



TOWN OF NORTH CASTLE, N.Y.
WATER DISTRICT NO. 9
PROPOSED EXTENSION
QUARRY HEIGHTS

OCTOBER 16, 2025



DOLPH ROTFELD ENGINEERING DIVISION

LOCAL OFFICE:

Dolph Rotfeld Engineering | 100 Summit Lake Drive, Suite 160, Valhalla, NY 10595 | Ph: (914) 631-8600 | Fax: (914) 631-5769
www.drepc.com | www.aiengineers.com

I. EXECUTIVE SUMMARY

Water District No. 9 (WD9) was established by the Town of North Castle to provide a reliable public water supply to the Quarry Heights neighborhood, where many homes have historically relied on private wells with limited yields and seasonal reliability issues. Initial improvements constructed by Westchester Joint Water Works (WJWW) established the initiation of the system and began public water service to a portion of the neighborhood.

This report evaluates and documents the proposed extension of WD9 to serve the remainder of Quarry Heights. The extension will expand water service to additional streets and complete coverage for the neighborhood.

The project is technically feasible, with capacity available in the WJWW system to support the extension. While local subsurface conditions and narrow rights-of-way present construction challenges, these can be addressed through proper design and construction methods. Costs have been developed to account for anticipated conditions, and financing will be determined by the Town and allocated among benefited properties.

The extension of WD9 will provide a sustainable and reliable public water supply to Quarry Heights, eliminating reliance on private wells, enhancing public health and safety, and ensuring adequate fire protection for the community.

II. EXISTING CONDITIONS

The Quarry Heights neighborhood is an established residential area located on the southernmost border of the Town of North Castle. Quarry Heights is comprised of the following streets: Old Orchard Street, Johnson Place, Memorial Lane, William Street, James Street, McClure Street, and Starkey Road. Properties are generally zoned for one-half acre or one acre residential use. In 2023, the Town engaged AI Engineers to prepare a feasibility study as the first step in addressing water supply deficiencies in Quarry Heights. Many homes in the neighborhood have historically relied on private wells, several of which have produced insufficient yields and, in some cases, have run dry during warmer months.

Utilities in the neighborhood consist of a low-pressure sanitary sewer forcemain, overhead electric service, and limited underground drainage infrastructure. Prior to recent work by Westchester Joint Water Works (WJWW), no other underground utilities were known to exist within the rights-of-way, except for WJWW's existing 8-inch water main in Old Orchard Street, which contains capped tees at several intersections to facilitate future water connections.

Water District No. 9 (WD9) was established by the Town of North Castle to provide public water service in Quarry Heights, thereby improving water reliability and protecting public health. In coordination with the Town and as part of the initial phase of WD9, WJWW constructed a 6-inch diameter water main starting at Old Orchard Street, running down William Street and James Street, and terminating at the northern end of Starkey Road. As part of this work WJWW also installed a master meter pit at the intersection of William Street and Old Orchard Street. This work provided the foundation for the southern portion of the district and brought public water service to a section of Quarry Heights.

Local conditions present construction challenges that influence both design and estimated construction cost. The high prevalence of bedrock requires labor-intensive rock excavation, while the narrow rights-of-way and limited space for staging and material storage necessitate careful construction sequencing. These constraints are recognized in the proposed extension's planning and cost estimates provided in this report.

III. PROPOSED EXTENSION AREA

The proposed extension of Water District No. 9 (WD9) will provide public water service to the remaining portions of the Quarry Heights neighborhood that were not included in the initial phase constructed by WJWW. The proposed extension area includes Johnson Place, Memorial Lane, McClure Street, Starkey Road, portions of William Street, and the southern end of Old Orchard Street.

Properties within the extension area are predominantly single-family residences on one-half acre or one-acre parcels, consistent with zoning in the rest of Quarry Heights. The land use is entirely residential, and no commercial or industrial users are located within the proposed extension boundaries. The initial phase of WD9 included 11 properties on William Street and James Street. The proposed extension will add 44 properties to the district, broken down as follows:

- Johnson Place: 4
- Memorial Lane: 5
- Starkey Road: 9
- Old Orchard Street: 16
- William Street: 8
- McClure Street: 2

A list of property addresses, including tax map section, block, and lot numbers, is provided in the appendix of this report.

The extension area is contiguous with the existing WD9 service area and will directly connect to the new water main in two locations: at Starkey Road and at the intersection of William Street and James Street. The northern part of the extension area, consisting of Johnson Place and Memorial Lane, will each be served by dedicated connections to the existing water main in Old Orchard Street. At these connection points master water meter pits will be installed from which new distribution mains will be extended along the unserved streets to complete service coverage for the neighborhood.

Boundary mapping for the proposed extension is included in the appendix of this report. The mapping illustrates the extended district's streets in relation to the existing WD9 infrastructure and identifies the parcels that will receive public water service as part of the project.

IV. ENGINEERING BASIS OF DESIGN

The proposed extension of WD9 will build upon the existing system installed by WJWW and extend service to the remaining streets in Quarry Heights. The design approach includes new connections to WJWW's mains, the installation of additional distribution mains and appurtenances, and provisions for both domestic and fire protection needs.

The extension will connect to the existing WD9 system at two locations:

- At the intersection of William Street and James Street.
- At the northern end of Starkey Road.

In addition, Johnson Place and Memorial Lane will each connect directly to the existing 8-inch WJWW main in Old Orchard Street.

As with the initial phase of WD9, new subgrade meter vaults will be required at Johnson Place and Memorial Lane to accommodate master meters and backflow prevention devices. The meter vault that was installed as part of the initial WD9 work will serve the southern portion of the extended district. The new vaults will be located within roadway shoulders where feasible and constructed with precast concrete structures and square access hatches. Each vault will also be equipped with a sump and remote meter reading provisions, consistent with WJWW standards.

New six-inch (6") diameter ductile iron water mains will be installed on Johnson Place and Memorial Lane. Increaser/reducer fittings will be provided at the connection points on William Street and Starkey Road to accommodate new eight-inch (8") mains on McClure Street, Starkey Road, and the southern portions of William Street and Old Orchard Street. Main sizing has been coordinated with the results of WJWW's recent fire flow tests at nearby hydrants and preliminary pressure loss calculations. Results of the fire flow tests are provided in the appendix of this report.

Attention has also been given to the alignment of the proposed mains with respect to required separations from existing utilities (particularly the parallel low-pressure sanitary sewer forcemain) as required by the Westchester County Department of Health (WCDOH) and Ten States' Recommended Standards for Water Works. Valves and hydrants will be provided as part of the extension to ensure reliable operation, maintenance access, and fire protection coverage.

Domestic Demand – The number of homes that will be served by the extension of WD9 is 44. The resulting estimated average daily demand for the extension area is approximately **19,800 gallons per day**, with a peak demand of **55 gallons per minute**. These values are consistent with WCDOH design standards for older homes with pre-1980 plumbing fixtures.

Fire Flow – A preliminary hydraulic analysis was performed during the feasibility study to evaluate pressures and available fire flows at representative locations within Quarry Heights. This analysis was repeated with considerations for the new water main that was installed by WJWW and the results of recent fire flow tests.

With an available supply pressure of 58 psi at Old Orchard Street and 70 psi at the intersection of James Street and Starkey Road preliminary calculations indicate that the system can maintain adequate pressures under both domestic and fire flow conditions through the proposed water main piping. A minimum fire flow of **1,000 gallons per minute for one hour** can be achieved throughout the neighborhood, meeting National Fire Protection Association recommendations for one- and two-family dwellings.

The proposed extension is technically feasible and supported by WJWW's existing system capacity. The layout of mains, meter vaults, and hydrants will complete service to all properties in Quarry Heights while ensuring adequate domestic supply and fire protection. Conceptual water main piping layout, profiles, and vault details are included in the appendices of this report.

V. ALTERNATIVES CONSIDERED

Several alternatives were reviewed to address the water supply deficiencies in Quarry Heights:

- **No Action** – If the district were not extended, properties would continue to rely on private wells, many of which have limited yields or run dry during seasonal droughts. This option would not provide long-term reliability, public health protection, or fire protection.
- **Individual Improvements** – Homeowners could continue to maintain or replace private wells on a property-by-property basis. However, this does not provide the oversight or redundancy of a regulated public water system, nor does it ensure adequate fire protection through hydrants.
- **District Extension (Preferred Alternative)** – Extending WD9 to the remaining Quarry Heights streets offers the most reliable and cost-effective solution. The extension will provide a consistent source of potable water meeting NYSDOH standards, integrate the unserved streets into the existing district, and ensure adequate domestic and fire protection service.

VI. COST ESTIMATE

The estimated cost of constructing the extension of WD9 has been developed based on conceptual layouts, recent unit pricing from comparable projects, and anticipated construction challenges in the Quarry Heights neighborhood. The estimate includes construction costs, engineering and permitting services, construction inspection and administration, and other administrative expenses. A detailed opinion of probable cost is provided in the appendix of this report.

Several factors contribute to the high cost of construction in Quarry Heights:

- **Bedrock Conditions** – The neighborhood has a high prevalence of shallow bedrock. Excavation will require labor-intensive rock removal. Excavated material cannot be reused as backfill and will need to be disposed of offsite. Controlled density backfill (flowable fill) or imported structural backfill will be required, which adds significant cost.
- **Narrow Rights-of-Way** – The extension mains will parallel the existing sanitary sewer forcemain in narrow rights-of-way, requiring careful construction sequencing to maintain separation requirements and to avoid damage to existing infrastructure.
- **Staging and Access Limitations** – The compact neighborhood layout offers limited space for staging equipment and materials. Contractors may need to secure offsite staging areas, coordinate daily material deliveries, and manage frequent mobilization and demobilization of equipment, all of which increase costs.

The extension work includes the installation of new ductile iron water mains (6-inch and 8-inch diameters as described in Section 4), valves, hydrants, and two additional master meter vaults to supplement the existing vault serving WD9 at William Street. Surface restoration will be provided for disturbed roadway areas.

Soft costs have also been included in the estimate and account for engineering design, geotechnical investigation, survey, permitting fees, public bidding assistance, construction administration, and project closeout support.

The opinion of probable cost has been prepared to reflect conditions specific to Quarry Heights and includes contingency to account for uncertainties at this preliminary stage of design. The total estimated cost of the extension, inclusive of survey, geotechnical investigation, engineering, permitting, construction, inspection, and administrative expenses, is approximately \$4.6 million. A detailed cost breakdown by street is provided in the appendix.

VII. DISTRICT FORMATION, APPROVALS, AND SEQUENCE

The extension of WD9 is subject to formal approval procedures under New York State Town Law and the regulations of the WCDOH. The following steps will be required before construction can proceed:

1. **Town Board Action** – The Town of North Castle Board must review this engineering report and adopt a resolution authorizing the extension of WD9. This resolution will identify the 44 benefitted parcels, establish the extension boundaries, set forth the method of financing, and commit the Town to proceed with the project, contingent on subsequent approvals.
2. **Public Hearing** – A public hearing will be scheduled by the Town Board to provide Quarry Heights residents an opportunity to review the proposed extension, financing method, and anticipated costs. Notice will be provided to owners of the 44 benefitted parcels within the proposed extension boundaries in accordance with Town Law requirements.
3. **Permitting and Health Department Approval** – Following Town Board authorization, this report which includes a property map and conceptual plan will be submitted to WCDOH for review and approval of the extension of WD9. Once that approval is received, an application will be made to WCDOH for extension of water mains into the newly formed parts of the district. This application will include detailed construction plans and comprehensive hydraulic calculations. WCDOH will review the application to ensure compliance with public health and water supply standards, including minimum pressure requirements, fire flow provisions, and separation from existing utilities.
4. **New York State Comptroller Review** – Because the extension of WD9 involves the financing of public improvements through debt service, final approval must be obtained from the Office of the New York State Comptroller. The Comptroller will review the engineering report, financial plan, and Town Board resolution to confirm compliance with statutory requirements.
5. **Other Permits and Approvals** – Additional permits may be required for street openings or staging areas. These permits will be obtained by the construction contractor following contract award.

Once steps 1-4 are complete, the Town may advertise the project for public bid and award a construction contract.

VIII. FINANCING AND COST TO USERS

The extension of WD9 will be financed under New York State Town Law, with costs borne by the benefited properties within the extension area. The upfront project construction cost includes survey, geotechnical investigation, engineering, permitting, construction, inspection, and administrative expenses.

Method of Financing – The Town of North Castle will issue bonds or notes to cover upfront construction costs. Debt service will be repaid through annual assessments levied on properties in the extension area. The assessment method, typically based on assessed property value or benefit units, will be determined by the Town Board. Property owners will be billed annually through Town property tax bills for repayment of debt service, generally over a 30–40 year period depending on financing arrangements.

Apportionment of Costs – Capital debt in WD9 will be apportioned based on each parcel's assessed value (i.e., in proportion to assessed value). The Town Assessor will prepare an apportionment roll that allocates the district's total annual debt service (principal and interest) to each property according to its share of the district's total assessed value. The total district debt will be divided by the district's total assessed value to set a cost per \$1,000 of assessed value; that rate is then applied to each parcel. The apportionment roll is subject to public review and comment as part of the Town Board proceedings.

For planning purposes, the table below shows the annual district-wide debt service to be recovered under several financing cases (assumes a \$4.6 million project; grants at 0%, 50%, and 75%; borrowing at 4.25% for 30 and 40 years). Individual parcel amounts will be calculated annually from the assessment rate per \$1,000 established by the Town.

Capital Debt Scenarios			
Grant Share	Net Financed	Annual Debt (4.25% / 30 Years)	Annual Debt (4.25% / 40 Years)
0%	\$4,600,000	\$274,152	\$241,125
50%	\$2,300,000	\$137,076	\$120,562
75%	\$1,150,000	\$68,538	\$60,281

Note: These figures reflect capital (debt service) only. Water usage and annual O&M are funded through water sales and billed separately.

Resident Contributions – In addition to district-wide assessments, each property owner will bear the cost of connecting their home to the new water mains. Typical expenses include

furnishing and installing the service lateral from the existing residential structure to the shut-off valve, as well as interior plumbing modifications, a backflow preventer, abandonment of private wells, and associated applicable permit fees.

Usage/Consumption Costs – Water consumption charges will be billed separately to individual property owners based on metered usage. The Town has established the following rate schedule for water consumption:

North Castle Water District No. 9 Water Rates	
Residential Rate Table	
<i>Up to 4,400 gals — minimum of \$25.00</i>	
<i>Gallons</i>	<i>Rate per 1000 gallons</i>
First – 4,401–14,000	\$5.75
Next – 14,001–25,000	\$5.85
Next – 25,001–40,000	\$5.95
Next – 40,001 & over	\$6.05

Assuming a typical four-person household using 100 gallons per person per day, consumption is about 36,000 gallons per quarter (approximately 146,000 gallons per year) per household. Under WD9’s residential rates, that usage equals about \$210 per quarter (\$25 minimum for the first 14,000 @ \$5.75/1k + 10,999 @ \$5.85/1k + 10,999 @ \$5.95/1k). Total billings for the entirety of WD9 would then be approximately \$11,130 per quarter (\$210 x 53 total households served) for 1.908 million gallons consumed.

The Town will be billed by WJWW at the applicable wholesale rate for WD9 consumption measured at the district’s master meters. As of July 1, 2025, the wholesale rate is \$4,923.47 per million gallons. Using the approximate consumption calculated above of 1.908 million gallons per quarter, the estimated wholesale cost to the Town is approximately \$9,394 per quarter (1.908 MG × \$4,923.47/MG).

Annual Operating Costs – Ongoing operation and maintenance of the extended WD9 system will be managed by the Town of North Castle. The annual O&M budget will be met by the sale of water in the district as estimated above. This amount covers routine system operation, sampling and reporting, meter reading and billing, hydrant flushing, leak detection/repairs, emergency response, and general administrative support, and will be reviewed and updated during the Town’s annual budget process.

Typical Cost to Homeowners – Homeowners in WD9 will be responsible for both upfront costs and recurring annual costs. The one-time, upfront costs will be determined by each property’s cost to make a connection to the new water main. These costs can vary widely by property and therefore cannot be averaged: factors include service-line length and depth; presence of ledge rock/bedrock and the extent to which rock excavation is needed; clearing, grubbing, trenching and surface restoration (lawn/driveway/walks/landscaping); purchase and installation of the meter and backflow preventer; interior plumbing modifications; abandonment of the private well; and applicable permits.

The average recurring annual costs for homeowners will include: (a) water usage charges billed by the Town based on metered consumption (for planning, a typical 4-person household using ~36,000 gallons per quarter is about \$840/year using the rate table above), and (b) a capital debt assessment. Individual assessments will vary because capital is apportioned in proportion to assessed value. However, an average assessment can be derived by dividing the district-wide annual debt by 55 parcels (11 existing + 44 extension).

Using estimated annual water usage fees discussed above and a \$4.6M project financed at 4.25%, the average annual cost to homeowners is estimated in the chart below under varying grant and financing scenarios:

Average Annual Cost to Homeowners					
		4.25% Interest 30-Year Amortization		4.25% Interest 40-Year Amortization	
Grant Share	Annual Water Usage Cost	Per Parcel / Yr (55)	Total Annual Cost	Per Parcel / Yr (55)	Total Annual Cost
0%	\$840	\$4,985	\$5,825	\$4,384	\$5,224
50%	\$840	\$2,492	\$3,332	\$2,192	\$3,032
75%	\$840	\$1,246	\$2,086	\$1,096	\$1,936

Actual parcel assessments will be set annually from the assessment roll (based on assessed value) and may be higher or lower than these averages; actual water bills will vary with use.

Financial Impact of Future WJWW Filtration Plant – WJWW intends to build a new 30-million-gallons-per-day water filtration plant at Rye Lake to bring long-term compliance and resiliency, including treatment for disinfection by-products as source-water conditions change. Funding will come from a mix of municipal bonds, grants, subsidized loans, and ratepayer contributions. It is anticipated that customer bills will rise on the order of 70% over about five years (with the per-gallon cost projected to reach ~\$0.020/gal by year five), reflecting the added WJWW debt-service component that will flow through wholesale rates to local districts and then retail schedules.

Again, assuming a typical four-person household using ~36,000 gallons per quarter, and factoring in the full five-year, cumulative 70% water-rate increase, the example annual usage bill rises from ~\$840/year to ~\$1,428/year.

Using the future estimated annual water usage fees noted above and a \$4.6M project financed at 4.25%, the average annual cost to homeowners in five (5) years is estimated in the chart below under varying grant and financing scenarios:

Future Average Annual Cost to Homeowners in 5 Years					
		4.25% Interest 30-Year Amortization		4.25% Interest 40-Year Amortization	
Grant Share	Annual Water Usage Cost	Per Parcel / Yr (55)	Total Annual Cost	Per Parcel / Yr (55)	Total Annual Cost
0%	\$1,428	\$4,985	\$6,413	\$4,384	\$5,812
50%	\$1,428	\$2,492	\$3,920	\$2,192	\$3,620
75%	\$1,428	\$1,246	\$2,674	\$1,096	\$2,524

Actual parcel assessments will be set annually from the assessment roll (based on assessed value) and may be higher or lower than these averages; actual water bills will vary with use.

IX. CONCLUSION

The proposed extension of Water District No. 9 will provide reliable public water service to 44 additional properties in Quarry Heights, eliminating reliance on private wells and improving fire protection. The design integrates with the existing WD9 system through two connection points and includes new mains, valves, hydrants, and master meter vaults sized to current standards.

The estimated project cost of approximately \$4.6 million accounts for construction, soft costs, and site-specific challenges such as shallow bedrock and limited rights-of-way. Financing will be secured through Town-issued bonds, repaid by annual assessments on benefited properties, with individual property owners responsible for service laterals.

Final implementation requires Town Board authorization, a public hearing, sequential Health Department approvals, and New York State Comptroller review. WCDOH must first approve the extension of WD9 to establish the district boundary, followed by approval of the extension of water mains within it. After these approvals and Comptroller authorization, the Town may proceed with bidding and construction. Upon completion, WD9 will serve 55 parcels in Quarry Heights (11 existing + 44 added through this extension), safeguarding public health, enhancing fire protection, and providing a sustainable long-term water supply for the neighborhood.

APPENDIX A

- Map (C-1) – Water District No. 9 Extension, Quarry Heights
Extension of Water District No. 9, Proposed Limits
- Map (C-2) – Water District No. 9 Extension, Quarry Heights
Water District No. 9, Existing and Proposed Limits



WATER DISTRICT NO. 9 EXTENSION BENEFITED PARCELS	
PARCEL ID	ADDRESS
123.05-1-6	3 JOHNSON PLACE
123.05-1-5	5 JOHNSON PLACE
123.05-1-2	10 JOHNSON PLACE
123.05-1-3	8 JOHNSON PLACE
123.05-1-31	1 MC CLURE STREET
123.05-1-28	2 MC CLURE STREET
123.05-1-13	2 MEMORIAL LANE
123.05-1-11	6 MEMORIAL LANE
123.05-1-10	8 MEMORIAL LANE
123.05-1-9	10 MEMORIAL LANE
123.05-1-8	12 MEMORIAL LANE
123.01-1-9	1402 OLD ORCHARD STREET
123.01-1-10	1442 OLD ORCHARD STREET
123.01-1-11	1446 OLD ORCHARD STREET
123.01-1-12	1448 OLD ORCHARD STREET
123.01-1-13	1450 OLD ORCHARD STREET
123.01-1-14	1454 OLD ORCHARD STREET
123.01-1-15	1460 OLD ORCHARD STREET
123.01-1-1	1462 OLD ORCHARD STREET
123.05-1-37	1465 OLD ORCHARD STREET
123.05-1-35	1466 OLD ORCHARD STREET
123.05-1-34	1469 OLD ORCHARD STREET
123.05-1-33	1471 OLD ORCHARD STREET
123.05-1-32	1475 OLD ORCHARD STREET
123.05-1-27	1477 OLD ORCHARD STREET
123.05-1-26	1479 OLD ORCHARD STREET
123.05-1-24	1481 OLD ORCHARD STREET
123.05-1-38	10 STARKEY ROAD
123.05-1-39	16 STARKEY ROAD
123.05-1-40	18 STARKEY ROAD
123.05-1-41	20 STARKEY ROAD
123.05-1-47	22 STARKEY ROAD
123.05-1-48	26 STARKEY ROAD
123.05-1-49	28 STARKEY ROAD
123.05-1-53	34 STARKEY ROAD
123.05-1-54	36 STARKEY ROAD
123.05-1-15	3 WILLIAM STREET
123.05-1-30	6 WILLIAM STREET
123.05-1-25	8 WILLIAM STREET
123.05-1-29	10 WILLIAM STREET
123.05-1-45	11 WILLIAM STREET
123.05-1-44	13 WILLIAM STREET
123.05-1-43	15 WILLIAM STREET
123.05-1-42	17 WILLIAM STREET

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REV.	DATE	REVISION DESCRIPTION	SHEET NO.

PLOTTED DATE: 10/15/25

DESIGNER/DRAFTER: PF
CHECKED BY: JN
APPROVED BY: AO

ENGINEER:
AI Engineers, INC.
dolph rotfeld engineering division
100 SUMMIT LAKE DRIVE, VALHALLA, NY 10595
(914) 631-8600

FILENAME: WATER DIST NO 9.DWG

SIGNATURE/
BLOCK:

PROJECT TITLE:
WATER DISTRICT NO. 9 EXTENSION
QUARRY HEIGHTS

MUNICIPALITY/OWNER:
TOWN OF NORTH CASTLE
NEW YORK

DRAWING TITLE:
EXTENSION OF WATER DISTRICT NO. 9
PROPOSED LIMITS

PROJECT NO.
—
DRAWING NO.
C-1
SHEET NO.
1 of 1

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PROPERTIES INCLUDED IN THE EXTENSION OF WATER DISTRICT No. 9

EXTENSION PLAN
N.T.S.

APPENDIX B

Water District No. 9 Extension, Quarry Heights
List of Benefitted Parcels

Water District No. 9

Proposed Benefitted Parcels

Parcel ID	No.	Street
123.05-1-6	3	JOHNSON PLACE
123.05-1-5	5	JOHNSON PLACE
123.05-1-3	8	JOHNSON PLACE
123.05-1-2	10	JOHNSON PLACE
123.05-1-31	1	MC CLURE STREET
123.05-1-28	2	MC CLURE STREET
123.05-1-13	2	MEMORIAL LANE
123.05-1-11	6	MEMORIAL LANE
123.05-1-10	8	MEMORIAL LANE
123.05-1-9	10	MEMORIAL LANE
123.05-1-8	12	MEMORIAL LANE
123.01-1-9	1402	OLD ORCHARD STREET
123.01-1-10	1442	OLD ORCHARD STREET
123.01-1-11	1446	OLD ORCHARD STREET
123.01-1-12	1448	OLD ORCHARD STREET
123.01-1-13	1450	OLD ORCHARD STREET
123.01-1-14	1454	OLD ORCHARD STREET
123.01-1-15	1460	OLD ORCHARD STREET
123.01-1-1	1462	OLD ORCHARD STREET
123.05-1-37	1465	OLD ORCHARD STREET
123.05-1-35	1466	OLD ORCHARD STREET
123.05-1-34	1469	OLD ORCHARD STREET
123.05-1-33	1471	OLD ORCHARD STREET
123.05-1-32	1475	OLD ORCHARD STREET
123.05-1-27	1477	OLD ORCHARD STREET
123.05-1-26	1479	OLD ORCHARD STREET
123.05-1-24	1481	OLD ORCHARD STREET

Parcel ID	No.	Street
123.05-1-38	10	STARKEY ROAD
123.05-1-39	16	STARKEY ROAD
123.05-1-40	18	STARKEY ROAD
123.05-1-41	20	STARKEY ROAD
123.05-1-47	22	STARKEY ROAD
123.05-1-48	26	STARKEY ROAD
123.05-1-49	28	STARKEY ROAD
123.05-1-53	34	STARKEY ROAD
123.05-1-54	36	STARKEY ROAD
123.05-1-15	3	WILLIAM STREET
123.05-1-30	6	WILLIAM STREET
123.05-1-25	8	WILLIAM STREET
123.05-1-29	10	WILLIAM STREET
123.05-1-45	11	WILLIAM STREET
123.05-1-44	13	WILLIAM STREET
123.05-1-43	15	WILLIAM STREET
123.05-1-42	17	WILLIAM STREET

Water District No. 9

Existing Benefitted Parcels

Parcel ID	No.	Street
123.05-1-18	5	WILLIAM STREET
123.05-1-20	9	WILLIAM STREET
123.05-1-62	47	JAMES STREET
123.05-1-55	50	JAMES STREET
123.05-1-60	53	JAMES STREET
123.05-1-59	57	JAMES STREET
123.05-1-56	58	JAMES STREET
123.05-1-57	65	JAMES STREET
123.05-1-51	66	JAMES STREET
123.05-1-50	68	JAMES STREET
123.05-1-21	69	JAMES STREET

APPENDIX C

Plan – Water District No. 9 Extension, Quarry Heights
Extension of Water District No. 9, Conceptual Plan and Profiles



THIS PLAN IS NOT VALID FOR CONSTRUCTION
WITHOUT ENGINEERS SEAL & SIGNATURE

NOTE: THE INFORMATION SHOWN ON THIS MAP HAS BEEN COMPILED FROM RECORDS PROVIDED BY WESTCHESTER COUNTY, TOWN OF NORTH CASTLE AND OTHERS. NO CERTIFICATION IS GIVEN TO THE EXACT LOCATIONS OF SUBSURFACE UTILITIES SHOWN HEREON. ALL INFORMATION SHOWN ON THIS MAP SHALL BE FIELD-VERIFIED PRIOR TO PREPARATION OF ANY POTENTIAL CONSTRUCTION DRAWINGS.

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING IS
A VIOLATION OF 7209(2) OF THE NYS EDUCATION LAW

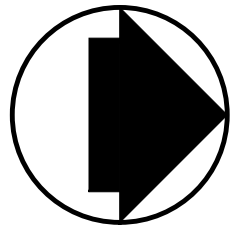
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					DESIGNER/DRAFTER: AL	ENGINEER: AI Engineers, Inc. dolph retfeld engineering division 100 SUMMIT LAKE DRIVE, VALHALLA, NY 10595 (914) 631-8600	SIGNATURE/ BLOCK:	PROJECT TITLE: WATER DISTRICT NO. 9 EXTENSION QUARRY HEIGHTS	MUNICIPALITY: NORTH CASTLE, NEW YORK	PROJECT NO. 3791
					CHECKED BY: JN					DRAWING NO. C-001
					APPROVED BY: AO				DRAWING TITLE: SITE PLAN	SHEET NO. 1 of 5
1	10-16-25	ADDITION OF PROPERTIES TO BE SERVED	1							
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	PLOTTED DATE: 10/16/2025		FILENAME: QUARRY HEIGHTS WATER DISTRICT 10-16-25.DWG				



MATCH LINE A



GRAPHIC SCALE



UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING IS A VIOLATION OF 7209(2) OF THE NYS EDUCATION LAW

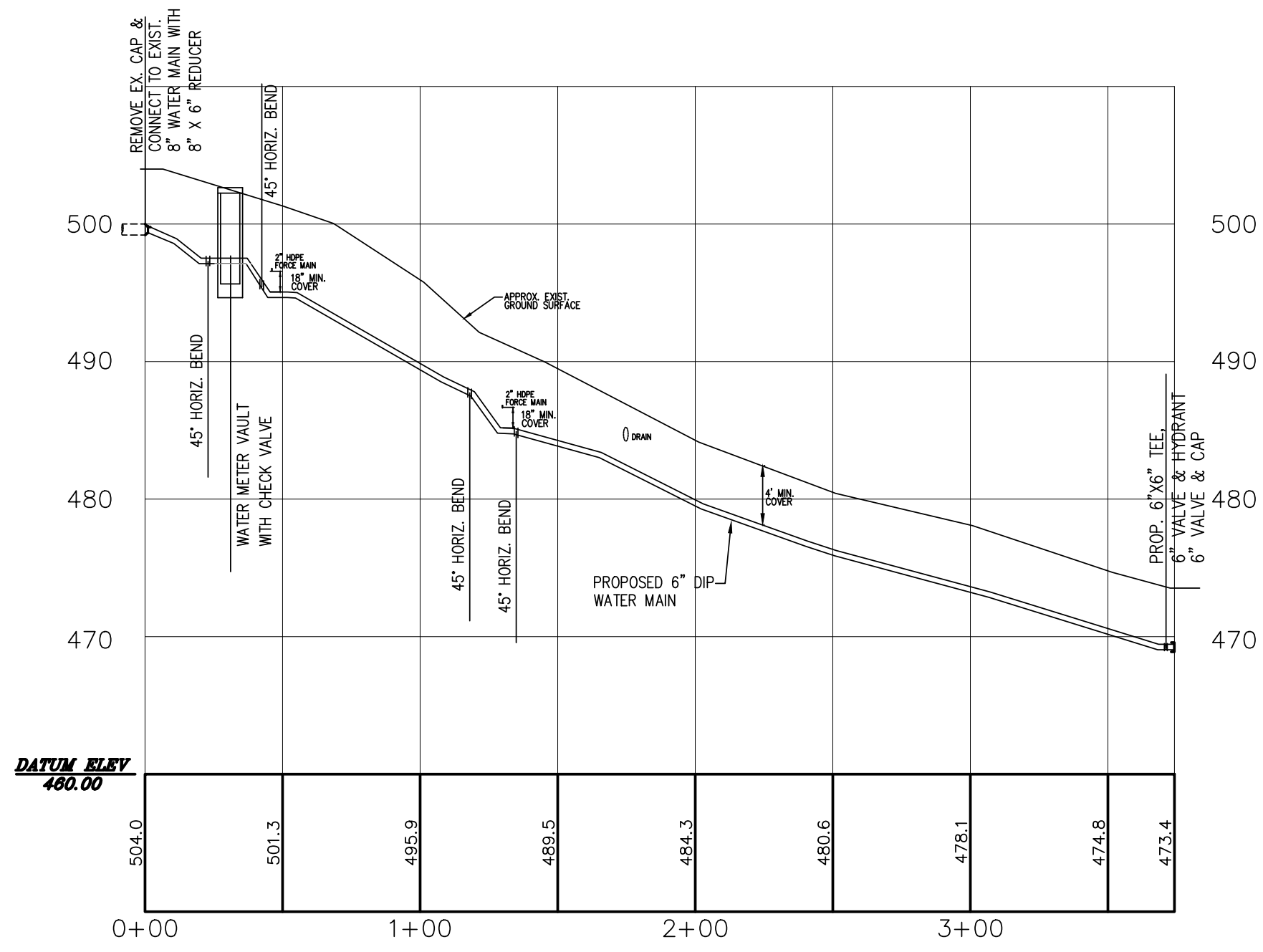
THIS PLAN IS NOT VALID FOR CONSTRUCTION WITHOUT ENGINEERS SEAL & SIGNATURE

NOTE: THE INFORMATION SHOWN ON THIS MAP HAS BEEN COMPILED FROM RECORDS PROVIDED BY WESTCHESTER COUNTY, TOWN OF NORTH CASTLE AND OTHERS. NO CERTIFICATION IS GIVEN TO THE EXACT LOCATIONS OF SUBSURFACE UTILITIES SHOWN HEREON. ALL INFORMATION SHOWN ON THIS MAP SHALL BE FIELD-VERIFIED PRIOR TO PREPARATION OF ANY POTENTIAL CONSTRUCTION DRAWINGS.

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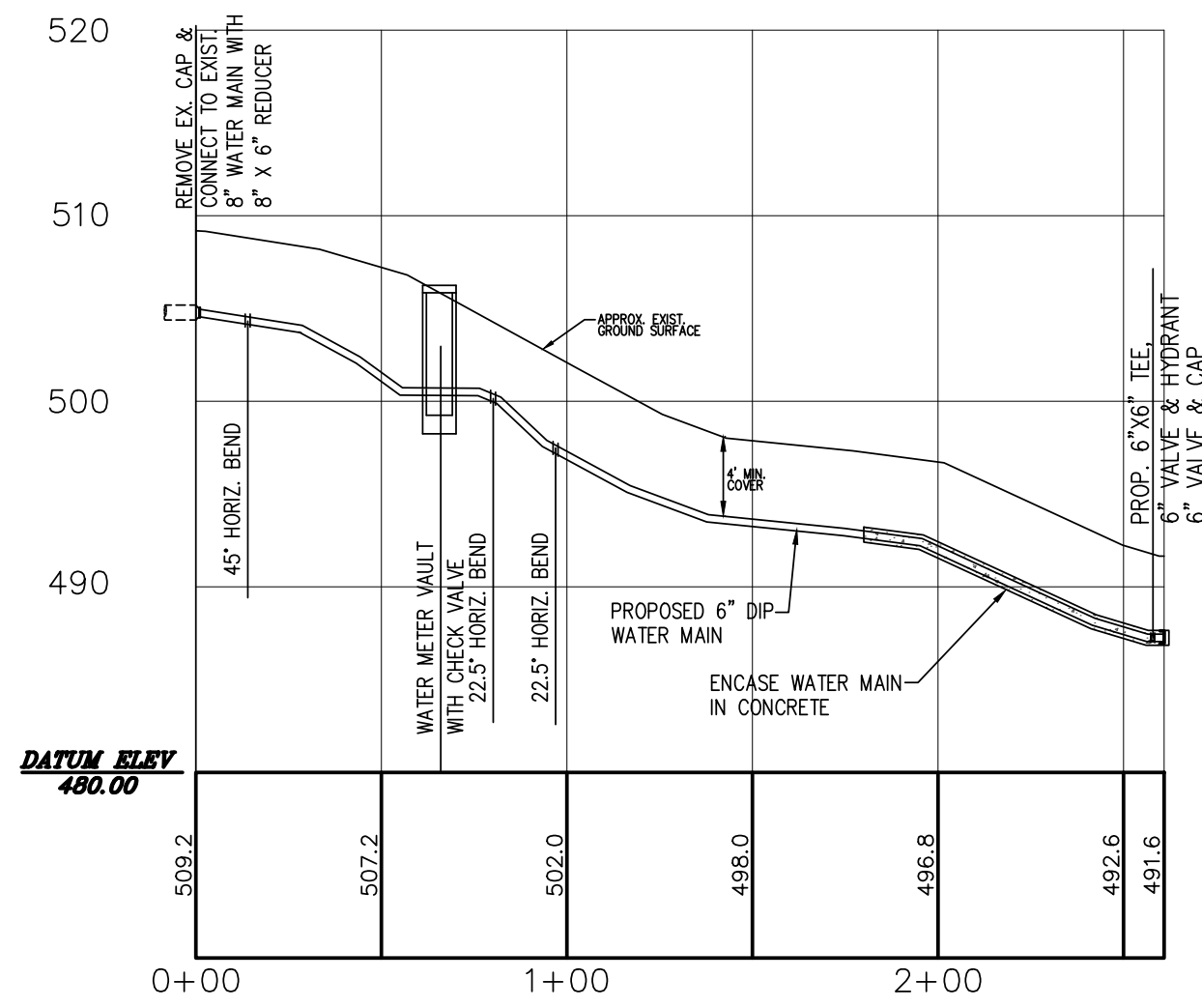
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					DESIGNER/DRAFTER: AL	<div>ENGINEER: <div>AI Engineers, Inc. dolph retfeld engineering division 100 SUMMIT LAKE DRIVE, VALHALLA, NY 10595 (914) 631-8600</div></div>	SIGNATURE/ BLOCK:	PROJECT TITLE: WATER DISTRICT NO. 9 EXTENSION QUARRY HEIGHTS	MUNICIPALITY: NORTH CASTLE, NEW YORK	PROJECT NO. 3791
			CHECKED BY: JN		DRAWING NO. C-002					
			APPROVED BY: AO		DRAWING TITLE: SITE PLAN				SHEET NO. 2 of 5	
1	10-16-25	ADDITION OF PROPERTIES TO BE SERVED	2							
REV.	DATE	REVISION DESCRIPTION	SHEET NO.		PLOTTED DATE: 10/16/2025					



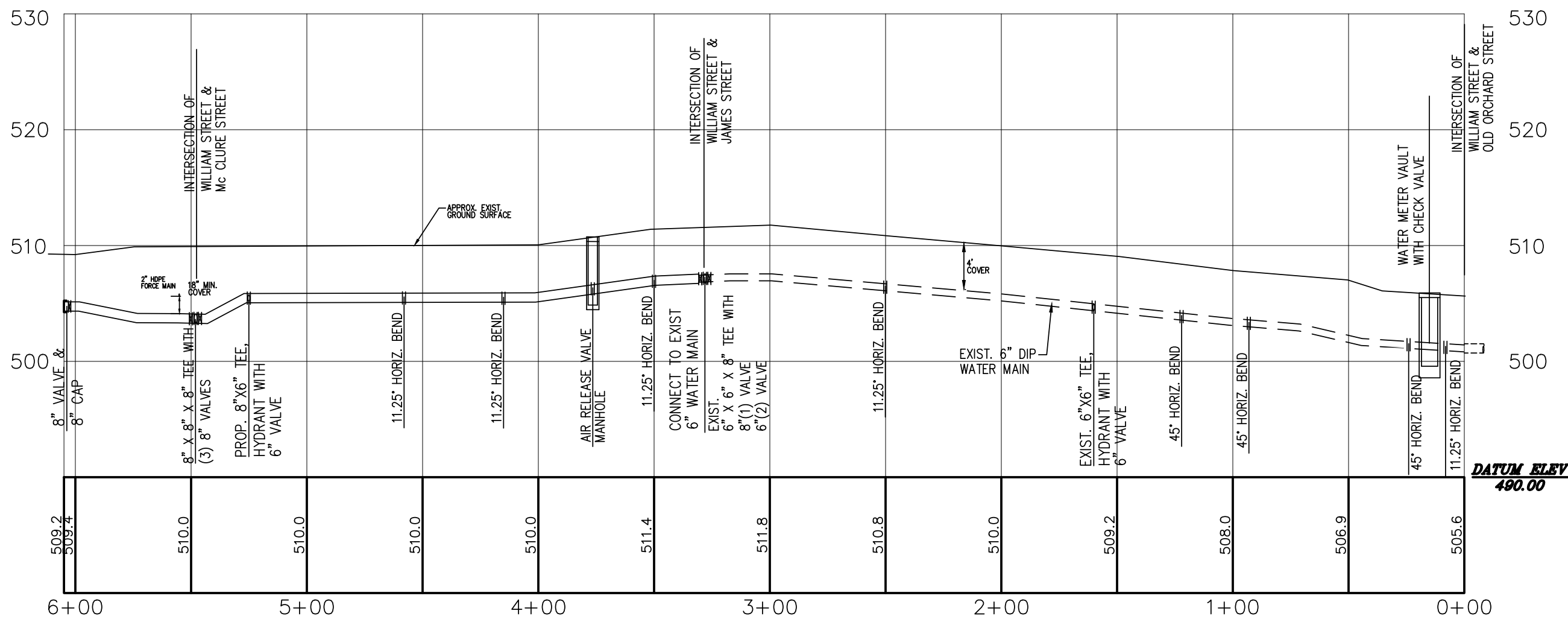
MEMORIAL LANE WATER MAIN PROFILE

SCALE : HORIZ. 1" = 50'
VERT. 1" = 10'



JOHNSON PLACE WATER MAIN PROFILE

SCALE : HORIZ. 1" = 50'
VERT. 1" = 10'



WILLIAM STREET WATER MAIN PROFILE

SCALE : HORIZ. 1" = 50'
VERT. 1" = 10'

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					CHECKED BY: JN					DRAWING NO. C-003
					APPROVED BY: AO					SHEET NO. 3 of 5
1	10-16-25	ADDITION OF PROPERTIES TO BE SERVED	3			FILENAME: QUARRY HEIGHTS WATER DISTRICT 10-16-25.DWG			DRAWING TITLE: WATER MAIN PROFILES 1	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	PLOTTED DATE: 10/16/2025						




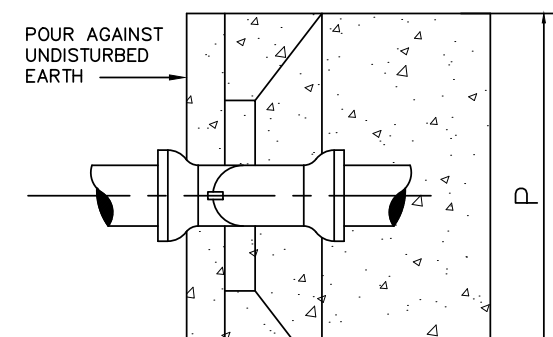
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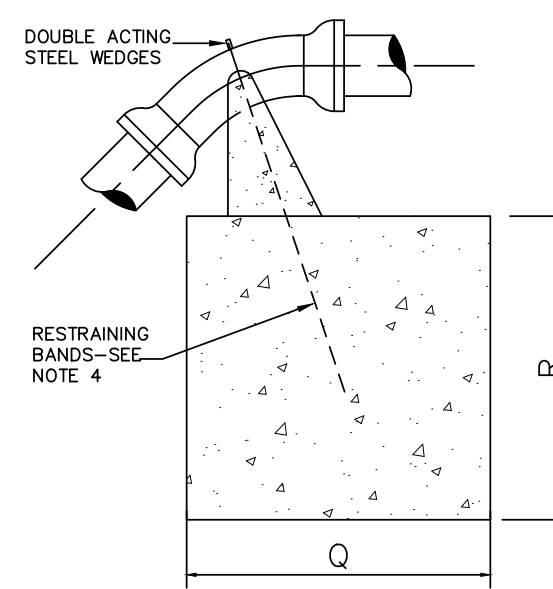


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				CHECKED BY: JN	DRAWING NO. C-004					
				APPROVED BY: AO	SHEET NO. 4 of 5					
1	10-16-25	ADDITION OF PROPERTIES TO BE SERVED	4			FILENAME: QUARRY HEIGHTS WATER DISTRICT 10-16-25.DWG				
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	PLOTTED DATE: 10/16/2025						



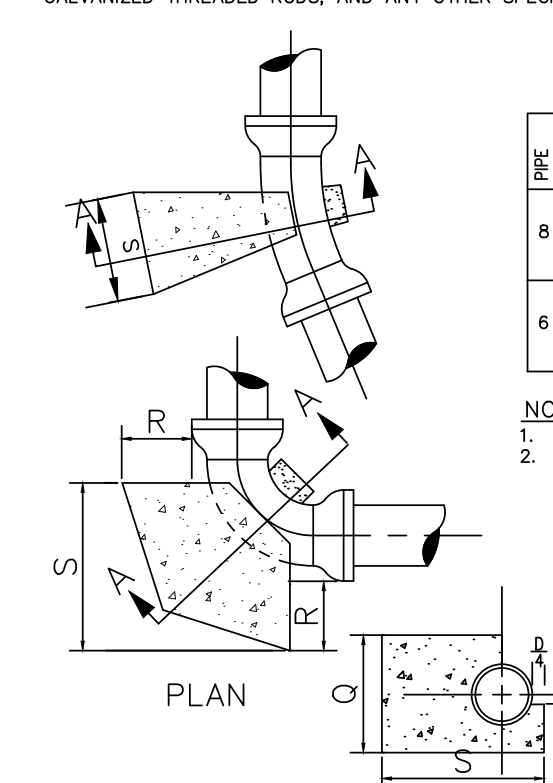
PIPE DIAM. IN.	BLOCK DIMENSIONS			CONCRETE VOLUME CU. YD.	
	BEND	P IN.	Q IN.		R IN.
8	45	48	36	36	1.3
	22 1/2	32	32	32	0.71
	11 1/4	26	26	26	0.38
6	45	42	30	28	0.76
	22 1/2	26	26	26	0.38
	11 1/4	24	24	24	0.30



- NOTES:
- 2500 psi concrete to be used.
 - BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.
 - WHERE 90° CREST VERTICAL BEND IS REQUIRED, APPROVAL MUST FIRST BE OBTAINED FROM THE ENGINEER. A SPECIAL DESIGN WILL BE REQUIRED.
 - 2-#6 REINFORCING RODS REQUIRED FOR 16" 45° BEND, 1-#6 REINFORCING ROD REQUIRED FOR ALL OTHER BENDS. EXPOSED BARS TO BE PROVIDED WITH PROTECTIVE COATING.

CREST VERTICAL BENDS

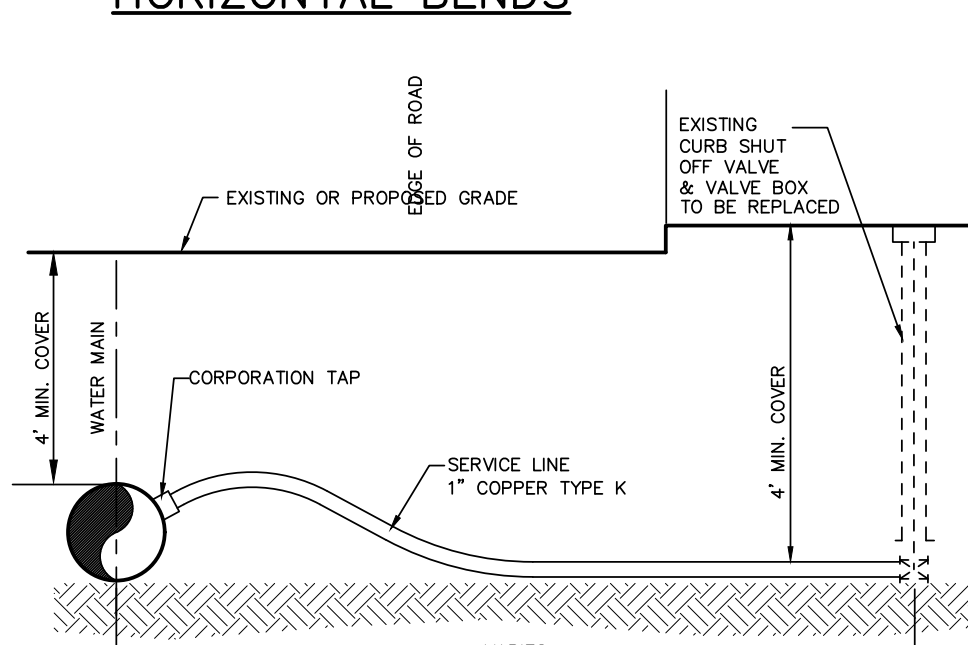
NOTE: IN ADDITION TO THE CONCRETE THRUST BLOCKS, ALL FITTINGS TO BE TIED TOGETHER WITH 3/4" GALVANIZED THREADED RODS, AND ANY OTHER SPECIALS AS DIRECTED BY THE WATER DISTRICT.



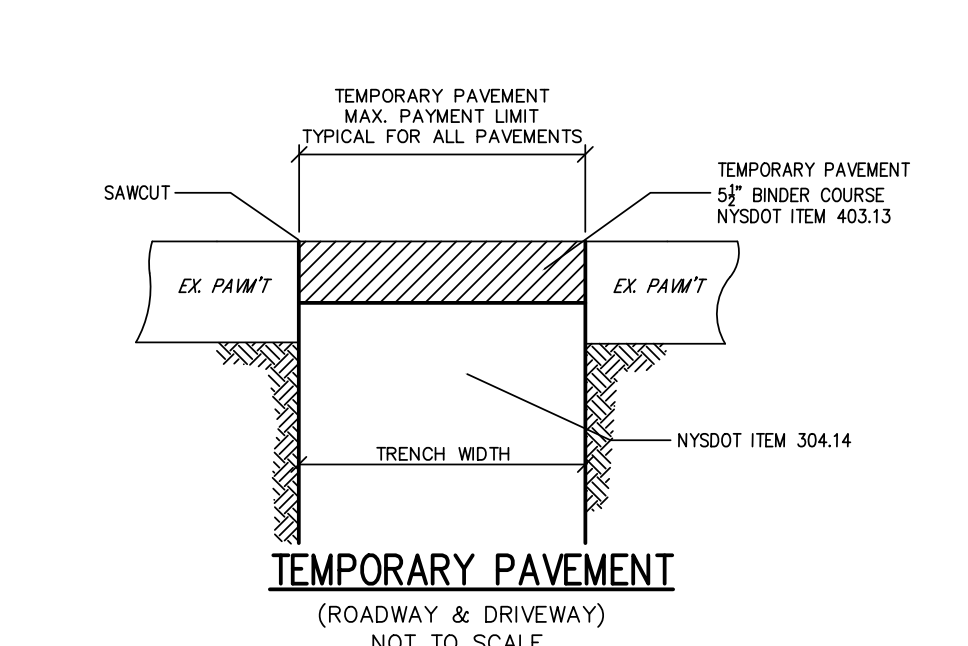
BLOCK DIMENSIONS				CONCRETE VOLUME CU. FT.
BED DIA.	S IN.	Q IN.	R IN.	
0	24	24	24	80
5	24	16	12	27
2 1/2	18	12	12	15
1 1/4				(3)
0	18	18	18	34
5	18	12	12	15
2 1/2	12	12	12	10
1 1/4				(3)

- NOTES:
- 2500 psi concrete to be used.
 - BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.

HORIZONTAL BENDS



WATER SERVICE LINE LATERAL



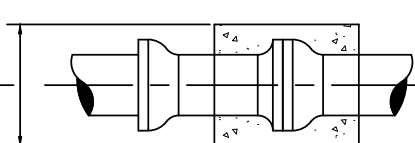
TEMPORARY PAVEMENT

(ROADWAY & DRIVEWAY)
NOT TO SCALE

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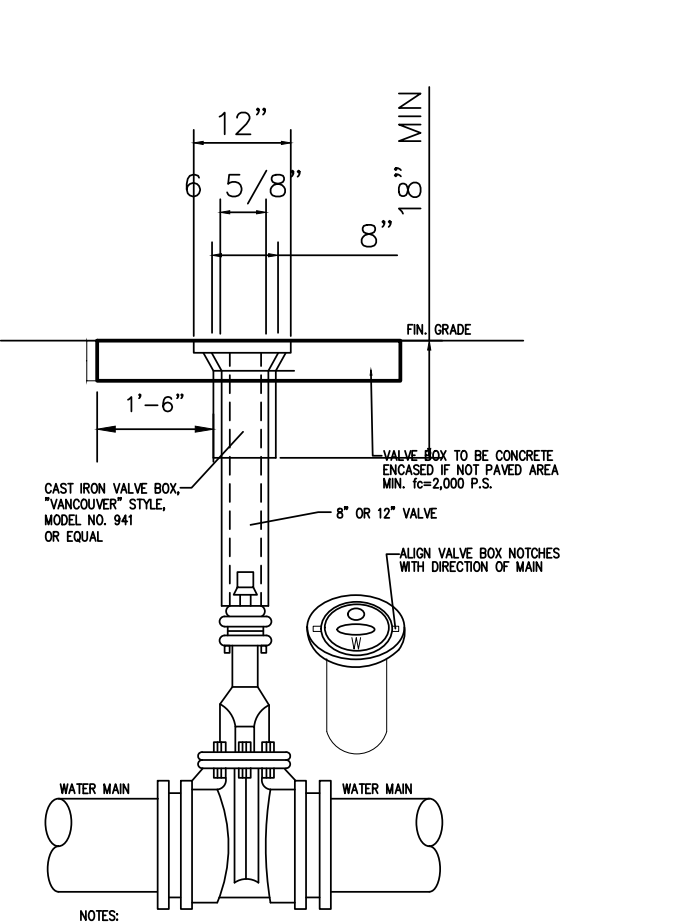
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PIPE DIA. IN.	BLOCK DIMENSIONS			CONCRETE VOLUME CU. FT.	
	BEND	S IN.	T IN.		U IN.
8	90	24	24	24	80
	45	24	16	12	27
	22 1/2	18	12	12	15
	11 1/4				(3)
6	90	18	18	18	34
	45	18	12	12	15
	22 1/2	12	12	12	10
	11 1/4				(3)

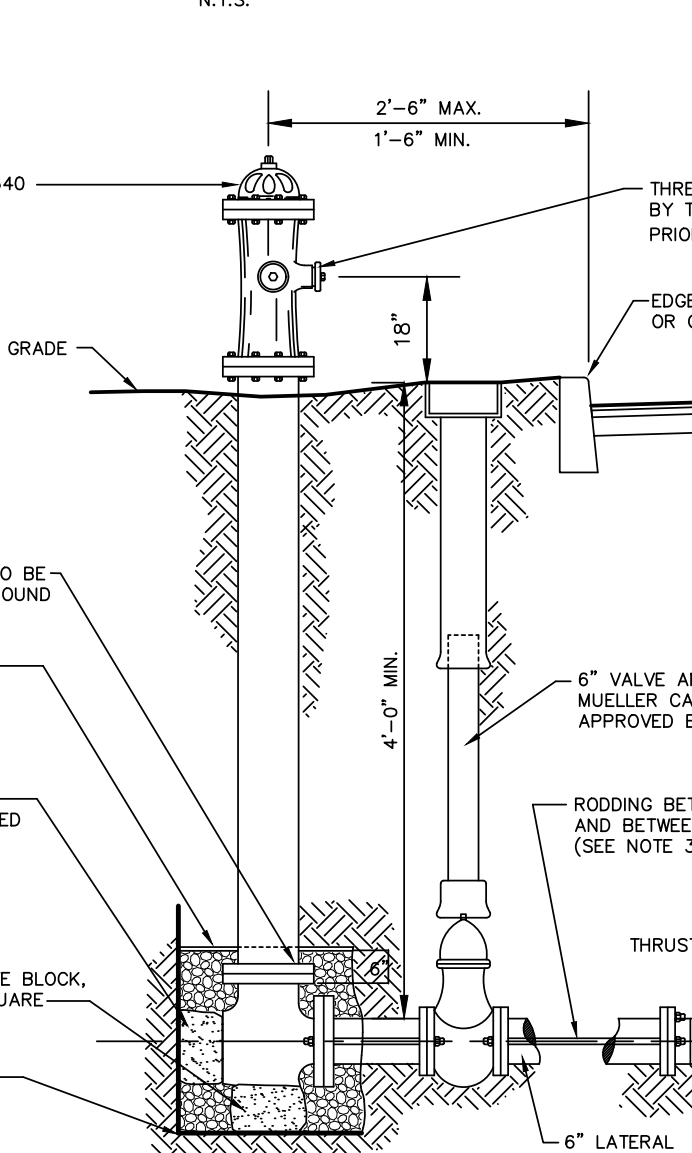
- NOTES:
- 2500 psi concrete to be used.
 - BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.
 - BEND TO BE SET AGAINST UNDISTURBED EARTH. BACKFILL TO BE FIRMLY TAMPED, OR BLOCK TO BE FURNISHED AS DIRECTED BY THE ENGINEER.

SAG VERTICAL BENDS



WATER VALVE BOX

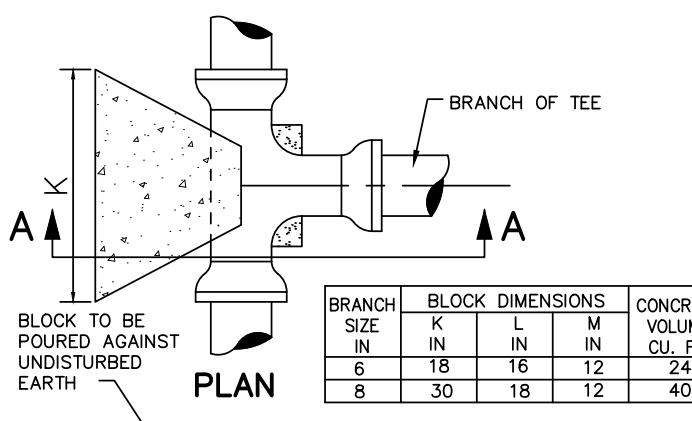
N.T.S.



- NOTES:
- PUMPER OUTLET SHALL FACE STREET; HOSE OUTLETS SHALL BE PARALLEL TO STREET.
 - PUMPNESS OF HYDRANT TO BE CHECKED IN TWO DIRECTIONS, 90° APART.
 - RODDING SHALL CONSIST OF TWO 3/4" THREADED RODS CAREFULLY COATED WITH BITUMASTIC PAINT. RODDING MAY BE OMITTED BETWEEN THE MAIN AND LATERAL VALVE ONLY WHERE A TAPPING VALVE OR HYDRANT VALVE ANCHORING TEE IS USED.
 - 1 1/2" STONE SHALL BE PLACED AROUND THE HYDRANT FROM THE BOTTOM OF THE TRENCH, BUT AT LEAST 6" BELOW THE BASE OF THE HYDRANT TO 6" ABOVE THE WASTE OPENING AND TO A DISTANCE OF 12" AROUND THE ELBOW.
 - HYDRANTS WITH PLUGGED DRAINS SHALL HAVE A 3" BLACK CIRCLE PAINTED DIRECTLY UNDER THE PUMPER OUTLET.
 - HYDRANT DRAINS TO BE PLUGGED WHERE THE WATER TABLE IS WITHIN 7 FEET OF FINISHED GRADE. WHEN THE DRAINS ARE PLUGGED, THE BARRELS MUST BE PUMPED DRY AFTER USE DURING FREEZING WEATHER. WHERE HYDRANT DRAINS ARE NOT PLUGGED, A GRAVEL POCKET OR DRY WELL SHALL BE PROVIDED UNLESS THE NATURAL SOILS WILL PROVIDE ADEQUATE DRAINAGE. HYDRANT DRAINS SHALL NOT BE CONNECTED TO OR LOCATED WITHIN 10 FT. OF SANITARY SEWERS OR STORM DRAINS.
 - HYDRANT DRAINS, WHERE ALLOWED, MUST BE ABOVE THE SEASONAL GROUNDWATER TABLE.

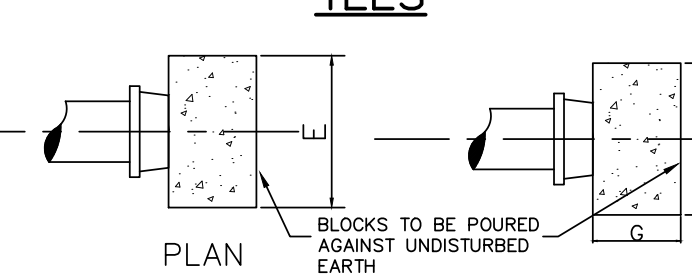
HYDRANT SETTING

N.T.S.



- NOTES:
- 2500 psi concrete to be used.
 - BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.

TEES



- NOTES:
- 2500 psi concrete to be used.
 - BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.
 - FOR USE ON ABANDONED LINES AND DEAD ENDS WHERE NO EXTENSION IS CONTEMPLATED.

CAPS, PLUGS AND VALVES

N.T.S.



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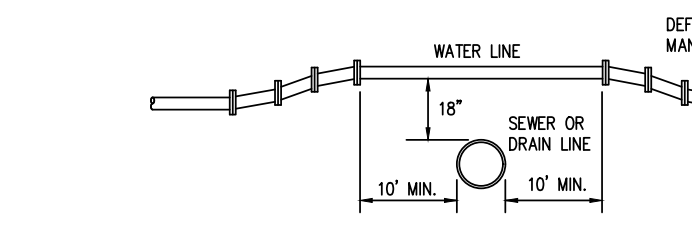
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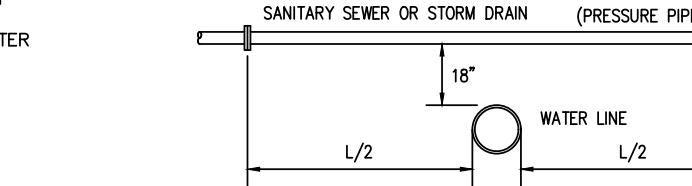
NOTE: CONTRACTOR TO SUBMIT SHOW DRAWINGS FOR ALL WATER METER VAULTS TO THE ENGINEER FOR APPROVAL PRIOR TO ORDERING THE PRECAST UNITS.



- NOTE:
- FOR ANY CONDITIONS OTHER THAN SHOWN ABOVE THE FOLLOWING REQUIREMENTS SHALL BE MET: THE JOINTS OF THE SANITARY SEWER OR STORM DRAIN SHALL BE A MINIMUM OF 10" FROM THE POINT OF CROSSING AND THE SANITARY SEWER SHALL BE CLASS 100 PRESSURE PIPE & THE STORM DRAIN SHALL BE DUCTILE IRON.

SANITARY SEWER OR STORM DRAIN CROSSING OF WATER LINE OVER

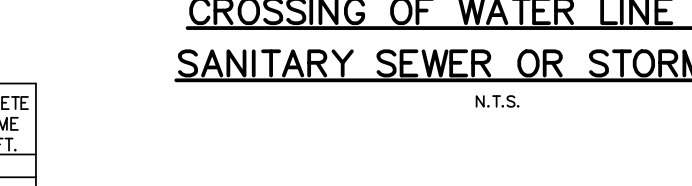
N.T.S.



- NOTE:
- WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE TOP OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER WITH PREFERENCE TO THE WATER MAIN LOCATED ABOVE THE SEWER.
 - AT CROSSINGS, ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE A MINIMUM OF 5 FEET FROM THE CROSSING. SPECIAL STRUCTURAL SUPPORT FOR THE WATER AND SEWER PIPES MAY BE REQUIRED.
 - IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN AN 18 INCH SEPARATION, WAWM WITH WOOD APPROVAL, MAY ALLOW DEVIATION ON A CASE-BY-CASE BASIS, PROVIDED THAT THE SEWER IS SUPPORTED AS DIRECTED BY THE ENGINEER. TO THE EXTENT FEASIBLE, JOINTS IN THE WATER MAIN SHALL BE KEPT AS FAR AS POSSIBLE FROM THE SEWER. WHERE AN 18" SEPARATION CANNOT BE OBTAINED DUE TO FIELD CONDITIONS, SEPARATE APPROVAL OF THE WESTCHESTER COUNTY HEALTH DEPARTMENT SHALL BE REQUIRED.

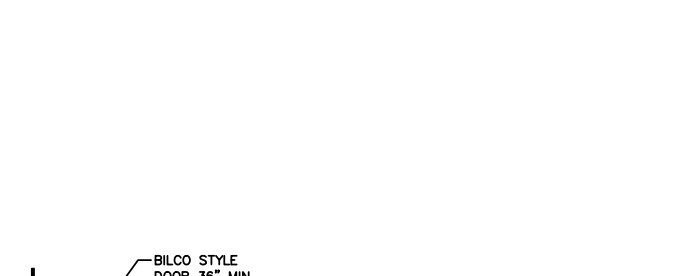
CROSSING OF WATER LINE UNDER SANITARY SEWER OR STORM DRAIN

N.T.S.



SEPARATION OF WATER MAINS AND SEWER CROSSINGS

N.T.S.



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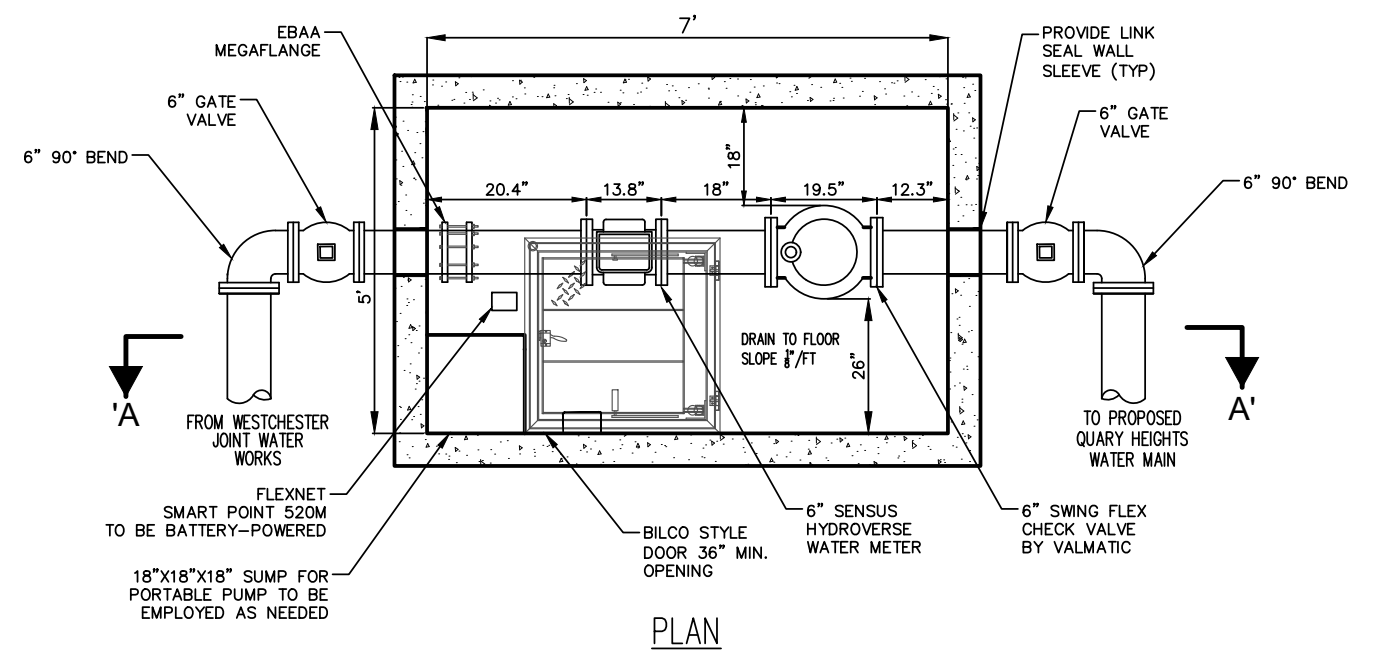
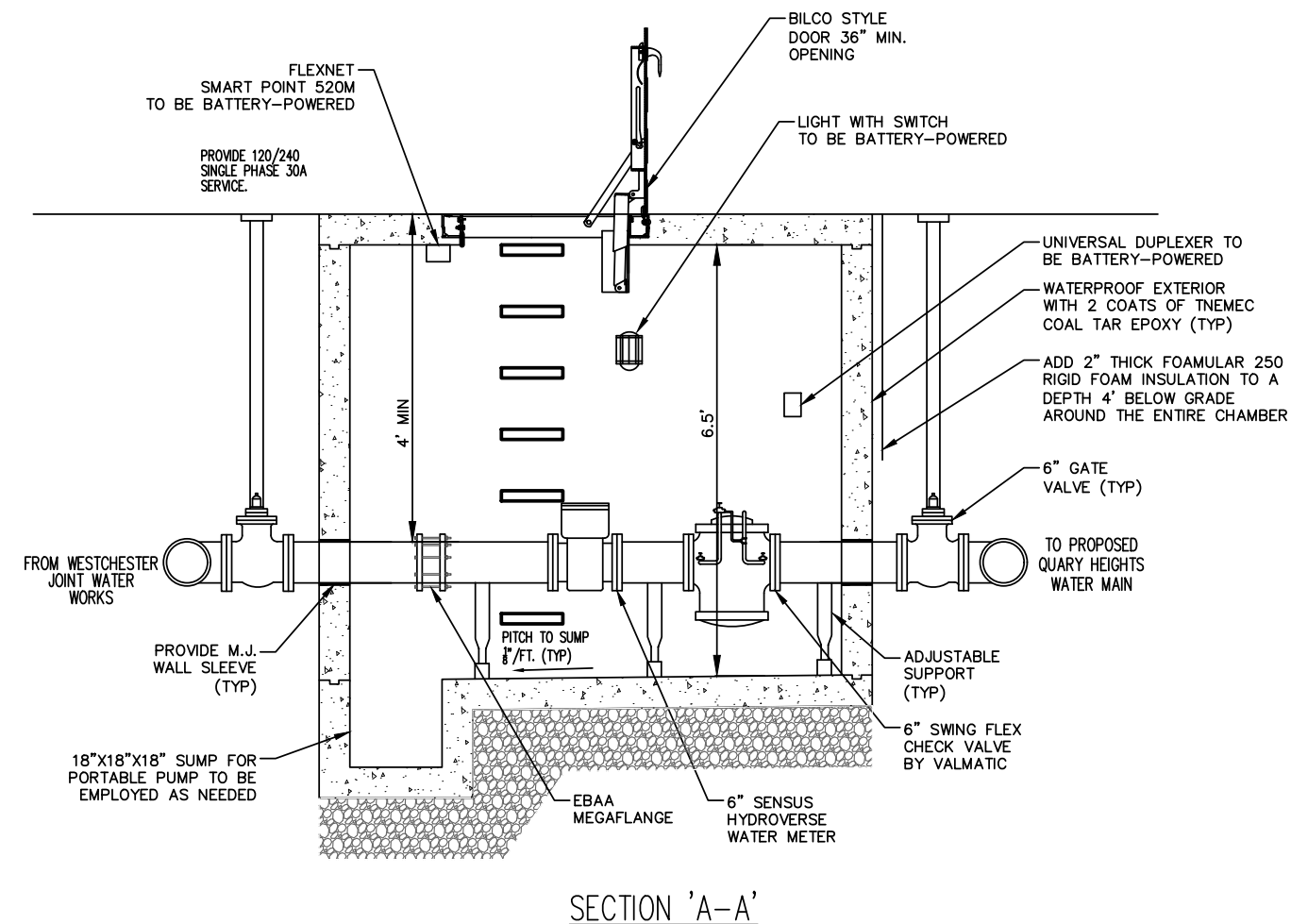
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NOTE: CONTRACTOR TO SUBMIT SHOW DRAWINGS FOR ALL WATER METER VAULTS

APPENDIX D

Plan – Water District No. 9 Extension, Quarry Heights
Extension of Water District No. 9, Water Meter Pit Detail



TYPICAL WATER METER VAULT WITH CHECK VALVE DETAIL

NOTE: CONTRACTOR TO SUBMIT SHOW DRAWINGS FOR ALL WATER METER VAULTS TO THE ENGINEER FOR APPROVAL PRIOR TO ORDERING THE PRECAST UNITS.

WATER DISTRICT NO. 9 EXTENSION
TOWN OF NORTH CASTLE, N.Y.

AI Engineers, INC.
dolph rotfeld engineering division
100 SUMMIT LAKE DRIVE, VALHALLA, NY 10595
(914) 631-8600

APPENDIX E

Westchester Joint Water Works
Fire Flow Test Results



WESTCHESTER JOINT WATER WORKS

1625 Mamaroneck Avenue
Mamaroneck, New York 10543
www.wjww.com

Telephone: (914) 698-3500
Fax: (914) 381-4241
Fax: (914) 381-0349

Fire Flow Test Report

Test Date & Time: July 30, 2025 12:21 PM

Tested By: VN

Test Location: 1490 old orchard

Pressure Hydrant

Hydrant ID: #6001
Hydrant Location: 1490 old orchard
Static Pressure (PSI): 58
Residual Pressure (PSI): 26
Pressure Drop (PSI): 32

Flow Hydrant 1

Hydrant ID: #0000
Hydrant Location: Starkey and James st
Outlet Diameter (in): 4.5
Velocity Pressure (PSI): 4
Coefficient of Discharge: 0.9

Flow Hydrant 1 - Calculation Results

Observed Flow (gal/min): 1,087
Flow with 20psi Drop (gal/min): 843
Available Fire Flow at 20psi (gal/min): 1,193

Reference Equations:

$$Q = 29.84 \, cd^2 \sqrt{p}$$

where: Q = flow (gpm)

c = coefficient of discharge

d = diameter of the outlet (in.)

p = pitot pressure (velocity head) (psi)

$$Q_r = Q_f \times h_r^{0.54} / h_f^{0.54}$$

where: Q_r = flow predicted at desired residual pressure

Q_f = total flow measured during test

h_r = pressure drop to desired residual pressure

h_f = pressure drop measured during test

Submitted By: Itroiano-wjww

Submitted Time: July 30, 2025 12:22 PM



WESTCHESTER JOINT WATER WORKS

1625 Mamaroneck Avenue
Mamaroneck, New York 10543
www.wjww.com

Telephone: (914) 698-3500
Fax: (914) 381-4241
Fax: (914) 381-0349

Fire Flow Test Report

Test Date & Time: July 30, 2025 12:24 PM
Tested By: LT
Test Location: Starkey rd and James st

Pressure Hydrant

Hydrant ID: #0000
Hydrant Location: Starkey rd and James st
Static Pressure (PSI): 70
Residual Pressure (PSI): 22
Pressure Drop (PSI): 48

Flow Hydrant 1

Hydrant ID: #6001
Hydrant Location: 1490 old orchard
Outlet Diameter (in): 4.5
Velocity Pressure (PSI): 14
Coefficient of Discharge: 0.9

Flow Hydrant 1 - Calculation Results

Observed Flow (gal/min): 2,034
Flow with 20psi Drop (gal/min): 1,268
Available Fire Flow at 20psi (gal/min): **2,079**

Reference Equations:

$$Q = 29.84 \, cd^2 \sqrt{p}$$

where: Q = flow (gpm)

c = coefficient of discharge

d = diameter of the outlet (in.)

p = pitot pressure (velocity head) (psi)

$$Q_r = Q_f \times h_r^{0.54} / h_f^{0.54}$$

where: Q_r = flow predicted at desired residual pressure

Q_f = total flow measured during test

h_r = pressure drop to desired residual pressure

h_f = pressure drop measured during test

APPENDIX E

Engineer's Opinion of Probable Cost

Town of North Castle
Water District No. 9 Proposed Extension
Quarry Heights
ENGINEER'S OPINION OF PROBABLE COST

Johnson Place

Construction Cost Estimate

Item No.	Item with Unit Price Written in Words	Unit	Bid Price	Quantity	Price Ext.
1M	Miscellaneous Additional Work	LS	\$20,000.00	1	\$20,000.00
2M	Miscellaneous Earth Excavation	CY	\$100.00	10	\$1,000.00
5R	Rock Removal	CY	\$300.00	160	\$48,000.00
5R-MV	Rock Removal for Meter Vault	CY	\$300.00	30	\$9,000.00
5R-WS	Rock Removal for Water Service	CY	\$300.00	40	\$12,000.00
13CB	F & I Water Service Valve and Curb Box	EA	\$1,000.00	4	\$4,000.00
13DI-6	F & I 6-inch Class 54 Ductile Iron Pipe	LF	\$200.00	270	\$54,000.00
13FDI	F & I Ductile Iron Fittings w/ Thrust Blocks	Ton	\$12,500.00	0.2	\$2,500.00
13FH	F & I Fire Hydrant Assembly Complete with Valve	EA	\$10,000.00	1	\$10,000.00
13K	F & I Water Service	LF	\$120.00	100	\$12,000.00
13MV	F & I Water Meter Vault	EA	\$70,000.00	1	\$70,000.00
13T	F & I Water Service Taps	EA	\$600.00	4	\$2,400.00
13V-6	F & I Water Valve (6")	EA	\$4,100.00	3	\$12,300.00
39	F & I Crushed Stone	CY	\$100.00	10	\$1,000.00
51	F & I Temporary Pavement	SY	\$75.00	100	\$7,500.00
51A	F & I Bituminous Hot Mix Asphalt Top Course (2") for Final Trench Restoration	TON	\$180.00	25	\$4,500.00
51M	Cold Milling and Removal of Bituminous Pavements (2")	SY	\$15.00	175	\$2,625.00
73	F & I Controlled Density Backfill	CY	\$175.00	160	\$28,000.00
76	Maintenance and Protection of Traffic	LS	\$25,000.00	1	\$25,000.00
150B	F & I 12" Wide White Stripe	LF	\$4.00	20	\$80.00
401-G	F & I Grass Seed	SY	\$10.00	90	\$900.00
401-TS	F & I Topsoil	CY	\$120.00	16	\$1,920.00

10% CONTINGENCY

\$32,873

TOTAL

\$361,598

Engineering Cost Estimate

Westchester County Department of Health Permitting	\$5,000.00
Survey	\$10,000.00
Engineering Design*	\$45,000.00
Construction Administration and Inspection**	\$36,000.00
TOTAL	\$96,000.00

* "Engineering" includes Design, Geotechnical Exploration (Borings) and Reporting, Construction Drawings, Bid Documents and Technical Specifications, and Bid Letting Services

[Lump sum based on ~9% of construction cost with contingency + ~\$5,000 for exploratory borings + ~\$8,000 geotechnical reporting]

** "Construction Administration and Inspection" includes Bond and Insurance Review, Contract Signing Support Services, Contractor Meeting Management, Shop Drawing Review, Daily On-Site Construction Inspection and Reporting, Contractor Payment Item Recording, Engineering Office Support Services, Payment Application Review and Processing, Town Staff Communication, Testing Oversight and Health Department Certification, As-builts and Project Close-Out

[Assumes 5-week construction period with full-time on-site inspection (40 hours/week) and office support (10 hours/week minimum during construction + miscellaneous contract administration and project closeout services)]

Town of North Castle
Water District No. 9 Proposed Extension
Quarry Heights
ENGINEER'S OPINION OF PROBABLE COST

Memorial Lane

Construction Cost Estimate

Item No.	Item with Unit Price Written in Words	Unit	Bid Price	Quantity	Price Ext.
1M	Miscellaneous Additional Work	LS	\$20,000.00	1	\$20,000.00
2M	Miscellaneous Earth Excavation	CY	\$100.00	10	\$1,000.00
5R	Rock Removal	CY	\$300.00	220	\$66,000.00
5R-MV	Rock Removal for Meter Vault	CY	\$300.00	30	\$9,000.00
5R-WS	Rock Removal for Water Service	CY	\$300.00	50	\$15,000.00
13CB	F & I Water Service Valve and Curb Box	EA	\$1,000.00	5	\$5,000.00
13DI-6	F & I 6-inch Class 54 Ductile Iron Pipe	LF	\$200.00	385	\$77,000.00
13FDI	F & I Ductile Iron Fittings w/ Thrust Blocks	Ton	\$12,500.00	0.3	\$3,750.00
13FH	F & I Fire Hydrant Assembly Complete with Valve	EA	\$10,000.00	1	\$10,000.00
13K	F & I Water Service	LF	\$120.00	130	\$15,600.00
13MV	F & I Water Meter Vault	EA	\$70,000.00	1	\$70,000.00
13T	F & I Water Service Taps	EA	\$600.00	5	\$3,000.00
13V-6	F & I Water Valve (6")	EA	\$4,100.00	3	\$12,300.00
39	F & I Crushed Stone	CY	\$100.00	10	\$1,000.00
51	F & I Temporary Pavement	SY	\$75.00	140	\$10,500.00
51A	F & I Bituminous Hot Mix Asphalt Top Course (2") for Final Trench Restoration	TON	\$180.00	35	\$6,300.00
51M	Cold Milling and Removal of Bituminous Pavements (2")	SY	\$15.00	250	\$3,750.00
73	F & I Controlled Density Backfill	CY	\$175.00	220	\$38,500.00
76	Maintenance and Protection of Traffic	LS	\$25,000.00	1	\$25,000.00
150B	F & I 12" Wide White Stripe	LF	\$4.00	20	\$80.00
401-G	F & I Grass Seed	SY	\$10.00	150	\$1,500.00
401-TS	F & I Topsoil	CY	\$120.00	25	\$3,000.00

10% CONTINGENCY

\$39,728

TOTAL

\$437,008

Engineering Cost Estimate

Westchester County Department of Health Permitting	\$5,000.00
Survey	\$10,000.00
Engineering Design*	\$52,000.00
Construction Administration and Inspection**	\$45,000.00
TOTAL	\$112,000.00

* "Engineering" includes Design, Geotechnical Exploration (Borings) and Reporting, Construction Drawings, Bid Documents and Technical Specifications, and Bid Letting Services

[Lump sum based on ~9% of construction cost with contingency + ~\$5,000 for exploratory borings + ~\$8,000 geotechnical reporting]

** "Construction Administration and Inspection" includes Bond and Insurance Review, Contract Signing Support Services, Contractor Meeting Management, Shop Drawing Review, Daily On-Site Construction Inspection and Reporting, Contractor Payment Item Recording, Engineering Office Support Services, Payment Application Review and Processing, Town Staff Communication, Testing Oversight and Health Department Certification, As-builts and Project Close-Out

[Assumes 6-week construction period with full-time on-site inspection (40 hours/week) and office support (10 hours/week minimum during construction + miscellaneous contract administration and project closeout services)]

Town of North Castle
Water District No. 9 Proposed Extension
Quarry Heights
ENGINEER'S OPINION OF PROBABLE COST

William Street

Construction Cost Estimate

Item No.	Item with Unit Price Written in Words	Unit	Bid Price	Quantity	Price Ext.
1M	Miscellaneous Additional Work	LS	\$25,000.00	1	\$25,000.00
2M	Miscellaneous Earth Excavation	CY	\$100.00	15	\$1,500.00
5R	Rock Removal	CY	\$300.00	170	\$51,000.00
5R-RV	Rock Removal for Air Release Manhole	CY	\$300.00	10	\$3,000.00
5R-WS	Rock Removal for Water Service	CY	\$300.00	80	\$24,000.00
13CB	F & I Water Service Valve and Curb Box	EA	\$1,000.00	8	\$8,000.00
13DI-8	F & I 8-inch Class 54 Ductile Iron Pipe	LF	\$300.00	295	\$88,500.00
13FDI	F & I Ductile Iron Fittings w/ Thrust Blocks	Ton	\$12,500.00	0.5	\$6,250.00
13FH	F & I Fire Hydrant Assembly Complete with Valve	EA	\$10,000.00	1	\$10,000.00
13K	F & I Water Service	LF	\$120.00	200	\$24,000.00
13RV	F & I Manhole w/ Air Release Valve Assembly	EA	\$20,000.00	1	\$20,000.00
13V-8	F & I Water Valve (8")	EA	\$12,500.00	3	\$37,500.00
13T	F & I Water Service Taps	EA	\$600.00	8	\$4,800.00
39	F & I Crushed Stone	CY	\$100.00	15	\$1,500.00
51	F & I Temporary Pavement	SY	\$75.00	150	\$11,250.00
51A	F & I Bituminous Hot Mix Asphalt Top Course (2") for Final Trench Restoration	TON	\$180.00	25	\$4,500.00
51M	Cold Milling and Removal of Bituminous Pavements (2")	SY	\$15.00	180	\$2,700.00
73	F & I Controlled Density Backfill	CY	\$175.00	170	\$29,750.00
76	Maintenance and Protection of Traffic	LS	\$20,000.00	1	\$20,000.00
150B	F & I 12" Wide White Stripe	LF	\$4.00	20	\$80.00
401-G	F & I Grass Seed	SY	\$10.00	120	\$1,200.00
401-TS	F & I Topsoil	CY	\$120.00	20	\$2,400.00

10% CONTINGENCY

\$37,693

TOTAL

\$414,623

Engineering Cost Estimate

Westchester County Department of Health Permitting	\$5,000.00
Survey	\$10,000.00
Engineering Design*	\$50,000.00
Construction Administration and Inspection**	\$40,000.00
TOTAL	\$105,000.00

* "Engineering" includes Design, Geotechnical Exploration (Borings) and Reporting, Construction Drawings, Bid Documents and Technical Specifications, and Bid Letting Services

[Lump sum based on ~9% of construction cost with contingency + ~\$5,000 for exploratory borings + ~\$8,000 geotechnical reporting]

** "Construction Administration and Inspection" includes Bond and Insurance Review, Contract Signing Support Services, Contractor Meeting Management, Shop Drawing Review, Daily On-Site Construction Inspection and Reporting, Contractor Payment Item Recording, Engineering Office Support Services, Payment Application Review and Processing, Town Staff Communication, Testing Oversight and Health Department Certification, As-builts and Project Close-Out

[Assumes 5-week construction period with full-time on-site inspection (40 hours/week) and office support (10 hours/week minimum during construction + miscellaneous contract administration and project closeout services)]

Town of North Castle
Water District No. 9 Proposed Extension
Quarry Heights
ENGINEER'S OPINION OF PROBABLE COST

Starkey Road

Construction Cost Estimate

Item No.	Item with Unit Price Written in Words	Unit	Bid Price	Quantity	Price Ext.
1M	Miscellaneous Additional Work	LS	\$50,000.00	1	\$50,000.00
2M	Miscellaneous Earth Excavation	CY	\$100.00	30	\$3,000.00
5R	Rock Removal	CY	\$300.00	680	\$204,000.00
5R-RV	Rock Removal for Air Release Manhole	CY	\$300.00	10	\$3,000.00
5R-WS	Rock Removal for Water Service	CY	\$300.00	90	\$27,000.00
13DI-8	F & I 8-inch Class 54 Ductile Iron Pipe	LF	\$300.00	1200	\$360,000.00
13CB	F & I Water Service Valve and Curb Box	EA	\$1,000.00	9	\$9,000.00
13FDI	F & I Ductile Iron Fittings w/ Thrust Blocks	Ton	\$12,500.00	1.2	\$15,000.00
13FH	F & I Fire Hydrant Assembly Complete with Valve	EA	\$10,000.00	2	\$20,000.00
13K	F & I Water Service	LF	\$120.00	230	\$27,600.00
13RV	F & I Manhole w/ Air Release Valve Assembly	EA	\$20,000.00	1	\$20,000.00
13T	F & I Water Service Taps	EA	\$600.00	9	\$5,400.00
13V-8	F & I Water Valve (8")	EA	\$12,500.00	3	\$37,500.00
39	F & I Crushed Stone	CY	\$100.00	30	\$3,000.00
51	F & I Temporary Pavement	SY	\$75.00	400	\$30,000.00
51A	F & I Bituminous Hot Mix Asphalt Top Course (2") for Final Trench Restoration	TON	\$180.00	90	\$16,200.00
51M	Cold Milling and Removal of Bituminous Pavements (2")	SY	\$15.00	700	\$10,500.00
73	F & I Controlled Density Backfill	CY	\$175.00	680	\$119,000.00
76	Maintenance and Protection of Traffic	LS	\$75,000.00	1	\$75,000.00
150B	F & I 12" Wide White Stripe	LF	\$4.00	40	\$160.00
401-G	F & I Grass Seed	SY	\$10.00	420	\$4,200.00
401-TS	F & I Topsoil	CY	\$120.00	80	\$9,600.00

10% CONTINGENCY

\$104,916

TOTAL

\$1,154,076

Engineering Cost Estimate

Westchester County Department of Health Permitting	\$10,000.00
Survey	\$30,000.00
Engineering Design*	\$110,000.00
Construction Administration and Inspection**	\$115,000.00
TOTAL	\$265,000.00

* "Engineering" includes Design, Geotechnical Exploration (Borings) and Reporting, Construction Drawings, Bid Documents and Technical Specifications, and Bid Letting Services

[Lump sum based on ~7.5% of construction cost with contingency + ~\$17,000 for exploratory borings + ~\$7,500 geotechnical reporting]

** "Construction Administration and Inspection" includes Bond and Insurance Review, Contract Signing Support Services, Contractor Meeting Management, Shop Drawing Review, Daily On-Site Construction Inspection and Reporting, Contractor Payment Item Recording, Engineering Office Support Services, Payment Application Review and Processing, Town Staff Communication, Testing Oversight and Health Department Certification, As-builts and Project Close-Out

[Assumes 8-week construction period with full-time on-site inspection (40 hours/week) and office support (10 hours/week minimum during construction + miscellaneous contract administration and project closeout services)]

**Town of North Castle
Water District No. 9 Proposed Extension
Quarry Heights
ENGINEER'S OPINION OF PROBABLE COST**

Old Orchard Street & McClure Street

Construction Cost Estimate

Item No.	Item with Unit Price Written in Words	Unit	Bid Price	Quantity	Price Ext.
1M	Miscellaneous Additional Work	LS	\$50,000.00	1	\$50,000.00
2M	Miscellaneous Earth Excavation	CY	\$100.00	30	\$3,000.00
5R	Rock Removal	CY	\$300.00	940	\$282,000.00
5R-WS	Rock Removal for Water Service	CY	\$300.00	170	\$51,000.00
13CB	F & I Water Service Valve and Curb Box	EA	\$1,000.00	18	\$18,000.00
13DI-8	F & I 8-inch Class 54 Ductile Iron Pipe	LF	\$300.00	1670	\$501,000.00
13FDI	F & I Ductile Iron Fittings w/ Thrust Blocks	Ton	\$12,500.00	1.1	\$13,750.00
13FH	F & I Fire Hydrant Assembly Complete with Valve	EA	\$10,000.00	3	\$30,000.00
13K	F & I Water Service	LF	\$120.00	450	\$54,000.00
13T	F & I Water Service Taps	EA	\$600.00	18	\$10,800.00
13V-8	F & I Water Valve (8")	EA	\$12,500.00	6	\$75,000.00
39	F & I Crushed Stone	CY	\$100.00	30	\$3,000.00
51	F & I Temporary Pavement	SY	\$75.00	570	\$42,750.00
51A	F & I Bituminous Hot Mix Asphalt Top Course (2") for Final Trench Restoration	TON	\$180.00	135	\$24,300.00
51M	Cold Milling and Removal of Bituminous Pavements (2")	SY	\$15.00	970	\$14,550.00
73	F & I Controlled Density Backfill	CY	\$175.00	940	\$164,500.00
76	Maintenance and Protection of Traffic	LS	\$120,000.00	1	\$120,000.00
150B	F & I 12" Wide White Stripe	LF	\$4.00	0	\$0.00
401-G	F & I Grass Seed	SY	\$10.00	570	\$5,700.00
401-TS	F & I Topsoil	CY	\$120.00	100	\$12,000.00

10% CONTINGENCY

\$147,535

TOTAL

\$1,622,885

Engineering Cost Estimate

Westchester County Department of Health Permitting	\$10,000.00
Survey	\$40,000.00
Engineering Design*	\$147,000.00
Construction Administration and Inspection**	\$160,000.00
TOTAL	\$357,000.00

* "Engineering" includes Design, Geotechnical Exploration (Borings) and Reporting, Construction Drawings, Bid Documents and Technical Specifications, and Bid Letting Services

[Lump sum based on ~7% of construction cost with contingency + ~\$22,000 for exploratory borings + ~\$10,000 geotechnical reporting]

** "Construction Administration and Inspection" includes Bond and Insurance Review, Contract Signing Support Services, Contractor Meeting Management, Shop Drawing Review, Daily On-Site Construction Inspection and Reporting, Contractor Payment Item Recording, Engineering Office Support Services, Payment Application Review and Processing, Town Staff Communication, Testing Oversight and Health Department Certification, As-builts and Project Close-Out

[Assumes 12-week construction period with full-time on-site inspection (40 hours/week) and office support (10 hours/week minimum during construction + miscellaneous contract administration and project closeout services)]

Town of North Castle
Water District No. 9 Proposed Extension
Quarry Heights
ENGINEER'S OPINION OF PROBABLE COST

TOTAL (All Streets)

Construction Cost Estimate

Item No.	Item with Unit Price Written in Words	Unit	Bid Price	Quantity	Price Ext.
1M	Miscellaneous Additional Work	LS	\$165,000.00	1	\$165,000.00
2M	Miscellaneous Earth Excavation	CY	\$100.00	95	\$9,500.00
5R	Rock Removal	CY	\$300.00	2170	\$651,000.00
5R-MV	Rock Removal for Meter Vault	CY	\$300.00	60	\$18,000.00
5R-RV	Rock Removal for Air Release Manhole	CY	\$300.00	20	\$6,000.00
5R-WS	Rock Removal for Water Service	CY	\$300.00	430	\$129,000.00
13CB	F & I Water Service Valve and Curb Box	EA	\$1,000.00	44	\$44,000.00
13DI-6	F & I 6-inch Class 54 Ductile Iron Pipe	LF	\$225.00	655	\$147,375.00
13DI-8	F & I 8-inch Class 54 Ductile Iron Pipe	LF	\$250.00	3165	\$791,250.00
13FDI	F & I Ductile Iron Fittings w/ Thrust Blocks	Ton	\$10,000.00	3.3	\$33,000.00
13FH	F & I Fire Hydrant Assembly Complete with Valve	EA	\$12,000.00	8	\$96,000.00
13K	F & I Water Service	LF	\$120.00	1110	\$133,200.00
13MV	F & I Water Meter Vault	EA	\$70,000.00	2	\$140,000.00
13RV	F & I Air Release Valve Manhole	EA	\$15,000.00	2	\$30,000.00
13T	F & I Water Service Taps	EA	\$500.00	44	\$22,000.00
13V-6	F & I Water Valve (6")	EA	\$4,100.00	6	\$24,600.00
13V-8	F & I Water Valve (8")	EA	\$4,500.00	12	\$54,000.00
39	F & I Crushed Stone	CY	\$90.00	95	\$8,550.00
51	F & I Temporary Pavement	SY	\$75.00	1360	\$102,000.00
51A	F & I Bituminous Hot Mix Asphalt Top Course (2") for Final Trench Restoration	TON	\$150.00	310	\$46,500.00
51M	Cold Milling and Removal of Bituminous Pavements (2")	SY	\$9.50	2275	\$21,612.50
73	F & I Controlled Density Backfill	CY	\$175.00	2170	\$379,750.00
76	Maintenance and Protection of Traffic	LS	\$265,000.00	1	\$265,000.00
150B	F & I 12" Wide White Stripe	LF	\$4.00	100	\$400.00
401-G	F & I Grass Seed	SY	\$10.00	1350	\$13,500.00
401-TS	F & I Topsoil	CY	\$120.00	241	\$28,920.00

10% CONTINGENCY

\$336,016

TOTAL

\$3,696,173

Engineering Cost Estimate

Professional Services Related to Grant Applications (Includes estimated fee for grant writer and engineering support)*	\$25,000.00
Westchester County Department of Health Permitting (Includes professional services to prepare application and follow-up comment resolution)	\$35,000.00
Survey	\$100,000.00
Engineering Design**	\$340,000.00
Construction Administration and Inspection***	\$375,000.00
TOTAL	\$875,000.00

* The cost associated with preparing grant applications could vary greatly depending on the requirements of the application and the grant writer's fee .

** "Engineering" includes Design, Geotechnical Exploration (Borings) and Reporting, Construction Drawings, Bid Documents and Technical Specifications, and Bid Letting Services
[Lump sum based on ~6.5% of construction cost with contingency + ~\$54,000 for exploratory borings + ~\$41,500 geotechnical reporting]

*** "Construction Administration and Inspection" includes Bond and Insurance Review, Contract Signing Support Services, Contractor Meeting Management, Shop Drawing Review, Daily On-Site Construction Inspection and Reporting, Contractor Payment Item Recording, Engineering Office Support Services, Payment Application Review and Processing, Town Staff Communication, Testing Oversight and Health Department Certification, As-builts and Project Close-Out

[Assumes 36-week construction period with full-time on-site inspection (40 hours/week) and office support (10 hours/week minimum during construction + miscellaneous contract administration and project closeout services)]

APPENDIX F

Environmental Assessment Form

Short Environmental Assessment Form

Part 1 - Project Information

Instructions for Completing

Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information				
Name of Action or Project:				
Project Location (describe, and attach a location map):				
Brief Description of Proposed Action:				
Name of Applicant or Sponsor:			Telephone:	
			E-Mail:	
Address:				
City/PO:		State:	Zip Code:	
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation?			NO	YES
If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.			<input type="checkbox"/>	<input type="checkbox"/>
2. Does the proposed action require a permit, approval or funding from any other government Agency?			NO	YES
If Yes, list agency(s) name and permit or approval:			<input type="checkbox"/>	<input type="checkbox"/>
3. a. Total acreage of the site of the proposed action? _____ acres b. Total acreage to be physically disturbed? _____ acres c. Total acreage (project site and any contiguous properties) owned _____ acres or controlled by the applicant or project sponsor?				
4. Check all land uses that occur on, are adjoining or near the proposed action: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Urban <input type="checkbox"/> Rural (non-agriculture) <input type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input type="checkbox"/> Residential (suburban) </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Forest <input type="checkbox"/> Agriculture <input type="checkbox"/> Aquatic <input type="checkbox"/> Other(Specify): </div> <div style="margin-top: 5px;"><input type="checkbox"/> Parkland</div>				

5. Is the proposed action, a. A permitted use under the zoning regulations? b. Consistent with the adopted comprehensive plan?	NO <input type="checkbox"/> <input type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/>	N/A <input type="checkbox"/> <input type="checkbox"/>
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	NO <input type="checkbox"/>	YES <input type="checkbox"/>	
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	NO <input type="checkbox"/>	YES <input type="checkbox"/>	
8. a. Will the proposed action result in a substantial increase in traffic above present levels? b. Are public transportation services available at or near the site of the proposed action? c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____ _____	NO <input type="checkbox"/>	YES <input type="checkbox"/>	
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____ _____	NO <input type="checkbox"/>	YES <input type="checkbox"/>	
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____ _____	NO <input type="checkbox"/>	YES <input type="checkbox"/>	
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places? b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	NO <input type="checkbox"/> <input type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/>	
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency? b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____ _____ _____	NO <input type="checkbox"/> <input type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/>	

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply: <input type="checkbox"/> Shoreline <input type="checkbox"/> Forest Agricultural/grasslands Early mid-successional Wetland <input type="checkbox"/> Urban Suburban		
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?	NO <input type="checkbox"/>	YES <input type="checkbox"/>
16. Is the project site located in the 100-year flood plan?	NO <input type="checkbox"/>	YES <input type="checkbox"/>
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes, a. Will storm water discharges flow to adjacent properties? b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)? If Yes, briefly describe: _____ _____	NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)? If Yes, explain the purpose and size of the impoundment: _____ _____	NO <input type="checkbox"/>	YES <input type="checkbox"/>
49. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe: _____ _____	NO <input type="checkbox"/>	YES <input type="checkbox"/>
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe: _____ _____	NO <input type="checkbox"/>	YES <input type="checkbox"/>
I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE Applicant/sponsor/name: _____ Date: _____ Signature: _____ Title: _____		