DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

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Technical Memorandum No. 1

Multi-Jurisdictional Use Facilities Capital Cost Allocation

DRAFT

April 17, 2013

Program Consultants Organization

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY
Washington, D.C.

Technical Memorandum 1
Multi-Jurisdictional Use Facilities Flow Analysis
April 17, 2013
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1. Methodology

PURPOSE

The "Multi-Jurisdictional Use Facilities Flow Analysis" study was undertaken to develop a technical basis upon which DC Water could determine each of the Blue Plains Municipal Users' share of peak flow in shared sewer. The study includes facilities inside the District and the Potomac Interceptor outside of the District. This document is based on the Blue Plains Intermunicipal Agreement of 2012.

MJUF IDENTIFICATION

Facilities that convey sewage to Blue Plains Advanced Waste Water Treatment Plant (BP AWWTP) from multiple Blue Plains Municipal Users are considered Multi-Jurisdictional Use Facilities (MJUFs).

DC Water's enabling legislation identified nineteen (19) joint-use sewerage facilities, which are shared by the District and other participating jurisdictions (DC Code § 34-2201.01, September 2000). These are listed in Table 1. By analyzing DC Water's MIKE URBAN hydraulic model and Geographic Information System (GIS) information of DC Water's complex interconnected collection system, additional facilities have been identified that convey multi-jurisdictional sewerage. This document analyzes both the original recognized facilities, excluding BP AWWTP, and those MJUF determined by analyzing the model and other information**.**

Table 1 – MJUF identified in Legislation

No.	Joint-Use Facility Identified in DC Water's Enabling Legislation
1	Little Falls Trunk Sewer
2	Upper Potomac Interceptor
3	Upper Potomac Interceptor Relief Sewer
4	Rock Creek Main Interceptor
5	Rock Creek Main Interceptor Relief Sewer
6	Potomac River Interceptor Sewer
7	Potomac Pumping Station
8	Potomac River Force Mains
9	Watt Branch Trunk Sewer
10	Anacostia Force Main
11	Anacostia Force Main & Gravity Sewer
12	Outfall Sewers (Sewers from Main Pumping Station)

No.	Joint-Use Facility Identified in DC Water's Enabling Legislation
13	Outfall Relief Sewers (Sewers from Potomac P.S.)
14	Lower Oxon Run Trunk Sewer
15	Upper Oxon Run Trunk Sewer
16	Lower Oxon Run Relief Sewer
17	Upper Oxon Run Relief Sewer
18	Blue Plains AWWTP
19	Potomac Interceptor Sewer

DC Water identified the MJUF primarily with the aid of their MIKE URBAN hydraulic model. The extensive computer hydraulic model, which was originally developed as part of the Long Term Control Plan (LTCP) for combined sewer overflows (CSO), has been extended beyond the combined system and integrated with GIS software mapping of the sewer networks. This integrated model incorporates the complex connectivity of the sewer pipe networks comprising the separate and combined systems.

The physical configuration of the sewer system was analyzed using data from the hydraulic model, GIS mapping and combined sewer system structure layouts. The MIKE URBAN program incorporates GIS capabilities, while using the latest versions of the MOUSE runoff and hydraulic model engines for computation. The MIKE URBAN model uses a GIS interface to display model elements and manage model inputs. The GIS interface allows direct incorporation of network elements from the geodatabase created from digitized counter maps of the District's collection system. This facilitated the addition of new elements into the pipe network and the ability to edit existing elements so that they can be represented in the correct geographic locations. The addition of external GIS layers such as buildings, roads, soil types, and topography assisted the development of various model parameters.

MJUF were determined by analyzing the model starting from the various Suburban contributions as identified in the Blue Plains Intermunicipal Agreement (IMA) of 2012. The modeled peak flow characteristics were analyzed from the District - Suburban boundary input points to identify which facilities actually function as multi-jurisdictional use facilities. There are nine (9) IMA boundary input points where flow characteristics were analyzed as starting points to trace flows through the sewer system. Because flows from these input points diverge and combine as they flow through the system, a total of eleven (11) distinct multi-jurisdictional use flow routes were ultimately defined and analyzed for peak flow characteristics.

Table 2 – IMA Connections

No.	IMA Transmission Points of Connection to the District's Wastewater Transmission System	Contributing Suburban Jurisdiction
1	Potomac Interceptor Sewer	All PI Users
2	Upper Potomac Interceptor Relief Sewer @ Chain Bridge	Fairfax
3	Upper Potomac Interceptor Sewer	WSSC
4	Little Falls Trunk Sewer	WSSC
5	Rock Creek Main Interceptor and Relief Sewer	WSSC
6	Anacostia Forcemain	WSSC
7	Watts Branch Interceptor	WSSC
8	Upper Oxon Run Trunk Sewer	WSSC
9	Lower Oxon Run Trunk Sewer	WSSC

The IMA allocations are conveyed from each input point at the political boundary either to a pumping station, Blue Plains or an intersection with another multi-jurisdictional use sewer. If there is a sewer structure where flow is diverted between multiple outlets during peak flows, the suburban flow was divided between the main sewer and the diverging sewer based on the peak flow ratio of flows in the diversion and the main sewer upstream of the diversion. Normal operating conditions for movable gates and normal gate or stop log placement in structures was assumed during modeled conditions for this analysis. Additionally, normal operating conditions for the pumping stations' wet wells was also assumed during modeled conditions.

This assumption assured the identification of any multi-jurisdictional use pipeline not specifically mentioned in the IMA, which receives contributions from an upstream pipeline by means of an overflow or diversion. This approach is effective in tracing the suburban flows and defines more precisely the sewer lines serving them. It reveals that there are additional multi-jurisdictional use facilities than those listed in DC Water's enabling legislation. The table below indicates all identified MJUF as well as the identified flow route.

Table 3 – Analyzed MJUFs

Flow Route	Multi-Jurisdictional Use Facility
1	Little Falls Trunk Sewer
2	Upper Potomac Interceptor
3	Upper Potomac Interceptor Relief Sewer

Flow Route	Multi-Jurisdictional Use Facility
4	Rock Creek Main Interceptor
	Rock Creek Main Interceptor Relief Sewers
5	96” Potomac River Force Main
	72” Potomac River Force Main
6	B Street / New Jersey Avenue Trunk Sewer
7	Anacostia Siphons
	East Outfall Sewer
	West Outfall Sewer
8	Anacostia Force Main
	North Interconnecting Branch Sewer (NIBS)
	South Interconnecting Branch Sewer (SIBS)
9	Watts Branch Trunk Sewer
	Anacostia Main Interceptor
10	Upper Oxon Run Relief Sewer
	Lower Oxon Run Trunk Sewer
11	East Outfall Relief Sewer
	West Outfall Relief Sewer
Pumping Stations	Rock Creek Pumping Station
	Potomac Pumping Station
	Main & O Street Pumping Stations
	Poplar Point Pumping Station

In addition to those facilities listed above, specific structures and appurtenances connected to multi-jurisdictional use facilities are themselves by definition multi-jurisdictional use facilities but are not enumerated here for clarity. Each route is evaluated in further detail as well as a section for the pumping stations.

Although not included in this study, it should be recognized that future major new multi-jurisdictional use facilities will be constructed within the District as part of the Long Term Control Plan (LTCP) for CSO control.

PEAK FLOW ANALYSIS

As indicated previously, the MIKE URBAN model developed for DC Water's LTCP was used to identify the MJUFs. The MIKE URBAN model included the suburban IMA peak flow limits as defined inputs at the boundary and computed District peak flow contributions downstream along the flow routes of multi-jurisdictional use sewers. Peak flows were simulated for the catchment areas tributary to each multi-jurisdictional use facility using the MIKE URBAN modeling software.

IMA peak flows were introduced into the proper multi-jurisdictional use sewers at the defined boundary input locations. The IMA peak flows and the corresponding MJUF are included in the table below.

Table 4 – IMA Peak Flow Allocations

Flow Route	IMA Transmission Points of Connection to the District's Wastewater Transmission System	Contributing Jurisdiction	IMA Peak Flow Rate (MGD)
1	Little Falls Trunk Sewer	WSSC	20.8
2	Upper Potomac Interceptor Sewer	WSSC	23.3
3	Potomac Interceptor (all except Pimmit Run)	All PI Users	151.0*
	Potomac Interceptor (Pimmit Run)	Fairfax	35.0
4	Rock Creek Main Interceptor and Relief Sewer	WSSC	56.6
8	Anacostia Forcemain	WSSC	185.0
9	Watts Branch Interceptor	WSSC	5.9
10	Upper Oxon Run Trunk Sewer	WSSC	15.6
	Lower Oxon Run Trunk Sewer (Barnaby Branch, Owens Road, Indian Head Highway)	WSSC	19.2

* The IMA Peak Flow allocation for all Potomac Interceptor (PI) users exceeds the design capacity, 151 MGD, at the District Boundary. Allocations for the PI among the various PI users are included in detail under Route 3, the Upper Potomac Interceptor Relief Sewer.

Suburban peak flows equal to the IMA peak flow allocations were held constant throughout the model run. Peak flows for the sanitary sewer system inside the District include sanitary sewage based on diurnal curves, base infiltration flow and a stormwater flow allowance to account for inflow. Peak flows for the combined sewer system inside the District include sanitary sewage based on diurnal curves, base infiltration flow and captured stormwater runoff.

MIKE URBAN model assumptions are summarized as follows:

1. Sanitary flows originating within the District were calculated based on 25 different diurnal patterns, as identified by analysis of metered flow data. The peak hourly dry-weather flows for these patterns range from 1.08 times to 2.56 times the average sanitary flow.
2. Base flows (infiltration) in the sanitary sewers are calculated values based on actual, metered data and vary by sewershed. Base flow values are held constant during model runs.
3. Stormwater flow allowances (inflow) in the sanitary sewers were computed using a regression-based model of the sanitary sewer sheds.
4. Stormwater runoff for combined sewersheds was calculated based on the MOUSE runoff model engine for 15-year frequency design storms. The 15-year design storm event is the DC Water design standard.
5. DC Water design-storm modeling for the LTCP model is based on the NOAA (National Oceanic and Atmospheric Administration) design storms.
6. To simulate collection of stormwater runoff flows into the multi-jurisdictional use sewers, catchments based on sewersheds were developed and connected to model nodes.
7. Data on sizes, materials, roughness and slopes of sewers, soil characteristics, topography, and extent of pervious and impervious surface areas in all of the tributary sewersheds are incorporated.

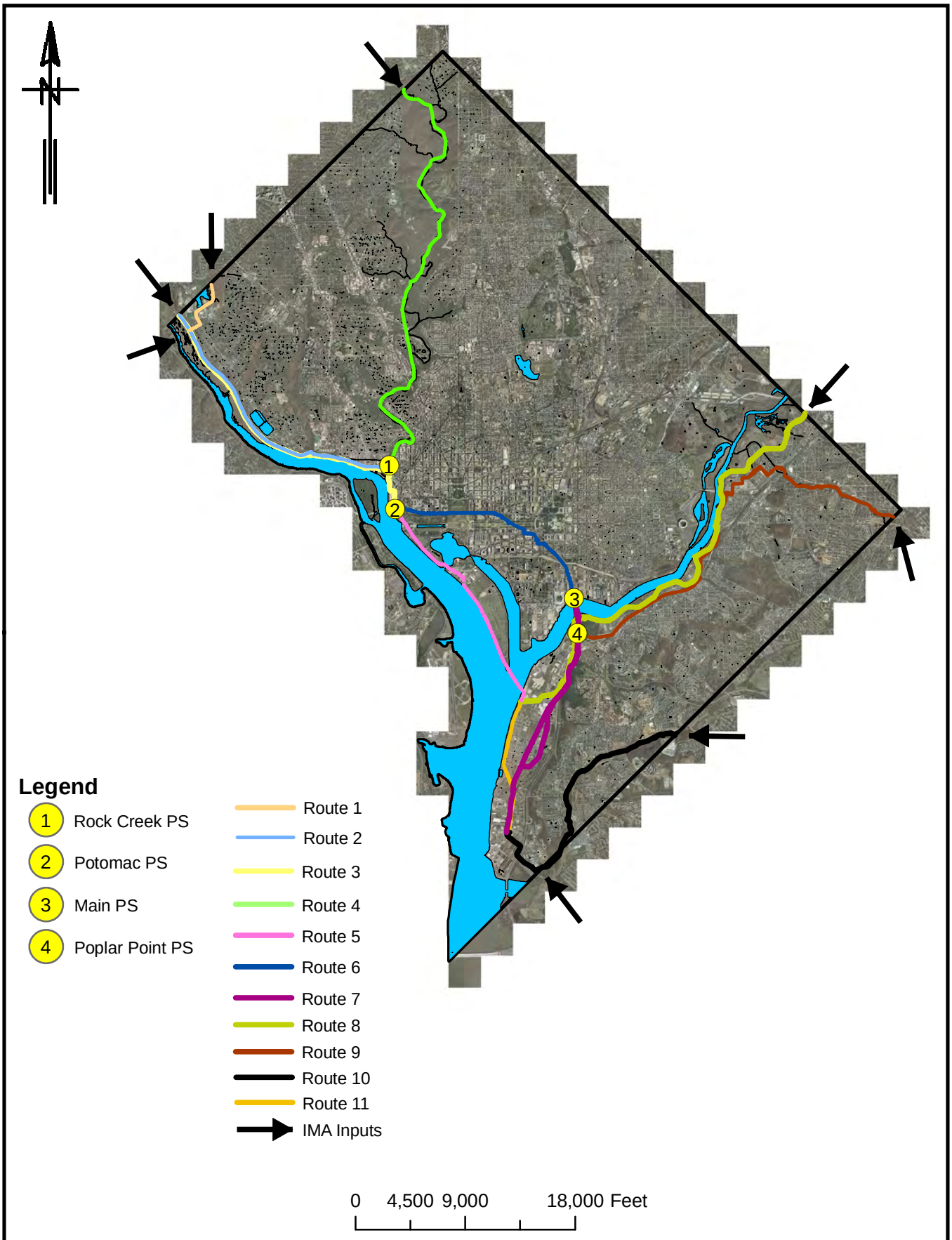
Suburban peak flows are constant for each MJUF until reaching a diversion structure, pumping station or Blue Plains. When one MJUF joins another MJUF before reaching a pumping station or Blue Plains, the suburban peak flows are added to determine the downstream suburban peak flows. Percentage of each suburban flow is equivalent to the ratio of suburban peak flow value to modeled peak flow value. District contributions are assumed to be the total peak flow minus all suburban contributions.

Analysis to determine contributions for multi-jurisdictional use pumping stations were also included in the calculations. This was accomplished by comparing the upstream peak suburban flows to the rated firm pumping station capacities (largest pump out of service). Remaining capacity was allocated for the District. Suburban and District allocations, as a percentage, were held constant for downstream force mains.

IMPACT OF LTCP COST SHARING

The Suburbs and District agreed that the Suburbs would pay 7.1% of capital cost of LTCP facilities that have flows from Suburban jurisdictions. In order to address the suburban flow in the LTCP facilities, suburban flows were decreased by 7.1% at the Main, Potomac and Poplar Point Pumping Stations. This reduction in suburban flow was negotiated by the jurisdictions as a credit for the suburban flows handled by the LTCP facilities. The flow reduction was performed at these pumping stations because the largest CSOs in the system typically occur upstream of these facilities.

The following figures represent all MJUF analyzed for peak flow ratios between the District and Suburban jurisdictions. Individual route analysis for the 11 identified routes and pumping stations follow.



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MJUF LOCATIONS

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2. Route 1 - Little Falls Trunk Sewer

SYSTEM DESCRIPTION

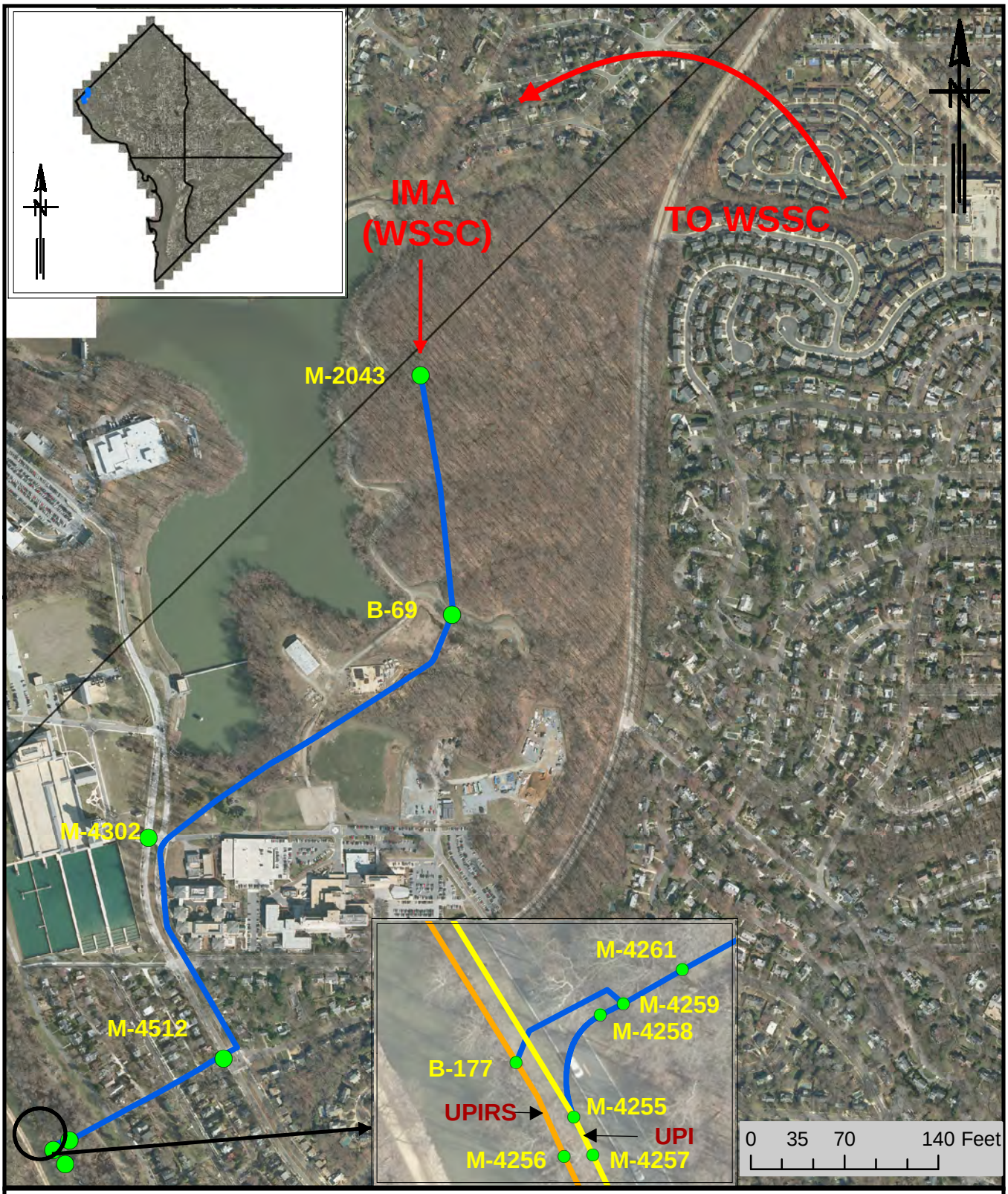
Little Falls Trunk Sewer conveys flows from southwestern Montgomery County, MD and several sewer sheds located along Western Avenue, NW from the District. The main trunk sewer pipe is approximately 5,215 feet long, varies in size and shape, from a 48-inch diameter to a 36-inch x 60-inch egg-shaped brick sewer. At the downstream end, the sewer diverges into two branches with the majority conveyed to the Upper Potomac Interceptor (UPI, Route 2). A short 18-inch diameter branch sewer directs flow from Little Falls Trunk Sewer Manhole M-4259 to the Upper Potomac Interceptor Relief Sewer (UPIRS, Route 3). See attached location map and flow schematic.

Per the IMA, WSSC is allocated 20.8 mgd of peak conveyance capacity in the Little Falls Trunk Sewer. District flows which are conveyed across the Maryland – District boundary have been accounted for in this evaluation. These District flows originate in the upstream sewer sheds, conveyed across the MD – DC border and then return through the Little Falls Trunk Sewer. Modeled flows calculated a peak flow of 10.9 mgd for the DC generated flow. These flows are in addition to WSSC's IMA peak conveyance capacity of 20.8 mgd. Therefore, the initial boundary flow for this route adds this 10.9 mgd to WSSC's allocated 20.8 mgd.

From the Maryland – District boundary, the model simulates the combined peak WSSC and DC flows along the sewer route including rainfall-derived infiltration and inflow and the sanitary flow collected in the system. As indicated in the flow analysis table, WSSC's flow share decreases from 65.6% at the upstream initial boundary to 55.1% at the downstream discharge. Correspondingly, DC's flow share increases from 34.4% at the boundary to 44.9% at the discharge.

The hydraulic model calculates the flow split and the corresponding WSSC and DC flow ratios in the two short branch sewers downstream of manhole M-4259, taking into account the inverts, slopes, diameters and other physical properties of the pipes. There are no DC inflows along these short sections of sewer other than rainfall-derived infiltration and inflow.

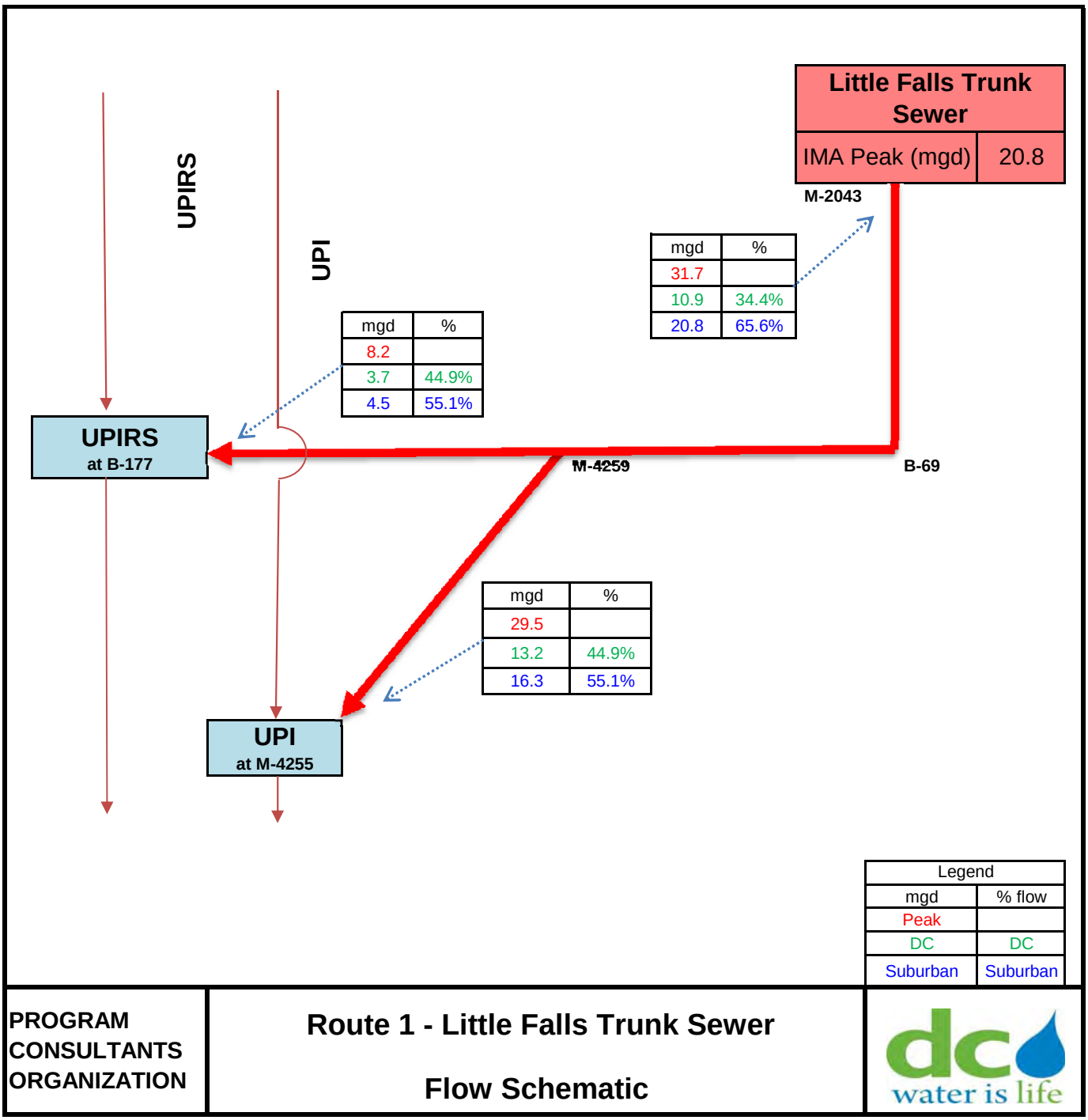
The attached table of percentage flow shares presents the peak flows for each modeled pipe segment of the Little Falls Trunk Sewer and the calculated ratios of suburban flows to peak flows.



Legend

- Manholes
- Little Falls Trunk Sewer
- DC Sewershed Inputs

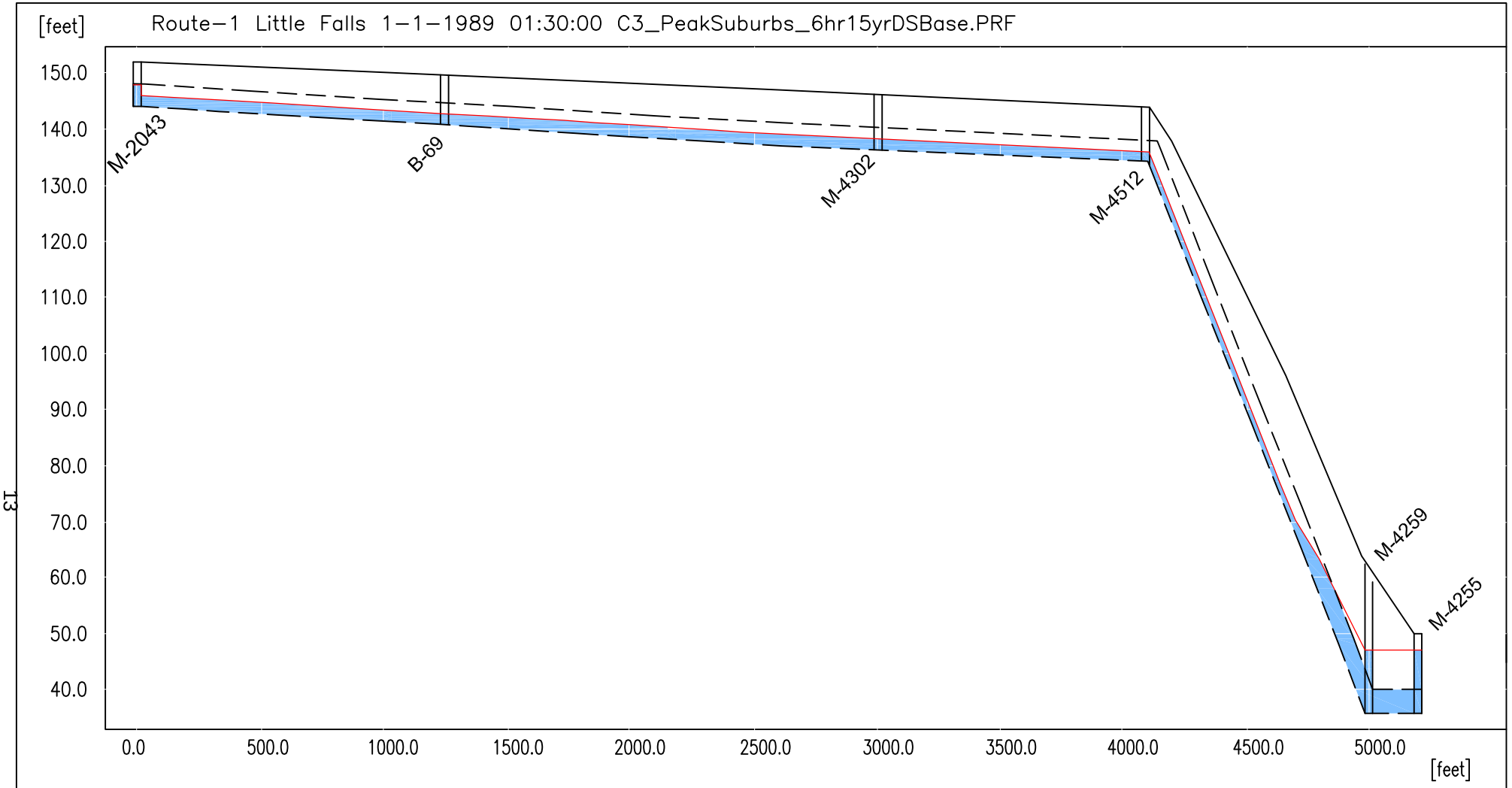
PROGRAM CONSULTANTS ORGANIZATION	Route 1 - Little Falls Trunk Sewer	dc water is life



PROGRAM CONSULTANTS ORGANIZATION	**Route 1 - Little Falls Trunk Sewer** **Flow Schematic**	dc water is life

ROUTE 1 - LITTLE FALLS TRUNK SEWER									
Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
1	M-2043	B-69	5	1,189	31.7	20.8	65.6%	10.9	34.4%
2	B-69	M-4302	5	1,825	35.0	20.8	59.4%	14.2	40.6%
3	M-4302	M-4512	4	1,055	35.0	20.8	59.4%	14.2	40.6%
4	M-4512	M-4259	4	946	34.9	20.8	59.6%	14.1	40.4%
5	M-4259	M-4255	4	94	29.5	16.3	55.1%	13.2	44.9%
6	M-4259	B-177	1.5	107	8.2	4.5	55.1%	3.7	44.9%
				5,215					

Route-1 Little Falls Trunk Sewer



Diameter	5.00	5.00	4.00	4.00	4.00	[ft]
Discharge	31.7	35	35	34.9	29.5	[mgd]

Legend

Hydraulic Gradient	
Flow Level	
Sewer Outline	

3. Route 2 - Upper Potomac Interceptor (UPI)

SYSTEM DESCRIPTION

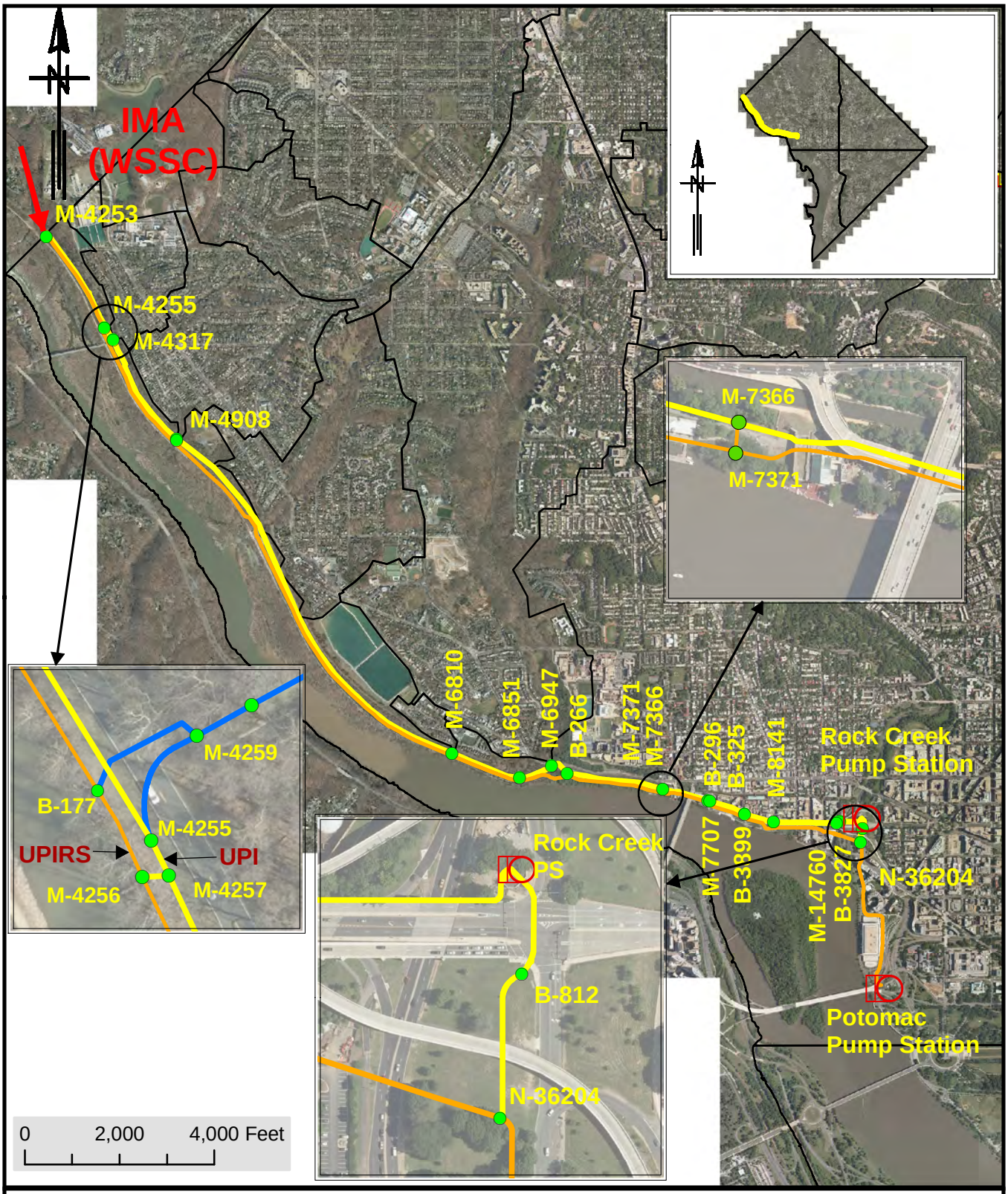
The Upper Potomac Interceptor (UPI) conveys flows from southwestern Montgomery County, MD, Loudoun and Fairfax Counties, VA, other small suburban users and several sewer sheds located in Northwest DC to the Rock Creek Pumping Station. The pipe size is generally 4-feet in diameter and is approximately 24,252 feet long inside the District. The Little Falls Trunk Sewer (Route 1) discharges flow into the UPI approximately 1,600 feet from the MD-District boundary. The UPI and the Upper Potomac Relief Interceptor Sewer (UPIRS, Route 3) have multiple interconnections which provide relief for peak flows. As such, the Potomac Interceptor users contribute peak flow in the UPI. Since DC Water has a CIP project planned to restore an out of service segment of the UPI, this section is assumed to convey flow as planned. See attached location map and flow schematic.

Per the IMA, WSSC is allocated 23.3 mgd of peak conveyance capacity at the initial upstream location at the MD-DC boundary at manhole M-4253. WSSC's peak flow of 23.3 mgd, represents 100 percent of the flow at the boundary.

As the flow is conveyed through the sewer route, the model accounts for rainfall-derived infiltration and in flow and the sanitary flow collected in the system as it passes through neighborhoods in Northwest DC. The model also accounts for peak flow from the Little Falls Trunk Sewer (Route 1) and the diversions to and from the UPIRS (Route 3) as noted above.

This route, the UPI, terminates at the Rock Creek Pumping Station, which has a firm rated capacity (largest pump out of service) of 50 mgd. As indicated in the flow analysis table, WSSC's flow share decreases from 100% at the boundary to 56.2% at the downstream route terminus. Potomac Interceptor users convey peak flow mid-route due to the interconnections with the UPIRS, as indicated.

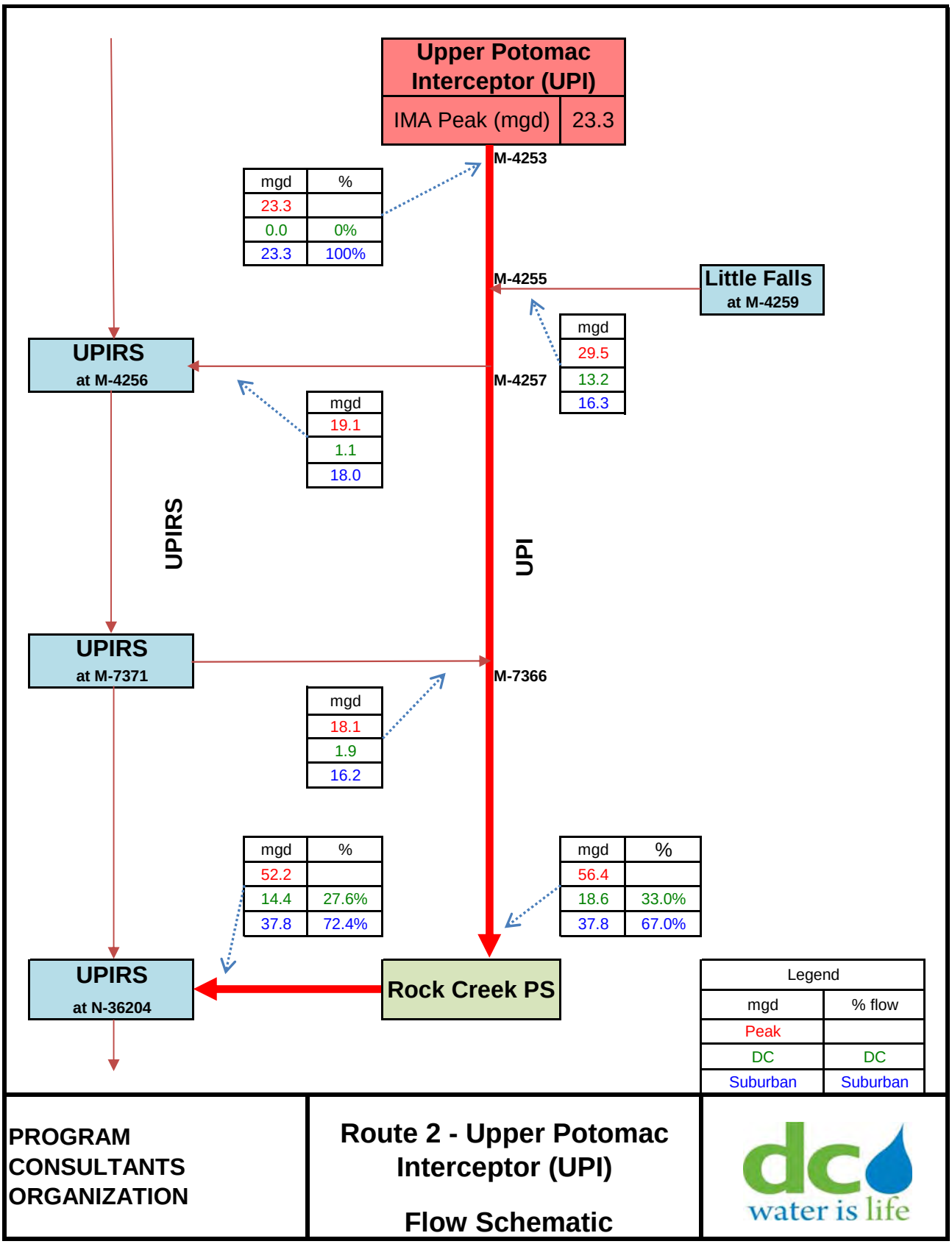
The attached table of percentage flow shares presents the peak flows for each modeled pipe segment of the UPI and the calculated ratios of suburban flows to peak flows.



Legend

- Manholes
- UPI
- Boundary Inputs
- UPIRS
- Little Falls Trunk Sewer
- Pump Stations

PROGRAM CONSULTANTS ORGANIZATION	**Route 2 - Upper Potomac Interceptor (UPI)**	dc water is life



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Route 2 - Upper Potomac Interceptor (UPI)

Flow Schematic

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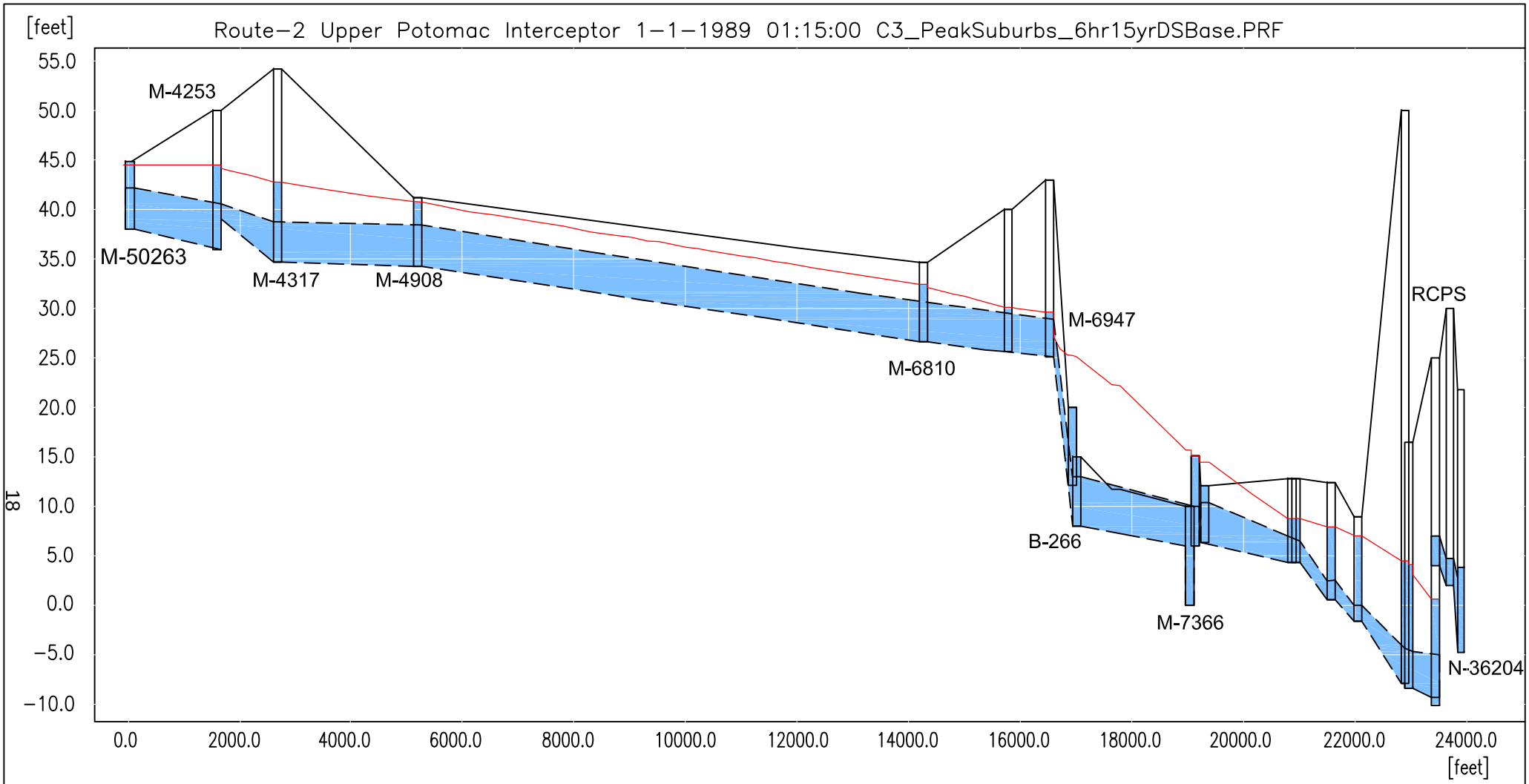
ROUTE 2 - UPPER POTOMAC INTERCEPTOR (UPI)

Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	Suburban Flow (mgd)	% Suburban Flow	WSSC Flow (mgd)	% WSSC Flow	Fairfax Flow (mgd)	% Fairfax Flow	LCSA Flow (mgd)	% LCSA Flow	Other PI Users Flow (mgd)	% Other Flow	DC Flow (mgd)	% DC Flow
1	M-4253	M-4255	4.0	1,615	23.3	23.3	100.0%	23.3	100.0%							0.0	0.0%
2	M-4255	M-4257	4.0	33	42.1	39.6	94.1%	39.6	94.1%							2.5	5.9%
3	M-4257	M-4317	4.0	1,059	24.1	21.6	89.6%	21.6	89.6%							2.5	10.4%
4	M-4317	M-4908	4.0	2,568	25.3	21.6	85.4%	21.6	85.4%							3.7	14.6%
5	M-4908	M-6810	4.0	9,240	27.2	21.6	79.4%	21.6	79.4%							5.6	20.6%
6	M-6810	M-6851	4.0	1,548	30.5	21.6	70.8%	21.6	70.8%							8.9	29.2%
7	M-6851	M-6947	4.0	772	30.3	21.6	71.3%	21.6	71.3%							8.7	28.7%
8	M-6947	B-266	4.0	419	46.7	21.6	46.3%	21.6	46.3%							25.1	53.7%
9	B-266	M-7366	3.5	2,080	45.7	21.6	47.3%	21.6	47.3%							24.1	52.7%
10	M-7366	B-296	4.0	169	57.7	37.8	65.5%	29.3	50.8%	6.0	10.4%	2.3	3.9%	0.2	0.4%	19.9	34.5%
11	B-296	B-325	4.0	1,606	54.3	37.8	69.6%	29.3	54.0%	6.0	11.0%	2.3	4.1%	0.2	0.5%	16.5	30.4%
12	B-325	M-7707	4.0	82	44.0	37.8	85.9%	29.3	66.6%	6.0	13.6%	2.3	5.1%	0.2	0.6%	6.2	14.1%
13	M-7707	B-3899	4.0	647	46.4	37.8	81.5%	29.3	63.2%	6.0	12.9%	2.3	4.8%	0.2	0.5%	8.6	18.5%
14	B-3899	M-8141	4.0	481	46.5	37.8	81.3%	29.3	63.1%	6.0	12.9%	2.3	4.8%	0.2	0.5%	8.7	18.7%
15	M-8141	M-14760	4.0	861	45.2	37.8	83.7%	29.3	64.9%	6.0	13.3%	2.3	5.0%	0.2	0.5%	7.4	16.3%
16	M-14760	B-3827	4.0	75	49.1	37.8	77.0%	29.3	59.7%	6.0	12.2%	2.3	4.6%	0.2	0.5%	11.3	23.0%
17	B-3827	RCPS	4.0	478	56.4	37.8	67.0%	29.3	52.0%	6.0	10.6%	2.3	4.0%	0.2	0.4%	18.6	33.0%
18	RCPS	B-812	4.0	176	50.1	37.8	75.5%	29.3	58.5%	6.0	12.0%	2.3	4.5%	0.2	0.5%	12.3	24.5%
19	B-812	N-36204	5.0	341	52.2	37.8	72.4%	29.3	56.2%	6.0	11.5%	2.3	4.3%	0.2	0.5%	14.4	27.6%
				24,252													

Route-2 Upper Potomac Interceptor (UPI)



Diameter	4.00	4.00	4.00	4.00	4.00			7.00	4.00		4.00		[ft]
Discharge	23.3	42.1	24.1	25.3	30.5			45.7	46.4		56.4		[mgd]

Legend

Hydraulic Gradient	
Flow Level	
Sewer Outline	

4. Route 3 - Upper Potomac Interceptor Relief Sewer (UPIRS)

SYSTEM DESCRIPTION

The Upper Potomac Interceptor Relief Sewer (UPIRS) conveys flow through the District from the Potomac Interceptor (PI) at the MD-DC border to the Potomac Pumping Station. The PI conveys flows from Northwest DC, Montgomery County, MD, Fairfax and Loudoun Counties, VA, and other smaller suburban users. Within the District of Columbia, the UPIRS varies from 60-inches to 108-inches in diameter but also includes one short segment of 42-inch pipe. The pipe length within the District is approximately 26,860 feet.

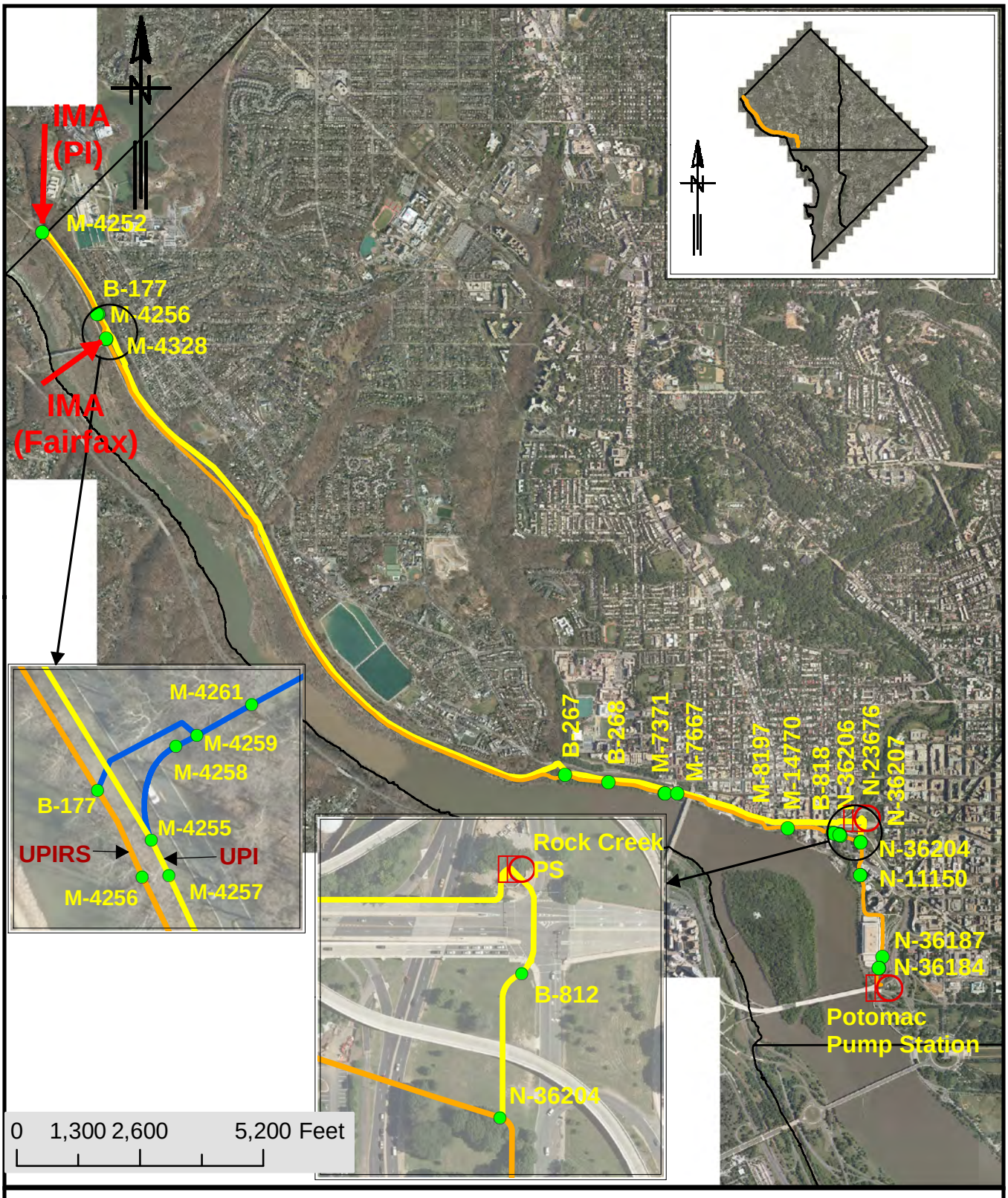
The IMA includes peak allocations for the various PI users totaling 200.0 mgd. However, the design basis for the Potomac Interceptor at the MD-DC boundary is 151 mgd. To account for this difference between the IMA and the design basis, the percentage of the IMA total peak was used to apportion the peak flow per the design basis which was simulated in the model. Allocation in the PI under administrative control of the District was not considered in the input analysis in the model. The peak flows allocated to the PI users were modified from the IMA as indicated in the table below.

Jurisdiction	Peak Flow in Potomac Interceptor per IMA (mgd)	% of Total Peak Flow at DC-MD Boundary	Peak Flow in Potomac Interceptor per Design Basis (% * 151 mgd Design Basis, mgd)
WSSC	87.4	43.7%	66.0
Fairfax	73.6	36.8%	55.6
LCSA	31.9	15.9%	24.0
Others	7.1	3.6%	5.4
Totals	200.0	100%	151.0

This represents 100 percent of the flow at the MD-DC boundary. An additional allocation to Fairfax County of 35 mgd peak flow enters the UPIRS near Chain Bridge Road. The UPI (Route 2) and the UPI RS have multiple interconnections which provide relief during peak flows. Due to a hydraulic restriction within the UPIRS, a 6 foot diameter pipe relieves 18 mgd of peak flow from the UPIRS into the UPI. See attached location map and flow schematic.

As the flow is routed through the sewer, the hydraulic model accounts for rainfall-derived infiltration and in flow and the sanitary flow collected in the system as it passes through the neighborhoods in Northwest DC. The UPIRS terminates at the Potomac Pumping Station, which has a firm rated capacity (largest pump out of service) of 460 mgd.

The attached table of percentage flow shares presents the peak flows for each major pipe segment of the UPIRS and the calculated ratios of suburban flows to peak flows.



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Route 3 - Upper Potomac Interceptor Relief Sewer (UPIRS)

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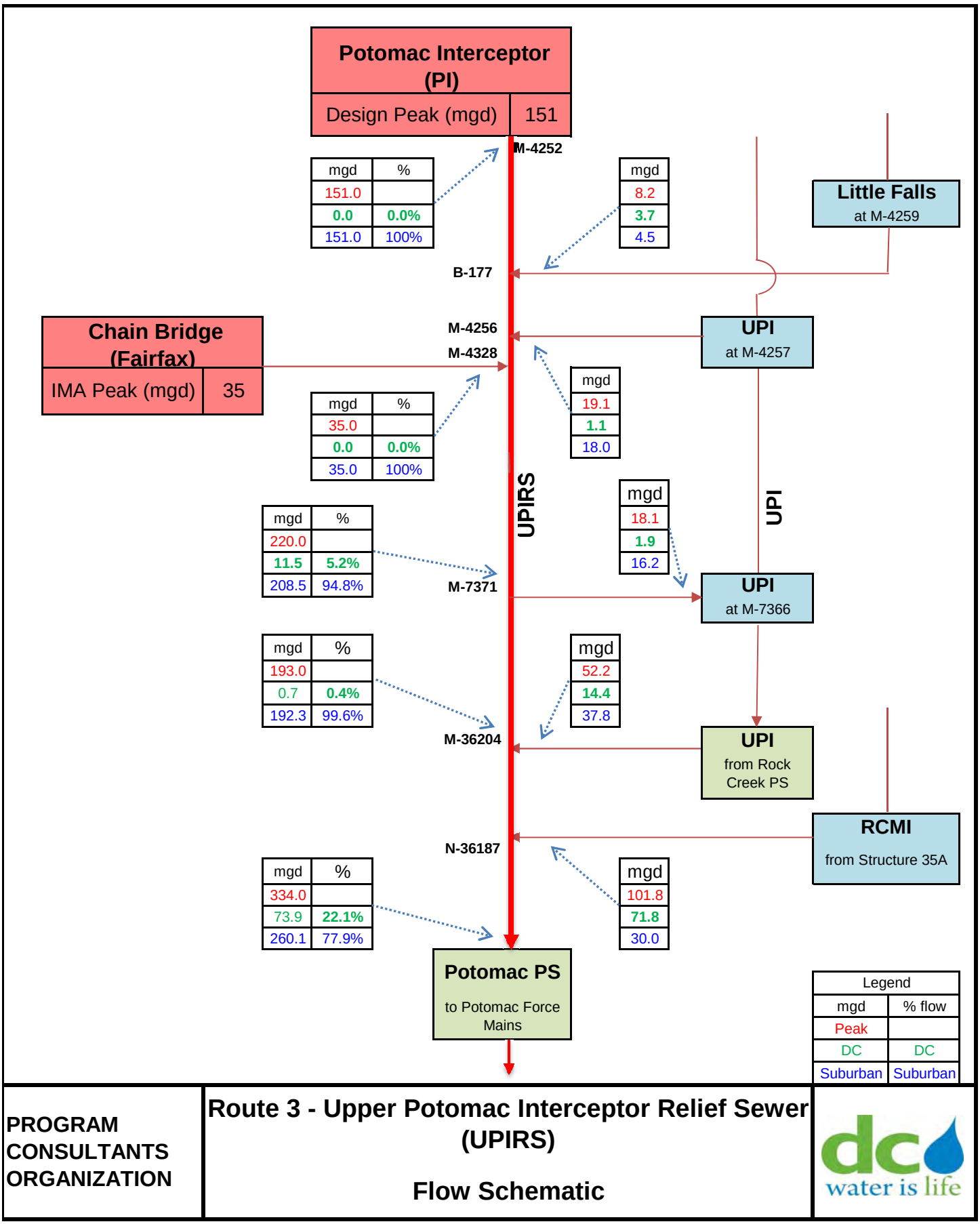
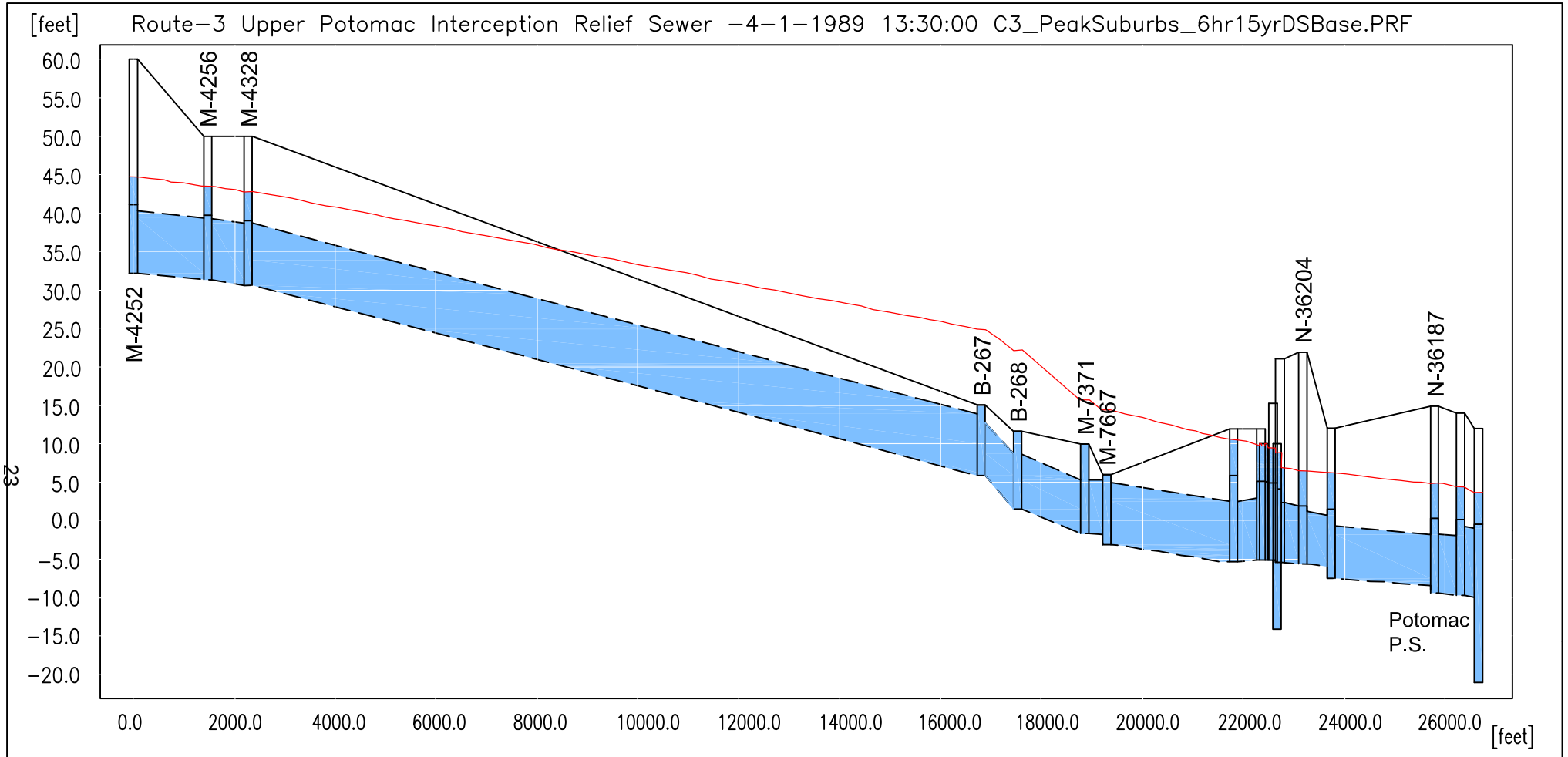


PROGRAM CONSULTANTS ORGANIZATION	**Route 3 - Upper Potomac Interceptor Relief Sewer (UPIRS)** **Flow Schematic**	dc water is life

ROUTE 3 - UPPER POTOMAC INTERCEPTOR RELIEF SEWER (UPIRS)

Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	Suburban Flow (mgd)	% Suburban Flow	WSSC Flow (mgd)	% WSSC Flow	Fairfax Flow (mgd)	% Fairfax Flow	LCSA Flow (mgd)	% LCSA Flow	Other PI Users Flow (mgd)	% Other Flow	DC Flow (mgd)	% DC Flow
1	M-4252	BN-177	8.0	1,479	151.0	151.0	100.0%	66.0	43.7%	55.6	36.8%	24.1	15.9%	5.4	3.6%	0.0	0.0%
2	BN-177	M-4256	8.0	827	160.0	155.5	97.2%	70.5	44.1%	55.6	34.7%	24.1	15.0%	5.4	3.4%	4.5	2.8%
3	M-4256	M-4328	8.0	35	177.0	173.5	98.0%	88.5	50.0%	55.6	31.4%	24.1	13.6%	5.4	3.1%	3.5	2.0%
4	M-4328	BN-267	8.0	14,617	201.0	208.5	103.7%	88.5	44.0%	90.6	45.1%	24.1	12.0%	5.4	2.7%	-7.5	-3.7%
5	BN-267	BN-268	7.0	706	204.0	208.5	102.2%	88.5	43.4%	90.6	44.4%	24.1	11.8%	5.4	2.6%	-4.5	-2.2%
6	BN-268	M-7371	7.0	1,342	220.0	208.5	94.8%	88.5	40.2%	90.6	41.2%	24.1	10.9%	5.4	2.5%	11.5	5.2%
7	M-7371	M-7667	7.0	438	213.0	191.4	89.8%	81.2	38.1%	83.1	39.0%	22.1	10.4%	5.0	2.3%	21.6	10.2%
8	M-7667	M-8197	8.0	2,537	213.0	191.4	89.8%	81.2	38.1%	83.1	39.0%	22.1	10.4%	5.0	2.3%	21.6	10.2%
9	M-8197	M-14770	8.0	531	213.0	191.4	89.8%	81.2	38.1%	83.1	39.0%	22.1	10.4%	5.0	2.3%	21.6	10.2%
10	M-14770	B-818	3.5	75	213.0	191.4	89.8%	81.2	38.1%	83.1	39.0%	22.1	10.4%	5.0	2.3%	21.6	10.2%
11	B-818	N-36206	8.0	188	193.0	191.4	99.1%	81.2	42.1%	83.1	43.1%	22.1	11.4%	5.0	2.6%	1.6	0.9%
12	N-36206	N-23676	5.0	71	193.0	191.4	99.1%	81.2	42.1%	83.1	43.1%	22.1	11.4%	5.0	2.6%	1.6	0.9%
13	N-23676	N-36207	5.0	69	193.0	191.4	99.1%	81.2	42.1%	83.1	43.1%	22.1	11.4%	5.0	2.6%	1.6	0.9%
14	N-36207	N-36204	8.5	467	193.0	191.4	99.1%	81.2	42.1%	83.1	43.1%	22.1	11.4%	5.0	2.6%	1.6	0.9%
15	N-36204	N-11150	6.8	563	243.0	230.1	94.7%	110.1	45.3%	90.6	37.3%	24.1	9.9%	5.4	2.2%	12.9	5.3%
16	N-11150	N-36187	6.8	2,049	248.0	230.1	92.8%	110.1	44.4%	90.6	36.5%	24.1	9.7%	5.4	2.2%	17.9	7.2%
17	N-36187	N-36184	7.8	523	334.0	260.1	77.9%	140.1	41.9%	90.6	27.1%	24.1	7.2%	5.4	1.6%	73.9	22.1%
18	N-36184	Potomac PS	9.0	343	334.0	260.1	77.9%	140.1	41.9%	90.6	27.1%	24.1	7.2%	5.4	1.6%	73.9	22.1%
				26,859													

Route-3 Upper Potomac Interceptor Relief Sewer (UPIRS)



Diameter	8.00		8.00		7.00		8.00		6.75		[ft]
Discharge	150.6	177	201		220		213	193	247		[ft]

Legend

Hydraulic Gradient	
Flow Level	
Sewer Outline	

5. Route 4 - Rock Creek Main Interceptor (RCMI)

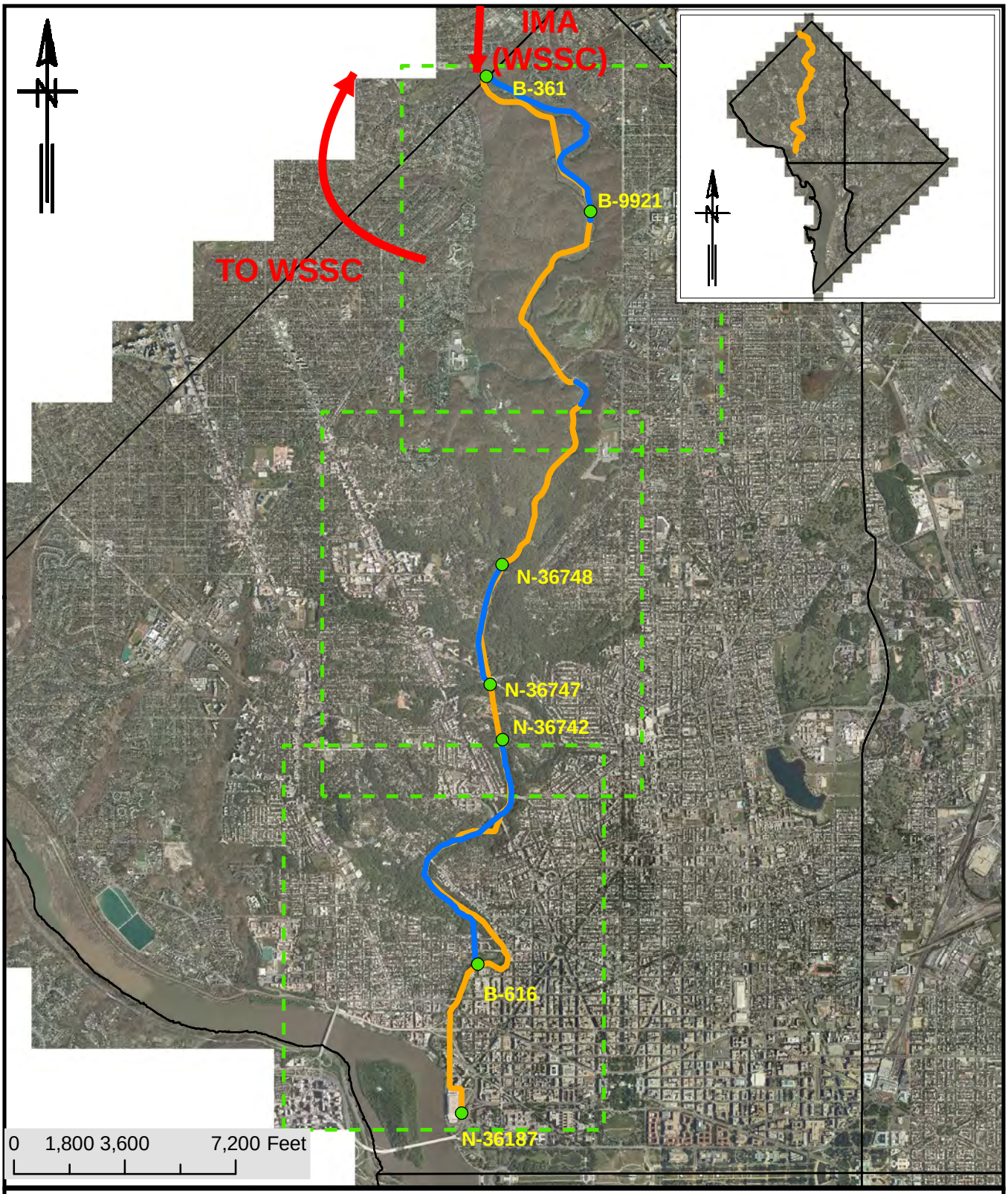
SYSTEM DESCRIPTION

The Rock Creek Main Interceptor (RCMI) conveys flows from Montgomery County, MD and Northwest DC. The pipe size varies in size from 51-inches to 78-inches in diameter and significant portions of the RCMI have parallel relief sewers. The RCMI length analyzed is approximately 42,120 feet, and there are approximately 22,280 feet of additional parallel relief sewers. See attached location map and flow schematic.

Per the IMA, WSSC is allocated 56.6 mgd of peak conveyance at the MD-DC boundary, originating at manhole B-361. WSSC's peak flow of 56.6 mgd represents 86.8 percent of flow at the boundary**.** The remaining flow is District flow that connects to WSSC's system before reentering the District in the DC Water system in the RCMI.

As the flow is routed through the pipeline, the hydraulic model accounts for rainfall-derived infiltration and inflow and the sanitary flow collected in the system as it passes through neighborhoods in Northwest DC. Due to the need for increased capacity, three relief sewers parallel to the RCMI were constructed to convey peak flows along the RCMI. The downstream flow splits at Structure 35A, near the terminus of the route. Flow is conveyed to both the B Street/New Jersey Avenue Trunk Sewer (Route 6) and the UPIRS Sewer (Route 3).

The attached flow analysis presents the peak flows for each major pipe segment of the RCMI and the three relief sewers as well as the calculated ratios of WSSC flow to peak flow.



Legend

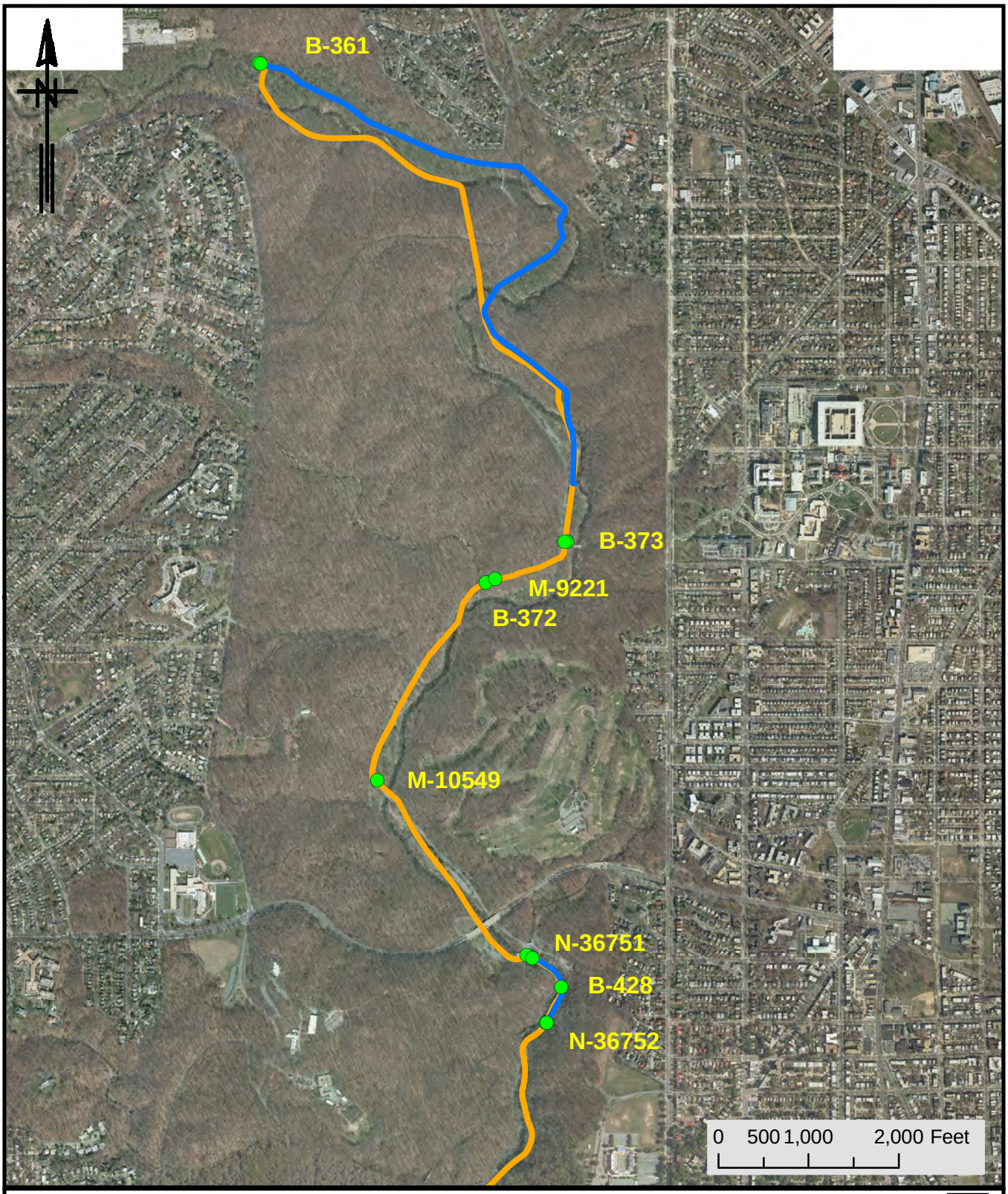
- Manholes
- RCMI
- RCMI Relief Sewers
- Boundary Inputs

1
2
3

PROGRAM CONSULTANTS ORGANIZATION

Route 4-Rock Creek Main Interceptor (RCMI) & RCMI Relief Sewers

dc water is life



Legend

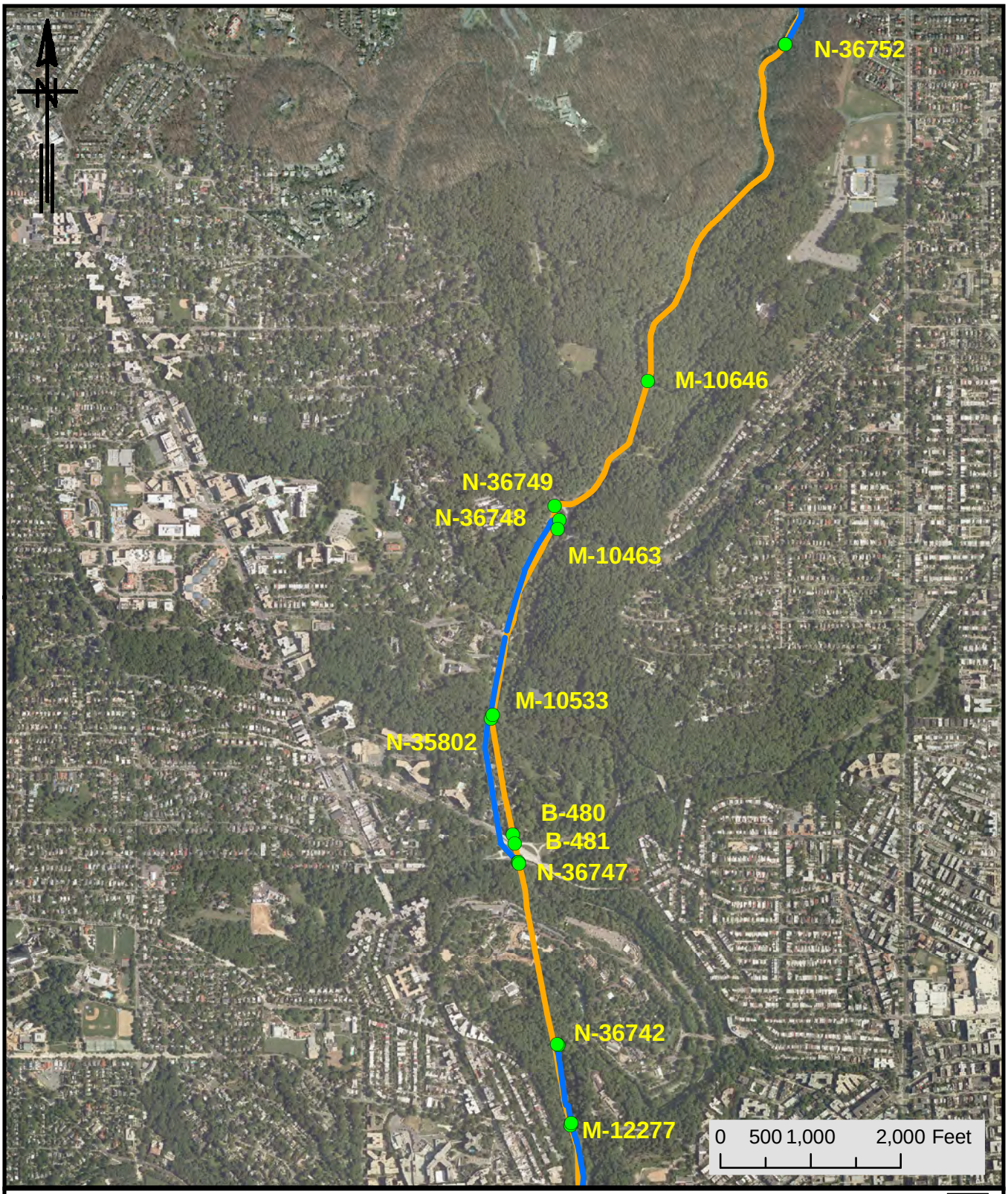
- Manholes
- RCMI
- RCMI Relief Sewers

1
2
3

PROGRAM CONSULTANTS ORGANIZATION

Route 4-RCMI
Detail 1 of 3

dc water is life



Legend

- Manholes
- RCMI
- RCMI Relief Sewers

1
2
3

PROGRAM CONSULTANTS ORGANIZATION	**Route 4- RCMI** **Detail 2 of 3**	dc water is life

Legend

- Manholes
- RCMI
- RCMI Relief Sewers

1
2
3

PROGRAM CONSULTANTS ORGANIZATION

Route 4- RCMI
Detail 3 of 3

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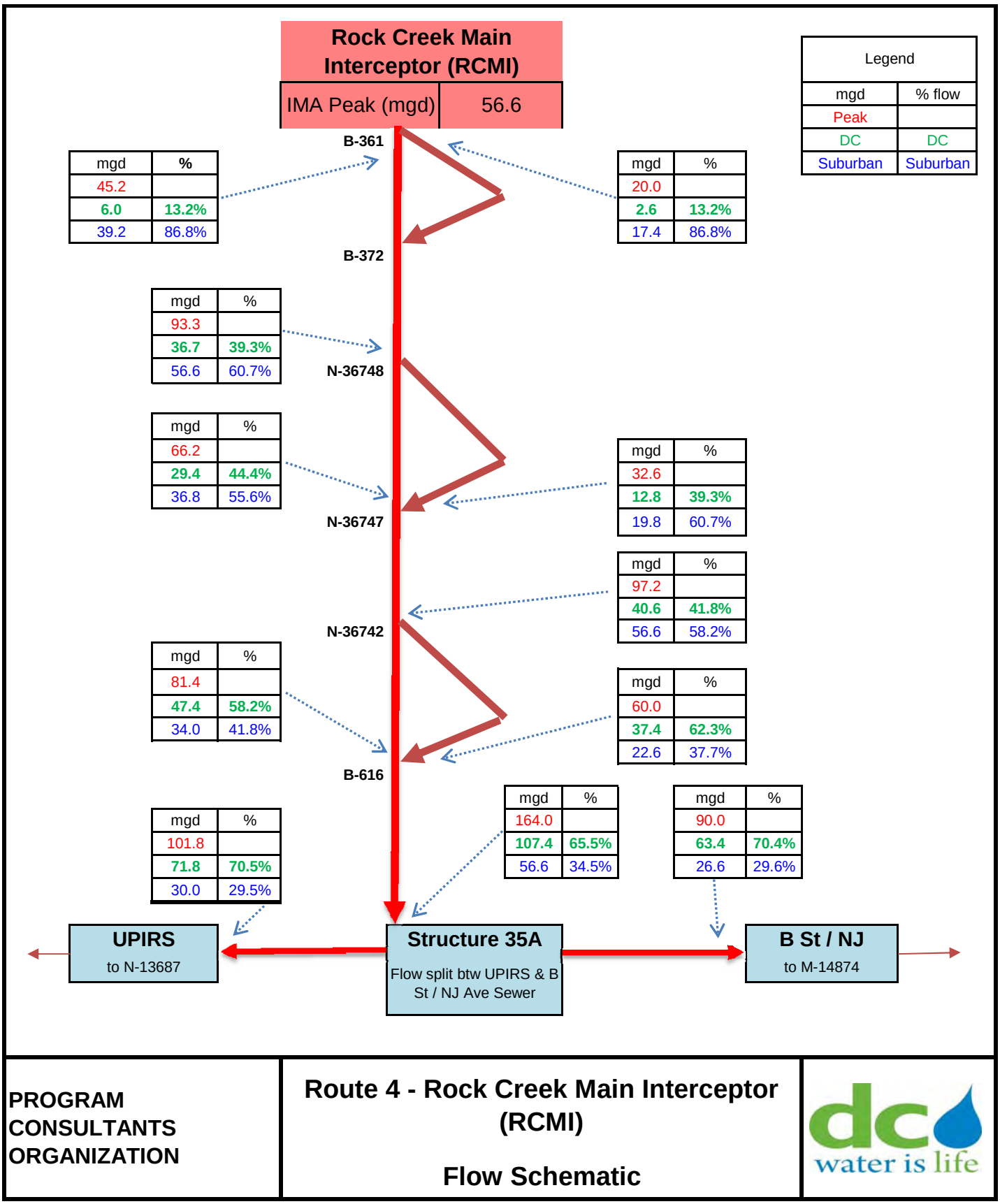


PROGRAM CONSULTANTS ORGANIZATION

Route 4 - Rock Creek Main Interceptor (RCMI)

Flow Schematic

dc water is life

ROUTE 4 - ROCK CREEK MAIN INTERCEPTOR (RCMI)

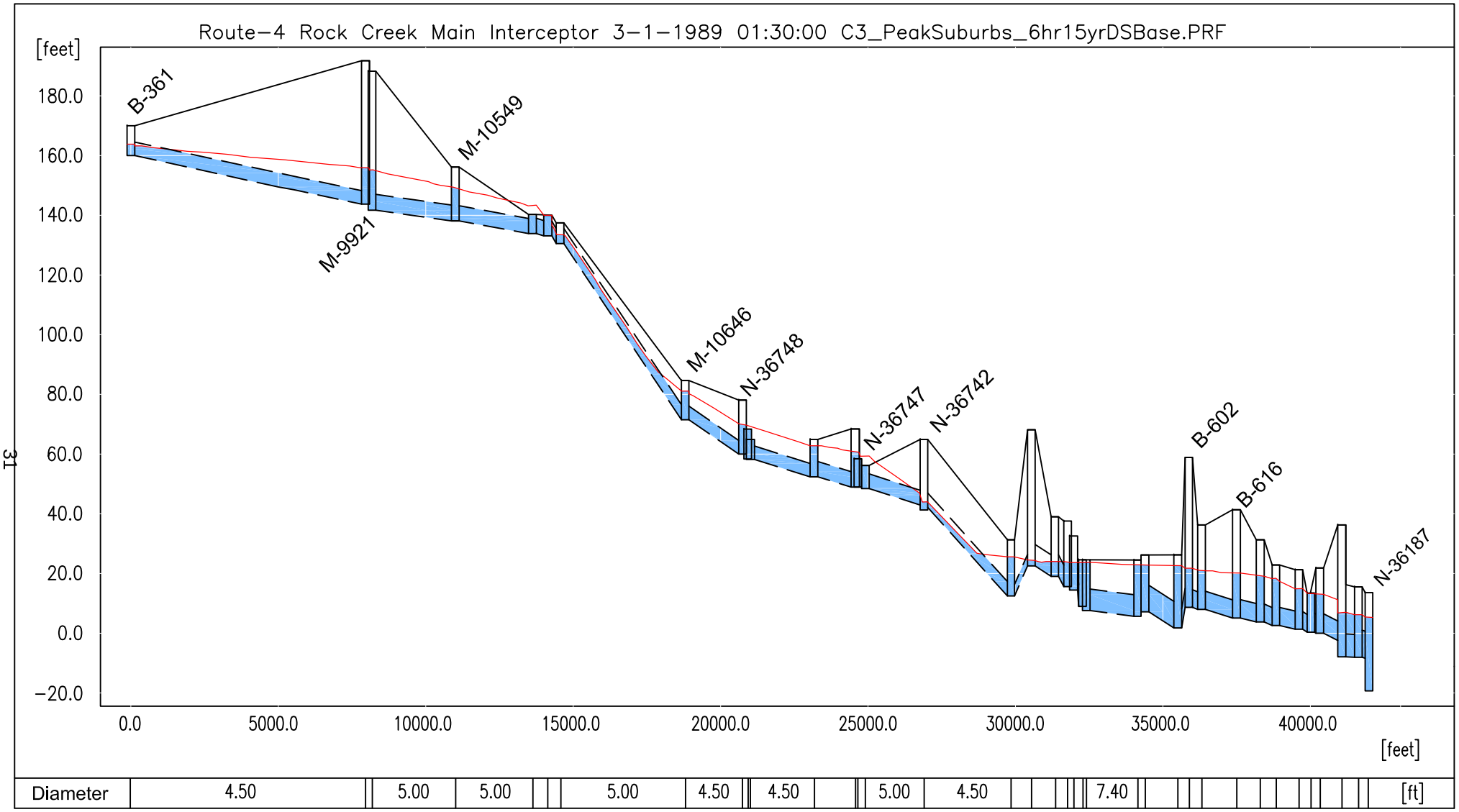
Main Sewer

Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
1	B-361	M-9921	4.5	8099	45.2	39.2	86.8%	6.0	13.2%
2	M-9921	B-372	3.0	253	64.5	56.6	87.8%	7.9	12.2%
3	B-372	M-10549	5.0	2898	64.5	56.6	87.8%	7.9	12.2%
4	M-10549	N-3675	5.0	2680	67.9	56.6	83.4%	11.3	16.6%
5	N-36751	B-428	5.0	484	82.9	56.6	68.3%	26.3	31.7%
6	B-428	N-36752	5.0	449	83.1	56.6	68.1%	26.5	31.9%
7	N-36752	M-10646	5.0	4338	83.1	56.6	68.1%	26.5	31.9%
8	M-10646	N-36749	4.5	1988	82.7	56.6	68.4%	26.1	31.6%
9	N-36749	N-36748	5.5	169	93.3	56.6	60.7%	36.7	39.3%
10	N-36748	M-10643	4.5	79	61.0	36.8	60.4%	24.2	39.6%
11	M-10643	M-10533	4.5	2212	59.0	36.8	62.5%	22.2	37.5%
12	M-10533	B-480	5.0	1415	59.0	36.8	62.5%	22.2	37.5%
13	B-480	B-481	5.0	107	61.4	36.8	60.0%	24.6	40.0%
14	B-481	N-36747	5.0	239	66.2	36.8	55.7%	29.4	44.3%
15	N-36747	N-36742	5.0	2052	97.2	56.6	58.2%	40.6	41.8%
16	N-36742	M-12277	4.3	1254	60.7	34.0	56.0%	26.7	44.0%
17	M-12277	M-11019	4.3	1195	60.7	34.0	56.0%	26.7	44.0%
18	M-11019	RCM-039	4.3	1090	56.9	34.0	59.8%	22.9	40.2%
19	RCM-039	RCM-041	4.3	1673	58.0	34.0	58.6%	24.0	41.4%
20	RCM-041	RCM-043	4.5	917	58.3	34.0	58.3%	24.3	41.7%
21	RCM-043	RCM-044	4.3	176	58.3	34.0	58.3%	24.3	41.7%
22	RCM-044	B-602	5.0	843	59.2	34.0	57.5%	25.2	42.5%
23	B-602	B-3903	6.0	925	61.2	34.0	55.6%	27.2	44.4%
24	B-3903	B-3754	6.0	300	76.8	34.0	44.3%	42.8	55.7%
25	B-3754	B-616	6.0	944	81.4	34.0	41.8%	47.4	58.2%
26	B-616	B-3835	6.0	1636	99.6	56.6	56.8%	43.0	43.2%
27	B-3835	B-3838	6.0	832	101.0	56.6	56.0%	44.4	44.0%
28	B-3838	B-3837	6.5	567	124.0	56.6	45.6%	67.4	54.4%
29	B-3837	M-14862	6.5	779	145.0	56.6	39.0%	88.4	61.0%
30	M-14862	M-14836	6.5	725	147.9	56.6	38.3%	91.3	61.7%
31	M-14836	B-840	6.5	767	164.0	56.6	34.5%	107.4	65.5%
To UPIRS	B-840	N-36187	6.5	36	101.8	30.0	29.5%	71.8	70.5%
				42120					

Relief Sewer

Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
A1	BN-361	BN-373	3	8346	20.0	17.4	86.8%	2.6	13.2%
A2	BN-373	M-9921	3	724	27.7	17.4	62.9%	10.3	37.1%
B1	N-36748	N-35802	3.5	2327	32.7	19.8	60.4%	12.9	39.6%
B2	N-35802	N-36747	4	1720	32.6	19.8	60.6%	12.8	39.4%
C1	N-36742	M-12573	4.5	2937	40.3	22.6	56.0%	17.7	44.0%
C2	M-12573	N-23472	4.5	697	40.1	22.6	56.3%	17.5	43.7%
C3	N-23472	M-12646	7.0	812	40.1	22.6	56.3%	17.5	43.7%
C4	M-12646	B-568	7.4	404	42.6	22.6	53.0%	20.0	47.0%
C5	B-568	N-36732	7.4	233	48.7	22.6	46.4%	26.1	53.6%
C6	N-36732	B-571	7.4	297	48.7	22.6	46.4%	26.1	53.6%
C7	B-571	M-12745	5.0	102	48.7	22.6	46.4%	26.1	53.6%
C8	M-12745	M-13071	7.4	1759	48.8	22.6	46.3%	26.2	53.7%
C9	M-13071	M-13074	5.0	243	48.9	22.6	46.2%	26.3	53.8%
C10	M-13074	B-616	6.0	1419	60.0	22.6	37.6%	37.4	62.4%
To B St	B-840	M-14874	6.5	262	90.0	26.6	29.6%	63.4	70.4%
				22281					

Route-4 Rock Creek Main Interceptor (RCMI)



Legend

Hydraulic Gradient	
Flow Level	
Sewer Outline	

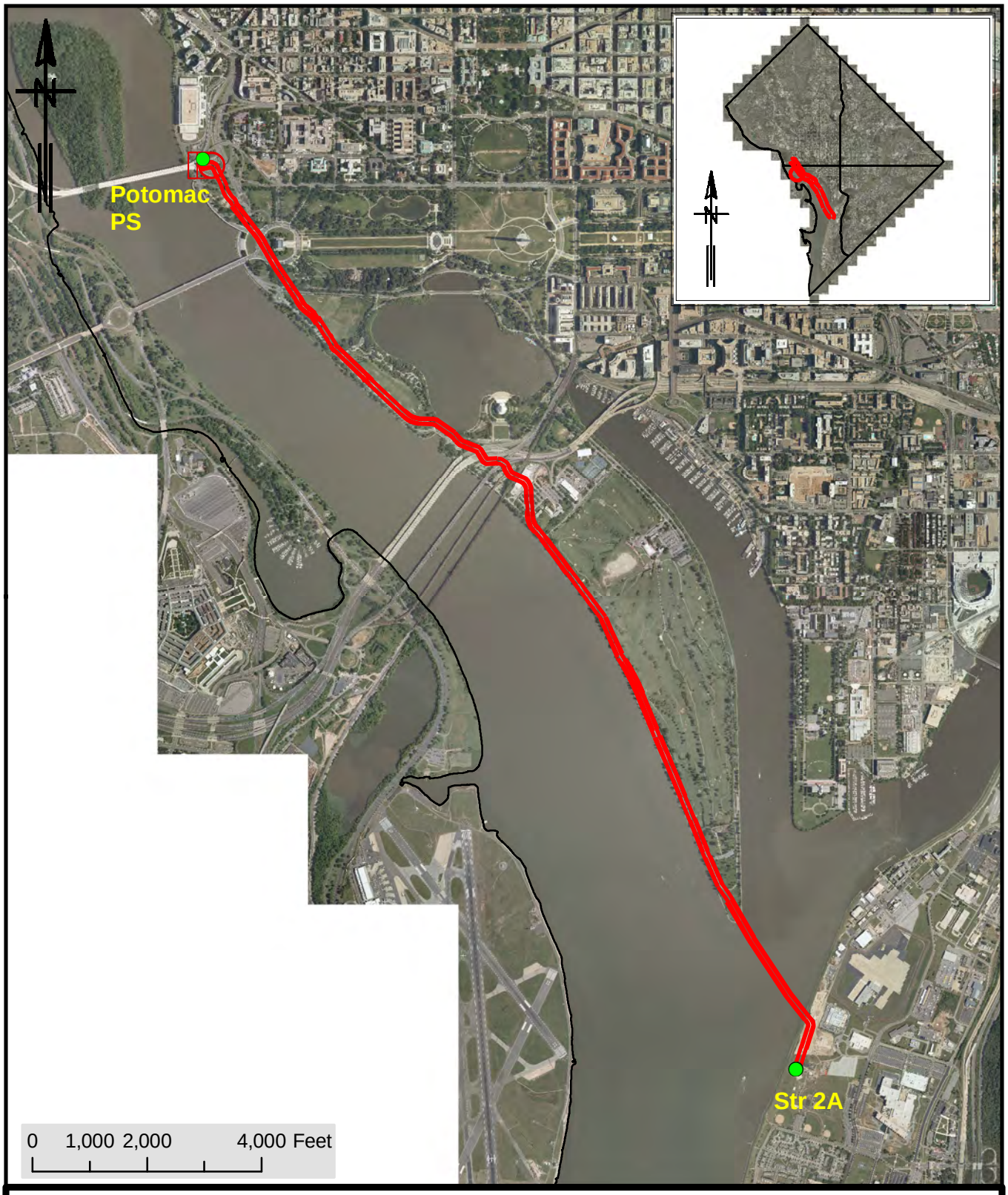
6. Route 5 - Potomac Force Mains (Potomac Pump Station to Structure 2A)

SYSTEM DESCRIPTION

The Potomac Force Mains convey flow from the Potomac Pump Station, under the Anacostia River, to Structure 2A (Str 2A), located on Bolling Air Force Base. The Potomac Pumping Station has a firm capacity to pump a peak flow rate of 460 mgd to the Potomac Force Mains. One barrel of the Potomac Force Mains has a 72-inch internal diameter that is primarily used in wet weather, and the other force main is a 96-inch internal diameter sewer.

The total peak flow that passes through the force mains equals the peak capacity of the Potomac Pump Station. There is no DC inflow included for the force mains and the calculated flow volume and share are constant through the entire length of the force mains. Due to constant flow and a hydraulic gradient that is consistently above the pipe, there is no hydraulic profile included for this route.

This route, the Potomac Force Mains, terminates at Str 2A where all flow is discharged. From Str 2A, the flow is conveyed via gravity through the Blue Plain Influent Sewers to Blue Plain Pump Station No.2 as indicated in Route 11.



Legend

- Manholes
- Potomac Force Main
- Pump Stations

PROGRAM
CONSULTANTS
ORGANIZATION

Route 5 - Potomac Force Mains

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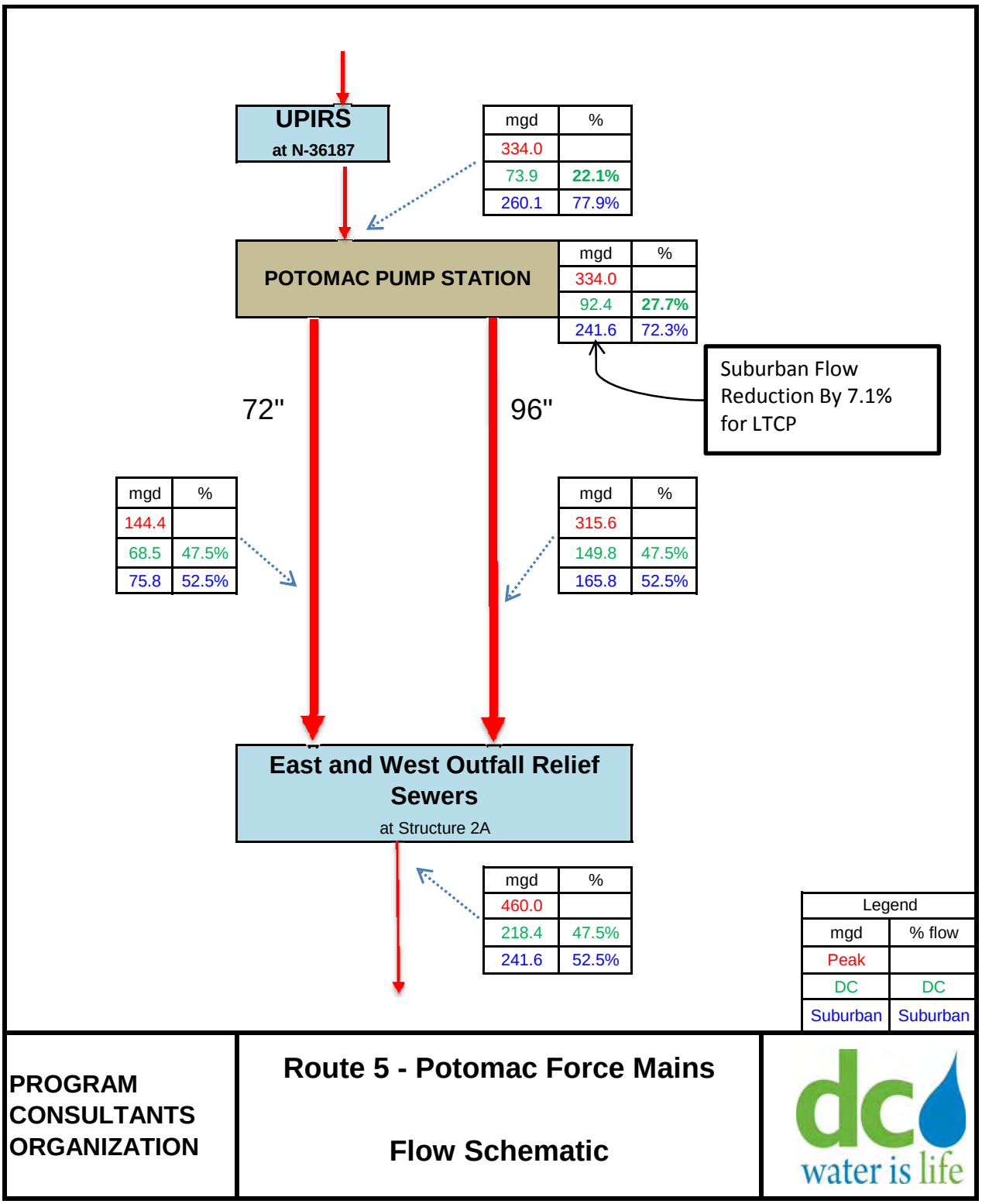


PROGRAM CONSULTANTS ORGANIZATION

Route 5 - Potomac Force Mains

Flow Schematic

dc water is life

Route 5 Potomac Force Mains (Potomac PS to Structure 2A)																
Facility	From	To	Dia (ft)	Modeled Peak Flow (mgd)	Suburban Flow (mgd)	% Suburban Flow	WSSC Flow (mgd)	% WSSC Flow	Fairfax Flow (mgd)	% Fairfax Flow	LCSA Flow (mgd)	% LCSA Flow	Other PI Users Flow (mgd)	% Other Flow	DC Flow (mgd)	% DC Flow
72" Potomac FM	Pot PS	Str 2A	6.0	144.4	75.9	52.53%	40.9	28.3%	26.4	18.3%	7.0	4.9%	1.6	1.1%	68.5	47.47%
96" Potomac FM	Pot PS	Str 2A	8.0	315.6	165.8	52.53%	89.3	28.3%	57.7	18.3%	15.3	4.9%	3.4	1.1%	149.8	47.47%
				460.0	241.6		130.1		84.1		22.4		5.0		218.4	

7. Route 6 - B Street / New Jersey Avenue Trunk Sewer

SYSTEM DESCRIPTION

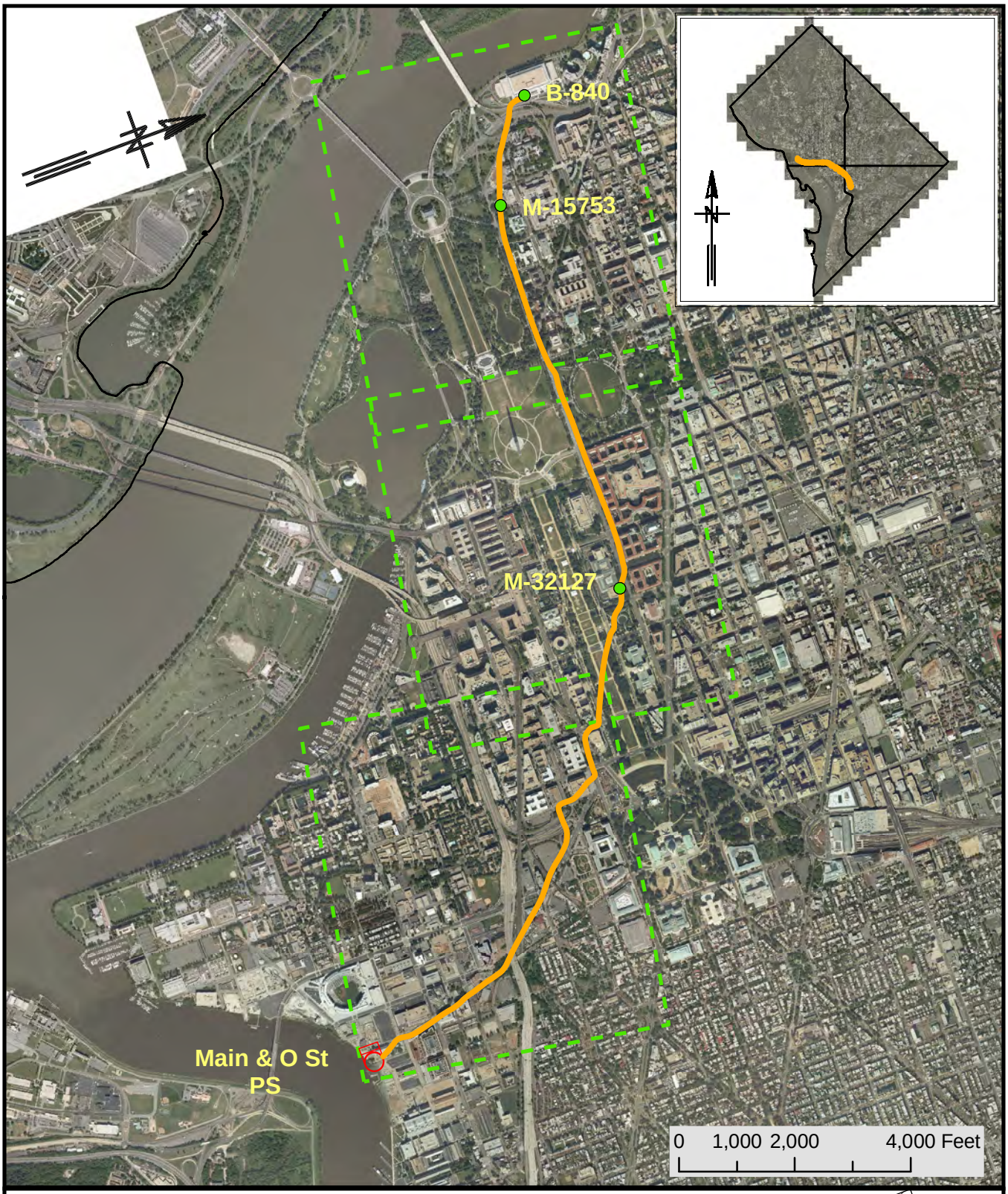
The B Street / New Jersey Ave. Trunk Sewer conveys flows from Montgomery County, MD, as well as flow from several sewer sheds in Northwest, Southwest and Southeast, DC, including the National Mall area. Flow route terminates at Main Pumping Station, located adjacent to the Anacostia River. The pipe size and shape varies from a circular 6.0 feet diameter sewer at the upstream end to a 16 feet arched sewer with a dry weather flow cunette near Main Pumping Station. The analyzed route is over 18,200 feet in length.

Due to the presence of WSSC flow the sewer functions as a multi-jurisdictional use facility, even though this was not recognized in DC Water's enabling legislation. The original sewer dates back to the earliest installed network of sewers serving the District and is a continuation of the Rock Creek Main Interceptor (RCMI, Route 4). In the 1960's, at control Structure 35A, the upstream end of the B Street / New Jersey Avenue Sewer was linked to the UPIRS (Route 3) near the Kennedy Center to provide hydraulic relief for the RCMI. Structure 35A allows flow to be conveyed to both the B Street / New Jersey Avenue Trunk Sewer or the UPIRS by operating slide gates within this control structure. Analysis included in this report is representative of current operating positions of the gates. See the attached location map and flow schematic.

Per the IMA, WSSC is allocated 56.6 mgd of peak conveyance at the MD-DC boundary through the RCMI (Route 4) where WSSC's flow into the B Street / New Jersey Ave. Sewer originates. The B Street/ New Jersey Ave. Trunk Sewer begin at Structure 35A, also known as manhole B-840. The RCMI flow, including the IMA allocated WSSC flow, splits to the UPIRS (Route 3) and the B Street / New Jersey Ave Trunk Sewer. The calculated WSSC flow diverted to B Street New / Jersey Ave at Structure 35A from the RCMI is 26.6 mgd of the 56.6 mgd.

As the flow is routed through the B Street / New Jersey Ave. Trunk Sewer, the hydraulic model accounts for rainfall-derived infiltration and inflow and the sanitary flow collected in the system as it passes through the adjacent neighborhoods in Northwest, Southwest and Southeast DC. As indicated in the methodology section, this evaluation assumes that all suburban flow is conveyed to Blue Plains. Therefore, the interconnections between the B Street / New Jersey Ave. Trunk Sewer and O Street Pumping Station, from the wet-weather diversions at Structures 15 and 15A, are not considered to be MJUF.

The attached table of percentage flow shares presents the peak flows for each major pipe segment of the B Street / New Jersey Ave. Trunk Sewer and the calculated ratios of WSSC flows to peak flows.



Legend

- Manholes
- B St. N.J. Trunk Sewer
- Pump Stations

Key

1
2
3

PROGRAM
CONSULTANTS
ORGANIZATION

Project : Route 6 - B Street
New Jersey Ave Trunk Sewer

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Legend

- Manholes
- B St. N.J. Trunk Sewer
- Sewersheds Boundary
- Pump Stations

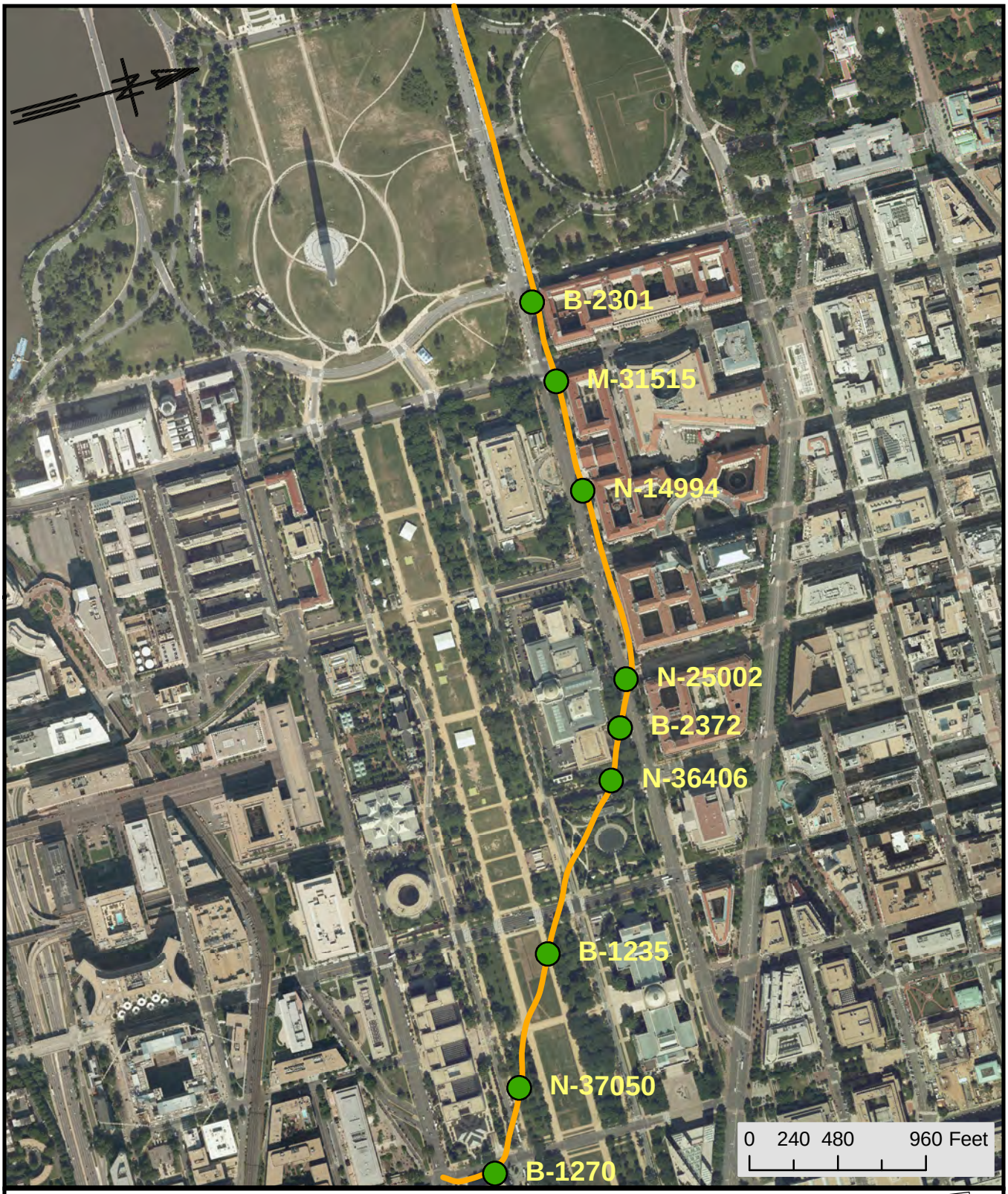
Key

1
2
3

PROGRAM CONSULTANTS ORGANIZATION

Route 6 - B St. N.J. Ave Trunk Sewer
Detail 1 of 3

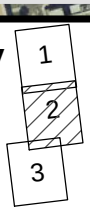
dc water is life



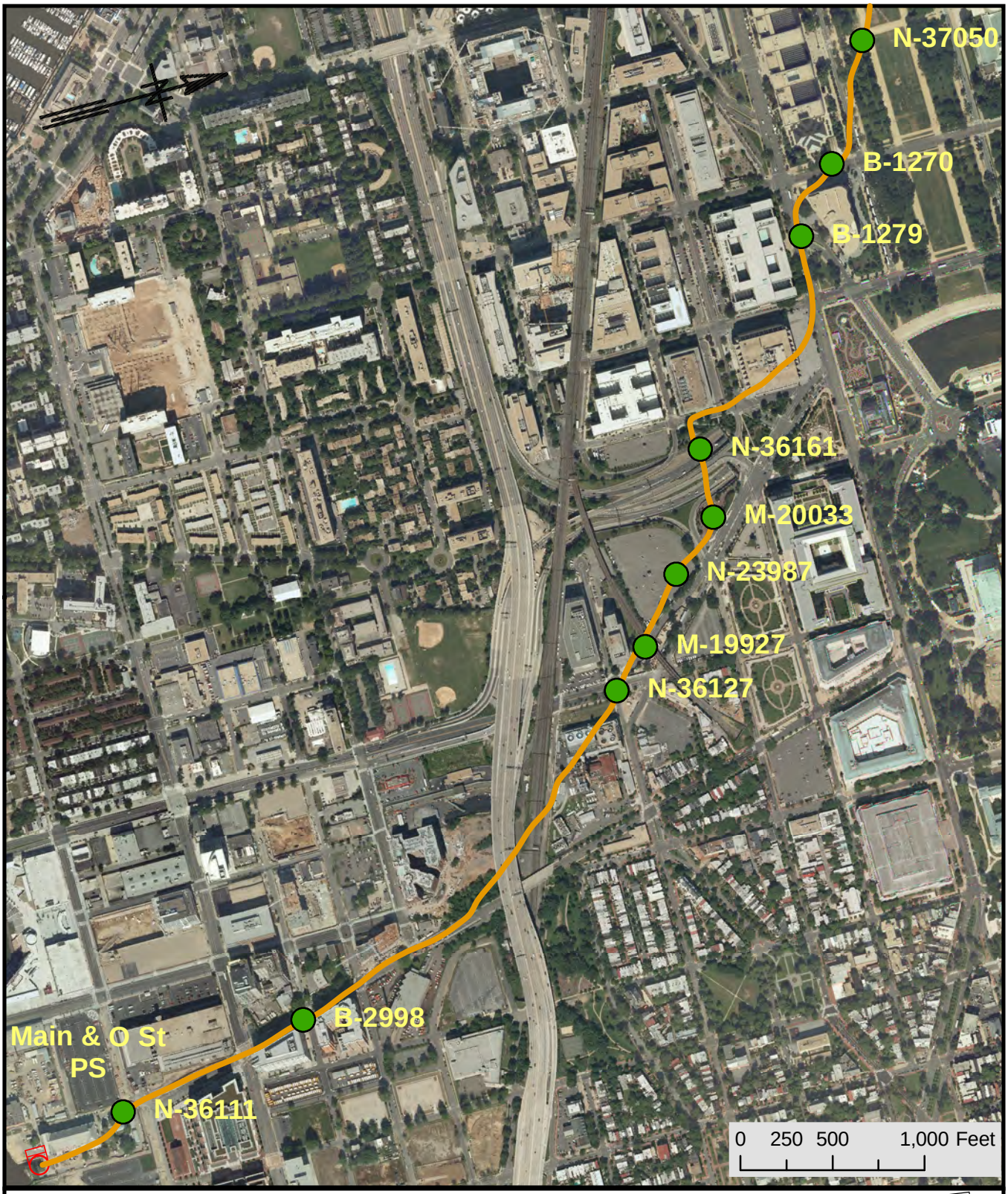
Legend

- Manholes
- B St. N.J. Trunk Sewer

Key



PROGRAM CONSULTANTS ORGANIZATION	**Route 6 - B St. N.J. Ave Trunk Sewer** **Detail 2 of 3**	dc water is life



Legend

- Manholes
- B St. N.J. Trunk Sewer
- Pump Stations

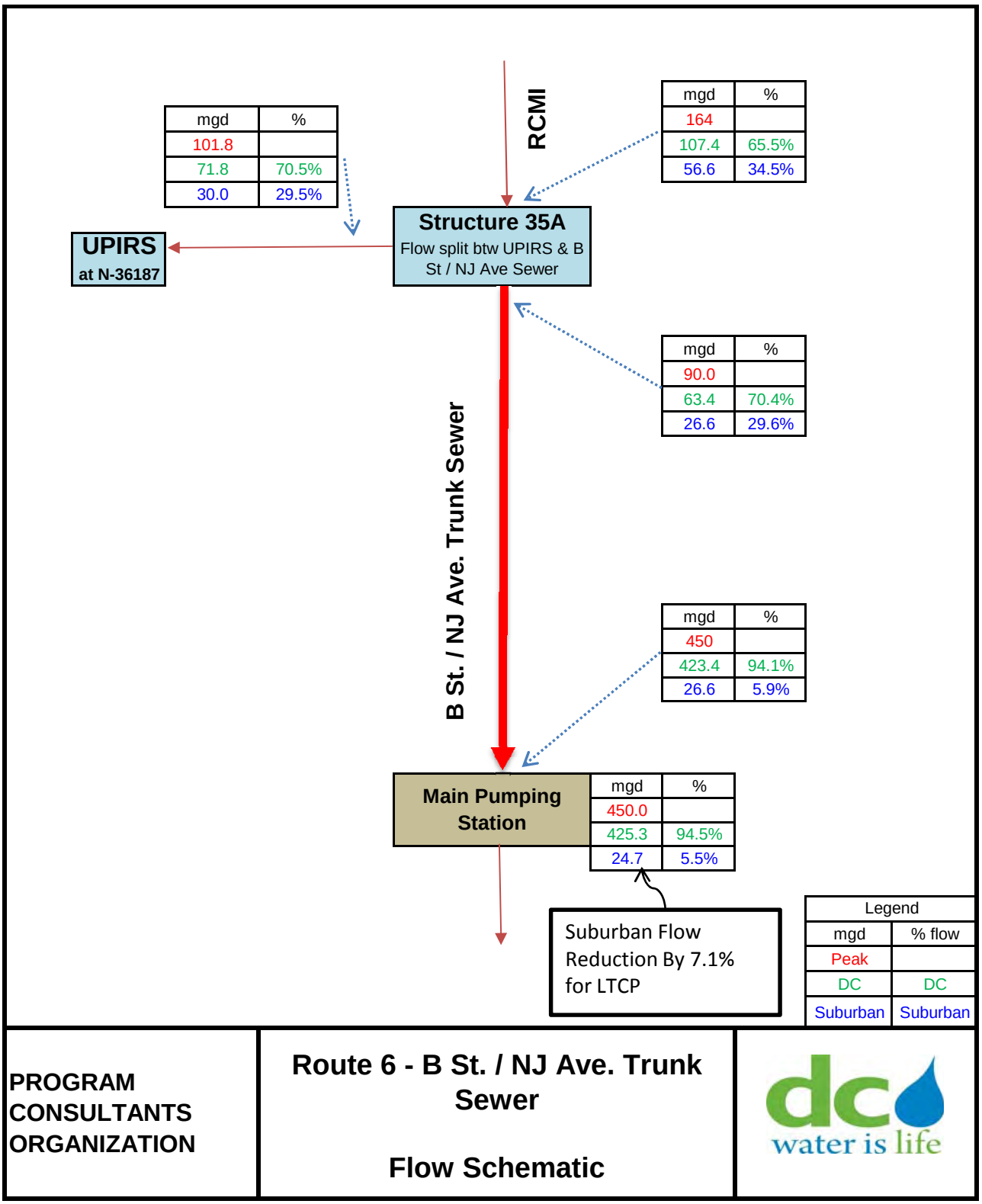
Key

1
2
3

PROGRAM CONSULTANTS ORGANIZATION

Route 6 - B St. N.J. Ave Trunk Sewer
Detail 3 of 3

dc water is life

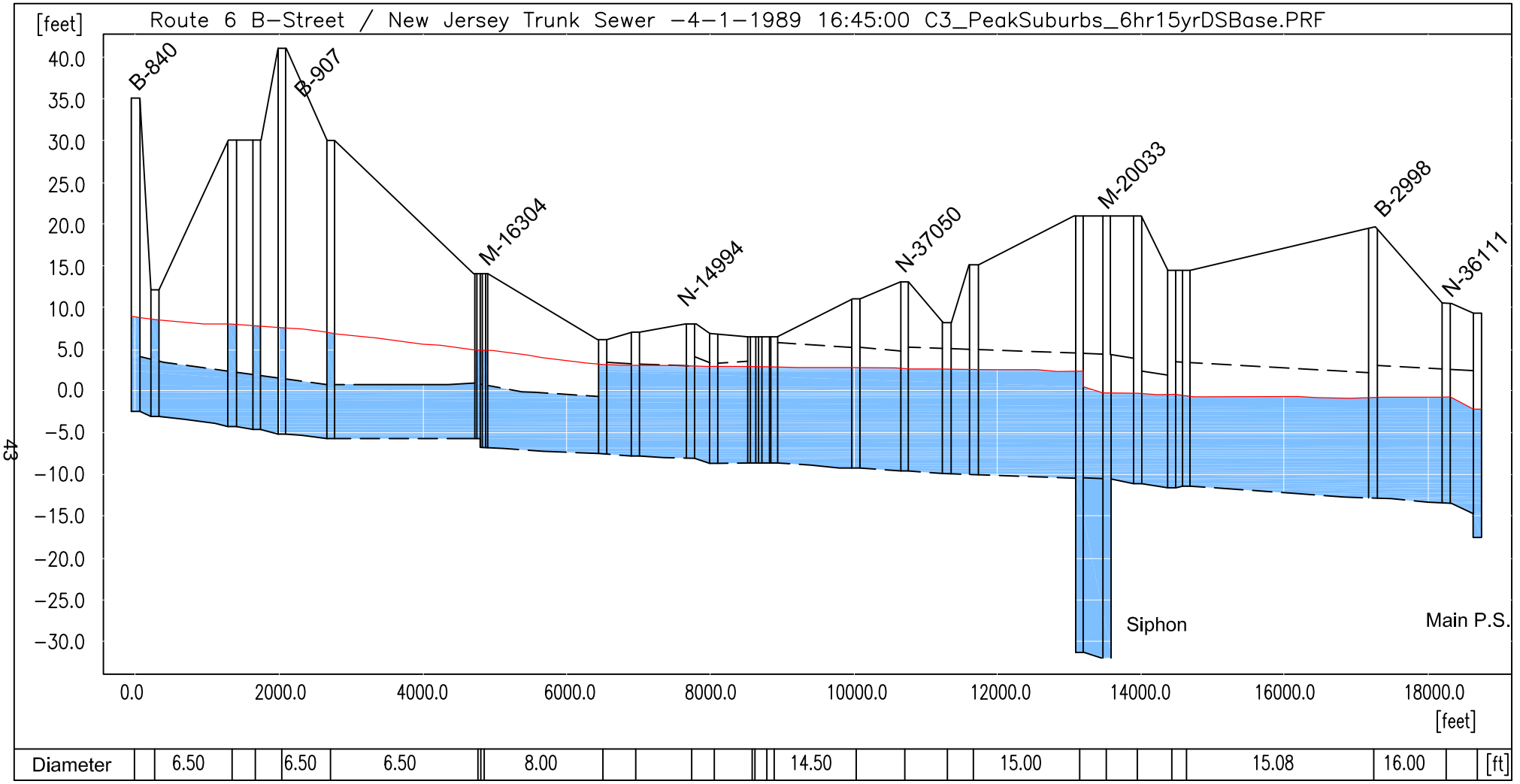


PROGRAM CONSULTANTS ORGANIZATION	**Route 6 - B St. / NJ Ave. Trunk Sewer** **Flow Schematic**	dc water is life

ROUTE 6 - B ST. / NJ AVE. TRUNK SEWER

Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
1	B-840 (Str 35A)	M-14874	6.5	262.1	90.0	26.6	29.6%	63.4	70.4%
2	M-14874	M-15275	6.5	1081.0	89.8	26.6	29.6%	63.2	70.4%
3	M-15275	M-15276	6.5	324.2	89.5	26.6	29.7%	62.9	70.3%
4	M-15276	B-907	6.5	362.6	92.8	26.6	28.7%	66.2	71.3%
5	B-907	B-903	6.5	690.6	115.0	26.6	23.1%	88.4	76.9%
6	B-903	M-16304	6.5	2055.2	120.0	26.6	22.2%	93.4	77.8%
7	M-16304	B-2301	7.0	1698.9	132.0	26.6	20.2%	105.4	79.8%
8	B-2301	M-31515	11.0	458.1	128.0	26.6	20.8%	101.4	79.2%
9	M-31515	N-14994	11.0	760.0	123.0	26.6	21.6%	96.4	78.4%
10	N-14994	N-25002	12.0	856.9	128.0	26.6	20.8%	101.4	79.2%
11	N-25002	B-2372	10.8	204.2	140.0	26.6	19.0%	113.4	81.0%
12	B-2372	N-36406	10.8	104.4	262.0	26.6	10.2%	235.4	89.8%
13	N-36406	B-1235	14.5	1146.7	262.0	26.6	10.2%	235.4	89.8%
14	B-1235	N-37050	14.5	674.2	262.0	26.6	10.2%	235.4	89.8%
15	N-37050	B-1270	15.0	595.9	352.0	26.6	7.6%	325.4	92.4%
16	B-1270	B-1279	15.0	365.2	416.0	26.6	6.4%	389.4	93.6%
17	B-1279	N-36161	15.0	1474.7	410.0	26.6	6.5%	383.4	93.5%
18	N-36161	N-20033	9.0	386.1	319.0	26.6	8.3%	292.4	91.7%
19	N-20033	M-23987	15.0	430.1	466.0	26.6	5.7%	439.4	94.3%
20	M-23987	M-19927	13.5	478.2	460.0	26.6	5.8%	433.4	94.2%
21	M-19927	N-36127	15.0	196.2	450.0	26.6	5.9%	423.4	94.1%
22	N-36127	B-2998	15.1	2611.2	450.0	26.6	5.9%	423.4	94.1%
23	B-2998	N-36111	16.0	1021.7	450.0	26.6	5.9%	423.4	94.1%
				18,238					

Route-6 B street / New Jersey Trunk Sewer



43

Legend

Hydraulic Gradient	
Flow Level	
Sewer Outline	

8. Route 7 - East and West Outfall Sewers (Main Pumping Station to Blue Plains)

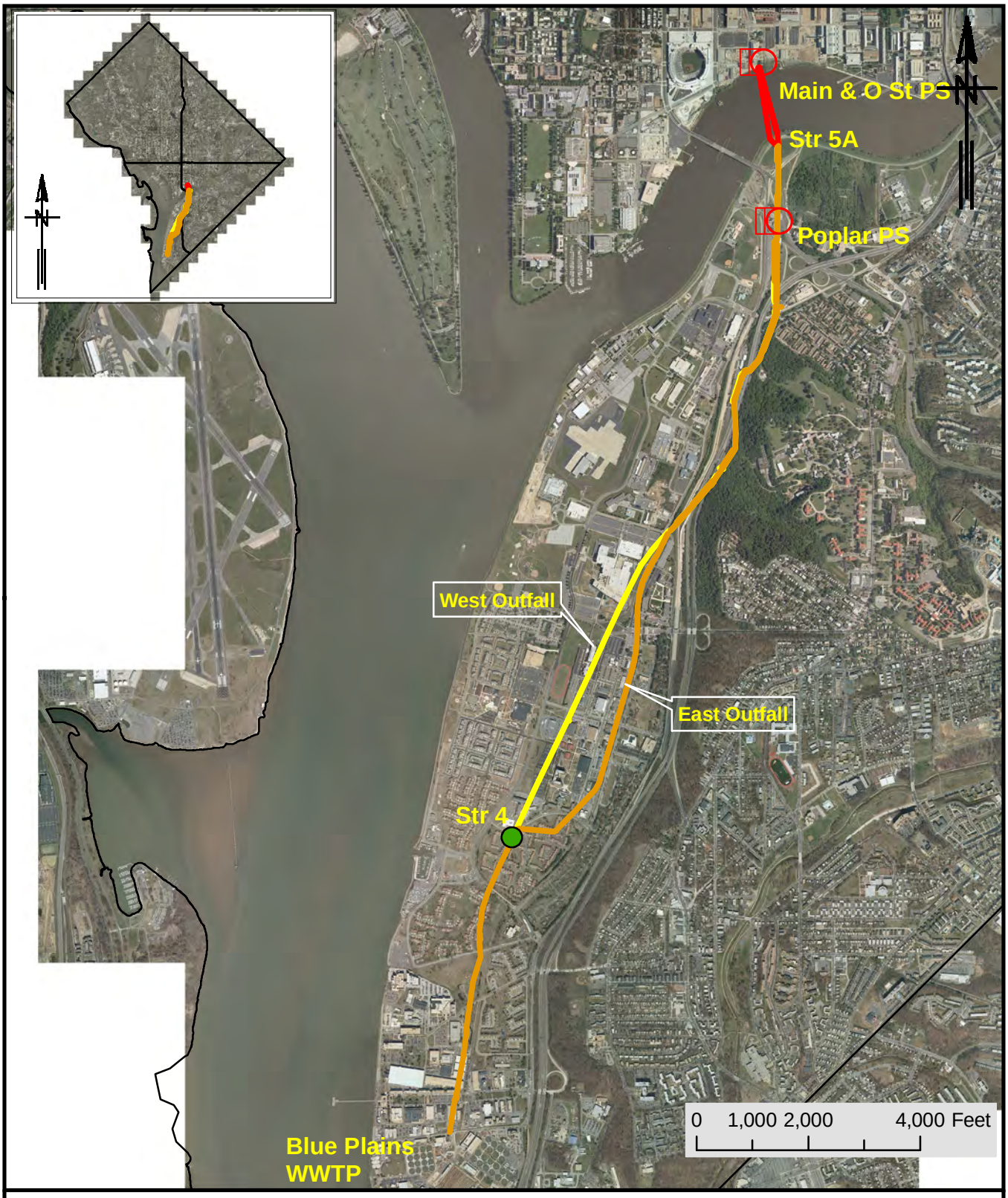
SYSTEM DESCRIPTION

Route 7 conveys MJUF flow from Main Street Pumping Station to the Blue Plains Pump Station No. 1. The route includes the Anacostia Siphons and the West and East Outfall Sewers, which are also known as the BP AWWTP Influent Sewers. The East Outfall Sewer is primarily an arch sewer with dimensions greater than 100 inches and is over 23,180 feet long. The West Outfall Sewer is also primarily an arch sewer with dimensions greater than 100 inches and is over 20,180 feet long.

MJUF flow for this route originates from Main Pumping Station, via the B Street / New Jersey Avenue Trunk Sewer and the Rock Creek Main Interceptor from WSSC. Additional MJUF peak flow is included from the Poplar Point Pumping Station. Poplar Point discharges flow into the West and East Outfall Sewers at Structure 5A (Str 5A). See the attached figures and schematics for more information.

The flow share for the route at the upstream end is based on the upstream conveyance from Main Pumping Station. The total firm capacity of this station is 240 mgd. Flow from Main Pumping Station is immediately joined downstream of the station by the 45 mgd firm capacity from O St. Pumping Station. The 285 mgd (240 mgd from Main PS and 45 mgd from O Street PS) is conveyed through the Anacostia Siphons. The flows change downstream after Str 5A due to the Poplar Point Pumping Station conveyance. The Poplar Point Pumping Station has a firm rated capacity of 45 mgd. Downstream of Str 5A, the flow share is constant as there is no significant DC inflow which affects the flow share.

A maximum flow rate of 555 mgd is the design peak flow rate to the Blue Plains Treatment Plant based on the accepted Total Nitrogen Removal / Wet Weather Plan. The maximum capacity for the combined Outfall Sewers to Blue Plains, the combined total of Routes 7 and 11, was, therefore, set at 555 mgd. The maximum design firm capacity for Blue Plains Pump Station No.1 is set at 222 mgd. As this route, the East and West Outfall Sewers, is the only contributing sewer system to Blue Plains Pump Station No. 1, the maximum flow capacity for the East and West Outfall Sewers is 222 mgd. However, the suburban and DC flow split percentage have been held constant in the accompanying tables despite the future change in peak flow rate. The remaining peak flow rates will be diverted to the LTCP tunnel system as peak shaving to accommodate Blue Plains' processes.



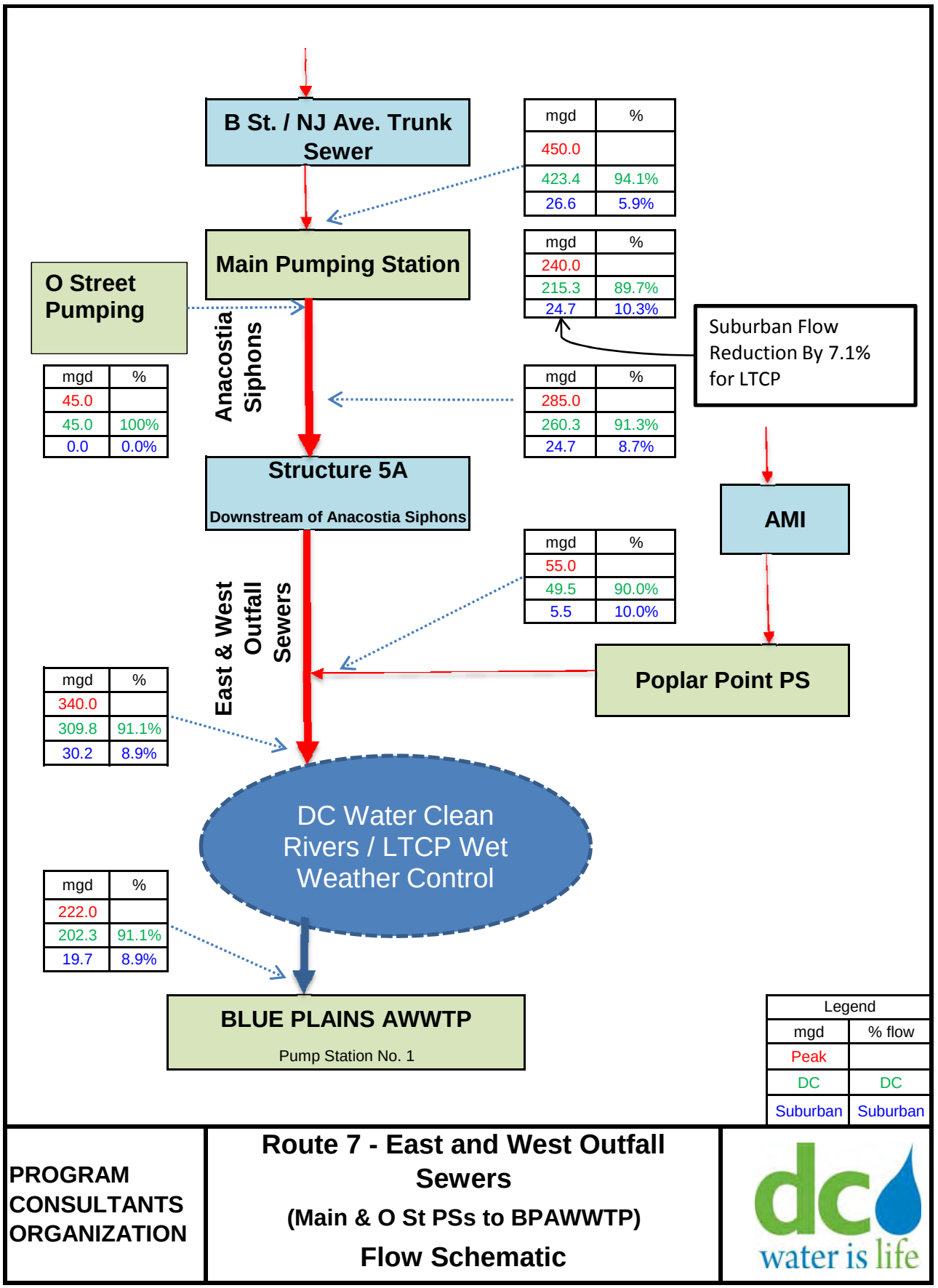
Legend

- Manholes
- East Outfall
- West Outfall
- Anacostia Siphons
- Pump Stations

PROGRAM CONSULTANTS ORGANIZATION

Route 7 - East & West Outfall (Main & O St. PS to Blue Plains)

dc water is life



PROGRAM CONSULTANTS ORGANIZATION	**Route 7 - East and West Outfall Sewers** **(Main & O St PSs to BPAWWTP)** **Flow Schematic**	dc water is life

ROUTE 7 - East and West Outfall Sewers

(From Main & O St. Pump Stations to Blue Plains AWWTP)

Facility	From	To	Design Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
Anacostia Siphons	Main & O St. Pumping Stations	Structure 5A	285	24.7	8.7%	260.3	91.3%
East and West Outfall Sewers	Structure 5A	Poplar Point PS	285	24.7	8.7%	260.3	91.3%
East and West Outfall Sewers	Poplar Point PS	Future DC Water Clean Rivers / LTCP Wet Weather Controls	340	30.2	8.9%	309.8	91.1%
East and West Outfall Sewers	Future DC Water Clean Rivers / LTCP Wet Weather Controls	BPWWTP Pump Station # 1	222	19.7	8.9%	202.3	91.1%

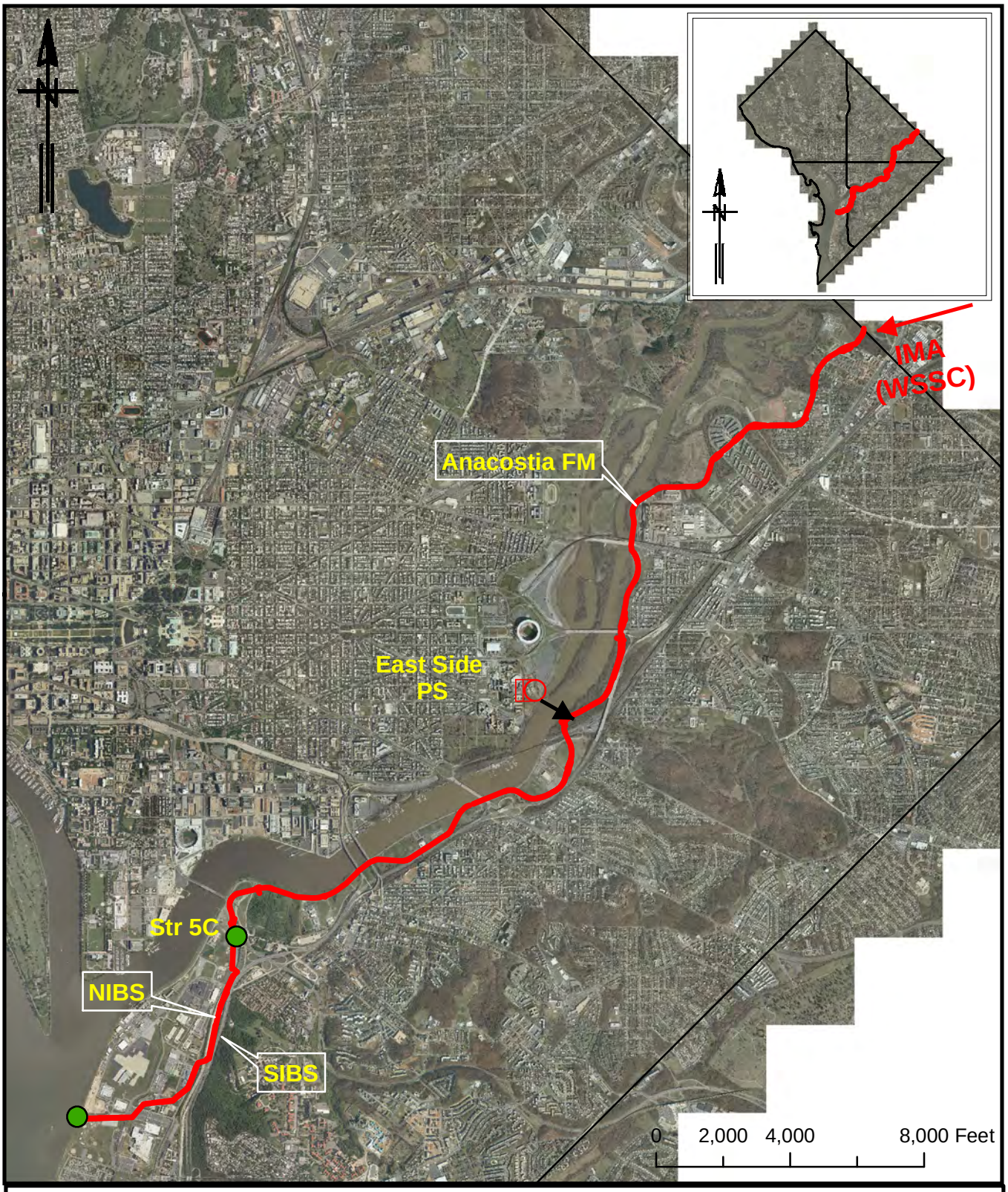
9. Route 8 - Anacostia Force Main & the NIBS and SIBS

SYSTEM DESCRIPTION

The Anacostia Force Main (AFM) is approximately 33,300 feet long inside the District and is 108 inches in diameter. The AFM conveys flow from Prince George's County, MD and several sewersheds located in the North East quadrant of the District. The Anacostia Force Main originates from WSSC's Pump Station No. 2 and discharges at Structure 5C (Str 5C). From there, flow is conveyed through either the North Interconnecting Branch Sewer (NIBS) or the South Interconnecting Branch Sewer (SIBS) to Structure 2A (Str 2A), which is the start of Route 11. The NIBS is approximately 7,850 feet long and 108inch diameter, and the SIBS is approximately 7,800 feet in length and 84 inches in diameter. See the attached figures and schematics for more information.

Per the IMA, WSSC is allocated 185 mgd of peak capacity to the District from the AFM. The AFM is currently operating with a peak conveyance of 199 mgd from WSSC's Anacostia Pump Station No. 2. 14mgd of the 199 mgd conveyed from Anacostia Pump Station No. 2 originates in the District and is conveyed to WSSC's system across Eastern Avenue. This District flow is then conveyed through the AFM back into the District. Additional District only flow is added to the AFM at M-43943 from conveyance from the East Side Pump Station. The East Side Pump Station has a firm rated capacity of45 mgd. Downstream of the East Side Pump Station, flow volumes and splits between users are kept constant as there is no significant DC inflow affecting the flow.

The attached table of percentage flow shares presents the peak flows for each major pipe segment of the AFM and the calculated ratios of WSSC flows to peak flows. WSSC's flow share varies from 93.0% at the MD-DC boundary to 75.8% at the downstream discharge. Correspondingly, DC's flow share varies from 7.0% at the boundary to 24.2% at Structure 5A.



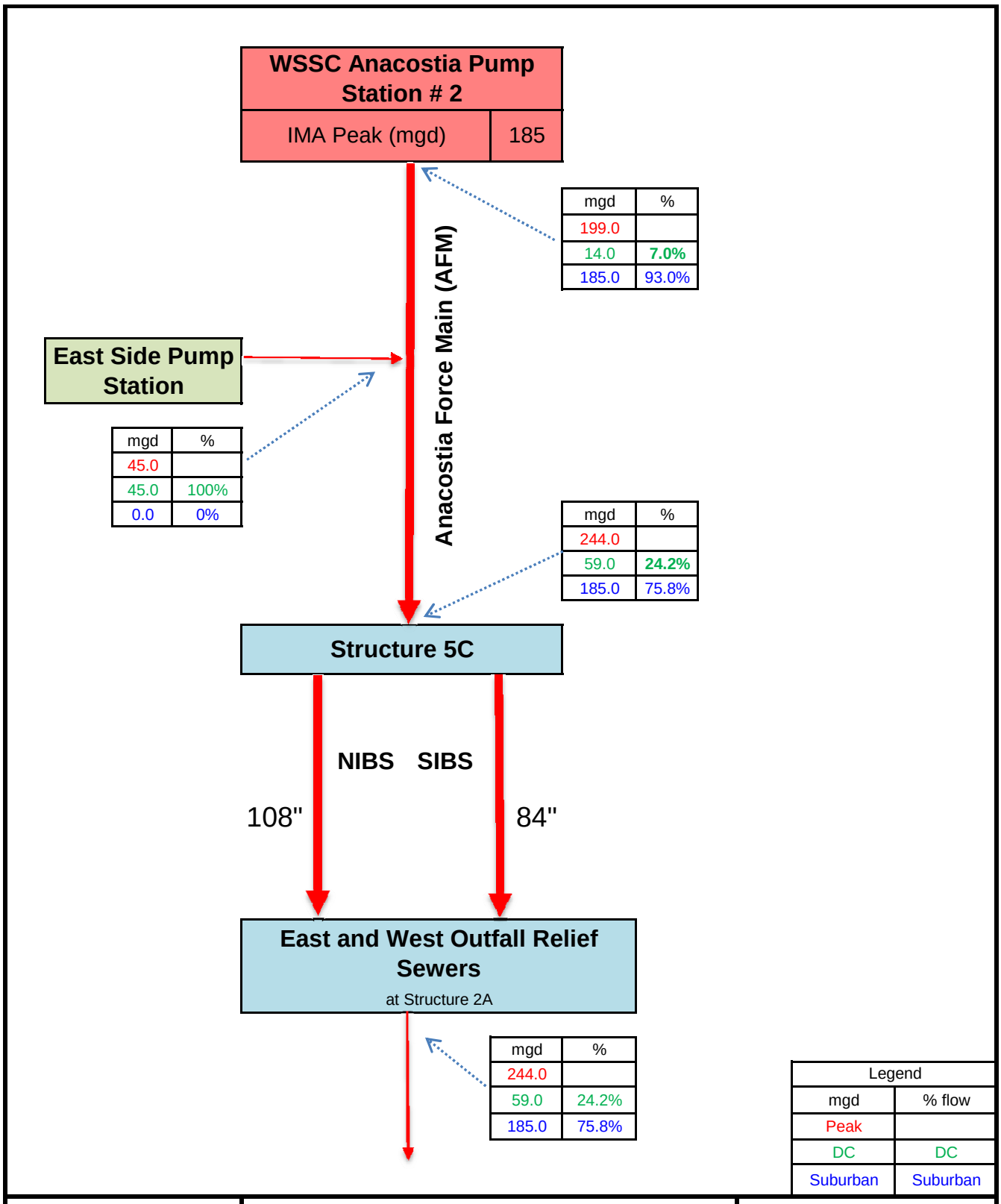
Legend

- Manholes
- Anacostia FM
- Boundary Inputs
- Pump Stations

PROGRAM CONSULTANTS ORGANIZATION

Route 8 - Anacostia Force Main (AFM) and NIBS & SIBS

dc water is life



PROGRAM CONSULTANTS ORGANIZATION

Route 8 - Anacostia Force Main (AFM)

(WSSC Anacostia Pump Station # 2 to Structure 2A)

Flow Schematic

dc water is life

ROUTE 8 - Anacostia Force Main (AFM) & NIBS and SIBS

(From WSSC Anacostia Pump Station #2 to Structure 2A)

Facility	From	To	Modeled Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
Anacostia Force Main	WSSC Anacostia Pump Station # 2	East Side Pump Station	199	185.0	93.0%	14.0	7.0%
Anacostia Force Main	East Side Pump Station	Structure 5C	244	185.0	75.8%	59.0	24.2%
North Interconnecting Branch Sewer (NIBS) & South Interconnecting Branch Sewer (SIBS)	Structure 5C	Structure 2A	244	185.0	75.8%	59.0	24.2%

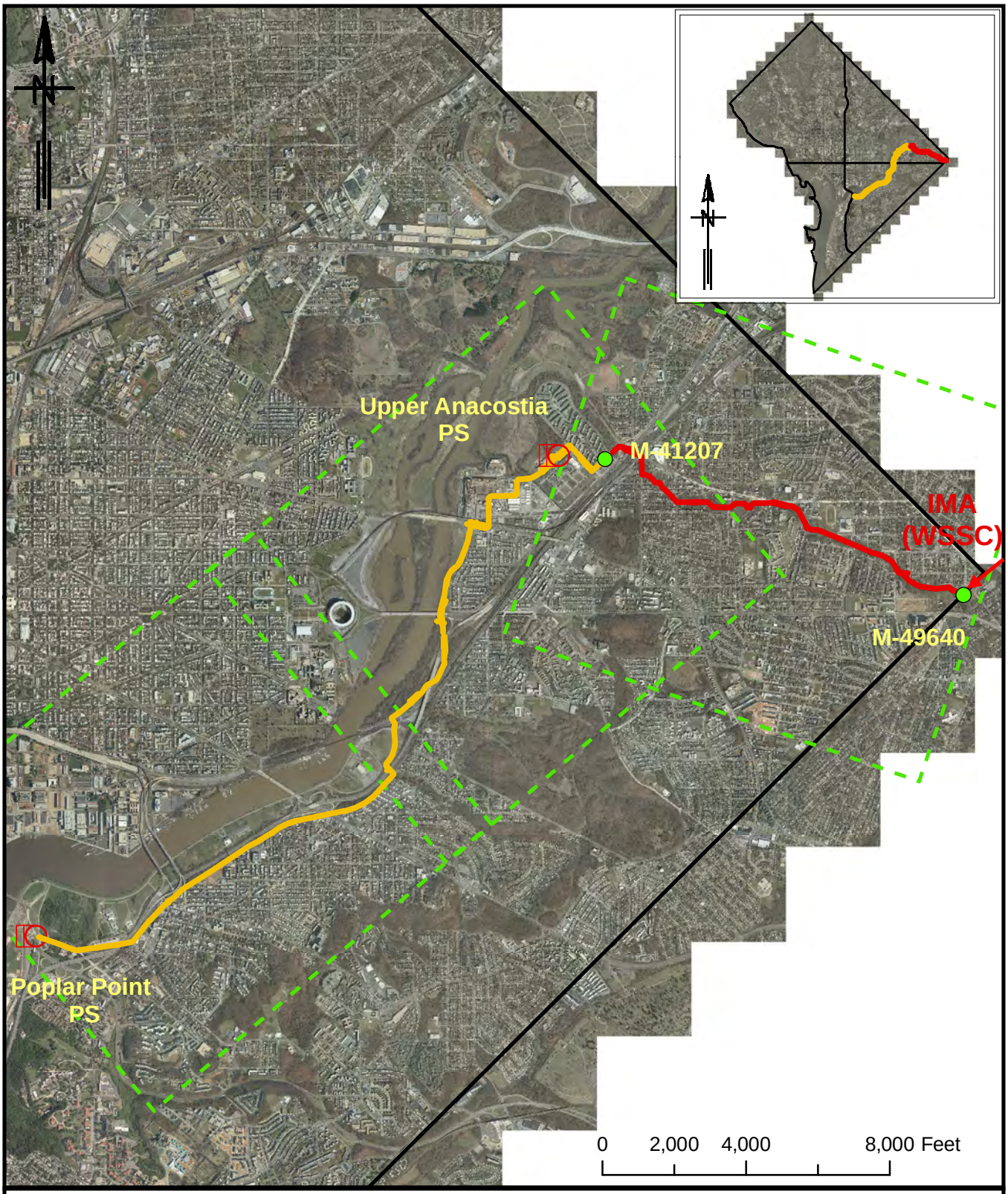
10. Route 9 - Watts Branch and Anacostia Main Interceptor Sewers

SYSTEM DESCRIPTION

The Watts Branch and Anacostia Main Interceptor (AMI) sewers convey peak sanitary flows originating from Prince George's County, MD. Flow is conveyed through and contributing from portions of the Northeast and Southeast quadrants of the District to the discharge at Poplar Point Pumping Station. The sewers range in size from 21-inch diameter to 66-inch diameter at the pumping station. The Watts Branch Sewer was installed in the 1940's to serve the growing development in upper Northeast, DC and Prince George's County, MD while the AMI dates back to the early 1900's, when the area along the Anacostia River was being developed. The Watts Branch and AMI together total over 37,750 feet in length. Seethe attached figures and schematics for more information.

Per the IMA, WSSC is allocated 5.9 mgd of peak capacity conveyance through the District from Watts Branch. WSSC was allocated 5.9 mgd peak conveyance capacity at M-49640, located at the MD-DC boundary, which represents 100 percent of the originating flow at the boundary for this route. As the peak flow is routed through the pipeline, the hydraulic model accounts for rainfall-derived infiltration and in flow and the sanitary flow collected in the system as it passes through the neighborhoods of Northeast and Southeast, DC, culminating in a peak flow of 47.7 mgd at the Poplar Point Pumping Station.

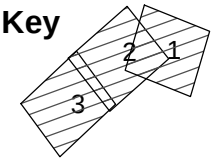
The attached table of percentage flow shares presents the peak flows for each major pipe segment of the Watts Branch and AMI sewers and the calculated ratios of WSSC flows to total peak flows. WSSC's flow share varies from 100.0% at the MD-DC boundary to 12.4% at the downstream end of the route. Correspondingly, DC's flow share varies from 0.0% at the upstream boundary to 87.6% at Poplar Point Pumping Station.



Legend

- Manholes
- AMI
- Watts Branch
- Pump Stations
- Boundary Inputs

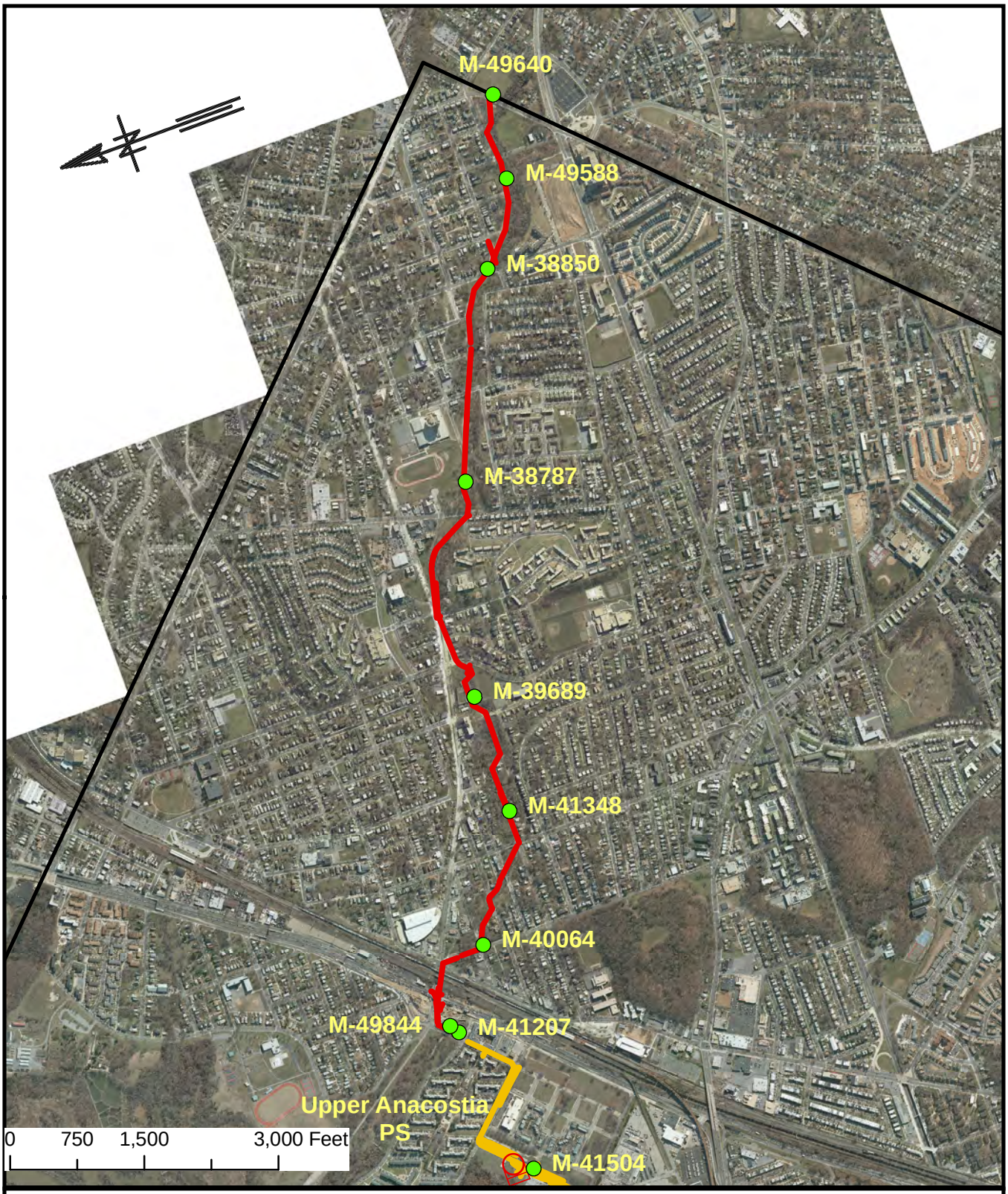
Key



PROGRAM CONSULTANTS ORGANIZATION

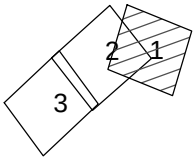
Route 9 - Watts Branch & Anacostia Main Interceptor (AMI)

dc water is life



Legend

- Manholes
- AMI
- Watts Branch
- Pump Stations



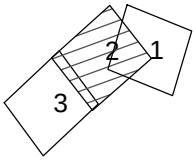
PROGRAM CONSULTANTS ORGANIZATION

Route 9 - Watts Branch & AMI
Detail 1 of 3

dc water is life

Legend

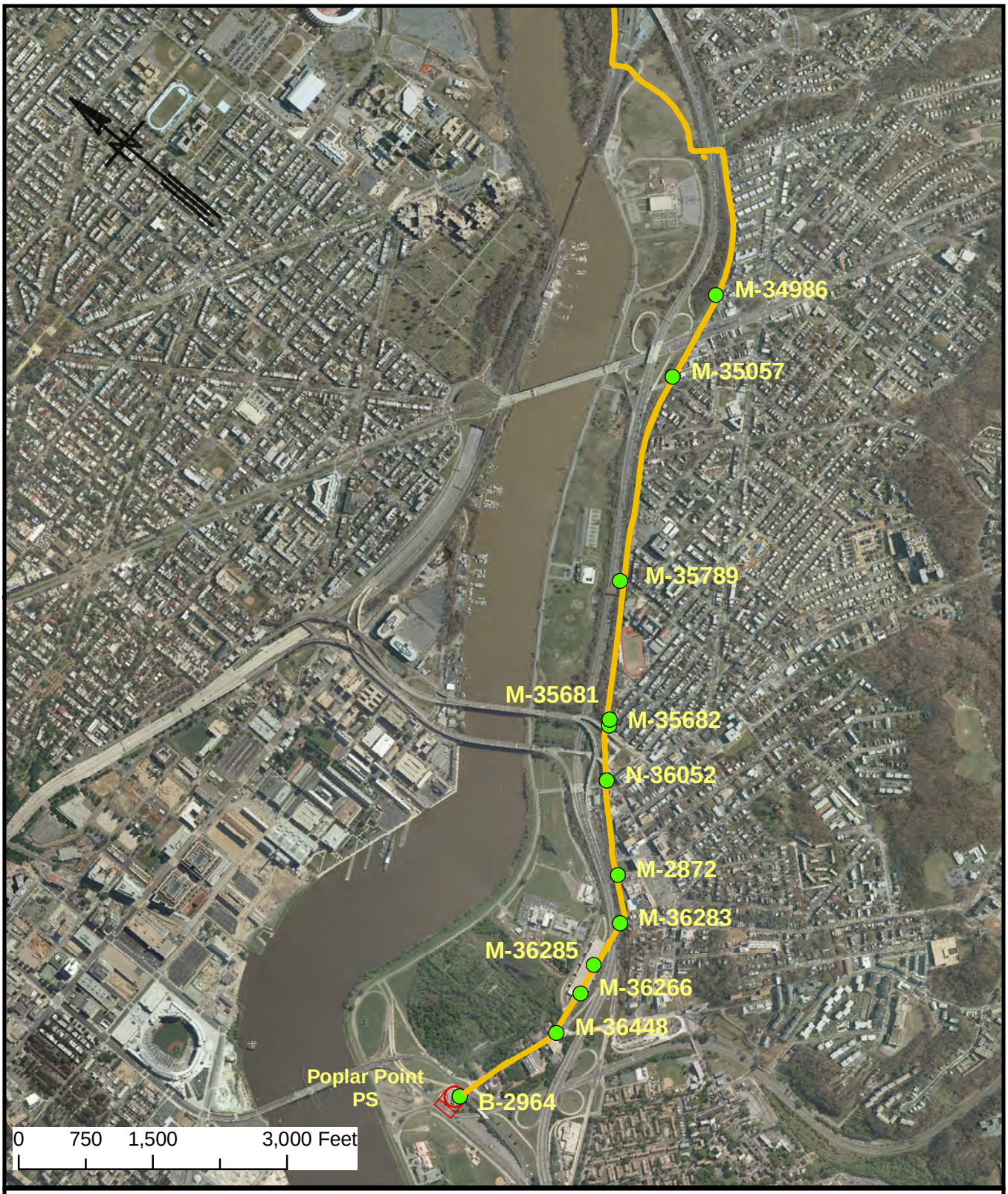
- Manholes
- AMI
- Watts Branch
- Pump Stations



PROGRAM CONSULTANTS ORGANIZATION

Route 9 - Watts Branch & AMI
Detail 2 of 3

dc water is life

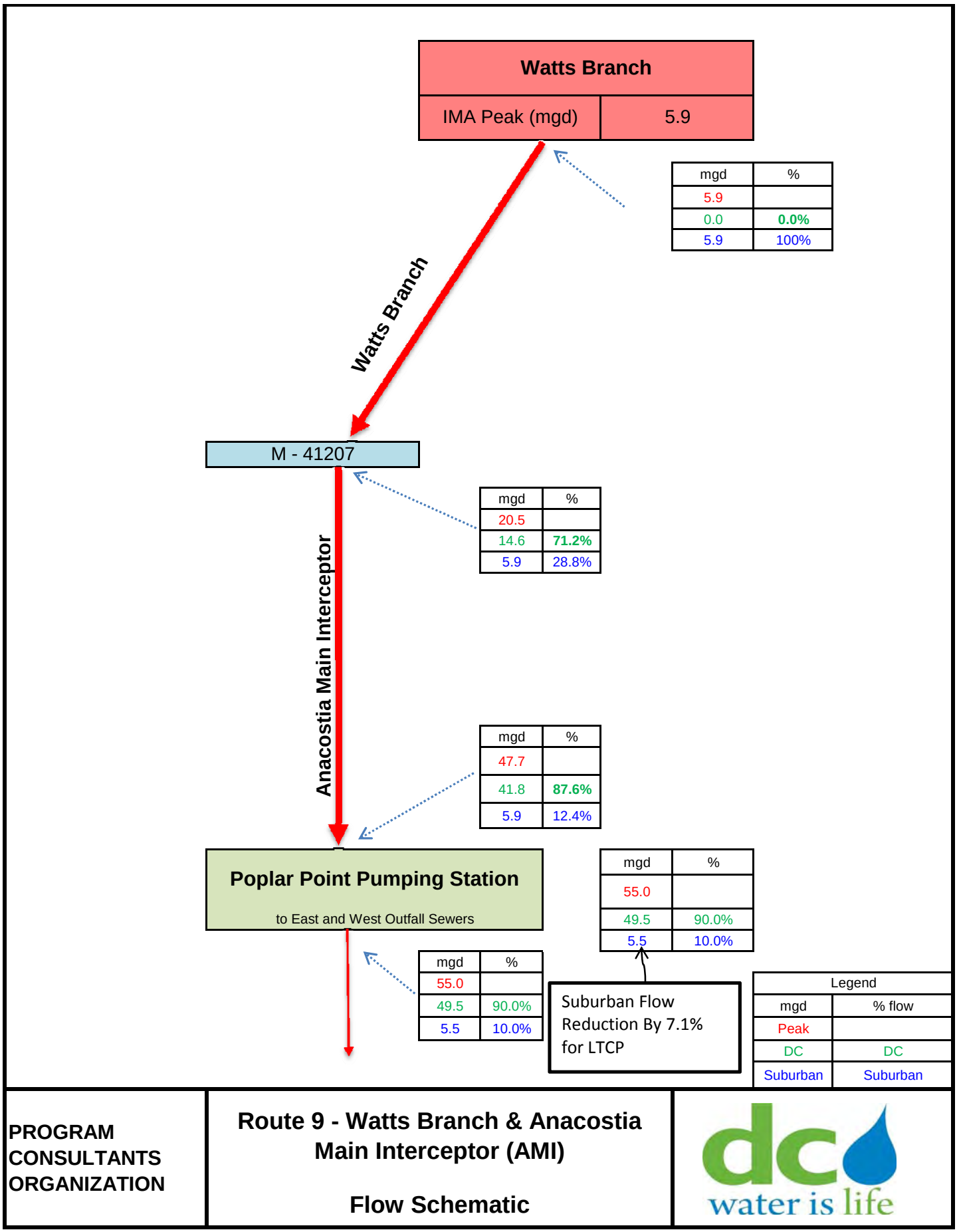


Legend

- Manholes
- AMI
- Watts Branch
- Pump Stations

2 1 3

PROGRAM CONSULTANTS ORGANIZATION	**Route 9 - Watts Branch & AMI** **Detail 3 of 3**	dc water is life



PROGRAM CONSULTANTS ORGANIZATION

Route 9 - Watts Branch & Anacostia Main Interceptor (AMI)

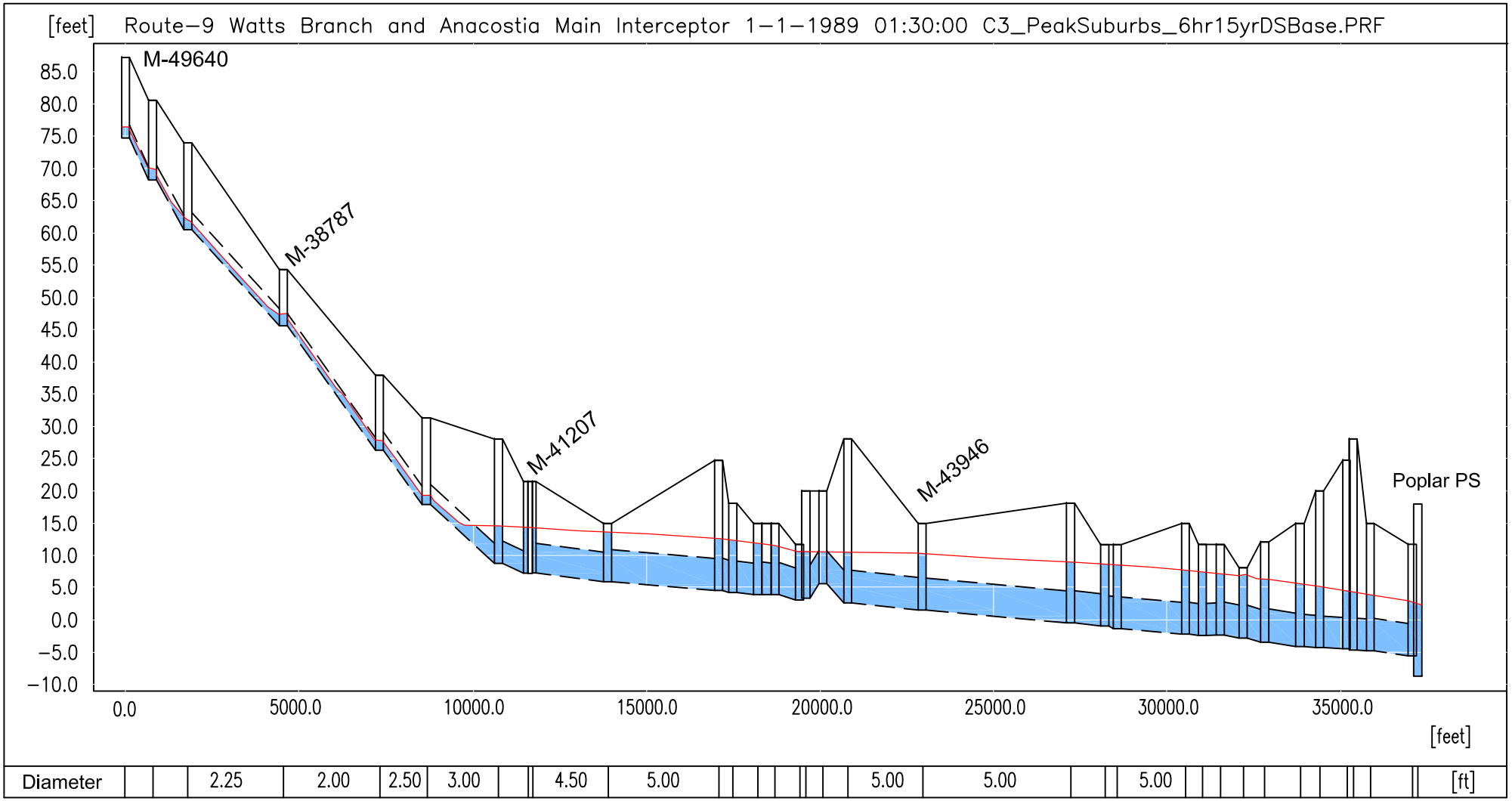
Flow Schematic

dc water is life

ROUTE 9 - Watts Branch & Anacostia Main Interceptor (AMI)

Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
1	M-49640	M-49588	1.8	809	5.9	5.90	100.0%	0.0	0.0%
2	M-49588	M-38850	2.0	1,075	5.9	5.90	99.7%	0.0	0.3%
3	M-38850	M-38787	2.5	2,873	6.0	5.90	98.5%	0.1	1.5%
4	M-38787	M-39689	2.0	2,918	6.6	5.90	88.9%	0.7	11.1%
5	M-39689	M-41348	2.5	1,418	7.3	5.90	81.0%	1.4	19.0%
6	M-41348	M-40064	3.0	2,153	7.4	5.90	79.9%	1.5	20.1%
7	M-40064	M-49844	3.5	917	8.2	5.90	72.0%	2.3	28.0%
8	M-49844	M-41207	4.5	100	8.4	5.90	70.1%	2.5	29.9%
9	M-41207	M-41504	4.5	2,284	20.5	5.90	28.8%	14.6	71.2%
10	M-41504	B-1020	5.0	4,537	24.5	5.90	24.1%	18.6	75.9%
11	B-1020	B-1018	5.0	515	28.2	5.90	20.9%	22.3	79.1%
12	B-1018	N-36107	5.0	737	27.3	5.90	21.6%	21.4	78.4%
13	N-36107	M-43946	5.0	3,722	30.5	5.90	19.3%	24.6	80.7%
14	M-43946	M-34986	5.0	4,478	30.5	5.90	19.3%	24.6	80.7%
15	M-34986	M-35057	5.0	1,022	32.8	5.90	18.0%	26.9	82.0%
16	M-35057	M-35789	5.0	2,429	34.3	5.90	17.2%	28.4	82.8%
17	M-35789	M-35681	5.0	511	37.7	5.90	15.7%	31.8	84.3%
18	M-35681	M-35682	5.0	44	34.8	5.90	17.0%	28.9	83.0%
19	M-35682	N-36052	5.0	629	37.7	5.90	15.7%	31.8	84.3%
20	N-36052	B-2872	5.0	1,078	35.9	5.90	16.4%	30.0	83.6%
21	B-2872	M-36283	5.0	573	41.3	5.90	14.3%	35.4	85.7%
22	M-36283	M-36265	5.0	850	41.3	5.90	14.3%	35.4	85.7%
23	M-36265	M-36266	2.0	177	48.9	5.90	12.1%	43.0	87.9%
24	M-36266	B-4825	5.0	519	48.0	5.90	12.3%	42.1	87.7%
25	B-4825	B-2964	5.0	1,273	52.5	5.90	11.2%	46.6	88.8%
26	B-2964	Poplar PS	5.0	129	47.7	5.90	12.4%	41.8	87.6%
				37,768					

Route-9 Watts Branch and Anacostia Main Interceptor Sewer (AMI)



Legend

Hydraulic Gradient	
Flow Level	
Sewer Outline	

11. Route 10 - Upper Oxon Run Trunk & Lower Oxon Run Relief Sewers

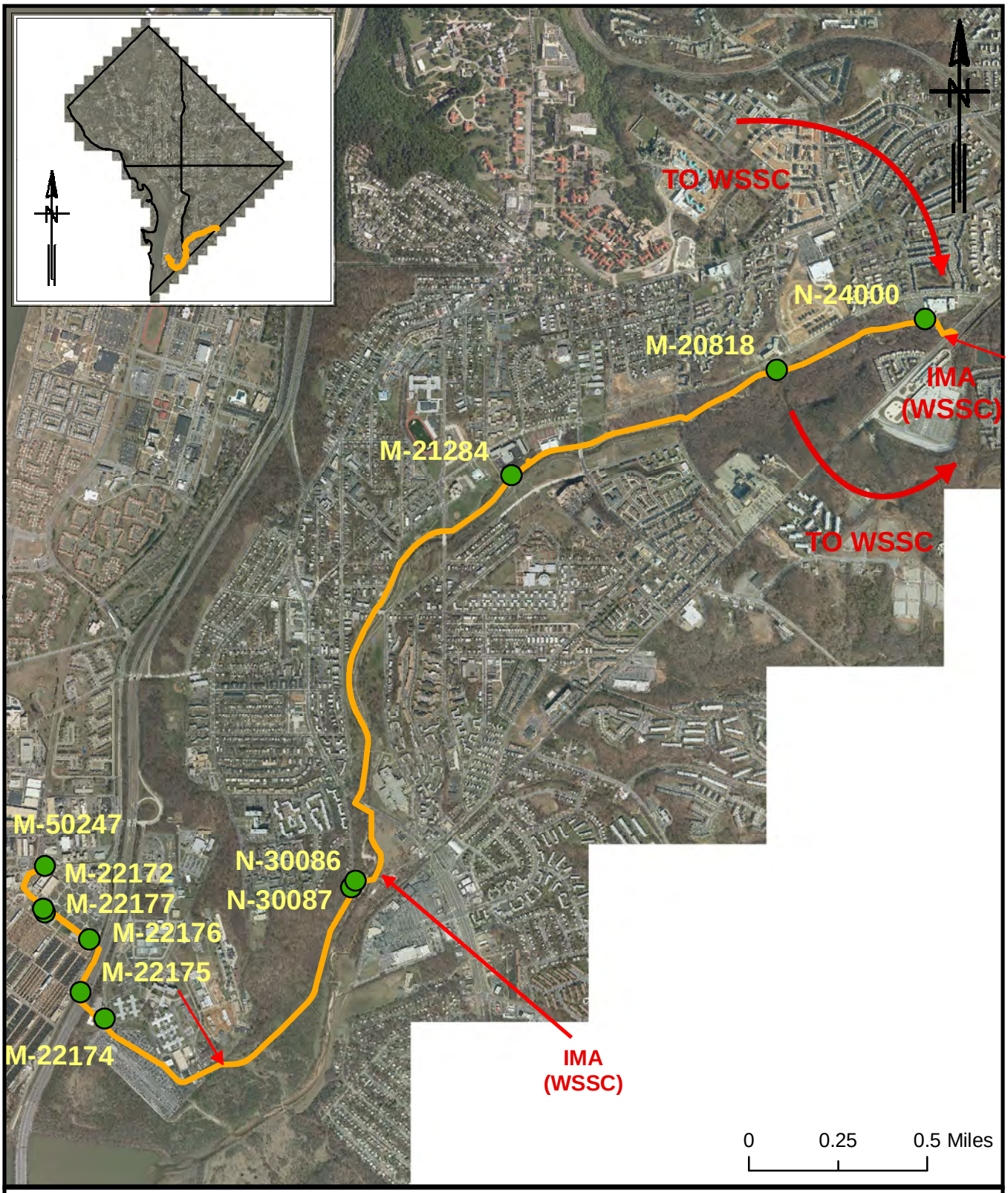
SYSTEM DESCRIPTION

The Upper Oxon Run (UOX) and Lower Oxon Run (LOX) Trunk and Relief Sewers convey flows from Prince Georges County, MD and the Southeast and Southwest quadrants in the District to the Blue Plains Wastewater Treatment Plant. The sewers vary in size from 42-inch to 66-inch diameter as the system nears the treatment plant. The total length of sewers evaluated for this route is over 23,500 feet. See the attached figures and schematics for more information.

Per the IMA, WSSC is allocated 15.6 mgd of peak capacity conveyance for the Upper Oxon Run Relief Sewer, originating at N-24000, the nearest manhole to the MD-DC boundary. At several locations along Southern Avenue (the MD-DC boundary), District flow enters WSSC's system and then returning to the District via the Upper Oxon Run Trunk Sewer. Due to these interconnections, WSSC flow accounts for only 86 percent of the flow at the start of the route at the MD-DC boundary. As the flow is routed through the pipeline, the hydraulic model accounts for rainfall-derived infiltration and inflow and the sanitary flow collected in the system as it passes through the neighborhoods of the Southeast and Southwest quadrants of the District.

A section of the Lower Oxon Run Relief Sewer near the District-Maryland border has been abandoned and all flow is diverted to the Upper Oxon Run Relief Sewer. As such, the Lower Oxon Run Relief Sewer no longer carries multi-jurisdictional use flow. All suburban flow is routed to the Upper Oxon Run Relief Sewer.

An additional WSSC peak flow allocation of 19.2 mgd from Barnaby Branch, Owens Road and Indian Head Highway is conveyed to the LOX. The Lower Oxon Run Sewer does not convey any DC flows before it discharges to the UOX at Structure 1C, N-300087. A peak flow of 47.9 mgd is conveyed by this system as it approaches the Blue Plains Wastewater Treatment Plant. The table of percentage flow shares, below, presents the peak flows for each major pipe segment of the sewer and the calculated ratios of WSSC flows to peak flows.



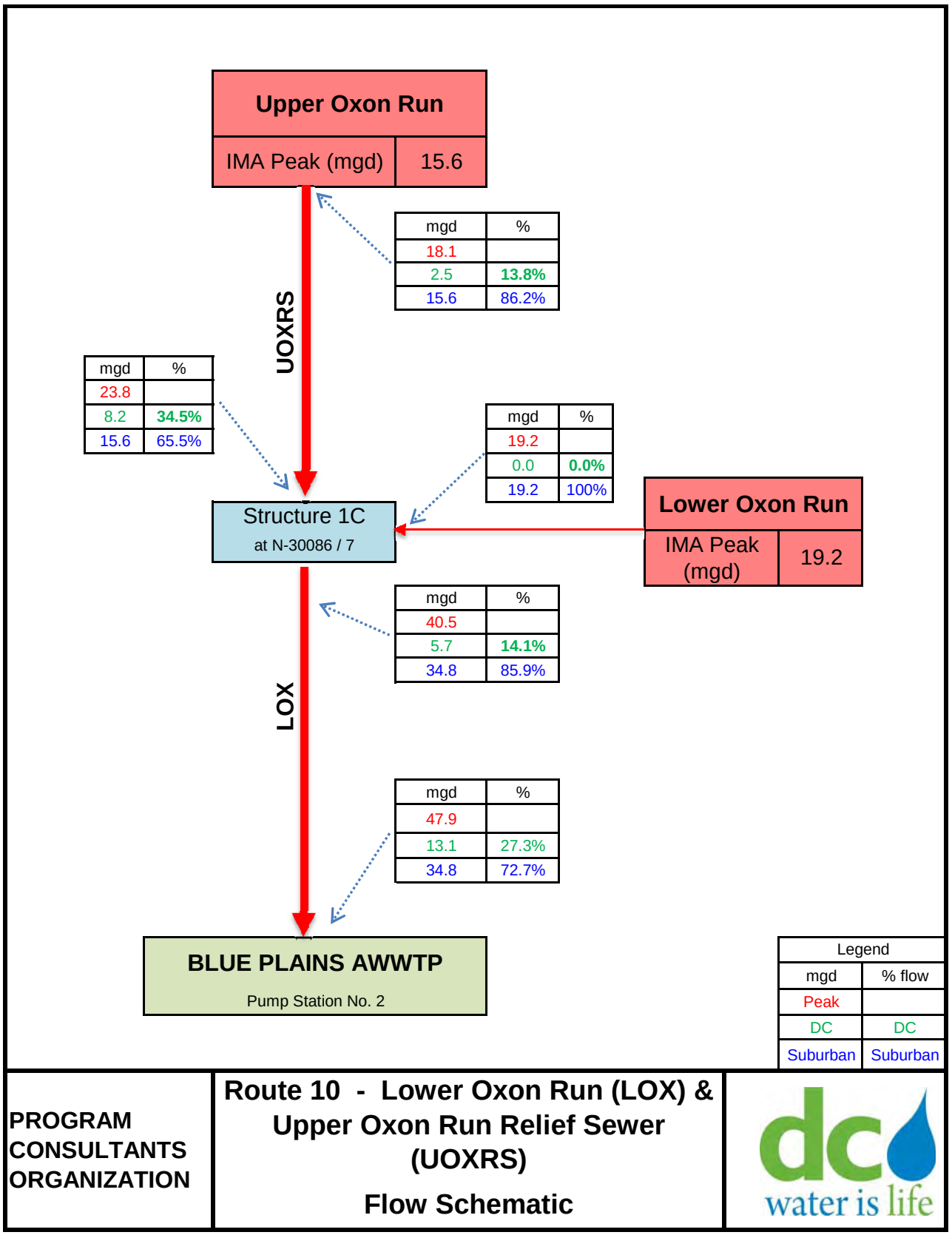
Legend

- Manholes
- Lower Oxon Run and Upper Oxon Run Sewer
- Boundary Inputs

PROGRAM CONSULTANTS ORGANIZATION

Route 10 - Upper Oxon and Lower Oxon Run Relief Sewer

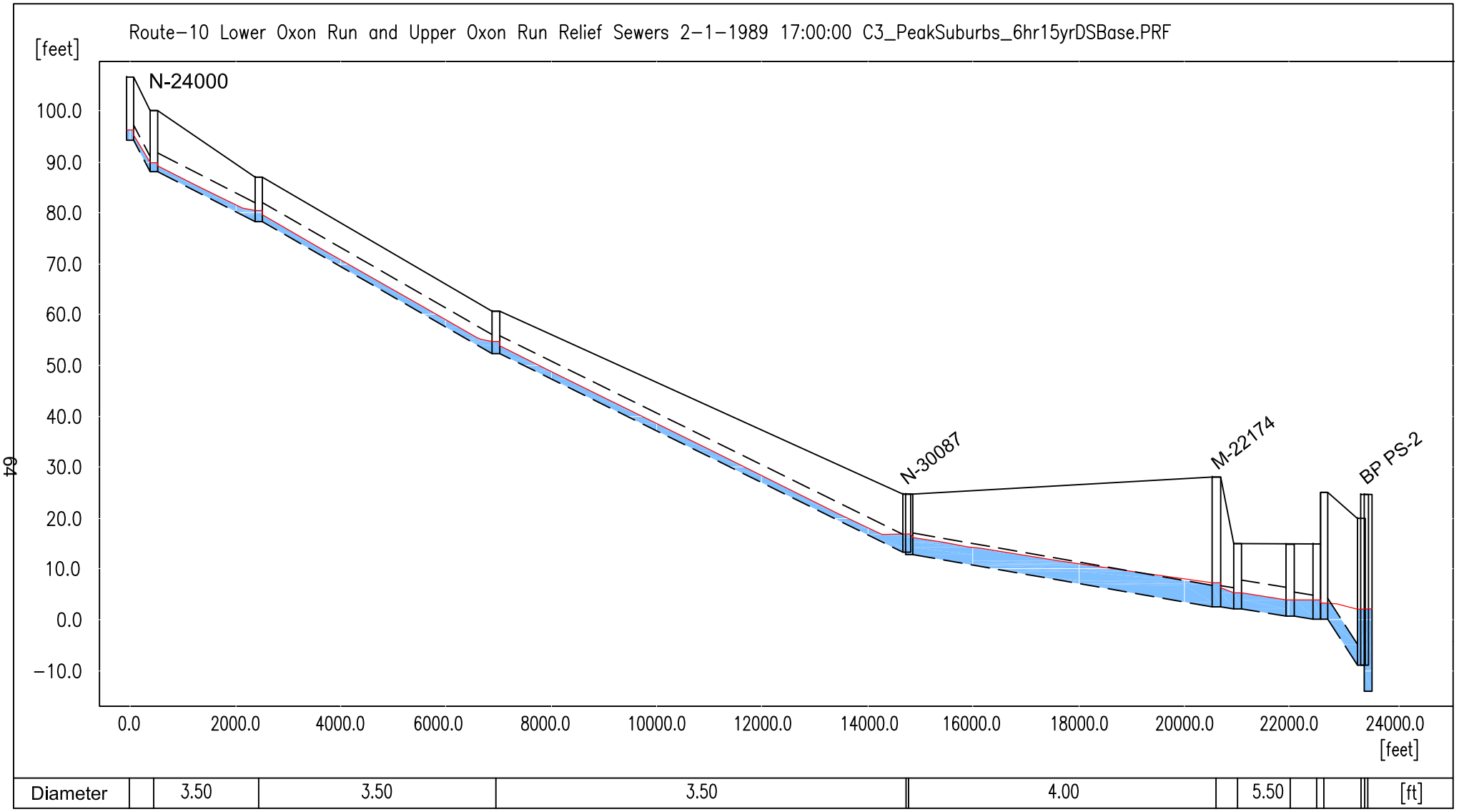
dc water is life



PROGRAM CONSULTANTS ORGANIZATION	**Route 10 - Lower Oxon Run (LOX) & Upper Oxon Run Relief Sewer (UOXRS)** **Flow Schematic**	dc water is life

ROUTE 10 - Lower Oxon Run (LOX) & Upper Oxon Run Relief Sewer (UOXRS)									
Segment	From MH	To MH	Dia (ft)	Length (ft)	Modeled Peak Flow (mgd)	WSSC Flow (mgd)	% WSSC Flow	DC Flow (mgd)	% DC Flow
1	N-24000	M-20813	3.5	2,063	18.1	15.6	86.2%	2.5	13.8%
2	M-20813	M-21284	3.5	4,613	22.6	15.6	69.1%	7.0	30.9%
3	M-21284	N-30087	3.5	8,029	23.8	15.6	65.6%	8.2	34.4%
4	N-30087 (Str 1C)	M-22174	4.0	6005	40.5	34.8	86.0%	5.7	14.0%
5	M-22174	M-22175	4.0	395	49.6	34.8	70.2%	14.8	29.8%
6	M-22175	M-22176	5.5	1030	49.5	34.8	70.3%	14.7	29.7%
7	M-22176	M-22177	4.5	520	44.3	34.8	78.6%	9.5	21.4%
8	M-22177	M-22172	4.0	148	48.0	34.8	72.5%	13.2	27.5%
9	M-22172	M-50247	4.0	729	47.9	34.8	72.7%	13.1	27.3%
				23,533					

Route-10 Lower Oxon Run and Upper Oxon Run Relief Sewers



Legend

Hydraulic Gradient	
Flow Level	
Sewer Outline	

12. Route 11 - East & West Outfall Relief Sewers (Influent Sewers from Structure 2A to Blue Plains)

SYSTEM DESCRIPTION

The East and West Outfall Relief Sewers are two of the major influent sewers to BP AWWTP. The East and West Outfall Relief Sewers convey flow from Structure 2A (Str 2A) to Blue Plains Pump Station No.2. The two sewers parallel each other and are approximately 22,300 feet in length. The majority of the West Outfall Relief Sewer is a 10 feet x 11 feet 6 inch arched sewer; and the majority of the East Outfall Relief Sewer is a 12 feet 3 inch x 11 feet 6 inch arched sewer.

As there is no significant DC inflow affecting the volume and the suburban-DC percentages, peak flow rates for these influent sewers are based on the upstream flow conveyed from Structure 2A. The flow conveyed at Str 2A is the combined flow from the Anacostia Force Main (Route 8) and the Potomac Force Mains (Route 5).

A maximum flow rate of 555 mgd is the design peak flow rate to the Blue Plains Treatment Plant based on the accepted Total Nitrogen Removal / Wet Weather Plan. The maximum capacity for the combined influent sewers to Blue Plains was, therefore, set at 555 mgd. The maximum design firm capacity for Blue Plains Pump Station No.2 is set at 333 mgd. As the East and West Outfall Relief Sewers are the only contributing sewers to Blue Plains Pump Station No. 2, the maximum flow capacity for the East and West Outfall Relief Sewers is 333 mgd. However, the suburban and DC flow split percentage have been held constant in the accompanying tables despite the future changes in peak flow rates. The remaining flow rates will be diverted to the LTCP tunnel system as peak shaving to accommodate Blue Plains' processes.

Legend

- Manholes
- Outfall Sewers

PROGRAM
CONSULTANTS
ORGANIZATION

Route 11 - Outfall Sewers

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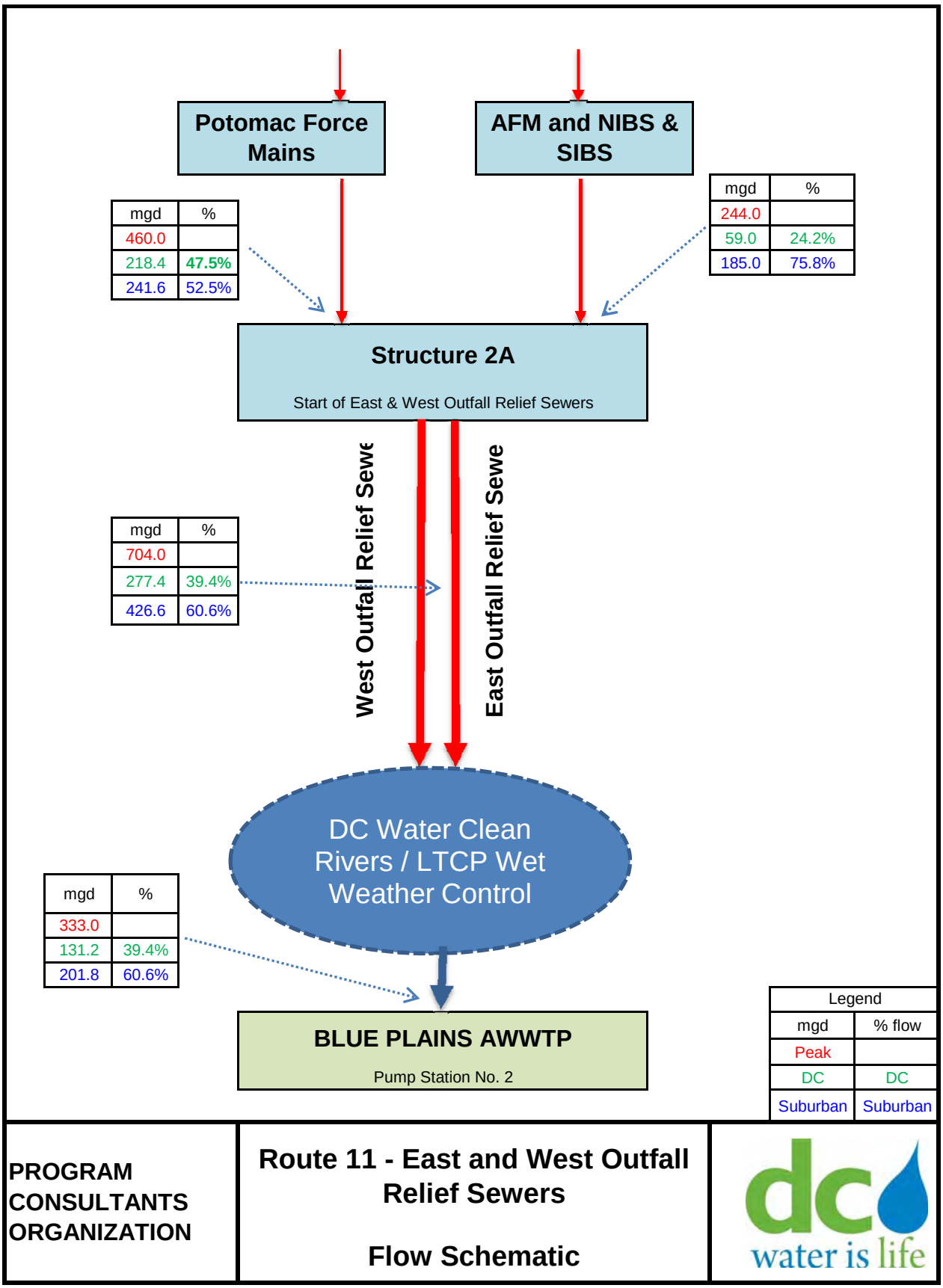

PROGRAM CONSULTANTS ORGANIZATION

Route 11 - East and West Outfall Relief Sewers

Flow Schematic

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ROUTE 11 - East and West Outfall Relief Sewers
(Influent Sewers from Structure 2A to Blue Plains)

Facility	From	To	Design Peak Flow (mgd)	Suburban Flow (mgd)	% Suburban Flow	WSSC Flow (mgd)	% WSSC Flow	Fairfax Flow (mgd)	% Fairfax Flow	LCSA Flow (mgd)	% LCSA Flow	Other PI Users Flow (mgd)	% Other Flow	DC Flow (mgd)	% DC Flow
East and West Outfall Relief Sewers	Structure 2A	Future DC Water Clean Rivers / LTCP Wet Weather Controls	704	426.6	60.6%	315.1	44.8%	84.1	12.0%	22.4	3.2%	5.0	0.7%	277.4	39.4%
East and West Outfall Relief Sewers	Future DC Water Clean Rivers / LTCP Wet Weather Controls	BPWWTP Pump Station # 2	333	201.8	60.6%	149.1	44.8%	39.8	12.0%	10.6	3.2%	2.4	0.7%	131.2	39.4%

13. Route 12 – Potomac Interceptor Outside DC Boundary

SYSTEM DESCRIPTION

The Potomac Interceptor (PI) is a 50-mile-long gravity sewer system that transports wastewater to the BP AWWTP. The PI sanitary sewer system currently conveys approximately 50 million gallons per day (mgd) of wastewater from several service areas starting near the Washington Dulles International Airport (Dulles), along the Potomac River to the Potomac Pumping Station (PS). Flows from the Potomac PS are sent to the BP AWWTP for treatment before discharge into the Potomac River.

The PI is owned and operated by DC Water. Outside of the District, suburban jurisdictions including Loudoun County and Fairfax County in Virginia, Montgomery County in Maryland, discharge wastewater to the PI. The National Park Service (NPS), Naval Ship Research & Development, Metropolitan Washington Airports Authority (Dulles Airport), Town of Herndon, Town of Vienna, and Arlington County also discharge wastewater to the PI.

The cost allocation is performed for the metered point of connections coming from Loudoun, Fairfax, WSSC and Other users of PI. The metered connections from PI tributaries like Sugarland Run Extension, Difficult Run Extension and the Upper Maryland Spur were also included in this analysis. The flows discharged to the Upper Potomac Interceptor (UPI), the Upper Potomac Interceptor Relief Sewer (UPIRS), and the Maryland Upper Potomac Interceptor (MUPI) was not included in this analysis.

METHODOLOGY

The peak flow rates used for the metered point of connections under WSSC and Fairfax jurisdictions, and other users like Dulles, Naval Ship R & D, Town of Vienna and NPS were based on the 2012 IMA.

For the PI, peak flow allocations in each section of pipe were added together arithmetically without routing. The percent of each jurisdiction's use of each pipe segment pipe was calculated by dividing the total peak flow of each jurisdiction's upstream locations by the sum of all peak flows from all upstream locations. Flow routing was not taken into consideration because of the large size of service area and the substantial geographic variability in storms.

For Loudoun County Sanitation Authority (LCSA), the current agreement has an overall peak flow limit of 31.9 mgd. Peak flow limits for each Loudoun point of connection are not specified in the agreement. As a result, a 12 month average of monthly peak flows for 2012 as reported in the Blue

Plains Service Area flow reports was calculated. For Russell Branch, Great Falls Forest #2 and PIP- Zerox, reliable 2012 data was not available. For these sites, a 12 month average of monthly peak flows for 2011 was used. The peak flow data for each site was scaled in proportion to its magnitude such that the sum of all the peak flows for LCSA equaled 31.9 mgd.

For Dulles Airport, Town of Vienna, Naval Ship R & D and National Park Service areas, the peak flows used were negotiated between suburbs and the District during the capital cost allocations for the upgrade of Rock Creek PS.

The peak flows used in PI analysis are shown on the following table.

Jurisdiction	PI Tributary	IMA Peak Flow Allocation (mgd)	Calculated Peak Flow (mgd)	Peaks Negotiated During Rock Creek PS Upgrade
WSSC	Cabin John Dulles	37		
	Muddy Branch	28.3		
	Watts Branch	16.5		
	Rock Run	5.6		
	Sub Total	87.4		
Fairfax	Sully Road #1	14		
	Sully Road #2	3		
	Rock Hill Road	2.4		
	Sugarland	14		
	Great Falls	30		
	Scotts Run	10.2		
	Sub Total	73.6		
LCSA	Cabin Branch		7.71	
	Hughes Branch		0.91	
	625/ 604 (Ss-8)		1.93	
	Boise Cascade		1.40	
	Seneca		1.66	
	Russell Branch		1.32	
	Countryside #1		0.27	
	Countryside #2		0.98	
	Cascades Western		1.01	
	Great Falls Forest #1		0.44	
	Great Falls Forest #2		0.22	
	Indian Creek (S-6)		2.09	
	Triple 7 (S-20)		2.74	
	PIP- Zerox		3.64	
	Woodstone		0.30	
	Cascades North		1.13	
	Broad Run		0.41	
	Northwestern		0.54	
	Northeastern		0.30	

Jurisdiction	PI Tributary	IMA Peak Flow Allocation (mgd)	Calculated Peak Flow (mgd)	Peaks Negotiated During Rock Creek PS Upgrade
	Beaumeade #1		0.19	
	Jefferson Village		0.36	
	Dulles Town Center		0.93	
	Loudoun Station		0.50	
	West Sterling		0.90	
	Sub Total		31.90	
Others	Dulles Airport			3.46
	Town of Vienna			3.46
	Naval Ship R & D			0.16
	National Park Service			0.07
	Sub Total			7.1
Arithmetic Sum of Peaks (No Flow Routing), mgd=		200.0		

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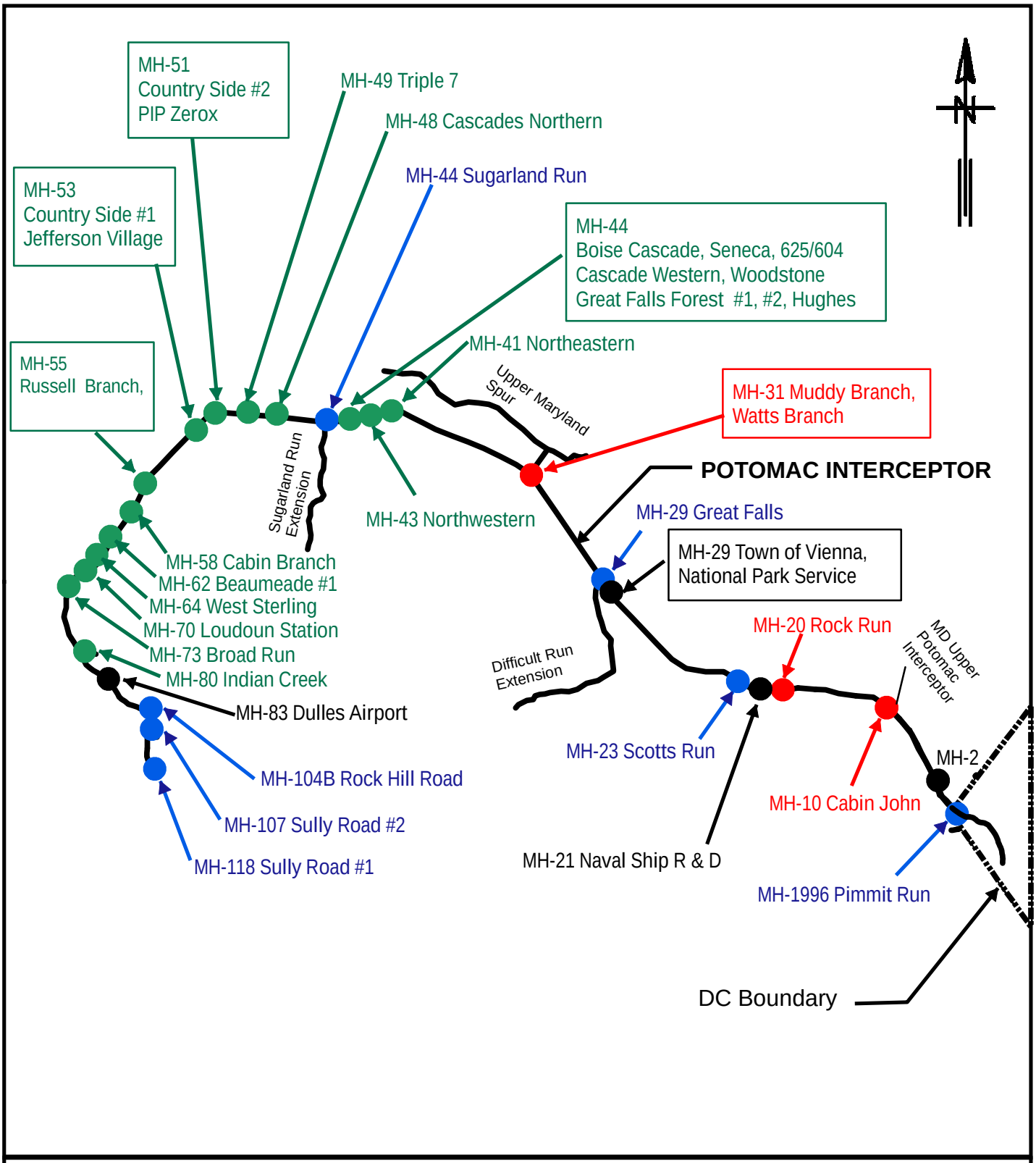

Legend

- MH Receiving Fairfax Flows
- MH Receiving Loudoun Flows
- MH Receiving WSSC Flows
- Potomac Interceptor
- MH Receiving Other Flows

PROGRAM CONSULTANTS ORGANIZATION

Route 12- Potomac Interceptor Outside DC Boundary

dc water is life

ROUTE 12 - POTOMAC INTERCEPTOR OUTSIDE OF DISTRICT BOUNDARY

PI Tributary	Point of Connection on PI @ MH	To MH	Peak Flow (mgd) in Tributary	Cumulative Flow in PI	WSSC Flow (mgd)	% WSSC Flow	Fairfax Flow (mgd)	% Fairfax Flow	LCSA Flow (mgd)	% LCSA Flow	Other PI Users Flow (mgd)	% Other Flow
Sully Road #1	118	107	14.0	14.0		0.0%	14.0	100.0%		0.0%		0.0%
Sully Road #2	107	104B	3.0	17.0		0.0%	17.0	100.0%		0.0%		0.0%
Rock Hill Road	104B	83	2.4	19.4		0.0%	19.4	100.0%		0.0%		0.0%
Dulles Airport*	83	80	3.46	22.9		0.0%	19.4	84.9%		0.0%	3.5	15.1%
Indian Creek (S-6)	80	73	2.09	25.0		0.0%	19.4	77.8%	2.1	8.4%	3.5	13.9%
Broad Run	73	70	0.41	25.4		0.0%	19.4	76.5%	2.5	9.9%	3.5	13.6%
Loudoun Station	70	64	0.50	25.9		0.0%	19.4	75.0%	3.0	11.6%	3.5	13.4%
West Sterling	64	58	0.90	26.8		0.0%	19.4	72.5%	3.9	14.6%	3.5	12.9%
Beaumeade #1	62	58	0.19	27.0		0.0%	19.4	72.0%	4.1	15.2%	3.5	12.8%
Cabin Branch	58	55	7.71	34.7		0.0%	19.4	56.0%	11.8	34.0%	3.5	10.0%
Dulles Town Center	55		0.93	35.6								
Russel Branch (S-17)	55	53	1.32	36.9		0.0%	19.4	52.6%	14.1	38.1%	3.5	9.4%
Jefferson Village	53		0.36	37.3								
Countryside #1	53	51	0.27	37.5		0.0%	19.4	51.7%	14.7	39.1%	3.5	9.2%
Countryside #2	51		0.98	38.5								
PIP Zerox	51	49	3.64	42.2		0.0%	19.4	46.0%	19.3	45.8%	3.5	8.2%
Triple 7	49	48	2.74	44.9		0.0%	19.4	43.2%	22.0	49.1%	3.5	7.7%
Cascades North	48	44	1.13	46.0		0.0%	19.4	42.1%	23.2	50.3%	3.5	7.5%
Boise Cascade	44		1.40	47.4								
Seneca	44		1.66	49.1								
Cascade Western	44		1.01	50.1								
Great Falls Forest# 1	44		0.44	50.5								
Great Falls Forest# 2	44		0.22	50.8								
Sugarland	44		14.0	64.8								
Woodstone	44		0.30	65.1								
625/ 604	44		1.93	67.0								
Hughes Branch	44	43	0.91	67.9		0.0%	33.4	49.2%	31.0	45.7%	3.5	5.1%
Northwestern	43	41	0.54	68.4		0.0%	33.4	48.8%	31.6	46.1%	3.5	5.1%
Northeastern	41	31	0.30	68.7		0.0%	33.4	48.6%	31.9	46.4%	3.5	5.0%
Watts Branch	31		16.5	85.2								
Muddy Branch	31	29	28.3	113.5	44.8	39.5%	33.4	29.4%	31.9	28.1%	3.5	3.0%
Tow of Vienna*	29		3.46	117.0								
National Park Service*	29		0.07	117.1								
Great Falls	29	23	30.0	147.1	44.8	30.5%	63.4	43.1%	31.9	21.7%	7.0	4.8%
Scotts Run	23	21	10.2	157.3	44.8	28.5%	73.6	46.8%	31.9	20.3%	7.0	4.4%
Naval Ship R & D*	21	20	0.16	157.4	44.8	28.5%	73.6	46.8%	31.9	20.3%	7.1	4.5%
Rock Run	20	10	5.6	163.0	50.4	30.9%	73.6	45.1%	31.9	19.6%	7.1	4.4%
Cabin John	10	1996	37.0	200.0	87.4	43.7%	73.6	36.8%	31.9	15.9%	7.1	3.5%
			200.0									

* Allocated peaks for "Other Users" of PI were negotiated between suburbs and the District during Rock Creek PS upgrade.

* * Pimmit Run sewer crosses Chain Bridge and enters UPIRS near MH 1996 inside the District limits, downstream of MH 2. Hence not included here.

JURISDICTION
LOUDOUN
FAIRFAX
WSSC
OTHER USERS

14 – Multi-Jurisdictional Pump Stations

SYSTEM DESCRIPTION

This study identified four pumping stations conveying multi-jurisdictional flow within the District of Columbia:

1. Rock Creek Pumping Station – This station is included in Route 2, the Upper Potomac Interceptor (UPI); however, peak flow from Route 1, Route 2 and Route 3 is conveyed through this station. As there are interconnections between the UPI and the Upper Potomac Interceptor Relief Sewer (UPIRS), peak flow from the Potomac Interceptor users as well as WSSC flow from the UPI and the Little Falls Trunk Sewer is conveyed through this pump station. Only MJUF are conveyed through this station. This station has a firm rated capacity of 50 mgd. Flow from this pump station discharges into the UPIRS (Route 3).
2. Potomac Pumping Station – This station is the downstream terminus for Route 3, the UPIRS, which also conveys flows from Route 1, Route 2, and a portion of Route 4, the Rock Creek Main Interceptor (RCMI). As such, WSSC flows are conveyed from Little Falls (Route 1), Upper Potomac Interceptor (UPI), the UPIRS and the RCMI (Route 4). Fairfax flows are conveyed from the UPIRS (Route 3) from Chain Bridge and the Potomac Interceptor. Other Potomac Interceptor users are conveyed to this station from Route 3, the UPIRS. This station does receive flow from District only sewers as well as from the UPIRS. This station has a firm rated capacity of 460 mgd which is conveyed through the Potomac Force Mains to Blue Plains. The Potomac Pumping Station serves as the start of Route 5, the Potomac Force Mains.
3. Main Pumping Station – This station is the downstream terminus for Route 6, the B Street / New Jersey Ave. Trunk Sewer. WSSC flow contributes to this station from the RCMI (Route 4), which is conveyed to the B Street / New Jersey Avenue Trunk Sewer at Structure 35A. This station does receive flow from District only sewers as well as the Route 6 MJUF. Main Pumping Station has a firm rated capacity of 240 mgd. MJUF peak flow discharged from Main Pumping Station is the start of Route 7 and is conveyed through the Anacostia Siphon Sewers to the East and West Outfall Sewers to Blue Plains AWWTP.
4. Poplar Point Pumping Station – This station is the downstream terminus for Route 9, Watts Branch and the Anacostia Main Interceptor (AMI). All of the WSSC flow from Watts Branch (5.9mgd) is conveyed through Route 9 to this station. This station currently has a firm rated capacity of 45mgd. DC Water is replacing this facility with a new pumping station with a capacity of 55mgd. Flow from Poplar Point contributes to the East and West Outfall Sewers (Route 7) at Structure 5A.

Multi-jurisdictional capacity was analyzed by determining the peak suburban volume reaching each

MJUF pumping station. The MJUF peak flow rate was then compared to the rated firm pumping station capacity (largest pump out-of-service capacity). The remaining rated pumping station capacity was determined to represent the District's flow allocation. The results of these calculations are shown in the following table.

DC Water MJUF Pump Stations

Facility	Firm Rated Pumping Capacity (mgd)	Suburban Flow Through Facility(mgd)	% Suburban Flow	WSSC Flow (mgd)	% WSSC Flow	Fairfax Flow (mgd)	% Fairfax Flow	LCSA Flow (mgd)	% LCSA Flow	Other PI Users Flow (mgd)	% Other Flow	DC Flow (mgd)	% DC Flow
Rock Creek Pumping Station	50	37.8	75.6%	29.3	58.6%	6.0	12.0%	2.3	4.5%	0.2	0.5%	12.2	24.4%
Potomac Pumping Station	460	231.0	50.2%	135.1	29.4%	67.7	14.7%	25.4	5.5%	2.8	0.6%	229.0	49.8%
Main Pumping Station	240	24.7	10.3%	24.7	10.3%							215.3	89.7%
Poplar Point Pumping Station	55	5.5	10.0%	5.5	10.0%							49.5	90.0%

MJUF Full Schematic