.15	0.74
C10_5	CHANNEL	49.43	0 12:33	0.69	0.10	0.42
C10_2	CHANNEL	58.83	0 12:37	0.85	0.32	0.40
C10_4	CHANNEL	57.08	0 12:32	0.72	0.63	0.45
C10_1	CHANNEL	60.88	0 12:44	1.03	0.31	0.35
C10_3	CHANNEL	57.69	0 12:34	0.76	0.31	0.43
C1_3	CONDUIT	51.05	0 12:30	3.61	0.96	1.00
C11	CONDUIT	3.10	0 11:56	0.29	0.00	0.42
C12	CONDUIT	1.15	0 12:30	0.52	0.03	0.92
C13	CONDUIT	33.80	0 12:00	11.30	0.70	1.00
C14	CONDUIT	3.79	0 11:54	1.60	0.13	1.00
C15	CONDUIT	4.64	0 12:18	1.32	0.08	0.87
C16	CONDUIT	60.90	0 12:48	0.67	0.03	0.76
C17	CHANNEL	60.62	0 12:54	1.19	0.27	0.60

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C3	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.02	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C5	1.00	0.00	0.44	0.00	0.56	0.00	0.00	0.00	0.02	0.0000
C6	1.00	0.01	0.43	0.00	0.56	0.00	0.00	0.00	0.06	0.0003
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C10	1.00	0.00	0.00	0.00	0.63	0.37	0.00	0.00	0.79	0.0003
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0001
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0004
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C13	1.00	0.00	0.00	0.00	0.97	0.03	0.00	0.00	0.23	0.0004
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0006
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0011
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000

****
Conduit Surcharge Summary
****

Conduit	--------- Hours Full -------- Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1_3	2.23	2.23	2.24	2.20	0.01
C13	0.42	0.42	0.42	0.01	0.01
C14	1.42	1.42	1.43	0.01	0.01

Analysis begun on: Mon Jan 05 16:30:51 2015
Analysis ended on: Mon Jan 05 16:30:51 2015
Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Rough

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 24
Number of nodes 30
Number of links 29
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	2yrSCS_24h_Type_III_4.09in	INTENSITY	15 min.

****

Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	3.35	72.00	1	221.24
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459

0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0293	0.0577	0.0854	0.1123	0.1384
0.1639	0.1887	0.2129	0.2365	0.2595
0.2820	0.3040	0.3254	0.3464	0.3670
0.3871	0.4068	0.4260	0.4449	0.4635
0.4248	0.3988	0.3814	0.3701	0.3633
0.3600	0.3594	0.3609	0.3642	0.3688
0.3957	0.4220	0.4480	0.4742	0.5009
0.5281	0.5561	0.5848	0.6143	0.6448
0.6765	0.7092	0.7428	0.7771	0.8124
0.8484	0.8852	0.9227	0.9610	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	84.170	4.089
Evaporation Loss	0.000	0.000
Infiltration Loss	39.944	1.941
Surface Runoff	39.868	1.937
Final Surface Storage	4.418	0.215
Continuity Error (%)	-0.072	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	31.263	0.000	4.251
Remaining Buildup	210.612	80.563	116.806
Continuity Error (%)	0.012	0.000	0.003

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	39.799	12.969
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.001	0.000
External Outflow	29.349	9.564
Internal Outflow	0.000	0.000
Storage Losses	8.566	2.791
Initial Stored Volume	1.833	0.597
Final Stored Volume	3.753	1.223
Continuity Error (%)	-0.087	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	31.200	0.000	4.242
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	0.000	0.000	0.000

External Outflow	23.059	0.000	3.135
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	7.544	0.000	1.026
Continuity Error (%)	1.911	0.000	1.911

****
Highest Continuity Errors
****
Node J10 (6.63%)
Node J7 (2.16%)

****
Time-Step Critical Elements
****
Link C1_3 (46.98%)
Link C13 (3.58%)

****
Highest Flow Instability Indexes
****
Link C15 (7)
Link C14 (5)
Link C10_3 (4)
Link C16 (3)
Link C10_4 (2)

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	4.31 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	4.09	0.00	0.00	0.95	2.98	1.06	23.48	0.729
S4	4.09	0.00	0.00	1.97	1.89	0.54	10.10	0.462
S10	4.09	0.00	0.00	1.52	2.32	0.57	11.17	0.567
S11	4.09	0.00	0.00	3.18	0.68	0.08	1.14	0.167

S12	4.09	0.00	0.00	1.52	2.32	0.22	4.41	0.568
S13	4.09	0.00	0.00	1.52	2.33	0.38	7.65	0.569
S21	4.09	0.00	0.00	2.92	0.94	0.16	2.12	0.231
S15	4.09	0.00	0.00	3.23	0.64	0.08	1.59	0.156
S7	4.09	0.00	0.00	0.25	3.69	1.62	30.85	0.903
S6	4.09	0.00	0.00	0.00	3.99	0.53	11.89	0.975
S26	4.09	0.00	0.00	2.43	1.47	0.20	3.40	0.359
S25	4.09	0.00	0.00	3.18	0.62	0.28	1.78	0.150
S22	4.09	0.00	0.00	0.18	3.79	0.22	5.12	0.927
S1	4.09	0.00	0.00	1.16	2.71	1.77	33.80	0.663
S2	4.09	0.00	0.00	2.92	0.96	0.19	3.04	0.234
S5	4.09	0.00	0.00	2.92	0.96	0.11	1.84	0.234
S8	4.09	0.00	0.00	2.92	0.96	0.07	1.15	0.235
S23	4.09	0.00	0.00	0.12	3.84	1.65	34.78	0.940
S16	4.09	0.00	0.00	2.92	0.94	0.09	1.17	0.229
S17	4.09	0.00	0.00	2.92	0.93	1.20	13.52	0.227
S18	4.09	0.00	0.00	2.92	0.93	0.37	4.27	0.227
S19	4.09	0.00	0.00	2.92	0.95	0.26	3.88	0.233
S20	4.09	0.00	0.00	2.92	0.96	0.05	0.86	0.235
S24	4.09	0.00	0.00	0.18	3.74	1.30	21.56	0.915

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	13.072	0.000	1.777
S25	18.191	0.000	2.473
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
S24	0.000	0.000	0.000

```
-------------------------------------------------------------
System                 31.263        0.000        4.251


*******************
Node Depth Summary
*******************

-----------------------------------------------------------------------
                      Average  Maximum  Maximum  Time of Max
                        Depth    Depth      HGL   Occurrence
Node            Type       Feet     Feet     Feet  days hr:min
-----------------------------------------------------------------------
J2              JUNCTION    1.57     3.77    15.05     0  12:58
J3              JUNCTION    1.30     3.54    15.13     0  12:58
J4              JUNCTION    0.99     3.24    15.31     0  12:56
J5              JUNCTION    0.89     3.05    15.58     0  12:52
J6              JUNCTION    0.79     2.92    15.76     0  12:49
J7              JUNCTION    1.38     3.76    15.96     0  12:47
J8              JUNCTION    0.18     0.96    15.96     0  12:45
J9              JUNCTION    0.45     1.52    17.02     0  12:21
J10              JUNCTION    0.46     1.81    17.81     0  12:07
J11              JUNCTION    0.34     1.55    15.05     0  12:59
J12              JUNCTION    1.80     3.98    14.97     0  12:57
J1              JUNCTION    2.04     4.16    14.86     0  12:57
J13              JUNCTION    1.49     2.85    13.70     0  13:04
J14              JUNCTION    1.97     3.95    14.62     0  13:00
J15              JUNCTION    1.88     3.72    14.41     0  13:01
J16              JUNCTION    1.66     3.24    14.03     0  13:02
J17              JUNCTION    0.46     2.11    14.11     0  12:57
J18              JUNCTION    0.80     2.69    14.49     0  12:59
J19              JUNCTION    1.94     3.83    14.49     0  13:01
J20              JUNCTION    2.34     3.69    13.69     0  13:04
J21              JUNCTION    0.35     2.03    14.86     0  12:57
J22              JUNCTION    0.48     2.83    15.66     0  12:29
J23              JUNCTION    2.00     4.17    14.92     0  12:56
J24              JUNCTION    0.21     1.55    15.05     0  12:57
J25              JUNCTION    0.38     2.08    15.05     0  12:57
J26              JUNCTION    0.55     1.90    17.81     0  12:08
J27              JUNCTION    0.57     1.90    17.72     0  12:09
OF1               OUTFALL    2.50     2.50    12.00     0  00:00
SU1               STORAGE    0.12     0.62    16.92     0  13:08
SU2               STORAGE    1.80     3.76    19.76     0  13:22


********************
Node Inflow Summary
********************

-------------------------------------------------------------------------------------
                      Maximum  Maximum                Lateral       Total
                      Lateral    Total  Time of Max     Inflow      Inflow
                       Inflow   Inflow   Occurrence     Volume      Volume
Node            Type      CFS      CFS  days hr:min    10^6 gal    10^6 gal
```

J2	JUNCTION	2.12	42.94	0	12:54	0.162	5.062
J3	JUNCTION	9.24	36.07	0	12:52	0.462	3.764
J4	JUNCTION	4.41	32.98	0	12:48	0.220	3.325
J5	JUNCTION	11.24	32.33	0	12:29	0.613	3.121
J6	JUNCTION	0.00	26.24	0	12:41	0.000	2.514
J7	JUNCTION	3.40	34.16	0	12:17	0.199	2.585
J8	JUNCTION	1.78	5.84	0	12:21	0.277	0.292
J9	JUNCTION	0.00	31.87	0	12:09	0.000	2.104
J10	JUNCTION	0.00	1.78	0	11:55	0.000	0.018
J11	JUNCTION	23.47	23.47	0	11:59	1.054	1.054
J12	JUNCTION	11.16	47.31	0	12:55	0.564	5.580
J1	JUNCTION	0.00	62.98	0	12:30	0.000	7.435
J13	JUNCTION	0.86	73.59	0	13:00	0.050	9.567
J14	JUNCTION	13.51	72.23	0	12:30	1.195	8.619
J15	JUNCTION	4.27	70.84	0	12:53	0.369	9.156
J16	JUNCTION	3.88	74.33	0	12:54	0.263	9.546
J17	JUNCTION	1.84	4.34	0	12:05	0.114	0.137
J18	JUNCTION	3.03	3.03	0	12:29	0.186	0.189
J19	JUNCTION	0.00	69.32	0	12:32	0.000	8.797
J20	JUNCTION	0.00	73.47	0	13:01	0.000	9.565
J21	JUNCTION	1.17	1.17	0	12:29	0.094	0.094
J22	JUNCTION	33.79	33.79	0	12:00	1.770	1.770
J23	JUNCTION	0.00	65.36	0	12:30	0.000	7.343
J24	JUNCTION	1.15	1.41	0	12:09	0.068	0.069
J25	JUNCTION	0.00	3.66	0	12:01	0.000	0.096
J26	JUNCTION	30.85	30.85	0	12:00	1.617	1.634
J27	JUNCTION	5.12	32.54	0	12:02	0.216	1.828
OF1	OUTFALL	0.00	73.35	0	13:04	0.000	9.563
SU1	STORAGE	46.65	46.65	0	12:00	2.176	2.176
SU2	STORAGE	21.56	21.56	0	12:00	1.298	1.298

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J18	JUNCTION	2.41	0.688	4.512
J21	JUNCTION	0.50	0.034	1.496
J22	JUNCTION	1.30	0.833	0.237

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
SU1	18.441	2	100	91.919	10	0 13:08	0.00
SU2	37.993	26	47	81.845	57	0 13:22	3.85

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.91	16.86	73.35	9.563	23.060	0.000	3.135
System	99.91	16.86	73.35	9.563	23.060	0.000	3.135

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	23.18	0 12:00	1.27	0.02	0.44
C2	CHANNEL	35.74	0 12:57	0.45	0.17	0.73
C3	CHANNEL	32.14	0 12:55	0.48	0.16	0.68
C4	CHANNEL	30.96	0 12:50	0.55	0.15	0.63
C5	CHANNEL	25.74	0 12:48	0.51	0.12	0.60
C6	CONDUIT	26.24	0 12:41	4.18	0.57	1.00
C7	CONDUIT	4.54	0 12:21	0.23	0.01	0.39
C8	CONDUIT	30.67	0 12:21	1.19	0.05	0.43
C9_2_1	CONDUIT	28.29	0 12:06	1.39	0.09	0.32
C1_1	CHANNEL	42.86	0 13:03	0.47	0.21	0.78
C10	CONDUIT	1.94	0 12:09	3.24	0.03	0.89
C1_2	CHANNEL	47.50	0 13:04	0.47	0.23	0.82
C10_5	CHANNEL	60.85	0 12:39	0.75	0.12	0.46
C10_2	CHANNEL	70.63	0 12:59	0.91	0.38	0.43
C10_4	CHANNEL	67.30	0 12:50	0.78	0.74	0.49
C10_1	CHANNEL	73.23	0 13:00	1.09	0.37	0.38
C10_3	CHANNEL	68.50	0 12:54	0.81	0.37	0.47

C1_3	CONDUIT	61.85	0	12:30	4.38	1.16	1.00
C11	CONDUIT	2.55	0	12:01	0.25	0.00	0.49
C12	CONDUIT	1.14	0	12:29	0.49	0.03	1.00
C13	CONDUIT	33.80	0	12:00	11.07	0.70	1.00
C14	CONDUIT	3.02	0	12:30	0.96	0.10	1.00
C15	CONDUIT	5.09	0	12:08	1.77	0.09	0.92
C16	CONDUIT	73.47	0	13:01	0.75	0.04	0.82
C17	CHANNEL	73.35	0	13:04	1.33	0.33	0.62
C9_1	CONDUIT	1.78	0	11:55	0.15	0.01	0.31
C9_2_2	CONDUIT	31.87	0	12:09	1.87	0.10	0.28
OR1	ORIFICE	0.00	0	00:00		0.00	
OR2	ORIFICE	3.85	0	13:23		0.38	

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C3	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.04	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C5	1.00	0.00	0.18	0.00	0.82	0.00	0.00	0.00	0.06	0.0000
C6	1.00	0.00	0.18	0.00	0.82	0.00	0.00	0.00	0.12	0.0001
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C8	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.07	0.0000
C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10	1.00	0.00	0.00	0.00	0.69	0.31	0.00	0.00	0.71	0.0002
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0001
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0005
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C13	1.00	0.00	0.00	0.00	0.98	0.02	0.00	0.00	0.18	0.0005
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0003
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0011
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C9_1	1.00	0.00	0.03	0.00	0.97	0.00	0.00	0.00	0.00	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000

****
Conduit Surcharge Summary

****

Conduit	Hours Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C6	2.58	2.58	2.58	0.54	0.01
C1_3	3.36	3.36	3.36	3.47	1.13
C12	0.50	0.50	0.50	0.01	0.01
C13	1.30	1.30	1.30	0.01	0.01
C14	2.41	2.41	2.42	0.01	0.01

Analysis begun on: Mon Jan 05 16:37:41 2015
Analysis ended on: Mon Jan 05 16:37:42 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Smooth

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 24
Number of nodes 30
Number of links 29
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	2yrSCS_24h_Type_III_4.09in	INTENSITY	15 min.

****

Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0300
C3	J4	J3	CONDUIT	506.7	0.0931	0.0300
C4	J5	J4	CONDUIT	484.9	0.0932	0.0300
C5	J6	J5	CONDUIT	340.0	0.0932	0.0300
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0300
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0300
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0300
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0300
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0300
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0300
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0300
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0300
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	2.15	72.00	1	409.91
C3	TR2	5.00	162.68	2.15	72.00	1	410.19
C4	TR2	5.00	162.68	2.15	72.00	1	410.35
C5	TR2	5.00	162.68	2.15	72.00	1	410.39
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	2.15	72.00	1	410.79
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	2.15	72.00	1	409.66
C10_5	TR1	8.00	248.00	4.48	50.00	1	1224.36
C10_2	TR1	8.00	248.00	4.48	50.00	1	447.97
C10_4	TR1	8.00	248.00	4.48	50.00	1	220.22
C10_1	TR1	8.00	248.00	4.48	50.00	1	482.57
C10_3	TR1	8.00	248.00	4.48	50.00	1	451.23
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	2.15	72.00	1	439.59
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0351	0.0692	0.1024	0.1348	0.1663
0.1972	0.2273	0.2566	0.2854	0.3135
0.3410	0.3679	0.3915	0.4121	0.4323
0.4524	0.4722	0.4918	0.5113	0.5305
0.5497	0.5686	0.5875	0.6062	0.6247

0.6432	0.6616	0.6798	0.6980	0.7161
0.7341	0.7520	0.7699	0.7876	0.8053
0.8230	0.8406	0.8581	0.8756	0.8930
0.9104	0.9277	0.9450	0.9592	0.9646
0.9706	0.9772	0.9843	0.9919	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0456	0.0898	0.1328	0.1746	0.2153
0.2549	0.2934	0.3310	0.3677	0.4035
0.4385	0.4726	0.5060	0.5386	0.5706
0.6018	0.6324	0.6624	0.6918	0.7206
0.6606	0.6201	0.5930	0.5754	0.5649
0.5598	0.5588	0.5612	0.5662	0.5734
0.5922	0.6112	0.6306	0.6502	0.6701
0.6902	0.7104	0.7309	0.7515	0.7722
0.7950	0.8177	0.8405	0.8632	0.8860
0.9088	0.9316	0.9544	0.9772	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	84.170	4.089
Evaporation Loss	0.000	0.000
Infiltration Loss	39.944	1.941
Surface Runoff	39.868	1.937
Final Surface Storage	4.418	0.215
Continuity Error (%)	-0.072	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	31.263	0.000	4.251
Remaining Buildup	210.612	80.563	116.806
Continuity Error (%)	0.012	0.000	0.003

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	39.799	12.969
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.003	0.001
External Outflow	29.675	9.670
Internal Outflow	0.000	0.000
Storage Losses	8.566	2.791
Initial Stored Volume	1.833	0.597
Final Stored Volume	3.424	1.116
Continuity Error (%)	-0.075	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	31.199	0.000	4.242
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	0.000	0.000	0.000

External Outflow	26.364	0.000	3.584
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	6.444	0.000	0.876
Continuity Error (%)	-5.156	0.000	-5.156

****
Highest Continuity Errors
****
Node J10 (6.62%)
Node J7 (1.69%)

****
Time-Step Critical Elements
****
Link C1_3 (44.19%)
Link C13 (2.15%)
Link C6 (2.09%)

****
Highest Flow Instability Indexes
****
Link C14 (10)
Link C10_3 (9)
Link C10_4 (8)
Link C10_2 (4)
Link C15 (3)

****
Routing Time Step Summary
****
Minimum Time Step : 0.50 sec
Average Time Step : 4.30 sec
Maximum Time Step : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	4.09	0.00	0.00	0.95	2.98	1.06	23.48	0.729
S4	4.09	0.00	0.00	1.97	1.89	0.54	10.10	0.462
S10	4.09	0.00	0.00	1.52	2.32	0.57	11.17	0.567

S11	4.09	0.00	0.00	3.18	0.68	0.08	1.14	0.167
S12	4.09	0.00	0.00	1.52	2.32	0.22	4.41	0.568
S13	4.09	0.00	0.00	1.52	2.33	0.38	7.65	0.569
S21	4.09	0.00	0.00	2.92	0.94	0.16	2.12	0.231
S15	4.09	0.00	0.00	3.23	0.64	0.08	1.59	0.156
S7	4.09	0.00	0.00	0.25	3.69	1.62	30.85	0.903
S6	4.09	0.00	0.00	0.00	3.99	0.53	11.89	0.975
S26	4.09	0.00	0.00	2.43	1.47	0.20	3.40	0.359
S25	4.09	0.00	0.00	3.18	0.62	0.28	1.78	0.150
S22	4.09	0.00	0.00	0.18	3.79	0.22	5.12	0.927
S1	4.09	0.00	0.00	1.16	2.71	1.77	33.80	0.663
S2	4.09	0.00	0.00	2.92	0.96	0.19	3.04	0.234
S5	4.09	0.00	0.00	2.92	0.96	0.11	1.84	0.234
S8	4.09	0.00	0.00	2.92	0.96	0.07	1.15	0.235
S23	4.09	0.00	0.00	0.12	3.84	1.65	34.78	0.940
S16	4.09	0.00	0.00	2.92	0.94	0.09	1.17	0.229
S17	4.09	0.00	0.00	2.92	0.93	1.20	13.52	0.227
S18	4.09	0.00	0.00	2.92	0.93	0.37	4.27	0.227
S19	4.09	0.00	0.00	2.92	0.95	0.26	3.88	0.233
S20	4.09	0.00	0.00	2.92	0.96	0.05	0.86	0.235
S24	4.09	0.00	0.00	0.18	3.74	1.30	21.56	0.915

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	13.072	0.000	1.777
S25	18.191	0.000	2.473
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000

S24	0.000	0.000	0.000
System	31.263	0.000	4.251

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	1.16	2.99	14.27	0 12:35
J3	JUNCTION	0.88	2.78	14.37	0 12:35
J4	JUNCTION	0.60	2.47	14.55	0 12:38
J5	JUNCTION	0.53	2.22	14.75	0 12:39
J6	JUNCTION	0.47	2.01	14.85	0 12:39
J7	JUNCTION	1.14	2.93	15.13	0 12:39
J8	JUNCTION	0.16	0.32	15.32	0 13:04
J9	JUNCTION	0.51	1.52	17.02	0 12:20
J10	JUNCTION	0.52	1.81	17.81	0 12:07
J11	JUNCTION	0.27	0.95	14.45	0 12:00
J12	JUNCTION	1.41	3.18	14.17	0 12:34
J1	JUNCTION	1.66	3.25	13.95	0 12:34
J13	JUNCTION	1.29	2.19	13.04	0 12:38
J14	JUNCTION	1.63	3.08	13.75	0 12:35
J15	JUNCTION	1.58	2.90	13.59	0 12:36
J16	JUNCTION	1.41	2.51	13.30	0 12:38
J17	JUNCTION	0.23	1.49	13.49	0 12:36
J18	JUNCTION	0.48	1.86	13.66	0 12:35
J19	JUNCTION	1.62	2.99	13.65	0 12:35
J20	JUNCTION	2.14	3.03	13.03	0 12:39
J21	JUNCTION	0.17	1.13	13.96	0 12:34
J22	JUNCTION	0.35	2.14	14.97	0 12:27
J23	JUNCTION	1.63	3.34	14.08	0 12:34
J24	JUNCTION	0.10	0.98	14.48	0 12:27
J25	JUNCTION	0.19	1.31	14.28	0 12:34
J26	JUNCTION	0.61	1.90	17.81	0 12:08
J27	JUNCTION	0.63	1.89	17.71	0 12:09
OF1	OUTFALL	2.50	2.50	12.00	0 00:00
SU1	STORAGE	0.15	0.62	16.92	0 13:08
SU2	STORAGE	1.82	3.76	19.76	0 13:22

****
Node Inflow Summary
****

	Maximum Lateral Inflow	Maximum Total Inflow	Time of Max Occurrence	Lateral Inflow Volume	Total Inflow Volume

Node	Type	CFS	CFS	days hr:min	10^6 gal	10^6 gal
J2	JUNCTION	2.12	63.53	0 12:30	0.162	5.090
J3	JUNCTION	9.24	47.55	0 12:30	0.462	3.797
J4	JUNCTION	4.41	41.97	0 12:30	0.220	3.344
J5	JUNCTION	11.24	39.85	0 12:29	0.613	3.133
J6	JUNCTION	0.00	30.68	0 12:41	0.000	2.524
J7	JUNCTION	3.40	34.96	0 12:29	0.199	2.567
J8	JUNCTION	1.78	1.78	0 12:30	0.277	0.277
J9	JUNCTION	0.00	31.85	0 12:09	0.000	2.104
J10	JUNCTION	0.00	1.78	0 11:55	0.000	0.018
J11	JUNCTION	23.48	23.48	0 12:00	1.054	1.054
J12	JUNCTION	11.16	69.02	0 12:36	0.564	5.639
J1	JUNCTION	0.00	95.17	0 12:32	0.000	7.500
J13	JUNCTION	0.86	110.52	0 12:34	0.050	9.670
J14	JUNCTION	13.51	105.68	0 12:30	1.195	8.695
J15	JUNCTION	4.27	108.04	0 12:32	0.369	9.250
J16	JUNCTION	3.88	113.74	0 12:33	0.263	9.637
J17	JUNCTION	1.84	2.65	0 12:31	0.114	0.131
J18	JUNCTION	3.03	3.03	0 12:29	0.186	0.216
J19	JUNCTION	0.00	105.59	0 12:32	0.000	8.913
J20	JUNCTION	0.00	109.95	0 12:37	0.000	9.670
J21	JUNCTION	1.17	1.17	0 12:29	0.094	0.094
J22	JUNCTION	33.79	33.79	0 12:00	1.770	1.770
J23	JUNCTION	0.00	95.78	0 12:30	0.000	7.407
J24	JUNCTION	1.15	4.90	0 12:27	0.068	0.077
J25	JUNCTION	0.00	5.80	0 12:27	0.000	0.087
J26	JUNCTION	30.85	30.85	0 12:00	1.617	1.634
J27	JUNCTION	5.12	32.54	0 12:02	0.216	1.828
OF1	OUTFALL	0.00	109.51	0 12:39	0.000	9.670
SU1	STORAGE	46.67	46.67	0 12:00	2.177	2.176
SU2	STORAGE	21.56	21.56	0 12:00	1.298	1.298

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J22	JUNCTION	0.05	0.145	0.925

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
SU1	22.329	2	100	91.920	10	0 13:08	0.00
SU2	38.393	27	47	81.843	57	0 13:22	3.85

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.93	21.83	109.51	9.670	26.364	0.000	3.584
System	99.93	21.83	109.51	9.670	26.364	0.000	3.584

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	23.20	0 12:00	1.63	0.02	0.32
C2	CHANNEL	48.31	0 12:42	1.08	0.12	0.58
C3	CHANNEL	41.59	0 12:43	1.12	0.10	0.52
C4	CHANNEL	38.14	0 12:41	1.26	0.09	0.47
C5	CHANNEL	30.80	0 12:42	1.14	0.08	0.42
C6	CONDUIT	30.68	0 12:41	4.88	0.66	1.00
C7	CONDUIT	1.51	0 13:04	0.18	0.00	0.27
C8	CONDUIT	30.69	0 12:20	1.40	0.05	0.37
C9_2_1	CONDUIT	28.29	0 12:06	1.39	0.09	0.32
C1_1	CHANNEL	61.22	0 12:39	1.20	0.15	0.62
C10	CONDUIT	5.49	0 12:27	3.24	0.09	0.55
C1_2	CHANNEL	69.87	0 12:37	1.21	0.17	0.65
C10_5	CHANNEL	93.87	0 12:33	1.57	0.08	0.35
C10_2	CHANNEL	107.03	0 12:34	1.84	0.24	0.34
C10_4	CHANNEL	103.15	0 12:33	1.55	0.47	0.38
C10_1	CHANNEL	109.96	0 12:34	2.22	0.23	0.29
C10_3	CHANNEL	104.71	0 12:33	1.63	0.23	0.37
C1_3	CONDUIT	94.10	0 12:31	6.66	1.77	1.00

C11	CONDUIT	2.82	0	12:00	0.26	0.00	0.36
C12	CONDUIT	1.21	0	12:29	0.56	0.03	0.78
C13	CONDUIT	33.81	0	12:00	11.69	0.70	1.00
C14	CONDUIT	4.65	0	11:58	1.94	0.16	0.96
C15	CONDUIT	4.28	0	12:29	1.24	0.08	0.80
C16	CONDUIT	109.95	0	12:37	1.41	0.06	0.65
C17	CHANNEL	109.51	0	12:39	2.54	0.25	0.55
C9_1	CONDUIT	1.78	0	11:55	0.15	0.01	0.31
C9_2_2	CONDUIT	31.85	0	12:09	1.86	0.10	0.28
OR1	ORIFICE	0.00	0	00:00		0.00	
OR2	ORIFICE	3.85	0	13:23		0.38	

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C3	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.11	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C5	1.00	0.00	0.18	0.00	0.82	0.00	0.00	0.00	0.15	0.0000
C6	1.00	0.00	0.18	0.00	0.82	0.00	0.00	0.00	0.27	0.0001
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C8	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.10	0.0000
C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C10	1.00	0.00	0.00	0.00	0.52	0.48	0.00	0.00	0.89	0.0010
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0001
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0004
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C13	1.00	0.00	0.00	0.00	0.95	0.05	0.00	0.00	0.33	0.0001
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0018
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0008
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C9_1	1.00	0.00	0.03	0.00	0.97	0.00	0.00	0.00	0.00	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Capacity	Hours Capacity Limited
C6	0.14	0.14	0.14	0.88	0.01
C1_3	0.70	0.70	0.70	2.59	0.70
C13	0.05	0.05	0.06	0.01	0.01

Analysis begun on: Mon Jan 05 16:32:59 2015
Analysis ended on: Mon Jan 05 16:33:00 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Current Conditions

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

```
**************
Element Count
**************
Number of rain gages ...... 1
Number of subcatchments ... 18
Number of nodes ........... 24
Number of links ........... 23
Number of pollutants ...... 3
Number of land uses ....... 1


*****************
Pollutant Summary
*****************
                    Ppt.     GW        Kdecay
Name             Units   Concen.   Concen.    1/days    CoPollutant
-----------------------------------------------------------------------
nitrogen          MG/L      0.00      0.00      0.00
potassium         MG/L      0.00      0.00      0.00
phosphorous       MG/L      0.00      0.00      0.00


***************
Landuse Summary
***************
                 Sweeping   Maximum     Last
Name              Interval   Removal    Swept
-----------------------------------------------
golfcourse            0.00      0.00      0.00


****************
Raingage Summary
****************
                              Data       Recording
Name             Data Source        Type       Interval
-------------------------------------------------------------
RG1              25yrSCS_24h_Type_III_8.94inINTENSITY    15 min.


********************
Subcatchment Summary
********************
Name                 Area    Width   %Imperv    %Slope    Rain Gage          Outlet
-----------------------------------------------------------------------------------------------------------
S3                  13.03   910.00     52.50    0.5000    RG1                J11
S4                  10.48   710.00     10.20    0.5000    RG1                J5
```

S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S25	16.66	300.00	2.00	0.5000	RG1	J8
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	
J19	JUNCTION	10.66	8.00	0.0	
J20	JUNCTION	10.00	8.00	0.0	
J21	JUNCTION	12.83	3.53	0.0	
J22	JUNCTION	12.83	3.07	0.0	
J23	JUNCTION	10.74	9.67	0.0	
J24	JUNCTION	13.50	2.50	0.0	
J25	JUNCTION	12.97	6.00	0.0	
OF1	OUTFALL	9.50	5.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness

C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67

C17	TR2	5.00	162.68	3.35	72.00	1	221.24

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459
0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2
Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910

```
        0.8308    0.8716    0.9134    0.9562    1.0000
Hrad:
        0.0293    0.0577    0.0854    0.1123    0.1384
        0.1639    0.1887    0.2129    0.2365    0.2595
        0.2820    0.3040    0.3254    0.3464    0.3670
        0.3871    0.4068    0.4260    0.4449    0.4635
        0.4248    0.3988    0.3814    0.3701    0.3633
        0.3600    0.3594    0.3609    0.3642    0.3688
        0.3957    0.4220    0.4480    0.4742    0.5009
        0.5281    0.5561    0.5848    0.6143    0.6448
        0.6765    0.7092    0.7428    0.7771    0.8124
        0.8484    0.8852    0.9227    0.9610    1.0000
Width:
        0.1677    0.1687    0.1697    0.1707    0.1717
        0.1727    0.1737    0.1747    0.1757    0.1767
        0.1777    0.1787    0.1798    0.1808    0.1818
        0.1828    0.1838    0.1848    0.1858    0.1868
        0.2216    0.2564    0.2912    0.3260    0.3608
        0.3956    0.4303    0.4651    0.4999    0.5347
        0.5590    0.5833    0.6076    0.6319    0.6562
        0.6806    0.7049    0.7292    0.7535    0.7778
        0.8000    0.8222    0.8444    0.8667    0.8889
        0.9111    0.9333    0.9556    0.9778    1.0000


**********************
Control Actions Taken
**********************


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet       inches
**************************    ---------       -------
Total Precipitation ......       141.785        8.941
Evaporation Loss .........         0.000        0.000
Infiltration Loss ........        63.726        4.019
Surface Runoff ...........        73.718        4.649
Final Surface Storage ....         4.454        0.281
Continuity Error (%) .....        -0.079


**************************      nitrogen     potassium   phosphorous
Runoff Quality Continuity           lbs           lbs           lbs
**************************   ----------    ----------    ----------
Initial Buildup ..........       186.114        61.982        93.140
Surface Buildup ..........         0.000         0.000         0.000
Wet Deposition ...........         0.000         0.000         0.000
Sweeping Removal .........         0.000         0.000         0.000
Infiltration Loss ........         0.000         0.000         0.000
BMP Removal ..............         0.000         0.000         0.000
Surface Runoff ...........        88.307         0.000        12.006
Remaining Buildup ........        97.736        61.982        81.124
Continuity Error (%) .....         0.038         0.000         0.010
```

```
**************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------      ---------
Dry Weather Inflow .......        0.000          0.000
Wet Weather Inflow .......       73.591         23.981
Groundwater Inflow .......        0.000          0.000
RDII Inflow ..............        0.000          0.000
External Inflow ..........        0.000          0.000
External Outflow .........       61.842         20.152
Internal Outflow .........       10.637          3.466
Storage Losses ...........        0.000          0.000
Initial Stored Volume ....        1.833          0.597
Final Stored Volume ......        2.974          0.969
Continuity Error (%) .....       -0.038


**************************      nitrogen     potassium   phosphorous
Quality Routing Continuity          lbs           lbs           lbs
**************************    ----------    ----------    ----------
Dry Weather Inflow .......        0.000         0.000         0.000
Wet Weather Inflow .......       88.159         0.000        11.986
Groundwater Inflow .......        0.000         0.000         0.000
RDII Inflow ..............        0.000         0.000         0.000
External Inflow ..........        0.000         0.000         0.000
Internal Flooding ........        0.126         0.000         0.017
External Outflow .........       72.980         0.000         9.922
Mass Reacted .............        0.000         0.000         0.000
Initial Stored Mass ......        0.000         0.000         0.000
Final Stored Mass ........       13.335         0.000         1.813
Continuity Error (%) .....        1.948         0.000         1.948


*************************
Highest Continuity Errors
*************************
Node J7 (1.72%)


****************************
Time-Step Critical Elements
****************************
Link C1_3 (51.81%)
Link C13 (4.31%)
Link C6 (1.02%)


*********************************
Highest Flow Instability Indexes
*********************************
Link C14 (5)
Link C10_3 (5)
Link C10_4 (4)
Link C15 (3)
```

Link C16 (2)

****
Routing Time Step Summary
****

Minimum Time Step : 0.50 sec
Average Time Step : 4.03 sec
Maximum Time Step : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.01

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	8.94	0.00	0.00	1.29	7.48	2.65	63.16	0.837
S4	8.94	0.00	0.00	2.77	5.90	1.68	34.13	0.660
S10	8.94	0.00	0.00	1.92	6.74	1.64	35.48	0.754
S11	8.94	0.00	0.00	5.58	3.10	0.35	6.96	0.347
S12	8.94	0.00	0.00	1.92	6.76	0.64	14.47	0.756
S13	8.94	0.00	0.00	1.92	6.76	1.11	25.58	0.756
S21	8.94	0.00	0.00	5.12	3.55	0.61	11.18	0.397
S15	8.94	0.00	0.00	5.67	3.03	0.39	8.05	0.339
S25	8.94	0.00	0.00	5.58	2.98	1.35	18.50	0.333
S1	8.94	0.00	0.00	1.47	7.23	4.73	102.97	0.809
S2	8.94	0.00	0.00	5.12	3.58	0.70	13.53	0.401
S5	8.94	0.00	0.00	5.12	3.58	0.43	8.20	0.401
S8	8.94	0.00	0.00	5.12	3.59	0.25	5.11	0.401
S16	8.94	0.00	0.00	5.12	3.54	0.36	6.37	0.396
S17	8.94	0.00	0.00	5.12	3.52	4.55	76.61	0.394
S18	8.94	0.00	0.00	5.12	3.53	1.40	24.02	0.394
S19	8.94	0.00	0.00	5.12	3.57	0.99	18.67	0.399
S20	8.94	0.00	0.00	5.12	3.59	0.19	3.82	0.401

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000

S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S25	88.307	0.000	12.006
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
System	88.307	0.000	12.006

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	2.00	5.18	16.46	0 12:33
J3	JUNCTION	1.70	4.90	16.50	0 12:33
J4	JUNCTION	1.29	4.47	16.54	0 12:34
J5	JUNCTION	1.04	4.07	16.60	0 12:34
J6	JUNCTION	0.81	3.77	16.61	0 12:35
J7	JUNCTION	1.34	4.48	16.68	0 12:37
J8	JUNCTION	0.31	1.70	16.70	0 12:37
J11	JUNCTION	0.56	2.95	16.45	0 12:32
J12	JUNCTION	2.24	5.45	16.43	0 12:32
J1	JUNCTION	2.48	5.65	16.35	0 12:31
J13	JUNCTION	1.77	4.15	15.00	0 12:33
J14	JUNCTION	2.40	5.61	16.29	0 12:31
J15	JUNCTION	2.29	5.38	16.07	0 12:32
J16	JUNCTION	2.00	4.76	15.55	0 12:32
J17	JUNCTION	0.80	3.57	15.57	0 12:32
J18	JUNCTION	1.22	4.57	16.37	0 12:29
J19	JUNCTION	2.36	5.50	16.16	0 12:32
J20	JUNCTION	2.62	4.97	14.97	0 12:34
J21	JUNCTION	0.63	3.53	16.36	0 12:27
J22	JUNCTION	0.76	3.07	15.90	0 11:47
J23	JUNCTION	2.45	5.66	16.40	0 12:32
J24	JUNCTION	0.40	2.50	16.00	0 12:12
J25	JUNCTION	0.63	3.45	16.42	0 12:33
OF1	OUTFALL	2.50	2.50	12.00	0 00:00

****

Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
J2	JUNCTION	11.17	114.29	0 12:30	0.612	8.849
J3	JUNCTION	33.36	71.82	0 12:37	1.494	5.455
J4	JUNCTION	14.47	51.17	0 12:30	0.641	3.979
J5	JUNCTION	39.86	47.04	0 12:29	2.025	3.496
J6	JUNCTION	0.00	18.64	0 12:48	0.000	1.556
J7	JUNCTION	0.00	16.28	0 12:42	0.000	1.416
J8	JUNCTION	18.49	18.49	0 12:30	1.343	1.343
J11	JUNCTION	63.15	63.15	0 12:00	2.645	2.645
J12	JUNCTION	35.47	80.06	0 12:39	1.642	9.498
J1	JUNCTION	0.00	75.07	0 13:21	0.000	12.076
J13	JUNCTION	3.82	186.93	0 12:31	0.188	20.169
J14	JUNCTION	76.56	134.08	0 12:29	4.545	16.589
J15	JUNCTION	24.01	163.73	0 12:30	1.401	18.623
J16	JUNCTION	18.66	186.60	0 12:30	0.985	20.029
J17	JUNCTION	8.20	8.20	0 12:00	0.425	0.450
J18	JUNCTION	13.53	13.53	0 12:00	0.694	0.704
J19	JUNCTION	0.00	142.43	0 12:30	0.000	17.253
J20	JUNCTION	0.00	185.70	0 12:31	0.000	20.161
J21	JUNCTION	6.37	6.37	0 12:29	0.356	0.356
J22	JUNCTION	102.94	105.18	0 12:29	4.728	5.152
J23	JUNCTION	0.00	81.05	0 12:39	0.000	12.158
J24	JUNCTION	5.11	59.56	0 12:31	0.254	1.170
J25	JUNCTION	0.00	55.86	0 12:31	0.000	1.111
OF1	OUTFALL	0.00	184.21	0 12:34	0.000	20.151

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J12	JUNCTION	0.86	0.446	1.566
J17	JUNCTION	2.16	1.066	2.434
J18	JUNCTION	4.89	2.574	2.626
J21	JUNCTION	3.02	1.530	0.000
J22	JUNCTION	3.34	1.070	0.000
J23	JUNCTION	1.46	0.655	4.012
J24	JUNCTION	2.07	0.500	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
J21	0.15	2.09	0 12:32	0.005	3.53
J22	1.84	105.16	0 12:29	2.473	3.07
J24	0.97	59.56	0 12:32	0.988	2.50

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.88	31.17	184.21	20.151	72.984	0.000	9.923
System	99.88	31.17	184.21	20.151	72.984	0.000	9.923

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	59.57	0 12:00	1.71	0.05	0.68
C2	CHANNEL	79.51	0 12:41	0.51	0.39	0.99
C3	CHANNEL	57.94	0 12:42	0.44	0.28	0.94
C4	CHANNEL	44.63	0 12:42	0.41	0.22	0.85
C5	CHANNEL	20.92	0 12:48	0.39	0.10	0.78
C6	CONDUIT	18.64	0 12:48	2.97	0.40	1.00
C7	CONDUIT	16.28	0 12:42	0.38	0.02	0.51
C1_1	CHANNEL	65.66	0 12:46	0.43	0.32	1.00
C10	CONDUIT	55.56	0 12:33	8.84	0.89	1.00
C1_2	CHANNEL	81.05	0 12:39	0.50	0.39	1.00
C10_5	CHANNEL	76.08	0 13:22	0.69	0.15	0.65
C10_2	CHANNEL	161.11	0 12:31	1.25	0.88	0.63
C10_4	CHANNEL	129.20	0 12:30	0.90	1.43	0.69
C10_1	CHANNEL	183.67	0 12:31	1.70	0.93	0.56
C10_3	CHANNEL	140.12	0 12:30	0.99	0.76	0.68

C1_3	CONDUIT	73.18	0	13:21	5.18	1.37	1.00
C11	CONDUIT	55.86	0	12:31	0.77	0.06	0.72
C12	CONDUIT	6.25	0	12:27	1.99	0.17	1.00
C13	CONDUIT	43.40	0	11:47	13.82	0.90	1.00
C14	CONDUIT	13.53	0	12:00	4.31	0.46	1.00
C15	CONDUIT	8.20	0	12:00	1.68	0.15	1.00
C16	CONDUIT	185.70	0	12:31	1.55	0.10	1.00
C17	CHANNEL	184.21	0	12:34	2.18	0.83	0.75

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C3	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.03	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C5	1.00	0.00	0.32	0.00	0.68	0.00	0.00	0.00	0.02	0.0000
C6	1.00	0.01	0.32	0.00	0.68	0.00	0.00	0.00	0.05	0.0002
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10	1.00	0.00	0.00	0.00	0.61	0.39	0.00	0.00	0.62	0.0006
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0002
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0005
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.28	0.0005
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0007
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0008
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0001

****
Conduit Surcharge Summary
****

Conduit	--- Hours Full --- Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C6	3.78	3.78	3.78	0.01	0.01

C1_1	0.40	0.40	0.40	0.01	0.01
C10	2.07	2.07	2.07	0.61	0.01
C1_2	0.86	0.86	0.86	0.01	0.01
C10_4	0.01	0.01	0.01	1.95	0.01
C1_3	5.68	5.68	5.69	5.53	2.73
C12	3.02	3.02	3.02	0.01	0.01
C13	3.34	3.34	3.34	0.01	0.01
C14	4.89	4.89	4.89	0.01	0.01
C15	2.16	2.16	2.16	0.01	0.01
C16	0.37	0.37	0.37	0.01	0.01

Analysis begun on: Mon Jan 05 16:30:28 2015
Analysis ended on: Mon Jan 05 16:30:29 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Rough

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

```
WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

**************
Element Count
**************
Number of rain gages ...... 1
Number of subcatchments ... 24
Number of nodes ........... 30
Number of links ........... 29
Number of pollutants ...... 3
Number of land uses ....... 1


******************
Pollutant Summary
******************
                      Ppt.     GW        Kdecay
Name              Units   Concen.   Concen.    1/days    CoPollutant
----------------------------------------------------------------------
nitrogen           MG/L      0.00      0.00      0.00
potassium          MG/L      0.00      0.00      0.00
phosphorous        MG/L      0.00      0.00      0.00


****************
Landuse Summary
****************
                 Sweeping   Maximum      Last
Name               Interval   Removal     Swept
-------------------------------------------------
golfcourse              0.00      0.00      0.00


*****************
Raingage Summary
*****************
                              Data       Recording
Name              Data Source        Type       Interval
-------------------------------------------------------------
RG1               25yrSCS_24h_Type_III_8.94inINTENSITY    15 min.


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Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	3.35	72.00	1	221.24
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459

0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0293	0.0577	0.0854	0.1123	0.1384
0.1639	0.1887	0.2129	0.2365	0.2595
0.2820	0.3040	0.3254	0.3464	0.3670
0.3871	0.4068	0.4260	0.4449	0.4635
0.4248	0.3988	0.3814	0.3701	0.3633
0.3600	0.3594	0.3609	0.3642	0.3688
0.3957	0.4220	0.4480	0.4742	0.5009
0.5281	0.5561	0.5848	0.6143	0.6448
0.6765	0.7092	0.7428	0.7771	0.8124
0.8484	0.8852	0.9227	0.9610	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	184.053	8.941
Evaporation Loss	0.000	0.000
Infiltration Loss	66.367	3.224
Surface Runoff	112.573	5.469
Final Surface Storage	5.283	0.257
Continuity Error (%)	-0.093	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	128.065	0.000	17.412
Remaining Buildup	113.751	80.563	103.637
Continuity Error (%)	0.037	0.000	0.010

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	112.397	36.626
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	74.527	24.286
Internal Outflow	17.400	5.670
Storage Losses	14.095	4.593
Initial Stored Volume	1.833	0.597
Final Stored Volume	8.253	2.689
Continuity Error (%)	-0.039	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	127.875	0.000	17.386
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	10.336	0.000	1.405

External Outflow	95.759	0.000	13.019
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	13.672	0.000	1.859
Continuity Error (%)	6.341	0.000	6.341

****
Highest Continuity Errors
****
Node J10 (5.40%)
Node J7 (1.14%)

****
Time-Step Critical Elements
****
Link C1_3 (51.06%)
Link C13 (3.69%)
Link C6 (1.14%)

****
Highest Flow Instability Indexes
****
Link C14 (5)
Link C10_3 (4)
Link C10_4 (4)
Link C15 (3)
Link C10 (2)

****
Routing Time Step Summary
****
Minimum Time Step : 0.50 sec
Average Time Step : 3.91 sec
Maximum Time Step : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.01

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	8.94	0.00	0.00	1.29	7.48	2.65	63.16	0.837
S4	8.94	0.00	0.00	2.77	5.90	1.68	34.13	0.660
S10	8.94	0.00	0.00	1.92	6.74	1.64	35.48	0.754

S11	8.94	0.00	0.00	5.58	3.10	0.35	6.96	0.347
S12	8.94	0.00	0.00	1.92	6.76	0.64	14.47	0.756
S13	8.94	0.00	0.00	1.92	6.76	1.11	25.58	0.756
S21	8.94	0.00	0.00	5.12	3.55	0.61	11.18	0.397
S15	8.94	0.00	0.00	5.67	3.03	0.39	8.05	0.339
S7	8.94	0.00	0.00	0.29	8.47	3.71	79.82	0.948
S6	8.94	0.00	0.00	0.00	8.83	1.18	27.55	0.988
S26	8.94	0.00	0.00	4.27	4.47	0.61	13.06	0.500
S25	8.94	0.00	0.00	5.58	2.98	1.35	18.50	0.333
S22	8.94	0.00	0.00	0.22	8.61	0.49	11.85	0.962
S1	8.94	0.00	0.00	1.47	7.23	4.73	102.97	0.809
S2	8.94	0.00	0.00	5.12	3.58	0.70	13.53	0.401
S5	8.94	0.00	0.00	5.12	3.58	0.43	8.20	0.401
S8	8.94	0.00	0.00	5.12	3.59	0.25	5.11	0.401
S23	8.94	0.00	0.00	0.15	8.66	3.71	84.44	0.968
S16	8.94	0.00	0.00	5.12	3.54	0.36	6.37	0.396
S17	8.94	0.00	0.00	5.12	3.52	4.55	76.61	0.394
S18	8.94	0.00	0.00	5.12	3.53	1.40	24.02	0.394
S19	8.94	0.00	0.00	5.12	3.57	0.99	18.67	0.399
S20	8.94	0.00	0.00	5.12	3.59	0.19	3.82	0.401
S24	8.94	0.00	0.00	0.22	8.53	2.96	57.43	0.953

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	39.758	0.000	5.405
S25	88.307	0.000	12.006
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000

S24	0.000	0.000	0.000
System	128.065	0.000	17.412

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	2.25	5.53	16.81	0 12:33
J3	JUNCTION	2.00	5.33	16.93	0 12:33
J4	JUNCTION	1.67	4.99	17.06	0 12:35
J5	JUNCTION	1.50	4.67	17.19	0 12:36
J6	JUNCTION	1.36	4.44	17.28	0 12:36
J7	JUNCTION	2.09	6.83	19.03	0 12:38
J8	JUNCTION	0.48	4.04	19.04	0 12:37
J9	JUNCTION	0.73	3.60	19.10	0 12:39
J10	JUNCTION	0.74	3.14	19.14	0 12:39
J11	JUNCTION	0.65	3.30	16.80	0 12:32
J12	JUNCTION	2.46	5.76	16.75	0 12:32
J1	JUNCTION	2.67	5.87	16.57	0 12:32
J13	JUNCTION	1.88	4.36	15.21	0 12:34
J14	JUNCTION	2.57	5.80	16.48	0 12:32
J15	JUNCTION	2.44	5.56	16.25	0 12:32
J16	JUNCTION	2.13	4.94	15.73	0 12:33
J17	JUNCTION	0.93	3.74	15.74	0 12:33
J18	JUNCTION	1.38	4.75	16.55	0 12:30
J19	JUNCTION	2.51	5.68	16.34	0 12:32
J20	JUNCTION	2.72	5.17	15.17	0 12:34
J21	JUNCTION	0.77	3.53	16.36	0 12:18
J22	JUNCTION	0.86	3.07	15.90	0 11:46
J23	JUNCTION	2.65	5.93	16.68	0 12:32
J24	JUNCTION	0.50	2.50	16.00	0 12:06
J25	JUNCTION	0.81	3.79	16.76	0 12:33
J26	JUNCTION	0.83	3.23	19.14	0 12:39
J27	JUNCTION	0.85	3.31	19.13	0 12:40
OF1	OUTFALL	2.50	2.50	12.00	0 00:00
SU1	STORAGE	0.86	1.99	18.29	0 14:12
SU2	STORAGE	2.33	6.00	22.00	0 12:25

****
Node Inflow Summary
****

	Maximum Lateral Inflow	Maximum Total Inflow	Time of Max Occurrence	Lateral Inflow Volume	Total Inflow Volume

Node	Type	CFS	CFS	days hr:min	10^6 gal	10^6 gal
J2	JUNCTION	11.18	172.03	0 12:30	0.612	15.118
J3	JUNCTION	33.37	131.25	0 12:41	1.494	11.731
J4	JUNCTION	14.47	109.84	0 12:38	0.641	10.288
J5	JUNCTION	39.88	107.54	0 12:30	2.025	9.679
J6	JUNCTION	0.00	77.45	0 12:46	0.000	7.668
J7	JUNCTION	13.06	101.14	0 12:11	0.605	7.799
J8	JUNCTION	18.50	19.42	0 12:08	1.343	1.386
J9	JUNCTION	0.00	94.81	0 12:04	0.000	5.830
J10	JUNCTION	0.00	3.76	0 11:51	0.000	0.043
J11	JUNCTION	63.16	63.16	0 12:00	2.645	2.645
J12	JUNCTION	35.48	114.73	0 12:30	1.642	14.589
J1	JUNCTION	0.00	88.75	0 14:00	0.000	16.352
J13	JUNCTION	3.82	197.40	0 12:30	0.188	24.310
J14	JUNCTION	76.61	147.71	0 12:30	4.545	20.761
J15	JUNCTION	24.02	176.65	0 12:30	1.401	22.779
J16	JUNCTION	18.67	199.15	0 12:30	0.985	24.164
J17	JUNCTION	8.20	8.20	0 12:00	0.425	0.437
J18	JUNCTION	13.53	13.53	0 12:00	0.694	0.700
J19	JUNCTION	0.00	155.58	0 12:30	0.000	21.409
J20	JUNCTION	0.00	194.40	0 12:31	0.000	24.298
J21	JUNCTION	6.37	16.94	0 12:31	0.356	0.453
J22	JUNCTION	102.97	111.06	0 12:30	4.728	5.568
J23	JUNCTION	0.00	114.43	0 12:33	0.000	16.910
J24	JUNCTION	5.11	78.78	0 12:31	0.254	2.349
J25	JUNCTION	0.00	75.57	0 12:31	0.000	2.266
J26	JUNCTION	79.82	79.82	0 12:00	3.710	3.751
J27	JUNCTION	11.85	86.28	0 12:00	0.490	4.193
OF1	OUTFALL	0.00	193.21	0 12:34	0.000	24.284
SU1	STORAGE	111.99	111.99	0 12:00	4.883	4.884
SU2	STORAGE	57.43	57.43	0 12:00	2.956	2.956

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J3	JUNCTION	0.59	0.327	0.074
J7	JUNCTION	1.03	0.831	0.969
J12	JUNCTION	1.50	0.763	1.249
J17	JUNCTION	3.02	1.238	2.262
J18	JUNCTION	5.91	2.750	2.450
J20	JUNCTION	0.28	0.174	2.826
J21	JUNCTION	4.28	1.530	0.000
J22	JUNCTION	4.54	1.070	0.000
J23	JUNCTION	2.46	0.933	3.734
J24	JUNCTION	3.14	0.500	0.000

```
SU2              STORAGE        1.51         1.000       0.000


**********************
Node Flooding Summary
**********************

Flooding refers to all water that overflows a node, whether it ponds or not.
-------------------------------------------------------------------------
                                          Total   Maximum
                     Maximum   Time of Max      Flood    Ponded
                Hours      Rate    Occurrence      Volume     Depth
Node             Flooded      CFS   days hr:min    10^6 gal      Feet
-------------------------------------------------------------------------
J21                0.57     16.94      0  12:31       0.160      3.53
J22                2.55    111.04      0  12:30       3.221      3.07
J24                1.82     78.78      0  12:32       2.194      2.50
SU2                 0.27     22.28      0  12:25       0.094      6.00


***********************
Storage Volume Summary
***********************

-----------------------------------------------------------------------------------------------
                 Average     Avg   E&I      Maximum     Max    Time of Max    Maximum
                  Volume    Pcnt  Pcnt       Volume    Pcnt     Occurrence    Outflow
Storage Unit        1000 ft3    Full  Loss      1000 ft3    Full    days hr:min       CFS
-----------------------------------------------------------------------------------------------
SU1                128.384      14    79      297.248      32       0  14:12       0.00
SU2                 50.231      35    25      144.000     100       0  12:25      23.18


************************
Outfall Loading Summary
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-----------------------------------------------------------------------------------------------------
                Flow      Avg.      Max.      Total        Total        Total        Total
                Freq.     Flow      Flow     Volume      nitrogen    potassium   phosphorous
Outfall Node      Pcnt.      CFS       CFS    10^6 gal          lbs          lbs          lbs
-----------------------------------------------------------------------------------------------------
OF1              99.89     36.14    193.21      24.284       95.763        0.000       13.020
-----------------------------------------------------------------------------------------------------
System            99.89     36.14    193.21      24.284       95.763        0.000       13.020


********************
Link Flow Summary
********************

-------------------------------------------------------------------------
                     Maximum  Time of Max   Maximum    Max/    Max/
                      |Flow|   Occurrence   |Veloc|    Full    Full
```

Link	Type	CFS	days hr:min	ft/sec	Flow	Depth
C1	CONDUIT	59.33	0 12:00	1.41	0.05	0.74
C2	CHANNEL	133.15	0 12:42	0.82	0.65	1.00
C3	CHANNEL	118.02	0 12:43	0.75	0.57	1.00
C4	CHANNEL	103.83	0 12:42	0.74	0.50	0.97
C5	CHANNEL	79.59	0 12:47	0.68	0.39	0.91
C6	CONDUIT	77.45	0 12:46	12.33	1.67	1.00
C7	CONDUIT	16.77	0 12:49	0.21	0.02	0.84
C8	CONDUIT	90.83	0 12:11	1.54	0.16	0.80
C9_2_1	CONDUIT	74.86	0 12:00	1.99	0.23	0.55
C1_1	CHANNEL	97.61	0 12:45	0.60	0.47	1.00
C10	CONDUIT	74.80	0 12:33	11.91	1.20	1.00
C1_2	CHANNEL	114.43	0 12:33	0.70	0.55	1.00
C10_5	CHANNEL	89.12	0 14:05	0.80	0.18	0.68
C10_2	CHANNEL	173.13	0 12:31	1.29	0.94	0.66
C10_4	CHANNEL	142.40	0 12:30	0.94	1.58	0.72
C10_1	CHANNEL	194.02	0 12:31	1.74	0.98	0.58
C10_3	CHANNEL	153.01	0 12:30	1.04	0.83	0.70
C1_3	CONDUIT	87.49	0 14:04	6.19	1.64	1.00
C11	CONDUIT	75.57	0 12:31	0.92	0.08	0.78
C12	CONDUIT	11.40	0 12:33	3.63	0.31	1.00
C13	CONDUIT	39.76	0 11:47	12.66	0.82	1.00
C14	CONDUIT	13.52	0 12:00	4.30	0.46	1.00
C15	CONDUIT	8.17	0 12:30	1.66	0.15	1.00
C16	CONDUIT	194.40	0 12:31	1.62	0.10	1.00
C17	CHANNEL	193.21	0 12:34	2.27	0.87	0.75
C9_1	CONDUIT	3.76	0 11:51	0.18	0.01	0.53
C9_2_2	CONDUIT	81.87	0 12:03	2.49	0.25	0.58
OR1	ORIFICE	0.00	0 00:00		0.00	
OR2	ORIFICE	23.18	0 12:25		1.00	

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.04	0.0001
C3	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.05	0.0001
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.07	0.0000
C5	1.00	0.00	0.10	0.00	0.90	0.00	0.00	0.06	0.0000
C6	1.00	0.00	0.10	0.00	0.90	0.00	0.00	0.12	0.0003
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.03	0.0000
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.08	0.0000
C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.15	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0000
C10	1.00	0.00	0.00	0.00	0.72	0.28	0.00	0.49	0.0010
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0001

C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0002
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0008
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0001
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.24	0.0009
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0005
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0005
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0001
C9_1	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.00	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C2	0.59	0.59	0.59	0.01	0.01
C6	5.95	5.95	5.95	3.16	0.01
C1_1	0.97	0.97	0.97	0.01	0.01
C10	3.14	3.14	3.14	1.21	0.01
C1_2	1.50	1.50	1.50	0.01	0.01
C10_4	0.01	0.01	0.01	2.96	0.01
C1_3	7.17	7.17	7.17	7.33	4.27
C12	4.28	4.28	4.28	0.01	0.01
C13	4.54	4.54	4.54	0.01	0.01
C14	5.91	5.91	5.91	0.01	0.01
C15	3.02	3.02	3.02	0.01	0.01
C16	0.62	0.62	0.62	0.01	0.01

Analysis begun on: Mon Jan 05 16:37:17 2015
Analysis ended on: Mon Jan 05 16:37:18 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Smooth

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 24
Number of nodes 30
Number of links 29
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	25yrSCS_24h_Type_III_8.94in	INTENSITY	15 min.

****

Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0300
C3	J4	J3	CONDUIT	506.7	0.0931	0.0300
C4	J5	J4	CONDUIT	484.9	0.0932	0.0300
C5	J6	J5	CONDUIT	340.0	0.0932	0.0300
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0300
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0300
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0300
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0300
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0300
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0300
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0300
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0300
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	2.15	72.00	1	409.91
C3	TR2	5.00	162.68	2.15	72.00	1	410.19
C4	TR2	5.00	162.68	2.15	72.00	1	410.35
C5	TR2	5.00	162.68	2.15	72.00	1	410.39
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	2.15	72.00	1	410.79
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	2.15	72.00	1	409.66
C10_5	TR1	8.00	248.00	4.48	50.00	1	1224.36
C10_2	TR1	8.00	248.00	4.48	50.00	1	447.97
C10_4	TR1	8.00	248.00	4.48	50.00	1	220.22
C10_1	TR1	8.00	248.00	4.48	50.00	1	482.57
C10_3	TR1	8.00	248.00	4.48	50.00	1	451.23
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	2.15	72.00	1	439.59
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0351	0.0692	0.1024	0.1348	0.1663
0.1972	0.2273	0.2566	0.2854	0.3135
0.3410	0.3679	0.3915	0.4121	0.4323
0.4524	0.4722	0.4918	0.5113	0.5305
0.5497	0.5686	0.5875	0.6062	0.6247

0.6432	0.6616	0.6798	0.6980	0.7161
0.7341	0.7520	0.7699	0.7876	0.8053
0.8230	0.8406	0.8581	0.8756	0.8930
0.9104	0.9277	0.9450	0.9592	0.9646
0.9706	0.9772	0.9843	0.9919	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0456	0.0898	0.1328	0.1746	0.2153
0.2549	0.2934	0.3310	0.3677	0.4035
0.4385	0.4726	0.5060	0.5386	0.5706
0.6018	0.6324	0.6624	0.6918	0.7206
0.6606	0.6201	0.5930	0.5754	0.5649
0.5598	0.5588	0.5612	0.5662	0.5734
0.5922	0.6112	0.6306	0.6502	0.6701
0.6902	0.7104	0.7309	0.7515	0.7722
0.7950	0.8177	0.8405	0.8632	0.8860
0.9088	0.9316	0.9544	0.9772	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	184.053	8.941
Evaporation Loss	0.000	0.000
Infiltration Loss	66.367	3.224
Surface Runoff	112.573	5.469
Final Surface Storage	5.283	0.257
Continuity Error (%)	-0.093	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	128.065	0.000	17.412
Remaining Buildup	113.751	80.563	103.637
Continuity Error (%)	0.037	0.000	0.010

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	112.397	36.626
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.001	0.000
External Outflow	86.502	28.188
Internal Outflow	6.461	2.105
Storage Losses	14.095	4.593
Initial Stored Volume	1.833	0.597
Final Stored Volume	7.206	2.348
Continuity Error (%)	-0.029	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	127.873	0.000	17.386
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	0.634	0.000	0.086

External Outflow	115.122	0.000	15.652
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	8.728	0.000	1.187
Continuity Error (%)	2.650	0.000	2.650

****
Highest Continuity Errors
****
Node J10 (6.47%)

****
Time-Step Critical Elements
****
Link C1_3 (63.21%)
Link C13 (1.63%)
Link C10 (1.24%)

****
Highest Flow Instability Indexes
****
Link C14 (8)
Link C10_3 (8)
Link C10_4 (7)
Link C10_2 (4)
Link C16 (3)

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	3.99 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.01

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	8.94	0.00	0.00	1.29	7.48	2.65	63.16	0.837
S4	8.94	0.00	0.00	2.77	5.90	1.68	34.13	0.660
S10	8.94	0.00	0.00	1.92	6.74	1.64	35.48	0.754
S11	8.94	0.00	0.00	5.58	3.10	0.35	6.96	0.347

S12	8.94	0.00	0.00	1.92	6.76	0.64	14.47	0.756
S13	8.94	0.00	0.00	1.92	6.76	1.11	25.58	0.756
S21	8.94	0.00	0.00	5.12	3.55	0.61	11.18	0.397
S15	8.94	0.00	0.00	5.67	3.03	0.39	8.05	0.339
S7	8.94	0.00	0.00	0.29	8.47	3.71	79.82	0.948
S6	8.94	0.00	0.00	0.00	8.83	1.18	27.55	0.988
S26	8.94	0.00	0.00	4.27	4.47	0.61	13.06	0.500
S25	8.94	0.00	0.00	5.58	2.98	1.35	18.50	0.333
S22	8.94	0.00	0.00	0.22	8.61	0.49	11.85	0.962
S1	8.94	0.00	0.00	1.47	7.23	4.73	102.97	0.809
S2	8.94	0.00	0.00	5.12	3.58	0.70	13.53	0.401
S5	8.94	0.00	0.00	5.12	3.58	0.43	8.20	0.401
S8	8.94	0.00	0.00	5.12	3.59	0.25	5.11	0.401
S23	8.94	0.00	0.00	0.15	8.66	3.71	84.44	0.968
S16	8.94	0.00	0.00	5.12	3.54	0.36	6.37	0.396
S17	8.94	0.00	0.00	5.12	3.52	4.55	76.61	0.394
S18	8.94	0.00	0.00	5.12	3.53	1.40	24.02	0.394
S19	8.94	0.00	0.00	5.12	3.57	0.99	18.67	0.399
S20	8.94	0.00	0.00	5.12	3.59	0.19	3.82	0.401
S24	8.94	0.00	0.00	0.22	8.53	2.96	57.43	0.953

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	39.758	0.000	5.405
S25	88.307	0.000	12.006
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
S24	0.000	0.000	0.000

System 128.065 0.000 17.412

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	1.58	4.88	16.16	0 12:31
J3	JUNCTION	1.32	4.61	16.21	0 12:32
J4	JUNCTION	1.02	4.22	16.29	0 12:32
J5	JUNCTION	0.91	3.88	16.40	0 12:33
J6	JUNCTION	0.81	3.63	16.47	0 12:33
J7	JUNCTION	1.66	6.31	18.51	0 12:36
J8	JUNCTION	0.42	3.52	18.52	0 12:37
J9	JUNCTION	0.74	3.10	18.60	0 12:37
J10	JUNCTION	0.75	2.74	18.74	0 12:02
J11	JUNCTION	0.47	2.66	16.16	0 12:32
J12	JUNCTION	1.82	5.12	16.11	0 12:31
J1	JUNCTION	2.03	4.92	15.62	0 12:31
J13	JUNCTION	1.49	3.56	14.41	0 12:32
J14	JUNCTION	1.97	4.81	15.49	0 12:30
J15	JUNCTION	1.89	4.60	15.28	0 12:31
J16	JUNCTION	1.66	4.06	14.85	0 12:31
J17	JUNCTION	0.47	2.87	14.87	0 12:29
J18	JUNCTION	0.81	3.79	15.59	0 12:29
J19	JUNCTION	1.94	4.70	15.36	0 12:31
J20	JUNCTION	2.34	4.36	14.36	0 12:32
J21	JUNCTION	0.37	2.85	15.68	0 12:29
J22	JUNCTION	0.62	3.07	15.90	0 11:47
J23	JUNCTION	2.03	5.32	16.06	0 12:31
J24	JUNCTION	0.27	2.50	16.00	0 12:22
J25	JUNCTION	0.41	3.17	16.14	0 12:31
J26	JUNCTION	0.84	2.83	18.74	0 12:03
J27	JUNCTION	0.86	2.86	18.68	0 12:32
OF1	OUTFALL	2.51	2.89	12.39	0 12:32
SU1	STORAGE	0.90	1.99	18.29	0 14:12
SU2	STORAGE	2.40	6.00	22.00	0 12:25

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal

J2	JUNCTION	11.18	192.90	0	12:30	0.612	15.277
J3	JUNCTION	33.35	143.94	0	12:30	1.494	11.806
J4	JUNCTION	14.46	122.85	0	12:30	0.641	10.333
J5	JUNCTION	39.85	115.74	0	12:30	2.025	9.708
J6	JUNCTION	0.00	83.56	0	12:42	0.000	7.691
J7	JUNCTION	13.06	109.11	0	12:18	0.605	7.792
J8	JUNCTION	18.49	24.23	0	12:03	1.343	1.378
J9	JUNCTION	0.00	94.77	0	12:04	0.000	5.829
J10	JUNCTION	0.00	3.76	0	11:51	0.000	0.036
J11	JUNCTION	63.14	63.14	0	11:59	2.645	2.645
J12	JUNCTION	35.46	184.86	0	12:30	1.642	16.669
J1	JUNCTION	0.00	178.96	0	12:49	0.000	19.992
J13	JUNCTION	3.81	310.55	0	12:31	0.188	28.189
J14	JUNCTION	76.58	251.20	0	12:29	4.545	24.526
J15	JUNCTION	24.01	283.81	0	12:30	1.401	26.606
J16	JUNCTION	18.66	308.27	0	12:30	0.985	28.016
J17	JUNCTION	8.20	8.20	0	11:59	0.425	0.435
J18	JUNCTION	13.53	13.53	0	11:59	0.694	0.738
J19	JUNCTION	0.00	261.43	0	12:30	0.000	25.253
J20	JUNCTION	0.00	310.07	0	12:31	0.000	28.188
J21	JUNCTION	6.37	6.37	0	12:29	0.356	0.356
J22	JUNCTION	102.92	102.92	0	11:59	4.727	4.823
J23	JUNCTION	0.00	184.04	0	12:33	0.000	19.734
J24	JUNCTION	5.11	36.13	0	12:31	0.254	0.476
J25	JUNCTION	0.00	31.92	0	12:31	0.000	0.449
J26	JUNCTION	79.79	79.79	0	11:59	3.710	3.744
J27	JUNCTION	11.85	86.26	0	12:00	0.490	4.193
OF1	OUTFALL	0.00	309.60	0	12:32	0.000	28.186
SU1	STORAGE	111.96	111.96	0	11:59	4.883	4.883
SU2	STORAGE	57.40	57.40	0	11:59	2.956	2.956

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J7	JUNCTION	0.46	0.311	1.489
J12	JUNCTION	0.30	0.124	1.888
J17	JUNCTION	0.79	0.369	3.131
J18	JUNCTION	2.62	1.791	3.409
J21	JUNCTION	1.60	0.847	0.683
J22	JUNCTION	2.25	1.070	0.000
J23	JUNCTION	0.70	0.320	4.347
J24	JUNCTION	1.23	0.500	0.000
SU2	STORAGE	1.51	1.000	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
J22	1.40	94.80	0 12:29	1.752	3.07
J24	0.42	36.13	0 12:32	0.260	2.50
SU2	0.27	22.27	0 12:25	0.093	6.00

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
SU1	134.348	15	79	297.250	32	0 14:12	0.00
SU2	51.964	36	25	144.000	100	0 12:25	23.18

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.89	46.61	309.60	28.186	115.130	0.000	15.653
System	99.89	46.61	309.60	28.186	115.130	0.000	15.653

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	62.41	0 11:59	1.94	0.05	0.63
C2	CHANNEL	150.83	0 12:36	1.07	0.37	0.95

C3	CHANNEL	126.78	0	12:37	1.12	0.31	0.88
C4	CHANNEL	113.00	0	12:37	1.24	0.28	0.81
C5	CHANNEL	85.46	0	12:39	1.24	0.21	0.75
C6	CONDUIT	83.56	0	12:42	13.30	1.80	1.00
C7	CONDUIT	17.70	0	12:38	0.42	0.02	0.79
C8	CONDUIT	90.98	0	12:13	1.75	0.16	0.76
C9_2_1	CONDUIT	74.84	0	12:00	1.99	0.23	0.47
C1_1	CHANNEL	162.79	0	12:37	1.17	0.40	0.99
C10	CONDUIT	31.98	0	12:32	5.09	0.51	1.00
C1_2	CHANNEL	184.04	0	12:33	1.16	0.45	1.00
C10_5	CHANNEL	180.43	0	12:49	1.82	0.15	0.56
C10_2	CHANNEL	282.97	0	12:31	2.72	0.63	0.54
C10_4	CHANNEL	248.46	0	12:30	2.11	1.13	0.59
C10_1	CHANNEL	307.23	0	12:31	3.48	0.64	0.48
C10_3	CHANNEL	260.52	0	12:30	2.28	0.58	0.58
C1_3	CONDUIT	175.74	0	12:49	12.43	3.30	1.00
C11	CONDUIT	31.92	0	12:31	0.48	0.04	0.67
C12	CONDUIT	6.36	0	12:29	2.03	0.17	1.00
C13	CONDUIT	49.33	0	11:48	15.70	1.02	1.00
C14	CONDUIT	13.53	0	12:00	4.31	0.46	1.00
C15	CONDUIT	9.40	0	11:51	2.85	0.17	1.00
C16	CONDUIT	310.07	0	12:31	2.73	0.16	0.95
C17	CHANNEL	309.60	0	12:32	3.93	0.70	0.72
C9_1	CONDUIT	3.76	0	11:51	0.19	0.01	0.46
C9_2_2	CONDUIT	81.81	0	12:03	2.49	0.25	0.50
OR1	ORIFICE	0.00	0	00:00		0.00	
OR2	ORIFICE	23.18	0	12:25		1.00	

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Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.09	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.10	0.0000
C3	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.13	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.19	0.0000
C5	1.00	0.00	0.10	0.00	0.90	0.00	0.00	0.17	0.0000
C6	1.00	0.00	0.10	0.00	0.90	0.00	0.00	0.31	0.0003
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.04	0.0000
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.11	0.0000
C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.15	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.10	0.0000
C10	1.00	0.00	0.00	0.00	0.38	0.62	0.00	0.86	0.0002
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.09	0.0000
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.10	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.11	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.09	0.0002
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.14	0.0001

C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0002
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0006
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C13	1.00	0.00	0.00	0.00	0.98	0.02	0.00	0.00	0.38	0.0002
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0025
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0006
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0001
C9_1	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.00	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C6	2.67	2.67	2.67	2.99	0.01
C10	1.23	1.23	1.23	0.06	0.01
C1_2	0.30	0.30	0.30	0.01	0.01
C10_4	0.01	0.01	0.01	0.63	0.01
C1_3	3.04	3.04	3.04	6.51	3.04
C12	1.60	1.60	1.61	0.01	0.01
C13	2.25	2.25	2.25	0.02	0.02
C14	2.62	2.62	2.62	0.01	0.01
C15	0.79	0.79	0.79	0.01	0.01

Analysis begun on: Mon Jan 05 16:33:33 2015
Analysis ended on: Mon Jan 05 16:33:34 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Current conditions

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 18
Number of nodes 24
Number of links 23
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	100yrSCS_24h_Type_III_12.18in	INTENSITY	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5

S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S25	16.66	300.00	2.00	0.5000	RG1	J8
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	
J19	JUNCTION	10.66	8.00	0.0	
J20	JUNCTION	10.00	8.00	0.0	
J21	JUNCTION	12.83	3.53	0.0	
J22	JUNCTION	12.83	3.07	0.0	
J23	JUNCTION	10.74	9.67	0.0	
J24	JUNCTION	13.50	2.50	0.0	
J25	JUNCTION	12.97	6.00	0.0	
OF1	OUTFALL	9.50	5.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness

C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67

C17	TR2	5.00	162.68	3.35	72.00	1	221.24

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459
0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2
Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910

```
        0.8308    0.8716    0.9134    0.9562    1.0000
Hrad:
        0.0293    0.0577    0.0854    0.1123    0.1384
        0.1639    0.1887    0.2129    0.2365    0.2595
        0.2820    0.3040    0.3254    0.3464    0.3670
        0.3871    0.4068    0.4260    0.4449    0.4635
        0.4248    0.3988    0.3814    0.3701    0.3633
        0.3600    0.3594    0.3609    0.3642    0.3688
        0.3957    0.4220    0.4480    0.4742    0.5009
        0.5281    0.5561    0.5848    0.6143    0.6448
        0.6765    0.7092    0.7428    0.7771    0.8124
        0.8484    0.8852    0.9227    0.9610    1.0000
Width:
        0.1677    0.1687    0.1697    0.1707    0.1717
        0.1727    0.1737    0.1747    0.1757    0.1767
        0.1777    0.1787    0.1798    0.1808    0.1818
        0.1828    0.1838    0.1848    0.1858    0.1868
        0.2216    0.2564    0.2912    0.3260    0.3608
        0.3956    0.4303    0.4651    0.4999    0.5347
        0.5590    0.5833    0.6076    0.6319    0.6562
        0.6806    0.7049    0.7292    0.7535    0.7778
        0.8000    0.8222    0.8444    0.8667    0.8889
        0.9111    0.9333    0.9556    0.9778    1.0000


**********************
Control Actions Taken
**********************


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet       inches
**************************    ---------       -------
Total Precipitation ......       193.154        12.181
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........        75.452         4.758
Surface Runoff ...........       113.004         7.126
Final Surface Storage ....         4.869         0.307
Continuity Error (%) .....        -0.089


**************************      nitrogen     potassium   phosphorous
Runoff Quality Continuity           lbs           lbs           lbs
**************************   ----------    ----------    ----------
Initial Buildup ..........       186.114        61.982        93.140
Surface Buildup ..........         0.000         0.000         0.000
Wet Deposition ...........         0.000         0.000         0.000
Sweeping Removal .........         0.000         0.000         0.000
Infiltration Loss ........         0.000         0.000         0.000
BMP Removal ..............         0.000         0.000         0.000
Surface Runoff ...........       149.180         0.000        20.282
Remaining Buildup ........        36.826        61.982        72.843
Continuity Error (%) .....         0.058         0.000         0.016
```

```
**************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------      ---------
Dry Weather Inflow .......        0.000          0.000
Wet Weather Inflow .......      112.820         36.764
Groundwater Inflow .......        0.000          0.000
RDII Inflow ..............        0.000          0.000
External Inflow ..........        0.000          0.000
External Outflow .........       83.906         27.342
Internal Outflow .........       27.241          8.877
Storage Losses ...........        0.000          0.000
Initial Stored Volume ....        1.833          0.597
Final Stored Volume ......        3.589          1.170
Continuity Error (%) .....       -0.072


**************************      nitrogen     potassium   phosphorous
Quality Routing Continuity          lbs           lbs           lbs
**************************    ----------    ----------    ----------
Dry Weather Inflow .......        0.000         0.000         0.000
Wet Weather Inflow .......      148.956         0.000        20.252
Groundwater Inflow .......        0.000         0.000         0.000
RDII Inflow ..............        0.000         0.000         0.000
External Inflow ..........        0.000         0.000         0.000
Internal Flooding ........        6.729         0.000         0.915
External Outflow .........      121.752         0.000        16.553
Mass Reacted .............        0.000         0.000         0.000
Initial Stored Mass ......        0.000         0.000         0.000
Final Stored Mass ........       17.545         0.000         2.385
Continuity Error (%) .....        1.967         0.000         1.967


**************************
Highest Continuity Errors
**************************
Node J7 (1.38%)


****************************
Time-Step Critical Elements
****************************
Link C1_3 (50.79%)
Link C13 (4.71%)


*********************************
Highest Flow Instability Indexes
*********************************
Link C14 (5)
Link C10_3 (4)
Link C10_4 (4)
Link C15 (3)
Link C10 (2)
```

****
Routing Time Step Summary
****

Minimum Time Step : 0.50 sec
Average Time Step : 3.80 sec
Maximum Time Step : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.01

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	12.18	0.00	0.00	1.40	10.61	3.75	91.12	0.871
S4	12.18	0.00	0.00	3.05	8.85	2.52	54.79	0.726
S10	12.18	0.00	0.00	2.03	9.85	2.40	54.45	0.809
S11	12.18	0.00	0.00	6.71	5.19	0.58	11.53	0.426
S12	12.18	0.00	0.00	2.03	9.87	0.94	22.01	0.810
S13	12.18	0.00	0.00	2.03	9.87	1.62	38.72	0.810
S21	12.18	0.00	0.00	6.17	5.73	0.99	18.39	0.470
S15	12.18	0.00	0.00	6.82	5.11	0.65	14.40	0.419
S25	12.18	0.00	0.00	6.71	5.03	2.27	35.70	0.413
S1	12.18	0.00	0.00	1.56	10.37	6.79	153.14	0.851
S2	12.18	0.00	0.00	6.17	5.77	1.12	23.56	0.473
S5	12.18	0.00	0.00	6.17	5.77	0.69	14.31	0.473
S8	12.18	0.00	0.00	6.17	5.77	0.41	8.85	0.474
S16	12.18	0.00	0.00	6.17	5.71	0.58	10.59	0.469
S17	12.18	0.00	0.00	6.17	5.69	7.36	130.58	0.467
S18	12.18	0.00	0.00	6.17	5.69	2.27	40.67	0.467
S19	12.18	0.00	0.00	6.17	5.75	1.59	30.93	0.472
S20	12.18	0.00	0.00	6.17	5.77	0.30	6.60	0.474

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000

S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S25	149.180	0.000	20.282
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
System	149.180	0.000	20.282

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	2.29	5.73	17.00	0 12:27
J3	JUNCTION	2.00	5.40	17.00	0 12:14
J4	JUNCTION	1.58	5.00	17.07	0 12:16
J5	JUNCTION	1.30	4.65	17.18	0 12:30
J6	JUNCTION	1.05	4.35	17.19	0 12:30
J7	JUNCTION	1.61	5.31	17.51	0 12:32
J8	JUNCTION	0.40	2.53	17.53	0 12:33
J11	JUNCTION	0.68	3.51	17.01	0 12:26
J12	JUNCTION	2.53	6.02	17.01	0 12:26
J1	JUNCTION	2.76	6.30	17.00	0 12:28
J13	JUNCTION	1.98	5.39	16.24	0 12:30
J14	JUNCTION	2.68	6.34	17.01	0 12:29
J15	JUNCTION	2.55	6.21	16.90	0 12:30
J16	JUNCTION	2.24	5.79	16.58	0 12:30
J17	JUNCTION	1.04	4.65	16.65	0 12:29
J18	JUNCTION	1.50	5.75	17.55	0 12:29
J19	JUNCTION	2.62	6.29	16.95	0 12:30
J20	JUNCTION	2.82	6.20	16.20	0 12:30
J21	JUNCTION	0.83	3.53	16.36	0 12:00
J22	JUNCTION	0.92	3.07	15.90	0 11:40
J23	JUNCTION	2.73	6.25	17.00	0 12:29
J24	JUNCTION	0.51	2.50	16.00	0 11:57
J25	JUNCTION	0.84	3.98	16.95	0 12:27
OF1	OUTFALL	2.50	2.50	12.00	0 00:00

****
Node Inflow Summary

****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
J2	JUNCTION	18.39	157.38	0 12:14	0.987	12.372
J3	JUNCTION	53.07	121.80	0 12:30	2.269	8.399
J4	JUNCTION	21.99	104.27	0 12:29	0.935	6.285
J5	JUNCTION	65.70	88.42	0 12:29	3.095	5.485
J6	JUNCTION	0.00	33.65	0 12:35	0.000	2.456
J7	JUNCTION	0.00	34.24	0 12:30	0.000	2.318
J8	JUNCTION	35.69	35.69	0 12:29	2.270	2.270
J11	JUNCTION	91.08	91.08	0 11:59	3.749	3.749
J12	JUNCTION	54.40	97.06	0 12:14	2.398	12.137
J1	JUNCTION	0.00	74.32	0 13:47	0.000	14.742
J13	JUNCTION	6.59	223.22	0 12:24	0.303	27.377
J14	JUNCTION	130.55	157.19	0 11:59	7.341	21.661
J15	JUNCTION	40.66	194.62	0 12:16	2.263	24.890
J16	JUNCTION	30.89	227.52	0 12:17	1.587	27.137
J17	JUNCTION	14.29	14.29	0 11:59	0.684	0.706
J18	JUNCTION	23.54	23.54	0 11:59	1.117	1.129
J19	JUNCTION	0.00	163.77	0 12:15	0.000	22.672
J20	JUNCTION	0.00	222.33	0 12:30	0.000	27.361
J21	JUNCTION	10.59	30.76	0 12:29	0.575	0.949
J22	JUNCTION	153.02	169.82	0 12:00	6.778	7.854
J23	JUNCTION	0.00	96.46	0 12:14	0.000	15.402
J24	JUNCTION	8.84	91.54	0 12:29	0.409	2.932
J25	JUNCTION	0.00	84.97	0 12:15	0.000	2.751
OF1	OUTFALL	0.00	222.30	0 12:30	0.000	27.340

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J3	JUNCTION	0.88	0.401	0.000
J4	JUNCTION	0.35	0.000	0.000
J12	JUNCTION	1.51	1.019	0.993
J17	JUNCTION	2.98	2.147	1.353
J18	JUNCTION	6.53	3.749	1.451
J20	JUNCTION	0.93	1.202	1.798
J21	JUNCTION	4.44	1.530	0.000
J22	JUNCTION	4.89	1.070	0.000
J23	JUNCTION	2.19	1.255	3.412
J24	JUNCTION	2.83	0.500	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
J3	0.42	121.79	0 12:30	0.885	5.40
J4	0.34	24.20	0 12:30	0.148	5.00
J21	1.05	30.75	0 12:29	0.577	3.53
J22	2.47	169.81	0 12:00	4.566	3.07
J24	1.64	91.53	0 12:29	2.699	2.50

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.89	40.26	222.30	27.340	121.759	0.000	16.554
System	99.89	40.26	222.30	27.340	121.759	0.000	16.554

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	90.06	0 12:00	1.59	0.07	0.77
C2	CHANNEL	103.33	0 12:46	0.64	0.50	1.00
C3	CHANNEL	85.51	0 12:47	0.55	0.41	1.00
C4	CHANNEL	88.04	0 12:30	0.59	0.43	0.97
C5	CHANNEL	35.01	0 12:34	0.32	0.17	0.90
C6	CONDUIT	33.65	0 12:35	5.36	0.73	1.00
C7	CONDUIT	34.24	0 12:30	0.54	0.04	0.65
C1_1	CHANNEL	74.97	0 12:54	0.46	0.36	1.00
C10	CONDUIT	83.77	0 12:27	13.33	1.34	1.00
C1_2	CHANNEL	96.46	0 12:14	0.59	0.47	1.00
C10_5	CHANNEL	75.15	0 13:48	0.69	0.15	0.74

C10_2	CHANNEL	186.42	0	12:17	1.30	1.01	0.75
C10_4	CHANNEL	143.46	0	12:15	0.94	1.59	0.79
C10_1	CHANNEL	217.55	0	12:24	1.83	1.10	0.70
C10_3	CHANNEL	157.94	0	12:16	1.04	0.85	0.78
C1_3	CONDUIT	72.30	0	13:51	5.11	1.36	1.00
C11	CONDUIT	84.97	0	12:15	0.98	0.10	0.81
C12	CONDUIT	20.17	0	12:29	6.42	0.55	1.00
C13	CONDUIT	35.10	0	12:30	11.17	0.73	1.00
C14	CONDUIT	23.54	0	12:00	7.49	0.80	1.00
C15	CONDUIT	14.30	0	12:00	2.91	0.26	1.00
C16	CONDUIT	222.33	0	12:30	1.85	0.11	1.00
C17	CHANNEL	222.30	0	12:30	2.61	1.00	0.75

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0001
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0001
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C5	1.00	0.00	0.26	0.00	0.74	0.00	0.00	0.00	0.02	0.0000
C6	1.00	0.01	0.26	0.00	0.73	0.00	0.00	0.00	0.04	0.0002
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0001
C10	1.00	0.00	0.00	0.00	0.75	0.25	0.00	0.00	0.48	0.0013
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0001
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0002
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0012
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0001
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.31	0.0011
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0007
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0008
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0001

****
Conduit Surcharge Summary
****

	Hours	Hours

Conduit	--------- Hours Full -------- Both Ends	Upstream	Dnstream	Above Full Capacity Normal Flow	Limited
C2	0.88	0.88	0.88	0.01	0.01
C6	5.18	5.18	5.18	0.94	0.01
C1_1	1.17	1.17	1.17	0.01	0.01
C10	2.83	2.83	2.83	1.31	0.01
C1_2	1.51	1.51	1.51	0.01	0.01
C10_2	0.01	0.01	0.01	0.10	0.01
C10_4	0.01	0.01	0.01	2.69	0.01
C10_1	0.01	0.01	0.01	0.69	0.01
C1_3	7.94	7.94	7.94	7.15	3.15
C12	4.44	4.44	4.44	0.01	0.01
C13	4.89	4.89	4.89	0.01	0.01
C14	6.53	6.53	6.53	0.01	0.01
C15	2.98	2.98	2.98	0.01	0.01
C16	1.13	1.13	1.13	0.01	0.01
C17	0.01	0.01	0.01	0.12	0.01

Analysis begun on: Mon Jan 05 16:31:21 2015
Analysis ended on: Mon Jan 05 16:31:22 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Rough

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

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WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

**************
Element Count
**************
Number of rain gages ...... 1
Number of subcatchments ... 24
Number of nodes ........... 30
Number of links ........... 29
Number of pollutants ...... 3
Number of land uses ....... 1


******************
Pollutant Summary
******************
                      Ppt.     GW        Kdecay
Name              Units   Concen.   Concen.    1/days    CoPollutant
----------------------------------------------------------------------
nitrogen           MG/L      0.00      0.00      0.00
potassium          MG/L      0.00      0.00      0.00
phosphorous        MG/L      0.00      0.00      0.00


****************
Landuse Summary
****************
                 Sweeping   Maximum      Last
Name               Interval   Removal     Swept
-------------------------------------------------
golfcourse              0.00      0.00      0.00


*****************
Raingage Summary
*****************
                              Data        Recording
Name              Data Source        Type       Interval
------------------------------------------------------------
RG1               100yrSCS_24h_Type_III_12.18inINTENSITY    15 min.


********************
```

Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	3.35	72.00	1	221.24
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459

0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0293	0.0577	0.0854	0.1123	0.1384
0.1639	0.1887	0.2129	0.2365	0.2595
0.2820	0.3040	0.3254	0.3464	0.3670
0.3871	0.4068	0.4260	0.4449	0.4635
0.4248	0.3988	0.3814	0.3701	0.3633
0.3600	0.3594	0.3609	0.3642	0.3688
0.3957	0.4220	0.4480	0.4742	0.5009
0.5281	0.5561	0.5848	0.6143	0.6448
0.6765	0.7092	0.7428	0.7771	0.8124
0.8484	0.8852	0.9227	0.9610	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
**********	---------	-------
Total Precipitation	250.737	12.181
Evaporation Loss	0.000	0.000
Infiltration Loss	78.496	3.813
Surface Runoff	166.728	8.100
Final Surface Storage	5.770	0.280
Continuity Error (%)	-0.102	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
**********	----------	----------	----------
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	204.971	0.000	28.545
Remaining Buildup	36.826	80.563	92.497
Continuity Error (%)	0.044	0.000	0.015

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
**********	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	166.476	54.249
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	97.668	31.827
Internal Outflow	41.921	13.661
Storage Losses	15.139	4.933
Initial Stored Volume	1.833	0.597
Final Stored Volume	13.863	4.517
Continuity Error (%)	-0.167	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
**********	----------	----------	----------
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	204.746	0.000	28.506
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	48.740	0.000	6.627

External Outflow	136.881	0.000	18.939
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	15.182	0.000	2.469
Continuity Error (%)	1.926	0.000	1.655

****
Highest Continuity Errors
****
Node J10 (4.36%)

****
Time-Step Critical Elements
****
Link C1_3 (45.99%)
Link C13 (5.44%)
Link C6 (2.53%)

****
Highest Flow Instability Indexes
****
Link C14 (5)
Link C10_3 (4)
Link C10_4 (3)
Link C15 (3)
Link C10 (3)

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	3.92 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.02

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	12.18	0.00	0.00	1.40	10.61	3.75	91.12	0.871
S4	12.18	0.00	0.00	3.05	8.85	2.52	54.79	0.726
S10	12.18	0.00	0.00	2.03	9.85	2.40	54.45	0.809
S11	12.18	0.00	0.00	6.71	5.19	0.58	11.53	0.426

S12	12.18	0.00	0.00	2.03	9.87	0.94	22.01	0.810
S13	12.18	0.00	0.00	2.03	9.87	1.62	38.72	0.810
S21	12.18	0.00	0.00	6.17	5.73	0.99	18.39	0.470
S15	12.18	0.00	0.00	6.82	5.11	0.65	14.40	0.419
S7	12.18	0.00	0.00	0.31	11.69	5.12	113.82	0.960
S6	12.18	0.00	0.00	0.00	12.07	1.61	38.04	0.991
S26	12.18	0.00	0.00	5.14	6.83	0.93	20.81	0.561
S25	12.18	0.00	0.00	6.71	5.03	2.27	35.70	0.413
S22	12.18	0.00	0.00	0.23	11.83	0.67	16.34	0.972
S1	12.18	0.00	0.00	1.56	10.37	6.79	153.14	0.851
S2	12.18	0.00	0.00	6.17	5.77	1.12	23.56	0.473
S5	12.18	0.00	0.00	6.17	5.77	0.69	14.31	0.473
S8	12.18	0.00	0.00	6.17	5.77	0.41	8.85	0.474
S23	12.18	0.00	0.00	0.15	11.88	5.09	118.13	0.976
S16	12.18	0.00	0.00	6.17	5.71	0.58	10.59	0.469
S17	12.18	0.00	0.00	6.17	5.69	7.36	130.58	0.467
S18	12.18	0.00	0.00	6.17	5.69	2.27	40.67	0.467
S19	12.18	0.00	0.00	6.17	5.75	1.59	30.93	0.472
S20	12.18	0.00	0.00	6.17	5.77	0.30	6.60	0.474
S24	12.18	0.00	0.00	0.23	11.74	4.08	82.99	0.964

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	55.791	0.000	8.263
S25	149.180	0.000	20.282
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
S24	0.000	0.000	0.000

```
-------------------------------------------------------------
System                 204.971        0.000       28.545


*******************
Node Depth Summary
*******************

-----------------------------------------------------------------------
                      Average  Maximum  Maximum  Time of Max
                        Depth    Depth      HGL   Occurrence
Node              Type     Feet     Feet     Feet  days hr:min
-----------------------------------------------------------------------
J2                JUNCTION    2.54     5.73    17.00     0  12:27
J3                JUNCTION    2.29     5.40    17.00     0  12:04
J4                JUNCTION    1.97     5.00    17.07     0  12:05
J5                JUNCTION    1.78     4.82    17.34     0  12:30
J6                JUNCTION    1.63     4.60    17.44     0  12:30
J7                JUNCTION    2.44     7.80    20.00     0  12:18
J8                JUNCTION    0.64     5.07    20.07     0  12:20
J9                JUNCTION    0.90     4.72    20.22     0  12:25
J10               JUNCTION    0.90     4.34    20.34     0  12:24
J11               JUNCTION    0.81     3.51    17.01     0  12:24
J12               JUNCTION    2.75     6.02    17.00     0  12:25
J1                JUNCTION    2.95     6.30    17.00     0  12:30
J13               JUNCTION    2.08     5.39    16.24     0  12:30
J14               JUNCTION    2.84     6.33    17.00     0  12:30
J15               JUNCTION    2.70     6.21    16.90     0  12:30
J16               JUNCTION    2.36     5.79    16.58     0  12:30
J17               JUNCTION    1.16     4.64    16.64     0  12:30
J18               JUNCTION    1.65     5.74    17.54     0  12:30
J19               JUNCTION    2.78     6.28    16.94     0  12:30
J20               JUNCTION    2.93     6.20    16.20     0  12:30
J21               JUNCTION    1.00     3.53    16.36     0  11:57
J22               JUNCTION    1.05     3.07    15.90     0  11:36
J23               JUNCTION    2.93     6.25    17.00     0  12:30
J24               JUNCTION    0.66     2.50    16.00     0  11:54
J25               JUNCTION    1.06     3.98    16.95     0  12:28
J26               JUNCTION    0.99     4.43    20.34     0  12:23
J27               JUNCTION    1.01     4.49    20.31     0  12:23
OF1                OUTFALL    2.50     2.50    12.00     0  00:00
SU1                STORAGE    1.45     3.10    19.40     0  16:03
SU2                STORAGE    2.57     6.00    22.00     0  12:03


********************
Node Inflow Summary
********************

-------------------------------------------------------------------------------------
                      Maximum  Maximum                  Lateral       Total
                      Lateral    Total  Time of Max      Inflow      Inflow
                       Inflow   Inflow   Occurrence      Volume      Volume
Node              Type     CFS      CFS  days hr:min    10^6 gal    10^6 gal
```

J2	JUNCTION	18.39	186.22	0	12:00	0.987	18.998
J3	JUNCTION	53.12	135.45	0	12:59	2.269	15.358
J4	JUNCTION	22.01	166.34	0	12:30	0.935	14.468
J5	JUNCTION	65.77	150.00	0	12:30	3.095	13.579
J6	JUNCTION	0.00	94.01	0	12:43	0.000	10.503
J7	JUNCTION	20.81	178.35	0	12:27	0.925	11.150
J8	JUNCTION	35.70	66.92	0	12:04	2.270	2.321
J9	JUNCTION	0.00	139.46	0	12:02	0.000	7.934
J10	JUNCTION	0.00	5.67	0	12:11	0.000	0.068
J11	JUNCTION	91.11	91.11	0	12:00	3.749	3.749
J12	JUNCTION	54.45	115.77	0	12:05	2.398	17.607
J1	JUNCTION	0.00	88.94	0	11:54	0.000	19.383
J13	JUNCTION	6.60	222.66	0	12:30	0.303	31.866
J14	JUNCTION	130.57	167.19	0	12:00	7.341	26.206
J15	JUNCTION	40.67	197.89	0	12:07	2.263	29.401
J16	JUNCTION	30.93	227.65	0	12:08	1.587	31.628
J17	JUNCTION	14.31	14.31	0	12:00	0.684	0.698
J18	JUNCTION	23.56	23.56	0	12:00	1.117	1.124
J19	JUNCTION	0.00	171.80	0	12:06	0.000	27.186
J20	JUNCTION	0.00	222.21	0	12:30	0.000	31.844
J21	JUNCTION	10.59	30.71	0	12:30	0.575	1.033
J22	JUNCTION	153.13	178.08	0	12:00	6.778	8.276
J23	JUNCTION	0.00	115.39	0	12:05	0.000	20.486
J24	JUNCTION	8.85	91.51	0	12:30	0.409	4.100
J25	JUNCTION	0.00	85.11	0	12:05	0.000	3.890
J26	JUNCTION	113.82	113.82	0	12:00	5.118	5.183
J27	JUNCTION	16.33	123.42	0	12:00	0.674	5.783
OF1	OUTFALL	0.00	222.19	0	12:30	0.000	31.824
SU1	STORAGE	156.17	156.17	0	12:00	6.697	6.697
SU2	STORAGE	82.99	82.99	0	12:00	4.070	4.070

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J3	JUNCTION	1.30	0.401	0.000
J4	JUNCTION	0.80	0.000	0.000
J7	JUNCTION	1.85	1.800	0.000
J12	JUNCTION	2.24	1.016	0.996
J17	JUNCTION	4.31	2.143	1.357
J18	JUNCTION	8.15	3.745	1.455
J20	JUNCTION	1.03	1.197	1.803
J21	JUNCTION	5.49	1.530	0.000
J22	JUNCTION	5.95	1.070	0.000
J23	JUNCTION	3.40	1.253	3.414
J24	JUNCTION	4.35	0.500	0.000

SU2	STORAGE	1.96	1.000	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
J3	0.58	121.97	0 12:30	1.252	5.40
J4	0.80	86.27	0 12:30	1.310	5.00
J7	0.38	85.47	0 12:27	0.504	7.80
J21	1.27	30.70	0 12:30	0.690	3.53
J22	3.51	177.95	0 12:00	5.366	3.07
J24	2.57	91.51	0 12:30	3.906	2.50
SU2	0.76	51.90	0 12:03	0.632	6.00

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
SU1	218.207	24	62	466.703	51	0 16:03	0.00
SU2	55.595	39	19	144.000	100	0 12:03	23.18

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.89	45.76	222.19	31.824	136.885	0.000	18.939
System	99.89	45.76	222.19	31.824	136.885	0.000	18.939

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	86.79	0 11:59	1.37	0.07	0.77
C2	CHANNEL	136.67	0 12:59	0.84	0.66	1.00
C3	CHANNEL	123.80	0 13:04	0.78	0.60	1.00
C4	CHANNEL	149.88	0 12:30	0.96	0.73	0.98
C5	CHANNEL	95.03	0 12:35	0.72	0.46	0.94
C6	CONDUIT	94.01	0 12:43	14.96	2.03	1.00
C7	CONDUIT	44.03	0 12:04	0.53	0.05	0.92
C8	CONDUIT	118.66	0 12:27	1.61	0.21	0.89
C9_2_1	CONDUIT	107.58	0 12:00	2.24	0.33	0.74
C1_1	CHANNEL	98.06	0 13:06	0.60	0.47	1.00
C10	CONDUIT	83.70	0 12:28	13.32	1.34	1.00
C1_2	CHANNEL	115.39	0 12:05	0.71	0.56	1.00
C10_5	CHANNEL	87.90	0 14:34	0.79	0.17	0.74
C10_2	CHANNEL	187.39	0 12:08	1.34	1.02	0.75
C10_4	CHANNEL	151.40	0 12:06	0.98	1.68	0.79
C10_1	CHANNEL	216.86	0 12:30	1.87	1.10	0.70
C10_3	CHANNEL	164.25	0 12:07	1.07	0.89	0.78
C1_3	CONDUIT	86.31	0 14:33	6.11	1.62	1.00
C11	CONDUIT	85.11	0 12:05	0.99	0.10	0.81
C12	CONDUIT	20.12	0 12:30	6.40	0.55	1.00
C13	CONDUIT	35.07	0 12:30	11.16	0.72	1.00
C14	CONDUIT	23.54	0 12:00	7.49	0.80	1.00
C15	CONDUIT	14.29	0 12:00	2.91	0.26	1.00
C16	CONDUIT	222.21	0 12:30	1.85	0.11	1.00
C17	CHANNEL	222.19	0 12:30	2.61	1.00	0.75
C9_1	CONDUIT	5.67	0 12:11	0.20	0.02	0.73
C9_2_2	CONDUIT	116.91	0 12:02	2.68	0.36	0.77
OR1	ORIFICE	0.00	0 00:00		0.00	
OR2	ORIFICE	23.18	0 12:03		1.00	

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0001
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0001
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.07	0.0001
C5	1.00	0.00	0.08	0.00	0.92	0.00	0.00	0.06	0.0000
C6	1.00	0.00	0.08	0.00	0.92	0.00	0.00	0.11	0.0004
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.02	0.0000
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.08	0.0000
C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.15	0.0000

C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C10	1.00	0.00	0.00	0.00	0.81	0.19	0.00	0.00	0.37	0.0013
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0002
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0012
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0001
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.26	0.0011
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0005
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0006
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0001
C9_1	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C2	1.30	1.30	1.31	0.01	0.01
C6	8.11	8.11	8.12	4.46	0.01
C1_1	1.68	1.68	1.68	0.01	0.01
C10	4.35	4.35	4.35	1.92	0.01
C1_2	2.24	2.24	2.24	0.01	0.01
C10_2	0.01	0.01	0.01	0.15	0.01
C10_4	0.01	0.01	0.01	4.09	0.01
C10_1	0.01	0.01	0.01	0.74	0.01
C1_3	10.35	10.35	10.35	10.18	5.01
C12	5.49	5.49	5.49	0.01	0.01
C13	5.95	5.95	5.95	0.01	0.01
C14	8.15	8.15	8.15	0.01	0.01
C15	4.31	4.31	4.31	0.01	0.01
C16	1.28	1.28	1.28	0.01	0.01
C17	0.01	0.01	0.01	0.15	0.01

Analysis begun on: Mon Jan 05 16:36:38 2015
Analysis ended on: Mon Jan 05 16:36:39 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Smooth

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 24
Number of nodes 30
Number of links 29
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	100yrSCS_24h_Type_III_12.18in	INTENSITY	15 min.

****

Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0300
C3	J4	J3	CONDUIT	506.7	0.0931	0.0300
C4	J5	J4	CONDUIT	484.9	0.0932	0.0300
C5	J6	J5	CONDUIT	340.0	0.0932	0.0300
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0300
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0300
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0300
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0300
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0300
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0300
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0300
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0300
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	2.15	72.00	1	409.91
C3	TR2	5.00	162.68	2.15	72.00	1	410.19
C4	TR2	5.00	162.68	2.15	72.00	1	410.35
C5	TR2	5.00	162.68	2.15	72.00	1	410.39
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	2.15	72.00	1	410.79
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	2.15	72.00	1	409.66
C10_5	TR1	8.00	248.00	4.48	50.00	1	1224.36
C10_2	TR1	8.00	248.00	4.48	50.00	1	447.97
C10_4	TR1	8.00	248.00	4.48	50.00	1	220.22
C10_1	TR1	8.00	248.00	4.48	50.00	1	482.57
C10_3	TR1	8.00	248.00	4.48	50.00	1	451.23
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	2.15	72.00	1	439.59
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0351	0.0692	0.1024	0.1348	0.1663
0.1972	0.2273	0.2566	0.2854	0.3135
0.3410	0.3679	0.3915	0.4121	0.4323
0.4524	0.4722	0.4918	0.5113	0.5305
0.5497	0.5686	0.5875	0.6062	0.6247

0.6432	0.6616	0.6798	0.6980	0.7161
0.7341	0.7520	0.7699	0.7876	0.8053
0.8230	0.8406	0.8581	0.8756	0.8930
0.9104	0.9277	0.9450	0.9592	0.9646
0.9706	0.9772	0.9843	0.9919	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0456	0.0898	0.1328	0.1746	0.2153
0.2549	0.2934	0.3310	0.3677	0.4035
0.4385	0.4726	0.5060	0.5386	0.5706
0.6018	0.6324	0.6624	0.6918	0.7206
0.6606	0.6201	0.5930	0.5754	0.5649
0.5598	0.5588	0.5612	0.5662	0.5734
0.5922	0.6112	0.6306	0.6502	0.6701
0.6902	0.7104	0.7309	0.7515	0.7722
0.7950	0.8177	0.8405	0.8632	0.8860
0.9088	0.9316	0.9544	0.9772	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	250.737	12.181
Evaporation Loss	0.000	0.000
Infiltration Loss	78.496	3.813
Surface Runoff	166.728	8.100
Final Surface Storage	5.770	0.280
Continuity Error (%)	-0.102	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	204.971	0.000	28.545
Remaining Buildup	36.826	80.563	92.497
Continuity Error (%)	0.044	0.000	0.015

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	166.477	54.249
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.001	0.000
External Outflow	121.460	39.580
Internal Outflow	19.627	6.396
Storage Losses	15.139	4.933
Initial Stored Volume	1.833	0.597
Final Stored Volume	12.228	3.985
Continuity Error (%)	-0.086	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	204.747	0.000	28.506
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	13.075	0.000	1.778

External Outflow	176.764	0.000	24.492
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	8.547	0.000	1.393
Continuity Error (%)	3.107	0.000	2.959

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Highest Continuity Errors
****
Node J10 (4.31%)

****
Time-Step Critical Elements
****
Link C1_3 (65.35%)
Link C13 (4.14%)
Link C6 (1.28%)

****
Highest Flow Instability Indexes
****
Link C14 (7)
Link C10_3 (6)
Link C10_4 (6)
Link C15 (4)
Link C16 (4)

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	3.74 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.01

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	12.18	0.00	0.00	1.40	10.61	3.75	91.12	0.871
S4	12.18	0.00	0.00	3.05	8.85	2.52	54.79	0.726
S10	12.18	0.00	0.00	2.03	9.85	2.40	54.45	0.809
S11	12.18	0.00	0.00	6.71	5.19	0.58	11.53	0.426

S12	12.18	0.00	0.00	2.03	9.87	0.94	22.01	0.810
S13	12.18	0.00	0.00	2.03	9.87	1.62	38.72	0.810
S21	12.18	0.00	0.00	6.17	5.73	0.99	18.39	0.470
S15	12.18	0.00	0.00	6.82	5.11	0.65	14.40	0.419
S7	12.18	0.00	0.00	0.31	11.69	5.12	113.82	0.960
S6	12.18	0.00	0.00	0.00	12.07	1.61	38.04	0.991
S26	12.18	0.00	0.00	5.14	6.83	0.93	20.81	0.561
S25	12.18	0.00	0.00	6.71	5.03	2.27	35.70	0.413
S22	12.18	0.00	0.00	0.23	11.83	0.67	16.34	0.972
S1	12.18	0.00	0.00	1.56	10.37	6.79	153.14	0.851
S2	12.18	0.00	0.00	6.17	5.77	1.12	23.56	0.473
S5	12.18	0.00	0.00	6.17	5.77	0.69	14.31	0.473
S8	12.18	0.00	0.00	6.17	5.77	0.41	8.85	0.474
S23	12.18	0.00	0.00	0.15	11.88	5.09	118.13	0.976
S16	12.18	0.00	0.00	6.17	5.71	0.58	10.59	0.469
S17	12.18	0.00	0.00	6.17	5.69	7.36	130.58	0.467
S18	12.18	0.00	0.00	6.17	5.69	2.27	40.67	0.467
S19	12.18	0.00	0.00	6.17	5.75	1.59	30.93	0.472
S20	12.18	0.00	0.00	6.17	5.77	0.30	6.60	0.474
S24	12.18	0.00	0.00	0.23	11.74	4.08	82.99	0.964

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	55.791	0.000	8.263
S25	149.180	0.000	20.282
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
S24	0.000	0.000	0.000

System 204.971 0.000 28.545

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Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	1.83	5.65	16.93	0 12:31
J3	JUNCTION	1.57	5.40	17.00	0 12:31
J4	JUNCTION	1.26	5.00	17.07	0 12:31
J5	JUNCTION	1.12	4.62	17.14	0 12:32
J6	JUNCTION	1.00	4.33	17.17	0 12:32
J7	JUNCTION	1.95	7.80	20.00	0 12:25
J8	JUNCTION	0.57	5.06	20.06	0 12:26
J9	JUNCTION	0.91	4.72	20.22	0 12:31
J10	JUNCTION	0.91	4.33	20.33	0 12:29
J11	JUNCTION	0.56	3.43	16.93	0 12:30
J12	JUNCTION	2.06	5.88	16.87	0 12:30
J1	JUNCTION	2.24	5.56	16.26	0 12:31
J13	JUNCTION	1.61	4.07	14.92	0 12:31
J14	JUNCTION	2.17	5.48	16.15	0 12:30
J15	JUNCTION	2.08	5.25	15.94	0 12:30
J16	JUNCTION	1.82	4.65	15.44	0 12:30
J17	JUNCTION	0.62	3.51	15.51	0 12:29
J18	JUNCTION	1.01	4.82	16.62	0 12:29
J19	JUNCTION	2.13	5.36	16.02	0 12:30
J20	JUNCTION	2.46	4.76	14.76	0 12:31
J21	JUNCTION	0.48	3.53	16.36	0 12:25
J22	JUNCTION	0.73	3.07	15.90	0 11:45
J23	JUNCTION	2.25	6.06	16.80	0 12:30
J24	JUNCTION	0.34	2.50	16.00	0 12:02
J25	JUNCTION	0.54	3.91	16.88	0 12:31
J26	JUNCTION	1.00	4.42	20.33	0 12:30
J27	JUNCTION	1.02	4.49	20.31	0 12:30
OF1	OUTFALL	2.52	3.27	12.77	0 12:31
SU1	STORAGE	1.54	3.10	19.40	0 16:03
SU2	STORAGE	2.71	6.00	22.00	0 12:03

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
System		204.971	0.000		28.545	

J2	JUNCTION	18.39	269.83	0	12:30	0.987	21.985
J3	JUNCTION	53.10	202.77	0	12:36	2.269	17.009
J4	JUNCTION	22.00	161.23	0	12:30	0.935	14.772
J5	JUNCTION	65.74	152.76	0	12:26	3.095	13.857
J6	JUNCTION	0.00	102.28	0	12:50	0.000	10.771
J7	JUNCTION	20.79	166.30	0	12:33	0.925	11.155
J8	JUNCTION	35.69	63.93	0	12:08	2.270	2.321
J9	JUNCTION	0.00	139.33	0	12:02	0.000	7.937
J10	JUNCTION	0.00	5.51	0	11:50	0.000	0.068
J11	JUNCTION	91.04	91.04	0	12:00	3.749	3.749
J12	JUNCTION	54.43	221.42	0	12:30	2.398	22.776
J1	JUNCTION	0.00	198.42	0	12:37	0.000	26.364
J13	JUNCTION	6.60	427.99	0	12:30	0.303	39.584
J14	JUNCTION	130.52	326.48	0	12:29	7.341	33.687
J15	JUNCTION	40.65	383.38	0	12:30	2.263	37.036
J16	JUNCTION	30.92	423.99	0	12:30	1.587	39.324
J17	JUNCTION	14.30	14.30	0	12:00	0.684	0.718
J18	JUNCTION	23.55	23.55	0	12:00	1.117	1.157
J19	JUNCTION	0.00	344.50	0	12:30	0.000	34.823
J20	JUNCTION	0.00	427.57	0	12:31	0.000	39.580
J21	JUNCTION	10.58	10.58	0	12:29	0.575	0.575
J22	JUNCTION	153.05	153.05	0	12:00	6.778	7.411
J23	JUNCTION	0.00	221.18	0	12:30	0.000	26.426
J24	JUNCTION	8.84	87.72	0	12:30	0.409	1.988
J25	JUNCTION	0.00	81.63	0	12:30	0.000	1.839
J26	JUNCTION	113.76	113.76	0	12:00	5.118	5.183
J27	JUNCTION	16.33	123.40	0	12:00	0.674	5.783
OF1	OUTFALL	0.00	427.05	0	12:31	0.000	39.577
SU1	STORAGE	156.05	156.05	0	12:00	6.696	6.697
SU2	STORAGE	82.96	82.96	0	12:00	4.070	4.070

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J3	JUNCTION	0.51	0.401	0.000
J4	JUNCTION	0.03	0.000	0.000
J7	JUNCTION	1.50	1.800	0.000
J12	JUNCTION	1.02	0.884	1.128
J17	JUNCTION	1.46	1.007	2.493
J18	JUNCTION	3.47	2.816	2.384
J21	JUNCTION	2.31	1.530	0.000
J22	JUNCTION	2.97	1.070	0.000
J23	JUNCTION	1.41	1.058	3.609
J24	JUNCTION	1.95	0.500	0.000
SU2	STORAGE	1.96	1.000	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
J3	0.01	1.02	0 12:31	0.000	5.40
J4	0.03	6.59	0 12:31	0.003	5.00
J7	0.26	68.79	0 12:33	0.278	7.80
J21	0.13	1.76	0 12:30	0.003	3.53
J22	1.90	146.62	0 12:29	3.756	3.07
J24	1.13	87.72	0 12:31	1.727	2.50
SU2	0.76	51.86	0 12:03	0.628	6.00

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Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
SU1	230.824	25	62	466.706	51	0 16:03	0.00
SU2	58.953	41	19	144.000	100	0 12:03	23.18

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.90	61.60	427.05	39.577	176.772	0.000	24.493
System	99.90	61.60	427.05	39.577	176.772	0.000	24.493

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	86.21	0	12:00	2.07	0.07	0.76
C2	CHANNEL	206.63	0	12:37	1.27	0.50	1.00
C3	CHANNEL	180.20	0	12:38	1.17	0.44	1.00
C4	CHANNEL	151.80	0	12:37	1.26	0.37	0.96
C5	CHANNEL	106.67	0	12:45	1.24	0.26	0.90
C6	CONDUIT	102.28	0	12:50	16.28	2.20	1.00
C7	CONDUIT	45.86	0	12:28	0.47	0.06	0.92
C8	CONDUIT	130.40	0	12:05	1.84	0.23	0.89
C9_2_1	CONDUIT	107.56	0	12:00	2.24	0.33	0.74
C1_1	CHANNEL	195.16	0	12:39	1.20	0.48	1.00
C10	CONDUIT	80.70	0	12:31	12.84	1.29	1.00
C1_2	CHANNEL	221.18	0	12:30	1.36	0.54	1.00
C10_5	CHANNEL	203.89	0	12:36	1.82	0.17	0.64
C10_2	CHANNEL	382.23	0	12:31	3.07	0.85	0.62
C10_4	CHANNEL	323.51	0	12:30	2.30	1.47	0.68
C10_1	CHANNEL	422.59	0	12:30	4.02	0.88	0.55
C10_3	CHANNEL	343.43	0	12:30	2.52	0.76	0.66
C1_3	CONDUIT	191.42	0	12:37	13.54	3.60	1.00
C11	CONDUIT	81.63	0	12:30	0.96	0.09	0.80
C12	CONDUIT	10.33	0	12:25	3.29	0.28	1.00
C13	CONDUIT	42.30	0	11:45	13.46	0.87	1.00
C14	CONDUIT	23.53	0	12:00	7.49	0.80	1.00
C15	CONDUIT	14.27	0	12:00	2.91	0.26	1.00
C16	CONDUIT	427.57	0	12:31	3.56	0.22	1.00
C17	CHANNEL	427.05	0	12:31	4.29	0.97	0.80
C9_1	CONDUIT	5.51	0	11:50	0.20	0.02	0.73
C9_2_2	CONDUIT	116.79	0	12:02	2.67	0.36	0.77
OR1	ORIFICE	0.00	0	00:00		0.00	
OR2	ORIFICE	23.18	0	12:03		1.00	

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.09	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.11	0.0000
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.13	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.19	0.0000
C5	1.00	0.00	0.08	0.00	0.92	0.00	0.00	0.17	0.0000
C6	1.00	0.00	0.08	0.00	0.92	0.00	0.00	0.33	0.0004
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.04	0.0000
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.12	0.0000
C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.15	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.11	0.0000

C10	1.00	0.00	0.00	0.00	0.43	0.57	0.00	0.00	0.81	0.0007
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0000
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0002
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0002
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0007
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C13	1.00	0.00	0.00	0.00	0.98	0.02	0.00	0.00	0.44	0.0002
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0023
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0014
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0001
C9_1	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C2	0.51	0.51	0.51	0.01	0.01
C6	3.50	3.50	3.50	4.37	0.01
C1_1	0.76	0.76	0.77	0.01	0.01
C10	1.95	1.95	1.95	0.89	0.01
C1_2	1.02	1.02	1.02	0.01	0.01
C10_4	0.01	0.01	0.01	1.35	0.01
C1_3	4.29	4.29	4.30	9.51	4.29
C12	2.31	2.31	2.32	0.01	0.01
C13	2.97	2.97	2.97	0.01	0.01
C14	3.47	3.47	3.47	0.01	0.01
C15	1.46	1.46	1.46	0.01	0.01
C16	0.18	0.18	0.18	0.01	0.01

Analysis begun on: Mon Jan 05 16:34:15 2015
Analysis ended on: Mon Jan 05 16:34:17 2015
Total elapsed time: 00:00:02

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Current Conditions

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 18
Number of nodes 24
Number of links 23
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	500yrSCS_24h_Type_III_16.97in	INTENSITY	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5

S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S25	16.66	300.00	2.00	0.5000	RG1	J8
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	
J19	JUNCTION	10.66	8.00	0.0	
J20	JUNCTION	10.00	8.00	0.0	
J21	JUNCTION	12.83	3.53	0.0	
J22	JUNCTION	12.83	3.07	0.0	
J23	JUNCTION	10.74	9.67	0.0	
J24	JUNCTION	13.50	2.50	0.0	
J25	JUNCTION	12.97	6.00	0.0	
OF1	OUTFALL	9.50	5.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness

C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67

C17	TR2	5.00	162.68	3.35	72.00	1	221.24

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459
0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2
Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910

```
        0.8308    0.8716    0.9134    0.9562    1.0000
Hrad:
        0.0293    0.0577    0.0854    0.1123    0.1384
        0.1639    0.1887    0.2129    0.2365    0.2595
        0.2820    0.3040    0.3254    0.3464    0.3670
        0.3871    0.4068    0.4260    0.4449    0.4635
        0.4248    0.3988    0.3814    0.3701    0.3633
        0.3600    0.3594    0.3609    0.3642    0.3688
        0.3957    0.4220    0.4480    0.4742    0.5009
        0.5281    0.5561    0.5848    0.6143    0.6448
        0.6765    0.7092    0.7428    0.7771    0.8124
        0.8484    0.8852    0.9227    0.9610    1.0000
Width:
        0.1677    0.1687    0.1697    0.1707    0.1717
        0.1727    0.1737    0.1747    0.1757    0.1767
        0.1777    0.1787    0.1798    0.1808    0.1818
        0.1828    0.1838    0.1848    0.1858    0.1868
        0.2216    0.2564    0.2912    0.3260    0.3608
        0.3956    0.4303    0.4651    0.4999    0.5347
        0.5590    0.5833    0.6076    0.6319    0.6562
        0.6806    0.7049    0.7292    0.7535    0.7778
        0.8000    0.8222    0.8444    0.8667    0.8889
        0.9111    0.9333    0.9556    0.9778    1.0000


**********************
Control Actions Taken
**********************


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet       inches
**************************    ---------       -------
Total Precipitation ......       269.030        16.966
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........        88.350         5.572
Surface Runoff ...........       175.547        11.071
Final Surface Storage ....         5.403         0.341
Continuity Error (%) .....        -0.101


**************************      nitrogen     potassium   phosphorous
Runoff Quality Continuity           lbs           lbs           lbs
**************************   ----------    ----------    ----------
Initial Buildup ..........       186.114        61.982        93.140
Surface Buildup ..........         0.000         0.000         0.000
Wet Deposition ...........         0.000         0.000         0.000
Sweeping Removal .........         0.000         0.000         0.000
Infiltration Loss ........         0.000         0.000         0.000
BMP Removal ..............         0.000         0.000         0.000
Surface Runoff ...........       186.114         0.000        34.214
Remaining Buildup ........         0.000        61.982        58.904
Continuity Error (%) .....         0.000         0.000         0.024
```

```
**************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......        0.000         0.000
Wet Weather Inflow .......      175.275        57.116
Groundwater Inflow .......        0.000         0.000
RDII Inflow ..............        0.000         0.000
External Inflow ..........        0.000         0.000
External Outflow .........      112.601        36.693
Internal Outflow .........       60.140        19.597
Storage Losses ...........        0.000         0.000
Initial Stored Volume ....        1.833         0.597
Final Stored Volume ......        4.583         1.494
Continuity Error (%) .....       -0.122


**************************      nitrogen     potassium   phosphorous
Quality Routing Continuity          lbs           lbs           lbs
**************************    ----------    ----------    ----------
Dry Weather Inflow .......        0.000         0.000         0.000
Wet Weather Inflow .......      186.110         0.000        34.168
Groundwater Inflow .......        0.000         0.000         0.000
RDII Inflow ..............        0.000         0.000         0.000
External Inflow ..........        0.000         0.000         0.000
Internal Flooding ........       53.376         0.000         7.257
External Outflow .........      135.709         0.000        23.412
Mass Reacted .............        0.000         0.000         0.000
Initial Stored Mass ......        0.000         0.000         0.000
Final Stored Mass ........        0.832         0.000         3.296
Continuity Error (%) .....       -2.045         0.000         0.592


**************************
Highest Continuity Errors
**************************
Node J7 (1.29%)


****************************
Time-Step Critical Elements
****************************
Link C1_3 (41.83%)
Link C13 (7.31%)
Link C6 (1.20%)


********************************
Highest Flow Instability Indexes
********************************
Link C14 (4)
Link C10_3 (4)
Link C10_4 (3)
Link C10 (3)
```

Link C15 (3)

****
Routing Time Step Summary
****

Minimum Time Step : 0.50 sec
Average Time Step : 3.95 sec
Maximum Time Step : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.03

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	16.97	0.00	0.00	1.50	15.29	5.41	132.84	0.901
S4	16.97	0.00	0.00	3.31	13.36	3.80	87.40	0.787
S10	16.97	0.00	0.00	2.14	14.52	3.54	83.16	0.856
S11	16.97	0.00	0.00	7.98	8.69	0.98	20.58	0.512
S12	16.97	0.00	0.00	2.14	14.54	1.38	33.33	0.857
S13	16.97	0.00	0.00	2.14	14.54	2.38	58.35	0.857
S21	16.97	0.00	0.00	7.33	9.32	1.61	31.14	0.549
S15	16.97	0.00	0.00	8.11	8.59	1.10	26.18	0.507
S25	16.97	0.00	0.00	7.98	8.48	3.84	65.57	0.500
S1	16.97	0.00	0.00	1.63	15.06	9.86	228.98	0.888
S2	16.97	0.00	0.00	7.33	9.38	1.82	41.28	0.553
S5	16.97	0.00	0.00	7.33	9.37	1.11	25.11	0.552
S8	16.97	0.00	0.00	7.33	9.38	0.67	15.41	0.553
S16	16.97	0.00	0.00	7.33	9.31	0.94	17.41	0.548
S17	16.97	0.00	0.00	7.33	9.27	11.99	218.67	0.546
S18	16.97	0.00	0.00	7.33	9.28	3.70	67.76	0.547
S19	16.97	0.00	0.00	7.33	9.35	2.59	54.98	0.551
S20	16.97	0.00	0.00	7.33	9.39	0.49	11.48	0.553

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000

S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S25	186.114	0.000	34.214
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
System	186.114	0.000	34.214

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	2.62	5.89	17.17	0 12:30
J3	JUNCTION	2.33	5.40	17.00	0 11:56
J4	JUNCTION	1.90	5.00	17.07	0 11:57
J5	JUNCTION	1.60	4.80	17.32	0 12:30
J6	JUNCTION	1.34	4.52	17.36	0 12:30
J7	JUNCTION	1.94	6.22	18.42	0 12:33
J8	JUNCTION	0.51	3.45	18.45	0 12:32
J11	JUNCTION	0.89	3.68	17.18	0 12:30
J12	JUNCTION	2.86	6.29	17.28	0 12:30
J1	JUNCTION	3.10	6.77	17.47	0 12:30
J13	JUNCTION	2.23	6.25	17.10	0 12:30
J14	JUNCTION	3.01	6.95	17.62	0 12:30
J15	JUNCTION	2.87	6.89	17.58	0 12:30
J16	JUNCTION	2.52	6.57	17.36	0 12:30
J17	JUNCTION	1.32	5.53	17.53	0 12:29
J18	JUNCTION	1.85	7.20	19.00	0 11:58
J19	JUNCTION	2.94	6.94	17.60	0 12:30
J20	JUNCTION	3.08	7.04	17.04	0 12:30
J21	JUNCTION	1.11	3.53	16.36	0 11:50
J22	JUNCTION	1.19	3.07	15.90	0 11:10
J23	JUNCTION	3.07	6.56	17.30	0 12:30
J24	JUNCTION	0.71	2.50	16.00	0 11:47
J25	JUNCTION	1.13	4.15	17.12	0 12:30
OF1	OUTFALL	2.50	2.64	12.14	0 12:30

****

Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
J2	JUNCTION	31.13	242.10	0 12:30	1.607	18.165
J3	JUNCTION	84.52	295.78	0 12:03	3.481	14.306
J4	JUNCTION	33.33	165.56	0 12:30	1.378	9.944
J5	JUNCTION	107.96	143.44	0 12:30	4.769	8.671
J6	JUNCTION	0.00	60.25	0 12:33	0.000	3.961
J7	JUNCTION	0.00	60.38	0 12:30	0.000	3.862
J8	JUNCTION	65.56	65.56	0 12:30	3.829	3.829
J11	JUNCTION	132.80	132.80	0 12:00	5.404	5.404
J12	JUNCTION	83.14	124.89	0 12:30	3.534	16.201
J1	JUNCTION	0.00	132.24	0 12:30	0.000	19.943
J13	JUNCTION	11.48	257.29	0 12:30	0.493	36.744
J14	JUNCTION	218.60	218.60	0 12:30	11.971	29.464
J15	JUNCTION	67.74	239.23	0 11:59	3.689	32.696
J16	JUNCTION	54.97	287.45	0 12:00	2.581	36.339
J17	JUNCTION	25.11	25.11	0 12:00	1.113	1.134
J18	JUNCTION	41.27	41.27	0 12:00	1.816	1.829
J19	JUNCTION	0.00	199.92	0 11:58	0.000	29.070
J20	JUNCTION	0.00	256.29	0 12:30	0.000	36.715
J21	JUNCTION	17.41	43.90	0 12:30	0.936	1.678
J22	JUNCTION	228.93	266.23	0 12:00	9.847	11.522
J23	JUNCTION	0.00	108.46	0 12:32	0.000	19.940
J24	JUNCTION	15.41	103.91	0 12:02	0.665	4.524
J25	JUNCTION	0.00	95.36	0 11:57	0.000	4.151
OF1	OUTFALL	0.00	256.28	0 12:30	0.000	36.690

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J3	JUNCTION	1.38	0.401	0.000
J4	JUNCTION	0.93	0.000	0.000
J7	JUNCTION	0.27	0.218	1.582
J12	JUNCTION	2.13	1.290	0.722
J17	JUNCTION	4.88	3.028	0.472
J18	JUNCTION	10.29	5.200	0.000
J20	JUNCTION	1.42	2.042	0.958
J21	JUNCTION	6.11	1.530	0.000
J22	JUNCTION	6.71	1.070	0.000

J23	JUNCTION	3.07	1.559	3.108
J24	JUNCTION	4.66	0.500	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
J3	0.91	295.76	0 12:03	5.296	5.40
J4	0.93	85.46	0 12:30	1.493	5.00
J18	0.27	3.95	0 12:00	0.010	7.20
J21	1.54	43.90	0 12:30	1.188	3.53
J22	3.87	266.04	0 12:00	7.389	3.07
J24	2.30	103.90	0 12:02	4.220	2.50

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.89	52.41	256.28	36.690	135.710	0.000	23.413
System	99.89	52.41	256.28	36.690	135.710	0.000	23.413

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	133.31	0 11:58	1.67	0.11	0.80
C2	CHANNEL	150.39	0 12:30	0.92	0.73	1.00
C3	CHANNEL	88.85	0 13:05	0.57	0.43	1.00
C4	CHANNEL	142.40	0 12:30	0.92	0.69	0.98
C5	CHANNEL	63.21	0 12:34	0.47	0.31	0.93
C6	CONDUIT	60.25	0 12:33	9.59	1.30	1.00
C7	CONDUIT	60.38	0 12:30	0.73	0.07	0.79
C1_1	CHANNEL	124.88	0 12:30	0.77	0.60	1.00

C10	CONDUIT	90.83	0	12:30	14.46	1.45	1.00
C1_2	CHANNEL	94.49	0	11:57	0.58	0.46	1.00
C10_5	CHANNEL	132.24	0	12:30	0.73	0.26	0.81
C10_2	CHANNEL	207.50	0	11:59	1.35	1.13	0.84
C10_4	CHANNEL	160.88	0	11:58	0.98	1.78	0.87
C10_1	CHANNEL	248.06	0	12:30	1.95	1.25	0.80
C10_3	CHANNEL	178.05	0	11:58	1.06	0.96	0.86
C1_3	CONDUIT	108.46	0	12:32	7.67	2.04	1.00
C11	CONDUIT	95.36	0	11:57	1.07	0.11	0.84
C12	CONDUIT	26.54	0	12:30	8.45	0.72	1.00
C13	CONDUIT	39.67	0	12:30	12.63	0.82	1.00
C14	CONDUIT	39.05	0	11:58	12.43	1.33	1.00
C15	CONDUIT	25.09	0	12:00	5.11	0.45	1.00
C16	CONDUIT	256.29	0	12:30	2.14	0.13	1.00
C17	CHANNEL	256.28	0	12:30	2.89	1.16	0.76

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0002
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0001
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0001
C5	1.00	0.00	0.24	0.00	0.76	0.00	0.00	0.00	0.02	0.0000
C6	1.00	0.00	0.23	0.00	0.76	0.00	0.00	0.00	0.03	0.0004
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0001
C10	1.00	0.00	0.00	0.00	0.73	0.27	0.00	0.00	0.38	0.0016
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0001
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0003
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0002
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0015
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0001
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.31	0.0011
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0008
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0009
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0001

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C2	1.38	1.38	1.38	0.01	0.01
C6	7.19	7.19	7.20	1.72	0.01
C1_1	1.70	1.70	1.70	0.01	0.01
C10	4.66	4.66	4.66	1.87	0.01
C1_2	2.13	2.13	2.13	0.01	0.01
C10_2	0.01	0.01	0.01	0.14	0.01
C10_4	0.01	0.01	0.01	3.77	0.01
C10_1	0.01	0.01	0.01	1.17	0.01
C1_3	11.76	11.76	11.76	11.06	4.61
C12	6.11	6.11	6.12	0.01	0.01
C13	6.71	6.71	6.71	0.01	0.01
C14	10.29	10.29	10.29	0.66	0.66
C15	4.88	4.88	4.88	0.01	0.01
C16	1.66	1.66	1.66	0.01	0.01
C17	0.01	0.01	0.01	0.74	0.01

Analysis begun on: Mon Jan 05 16:31:50 2015
Analysis ended on: Mon Jan 05 16:31:51 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Rough

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 24
Number of nodes 30
Number of links 29
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	500yrSCS_24h_Type_III_16.97in	INTENSITY	15 min.

****

Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0800
C3	J4	J3	CONDUIT	506.7	0.0931	0.0800
C4	J5	J4	CONDUIT	484.9	0.0932	0.0800
C5	J6	J5	CONDUIT	340.0	0.0932	0.0800
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0800
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0800
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0800
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0800
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0800
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0800
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0800
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0800
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	3.35	72.00	1	206.30
C3	TR2	5.00	162.68	3.35	72.00	1	206.44
C4	TR2	5.00	162.68	3.35	72.00	1	206.52
C5	TR2	5.00	162.68	3.35	72.00	1	206.55
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	3.35	72.00	1	206.75
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	3.35	72.00	1	206.18
C10_5	TR1	8.00	248.00	5.13	50.00	1	502.35
C10_2	TR1	8.00	248.00	5.13	50.00	1	183.80
C10_4	TR1	8.00	248.00	5.13	50.00	1	90.36
C10_1	TR1	8.00	248.00	5.13	50.00	1	198.00
C10_3	TR1	8.00	248.00	5.13	50.00	1	185.14
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	3.35	72.00	1	221.24
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

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Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0306	0.0604	0.0895	0.1178	0.1454
0.1723	0.1986	0.2242	0.2494	0.2739
0.2979	0.3215	0.3421	0.3600	0.3778
0.3953	0.4126	0.4297	0.4467	0.4636
0.4803	0.4968	0.5133	0.5296	0.5459

0.5620	0.5781	0.5940	0.6099	0.6257
0.6414	0.6571	0.6727	0.6882	0.7037
0.7191	0.7345	0.7498	0.7651	0.7803
0.7955	0.8106	0.8257	0.8439	0.8710
0.8974	0.9233	0.9490	0.9745	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0293	0.0577	0.0854	0.1123	0.1384
0.1639	0.1887	0.2129	0.2365	0.2595
0.2820	0.3040	0.3254	0.3464	0.3670
0.3871	0.4068	0.4260	0.4449	0.4635
0.4248	0.3988	0.3814	0.3701	0.3633
0.3600	0.3594	0.3609	0.3642	0.3688
0.3957	0.4220	0.4480	0.4742	0.5009
0.5281	0.5561	0.5848	0.6143	0.6448
0.6765	0.7092	0.7428	0.7771	0.8124
0.8484	0.8852	0.9227	0.9610	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	349.233	16.966
Evaporation Loss	0.000	0.000
Infiltration Loss	91.830	4.461
Surface Runoff	251.407	12.214
Final Surface Storage	6.394	0.311
Continuity Error (%)	-0.114	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	241.905	0.000	47.084
Remaining Buildup	0.000	80.563	73.949
Continuity Error (%)	0.000	0.000	0.023

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	251.044	81.806
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	127.365	41.504
Internal Outflow	86.792	28.282
Storage Losses	16.734	5.453
Initial Stored Volume	1.833	0.597
Final Stored Volume	22.282	7.261
Continuity Error (%)	-0.117	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	241.695	0.000	47.024
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	138.818	0.000	20.004

External Outflow	115.032	0.000	24.686
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	0.988	0.000	3.397
Continuity Error (%)	-5.437	0.000	-2.258

****
Highest Continuity Errors
****
Node J10 (2.54%)

****
Time-Step Critical Elements
****
Link C1_3 (37.17%)
Link C13 (11.62%)
Link C6 (2.10%)

****
Highest Flow Instability Indexes
****
Link C14 (4)
Link C10_3 (3)
Link C15 (3)
Link C10_4 (3)
Link C10 (2)

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	3.92 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.03

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	16.97	0.00	0.00	1.50	15.29	5.41	132.84	0.901
S4	16.97	0.00	0.00	3.31	13.36	3.80	87.40	0.787
S10	16.97	0.00	0.00	2.14	14.52	3.54	83.16	0.856
S11	16.97	0.00	0.00	7.98	8.69	0.98	20.58	0.512

S12	16.97	0.00	0.00	2.14	14.54	1.38	33.33	0.857
S13	16.97	0.00	0.00	2.14	14.54	2.38	58.35	0.857
S21	16.97	0.00	0.00	7.33	9.32	1.61	31.14	0.549
S15	16.97	0.00	0.00	8.11	8.59	1.10	26.18	0.507
S7	16.97	0.00	0.00	0.32	16.45	7.21	164.62	0.970
S6	16.97	0.00	0.00	0.00	16.85	2.25	53.51	0.993
S26	16.97	0.00	0.00	6.11	10.64	1.44	33.90	0.627
S25	16.97	0.00	0.00	7.98	8.48	3.84	65.57	0.500
S22	16.97	0.00	0.00	0.24	16.61	0.95	22.93	0.979
S1	16.97	0.00	0.00	1.63	15.06	9.86	228.98	0.888
S2	16.97	0.00	0.00	7.33	9.38	1.82	41.28	0.553
S5	16.97	0.00	0.00	7.33	9.37	1.11	25.11	0.552
S8	16.97	0.00	0.00	7.33	9.38	0.67	15.41	0.553
S23	16.97	0.00	0.00	0.16	16.66	7.14	168.02	0.982
S16	16.97	0.00	0.00	7.33	9.31	0.94	17.41	0.548
S17	16.97	0.00	0.00	7.33	9.27	11.99	218.67	0.546
S18	16.97	0.00	0.00	7.33	9.28	3.70	67.76	0.547
S19	16.97	0.00	0.00	7.33	9.35	2.59	54.98	0.551
S20	16.97	0.00	0.00	7.33	9.39	0.49	11.48	0.553
S24	16.97	0.00	0.00	0.24	16.49	5.73	121.80	0.972

****
Subcatchment Washoff Summary
****

Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	55.791	0.000	12.870
S25	186.114	0.000	34.214
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
S24	0.000	0.000	0.000

System 241.905 0.000 47.084

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	2.87	5.90	17.18	0 12:02
J3	JUNCTION	2.62	5.40	17.00	0 11:53
J4	JUNCTION	2.30	5.00	17.07	0 11:54
J5	JUNCTION	2.10	4.94	17.47	0 12:02
J6	JUNCTION	1.94	4.71	17.55	0 12:03
J7	JUNCTION	2.83	7.80	20.00	0 12:01
J8	JUNCTION	0.82	5.17	20.17	0 12:02
J9	JUNCTION	1.07	4.93	20.43	0 12:07
J10	JUNCTION	1.06	4.67	20.67	0 12:05
J11	JUNCTION	1.05	3.68	17.18	0 12:02
J12	JUNCTION	3.09	6.29	17.28	0 12:29
J1	JUNCTION	3.30	6.77	17.47	0 12:30
J13	JUNCTION	2.35	6.25	17.10	0 12:30
J14	JUNCTION	3.18	6.95	17.62	0 12:30
J15	JUNCTION	3.02	6.89	17.58	0 12:30
J16	JUNCTION	2.65	6.57	17.36	0 12:30
J17	JUNCTION	1.45	5.53	17.53	0 12:29
J18	JUNCTION	2.01	7.20	19.00	0 11:57
J19	JUNCTION	3.10	6.94	17.60	0 12:30
J20	JUNCTION	3.19	7.04	17.04	0 12:30
J21	JUNCTION	1.28	3.53	16.36	0 11:48
J22	JUNCTION	1.33	3.07	15.90	0 11:02
J23	JUNCTION	3.28	6.56	17.30	0 12:29
J24	JUNCTION	0.89	2.50	16.00	0 11:35
J25	JUNCTION	1.34	4.15	17.12	0 12:03
J26	JUNCTION	1.15	4.75	20.66	0 12:05
J27	JUNCTION	1.17	4.79	20.61	0 12:05
OF1	OUTFALL	2.50	2.64	12.14	0 12:30
SU1	STORAGE	2.38	4.87	21.17	0 16:11
SU2	STORAGE	2.81	6.00	22.00	0 11:55

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal

J2	JUNCTION	31.12	243.68	0	12:02	1.607	26.334
J3	JUNCTION	84.51	307.90	0	12:02	3.481	22.773
J4	JUNCTION	33.32	219.55	0	12:02	1.378	19.702
J5	JUNCTION	107.94	192.06	0	12:01	4.769	18.392
J6	JUNCTION	0.00	94.18	0	13:02	0.000	13.651
J7	JUNCTION	33.89	266.44	0	12:09	1.441	16.281
J8	JUNCTION	65.56	83.54	0	11:55	3.829	3.874
J9	JUNCTION	0.00	175.89	0	12:06	0.000	11.009
J10	JUNCTION	0.00	12.43	0	12:01	0.000	0.149
J11	JUNCTION	132.83	132.83	0	11:59	5.404	5.404
J12	JUNCTION	83.13	124.99	0	12:29	3.534	22.766
J1	JUNCTION	0.00	132.32	0	12:30	0.000	25.056
J13	JUNCTION	11.47	257.32	0	12:29	0.493	41.576
J14	JUNCTION	218.66	218.66	0	12:29	11.971	34.434
J15	JUNCTION	67.76	240.03	0	11:56	3.689	37.557
J16	JUNCTION	54.96	282.97	0	11:57	2.581	41.177
J17	JUNCTION	25.10	25.10	0	11:59	1.113	1.126
J18	JUNCTION	41.26	41.26	0	11:59	1.816	1.825
J19	JUNCTION	0.00	205.72	0	11:56	0.000	33.938
J20	JUNCTION	0.00	256.34	0	12:30	0.000	41.539
J21	JUNCTION	17.41	43.92	0	12:29	0.936	1.754
J22	JUNCTION	228.92	266.97	0	11:59	9.847	12.083
J23	JUNCTION	0.00	116.53	0	11:54	0.000	25.614
J24	JUNCTION	15.41	105.56	0	12:01	0.665	5.988
J25	JUNCTION	0.00	95.18	0	11:54	0.000	5.559
J26	JUNCTION	164.57	164.57	0	11:59	7.203	7.348
J27	JUNCTION	22.93	169.29	0	12:00	0.946	8.210
OF1	OUTFALL	0.00	256.33	0	12:30	0.000	41.501
SU1	STORAGE	221.49	221.49	0	11:59	9.379	9.379
SU2	STORAGE	121.75	121.75	0	11:59	5.719	5.719

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J3	JUNCTION	1.87	0.401	0.000
J4	JUNCTION	1.27	0.000	0.000
J7	JUNCTION	2.45	1.800	0.000
J12	JUNCTION	3.12	1.290	0.722
J17	JUNCTION	5.77	3.029	0.471
J18	JUNCTION	11.81	5.200	0.000
J20	JUNCTION	1.52	2.043	0.957
J21	JUNCTION	7.53	1.530	0.000
J22	JUNCTION	8.17	1.070	0.000
J23	JUNCTION	4.96	1.560	3.107
J24	JUNCTION	5.84	0.500	0.000

```
SU2              STORAGE        2.43         1.000       0.000


**********************
Node Flooding Summary
**********************

Flooding refers to all water that overflows a node, whether it ponds or not.
--------------------------------------------------------------------------
                                          Total   Maximum
                     Maximum   Time of Max      Flood    Ponded
                Hours      Rate    Occurrence      Volume     Depth
Node             Flooded      CFS   days hr:min    10^6 gal      Feet
--------------------------------------------------------------------------
J3                0.96    307.89      0  12:02       5.680      5.40
J4                1.27    139.49      0  12:02       2.881      5.00
J7                1.02    175.12      0  12:09       2.450      7.80
J18               0.31      4.83      0  12:00       0.012      7.20
J21               1.82     43.91      0  12:29       1.299      3.53
J22               5.23    266.73      0  11:59       8.784      3.07
J24               3.73    105.56      0  12:01       5.749      2.50
SU2               1.11     96.30      0  12:00       1.426      6.00


***********************
Storage Volume Summary
***********************

-----------------------------------------------------------------------------------------
                 Average     Avg   E&I      Maximum     Max    Time of Max    Maximum
                  Volume    Pcnt  Pcnt       Volume    Pcnt     Occurrence    Outflow
Storage Unit       1000 ft3    Full  Loss      1000 ft3    Full    days hr:min       CFS
-----------------------------------------------------------------------------------------
SU1               360.697      39    48      740.128      81       0  16:11       0.66
SU2                61.158      42    17      144.000     100       0  11:55      23.18


************************
Outfall Loading Summary
************************

-------------------------------------------------------------------------------------------------
                Flow      Avg.      Max.      Total        Total        Total        Total
                Freq.     Flow      Flow      Volume      nitrogen     potassium   phosphorous
Outfall Node     Pcnt.      CFS       CFS    10^6 gal         lbs          lbs          lbs
-------------------------------------------------------------------------------------------------
OF1              99.89     58.30    256.33      41.501      115.033        0.000       24.686
-------------------------------------------------------------------------------------------------
System           99.89     58.30    256.33      41.501      115.033        0.000       24.686


********************
Link Flow Summary
********************
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Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	131.81	0	11:57	1.60	0.11	0.80
C2	CHANNEL	152.40	0	12:03	0.94	0.74	1.00
C3	CHANNEL	123.10	0	13:18	0.77	0.60	1.00
C4	CHANNEL	189.85	0	12:03	1.18	0.92	0.99
C5	CHANNEL	95.36	0	12:35	0.72	0.46	0.97
C6	CONDUIT	94.18	0	13:02	14.99	2.03	1.00
C7	CONDUIT	76.86	0	12:03	0.73	0.10	0.93
C8	CONDUIT	172.89	0	12:08	1.66	0.30	0.91
C9_2_1	CONDUIT	146.83	0	12:00	2.48	0.45	0.79
C1_1	CHANNEL	124.96	0	12:29	0.77	0.60	1.00
C10	CONDUIT	91.04	0	12:03	14.49	1.46	1.00
C1_2	CHANNEL	116.53	0	11:54	0.72	0.57	1.00
C10_5	CHANNEL	132.32	0	12:30	0.75	0.26	0.81
C10_2	CHANNEL	209.32	0	11:57	1.38	1.14	0.84
C10_4	CHANNEL	169.68	0	11:55	1.00	1.88	0.87
C10_1	CHANNEL	248.09	0	12:30	1.93	1.25	0.80
C10_3	CHANNEL	184.82	0	11:56	1.12	1.00	0.86
C1_3	CONDUIT	108.52	0	12:32	7.68	2.04	1.00
C11	CONDUIT	95.18	0	11:54	1.08	0.11	0.84
C12	CONDUIT	26.55	0	12:30	8.45	0.72	1.00
C13	CONDUIT	39.67	0	12:30	12.63	0.82	1.00
C14	CONDUIT	38.06	0	11:57	12.11	1.30	1.00
C15	CONDUIT	25.10	0	12:00	5.11	0.45	1.00
C16	CONDUIT	256.34	0	12:30	2.14	0.13	1.00
C17	CHANNEL	256.33	0	12:30	2.89	1.16	0.76
C9_1	CONDUIT	12.43	0	12:01	0.22	0.04	0.78
C9_2_2	CONDUIT	155.24	0	12:06	2.72	0.48	0.81
OR1	ORIFICE	0.66	0	16:11		0.37	
OR2	ORIFICE	23.18	0	11:55		1.00	

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0002
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0001
C5	1.00	0.00	0.06	0.00	0.94	0.00	0.00	0.00	0.06	0.0000
C6	1.00	0.00	0.06	0.00	0.94	0.00	0.00	0.00	0.09	0.0004
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.08	0.0000

C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0001
C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C10	1.00	0.00	0.00	0.00	0.76	0.24	0.00	0.00	0.32	0.0013
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0001
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0003
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0002
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0012
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0001
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.26	0.0006
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0007
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0006
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0001
C9_1	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.01	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0001

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C2	1.87	1.87	1.87	0.01	0.01
C6	11.83	11.83	11.83	6.15	0.01
C1_1	2.32	2.32	2.32	0.01	0.01
C10	5.84	5.84	5.84	2.62	0.01
C1_2	3.12	3.12	3.12	0.01	0.01
C10_2	0.01	0.01	0.01	0.15	0.01
C10_4	0.01	0.01	0.01	4.95	0.01
C10_1	0.01	0.01	0.01	1.19	0.01
C1_3	14.23	14.23	14.23	13.73	6.36
C12	7.53	7.53	7.54	0.01	0.01
C13	8.17	8.17	8.17	0.01	0.01
C14	11.81	11.81	11.81	0.66	0.66
C15	5.77	5.77	5.77	0.01	0.01
C16	1.88	1.88	1.88	0.01	0.01
C17	0.01	0.01	0.01	0.76	0.01

Analysis begun on: Mon Jan 05 16:36:13 2015
Analysis ended on: Mon Jan 05 16:36:14 2015
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)

Proposed Conditions - Smooth

Corpus Christi Army Depot Drainage Model
Developed by Marat Mardenov
December 24 2014

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... YES
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date DEC-24-2014 00:00:00
Ending Date DEC-25-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J4

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 24
Number of nodes 30
Number of links 29
Number of pollutants 3
Number of land uses 1

****
Pollutant Summary
****

Name	Ppt. Units	GW Concen.	Kdecay Concen.	1/days	CoPollutant
nitrogen	MG/L	0.00	0.00	0.00	
potassium	MG/L	0.00	0.00	0.00	
phosphorous	MG/L	0.00	0.00	0.00	

****
Landuse Summary
****

Name	Sweeping Interval	Maximum Removal	Last Swept
golfcourse	0.00	0.00	0.00

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG1	500yrSCS_24h_Type_III_16.97in	INTENSITY	15 min.

****

Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S3	13.03	910.00	52.50	0.5000	RG1	J11
S4	10.48	710.00	10.20	0.5000	RG1	J5
S10	8.98	750.00	2.00	0.5000	RG1	J12
S11	4.14	350.00	2.00	0.5000	RG1	J5
S12	3.50	350.00	2.00	0.5000	RG1	J4
S13	6.04	670.00	2.00	0.5000	RG1	J3
S21	6.36	530.00	10.00	0.5000	RG1	J2
S15	4.72	730.00	0.40	0.5000	RG1	J3
S7	16.14	480.00	80.00	0.5000	RG1	J26
S6	4.91	425.00	100.00	0.5000	RG1	SU1
S26	4.99	500.00	25.00	0.5000	RG1	J7
S25	16.66	300.00	2.00	0.5000	RG1	J8
S22	2.10	210.00	85.00	0.5000	RG1	J27
S1	24.10	1348.00	25.00	0.5000	RG1	J22
S2	7.14	730.00	10.00	0.5000	RG1	J18
S5	4.38	430.00	10.00	0.5000	RG1	J17
S8	2.61	300.00	10.00	0.5000	RG1	J24
S23	15.79	800.00	90.00	0.5000	RG1	SU1
S16	3.71	160.00	10.00	0.5000	RG1	J21
S17	47.65	1500.00	10.00	0.5000	RG1	J14
S18	14.67	500.00	10.00	0.5000	RG1	J15
S19	10.18	750.00	10.00	0.5000	RG1	J16
S20	1.94	230.00	10.00	0.5000	RG1	J13
S24	12.79	257.00	85.00	0.5000	RG1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J2	JUNCTION	11.28	6.00	0.0	
J3	JUNCTION	11.60	5.40	0.0	
J4	JUNCTION	12.07	5.00	0.0	
J5	JUNCTION	12.52	5.00	0.0	
J6	JUNCTION	12.84	7.16	0.0	
J7	JUNCTION	12.20	7.80	0.0	
J8	JUNCTION	15.00	6.00	0.0	
J9	JUNCTION	15.50	6.00	0.0	
J10	JUNCTION	16.00	6.00	0.0	
J11	JUNCTION	13.50	6.00	0.0	
J12	JUNCTION	10.99	7.01	0.0	
J1	JUNCTION	10.70	10.30	0.0	
J13	JUNCTION	10.85	8.00	0.0	
J14	JUNCTION	10.67	8.00	0.0	
J15	JUNCTION	10.69	8.00	0.0	
J16	JUNCTION	10.79	8.00	0.0	
J17	JUNCTION	12.00	6.00	0.0	
J18	JUNCTION	11.80	7.20	0.0	

J19	JUNCTION	10.66	8.00	0.0
J20	JUNCTION	10.00	8.00	0.0
J21	JUNCTION	12.83	3.53	0.0
J22	JUNCTION	12.83	3.07	0.0
J23	JUNCTION	10.74	9.67	0.0
J24	JUNCTION	13.50	2.50	0.0
J25	JUNCTION	12.97	6.00	0.0
J26	JUNCTION	15.91	6.00	0.0
J27	JUNCTION	15.82	6.00	0.0
OF1	OUTFALL	9.50	5.00	0.0
SU1	STORAGE	16.30	6.00	0.0
SU2	STORAGE	16.00	6.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J11	J2	CONDUIT	303.5	0.7324	0.0300
C2	J3	J2	CONDUIT	346.2	0.0930	0.0300
C3	J4	J3	CONDUIT	506.7	0.0931	0.0300
C4	J5	J4	CONDUIT	484.9	0.0932	0.0300
C5	J6	J5	CONDUIT	340.0	0.0932	0.0300
C6	J6	J7	CONDUIT	102.8	0.6223	0.0100
C7	J8	J7	CONDUIT	849.4	0.3297	0.0300
C8	J9	J7	CONDUIT	884.0	0.3733	0.0450
C9_2_1	J26	J27	CONDUIT	244.0	0.0369	0.0250
C1_1	J2	J12	CONDUIT	309.4	0.0934	0.0300
C10	J24	J25	CONDUIT	46.9	1.1294	0.0100
C1_2	J12	J23	CONDUIT	263.7	0.0929	0.0300
C10_5	J1	J14	CONDUIT	607.5	0.1343	0.0300
C10_2	J16	J15	CONDUIT	561.6	0.0180	0.0300
C10_4	J14	J19	CONDUIT	322.1	0.0043	0.0300
C10_1	J13	J16	CONDUIT	287.5	0.0209	0.0300
C10_3	J15	J19	CONDUIT	158.9	0.0182	0.0300
C1_3	J23	J1	CONDUIT	45.6	0.0942	0.0100
C11	J25	J2	CONDUIT	419.8	0.4033	0.0300
C12	J21	J1	CONDUIT	136.4	1.5620	0.0100
C13	J22	J23	CONDUIT	77.1	2.7089	0.0100
C14	J18	J19	CONDUIT	114.2	0.9981	0.0100
C15	J17	J16	CONDUIT	112.3	1.0777	0.0100
C16	J13	J20	CONDUIT	151.2	0.5623	0.0100
C17	J20	OF1	CONDUIT	467.4	0.1070	0.0300
C9_1	J10	J26	CONDUIT	238.0	0.0378	0.0250
C9_2_2	J27	J9	CONDUIT	883.2	0.0362	0.0250
OR1	SU1	J10	ORIFICE			
OR2	SU2	J9	ORIFICE			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C1	PARABOLIC	6.00	120.00	3.64	30.00	1	1204.20
C2	TR2	5.00	162.68	2.15	72.00	1	409.91
C3	TR2	5.00	162.68	2.15	72.00	1	410.19
C4	TR2	5.00	162.68	2.15	72.00	1	410.35
C5	TR2	5.00	162.68	2.15	72.00	1	410.39
C6	CIRCULAR	2.00	3.14	0.50	2.00	2	23.20
C7	PARABOLIC	6.00	120.00	3.64	30.00	1	807.90
C8	PARABOLIC	6.00	120.00	3.64	30.00	1	573.15
C9_2_1	PARABOLIC	6.00	120.00	3.64	30.00	1	324.29
C1_1	TR2	5.00	162.68	2.15	72.00	1	410.79
C10	CIRCULAR	2.00	3.14	0.50	2.00	2	31.25
C1_2	TR2	5.00	162.68	2.15	72.00	1	409.66
C10_5	TR1	8.00	248.00	4.48	50.00	1	1224.36
C10_2	TR1	8.00	248.00	4.48	50.00	1	447.97
C10_4	TR1	8.00	248.00	4.48	50.00	1	220.22
C10_1	TR1	8.00	248.00	4.48	50.00	1	482.57
C10_3	TR1	8.00	248.00	4.48	50.00	1	451.23
C1_3	CIRCULAR	3.00	7.07	0.75	3.00	2	26.61
C11	PARABOLIC	6.00	120.00	3.64	30.00	1	893.58
C12	CIRCULAR	2.00	3.14	0.50	2.00	1	36.76
C13	CIRCULAR	2.00	3.14	0.50	2.00	1	48.40
C14	CIRCULAR	2.00	3.14	0.50	2.00	1	29.38
C15	CIRCULAR	2.50	4.91	0.63	2.50	1	55.36
C16	RECT_CLOSED	4.00	120.00	1.76	30.00	1	1952.67
C17	TR2	5.00	162.68	2.15	72.00	1	439.59
C9_1	PARABOLIC	6.00	120.00	3.64	30.00	1	328.36
C9_2_2	PARABOLIC	6.00	120.00	3.64	30.00	1	321.40

****
Transect Summary
****

Transect TR1
Area:

0.0130	0.0260	0.0392	0.0524	0.0658
0.0793	0.0929	0.1065	0.1203	0.1342
0.1482	0.1623	0.1765	0.1911	0.2061
0.2216	0.2374	0.2537	0.2703	0.2874
0.3049	0.3228	0.3411	0.3599	0.3790
0.3986	0.4186	0.4390	0.4598	0.4810
0.5026	0.5246	0.5471	0.5699	0.5932
0.6169	0.6410	0.6655	0.6905	0.7158
0.7416	0.7677	0.7943	0.8213	0.8490
0.8776	0.9069	0.9371	0.9682	1.0000

Hrad:

0.0351	0.0692	0.1024	0.1348	0.1663
0.1972	0.2273	0.2566	0.2854	0.3135
0.3410	0.3679	0.3915	0.4121	0.4323
0.4524	0.4722	0.4918	0.5113	0.5305
0.5497	0.5686	0.5875	0.6062	0.6247

0.6432	0.6616	0.6798	0.6980	0.7161
0.7341	0.7520	0.7699	0.7876	0.8053
0.8230	0.8406	0.8581	0.8756	0.8930
0.9104	0.9277	0.9450	0.9592	0.9646
0.9706	0.9772	0.9843	0.9919	1.0000

Width:

0.4032	0.4064	0.4096	0.4128	0.4160
0.4192	0.4224	0.4256	0.4288	0.4320
0.4352	0.4384	0.4464	0.4592	0.4720
0.4848	0.4976	0.5104	0.5232	0.5360
0.5488	0.5616	0.5744	0.5872	0.6000
0.6128	0.6256	0.6384	0.6512	0.6640
0.6768	0.6896	0.7024	0.7152	0.7280
0.7408	0.7536	0.7664	0.7792	0.7920
0.8048	0.8176	0.8304	0.8464	0.8720
0.8976	0.9232	0.9488	0.9744	1.0000

Transect TR2

Area:

0.0074	0.0148	0.0223	0.0299	0.0374
0.0451	0.0527	0.0604	0.0682	0.0760
0.0838	0.0917	0.0997	0.1076	0.1157
0.1237	0.1318	0.1400	0.1482	0.1564
0.1655	0.1761	0.1882	0.2018	0.2170
0.2338	0.2521	0.2719	0.2932	0.3161
0.3403	0.3656	0.3920	0.4194	0.4479
0.4775	0.5081	0.5399	0.5727	0.6066
0.6415	0.6774	0.7143	0.7521	0.7910
0.8308	0.8716	0.9134	0.9562	1.0000

Hrad:

0.0456	0.0898	0.1328	0.1746	0.2153
0.2549	0.2934	0.3310	0.3677	0.4035
0.4385	0.4726	0.5060	0.5386	0.5706
0.6018	0.6324	0.6624	0.6918	0.7206
0.6606	0.6201	0.5930	0.5754	0.5649
0.5598	0.5588	0.5612	0.5662	0.5734
0.5922	0.6112	0.6306	0.6502	0.6701
0.6902	0.7104	0.7309	0.7515	0.7722
0.7950	0.8177	0.8405	0.8632	0.8860
0.9088	0.9316	0.9544	0.9772	1.0000

Width:

0.1677	0.1687	0.1697	0.1707	0.1717
0.1727	0.1737	0.1747	0.1757	0.1767
0.1777	0.1787	0.1798	0.1808	0.1818
0.1828	0.1838	0.1848	0.1858	0.1868
0.2216	0.2564	0.2912	0.3260	0.3608
0.3956	0.4303	0.4651	0.4999	0.5347
0.5590	0.5833	0.6076	0.6319	0.6562
0.6806	0.7049	0.7292	0.7535	0.7778
0.8000	0.8222	0.8444	0.8667	0.8889
0.9111	0.9333	0.9556	0.9778	1.0000

****

Control Actions Taken
****

********** Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	349.233	16.966
Evaporation Loss	0.000	0.000
Infiltration Loss	91.830	4.461
Surface Runoff	251.407	12.214
Final Surface Storage	6.394	0.311
Continuity Error (%)	-0.114	

********** Runoff Quality Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Initial Buildup	241.905	80.563	121.061
Surface Buildup	0.000	0.000	0.000
Wet Deposition	0.000	0.000	0.000
Sweeping Removal	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000
BMP Removal	0.000	0.000	0.000
Surface Runoff	241.905	0.000	47.084
Remaining Buildup	0.000	80.563	73.949
Continuity Error (%)	0.000	0.000	0.023

********** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	251.043	81.806
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	168.001	54.746
Internal Outflow	48.648	15.853
Storage Losses	16.740	5.455
Initial Stored Volume	1.833	0.597
Final Stored Volume	19.736	6.431
Continuity Error (%)	-0.099	

********** Quality Routing Continuity	nitrogen lbs	potassium lbs	phosphorous lbs
Dry Weather Inflow	0.000	0.000	0.000
Wet Weather Inflow	241.695	0.000	47.024
Groundwater Inflow	0.000	0.000	0.000
RDII Inflow	0.000	0.000	0.000
External Inflow	0.000	0.000	0.000
Internal Flooding	75.447	0.000	10.549

External Outflow	170.433	0.000	34.903
Mass Reacted	0.000	0.000	0.000
Initial Stored Mass	0.000	0.000	0.000
Final Stored Mass	0.034	0.000	1.693
Continuity Error (%)	-1.746	0.000	-0.257

****
Highest Continuity Errors
****
Node J10 (2.55%)

****
Time-Step Critical Elements
****
Link C1_3 (66.13%)
Link C13 (5.11%)
Link C6 (1.24%)

****
Highest Flow Instability Indexes
****
Link C10_3 (5)
Link C14 (5)
Link C15 (5)
Link C16 (4)
Link C10_4 (4)

****
Routing Time Step Summary
****

Minimum Time Step	:	0.50 sec
Average Time Step	:	3.58 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.03

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
S3	16.97	0.00	0.00	1.50	15.29	5.41	132.84	0.901
S4	16.97	0.00	0.00	3.31	13.36	3.80	87.40	0.787
S10	16.97	0.00	0.00	2.14	14.52	3.54	83.16	0.856
S11	16.97	0.00	0.00	7.98	8.69	0.98	20.58	0.512

S12	16.97	0.00	0.00	2.14	14.54	1.38	33.33	0.857
S13	16.97	0.00	0.00	2.14	14.54	2.38	58.35	0.857
S21	16.97	0.00	0.00	7.33	9.32	1.61	31.14	0.549
S15	16.97	0.00	0.00	8.11	8.59	1.10	26.18	0.507
S7	16.97	0.00	0.00	0.32	16.45	7.21	164.62	0.970
S6	16.97	0.00	0.00	0.00	16.85	2.25	53.51	0.993
S26	16.97	0.00	0.00	6.11	10.64	1.44	33.90	0.627
S25	16.97	0.00	0.00	7.98	8.48	3.84	65.57	0.500
S22	16.97	0.00	0.00	0.24	16.61	0.95	22.93	0.979
S1	16.97	0.00	0.00	1.63	15.06	9.86	228.98	0.888
S2	16.97	0.00	0.00	7.33	9.38	1.82	41.28	0.553
S5	16.97	0.00	0.00	7.33	9.37	1.11	25.11	0.552
S8	16.97	0.00	0.00	7.33	9.38	0.67	15.41	0.553
S23	16.97	0.00	0.00	0.16	16.66	7.14	168.02	0.982
S16	16.97	0.00	0.00	7.33	9.31	0.94	17.41	0.548
S17	16.97	0.00	0.00	7.33	9.27	11.99	218.67	0.546
S18	16.97	0.00	0.00	7.33	9.28	3.70	67.76	0.547
S19	16.97	0.00	0.00	7.33	9.35	2.59	54.98	0.551
S20	16.97	0.00	0.00	7.33	9.39	0.49	11.48	0.553
S24	16.97	0.00	0.00	0.24	16.49	5.73	121.80	0.972

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Subcatchment Washoff Summary
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Subcatchment	nitrogen lbs	potassium lbs	phosphorous lbs
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S10	0.000	0.000	0.000
S11	0.000	0.000	0.000
S12	0.000	0.000	0.000
S13	0.000	0.000	0.000
S21	0.000	0.000	0.000
S15	0.000	0.000	0.000
S7	0.000	0.000	0.000
S6	0.000	0.000	0.000
S26	55.791	0.000	12.870
S25	186.114	0.000	34.214
S22	0.000	0.000	0.000
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S5	0.000	0.000	0.000
S8	0.000	0.000	0.000
S23	0.000	0.000	0.000
S16	0.000	0.000	0.000
S17	0.000	0.000	0.000
S18	0.000	0.000	0.000
S19	0.000	0.000	0.000
S20	0.000	0.000	0.000
S24	0.000	0.000	0.000

System 241.905 0.000 47.084

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Node Depth Summary
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Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min
J2	JUNCTION	2.10	5.78	17.06	0 12:01
J3	JUNCTION	1.85	5.40	17.00	0 12:00
J4	JUNCTION	1.53	5.00	17.07	0 12:00
J5	JUNCTION	1.35	4.73	17.25	0 12:02
J6	JUNCTION	1.21	4.46	17.30	0 12:02
J7	JUNCTION	2.24	7.80	20.00	0 12:03
J8	JUNCTION	0.70	5.12	20.12	0 12:04
J9	JUNCTION	1.07	4.91	20.41	0 12:10
J10	JUNCTION	1.06	4.63	20.63	0 12:07
J11	JUNCTION	0.68	3.60	17.10	0 12:01
J12	JUNCTION	2.32	6.05	17.03	0 12:01
J1	JUNCTION	2.49	5.90	16.60	0 12:30
J13	JUNCTION	1.77	4.46	15.31	0 12:30
J14	JUNCTION	2.41	5.90	16.57	0 12:30
J15	JUNCTION	2.30	5.69	16.38	0 12:30
J16	JUNCTION	2.01	5.10	15.89	0 12:30
J17	JUNCTION	0.80	4.06	16.06	0 12:29
J18	JUNCTION	1.26	6.66	18.46	0 12:00
J19	JUNCTION	2.36	5.80	16.46	0 12:30
J20	JUNCTION	2.61	5.07	15.07	0 12:30
J21	JUNCTION	0.62	3.53	16.36	0 11:56
J22	JUNCTION	0.89	3.07	15.90	0 11:30
J23	JUNCTION	2.52	6.23	16.97	0 12:01
J24	JUNCTION	0.44	2.50	16.00	0 11:53
J25	JUNCTION	0.69	4.07	17.04	0 12:01
J26	JUNCTION	1.15	4.71	20.62	0 12:08
J27	JUNCTION	1.17	4.75	20.57	0 12:08
OF1	OUTFALL	2.54	3.53	13.03	0 12:30
SU1	STORAGE	2.50	4.87	21.17	0 16:11
SU2	STORAGE	2.98	6.00	22.00	0 11:55

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal

J2	JUNCTION	31.13	298.06	0	12:00	1.606	28.147
J3	JUNCTION	84.48	222.89	0	12:08	3.480	22.799
J4	JUNCTION	33.31	247.11	0	12:04	1.378	20.177
J5	JUNCTION	107.92	202.06	0	12:03	4.769	18.826
J6	JUNCTION	0.00	104.33	0	13:04	0.000	14.069
J7	JUNCTION	33.87	256.46	0	12:11	1.441	16.297
J8	JUNCTION	65.53	106.44	0	11:58	3.829	3.884
J9	JUNCTION	0.00	185.02	0	11:59	0.000	11.013
J10	JUNCTION	0.00	12.15	0	12:04	0.000	0.148
J11	JUNCTION	132.75	132.75	0	11:59	5.403	5.404
J12	JUNCTION	83.11	211.13	0	12:01	3.534	29.081
J1	JUNCTION	0.00	187.58	0	12:43	0.000	33.402
J13	JUNCTION	11.47	526.73	0	12:30	0.493	54.758
J14	JUNCTION	218.60	365.24	0	12:01	11.971	45.170
J15	JUNCTION	67.74	450.06	0	12:29	3.689	50.619
J16	JUNCTION	54.95	518.55	0	12:29	2.581	54.354
J17	JUNCTION	25.10	25.10	0	12:00	1.113	1.183
J18	JUNCTION	41.25	41.25	0	12:00	1.816	1.841
J19	JUNCTION	0.00	389.86	0	12:02	0.000	46.973
J20	JUNCTION	0.00	526.30	0	12:30	0.000	54.752
J21	JUNCTION	17.41	29.75	0	12:29	0.936	1.109
J22	JUNCTION	228.81	260.65	0	12:00	9.846	10.885
J23	JUNCTION	0.00	210.46	0	12:01	0.000	33.796
J24	JUNCTION	15.40	101.88	0	12:01	0.665	3.231
J25	JUNCTION	0.00	95.06	0	12:00	0.000	2.912
J26	JUNCTION	164.50	164.50	0	12:00	7.203	7.347
J27	JUNCTION	22.93	179.01	0	12:00	0.946	8.210
OF1	OUTFALL	0.00	526.36	0	12:30	0.000	54.742
SU1	STORAGE	221.34	221.34	0	11:59	9.378	9.379
SU2	STORAGE	121.73	121.73	0	12:00	5.719	5.719

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
J3	JUNCTION	0.93	0.401	0.000
J4	JUNCTION	0.61	0.000	0.000
J7	JUNCTION	2.05	1.800	0.000
J12	JUNCTION	1.43	1.045	0.967
J17	JUNCTION	2.10	1.560	1.940
J18	JUNCTION	5.22	4.658	0.542
J20	JUNCTION	0.45	0.066	2.934
J21	JUNCTION	3.07	1.530	0.000
J22	JUNCTION	4.37	1.070	0.000
J23	JUNCTION	2.00	1.232	3.435
J24	JUNCTION	2.59	0.500	0.000

SU2	STORAGE	2.43	1.000	0.000

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Node Flooding Summary
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
J3	0.62	187.57	0 12:03	1.996	5.40
J4	0.61	109.29	0 12:03	0.818	5.00
J7	0.86	159.52	0 12:11	2.107	7.80
J21	0.78	29.75	0 12:30	0.466	3.53
J22	2.64	260.47	0 12:00	6.169	3.07
J24	1.59	101.87	0 12:01	2.874	2.50
SU2	1.10	96.30	0 12:00	1.421	6.00

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Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
SU1	379.708	41	48	740.129	81	0 16:11	0.66
SU2	65.076	45	17	144.000	100	0 11:55	23.18

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Outfall Loading Summary
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Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal	Total nitrogen lbs	Total potassium lbs	Total phosphorous lbs
OF1	99.92	80.39	526.36	54.742	170.439	0.000	34.904
System	99.92	80.39	526.36	54.742	170.439	0.000	34.904

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Link Flow Summary
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Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	128.92	0 11:59	2.03	0.11	0.78
C2	CHANNEL	199.75	0 12:42	1.23	0.49	1.00
C3	CHANNEL	173.35	0 12:43	1.16	0.42	1.00
C4	CHANNEL	218.60	0 12:04	1.44	0.53	0.97
C5	CHANNEL	106.78	0 13:05	1.23	0.26	0.92
C6	CONDUIT	104.33	0 13:04	16.60	2.25	1.00
C7	CONDUIT	69.12	0 12:06	0.77	0.09	0.93
C8	CONDUIT	166.87	0 12:11	1.75	0.29	0.91
C9_2_1	CONDUIT	156.16	0 12:00	2.53	0.48	0.79
C1_1	CHANNEL	184.10	0 12:45	1.15	0.45	1.00
C10	CONDUIT	87.47	0 12:01	13.92	1.40	1.00
C1_2	CHANNEL	210.46	0 12:01	1.29	0.51	1.00
C10_5	CHANNEL	192.15	0 12:44	1.79	0.16	0.69
C10_2	CHANNEL	449.19	0 12:30	3.22	1.00	0.67
C10_4	CHANNEL	351.94	0 12:02	2.30	1.60	0.73
C10_1	CHANNEL	517.57	0 12:30	4.38	1.07	0.60
C10_3	CHANNEL	384.78	0 12:02	2.58	0.85	0.72
C1_3	CONDUIT	179.17	0 12:45	12.67	3.37	1.00
C11	CONDUIT	95.06	0 12:00	1.08	0.11	0.82
C12	CONDUIT	14.82	0 11:56	4.72	0.40	1.00
C13	CONDUIT	36.65	0 11:31	11.67	0.76	1.00
C14	CONDUIT	41.25	0 12:00	13.13	1.40	1.00
C15	CONDUIT	25.10	0 12:00	5.11	0.45	1.00
C16	CONDUIT	526.30	0 12:30	4.39	0.27	1.00
C17	CHANNEL	526.36	0 12:30	4.61	1.20	0.85
C9_1	CONDUIT	12.15	0 12:04	0.22	0.04	0.78
C9_2_2	CONDUIT	161.85	0 11:59	3.00	0.50	0.80
OR1	ORIFICE	0.66	0 16:11		0.37	
OR2	ORIFICE	23.18	0 11:55		1.00	

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.09	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.11	0.0001
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.13	0.0001
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.18	0.0000
C5	1.00	0.00	0.06	0.00	0.94	0.00	0.00	0.17	0.0000
C6	1.00	0.00	0.06	0.00	0.94	0.00	0.00	0.32	0.0004
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0000
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.12	0.0000
C9_2_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.16	0.0000

C1_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0001
C10	1.00	0.00	0.00	0.00	0.52	0.48	0.00	0.00	0.72	0.0011
C1_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0001
C10_5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C10_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0001
C10_4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0002
C10_1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0001
C10_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0001
C1_3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.24	0.0008
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0002
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.47	0.0002
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0015
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0023
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0001
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.25	0.0001
C9_1	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.01	0.0000
C9_2_2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0001

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Conduit Surcharge Summary
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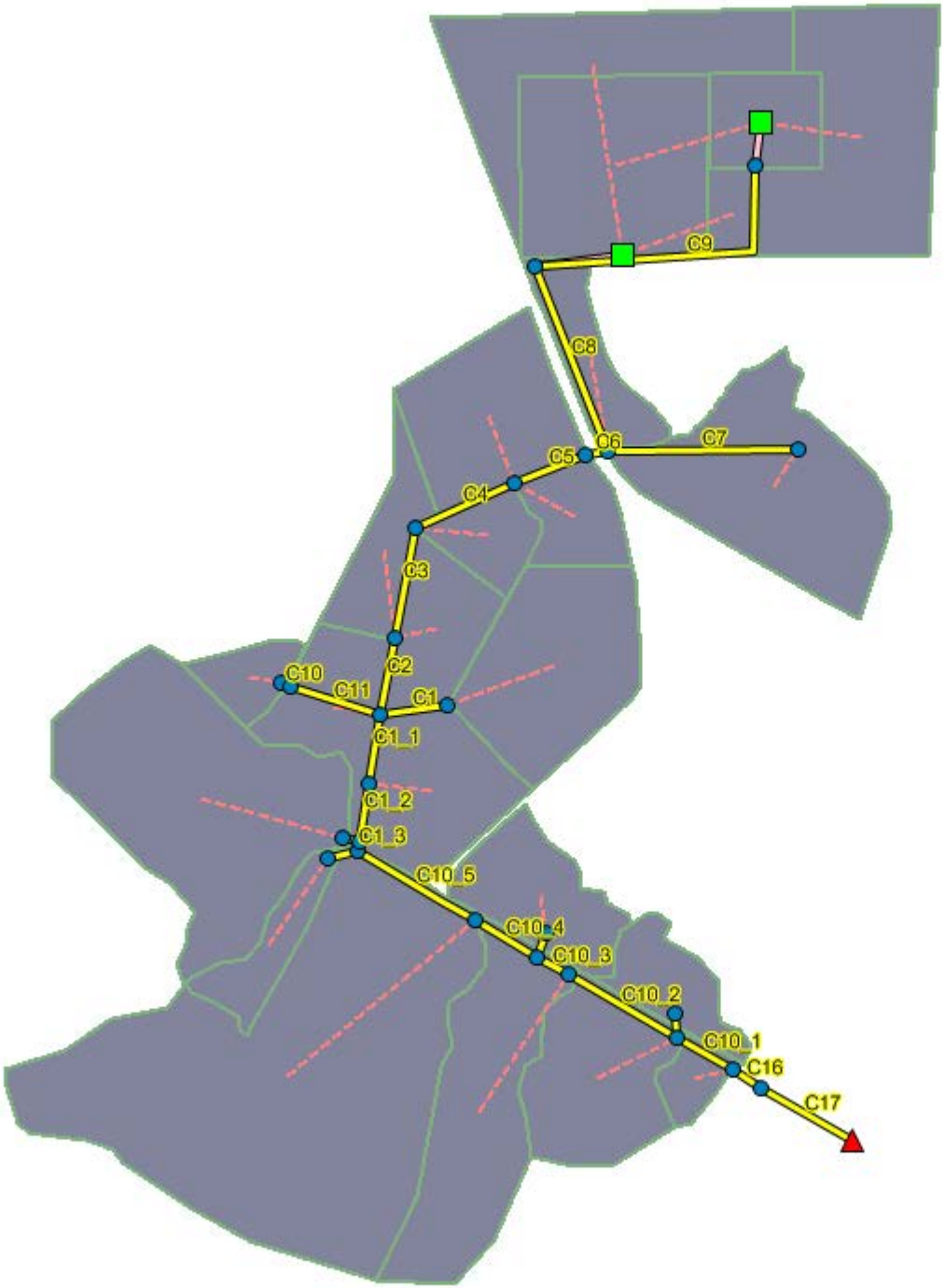
Conduit	Hours Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Capacity Limited
C2	0.93	0.93	0.94	0.01	0.01
C6	5.29	5.29	5.29	6.18	0.01
C1_1	1.17	1.17	1.17	0.01	0.01
C10	2.59	2.59	2.59	1.29	0.01
C1_2	1.43	1.43	1.43	0.01	0.01
C10_2	0.01	0.01	0.01	0.05	0.01
C10_4	0.01	0.01	0.01	1.94	0.01
C10_1	0.01	0.01	0.01	0.56	0.01
C1_3	6.05	6.05	6.05	13.13	6.05
C12	3.07	3.07	3.07	0.01	0.01
C13	4.37	4.37	4.37	0.01	0.01
C14	5.22	5.22	5.22	0.66	0.66
C15	2.10	2.10	2.10	0.01	0.01
C16	0.79	0.79	0.79	0.01	0.01
C17	0.01	0.01	0.01	0.68	0.01

Analysis begun on: Mon Jan 05 16:34:42 2015
Analysis ended on: Mon Jan 05 16:34:43 2015
Total elapsed time: 00:00:01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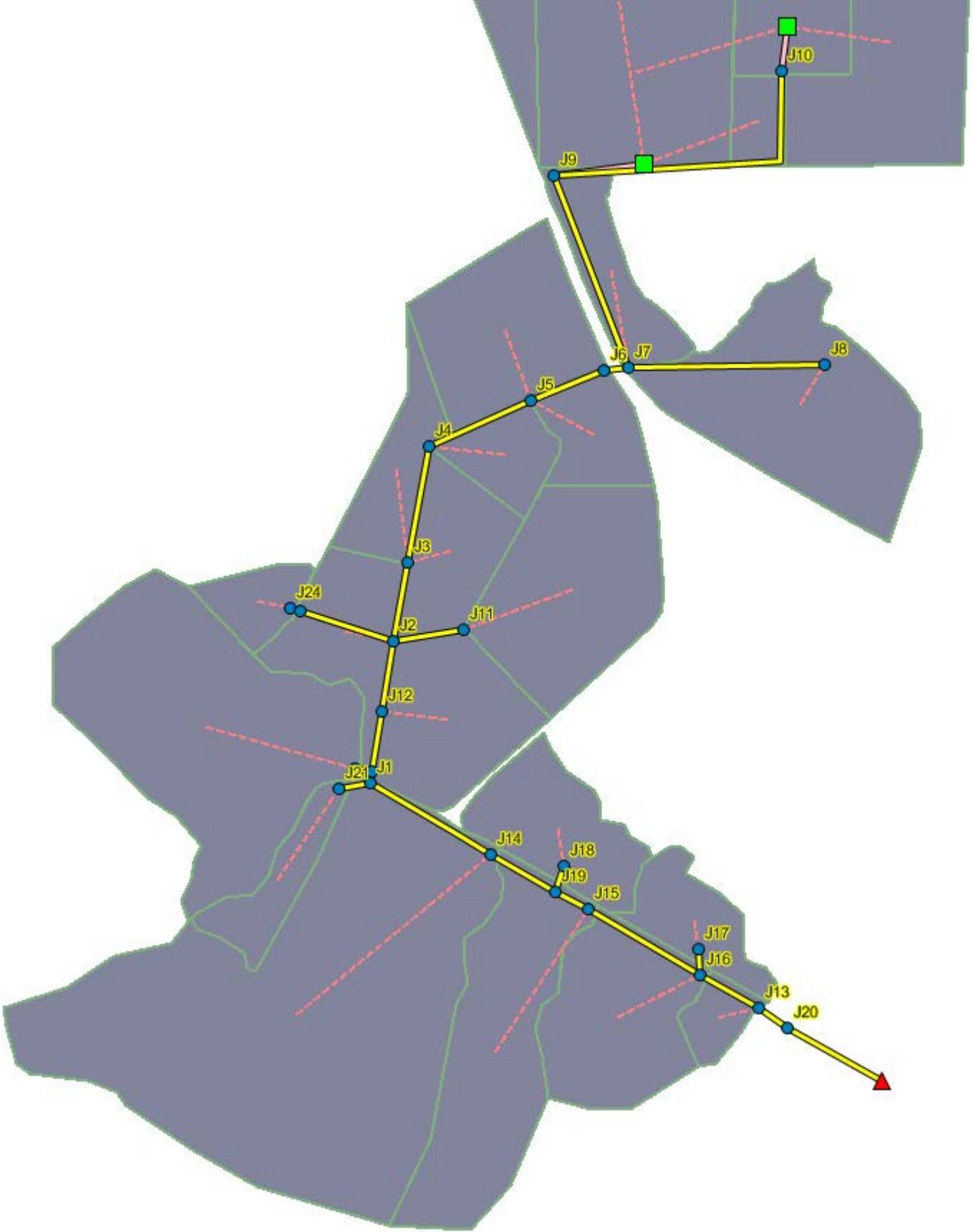
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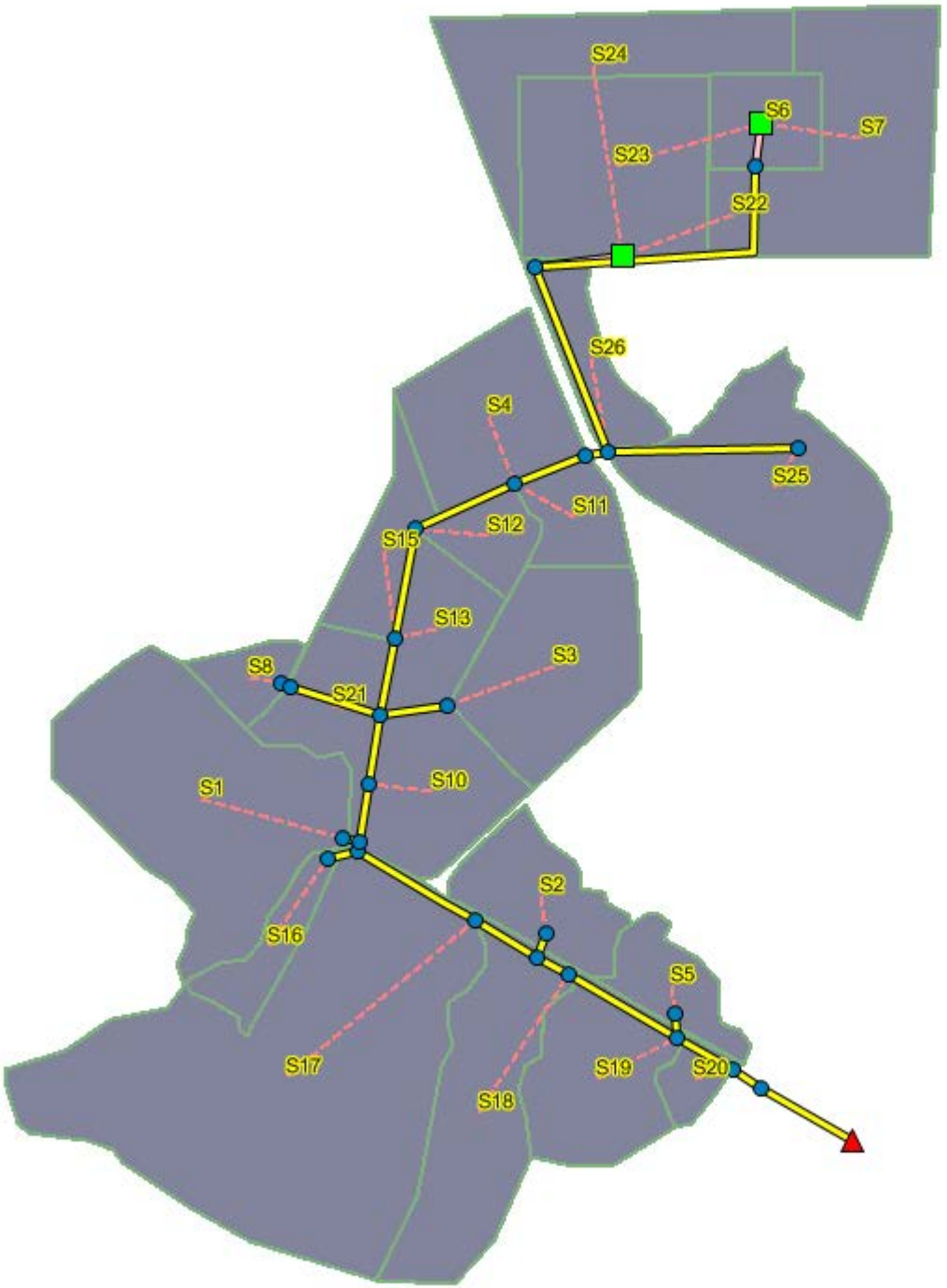
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