CONSTITUTION PIPELINE

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HYDROLOGIC & HYDRAULIC CALCULATIONS

FOR

WATERBODIES CROSSED BY

CONSTITUTION PIPELINE

Submitted by: Constitution Pipeline

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INTRODUCTION

The attached hydrologic and hydraulic calculations were performed for all field surveyed waterbodies crossed by the Constitution Pipeline (Project) within Broome, Chenango, Delaware, and Schoharie Counties in New York. The Project consists of approximately 124-miles of new 30-inch diameter pipeline, two meter stations with interconnecting piping, and additional ancillary facilities such as main line valves (MLVs), cathodic protection, and internal inspection device launchers and receivers. Of the approximately 124-miles, approximately 99-miles are located within New York.

The primary objective of the attached calculations was to size temporary flume pipes at each waterbody crossing to convey, at a minimum, normal flow safely through the construction workspace. A typical waterbody crossing will consist of sand bag cofferdams placed at the upstream and downstream limits of the construction workspace, a smooth interior and exterior class I steel pipe (same as being used to construct the pipeline), and a temporary bridge equipment crossing. The equipment crossing type (i.e. bridge crossing or flume pipes backfilled with clean stone) will be based on a combination of the width of the waterbody and the flow present while constructing the crossing. Depending on the size of the waterbody, the majority of the waterbodies will be crossed within 24 – 48 hours.

DESIGN CRITERIA AND METHODOLOGY

The following design criteria and methodology was used to perform the calculations:

1. Hydrologic Methodology

Hydrologic calculations were performed using either the Rational Method, the NRCS (SCS) Peak Flow Method, USGS StreamStats, or USGS StreamStats with HydroCAD v.10.0. The specific method used to calculate the design flows for each waterbody varied based on parameters such as the watershed size, waterbody slope, basin elevation, and ground cover type (e.g. pasture, forest, urban).

a. Rational Method: Q=CIA

- Q = flow (cubic feet per second - cfs)
  C = runoff coefficient
  A = drainage area (acres – ac)
  I = rainfall intensity (inches per hour – in/hr)
- This method was used for drainage areas up to 200 acres in size
- NOAA Technical Memorandum NWS Hydro-35 was used to determine "I" in the New York Counties of Broome, Chenango, Delaware and Schoharie.
- The following Runoff Coefficients were used:

Cover Type	Slope Range (%)	Hydrologic Soil Group*	Runoff Coefficient
Pasture	0% – 6 %	D	0.20
Forest	0% – 20 %	D	0.32
Forest	> 20 %	D	0.38

*Hydrologic Soil Group D was used for a conservative approach.

- Time of Concentrations were calculated using the following:
  - **Sheet Flow:**
    Manning's Kinematic Solution
    Maximum (max) sheet flow length of 150ft

- **Shallow Concentrated Flow**
  The travel time for shallow concentrated flow was calculated by dividing the travel path length by a calculated velocity. The velocity for specific cover types were calculated using Manning's equation.

- **Channel Flow**
  As upstream channel morphology is not constant, the travel time for Channel flow was calculated by assuming a channel velocity of 15.00 ft/s and applying it to the shallow concentrated flow formula.

b. NRCS (SCS) Peak Flow Method:

The computer program HydroCAD, Version 10.0, was used to determine the peak flow discharges for the watershed. HydroCAD is a program which employs TR-20 methodology which uses the unit-hydrograph runoff procedure. As with TR-20, the HydroCAD peak flow discharges are dependent upon parameters such as watershed size, the curve number for a given watershed, time of concentration, available flood storage, rainfall storm type, rainfall intensity and storm duration.

- This method was used for drainage areas over 200 acres and up to 960 acres (1.5 square miles) in size.
- The following curve numbers were used:

Cover Type	Hydrologic Soil Group*	Curve Number (CN)
Woods	D	83
Pasture	D	89
Urban	D	98

- In the counties of Broome, Chenango, Delaware, and Schoharie, depths were used in conjunction with a 24-hour storm duration.
- The Time of Concentration was calculated using the same methodology used for the Rational Method.

c. USGS StreamStats for New York

StreamStats is a Web-based tool developed by the USGS and Environmental Systems Research Institute, Inc. (ESRI). This map-based Web application was designed to make it easy for users to obtain stream flow statistics, drainage-basin characteristics, and other information for user-selected sites. StreamStats utilizes previously published information

from gaging stations and previously gathered basin characteristics to develop stream flow statistics utilizing the appropriate regression equations to compute the stream flows. The StreamStats flows will only be utilized where the drainage area of over 400 acres falls within the acceptable ranges for Mean/Base-Flow or for Peak Flow. Drainage areas outside the acceptable ranges generate flows that are based on extrapolations with unknown errors.

d. Design Frequency:

The design frequency utilized in the design varied based on the U.S. Weather Bureau Technical Paper 40. A 2-year design, a 5-year, and a 10-year maximum design storm were utilized for all watershed classifications with the 5-year as the design storm. Average daily flow calculations were also performed for larger watersheds where the 2- and 5-year storms resulted in flows that cannot be completely passed within the designed pipes and it is unlikely that a 2-year or 5-year storm event will occur during the crossing.

2. Hydraulic Calculations

The temporary flume pipes were sized using the Federal Highway Administration (FHWA) HY-8 computer program. HY-8 is a culvert analysis program that automates the design methods described in HDS No. 5, "Hydraulic Design of Highway Culverts".

It should be noted that all flume pipes analyzed with HY-8 called for the pipe crossing materials to be High Density Polyethylene (HDPE) pipes. This is only for the modeling of the pipe crossings due to material limitations within the program. As previously noted, all flume pipes that are to cross the waterbodies for the construction of the pipeline will be temporary and consist of Class I smooth interior and exterior steel pipe, a material selection that is not available in HY8, therefore HDPE was selected in the model because its Manning's roughness coefficient is the same as the steel pipe.

For the larger storm events, those with stream flows generated by Streamstats, the contractor will be responsible for determining the appropriate stream crossing method due to the flow conditions at the time of construction at the location specified. The contractor will provide crossing details as part of the construction submittal process. These methodologies may include, but are not limited to, temporary diversion channels, temporary bridges, temporary fords, and temporary pipe crossings. All temporary crossings will conform to all local, state and federal regulations.

3. Summary and Recommendations

For the waterbody crossings along the proposed pipeline, the Streamstats generated flows for even the 2 year storm event are significant and will require the Contractor to design water conveyance and handling facilities based upon his specific means, methods and equipment for each crossing and coordinate the construction activities with periods of lower or average daily flows to facilitate safe passage and conveyance of flows during installation of the proposed pipeline crossing under the waterbody. See Hydraulic Calculations above for further information.

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK

Spread	Waterbody ID[a]	Waterbody Name[b]	Approximate Milepost[c]	Latitude	Longitude	Town / County	Quadrangle	Pipe Size (inches)	Pipe Length (feet)[e]	Number of Pipes	Design Flow (CFS)	Pipe Inv. In	Pipe Inv. Out	Top Of Coffer Dam Elevation	Notes
WATERBODIES ASSOCIATED WITH PIPELINE															
SPREAD 2	BR-1C-S207	UNT to Fly Creek	26.37	42.008494	-75.527270	Sanford /Broome	Gulf Summit	18	85	1	6.22	1681.00	1667.00	1684.00	
	BR-1C-S230	UNT to Fly Creek	26.47	42.009782	-75.526227	Sanford /Broome	Gulf Summit	24	75	1	15.76	1647.00	1627.46	1649.50	
	BR-1S-S206	UNT to Fly Creek	26.57	42.011169	-75.525888	Sanford /Broome	Gulf Summit	18	85	3	27.90	1631.00	1618.00	1633.50	
	BR-1H-S131	UNT to Fly Creek	27.40	42.021673	-75.523901	Sanford /Broome	Gulf Summit				Stream Stats				Site Specific Design Required
	BR-1H-S179	UNT to Fly Creek	28.30	42.031825	-75.515683	Sanford /Broome	Gulf Summit	30	54	1	32.88	1413.29	1412.70	1417.00	
	BR-1H-S178	UNT to Fly Creek	28.70	42.037302	-75.516066	Sanford /Broome	Gulf Summit				Stream Stats				Site Specific Design Required
	BR-XX-S28.75	Road Ditch	28.75	42.037583	-75.513957	Sanford /Broome	Gulf Summit								Road Crossing
	BR-1B-S049	UNT to Fly Creek	28.80	42.037702	-75.517278	Sanford /Broome	Gulf Summit				Stream Stats				Site Specific Design Required
	BR-1J-S170	UNT to Fly Creek	28.90	42.039437	-75.518118	Sanford /Broome	Gulf Summit	30	70	1	30.59	1231.33	1225.73	1235.00	
	BR-1H-S208	UNT to Fly Creek	29.00	42.040889	-75.518393	Sanford /Broome	Gulf Summit	15	125	2	9.73	1254.00	1225.00	1256.00	
	BR-1J-S048	UNT to Fly Creek	29.17	42.042732	-75.516527	Sanford /Broome	Gulf Summit	24	70	3	34.00	1212.00	1209.00	1215.00	
	BR-1I-S050	UNT to Fly Creek	29.35	42.044757	-75.514406	Sanford /Broome	Gulf Summit	30	90	1	33.75	1234.00	1223.50	1238.00	
	BR-1I-S051	UNT to Fly Creek	29.70	42.049576	-75.512531	Sanford /Broome	Gulf Summit	18	80	1	11.72	1370.45	1363.59	1374.00	
	BR-1I-S001	UNT to Marsh Creek	30.30	42.056596	-75.508011	Sanford /Broome	Gulf Summit				Stream Stats				Site Specific Design Required
	BR-1B-S054B	UNT to Marsh Creek	30.58	42.059794	-75.50451	Sanford /Broome	Gulf Summit	15	85	1	5.18	1214.00	1209.00	1216.00	
	BR-1I-S055	Marsh Creek	30.71	42.061219	-75.504102	Sanford /Broome	Gulf Summit	36	81	6	236.20	1153.00	1149.00	1157.00	
	BR-XX-S29.54	UNT to Oquaga Creek	31.72	42.072217	-75.492539	Sanford /Broome	Deposit								No Survey Access

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SPREAD 2	BR-1I-S188A	UNT to Oquaga Creek	32.92	42.083158	-75.477838	Sanford /Broome	Deposit				Stream Stats				Site Specific Design Required
	BR-1G-S186	UNT to Oquaga Creek	33.60	42.092322	-75.48099	Sanford /Broome	Deposit	18	75	1	13.03	1142.75	1138.90	1146.00	
	BR-1B-S056A	UNT to Oquaga Creek	33.62	42.092885	-75.481049	Sanford /Broome	Deposit	24	75	2	47.68	1138.50	1138.10	1142.50	
	BR-1I-S057	Oquaga Creek	33.95	42.097941	-75.480686	Sanford /Broome	Deposit				Stream Stats				Site Specific Design Required
	BR-1G-S189	UNT to Oquaga Creek	34.60	42.104719	-75.474086	Sanford /Broome	Deposit	12	75	1	5.58	1279.00	1271.50	1282.00	
	BR-1I-S190	UNT to Oquaga Creek	34.69	42.105835	-75.473165	Sanford /Broome	Deposit	48	75	2	171.97	1268.00	1263.00	1273.00	
	BR-1U-S135	UNT to Oquaga Creek	35.15	42.112629	-75.471445	Sanford /Broome	Deposit	18	75	1	15.90	1321.40	1308.96	1326.00	
	BR-1K-S138	UNT to Oquaga Creek	35.27	42.113904	-75.470782	Sanford /Broome	Deposit	18	95	1	8.20	1309.00	1299.00	1311.50	
	BR-1K-S140	UNT to Oquaga Creek	35.54	42.117453	-75.468261	Sanford /Broome	Deposit	30	75	2	98.43	1235.90	1231.78	1242.00	
	BR-1I-S062	UNT to Oquaga Creek	35.90	42.122358	-75.466133	Sanford /Broome	Deposit	30	75	4	143.67	1227.80	1227.30	1232.00	
	BR-1I-S065	UNT to Oquaga Creek	36.30	42.126215	-75.463696	Sanford /Broome	North Sanford	24	81	2	33.51	1286.47	1281.79	1290.00	
	BR-1U-S141	Oquaga Creek	36.63	42.131094	-75.463014	Sanford /Broome	North Sanford				Stream Stats				Site Specific Design Required
	BR-1C-S150	Dry Brook	37.40	42.140068	-75.467243	Sanford /Broome	North Sanford				Stream Stats				Site Specific Design Required
	BR-1C-S071A	UNT to Dry Brook	38.40	42.152411	-75.481083	Sanford /Broome	North Sanford	24	90	1	14.62	1565.00	1559.00	1568.00	
	BR-1Q-S209	UNT to Dry Brook	38.70	42.155591	-75.484737	Sanford /Broome	North Sanford				Stream Stats				Site Specific Design Required
	BR-1Q-S210	UNT to Dry Brook	38.90	42.156227	-75.485445	Sanford /Broome	North Sanford	15	75	1	4.52	1611.00	1601.50	1612.50	
	BR-1C-S150A	UNT to Dry Brook	38.94	42.160044	-75.489531	Sanford /Broome	North Sanford	24	80	2	34.95	1619.00	1610.00	1622.00	
	BR-1C-S221	UNT to Dry Brook	39.61	42.166254	-75.495399	Sanford /Broome	North Sanford	18	100	1	9.18	1731.00	1718.00	1733.00	

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SPREAD 2	BR-1B-S072	Road Ditch	40.65	42.17824	-75.506338	Sanford /Broome	Afton	15	77	1	3.36	1734.00	1727.38	1736.50	
	BR-1G-S196	UNT of Cornell Creek	41.20	42.182978	-75.513448	Sanford /Broome	Afton	12	81	1	3.63	1569.00	1563.00	1571.00	
	BR-1I-S198	UNT of Cornell Creek	41.25	42.184081	-75.513381	Sanford /Broome	Afton	15	80	1	3.54	1551.78	1548.97	1554.00	
	BR-1C-S151	UNT of Cornell Creek	41.38	42.18558	-75.512928	Sanford /Broome	Afton	12	89	1	1.69	1534.00	1527.00	1536.00	
	BR-1S-S203	UNT of Cornell Creek	41.95	42.190632	-75.509430	Sanford /Broome	Afton	18	90	1	6.70	1500.50	1496.50	1502.50	
	CH-1L-S250	UNT of Cornell Creek	42.25	42.195417	-75.505219	Afton /Chenango	Afton				Stream Stats				Site Specific Design Required
	CH-1H-S011	UNT of Cornell Creek	42.40	42.196823	-75.504572	Afton /Chenango	Afton	18	81	1	8.99	1392.00	1381.00	1394.50	
	CH-1H-S011A	UNT of Cornell Creek	42.40	42.196824	-75.504758	Afton /Chenango	Afton								Divert through CH-1H-S011
	CH-1J-S014A	UNT of Cornell Creek	42.71	42.201388	-75.505398	Afton /Chenango	Afton				Stream Stats				Site Specific Design Required
	CH-1J-S014	UNT of Cornell Creek	42.71	42.201527	-75.505612	Afton /Chenango	Afton				Stream Stats				Site Specific Design Required
	CH-1J-S015	UNT of Cornell Creek	42.75	42.201907	-75.505886	Afton /Chenango	Afton	48	224	2	243.75	1266.00	1254.97	1272.50	
	CH-XX-42.81	UNT of Cornell Creek	43.0	42.204995	-75.504285	Afton /Chenango	Afton	36	110	3	128.01	1314.00	1307.50	1318.00	
	CH-1H-S016	UNT of Cornell Creek	43.75	42.213675	-75.50046	Afton /Chenango	Afton	30	190	3	64.00	1529.50	1528.50	1532.25	
	CH-1S-S060	UNT to Susquehanna River	45.20	42.234511	-75.489351	Afton /Chenango	Afton	18	110	1	6.65	1074.50	1064.75	1077.00	
	CH-1A-S048	UNT to Susquehanna River	45.30	42.234677	-75.489265	Afton /Chenango	Afton				Stream Stats				Site Specific Design Required
	CH-1C-S065	UNT to Susquehanna River	45.70	42.238649	-75.482796	Afton /Chenango	Afton	30	75	1	22.61	1086.00	1084.00	1089.00	
	CH-1X-S063	UNT to Susquehanna River	46.20	42.242103	-75.476305	Afton /Chenango	North Sanford	30	100	2	80.10	1114.00	1109.00	1118.50	

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SPREAD 2	CH-1X-S062A	UNT to Susquehanna River	46.29	42.243011	-75.475555	Afton /Chenango	North Sanford	30	90	2	41.99	1127.00	1117.50	1130.50	
	CH-1X-S061	UNT to Susquehanna River	46.39	42.243018	-75.474460	Afton /Chenango	North Sanford	12	60	1	1.91	1136.00	1132.50	1137.00	
	CH-1C-S035	UNT to Susquehanna River	46.45	42.246421	-75.47211	Afton /Chenango	North Sanford	24	135	1	14.66	1292.00	1265.35	1295.00	
	CH-1Q-S036A	UNT to Susquehanna River	46.79	42.248137	-75.471165	Afton /Chenango	North Sanford	12	90	1	3.55	1365.75	1355.50	1368.00	
	CH-1C-S008	UNT to Osborne Brook	47.30	42.256278	-75.466098	Afton /Chenango	Sidney	12	79	1	4.76	1097.00	1086.01	1100.00	
	CH-1K-S009	UNT to Osborne Brook	47.45	42.257989	-75.465475	Afton /Chenango	Sidney	18	83	1	10.92	1004.40	999.10	1007.00	
	CH-1A-S010	Bennettsville Creek	47.70	42.261009	-75.461675	Bainbridge /Chenango	Sidney				Stream Stats				Site Specific Design Required
SPREAD 3	CH-1B-S025	UNT to Bennettsville Creek	48.21	42.264938	-75.454106	Bainbridge /Chenango	Sidney	30	81	1	23.11	1130.44	1127.43	1134.00	
	CH-1S-S042	UNT to Bennettsville Creek	49.60	42.276456	-75.432947	Bainbridge /Chenango	Sidney	12	50	1	1.84	1554.00	1550.00	1555.00	
	CH-1S-S046	UNT to Bennettsville Creek	49.70	42.277131	-75.432062	Bainbridge /Chenango	Sidney	12	100	6	16.09	1560.70	1555.62	1562.00	
	CH-1A-S038	UNT to Bennettsville Creek	50.20	42.277365	-75.429621	Bainbridge /Chenango	Sidney	12	90	1	1.39	1602.04	1594.29	1603.50	
	DE-1H-S026	Rock Creek	50.95	42.278313	-75.407083	Masonville /Delaware	Sidney	48	59	2	221.40	1538.00	1537.24	1544.00	
	DE-1C-S270	UNT to Rock Creek	51.12	42.278149	-75.406801	Masonville /Delaware	Sidney	12	115	1	2.18	1624.80	1616.00	1626.00	
	DE-1H-S028	Road Ditch	51.62	42.278565	-75.394623	Masonville /Delaware	Sidney								Road Crossing
	DE-1B-S029	UNT to Susquehanna River	52.51	42.283555	-75.385043	Sidney /Delaware	Sidney	24	58	2	36.10	1664.09	1655.51	1667.50	

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SPREAD 3	DE-XX-S53.55	Road Ditch	53.55	42.289101	-75.363414	Sidney /Delaware	Sidney								Road Crossing
	DE-1H-S033	UNT to Masonville Creek	53.90	42.289272	-75.357606	Sidney /Delaware	Unadilla	24	79	2	31.94	1756.18	1755.30	1759.50	
	DE-1H-S013	UNT to Susquehanna River	54.50	42.291184	-75.345626	Sidney /Delaware	Unadilla	24	100	5	98.75	1611.08	1610.00	1614.50	
	DE-1H-S013	UNT to Susquehanna River	54.39	42.291184	-75.345626	Sidney /Delaware	Unadilla								Divert Through DE-1H-S013
	DE-1M-S075	UNT to Susquehanna River	55.10	42.296436	-75.331549	Sidney /Delaware	Unadilla	15	53	3	9.89	1661.59	1656.73	1663.00	
	DE-XX-S55.60	Road Ditch	55.60	42.295389	-75.325456	Sidney /Delaware	Unadilla								Road Crossing
	DE-1M-S077A	UNT to Carrs Creek	55.70	42.295285	-75.323674	Sidney /Delaware	Unadilla	18	80	1	9.06	1414.35	1401.34	1419.44	
	DE-1KS077A	UNT to Carrs Creek	55.71	42.295105	-75.323372	Sidney /Delaware	Unadilla								Road Crossing
	DE-1M-S077B	UNT to Carrs Creek	55.79	42.295119	-75.322697	Sidney /Delaware	Unadilla	18	102	2	21.51	1368.40	1357.96	1372.00	
	DE-1F-S078	UNT to Carrs Creek	55.90	42.294573	-75.321115	Sidney /Delaware	Unadilla				Stream Stats				Site Specific Design Required
	DE-1C-S269	UNT to Carrs Creek	56.00	42.296662	-75.318026	Sidney /Delaware	Unadilla								Road Crossing
	DE-XX-S56.35	UNT to Carrs Creek	56.50	42.300920	-75.312301	Sidney /Delaware	Unadilla	18	75	8	64.69	1178	1174.00	1180.00	
	DE-XX-S56.59	UNT to Carrs Creek	56.68	42.304115	-75.310732	Sidney /Delaware	Unadilla				Stream Stats				Site Specific Design Required
	DE-1C-S110B	UNT to Susquehanna River	57.90	42.317297	-75.297673	Sidney /Delaware	Unadilla	24	215	2	26.26	1153.00	1132.00	1156.00	
	DE-1C-S113C	UNT to Susquehanna River	58.00	42.318792	-75.295812	Sidney /Delaware	Unadilla	30	90	2	68.49	1110.50	1106.00	1114.50	
	DE-1C-S113D	UNT to Susquehanna River	58.10	42.319525	-75.294569	Sidney /Delaware	Unadilla	15	80	1	5.54	1128.00	1122.00	1130.00	

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Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**
SPREAD 3	DE-1N-S079	UNT to Susquehanna River	58.42	42.322491	-75.289412	Sidney /Delaware	Unadilla	36	90	1	56.51	1100.00	1096.00	1106.00	
	DE-1N-S079A	UNT to Susquehanna River	58.28	42.322233	-75.28941	Sidney /Delaware	Unadilla								Divert through DE-1N-S079
	DE-1C-S190	UNT to Susquehanna River	58.80	42.326126	-75.28508	Sidney /Delaware	Unadilla	18	80	1	9.01	1131.75	1128.00	1134.00	
	DE-1S-S100	UNT to Pond	58.85	42.326961	-75.283635	Sidney /Delaware	Unadilla	30	120	1	28.38	1114.00	1108.00	1118.00	
	DE-1N-S101	UNT to Pond	59.05	42.328950	-75.281874	Sidney /Delaware	Unadilla	24	105	2	33.62	1102.50	1098.25	1106.00	
	DE-1M-S081	UNT to Susquehanna River	59.59	42.333405	-75.273148	Sidney /Delaware	Unadilla	18	80	3	19.38	1137.00	1128.00	1139.00	
	DE-1S-S102	UNT to Outleout Creek	59.90	42.33528	-75.267013	Sidney /Delaware	Unadilla	30	100	6	276.11	1160.00	1155.20	1165.50	
	DE-1Q-S071	UNT to Outleout Creek	60.27	42.338948	-75.259703	Sidney /Delaware	Unadilla	18	95	1	10.20	1297.00	1286.00	1299.50	
	DE-1P-S129	Ouleout Creek	60.80	42.342253	-75.254519	Sidney /Delaware	Unadilla				Stream Stats				Site Specific Design Required
	DE-1W-S130	UNT to Outleout Creek	61.11	42.344852	-75.250559	Sidney /Delaware	Unadilla	48	80	1	94.58	1077.00	1073.00	1082.00	
	DE-1A-S301	UNT to Outleout Creek	62.43	42.354574	-75.231646	Sidney /Delaware	Franklin	24	165	2	26.56	1596.50	1594.00	1599.00	
	DE-1P-S211	UNT to Outleout Creek	63.11	42.356208	-75.218186	Sidney /Delaware	Franklin	24	82	2	42.72	1571.50	1567.00	1575.00	
	DE-1X-S235	UNT to Outleout Creek	63.92	42.357316	-75.20209	Sidney /Delaware	Franklin								No Survey Access
	DE-XX-S64.62	UNT to Outleout Creek	64.79	42.362367	-75.187141	Franklin /Delaware	Franklin								No Survey Access
	DE-1L-S176	UNT to Outleout Creek	66.25	42.372715	-75.163546	Franklin /Delaware	Franklin	24	80	3	50.69	1674.77	1674.62	1678.00	
	DE-1C-S273	UNT to Outleout Creek	68.90	42.375263	-75.151790	Franklin /Delaware	Oneonta	12	95	1	3.10	1682.00	1680.00	1684.00	
	DE-XX-S66.57	UNT to Outleout Creek	68.80	42.388756	-75.118972	Franklin /Delaware	Oneonta								No Survey Access

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK															
Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**
SPREAD 3	DE-1P-S054	UNT to Outleout Creek	69.49	42.388823	-75.106163	Franklin /Delaware	Oneonta				Stream Stats				Site Specific Design Required
	DE-1P-S056	UNT to Outleout Creek	70.90	42.403746	-75.089380	Franklin /Delaware	Oneonta				Stream Stats				Site Specific Design Required
	DE-1P-S056A	UNT to Outleout Creek	70.95	42.403738	-75.089176	Franklin /Delaware	Oneonta	24	75	1	10.40	1637.72	1635.68	1640.00	
SPREAD 4	DE-1P-S058	UNT to Outleout Creek	71.78	42.408469	-75.076315	Franklin /Delaware	Oneonta	60	85	2	450.19	1609.50	1607.25	1618.00	
	DE-1P-S058B	UNT to Outleout Creek	71.78	42.408557	-75.076194	Franklin /Delaware	Oneonta								Divert Through DE-1P-S058
	DE-1C-S192	UNT to Ouleout Creek	71.90	42.409363	-75.074955	Franklin /Delaware	Oneonta	12	90	1	0.68	1702.00	1685.00	1704.00	
	DE-1C-S192A	UNT to Outleout Creek	71.90	42.409458	-75.074356	Franklin /Delaware	Oneonta	12	90	1	0.41	1706.00	1688.00	1708.00	
	DE-XX-S70.69	UNT to Outleout Creek	73.99	42.419484	-75.059779	Franklin /Delaware	Oneonta								No Survey Access
	DE-1P-S125	UNT to Outleout Creek	73.97	42.418031	-75.036913	Davenport /Delaware	Oneonta	24	80	1	20.83	1872.35	1862.50	1876.00	
	DE-1P-S126	UNT to Outleout Creek	74.30	42.419183	-75.034966	Davenport /Delaware	Oneonta	60	115	1	173.34	1783.45	1779.70	1791.00	
	DE-1C-S268	UNT to Outleout Creek	75.30	42.422663	-75.016817	Davenport /Delaware	Oneonta								Road Crossing
	DE-XX-S73.57	UNT to Outleout Creek	75.88	42.418287	-75.007359	Davenport /Delaware	Oneonta								No Survey Access
	DE-XX-S74.13	UNT to Outleout Creek	76.42	42.420625	-74.996601	Davenport /Delaware	West Davenport								No Survey Access
	DE-XX-S74.20	UNT to Outleout Creek	76.50	42.420658	-74.995654	Davenport /Delaware	West Davenport								No Survey Access
	DE-XX-S75.57	UNT to Outleout Creek	77.85	42.424136	-74.965477	Davenport /Delaware	West Davenport				Stream Stats				Site Specific Design Required
	DE-XX-S75.78	UNT to Outleout Creek	78.09	42.424060	-74.965944	Davenport /Delaware	West Davenport				Stream Stats				Site Specific Design Required
	DE-1G-S209	UNT to Charlotte Creek	78.20	42.423904	-74.963172	Davenport /Delaware	West Davenport				Stream Stats				Site Specific Design Required
	DE-1G-S241	Road Ditch	78.25	42.423497	-74.962622	Davenport /Delaware	West Davenport								Road Crossing

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK

Spread	Waterbody ID[a]	Waterbody Name[b]	Approximate Milepost[c]	Latitude	Longitude	Town / County	Quadrangle	Pipe Size (inches)	Pipe Length (feet)[e]	Number of Pipes	Design Flow (CFS)	Pipe Inv. In	Pipe Inv. Out	Top Of Coffer Dam Elevation	Notes
SPREAD 4	DE-1L-S210	UNT to Charlotte Creek	78.31	42.423182	-74.961013	Davenport /Delaware	West Davenport	36	85	2	121.04	1530.20	1522.76	1536.00	
	DE-1L-S210A	UNT to Charlotte Creek	78.31	42.423381	-74.96099	Davenport /Delaware	West Davenport								Divert Through DE-1L-S210
	DE-1G-S242	UNT to Charlotte Creek	78.55	42.422764	-74.955092	Davenport /Delaware	West Davenport	30	85	1	32.90	1657.31	1648.40	1661.00	
	DE-1G-S244	UNT to Charlotte Creek	78.62	42.422732	-74.954346	Davenport /Delaware	West Davenport								Divert through DE-1G-S243
	DE-1G-S243	UNT to Charlotte Creek	78.63	42.423128	-74.955013	Davenport /Delaware	West Davenport	30	85	1	32.90	1657.31	1648.40	1661.00	
	DE-1L-S254	UNT to Charlotte Creek	79.09	42.422339	-74.946660	Davenport /Delaware	West Davenport	12	78	1	1.12	1752.18	1746.38	1753.50	
	DE-1L-S256	UNT to Charlotte Creek	79.1	42.422220	-74.946210	Davenport /Delaware	West Davenport	12	94	7	16.68	1765.34	1754.34	1766.50	
	DE-1L-S255	UNT to Charlotte Creek	79.18	42.421959	-74.945030	Davenport /Delaware	West Davenport	15	100	1	3.89	1821.55	1788.32	1823.00	
	DE-1P-S134	UNT to Charlotte Creek	79.85	42.425684	-74.932588	Davenport /Delaware	West Davenport	18	80	1	8.01	1795.50	1780.50	1798.00	
	DE-1M-S135	UNT to Charlotte Creek	79.92	42.425214	-74.931069	Davenport /Delaware	West Davenport	24	80	1	19.81	1778.50	1762.00	1782.00	
	DE-1P-S136	UNT to Charlotte Creek	80.25	42.424782	-74.924925	Davenport /Delaware	West Davenport	18	85	2	18.19	1658.00	1652.00	1661.00	
	DE-1P-S138	UNT to Charlotte Creek	80.35	42.425008	-74.922925	Davenport /Delaware	West Davenport	36	85	2	78.32	1643.32	1636.30	1647.00	
	DE-1P-S137	UNT to Charlotte Creek	80.35	42.425009	-74.922511	Davenport /Delaware	West Davenport	12	90	1	3.42	1640.00	1631.16	1642.00	

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK															
Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**
SPREAD 4	DE-1G-S207	UNT to Charlotte Creek	80.35	42.424668	-74.922885	Davenport /Delaware	West Davenport								Divert Through DE-1G-S137
	DE-1L-S208	UNT to Charlotte Creek	80.35	42.424646	-74.922766	Davenport /Delaware	West Davenport								Divert Through DE-1G-S137
	DE-1L-S206	UNT to Charlotte Creek	80.41	42.424973	-74.921731	Davenport /Delaware	West Davenport								Road Crossing
	DE-1B-S267	UNT to Charlotte Creek	80.5	42.424929	-74.919388	Davenport /Delaware	West Davenport	18	83	3	31.04	1661.50	1644.80	1664.00	
	DE-1G-S183C	UNT to Charlotte Creek	80.59	42.425546	-74.918669	Davenport /Delaware	West Davenport	24	80	4	47.47	1627.75	1622.50	1630.00	
	DE-1G-S183	UNT to Charlotte Creek	80.6	42.425546	-74.918669	Davenport /Delaware	West Davenport								Divert Through DE-1G-S183C
	DE-1L-S201	UNT to Kortright Creek	81.62	42.436163	-74.90123	Davenport /Delaware	West Davenport				Stream Stats				Site Specific Design Required
	DE-1G-S203	UNT to Kortright Creek	82.01	42.437321	-74.896377	Davenport /Delaware	West Davenport	12	90	1	2.71	1441.47	1429.93	1443.00	
	DE-XX-S80.81	UNT to Kortright Creek	83.15	42.442474	-74.876285	Davenport /Delaware	West Davenport	36	80	1	38.22	1724.00	1720.00	1728.00	
	DE-1B-S272	UNT to Kortright Creek	83.40	42.444494	-74.87115	Davenport /Delaware	Davenport	15	75	4	14.19	1729.67	1727.67	1731.00	
	DE-XX-S82.37	UNT to Charlotte Creek	84.70	42.453407	-74.850648	Davenport /Delaware	Davenport								No Survey Access
	DE-1L-S252	UNT to Charlotte Creek	86.1	42.457094	-74.823197	Davenport /Delaware	Davenport	12	83	10	30.82	1862.67	1858.39	1864.00	
	DE-1R-S001	UNT to Middle Brook	87.10	42.463088	-74.806956	Davenport /Delaware	Davenport	30	55	2	64.83	1898.50	1895.05	1902.00	
	DE-1T-S051	Middle Brook	87.80	42.467988	-74.793928	Davenport /Delaware	Davenport				Stream Stats				Site Specific Design Required

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK															
Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**
SPREAD 4	DE-1T-S052	UNT to Middle Brook	88.05	42.469305	-74.790416	Davenport /Delaware	Davenport				Stream Stats				Site Specific Design Required
	DE-1P-S052A	UNT to Middle Brook	88.49	42.472475	-74.783278	Davenport /Delaware	Davenport				Stream Stats				Site Specific Design Required
	DE-1L-S250	UNT to Charlotte Creek	90.21	42.490136	-74.760873	Harpersfield /Delaware	Charlottevill e								Road Crossing
	DE-1G-S006	UNT to Charlotte Creek	91.81	42.501473	-74.734856	Harpersfield /Delaware	Charlottevill e				Stream Stats				Site Specific Design Required
	DE-1G-S005	UNT to Charlotte Creek	92.32	42.502937	-74.729153	Harpersfield /Delaware	Charlottevill e	18	90	10	58.44	1942.87	1939.91	1944.50	
SPREAD 5	SC-1F-S002	UNT to Charlotte Creek	94.60	42.516533	-74.691728	Summit /Schoharie	Charlottevill e	36	80	2	65.18	1587.83	1581.94	1592.00	
	SC-1S-S315	UNT to Charlotte Creek	94.60	42.516533	-74.691728	Summit /Schoharie	Charlottevill e	12	95	2	3.42	1590.50	1583.33	1592.00	
	SC-1Y-S342	Clapper Hollow Creek	94.90	42.519170	-74.685411	Summit /Schoharie	Charlottevill e								Road Crossing
	SC-1C-S325	Clapper Hollow Creek	95.20	42.520821	-74.681950	Summit /Schoharie	Charlottevill e				Stream Stats				Site Specific Design Required
	SC-1Q-S284	UNT to Clapper Hollow Creek	95.38	42.522481	-74.679842	Summit /Schoharie	Charlottevill e	30	80	1	24.28	1573.50	1569.60	1577.00	
	SC-1Q-S278	UNT to Clapper Hollow Creek	96.08	42.52561	-74.667171	Jefferson /Schoharie	Charlottevill e	36	80	1	58.39	1791.50	1783.00	1797.00	
	SC-1C-S280	Road Ditch	96.40	42.527671	-74.661531	Jefferson /Schoharie	Charlottevill e								Road Crossing
	SC-1G-S342	UNT to Clapper Hollow Creek	96.65	42.535143	-74.645672	Jefferson /Schoharie	Charlottevill e								Road Crossing
	SC-1G-S343	UNT to Clapper Hollow Creek	97.45	42.535283	-74.645455	Jefferson /Schoharie	Charlottevill e	24	80	1	17.93	2132.60	2128.28	2136.00	

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK															
Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**
SPREAD 5	SC-1A-S370	UNT to Clapper Hollow Creek	97.79	42.537435	-74.639313	Jefferson /Schoharie	Charlottevill e	48	80	3	186.51	2024.50	2024.00	2030.00	Site Specific Design Required
	SC-1A-S370C	UNT to Clapper Hollow Creek	97.78	42.537379	-74.639485	Jefferson /Schoharie	Charlottevill e								Divert Through SC-1A-S370
	SC-1A-S370F	UNT to Clapper Hollow Creek	97.80	42.537470	-74.639192	Jefferson /Schoharie	Charlottevill e								Divert Through SC-1A-S370
	SC-1L-S335	UNT to Clapper Hollow Creek	98.60	42.542571	-74.625275	Jefferson /Schoharie	Charlottevill e	30	100	2	81.82	2047.84	2043.24	2052.00	
	SC-1E-S102	West Kill	101.75	42.571182	-74.585849	Summit /Schoharie	Summit				Stream Stats				Site Specific Design Required
	SC-1E-S104	UNT to West Kill	102.10	42.574071	-74.580766	Summit /Schoharie	Summit	18	82	2	14.83	1985.00	1980.00	1987.00	
	SC-1E-S105	UNT to Cobleskill Creek	102.95	42.585515	-74.574102	Summit /Schoharie	Summit	15	80	3	21.62	2043.00	2038.58	2045.25	
	SC-1M-S013	UNT to Cobleskill Creek	104.09	42.596805	-74.561004	Summit /Schoharie	Summit	12	155	1	1.83	1618.00	1588.00	1620.00	
	SC-1G-S151	Beards Hollow Brook	104.52	42.601084	-74.556202	Summit /Schoharie	Summit				Stream Stats				Site Specific Design Required
	SC-1Q-S244	UNT to Beards Hollow	104.85	42.605366	-74.551974	Summit /Schoharie	Summit	18	80	2	22.15	1505.00	1485.00	1508.00	
	SC-1P-S218	UNT to Beards Hollow	105.25	42.608744	-74.5462	Richmondvil le /Schoharie	Summit	12	100	2	10.80	1535.44	1510.73	1538.00	
	SC-1P-S218A	UNT to Beards Hollow	105.25	42.608924	-74.54607	Richmondvil le /Schoharie	Summit								Divert through SC-1P-S218
	SC-1G-S249	UNT to Beards Hollow	105.65	42.612512	-74.54026	Richmondvil le /Schoharie	Summit	12	195	1	1.88	1446.00	1410.18	1448.00	
	SC-1L-S166	UNT to Cobleskill Creek	105.80	42.6135	-74.537828	Richmondvil le /Schoharie	Summit				Stream Stats				Site Specific Design Required
	SC-1L-S164	UNT to Cobleskill Creek	106.18	42.614269	-74.531564	Richmondvil le /Schoharie	Summit	30	80	2	63.01	1404.75	1394.87	1408.00	

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK															
Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**
SPREAD 5	SC-1I-S297	UNT to Cobleskill Creek	106.39	42.616405	-74.527951	Richmondville /Schoharie	Summit	12	76	2	4.91	1473.75	1458.00	1475.00	
	SC-1J-S298	UNT to Cobleskill Creek	106.47	42.617247	-74.526498	Richmondville /Schoharie	Summit	12	133	1	2.08	1495.00	1460.00	1496.00	
	SC-1L-S195	UNT to Cobleskill Creek	106.54	42.617578	-74.525347	Richmondville /Schoharie	Summit	15	85	2	7.92	1462.48	1439.79	1464.25	
	SC-1L-S264	UNT to Cobleskill Creek	106.55	42.617587	-74.524644	Richmondville /Schoharie	Summit	18	90	1	9.21	1451.00	1438.57	1453.25	
	SC-1L-S165A	UNT to Cobleskill Creek	106.59	42.617903	-74.524134	Richmondville /Schoharie	Summit	12	85	1	1.68	1462.46	1449.87	1464.50	
	SC-1L-S265	UNT to Cobleskill Creek	106.61	42.618169	-74.52385	Richmondville /Schoharie	Summit								Divert through SC-1L-S165B
	SC-1L-S165B	UNT to Cobleskill Creek	106.61	42.618742	-74.524049	Richmondville /Schoharie	Summit	36	90	3	177.64	1463.42	1455.30	1469.00	
	SC-1Q-S165C	UNT to Cobleskill Creek	106.61	42.618758	-74.523407	Richmondville /Schoharie	Summit								Divert through SC-1L-S165B
	SC-1L-S267	UNT to Beards Hollow	107.00	42.622841	-74.52041	Richmondville /Schoharie	Summit	48	85	1	82.94	1623.93	1622.35	1629.00	
	SC-1C-S271	UNT to Cobleskill Creek	108.80	42.632501	-74.489153	Richmondville /Schoharie	Cobleskill	12	80	1	3.22	1860.50	1847.25	1862.50	
	SC-1C-S279	UNT to Cobleskill Creek	109.11	42.634357	-74.483433	Richmondville /Schoharie	Cobleskill	12	85	1	0.26	1884.50	1859.00	1886.00	
	SC-1C-S278	UNT to Cobleskill Creek	109.12	42.634509	-74.483182	Richmondville /Schoharie	Cobleskill	12	80	1	1.12	1882.00	1871.03	1884.00	
	SC-1Q-S273	UNT to House Creek	109.50	42.634095	-74.476186	Richmondville /Schoharie	Cobleskill	24	95	1	18.43	1813.00	1808.85	1816.00	
	SC-1Q-S280	UNT to House Creek	109.70	42.633877	-74.472458	Richmondville /Schoharie	Cobleskill	24	100	1	10.79	1863.35	1862.35	1866.00	

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Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**
SPREAD 5	SC-1I-S280A	UNT to House Creek	109.70	42.634199	-74.472105	Richmondville /Schoharie	Cobleskill								Divert Through SC-1Q-S280
	SC-1C-S186	House Creek	110.10	42.637003	-74.464025	Cobleskill /Schoharie	Cobleskill				Stream Stats				Site Specific Design Required
	SC-1C-S186A	UNT to House Creek	110.28	42.637521	-74.461607	Cobleskill /Schoharie	Cobleskill	24	105	2	51.23	1880.50	1878.61	1884.50	
	SC-1C-S187	UNT to House Creek	110.55	42.638252	-74.456421	Cobleskill /Schoharie	Cobleskill								Road Crossing
	SC-1C-S332	UNT to House Creek	110.75	42.640057	-74.449746	Cobleskill /Schoharie	Cobleskill	18	75	2	10.36	2038.00	2030.00	2040.00	
	SC-1P-S019	UNT to Schoharie Creek	113.39	42.650173	-74.407856	Middleburgh /Schoharie	Cobleskill				Stream Stats				Site Specific Design Required
	SC-1M-S018	UNT to Ecker Hollow	113.75	42.653513	-74.402522	Middleburgh /Schoharie	Cobleskill	48	80	2	278.40	1164.50	1163.68	1170.00	Only passes 2-yr Storm without overtopping
	SC-1N-S016	UNT to Schoharie Creek	114.50	42.659320	-74.391290	Middleburgh /Schoharie	Cobleskill	12	110	1	3.03	1431.50	1404.00	1433.00	
	SC-1Q-S289	Schoharie Creek	119.71	42.70231	-74.317496	Schoharie /Schoharie	Schoharie				Stream Stats				Site Specific Design Required
	SC-1Q-S291	UNT to Schoharie Creek	119.90	42.703518	-74.314805	Schoharie /Schoharie	Schoharie	12	77	1	2.17	594.65	593.96	597.01	
	SC-1D-S181	UNT to Schoharie Creek	120.49	42.707116	-74.304944	Schoharie /Schoharie	Schoharie	18	80	2	12.62	693.57	687.69	696.00	
	SC-1C-S184	UNT to Schoharie Creek	120.55	42.707397	-74.302671	Schoharie /Schoharie	Schoharie	12	80	1	2.00	708.89	704.68	711.00	
	SC-1C-S180	UNT to Schoharie Creek	120.70	42.705928	-74.280192	Schoharie /Schoharie	Schoharie				Stream Stats				Site Specific Design Required
	SC-1G-S196	UNT to Schoharie Creek	122.55	42.702829	-74.269813	Schoharie /Schoharie	Schoharie	24	80	2	29.09	1299.27	1294.67	1302.00	
	SC-1Q-S060	Louse Kill	123.95	42.700507	-74.24299	Schoharie /Schoharie	Gallupville	42	80	6	283.14	1175.12	1172.55	1179.00	

TABLE 6.0-1 - WATERBODIES CROSSED BY THE CONSTITUTION PIPELINE PROJECT - PIPELINE FACILITIES - NEW YORK															
Spread	**Waterbody ID[a]**	**Waterbody Name[b]**	**Approximate Milepost[c]**	**Latitude**	**Longitude**	**Town / County**	**Quadrangle**	**Pipe Size (inches)**	**Pipe Length (feet)[e]**	**Number of Pipes**	**Design Flow (CFS)**	**Pipe Inv. In**	**Pipe Inv. Out**	**Top Of Coffer Dam Elevation**	**Notes**

N/A = Not Applicable

TBD = To Be Determined

a: Crossings and lengths for waterbody features with "XX" in identification name taken from National Hydrography Dataset GIS datalayer (USGS 2012b) and estimated based on scaled aerial photographs. Where tree canopy cover obscured estimation of the waterbody crossing from scaled aerial photographs, a nominal waterbody crossing width of three feet has been included for single-line NHD waterbody features incorporated into project drawings.

b: UNT: Unnamed Tributary. UNT name was identified based on review of USGS topographical mapping.

c: MP provided for access roads indicate the point at which the access road meets the proposed pipeline.

d: P = perennial; I = intermittent; POW = open water; E = Ephemeral.

e: 0.0 = waterbody is not crossed but is in workspace. For minor waterbodies less than 3 feet in width delineated in the survey area and shown as a single line feature on the Project alignment sheets, an assumed 3 foot width has been used for this analysis. For USGS NHD waterbody data used to identify waterbodies on no-access parcels and shown as a single line feature on the Project alignment sheets, an assumed 3 foot width has been used for this analysis. Where tree canopy cover allowed for suitable analysis, scaled aerial photography was used to estimate crossing length for these NHD stream features.

f: MI = Minor (<10 feet); I = Intermediate (>10 - <100 feet); MA = Major (>100 feet).

g:: NY Water Quality Standards Definition: Water quality standards based on the classification and best use of waterbody as determined by NYSDEC (6 NYCRR Parts 815, 879, 931).

h: NY Fishery Classifications: T = Trout; TS = Trout Spawning (6 NYCRR 701.25).

i: Construction Windows for cold water fisheries are a based on correspondence from P. Desnoyers of NYSDEC to Secretary K. Bose of FERC dated May 28, 2013, which include NYSDEC's Best Management Practices (BMPs) for Gas Transmission Line Construction Projects (dated May 16, 2013). Section 3.0 includes Stream and Wetland Protection Procedures. Potential timing restrictions reflect dates during which construction activities may occur.

j: I = Wet Open Cut Method; II = Dry Crossing Method, including Flume or Dam and Pump, Cofferdam, or Dry Open Cut for waterbodies that are dry at the time of crossing; Method III = Conventional Bore; IV = HDD, V = Direct Pipe Method. Intermittent waterbodies containing discernible flow at the time of construction will be crossed using a dry crossing method, unless otherwise authorized by applicable regulatory agencies.

Hydrologic and Hydraulic Calculations

(provided under separate cover on CD)