DRAINAGE REPORT – 3-Story Medical Office Bldg w/ Basement

10 W. Martin Ave.

Naperville, IL

Naperville Project # 22-10000030

Prepared by:
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Updated on: 09/28/2022

Kimley»Horn

Memo Overview

Kimley-Horn is the civil engineering consultant for 10 W. Martin LLC, who intends to redevelop 3.65 acres of an existing medical office building into a new 3-story medical office building with a basement totaling 70,830 square feet with associated parking that expands onto the adjacent parcel. The property is located at 10 W. Martin Ave. in Naperville, IL.

Stormwater Management Facilities that were designed in accordance with Dupage County Stormwater Ordinance and includes Volume Control Best Management Practices (VCBMP) for the proposed development by utilizing a flow through water quality unit. The proposed development disturbs 3.65 acres of two adjacent parcels.

Existing Conditions

The site is located at the SW corner of W. Martin Ave. and Washington St. intersection. It consists of an existing medical office building with associated parking and utilities. The portion of the adjacent parcel, located to the south, that will be impacted by this redevelopment consists of an entrance access road for the greater Edward Elmhurst Hospital (EEH) campus and a courtyard with a brick sidewalk and landscaping. Of the 3.65 acres (159,000 sf) of proposed disturbed area, approximately 2.56 acres (109,800 sf) are impervious in the existing conditions.

The site currently drains to a storm sewer network that captures water throughout the EEH campus and releases it into the city's storm sewer network that ultimately discharges into the Dupage River located directly to the east of the W Martin Ave. and Washington St. intersection.

Post Development Conditions

The proposed improvements have been designed in accordance with the Dupage County Stormwater Ordinance (DCSO). Of the 3.65 acres (159,000 sf) of disturbed area, approximately 2.65 acres (115,500 sf) are impervious in the proposed conditions. Therefore, the net change in impervious area is 0.13 acres (5,700 sf) which exceeds the 2,500 sf that triggers the need for Post Construction Best Management Practices (PCBMPs) according to Article VIII, Section 15-63.A.1 of the DCSO. According to Article IX , Section 15-71.A.1 of the DCSO there is no requirement for detention since our site does not exceed the net new impervious area of 25,000 sf.

Due to the redevelopment taking place on the downstream end of the EEH's storm sewer network there are pipes and structures on site that will need to be maintained as to not disrupt drainage upstream. The plans call for multiple storm structures to have their rims adjusted to adapt to the new proposed grades. The stormwater runoff for the proposed site will be conveyed through the storm sewer system for the 0 – 100-year events. Landscaped drainage swales will also be used to convey runoff to the storm sewer system along the existing retaining wall along the west property line.

Flood Plains

The FEMA FIRM Map numbers 170213, effective date August 8, 2019 shows the site within Zone X.

Wetland/Wetland Buffers

Per the Wetland Determination Letter dated April 22, 2022 there are no wetlands present on site.

Waterway Buffers

There are no waterways on the site, and thus there are no waterway buffers on the site.

Sediment and Erosion Control

Construction activities will consist of building two office/warehouse buildings with associated surface parking and utilities. The disturbed area of the site will be 3.65 acres as shown on the Erosion Control Plan. The intended sequence of major soil disturbing activities is as follows:

1. Install sediment control measures
2. Rough grade site and stockpile topsoil
3. Construct bioretention facilities
4. Install storm sewer
5. Temporary vegetation
6. Pave drive aisles and parking
7. Final grading
8. Permanent vegetation
9. Install landscaping

During the construction phase, the General Contractor shall implement the following measures:

1. Silt dike shall be installed at the low end of the disturbance of the site to prevent soil runoff onto surrounding properties. Silt fencing will act as the silt dike for this project.
2. A construction entrance shall be installed at the entrance to the disturbed areas to prevent trucks from tracking sediment offsite.
3. Materials resulting from the clearing and grubbing or excavation operations shall be stockpiled up slope from adequate sedimentation controls. Fast-germinating temporary seed shall be installed in areas where there will be no construction for longer than 21 days. Materials removed to an off-site location shall be protected with appropriate controls and properly permitted.
4. The General Contractor shall designate areas for equipment cleaning, maintenance, and repair. The General Contractor and subcontractors shall utilize such designated areas. Cleaning, maintenance, and repair areas shall be protected by a temporary perimeter berm.
5. Use of detergents for large scale washing is prohibited (i.e., vehicles, buildings, pavement surfaces, etc.)
6. Chemicals, paints, solvents, fertilizers, and other toxic materials must be stored in weatherproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated, and disposed at an approved solid waste or chemical disposal facility.

It is important to divert stormwater flow from exposed soils and structural practices to store flows, retain sediment onsite or in any other way limit stormwater runoff. The following structural controls will be implemented onsite to serve this purpose:

1. Silt Dike: Silt dike is designed to retain sediment-laden water to allow settlement of suspended soils before filtering for discharge downstream. Silt dike shall be located to capture overland, low-velocity sheet flows. Silt dike shall be installed around all disturbed areas on-site and off-site and is adhered to the surface in paved areas. Silt fencing will act as the silt dike for this project.
2. Construction Entrance/Exit: All access points from the public street into the construction site shall include a construction entrance/exit composed of coarse stone to the dimensions shown on the Construction Drawings. The rough texture of the stone helps to remove clumps of soil adhering to construction vehicle tires through the action of vibration and jarring over the rough surface and the friction of the stone matrix against soils attached to vehicle tires.

Until permanent vegetation and soil stabilization has been established, all disturbed areas and pollutant controls must be inspected at least once every seven calendar days and within 24 hours following a rainfall of 0.5 inches or greater. The purpose of site inspections is to assess performance of pollutant controls. The inspections will be conducted by the General Contractor's Storm Water Coordinator. Based on these inspections, the General Contractor will decide whether it is necessary to add or relocate controls or revise or implement additional BMP's in order to prevent pollutants from leaving the site via storm water runoff. The General Contractor has the duty to cause pollutant control measures to be repaired, modified, maintained, supplemented, and take additional steps as necessary in order to achieve effective pollutant control.

Examples of specific items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. During each inspection, the inspector must evaluate overall pollutant control system performance as well as particular details of individual system components. Additional factors should be considered as appropriate to the circumstances.

1. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized construction entrance/exit shall be constructed where vehicles enter and exit. Entrances/exits shall be maintained or supplemented as necessary to prevent the release of sediment from vehicles leaving the site.
2. Sediment barriers must be inspected and they must be extended or cleaned at such time as their original capacity has been reduced by 50 percent. All material excavated from behind sediment barriers shall be stockpiled on the up-slope side. Additional sediment barriers must be constructed as needed.
3. Inspections shall evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system or discharging from the site. If necessary, the materials must be covered or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas.
4. Grassed areas shall be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with at least 70 percent density. The density of 70 percent or greater must be maintained to be considered as stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this requirement.

5. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

Variance

No variances from the stormwater ordinance are being sought.

Attachments

- FEMA FIRM Map
- Determination Letter
- Contech CDS Water Quality Unit Calcs and Details
- 25-Yr and 100-Yr Hydraflow Storm Sewer Calcs with Map

National Flood Hazard Layer FIRMette

FEMA

88°9'18"W 41°45'59"N

88°8'41"W 41°45'32"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

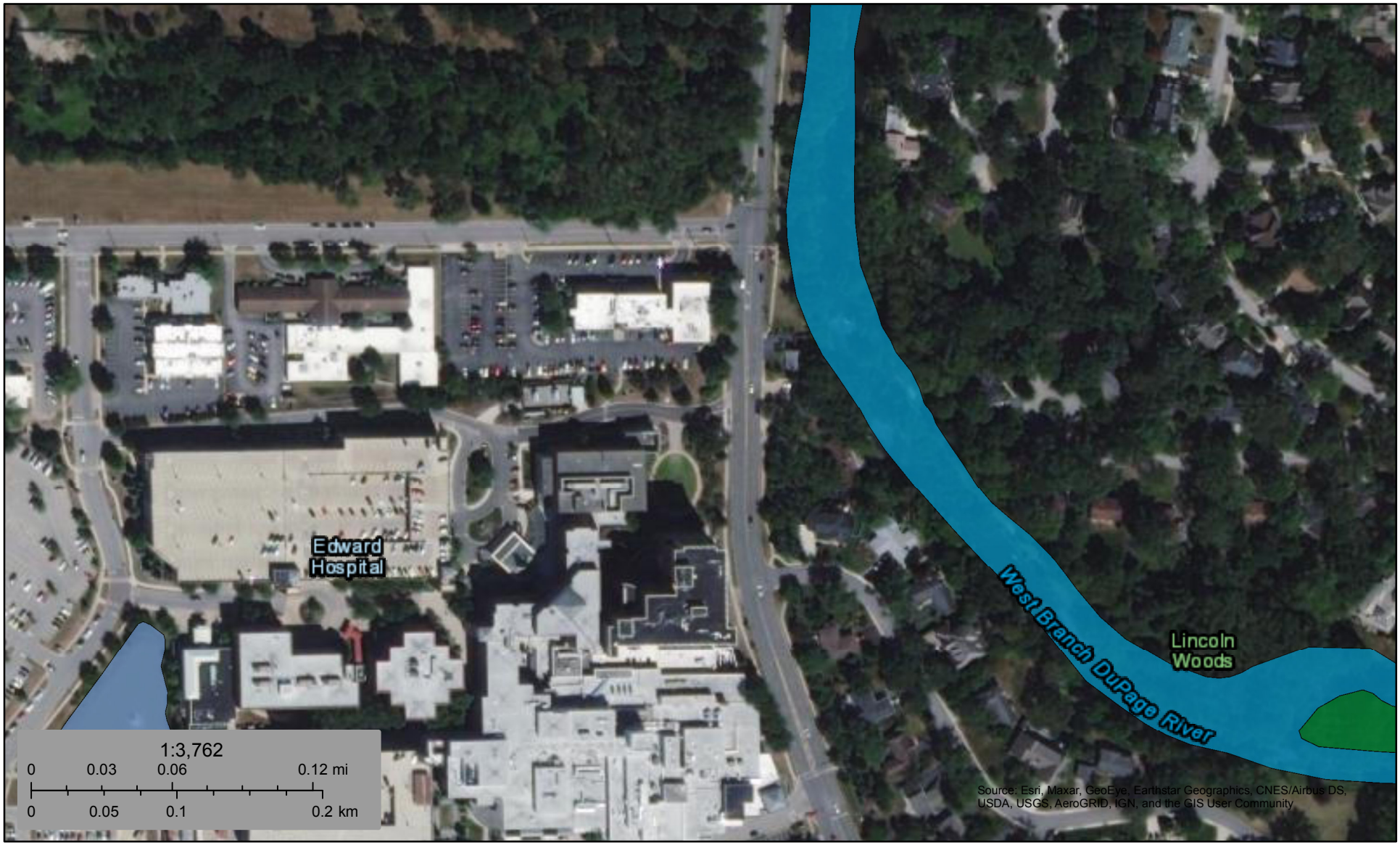
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/22/2022 at 9:34 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

U.S. Fish and Wildlife Service
National Wetlands Inventory

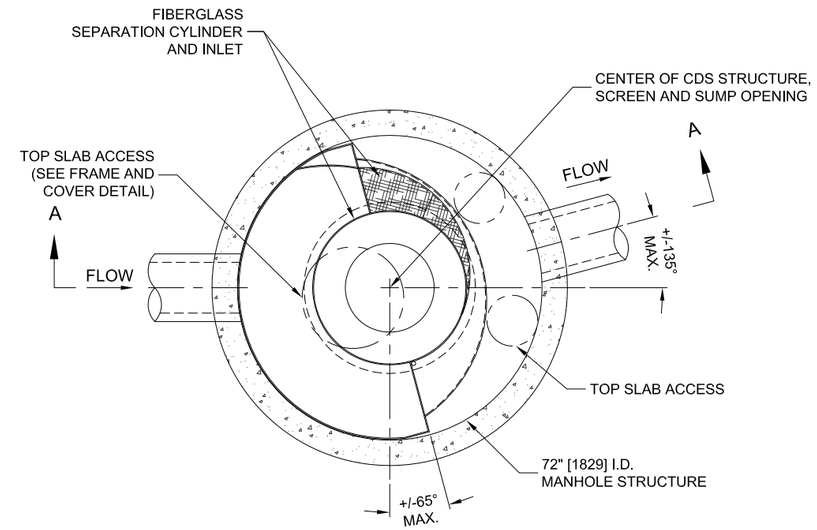
Naperville MOB Wetlands



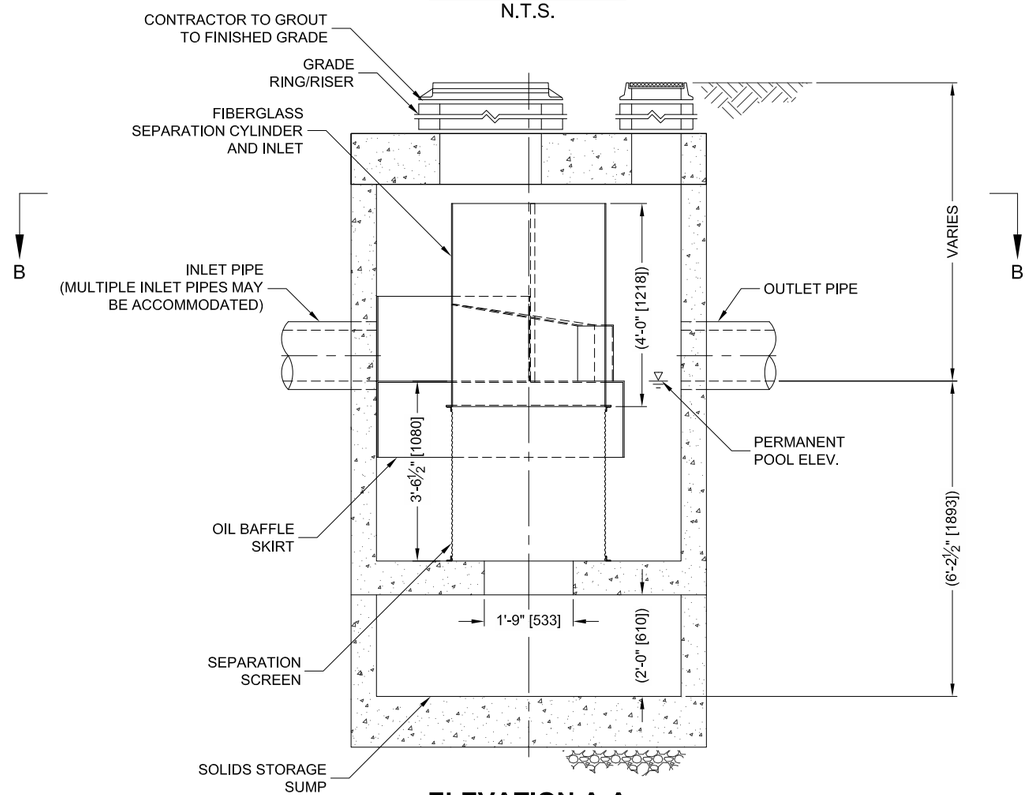
April 22, 2022

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

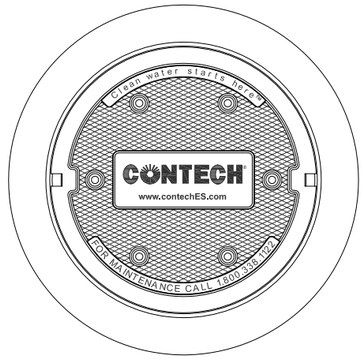
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS3030-6-C DESIGN NOTES

CDS3030-6-C RATED TREATMENT CAPACITY IS 3.0 CFS [85.0 L/s], OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 20.0 CFS [566 L/s]. IF THE SITE CONDITIONS EXCEED 20.0 CFS [566 L/s], AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS3030-6-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	2.8
PEAK FLOW RATE (CFS OR L/s)	35.48
RETURN PERIOD OF PEAK FLOW (YRS)	100
SCREEN APERTURE (2400 OR 4700)	2400

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	674.90	RCP	30
INLET PIPE 2	*	*	*
OUTLET PIPE	672.00	RCP	30

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	N/A	N/A

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS3030-6-C
ONLINE CDS
STANDARD DETAIL

CONTECH ENGINEERED SOLUTIONS

CDS ESTIMATED FREE OIL REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
ESTIMATED REMOVAL EFFICIENCY CALCULATION
NAPERVILEE MOB
NAPERVILLE, IL
System: D2

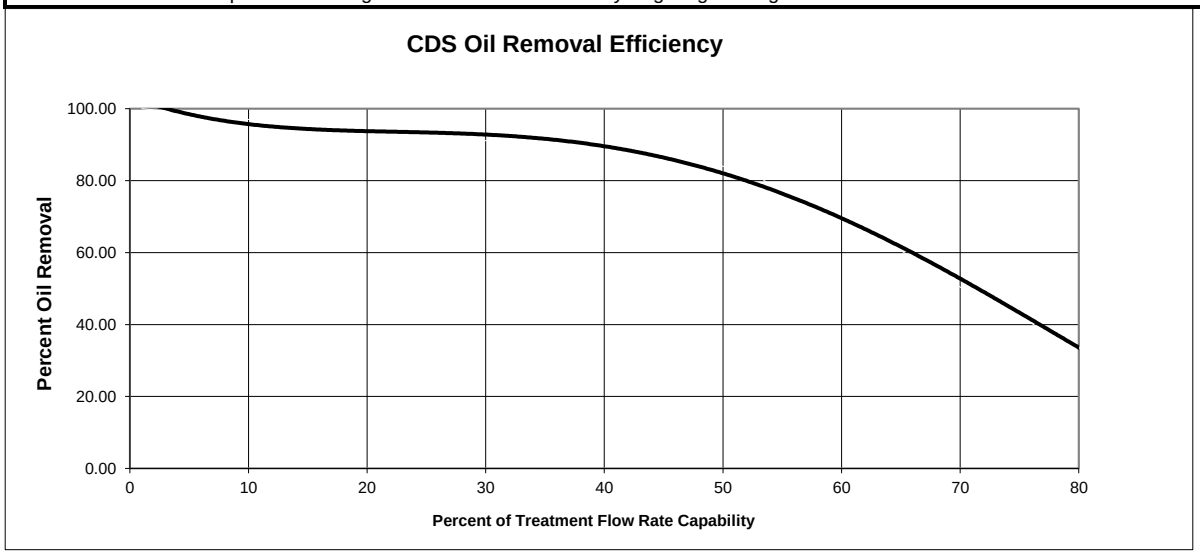
CDS TECHNOLOGIES

Area	3.56	acres	CDS Model	3030	
Weighted C	0.90		CDS Treatment Capacity	3.0	cfs
Tc	10	minutes			

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	% Rainfall Volume Treated	Total Flowrate (cfs)	Treated Flowrate (cfs)	Operating Rate (%)	Removal Efficiency (%)[2]	Incremental Removal (%)
0.02	10.6%	10.6%	10.6%	0.06	0.06	2.14	99.7	10.6
0.04	9.1%	19.7%	9.1%	0.13	0.13	4.27	99.0	9.0
0.06	8.9%	28.6%	8.9%	0.19	0.19	6.41	98.3	8.8
0.08	7.6%	36.2%	7.6%	0.26	0.26	8.54	97.7	7.4
0.10	6.8%	43.0%	6.8%	0.32	0.32	10.68	97.0	6.6
0.12	3.7%	46.7%	3.7%	0.38	0.38	12.82	96.3	3.5
0.14	3.9%	50.6%	3.9%	0.45	0.45	14.95	95.7	3.7
0.16	4.3%	54.9%	4.3%	0.51	0.51	17.09	94.7	4.0
0.18	2.9%	57.8%	2.9%	0.58	0.58	19.22	94.0	2.7
0.20	2.8%	60.6%	2.8%	0.64	0.64	21.36	93.3	2.6
0.25	6.5%	67.0%	6.5%	0.80	0.80	26.70	91.5	5.9
0.30	4.1%	71.2%	4.1%	0.96	0.96	32.04	90.9	3.7
0.35	4.4%	75.5%	4.4%	1.12	1.12	37.38	90.3	4.0
0.40	1.8%	77.3%	1.8%	1.28	1.28	42.72	89.2	1.6
0.45	2.9%	80.2%	2.9%	1.44	1.44	48.06	86.0	2.5
0.50	1.9%	82.1%	1.9%	1.60	1.60	53.40	81.0	1.5
0.75	5.9%	88.0%	5.9%	2.40	2.40	80.10	33.6	2.0
1.00	3.6%	91.6%	3.4%	3.20	3.00	100.00	0.0	0.0
1.50	5.6%	97.2%	3.5%	4.81	3.00	100.00	0.0	0.0
2.00	2.8%	100.0%	1.3%	6.41	3.00	100.00	0.0	0.0
2.00	0.0%	100.0%	0.0%	6.41	3.00	100.00	0.0	0.0
2.40	0.0%	100.0%	0.0%	7.69	3.00	100.00	0.0	0.0
2.80	0.0%	100.0%	0.0%	8.97	3.00	100.00	0.0	0.0
3.20	0.0%	100.0%	0.0%	10.25	3.00	100.00	0.0	0.0
								80.2

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	96.2%
Predicted Net Annual Load Removal Efficiency =	**80.2%**

1 - Based on 10 years of hourly precipitation data from NCDC Station 1549, Chicago O'Hare WSO Airport, Cook County, IL
2 - Removal efficiencies per CDS testing at Portland State University targeting floating free oil.



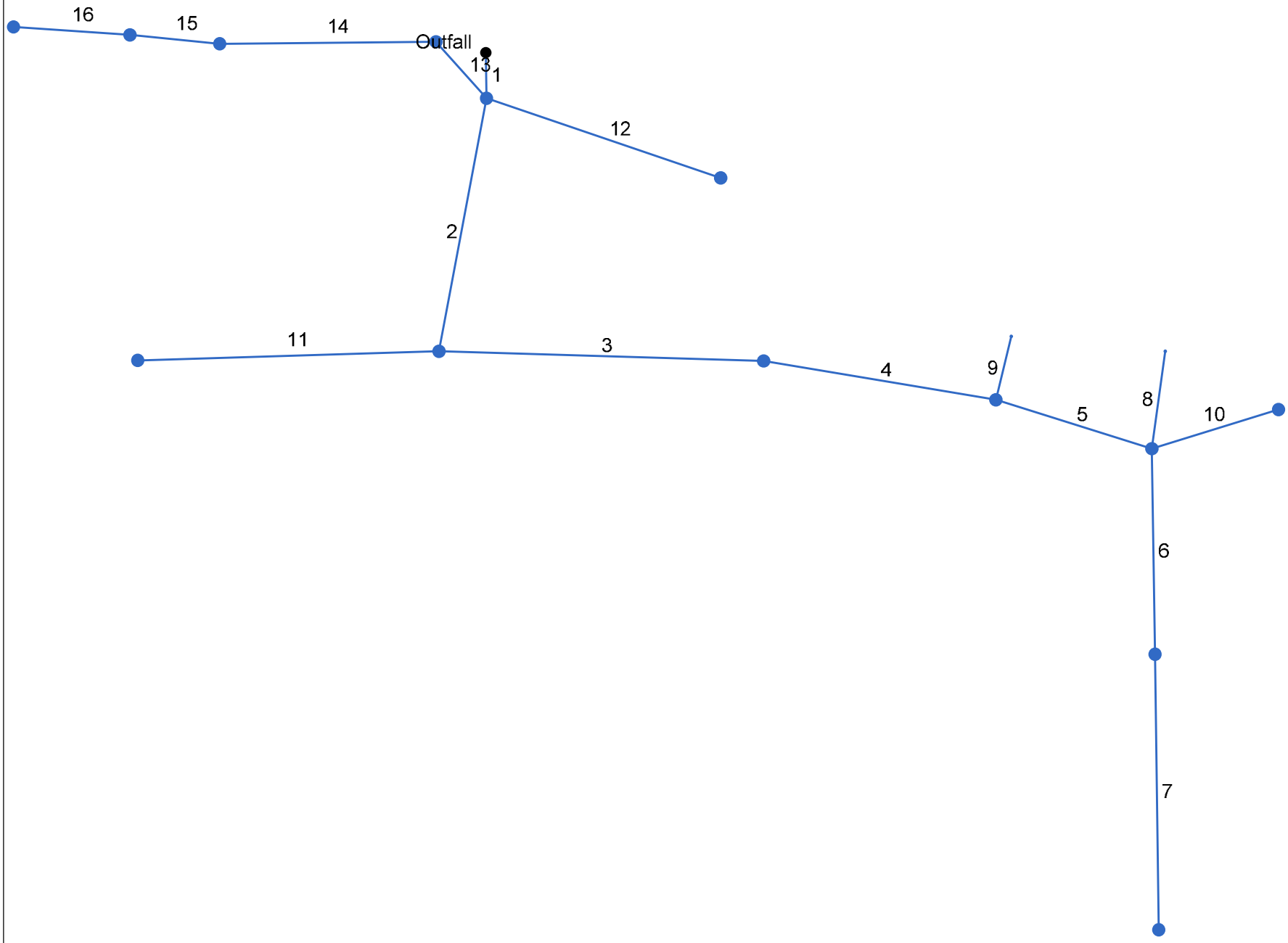
CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON AN AVERAGE PARTICLE SIZE OF 110 MICRONS
NAPERVILLE MOB
NAPERVILLE, IL
System: D2

Area	3.56	acres	Rainfall Station #	54	
Weighted C	0.9		Particle size	110	microns
Tc	10	minutes	CDS Treatment Capacity	3.0	cfs
CDS Model	3030		CDS Hydraulic Capacity	20.0	cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.02	10.6%	10.6%	0.06	0.06	2.14	100.0	10.6
0.04	9.1%	19.7%	0.13	0.13	4.27	100.0	9.1
0.06	8.9%	28.6%	0.19	0.19	6.41	99.9	8.9
0.08	7.6%	36.2%	0.26	0.26	8.54	99.4	7.6
0.10	6.8%	43.0%	0.32	0.32	10.68	98.8	6.8
0.12	3.7%	46.7%	0.38	0.38	12.82	98.3	3.6
0.14	3.9%	50.6%	0.45	0.45	14.95	97.8	3.8
0.16	4.3%	54.9%	0.51	0.51	17.09	97.3	4.2
0.18	2.9%	57.8%	0.58	0.58	19.22	96.8	2.8
0.20	2.8%	60.6%	0.64	0.64	21.36	96.3	2.7
0.25	6.5%	67.0%	0.80	0.80	26.70	95.0	6.1
0.30	4.1%	71.2%	0.96	0.96	32.04	93.8	3.9
0.35	4.4%	75.5%	1.12	1.12	37.38	92.5	4.1
0.40	1.8%	77.3%	1.28	1.28	42.72	91.2	1.6
0.45	2.9%	80.2%	1.44	1.44	48.06	90.0	2.6
0.50	1.9%	82.1%	1.60	1.60	53.40	88.7	1.7
0.75	5.9%	88.0%	2.40	2.40	80.10	82.4	4.9
1.00	3.6%	91.6%	3.20	3.00	100.00	77.6	2.6
1.50	5.6%	97.2%	4.81	3.00	100.00	77.6	2.7
2.00	2.8%	100.0%	6.41	3.00	100.00	77.6	1.0
							91.1
						Removal Efficiency Adjustment[2] =	6.5%
						Predicted % Annual Rainfall Treated =	89.7%
						Predicted Net Annual Load Removal Efficiency =	**84.7%**

1 - Based on 10 years of hourly precipitation data from NCDC Station 1549, Chicago O'Hare WSO Airport, Cook County, IL
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

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



Project File: New.stm	Number of lines: 16	Date: 9/28/2022

10-YR Storm Sewer Calculations (Hydraflow)

Line	ToLine	LineLength	Incr.Area	TotalArea	RunoffCoeff.	IncrC x A	TotalC x A	InletTime	TimeConc	RnfallInt	TotalRunoff	AdnlFlow	TotalFlow	CapacFull	Veloc	PipeSize	PipeSlope	Inv ElevDn	Inv ElevUp	HGLDn	HGLUp	Grnd/RimDn	Grnd/RimUp	Line ID
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	D7	Outfall	20	0	2.7	0	0	2.43	0	14.9	5.51	13.41	0	13.41	29	5.68	30	0.5	674.9	675	676.09	676.23	685.36	685.39
2	D8	1	112.038	0.15	1.46	0.9	0.14	1.31	10	14.1	5.64	7.4	0	7.4	24.66	5.89	24	1.19	680.99	682.32	681.74	683.28	685.39	687
3	D9	2	114.96	0.29	1.21	0.9	0.26	1.09	10	13.6	5.73	6.25	0	6.25	9.08	5.37	18	0.75	682.54	683.4	683.46	684.37	687	687.82
4	D10	3	83.859	0.17	0.92	0.9	0.16	0.83	10	13.1	5.82	4.82	0	4.82	6.94	4.1	18	0.44	683.38	683.74	684.37	684.65	687.82	688.18
5	D11	4	59.147	0	0.48	0	0	0.44	0	12.7	5.91	2.57	0	2.57	3.42	2.18	15	0.28	683.74	683.91	684.94	685.02	688.18	688.97
6	D12	5	90	0.18	0.31	0.9	0.16	0.28	10	12	6.04	1.69	0	1.69	2.03	2.89	12	0.33	685.76	686.05	686.46	686.75	688.97	689.3
7	D13	6	120.631	0.13	0.13	0.9	0.12	0.12	10	10	6.47	0.78	0	0.78	2.86	2.14	12	0.65	686.05	686.83	686.77	687.20 j	689.3	690
8	RD2	5	42.826	0.01	0.01	0.9	0.01	0.01	10	10	6.47	0.07	0	0.07	0.47	1.72	6	0.61	685.24	685.5	685.37	685.63	688.97	688.42
9	RD3	4	28.34	0.26	0.26	0.9	0.24	0.24	10	10	6.47	1.53	0	1.53	3.85	4.14	12	1	684.72	685	685.16	685.52	688.18	688.5
10	D16	5	47.973	0.16	0.16	0.9	0.15	0.15	10	10	6.47	0.94	0	0.94	3.57	0.82	15	0.31	683.91	684.06	685.1	685.1	688.97	687.56
11	D14	2	106.653	0.1	0.1	0.9	0.09	0.09	10	10	6.47	0.55	0	0.55	3	1.79	12	0.71	682.54	683.3	683.28	683.61 j	687	686.82
12	RD1	1	89.947	0.28	0.28	0.9	0.26	0.26	10	10	6.47	1.65	0	1.65	4.66	4.6	12	1.46	682.14	683.45	682.55	684	685.39	688.49
13	D3	1	30.578	0.05	0.96	0.9	0.04	0.87	10	12.2	6	5.19	0	5.19	7.43	4.54	18	0.5	677.66	677.82	678.59	678.74	685.39	684.74
14	D4	13	76.5	0.7	0.91	0.9	0.63	0.82	10	11.8	6.08	5	0	5	7.43	3.74	18	0.5	677.82	678.2	679.01	679.16	684.74	682
15	D5	14	31.988	0.19	0.21	0.9	0.17	0.19	10	11.5	6.15	1.19	0	1.19	6.43	2.45	12	3.26	678.2	679.24	679.21	679.70 j	682	682.41
16	D6	15	41.349	0.03	0.03	0.9	0.03	0.03	10	10	6.47	0.17	0	0.17	2.95	2.86	8	5.1	679.58	681.68	679.7	681.87	682.41	684.54

100-YR Storm Sewer Calculations (Hydraflow)

Line	ToLine	LineLength	Incr.Area	TotalArea	RunoffCoeff.	IncrC x A	TotalC x A	InletTime	TimeConc	RnfallInt	TotalRunoff	AdnlFlow	TotalFlow	CapacFull	Veloc	PipeSize	PipeSlope	Inv ElevDn	Inv ElevUp	HGLDn	HGLUp	Grnd/RimDn	Grnd/RimUp	Line ID
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	D7	Outfall	20	0	2.7	0	0	2.43	0	12.9	9.75	23.72	0	23.72	29	6.59	30	0.5	674.9	675	676.62	676.72	685.36	685.39
2	D8	1	112.038	0.15	1.46	0.9	0.14	1.31	10	12.5	9.9	12.98	0	12.98	24.66	6.99	24	1.19	680.99	682.32	682.02	683.61	685.39	687
3	D9	2	114.96	0.29	1.21	0.9	0.26	1.09	10	12.2	10	10.9	0	10.9	9.08	6.17	18	0.75	682.54	683.4	684.04	685.28	687	687.82
4	D10	3	83.859	0.17	0.92	0.9	0.16	0.83	10	11.9	10.1	8.37	0	8.37	6.94	4.74	18	0.44	683.38	683.74	685.4	685.93	687.82	688.18
5	D11	4	59.147	0	0.48	0	0	0.44	0	11.6	10.19	4.44	0	4.44	3.42	3.62	15	0.28	683.74	683.91	686.28	686.56	688.18	688.97
6	D12	5	90	0.18	0.31	0.9	0.16	0.28	10	11.2	10.33	2.89	0	2.89	2.03	3.68	12	0.33	685.76	686.05	686.77	687.36	688.97	689.3
7	D13	6	120.631	0.13	0.13	0.9	0.12	0.12	10	10	10.79	1.31	0	1.31	2.86	1.92	12	0.65	686.05	686.83	687.39	687.55	689.3	690
8	RD2	5	42.826	0.01	0.01	0.9	0.01	0.01	10	10	10.79	0.12	0	0.12	0.47	0.6	6	0.61	685.24	685.5	686.77	686.78	688.97	688.42
9	RD3	4	28.34	0.26	0.26	0.9	0.24	0.24	10	10	10.79	2.55	0	2.55	3.85	3.24	12	1	684.72	685	686.28	686.41	688.18	688.5
10	D16	5	47.973	0.16	0.16	0.9	0.15	0.15	10	10	10.79	1.57	0	1.57	3.57	1.28	15	0.31	683.91	684.06	686.77	686.79	688.97	687.56
11	D14	2	106.653	0.1	0.1	0.9	0.09	0.09	10	10	10.79	0.93	0	0.93	3	1.91	12	0.71	682.54	683.3	683.61	683.76	687	686.82
12	RD1	1	89.947	0.28	0.28	0.9	0.26	0.26	10	10	10.79	2.76	0	2.76	4.66	5.4	12	1.46	682.14	683.45	682.69	684.16	685.39	688.49
13	D3	1	30.578	0.05	0.96	0.9	0.04	0.87	10	11.3	10.29	8.91	0	8.91	7.43	5.04	18	0.5	677.66	677.82	679.16	679.38	685.39	684.74
14	D4	13	76.5	0.7	0.91	0.9	0.63	0.82	10	11.1	10.38	8.53	0	8.53	7.43	4.83	18	0.5	677.82	678.2	679.72	680.23	684.74	682
15	D5	14	31.988	0.19	0.21	0.9	0.17	0.19	10	10.9	10.46	2.02	0	2.02	6.43	2.57	12	3.26	678.2	679.24	680.28	680.39	682	682.41
16	D6	15	41.349	0.03	0.03	0.9	0.03	0.03	10	10	10.79	0.28	0	0.28	2.95	1.6	8	5.1	679.58	681.68	680.4	681.93 j	682.41	684.54