APPENDIX A
NRCS SOILS MAP

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Lake County, Indiana

Home2Suites - Munster, IN

June 28, 2020

Preface

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

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

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

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

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

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

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Contents

Soil Map

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

Map Scale: 1:704 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 30 60 120 180

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Lake County, Indiana
Survey Area Data: Version 22, Sep 16, 2019

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

Date(s) aerial images were photographed: Aug 28, 2019—Oct 9, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Mm	Maumee loamy fine sand, 0 to 1 percent slopes	1.3	100.0%
Totals for Area of Interest		**1.3**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

Lake County, Indiana

Mm—Maumee loamy fine sand, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2w5n0
Elevation: 630 to 740 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 230 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Maumee and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Maumee

Setting

Landform: Depressions on outwash plains, depressions on lake plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Sandy outwash

Typical profile

Ap - 0 to 10 inches: loamy fine sand
A - 10 to 17 inches: loamy fine sand
Bg - 17 to 28 inches: fine sand
Cg - 28 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: Wet Kankakee Drift Flats (R098XB034IN)
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Minor Components

Gilford

Percent of map unit: 3 percent
Landform: Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Morocco

Percent of map unit: 3 percent
Landform: Dune fields, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: Kankakee Acidic Interdunes (F098XB031IN)
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Gumz

Percent of map unit: 2 percent
Landform: Depressions on till plains
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Newton

Percent of map unit: 2 percent
Landform: Depressions on outwash plains
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

APPENDIX B
EXISTING CONDITIONS
CALCULATIONS

TOWN OF MUNSTER WORKSHEET FOR STORMWATER DETENTION FACILITY

Peak Discharge Rate prior to Redevelopment

(RATIONAL METHOD)

SITE:	**LAKE BUSINESS CENTER HOTEL SITE IMPROVEMENTS (Munster, IN)**		
PROJECT:	SIMBU 120610	DATE:	June 13, 2012
Prepared By:	Short Elliott Hendrickson, Inc. (SEH)	Prepared For:	Simborg Development, Inc.

TOTAL TRIBUTARY AREA (A) 5.93 Acres

Existing Conditions: Flat, Silty Sand and Clay soil grass areas and parking lots

EXISTING "**C**" COEFFICIENT = **0.609**

	AREA (Ac.)	COEFFICIENT	AREA * C
Impervious	2.100	0.90	0.319
Pervious	3.830	0.45	0.291
	5.930		0.609

EXISTING TIME OF CONCENTRATION (Tc)

Tc = [1.8*(1.1-C)*(D)^.5]/(S)^1/3

L = flow length (ft) = 1204

s = land slope (ft / ft) = 0.01

Tc = 319

Since computed Tc is greater than 30 minutes, use 30 minutes

EXISTING RELEASE RATE / UNDEVELOPED RUNOFF (Qu)

Rainfall Intensity (2-yr, 30 min. event)(in.) = **I** = 2.10

Qu = C*I*A = 7.59 cfs

DEVELOPED "C" COEFF. = **0.804**

	AREA (Ac.)	COEFFICIENT	AREA * C
Impervious	4.660	0.90	0.707
Pervious	1.270	0.45	0.096
	5.930		0.804

PROPOSED RELEASE RATE / DEVELOPED RUNOFF (Qd)

Rainfall Intensity (2-yr, 30 min. event)(in.) = **I** = 2.10

Qd = C*I*A = 10.008 * cfs

* Unrestricted

Munster Rainfall Data

STORM DURATION (MIN)	STORM DURATION (HR)	RAINFALL FREQUENCY (IN)	RAINFALL INTENSITY (IN/HR)
10	0.17	0.604	3.55
20	0.33	0.858	2.60
30	0.50	1.050	2.10
40	0.67	1.206	1.80
50	0.83	1.328	1.60
60	1.00	1.400	1.40
90	1.50	1.575	1.05
120	2.00	1.600	0.80
180	3.00	1.800	0.60

APPENDIX C
POST-DEVELOPED CALCULATIONS

TOWN OF MUNSTER WORKSHEET FOR STORMWATER DETENTION FACILITY

(RATIONAL METHOD)

SITE:	**LAKE BUSINESS CENTER HOTEL SITE IMPROVEMENTS (Munster, IN)**		
PROJECT:	SIMBU 120610	DATE:	June 12, 2012
Prepared By:	Short Elliott Hendrickson, Inc. (SEH)	Prepared For:	Simborg Development, Inc.

TOTAL TRIBUTARY AREA (A) 5.93 Acres

Existing Conditions: Flat, Silty Sand and Clay soil grass areas and parking lots

Please note that the impervious area was increased by only 2.56 Acres, therefore A= 2.56

EXISTING "**C**" COEFFICIENT = **0.450**

	AREA (Ac.)	COEFFICIENT	AREA * C
Impervious	0.000	0.90	0.000
Pervious	2.560	0.45	0.450
	2.560		0.450

EXISTING TIME OF CONCENTRATION (Tc)

Tc = [1.8*(1.1-C)*(D)^.5]/(S)^1/3

L = flow length (ft) = 1194

s = land slope (ft / ft) = 0.01

Tc = 188

Since computed Tc is greater than 30 minutes, use 30 minutes

EXISTING RELEASE RATE / UNDEVELOPED RUNOFF (Qu)

Rainfall Intensity (2-yr, 30 min. event)(in.) = **I** = 2.10

Qu = C*I*A = 2.419 cfs

DEVELOPED "C" COEFF. = **0.900**

	AREA (Ac.)	COEFFICIENT	AREA * C
Impervious	2.560	0.90	0.900
Pervious	0.000	0.45	0.000
	2.560		0.900

FINAL STORAGE VOLUME CALCULATIONS (100 YEAR)

DEVELOPED "C"	STORM DURATION (HR)	RAINFALL FREQUENCY (IN)	RAINFALL INTENSITY (IN/HR)	DRAINAGE AREA (Acres)	INFLOW RATE (CFS)	RELEASE RATE (CFS)	STORAGE RATE (CFS)	STORAGE REQUIRED (AC*FT)
0.900	0.08	0.850	10.63	2.56	24.480	2.419	22.061	0.1459
0.900	0.17	1.500	8.82	2.56	20.329	2.419	17.910	0.2516
0.900	0.25	1.920	7.68	2.56	17.695	2.419	15.276	0.3156
0.900	0.50	2.630	5.26	2.56	12.119	2.419	9.700	0.4008
0.900	1.00	3.350	3.35	2.56	7.718	2.419	5.299	0.4380
0.900	2.00	4.130	2.07	2.56	4.758	2.419	2.339	0.3865
0.900	3.00	4.560	1.52	2.56	3.502	2.419	1.083	0.2685
0.900	6.00	5.340	0.89	2.56	2.051	2.419	-0.369	-0.1828
0.900	12.00	6.190	0.52	2.56	1.188	2.419	-1.231	-1.2205
0.900	18.00	6.690	0.37	2.56	0.856	2.419	-1.563	-2.3249
0.900	24.00	7.120	0.30	2.56	0.684	2.419	-1.736	-3.4427

MAXIMUM STORAGE REQ. = 0.438 ACRE-FT

= 19,077.12 CF

Munster Rainfall Data

STORM DURATION (MIN)	STORM DURATION (HR)	RAINFALL FREQUENCY (IN)	RAINFALL INTENSITY (IN/HR)
10	0.17	0.604	3.55
20	0.33	0.858	2.60
30	0.50	1.050	2.10
40	0.67	1.206	1.80
50	0.83	1.328	1.60
60	1.00	1.400	1.40
90	1.50	1.575	1.05
120	2.00	1.600	0.80
180	3.00	1.800	0.60

RESTRICTOR ORIFICE WORKSHEET

SITE:	**LAKE BUSINESS CENTER HOTEL SITE IMPROVEMENTS (Munster, IN)**		
PROJECT:	SIMBU 120610	DATE:	June 12, 2012
Prepared By:	Short Elliott Hendrickson, Inc. (SEH)	Prepared For:	Simborg Development, Inc.

FLOWS ARE BASED ON THE FOLLOWING EQUATION:

$$Q = A\ C\ \sqrt{(2gH)}$$

Q =	Flow (cfs)
A =	Area of orifice (sq. ft.)
C =	Orifice coefficient
g =	Gravity = 32.2 ft / sec^2
H =	Head (ft.)

ORIFICE DATA:

Orifice diameter	6.80	in.	0.567	ft.
Orifice area (sq. ft.)	0.252	sq. ft.		
Proposed invert elevation	607.14			
Centerline of flow (elevation)	607.42			
Orifice coefficient	0.61			

NOTE: 3" orifice opening is minimum per Town of Munster Ordinance

RATING TABLE:

Water elevation (ft.)*	Head (ft.)	Q (cfs)	
610.20	2.78	2.057	
610.30	2.88	2.094	
610.40	2.98	2.130	
610.50	3.08	2.166	
610.60	3.18	2.200	
610.70	3.28	2.235	
610.80	3.38	2.269	
610.90	3.48	2.302	
611.00	3.58	2.335	
611.10	3.68	2.367	
611.20	3.78	2.399	<==== HWL
611.30	3.88	2.431	
611.40	3.98	2.462	

*Water elevation must be higher than centerline of flow

PRINSCO

ENGINEERED WITH INTEGRITY℠

LAKE BUSINESS CENTER

MUNSTER, IN

48" STORM WATER RETENTION SYSTEM

PRINSCO STORM WATER RETENTION/DETENTION SYSTEM SPECIFICATIONS

SCOPE
THIS SPECIFICATION DESCRIBES PRINSCO PIPE SYSTEMS FOR USE IN NON-PRESSURE, GRAVITY-FLOW RETENTION/DETENTION SYSTEMS.

PIPE
PRINSCO RETENTION/DETENTION SYSTEMS MAY BE CONSTRUCTED OUT OF THE VARIOUS PRODUCTS LISTED BELOW:

- GOLDFLO WT PIPE - MEETS OR EXCEEDS THE REQUIREMENTS OF AASHTO M294 AND ASTM F2306.
- ECOFLO 100 WT PIPE - MEETS OR EXCEEDS THE REQUIREMENTS OF AASHTO M294 AND ASTM F2306 WITH THE EXCEPTION THAT THE MATERIAL FORMULATION SHALL CONTAIN A MINIMUM OF 40% RECYCLED POLYETHYLENE.

BOTH PRODUCT LINES HAVE A SMOOTH INTERIOR AND ANNULAR EXTERIOR CORRUGATIONS. BOTH PRODUCTS CAN BE ORDERED PERFORATED OR NON-PERFORATED.

JOINTS
WT JOINTS SHALL MEET THE REQUIREMENTS OF ASTM D3212, WITH A BELL AND SPIGOT JOINT. JOINTS WILL UTILIZE A ELASTOMERIC GASKET MEETING THE REQUIREMENTS OF ASTM F477.

FITTINGS
FITTINGS WILL MEET THE REQUIREMENTS OF AASHTO M294 AND ASTM F2306.
CUSTOM FITTINGS ARE ALSO AVAILABLE.

INSTALLATION
RETENTION/DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF ASTM D2321 AND PRINSCO INSTALLATION GUIDELINES.

NOTES:

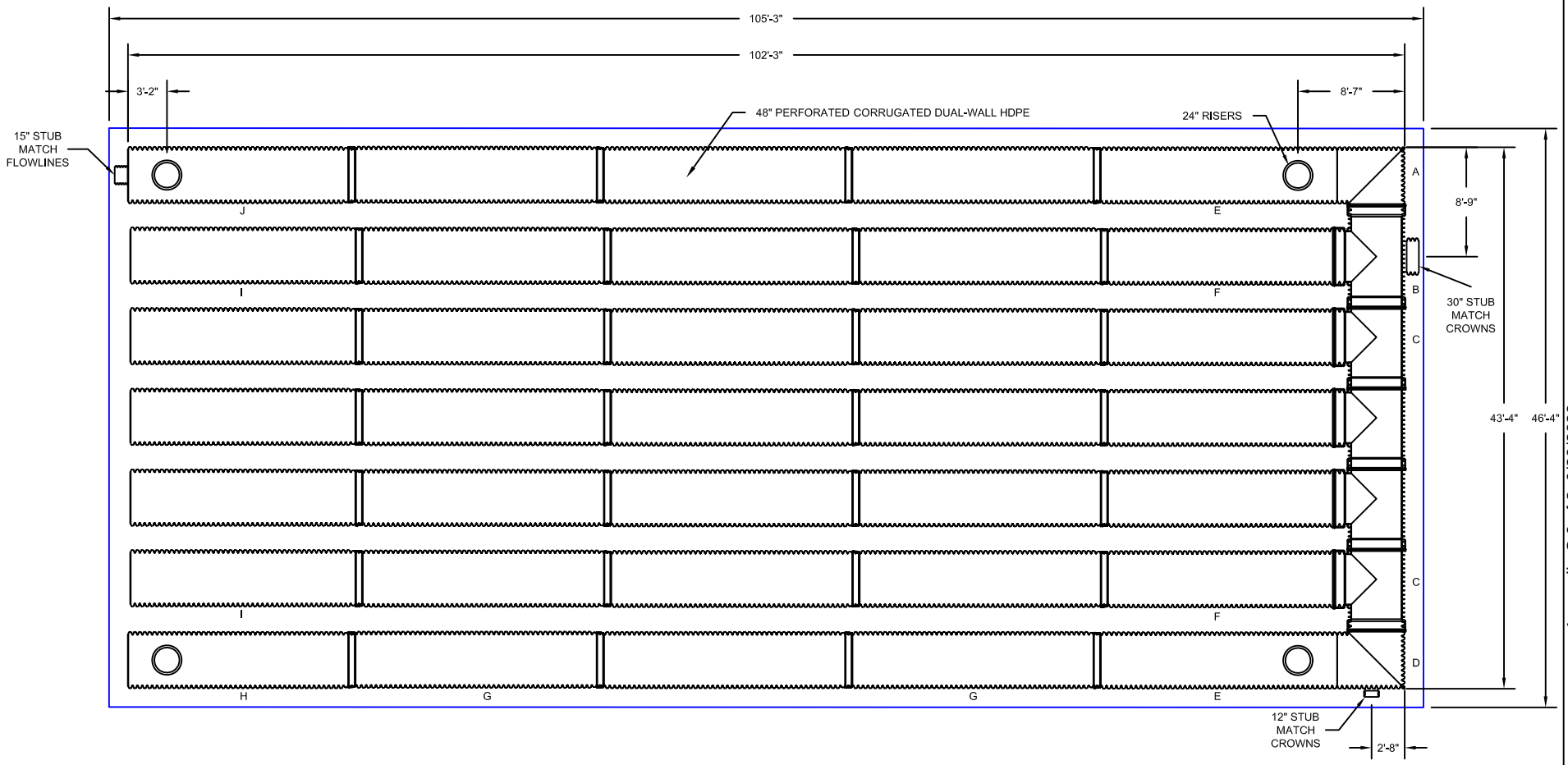
- SYSTEM INSTALLATION SHOULD BE STARTED AT THE OUTFALL.
- FOLLOW ASTM D2321 INSTALLATION GUIDELINES WITH CLASS I MATERIAL FOR RETENTION SYSTEMS AND CLASS I OR II MATERIAL FOR DETENTION SYSTEMS.
- MINIMUM COVER TO BASE OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT FOR H-25 LOADS SHALL BE 12" FOR 36" DIAMETER PIPE OR SMALLER, 15" FOR 42" DIAMETER PIPE AND 18" FOR 48" - 60" DIAMETER PIPE.
- ENGINEER/CONTRACTOR SHALL VERIFY SYSTEM LAYOUT INCLUDING ALL ELEVATIONS, BURIAL DEPTHS, DIMENSIONS, INLET/OUTLET STUB LOCATIONS AND RISER LOCATIONS.
- IT IS THE ENGINEERS/CONTRACTORS RESPONSIBILITY TO VERIFY THE APPLICATION SUITABILITY, PRINSCO SHALL NOT BE HELD LIABLE FOR IMPROPER INSTALLATION/APPLICATION OF THE SYSTEM.
- ALL PIPE AND FITTING DIMENSIONS ARE FOR REFERENCE ONLY AND ACTUAL DIMENSIONS MAY VARY SLIGHTLY.

PROJECT INFORMATION:

- PROJECT NUMBER: SS-12-12
- PRINSCO SALES CONTACT: Ty Thompson: 847-774-8453
- ENGINEER:
- CONTRACTOR:

THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (4) PAGES

CUSTOMER _____ DATE _____



BILL OF MATERIALS					
PART	DESCRIPTION	QTY.	PART	DESCRIPTION	QTY.
A	48" CORRUGATED DUAL-WALL HDPE 90° ELBOW	1	B	48" INTEGRITY TEE w/30" STUB	1
C	48" INTEGRITY TEE w/ONE BELL REMOVED	4	D	48" CORRUGATED DUAL-WALL HDPE 90° ELBOW w/12" STUB	1
E	48"x20' PERF. CORRUGATED DUAL-WALL HDPE w/SPIGOT REMOVED & 24" RISER	2	F	48"x20' PERF. CORRUGATED DUAL-WALL HDPE w/SPIGOT REMOVED	5
G	48"x20' PERF. CORRUGATED DUAL-WALL HDPE	21	H	48"x18'2" PERF. CORRUGATED DUAL-WALL HDPE w/SPIGOT, WELDED END PLATE & 24" RISER	1
I	48"x18'7" PERF. CORRUGATED DUAL-WALL HDPE w/SPIGOT & WELDED END PLATE	5	J	48"x18'2" PERF. CORRUGATED DUAL-WALL HDPE w/SPIGOT, WELDED END PLATE, 15" STUB & 24" RISER	1
K	48" SADDLE GASKET	7	L	48" INTEGRITY RIB GASKET	4
M	48" MARMAC COUPLER	2			

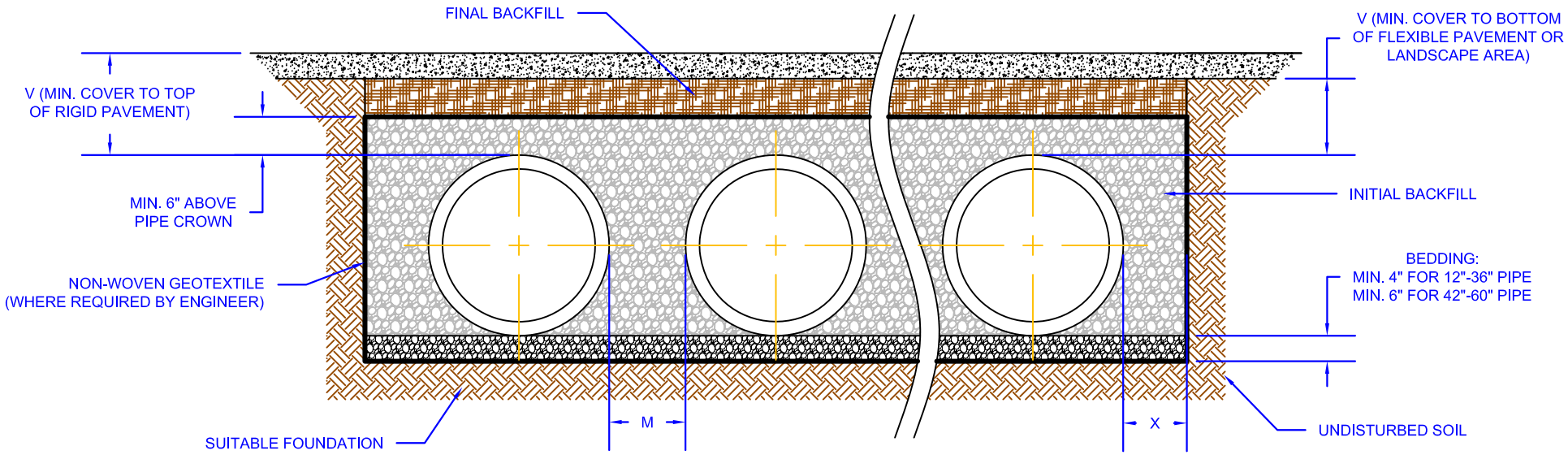
NOTES:
- All pipe and fittings meet the requirements of AASHTO M294standard specification for HDPE pipe.
- System should be started at outfall.
- Systems should be installed in accordance with the latest edition of ASTM D2321 and Prinsco Installation guidelines.
- Engineer/Contractor shall verify system layout including all elevations, burial depths, dimensions, inlet/outlet stub locations and riser locations.
- It is the Engineers/Contractors responsibility to verify the application suitability, Prinsco shall not be held liable for improper installation/application of the system.
- All pipe and fitting dimensions are for reference only and actual dimensions may vary slightly.
- Prinsco sales contact: TY THOMPSON: 847-774-8453

PRINSCO
ENGINEERED WITH INTEGRITY
1717 16TH ST. NE
WILLMAR, MN 56201
www.prinsco.com

DESCRIPTION: LAKE BUSINESS CENTER
MUNSTER, IN

SYSTEM VOLUME:	15,545 CF	DRAWN BY:	JAJ
SYSTEM FOOTPRINT:	4,878 SF	DATE:	11/05/2013
		SCALE:	NTS
		SHEET:	2 OF 4

DRAWING NUMBER: SS-12-12



NOTES:

1. DETENTION AND/OR RETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF ASTM D2321 AND THE MANUFACTURER'S INSTALLATION GUIDELINES.
2. A NON-WOVEN GEOTEXTILE FILTER FABRIC OR OTHER MEASURES SHOULD BE TAKEN TO PREVENT NATIVE SOIL FROM MIGRATING INTO THE INITIAL BACKFILL MATERIAL, WHEN REQUIRED.
3. **FOUNDATION:** TRENCH BOTTOMS WITH UNSTABLE OR UNYIELDING MATERIAL SHALL BE EXCAVATED TO A DEPTH DIRECTED BY THE ENGINEER AND REPLACED WITH SUITABLE MATERIAL. FOR UNSTABLE MATERIALS, GEOTEXTILE MAY BE USED TO STABILIZE THE TRENCH BOTTOM, IF DIRECTED BY THE ENGINEER.
4. **BEDDING:** SUITABLE MATERIAL SHALL BE CLASS I OR II, AS SPECIFIED BY ASTM D2321. MINIMUM BEDDING THICKNESS SHALL BE 4".
5. **INITIAL BACKFILL:** SUITABLE MATERIAL SHALL BE CLASS I OR II, AS SPECIFIED BY ASTM D2321. COMPACTION AND BACKFILL LIFTS SHALL BE IN ACCORDANCE WITH ASTM D2321. INITIAL BACKFILL SHALL EXTEND TO NOT LESS THAN 6" ABOVE THE TOP OF THE PIPE.
6. **MINIMUM COVER:** FOR UP TO H-25 TRAFFIC APPLICATIONS A MINIMUM OF 12" FOR PIPE DIAMETER UP TO 36" DIAMETER, 15" FOR 42" AND 18" FOR 48" AND 60" DIAMETER. MINIMUM COVER, V, SHALL BE MEASURED FROM THE TOP OF THE PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO THE TOP OF RIGID PAVEMENT. ADDITIONAL COVER MAY BE REQUIRED FOR CONSTRUCTION LOADS, FOR VEHICLES OVER 75T OR TO PREVENT FLOATATION.
7. **FINAL BACKFILL:** SUITABLE MATERIALS DIRECTED BY THE ENGINEER SHALL BE USED IN LANDSCAPE OR NON-TRAFFIC APPLICATIONS. FOR AREAS SUBJECTED TO TRAFFIC A HIGHER DEGREE OF COMPACTION IS REQUIRED AND A SEPARATION LAYER OF NON-WOVEN GEOTEXTILE MAY BE REQUIRED. COMPACTION LEVELS AND/OR GEOTEXTILE MAY BE SPECIFIED AT THE DISCRETION OF THE DESIGN ENGINEER.

NOMINAL I.D.	NOMINAL O.D.	MIN. SIDE WALL "X"	MIDWEST REGION SPACING "M"	WESTERN REGION SPACING "M"	MIN. COVER "V"
12"	14.4"	8"	12"		12"
15"	17.6"	8"	12"		12"
18"	21.5"	9"	14"		12"
24"	28.4"	10"	19"		12"
30"	34.8"	18"	20"	20.4"	12"
36"	41.0"	18"	18"	20.6"	12"
42"	47.8"	18"	22.4"	18.6"	15"
48"	54.0"	18"	22.1"	20.5"	18"
60"	66.5"	18"	26"		18"

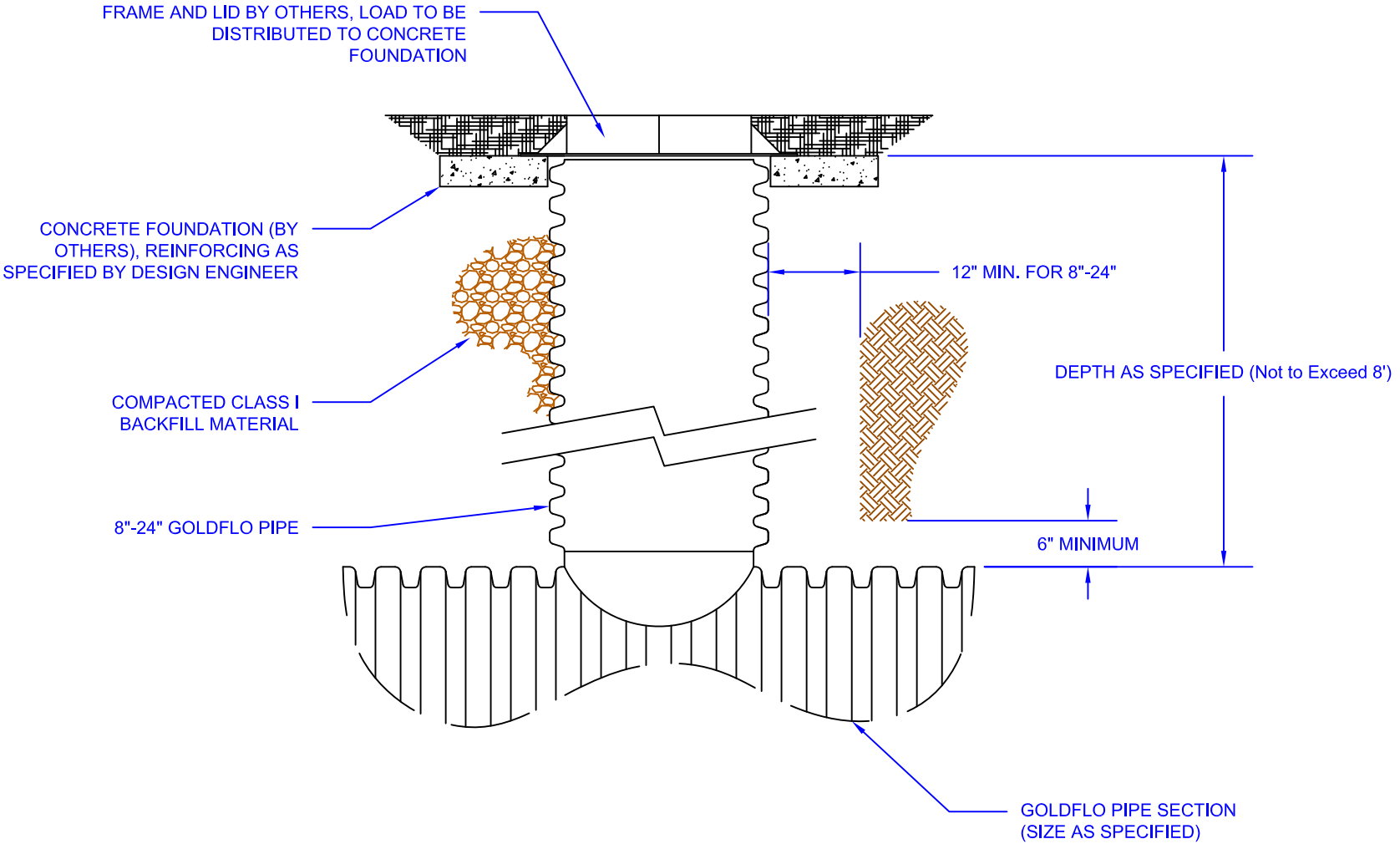
*MINIMUM SPACING "M" MEASURED FROM OUTSIDE DIAMETERS

PRINSCO
ENGINEERED WITH INTEGRITY
1717 16TH ST. NE
WILLMAR, MN 56201
www.prinsco.com

DETENTION SYSTEM CROSS SECTION

DRAWN BY:	JAE
DATE:	10/21/2010
SCALE:	NTS

DRAWING NUMBER: D-5-101



NOTE:
PLEASE REFERENCE PRINSCO INSTALLATION GUIDE FOR PROPER TRENCH AND BACKFILL INSTRUCTIONS.

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WILLMAR, MN 56201
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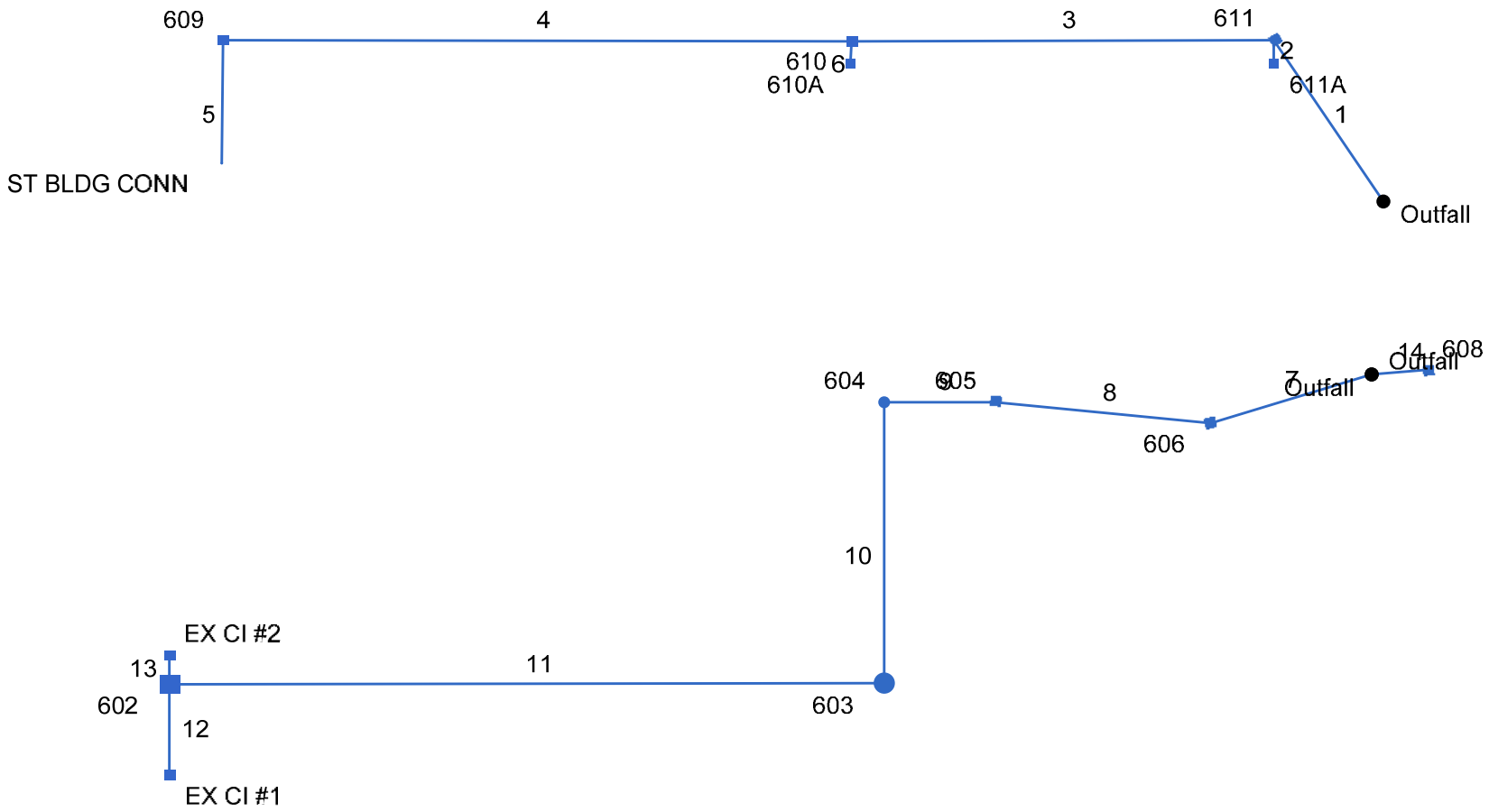
DESCRIPTION: ACCESS RISER INSTALLATION
DRAWN BY: JAE
DATE: 10/21/2010
SCALE: NTS
DRAWING NUMBER: D-1-104

APPENDIX D
PIPE SIZING CALCULATIONS

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: Proposed Storm Sewer - REV 6-25-20.stm	Number of lines: 14	Date: 6/26/2020

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	41.879	-124.136	Genr	0.01	0.00	0.00	0.0	610.70	0.31	610.83	12	Cir	0.012	1.93	614.69	56
2	1	4.988	-146.392	Genr	0.00	0.04	0.90	5.0	611.92	0.40	611.94	12	Cir	0.012	1.00	615.44	58
3	1	90.550	-55.964	Genr	0.01	0.00	0.00	0.0	610.87	0.30	611.14	12	Cir	0.012	1.50	614.68	55
4	3	134.801	0.115	Genr	0.00	0.05	0.55	5.0	611.19	0.53	611.90	12	Cir	0.012	1.50	615.36	54
5	4	26.496	-89.695	None	0.00	0.41	0.90	5.0	611.86	6.94	613.70	12	Cir	0.012	1.00	614.81	53
6	3	4.844	-88.276	Genr	0.00	0.04	0.90	5.0	611.74	0.41	611.76	12	Cir	0.012	1.00	615.26	57
7	End	36.192	162.909	Genr	0.00	0.17	0.87	5.0	610.23	0.30	610.34	12	Cir	0.012	0.66	615.00	65
8	7	46.434	22.681	Genr	0.00	0.04	0.72	5.0	610.38	0.30	610.52	12	Cir	0.012	0.50	615.25	64
9	8	23.661	-5.589	Genr	0.00	0.11	0.78	5.0	610.57	0.30	610.64	12	Cir	0.012	1.50	615.25	63
10	9	60.610	-89.894	Genr	0.01	0.00	0.00	0.0	610.69	0.30	610.87	12	Cir	0.012	1.50	615.31	62
11	10	153.199	89.885	Genr	0.01	0.00	0.00	0.0	610.91	0.30	611.37	12	Cir	0.012	2.25	614.64	61
12	11	19.694	-90.195	Genr	0.01	0.00	0.00	0.0	611.81	0.30	611.87	12	Cir	0.012	1.00	614.42	59
13	11	6.154	90.023	Genr	0.00	0.18	0.62	5.0	611.37	0.33	611.39	12	Cir	0.012	1.00	614.44	60
14	End	11.985	-3.802	Genr	0.00	0.16	0.83	5.0	611.08	1.25	611.23	12	Cir	0.012	1.00	615.25	66

Project File: Proposed Storm Sewer - REV 6-25-20.stm | Number of lines: 14 | Date: 6/26/2020

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	611	Generic	614.69	Rect	2.00	2.00	12	Cir	610.83	12 12	Cir Cir	611.92 610.87
2	611A	Generic	615.44	Rect	2.00	2.00	12	Cir	611.94			
3	610	Generic	614.68	Rect	2.00	2.00	12	Cir	611.14	12 12	Cir Cir	611.19 611.74
4	609	Generic	615.36	Rect	2.00	2.00	12	Cir	611.90	12	Cir	611.86
5	ST BLDG CONN	None	614.81	n/a	n/a	n/a	12	Cir	613.70			
6	610A	Generic	615.26	Rect	2.00	2.00	12	Cir	611.76			
7	606	Generic	615.00	Rect	2.00	2.00	12	Cir	610.34	12	Cir	610.38
8	605	Generic	615.25	Rect	2.00	2.00	12	Cir	610.52	12	Cir	610.57
9	604	Generic	615.25	Cir	2.00	2.00	12	Cir	610.64	12	Cir	610.69
10	603	Generic	615.31	Cir	4.00	4.00	12	Cir	610.87	12	Cir	610.91
11	602	Generic	614.64	Rect	4.00	4.00	12	Cir	611.37	12 12	Cir Cir	611.81 611.37
12	EX CI #1	Generic	614.42	Rect	2.00	2.00	12	Cir	611.87			
13	EX CI #2	Generic	614.44	Rect	2.00	2.00	12	Cir	611.39			
14	608	Generic	615.25	Rect	2.00	2.00	12	Cir	611.23			

Project File: Proposed Storm Sewer - REV 6-25-20.stm | Number of Structures: 14 | Run Date: 6/26/2020

Summary

Line No.	Inlet ID	Total Area (ac)	Runoff Coeff (C)	Tc (min)	Q Capt (cfs)	Line Size (in)	Capac Full (cfs)	Flow Rate (cfs)	Vel Ave (ft/s)	HGL Jnct (ft)
1	611	0.54	0.00	6.1	0.01	12	2.15	3.13	4.44	612.36
2	611A	0.04	0.90	5.0	0.25	12	2.44	0.25	0.78	612.37
3	610	0.50	0.00	5.7	0.01	12	2.11	2.94	3.75	613.22
4	609	0.46	0.55	5.1	0.19	12	2.80	2.78	3.55	614.21
5	ST BLDG CONN	0.41	0.90	5.0	....	12	10.17	2.61	3.91	614.39
6	610A	0.04	0.90	5.0	0.25	12	2.48	0.25	0.32	613.22
7	606	0.50	0.87	7.7	1.05	12	2.13	2.33	3.81	611.29
8	605	0.33	0.72	7.3	0.20	12	2.12	1.45	2.01	611.37
9	604	0.29	0.78	7.1	0.61	12	2.10	1.28	1.95	611.49
10	603	0.18	0.00	6.3	0.01	12	2.10	0.76	1.29	611.56
11	602	0.18	0.00	5.1	0.01	12	2.11	0.81	2.03	612.02
12	EX CI #1	0.00	0.00	0.0	0.01	12	2.13	0.01	0.11	612.02
13	EX CI #2	0.18	0.62	5.0	0.79	12	2.20	0.79	1.48	612.06
14	608	0.16	0.83	5.0	0.94	12	4.32	0.94	3.14	611.64

Project File: Proposed Storm Sewer - REV 6-25-20.stm | Number of lines: 14 | Date: 6/26/2020

NOTES: ** Critical depth

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	56	User																		0.00
2	58	User																		5.00
3	55	User																		0.00
4	54	User																		5.00
5	53	User																		5.00
6	57	User																		5.00
7	65	User																		5.00
8	64	User																		5.00
9	63	User																		5.00
10	62	User																		0.00
11	61	User																		0.00
12	59	User																		0.00
13	60	User																		5.00
14	66	User																		5.00

Project File: Proposed Storm Sewer - REV 6-25-20.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 14 | Date: 6/26/2020

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	12	3.13	610.70	611.46	0.76	0.64	4.90	0.37	611.83	0.774	41.879	610.83	611.88	1.00	0.79	3.99	0.25	612.13	0.658	0.716	0.300	1.93	0.48
2	12	0.25	611.92	612.36	0.44	0.33	0.76	0.01	612.37	0.027	4.988	611.94	612.36	0.42	0.32	0.81	0.01	612.37	0.031	0.029	0.001	1.00	0.01
3	12	2.94	610.87	612.36	1.00	0.79	3.75	0.22	612.58	0.582	90.550	611.14	612.89	1.00	0.79	3.75	0.22	613.11	0.582	0.582	0.527	1.50	0.33
4	12	2.78	611.19	613.22	1.00	0.79	3.55	0.20	613.41	0.521	134.801	611.90	613.92	1.00	0.79	3.54	0.20	614.11	0.521	0.521	0.702	1.50	0.29
5	12	2.61	611.86	614.21	1.00	0.58	3.32	0.17	614.38	0.457	26.496	613.70	614.39 j	0.69**	0.58	4.50	0.32	614.71	0.673	0.565	n/a	1.00	0.32
6	12	0.25	611.74	613.22	1.00	0.79	0.32	0.00	613.22	0.004	4.844	611.76	613.22	1.00	0.79	0.32	0.00	613.22	0.004	0.004	0.000	1.00	0.00
7	12	2.33	610.23	610.88	0.65*	0.54	4.29	0.29	611.17	0.630	36.192	610.34	611.18	0.84	0.70	3.32	0.17	611.35	0.353	0.491	0.178	0.66	0.11
8	12	1.45	610.38	611.29	0.91	0.75	1.93	0.06	611.35	0.123	46.434	610.52	611.34	0.82	0.69	2.10	0.07	611.41	0.141	0.132	0.061	0.50	0.03
9	12	1.28	610.57	611.37	0.80	0.68	1.89	0.06	611.43	0.114	23.661	610.64	611.39	0.75	0.64	2.01	0.06	611.46	0.130	0.122	0.029	1.50	0.09
10	12	0.76	610.69	611.49	0.80	0.67	1.14	0.02	611.51	0.041	60.610	610.87	611.51	0.64	0.53	1.44	0.03	611.54	0.071	0.056	0.034	1.50	0.05
11	12	0.81	610.91	611.56	0.65	0.54	1.49	0.03	611.59	0.076	153.199	611.37	611.79	0.42	0.31	2.56	0.10	611.89	0.318	0.197	0.302	2.25	0.23
12	12	0.01	611.81	612.02	0.21	0.12	0.08	0.00	612.02	0.001	19.694	611.87	612.02	0.15	0.08	0.13	0.00	612.02	0.003	0.002	0.000	1.00	0.00
13	12	0.79	611.37	612.02	0.65	0.54	1.46	0.03	612.05	0.073	6.154	611.39	612.02	0.63	0.52	1.51	0.04	612.06	0.079	0.076	0.005	1.00	0.04
14	12	0.94	611.08	611.49	0.41*	0.30	3.14	0.15	611.64	0.000	11.985	611.23	611.64	0.41**	0.30	3.14	0.15	611.79	0.000	0.000	n/a	1.00	n/a

Project File: Proposed Storm Sewer - REV 6-25-20.stm | Number of lines: 14 | Run Date: 6/26/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hotel
storm CAD
output
trials
#120610

Lake Business Center - Hotel Storm Sewer Output

10 Year Storm Event

Label	Start Node	Elevation RIM/Ground (Start) (ft)	Invert (Upstream) (ft)	Stop Node	Elevation RIM/Ground (Stop) (ft)	Invert (Downstream) (ft)	Conduit Shape	Section Size	Diameter (in)	Manning's n	System CA (acres)	System Intensity (in/hr)	Flow (ft³/s)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (ft³/s)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Cover (Start) (ft)	Cover (Stop) (ft)	Velocity (Average) (ft/s)	Design Conduit?
P-1	IN-1	615.30	612.80	CB-2	615.00	612.20	Circular Pipe	HDPE- 12"	12	0.01	0.13	6.00	0.79	38	0.016	5.82	613.17	612.67	1.50	1.80	5.17	TRUE
P-2	CB-2	615.00	612.20	CB-3	615.00	612.10	Circular Pipe	HDPE- 12"	12	0.01	0.19	5.99	1.15	30	0.003	2.67	612.67	612.65	1.80	1.90	3.28	TRUE
P-3	CB-3	615.00	612.10	CB-4	614.90	611.70	Circular Pipe	HDPE- 12"	12	0.01	0.25	5.97	1.51	132	0.003	2.55	612.65	612.47	1.90	2.20	3.38	TRUE
P-4	CB-4	614.90	611.70	CB-5	614.90	611.43	Circular Pipe	HDPE- 15"	15	0.01	0.54	5.91	3.22	90	0.003	4.60	612.47	612.27	1.95	2.22	4.05	TRUE
P-5	CB-5	614.90	611.43	CB-6	614.90	611.05	Circular Pipe	HDPE- 15"	15	0.01	0.72	5.86	4.25	64	0.006	6.47	612.27	612.27	2.22	2.60	5.63	TRUE
P-6	CB-6	614.90	611.05	MH-9	615.20	610.86	Circular Pipe	HDPE- 18"	18	0.01	0.92	5.83	5.41	90	0.002	6.27	612.27	612.16	2.35	2.84	3.99	TRUE
P-7	CB-8	614.75	611.75	MH-9	615.20	611.20	Circular Pipe	HDPE- 12"	12	0.01	0.79	6.00	4.77	26	0.021	6.74	612.65	612.16	2.00	3.00	9.30	TRUE
P-8	IN-7	614.75	612.25	CB-8	614.75	611.75	Circular Pipe	HDPE- 12"	12	0.01	0.51	6.00	3.08	24	0.021	6.68	613.00	612.65	1.50	2.00	8.34	TRUE
P-9	MH-9	615.20	610.86	CB-10	614.90	610.73	Circular Pipe	HDPE- 24"	24	0.01	1.71	5.79	9.97	64	0.002	13.25	612.16	612.03	2.34	2.17	4.63	TRUE
P-10	CB-10	614.90	610.73	MH-13	616.25	610.16	Circular Pipe	HDPE- 24"	24	0.01	2.24	5.76	13.00	144	0.004	18.50	612.03	611.56	2.17	4.09	6.38	TRUE
P-11	CB-12	614.75	611.75	MH-13	616.25	610.89	Circular Pipe	HDPE- 12"	12	0.01	0.40	5.99	2.42	60	0.014	5.54	612.42	611.56	2.00	4.36	6.82	TRUE
P-12	IN-11	614.75	612.25	CB-12	614.75	611.75	Circular Pipe	HDPE- 12"	12	0.01	0.08	6.00	0.48	24	0.021	6.68	612.54	612.42	1.50	2.00	4.95	TRUE
P-13	MH-13	616.25	610.16	CB-14	614.90	609.68	Circular Pipe	HDPE- 24"	24	0.01	2.64	5.71	15.18	118	0.004	18.76	611.56	611.22	4.09	3.22	6.65	TRUE
P-14	CB-14	614.90	609.68	CB-18	614.80	608.65	Circular Pipe	HDPE- 24"	24	0.01	3.19	5.66	18.21	158	0.007	23.74	611.22	610.32	3.22	4.15	8.33	TRUE
P-15	IN-19	614.90	612.40	CB-18	614.80	610.74	Circular Pipe	HDPE- 12"	12	0.01	0.26	6.00	1.57	82	0.020	6.59	612.93	611.07	1.50	3.06	6.89	TRUE
P-16	CB-16	614.65	611.65	CB-18	614.80	610.74	Circular Pipe	HDPE- 12"	12	0.01	0.30	5.99	1.81	68	0.013	5.36	612.22	611.14	2.00	3.06	6.16	TRUE
P-17	IN-15	614.65	612.15	CB-16	614.65	611.65	Circular Pipe	HDPE- 12"	12	0.01	0.12	6.00	0.73	24	0.021	6.68	612.51	612.22	1.50	2.00	5.58	TRUE
P-18	CB-18	614.80	608.65	CB-22	614.80	607.85	Circular Pipe	HDPE- 27"	27	0.01	4.04	5.62	22.87	160	0.005	28.47	610.32	609.60	3.90	4.70	7.96	TRUE
P-22	CB-21	614.60	611.60	CB-22	614.80	610.81	Circular Pipe	HDPE- 12"	12	0.01	0.26	5.99	1.57	48	0.016	5.94	612.13	611.17	2.00	2.99	6.39	TRUE
P-23	IN-20	614.60	612.10	CB-21	614.60	611.60	Circular Pipe	HDPE- 12"	12	0.01	0.11	6.00	0.67	24	0.021	6.68	612.44	612.13	1.50	2.00	5.44	TRUE
P-19	CB-22	614.80	607.85	CB-23	614.80	607.49	Circular Pipe	HDPE- 27"	27	0.01	4.49	5.56	25.14	60	0.006	31.18	609.60	609.28	4.70	5.06	8.73	TRUE
P-20	CB-23	614.80	607.49	OF-1	614.69	607.42	Circular Pipe	HDPE- 27"	27	0.01	4.71	5.54	26.28	10	0.007	33.68	609.28	609.09	5.06	5.02	9.37	TRUE
P-28	IN-28	614.65	612.15	CB-27	614.65	611.65	Circular Pipe	HDPE- 12"	12	0.01	0.09	6.00	0.54	24	0.021	6.68	612.46	612.20	1.50	2.00	5.12	TRUE
P-27	CB-27	614.65	611.65	CB-26	614.80	611.41	Circular Pipe	HDPE- 12"	12	0.01	0.20	5.99	1.21	40	0.006	3.59	612.20	612.22	2.00	2.39	4.12	TRUE
P-25	CB-26	614.80	611.41	CB-25	614.80	610.18	Circular Pipe	HDPE- 12"	12	0.01	0.60	5.98	3.61	112	0.011	4.85	612.22	611.06	2.39	3.62	6.77	TRUE
P-24	CB-25	614.80	610.18	CB-24	614.80	609.82	Circular Pipe	HDPE- 15"	15	0.01	0.78	5.95	4.68	60	0.006	6.50	611.06	610.78	3.37	3.73	5.77	TRUE
P-21	CB-24	614.80	609.82	OF-2	614.68	609.79	Circular Pipe	HDPE- 18"	18	0.01	0.96	5.93	5.74	10	0.003	7.48	610.78	610.71	3.48	3.39	4.67	TRUE
P-26	CB-lm.	614.80	611.77	CB-26	614.80	611.41	Circular Pipe	HDPE- 12"	12	0.01	0.20	6.00	1.21	60	0.006	3.59	612.23	612.22	2.03	2.39	4.12	TRUE

P21 TO OF2
el. 609.79 SLOPE = .008 FLOW = 5.74 / 7.27
el 609.80 SLOPE = .005 FLOW = 5.74 / 5.94 - close
el 609.81 SLOPE = .003 FLOW = 5.74 / 4.20 - over

18 - 0.20% 4.70

21 - 0.20%, 11.99 7.08

27 - 0.15% 10.11

24 - 0.20%, 15.88

30 - 0.15%

Label	Start Node	RIM Elevation Ground (Start) (ft)	Invert (Upstream) (ft)	Stop Node	RIM Elevation Ground (Stop) (ft)	Invert (Downstream) (ft)	Conduit Type	Conduit Shape	Material	Manning's n	Section Size	Diameter (in)	Rise (in)	Span (in)	Upstream CA (acres)	System CA (acres)	System Intensity (in/hr)	Flow (ft³/s)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (ft³/s)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
P-1	IN-1	615.3	612.80 ~~612.3~~	CB-2	615	612.20 ~~612~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.13	0.13	6	0.79	38	1.58% ~~0.008~~	4.12	615.3	615
P-2	CB-2	615	612.20 ~~612~~	CB-3	615	612.10 ~~611.82~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.19	0.19	5.937	1.14	30	0.3% ~~0.006~~	3.59	615	615
P-3	CB-3	615	612.10 ~~611.82~~	CB-4	614.9	611.70 ~~611.16~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.25	0.25	5.902	1.49	132	0.3% ~~0.005~~	3.27	615	614.9
P-4	CB-4	614.9	611.70 ~~611.16~~	CB-5	614.9	611.54 ~~610.62~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	15 ~~12~~	(N/A)	(N/A)	0.54	0.54	5.75	3.13	90	0.25 ~~0.006~~	3.59	614.9	614.9
P-5	CB-5	614.9	611.54 ~~610.62~~	CB-6	614.9	611.16 ~~610.3~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 15"	15	(N/A)	(N/A)	0.72	0.72	5.698	4.14	64	0.45% ~~0.005~~	5.94	614.9	614.9
P-6	CB-6	614.9	611.16 ~~610.3~~	MH-9	615.2	611.0 ~~609.76~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 15"	18 ~~15~~	(N/A)	(N/A)	0.92	0.92	5.653	5.24	90	0.2% ~~0.006~~	6.5	614.9	615.2
P-7	MH-9	615.2	611.14 20	CB-8	614.75	611.75 ~~611.25~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	18 ~~12~~	(N/A)	(N/A)	0.79	0.79	5.99	4.77	26	0.2% ~~0.004~~	-3.01	615.2	614.75
P-8	CB-8	614.75	611.25 75	IN-7	614.75	612.25 ~~611.75~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.51	0.51	6	3.08	24	~~-0.021~~	-6.68	614.75	614.75
P-9	MH-9	615.2	611.0 ~~609.76~~	CB-10	614.9	610.870 ~~609.37~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 18"	18	(N/A)	(N/A)	1.71	1.71	5.597	9.65	64	~~0.006~~	10.66	615.2	614.9
P-10	CB-10	614.9	610.87 ~~609.37~~	MH-13	616.25	610.36 ~~608.5~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 18"	24 ~~18~~	(N/A)	(N/A)	2.24	2.24	5.562	12.56	144	0.35% ~~0.006~~	10.61	614.9	616.25
P-11	MH-13	616.25	610.89	CB-12	614.75	611.75 ~~611.25~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.4	0.4	5.992	2.42	60	-0.006	-3.59	616.25	614.75
P-12	CB-12	614.75	75 ~~611.25~~	IN-11	614.75	612.25 ~~611.75~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.08	0.08	6	0.48	24	-0.021	-6.68	614.75	614.75
P-13	MH-13	616.25	610.36 ~~608.5~~	CB-14	614.9	609.83 ~~607.79~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 21"	24 ~~21~~	(N/A)	(N/A)	2.64	2.64	5.505	14.65	118	0.45% ~~0.006~~	15.98	616.25	614.9
P-14	CB-14	614.9	609.83 ~~607.79~~	CB-18	614.8	608.80 ~~606.84~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 21"	24 ~~21~~	(N/A)	(N/A)	3.19	3.19	5.453	17.53	158	0.65% ~~0.006~~	15.97	614.9	614.8
P-15	CB-18	614.8	610.74	IN-19	614.9	612.4 ~~611.9~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.26	0.26	6	1.57	82	-0.014	-5.51	614.8	614.9
P-16	CB-18	614.8	610.74	CB-16	614.65	611.65 ~~611.15~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.3	0.3	5.993	1.81	68	-0.006	-3.6	614.8	614.65
P-17	CB-16	614.65	611.65 ~~611.15~~	IN-15	614.65	612.15 ~~611.65~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.12	0.12	6	0.73	24	-0.021	-6.68	614.65	614.65
P-18	CB-18	614.8	608.80 ~~606.84~~	CB-22	614.8	607.92 ~~605.88~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 24"	27 ~~24~~	(N/A)	(N/A)	4.04	4.04	5.388	21.94	160	0.55% ~~0.006~~	22.78	614.8	614.8
P-22	CB-22	614.8	610.81	CB-21	614.6	611.6 ~~611.1~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.26	0.26	5.993	1.57	48	-0.006	-3.6	614.8	614.6
P-23	CB-21	614.6	611.6 ~~611.1~~	IN-20	614.6	612.1 ~~611.6~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.11	0.11	6	0.67	24	-0.021	-6.68	614.6	614.6
P-19	CB-22	614.8	607.92 ~~605.88~~	CB-23	614.8	607.53 ~~605.52~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 18"	27 ~~18~~	(N/A)	(N/A)	4.49	4.49	5.325	24.1	60	0.65% ~~0.006~~	10.58	614.8	614.8
P-20	CB-23	614.8	607.53 ~~605.52~~	OF-1	614.69	607.46 ~~605.46~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 18"	27 ~~18~~	(N/A)	(N/A)	4.71	4.71	5.313	25.22	10	0.70% ~~0.006~~	10.58	614.8	614.69
P-28	IN-28	614.65	612.15	CB-27	614.65	611.65	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.09	0.09	6	0.54	24	0.021	6.68	614.65	614.65
P-27	CB-27	614.65	611.65	CB-26	614.8	611.41	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.2	0.2	5.992	1.21	40.5 ~~40~~	0.006	3.57	614.65	614.8
P-25	CB-26	614.8	611.41	CB-25	614.8	610.18 ~~610.74~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 15"	12 ~~15~~	(N/A)	(N/A)	0.6	0.6	5.976	3.61	112.5 ~~112~~	1.1% ~~0.006~~	6.48	614.8	614.8
P-24	CB-25	614.8	610.18 ~~610.74~~	CB-24	614.8	609.82 ~~610.38~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 18"	15 ~~18~~	(N/A)	(N/A)	0.78	0.78	5.941	4.67	60	0.006	10.58	614.8	614.8
P-21	CB-24	614.8	609.82 ~~610.38~~	OF-2	614.68	609.79 ~~610.32~~	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 18"	~~18~~ 18	(N/A)	(N/A)	0.96	0.96	5.924	5.73	10	0.35% ~~0.006~~	10.58	614.8	614.68
P-26	CB-lm	614.8	611.77	CB-26	614.8	611.41	Catalog Conduit	Circular Pipe	PVC	0.01	HDPE- 12"	12	(N/A)	(N/A)	0.2	0.2	6	1.21	60	0.006	3.59	614.8	614.8

Tc

	Label	Start Node	Elevation RIM/Ground (Start) (ft)	Invert (Upstream) (ft)	Stop Node	Elevation RIM/Ground (Stop) (ft)	Invert (Downstream) (ft)	Conduit Shape	Section Size	Diameter (in)	Manning's n	Upstream CA (acres)	System Intensity (in/hr)	Flow (ft³/s)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (ft³/s)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Cover (Start) (ft)	Cover (Stop) (ft)	Velocity (Average) (ft/s)	Design Conduit?
1	P-1	IN-1	615.30	612.80	CB-2	615.00	612.2	Circular Pipe	HDPE- 12"	12	0.01	0.13	6.00	0.79	38	0.016	5.82	613.17	613.13	1.50	1.80	5.17	TRUE
2	P-2	CB-2	615.00	612.20	CB-3	615.00	612.1	Circular Pipe	HDPE- 12"	12	0.01	0.19	5.99	1.15	30	0.003	2.67	613.13	613.12	1.80	1.90	3.28	TRUE
3	P-3	CB-3	615.00	612.10	CB-4	614.90	611.7	Circular Pipe	HDPE- 12"	12	0.01	0.25	5.97	1.51	132	0.003	2.55	613.12	612.98	1.90	2.20	1.92	TRUE
5	P-4	CB-4	614.90	611.70	CB-5	614.90	611.54	Circular Pipe	HDPE- 15"	15	0.01	0.54	5.84	3.18	90	0.002	3.54	612.98	612.85	1.95	2.11	2.59	TRUE
6	P-5	CB-5	614.90	611.54	CB-6	614.90	611.16	Circular Pipe	HDPE- 15"	15	0.01	0.72	5.77	4.19	64	0.006	6.47	612.85	612.69	2.11	2.49	3.41	TRUE
7	P-6	CB-6	614.90	611.16	MH-9	615.20	611	Circular Pipe	HDPE- 18"	18	0.01	0.92	5.73	5.31	90	0.002	5.76	612.69	612.55	2.24	2.70	3.00	TRUE
	P-7	CB-8	614.75	611.75	MH-9	615.20	611.2	Circular Pipe	HDPE- 18"	12 18	0.01	0.79	6.00	4.77	26	0.021	19.86	612.59	612.55	1.50	2.50	9.24	TRUE
	P-8	IN-7	614.75	612.25	CB-8	614.75	611.75	Circular Pipe	HDPE- 12"	12	0.01	0.51	6.00	3.08	24	0.021	6.68	613.00	612.59	1.50	2.00	8.34	TRUE
8	P-9	MH-9	615.20	611.00	CB-10	614.90	610.87	Circular Pipe	HDPE- 18"	24 18	0.01	1.71	5.66	9.75	64	0.002	6.15	612.55	612.15	2.70	2.53	5.52	TRUE
9	P-10	CB-10	614.90	610.87	MH-13	616.25	610.36	Circular Pipe	HDPE- 24"	24	0.01	2.24	5.63	12.71	144	0.004	17.50	612.15	611.75	2.03	3.89	6.07	TRUE
	P-11	CB-12	614.75	611.75	MH-13	616.25	610.89	Circular Pipe	HDPE- 12"	12	0.01	0.40	5.99	2.42	60	0.014	5.54	612.42	611.75	2.00	4.36	6.82	TRUE
	P-12	IN-11	614.75	612.25	CB-12	614.75	611.75	Circular Pipe	HDPE- 12"	12	0.01	0.08	6.00	0.48	24	0.021	6.68	612.54	612.42	1.50	2.00	4.95	TRUE
10	P-13	MH-13	616.25	610.36	CB-14	614.90	609.83	Circular Pipe	HDPE- 24"	24	0.01	2.64	5.56	14.79	118	0.004	19.71	611.75	611.35	3.89	3.07	6.89	TRUE
11	P-14	CB-14	614.90	609.83	CB-18	614.80	608.8	Circular Pipe	HDPE- 24"	24	0.01	3.19	5.51	17.72	158	0.007	23.74	611.35	610.45	3.07	4.00	8.29	TRUE
	P-15	IN-19	614.90	612.40	CB-18	614.80	610.74	Circular Pipe	HDPE- 12"	12	0.01	0.26	6.00	1.57	82	0.020	6.59	612.93	611.07	1.50	3.06	6.89	TRUE
	P-16	CB-16	614.65	611.65	CB-18	614.80	610.74	Circular Pipe	HDPE- 12"	12	0.01	0.30	5.99	1.81	68	0.013	5.36	612.22	611.14	2.00	3.06	6.16	TRUE
	P-17	IN-15	614.65	612.15	CB-16	614.65	611.65	Circular Pipe	HDPE- 12"	12	0.01	0.12	6.00	0.73	24	0.021	6.68	612.51	612.22	1.50	2.00	5.58	TRUE
12	P-18	CB-18	614.80	608.80	CB-22	614.80	607.92	Circular Pipe	HDPE- 27"	27	0.01	4.04	5.46	22.23	160	0.005	29.86	610.45	609.65	3.75	4.63	8.23	TRUE
	P-22	CB-21	614.60	611.60	CB-22	614.80	610.81	Circular Pipe	HDPE- 12"	12	0.01	0.26	5.99	1.57	48	0.016	5.94	612.13	611.17	2.00	2.99	6.39	TRUE
	P-23	IN-20	614.60	612.10	CB-21	614.60	611.6	Circular Pipe	HDPE- 12"	12	0.01	0.11	6.00	0.67	24	0.021	6.68	612.44	612.13	1.50	2.00	5.44	TRUE
13	P-19	CB-22	614.80	607.92	CB-23	614.80	607.53	Circular Pipe	HDPE- 27"	27	0.01	4.49	5.40	24.44	60	0.006	32.46	609.65	609.30	4.63	5.02	8.97	TRUE
14	P-20	CB-23	614.80	607.53	OF-1	614.69	607.46	Circular Pipe	HDPE- 27"	27	0.01	4.71	5.38	25.55	10	0.007	33.68	609.30	609.10	5.02	4.98	9.32	TRUE
	P-28	IN-28	614.65	612.15	CB-27	614.65	611.65	Circular Pipe	HDPE- 12"	12	0.01	0.09	6.00	0.54	24	0.021	6.68	612.46	612.20	1.50	2.00	5.12	TRUE
	P-27	CB-27	614.65	611.65	CB-26	614.80	611.41	Circular Pipe	HDPE- 12"	12	0.01	0.20	5.99	1.21	40	0.006	3.59	612.20	612.22	2.00	2.39	4.12	TRUE
	P-25	CB-26	614.80	611.41	CB-25	614.80	610.18	Circular Pipe	HDPE- 12"	12	0.01	0.60	5.98	3.61	112	0.011	4.85	612.22	611.06	2.39	3.62	6.77	TRUE
	P-24	CB-25	614.80	610.18	CB-24	614.80	609.82	Circular Pipe	HDPE- 15"	15	0.01	0.78	5.95	4.68	60	0.006	6.50	611.06	610.78	3.37	3.73	5.77	TRUE
	P-21	CB-24	614.80	609.82	OF-2	614.68	609.79	Circular Pipe	HDPE- 18"	18	0.01	0.96	5.93	5.74	10	0.003	7.48	610.78	610.71	3.48	3.39	4.67	TRUE
	P-26	CB-Im.	614.80	611.77	CB-26	614.80	611.41	Circular Pipe	HDPE- 12"	12	0.01	0.20	6.00	1.21	60	0.006	3.59	612.23	612.22	2.03	2.39	4.12	TRUE

O = slopes < .005 ft/ft

Label	Start Node	Elevation RIM/Ground (Start) (ft)	Invert (Upstream) (ft)	Stop Node	Elevation RIM/Ground (Stop) (ft)	Invert (Downstream) (ft)	Conduit Shape	Section Size	Diameter (in)	Manning's n	Upstream CA (acres)	System Intensity (in/hr)	Flow (ft³/s)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (ft³/s)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Cover (Start) (ft)	Cover (Stop) (ft)	Velocity (Average) (ft/s)	Design Conduit?
P-1	IN-1	615.30	612.80	CB-2	615.00	612.2	Circular Pip	HDPE- 12"	12	0.01	0.13	6.00	0.79	38	0.016	5.82	613.17	613.13	1.50	1.80	5.17	TRUE
P-2	CB-2	615.00	612.20	CB-3	615.00	612.1	Circular Pip	HDPE- 12"	12	0.01	0.19	5.99	1.15	30	0.003	2.67	613.13	613.12	1.80	1.90	3.28	TRUE
P-3	CB-3	615.00	612.10	CB-4	614.90	611.7	Circular Pip	HDPE- 12"	12	0.01	0.25	5.97	1.51	132	0.003	2.55	613.12	612.98	1.90	2.20	1.92	TRUE
P-4	CB-4	614.90	611.70	CB-5	614.90	611.54	Circular Pip	HDPE- 15"	15	0.01	0.54	5.84	3.18	90	0.002	3.54	612.98	612.85	1.95	2.11	2.59	TRUE
P-5	CB-5	614.90	611.54	CB-6	614.90	611.16	Circular Pip	HDPE- 15"	15	0.01	0.72	5.77	4.19	64	0.006	6.47	612.85	612.69	2.11	2.49	3.41	TRUE
P-6	CB-6	614.90	611.16	MH-9	615.20	611	Circular Pip	HDPE- 18"	18	0.01	0.92	5.73	5.31	90	0.002	5.76	612.69	612.55	2.24	2.70	3.00	TRUE
P-7	CB-8	614.75	611.75	MH-9	615.20	611.2	Circular Pip	HDPE- 18"	18	0.01	0.79	6.00	4.77	26	0.021	19.86	612.59	612.55	1.50	2.50	9.24	TRUE
P-8	IN-7	614.75	612.25	CB-8	614.75	611.75	Circular Pip	HDPE- 12"	12	0.01	0.51	6.00	3.08	24	0.021	6.68	613.00	612.59	1.50	2.00	8.34	TRUE
P-9	MH-9	615.20	611.00	CB-10	614.90	610.87	Circular Pip	HDPE- 18"	18	0.01	1.71	5.66	9.75	64	0.002	6.15	612.55	612.15	2.70	2.53	5.52	TRUE
P-10	CB-10	614.90	610.87	MH-13	616.25	610.36	Circular Pip	HDPE- 24"	24	0.01	2.24	5.63	OK 12.71	144	0.004	17.50 OK	612.15	611.75	2.03	3.89	6.07	TRUE
P-11	CB-12	614.75	611.75	MH-13	616.25	610.89	Circular Pip	HDPE- 12"	12	0.01	0.40	5.99	2.42	60	0.014	5.54	612.42	611.75	2.00	4.36	6.82	TRUE
P-12	IN-11	614.75	612.25	CB-12	614.75	611.75	Circular Pip	HDPE- 12"	12	0.01	0.08	6.00	0.48	24	0.021	6.68	612.54	612.42	1.50	2.00	4.95	TRUE
P-13	MH-13	616.25	610.36	CB-14	614.90	609.83	Circular Pip	HDPE- 24"	24	0.01	2.64	5.56	14.79	118	0.004	19.71	611.75	611.35	3.89	3.07	6.89	TRUE
P-14	CB-14	614.90	609.83	CB-18	614.80	608.8	Circular Pip	HDPE- 24"	24	0.01	3.19	5.51	17.72	158	0.007	23.74	611.35	610.45	3.07	4.00	8.29	TRUE
P-15	IN-19	614.90	612.40	CB-18	614.80	610.74	Circular Pip	HDPE- 12"	12	0.01	0.26	6.00	1.57	82	0.020	6.59	612.93	611.07	1.50	3.06	6.89	TRUE
P-16	CB-16	614.65	611.65	CB-18	614.80	610.74	Circular Pip	HDPE- 12"	12	0.01	0.30	5.99	1.81	68	0.013	5.36	612.22	611.14	2.00	3.06	6.16	TRUE
P-17	IN-15	614.65	612.15	CB-16	614.65	611.65	Circular Pip	HDPE- 12"	12	0.01	0.12	6.00	0.73	24	0.021	6.68	612.51	612.22	1.50	2.00	5.58	TRUE
P-18	CB-18	614.80	608.80	CB-22	614.80	607.92	Circular Pip	HDPE- 27"	27	0.01	4.04	5.46	22.23	160	0.005	29.86	610.45	609.65	3.75	4.63	8.23	TRUE
P-22	CB-21	614.60	611.60	CB-22	614.80	610.81	Circular Pip	HDPE- 12"	12	0.01	0.26	5.99	1.57	48	0.016	5.94	612.13	611.17	2.00	2.99	6.39	TRUE
P-23	IN-20	614.60	612.10	CB-21	614.60	611.6	Circular Pip	HDPE- 12"	12	0.01	0.11	6.00	0.67	24	0.021	6.68	612.44	612.13	1.50	2.00	5.44	TRUE
P-19	CB-22	614.80	607.92	CB-23	614.80	607.53	Circular Pip	HDPE- 27"	27	0.01	4.49	5.40	24.44	60	0.006	32.46	609.65	609.30	4.63	5.02	8.97	TRUE
P-20	CB-23	614.80	607.53	OF-1	614.69	607.46	Circular Pip	HDPE- 27"	27	0.01	4.71	5.38	25.55	10	0.007	33.68	609.30	609.10	5.02	4.98	9.32	TRUE
P-28	IN-28	614.65	612.15	CB-27	614.65	611.65	Circular Pip	HDPE- 12"	12	0.01	0.09	6.00	0.54	24	0.021	6.68	612.46	612.20	1.50	2.00	5.12	TRUE
P-27	CB-27	614.65	611.65	CB-26	614.80	611.41	Circular Pip	HDPE- 12"	12	0.01	0.20	5.99	1.21	40	0.006	3.59	612.20	612.22	2.00	2.39	4.12	TRUE
P-25	CB-26	614.80	611.41	CB-25	614.80	610.18	Circular Pip	HDPE- 12"	12	0.01	0.60	5.98	3.61	112	0.011	4.85	612.22	611.06	2.39	3.62	6.77	TRUE
P-24	CB-25	614.80	610.18	CB-24	614.80	609.82	Circular Pip	HDPE- 15"	15	0.01	0.78	5.95	4.68	60	0.006	6.50	611.06	610.78	3.37	3.73	5.77	TRUE
P-21	CB-24	614.80	609.82	OF-2	614.68	609.79	Circular Pip	HDPE- 18"	18	0.01	0.96	5.93	5.74	10	0.003	7.48	610.78	610.71	3.48	3.39	4.67	TRUE
P-26	CB-Im.	614.80	611.77	CB-26	614.80	611.41	Circular Pip	HDPE- 12"	12	0.01	0.20	6.00	1.21	60	0.006	3.59	612.23	612.22	2.03	2.39	4.12	TRUE

Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Cover (Start) (ft)	Cover (Stop) (ft)	Velocity (Average) (ft/s)	Design Conduit?
614.42	614.41	2	2	1	TRUE
614.41	614.39	2	2.18	1.45	TRUE
614.39	614.25	2.18	2.74	1.89	TRUE
614.25	613.84	2.74	3.28	3.99	TRUE
613.84	613.69	3.03	3.35	3.37	TRUE
613.69	613.34	3.35	4.19	4.27	TRUE
613.61	613.34	3.06	2.5	6.07	TRUE
613.72	613.61	2.5	2	3.93	TRUE
613.34	613.02	3.94	4.03	5.46	TRUE
613.02	611.8	4.03	6.25	7.11	TRUE
611.92	611.8	4.36	2.5	4.9	TRUE
612.04	611.92	2.5	2	4.95	TRUE
611.8	611.2	6	5.36	6.09	TRUE
611.2	610.06	5.36	6.21	7.29	TRUE
612.43	611.11	3.06	2	6.04	TRUE
611.72	611.24	3.06	2.5	4.59	TRUE
612.01	611.72	2.5	2	5.58	TRUE
610.06	609.17	5.96	6.92	6.98	TRUE
611.63	611.27	2.99	2.5	4.43	TRUE
611.94	611.63	2.5	2	5.44	TRUE
609.17	607.3	7.42	7.78	13.64	TRUE
607.3	606.95	7.78	7.73	14.27	TRUE
612.46	612.11	1.5	2	5.12	TRUE
612.11	612.18	2	2.39	4.1	TRUE
612.18	611.57	2.14	2.81	5.43	TRUE
611.57	611.3	2.56	2.92	5.8	TRUE
611.3	611.16	2.92	2.86	6.11	TRUE
612.23	612.18	2.03	2.39	4.12	TRUE