

## I. EXECUTIVE SUMMARY

Passaic Valley Water Commission (PVWC) is a publically owned water purveyor located within the northern New Jersey water supply region. PVWC has three uncovered, finished water reservoirs, including Great Notch, New Street and Levine Reservoirs. The Great Notch and New Street Reservoirs are both located in Woodland Park, with Levine Reservoir being located in the City of Paterson.

These reservoirs are presently not in conformance with current applicable NJDEP and USEPA regulations for finished water storage. In March of 2009, the New Jersey Department of Environmental Protection (NJDEP) issued an Administrative Consent Order (ACO) to PVWC. The NJDEP provided PVWC with a schedule that required producing a feasibility study for addressing the regulatory requirements of the existing uncovered finished water reservoirs. This study is a part of the ACO requirements.

This feasibility study was initiated with a detailed review of PVWC's existing open reservoirs and distribution system. All relevant reports, maps, flow data, studies, and documents prepared by or for PVWC were reviewed. Reservoir sites and associated facilities were field investigated, along with meetings held with PVWC personnel to discuss standard operating and maintenance procedures. Following the completion of this review, Technical Memorandum #1 has been prepared and included herein.

Once the detailed review of the PVWC system was completed, it was then critical to set the criteria necessary in developing the various alternatives available to the PVWC. Review of power outage, existing plant and pump station power systems, backup power, reliability, emergency interconnections with other utilities, ability to transfer water during emergencies for each reservoir, and verification of previous emergency reserve, fire reserve, and demand equalization for the entire system were all part of setting the criteria phase of the project. This also included establishing the minimum storage requirements for PVWC operations. The treatment plant operations and capabilities, including reliability and redundancy, and back-up power capabilities were all reviewed and analyzed, as well.

Boundary, Topographic and Bathymetric surveys were performed for Great Notch, New Street and Levine Reservoirs. Boundary surveys of the Commission-owned properties have been prepared for each reservoir. New aerial photography was performed in order to prepare topographic and planimetric mapping of the three (3) reservoirs. A bathymetric survey of the three (3) reservoirs was also performed in order to map the bottom of the reservoirs. The bathymetric contours were then merged with the land survey and topographic information to provide a complete set of accurate topographic drawings for each reservoir. This information was critical in developing the various alternatives for each reservoir site, including the calculation of storm water runoff, and determining construction cost opinions.

A Phase 1A Cultural Resource Survey was performed for the three (3) reservoirs by Richard Grubb & Associates (RGA), a subconsultant to TYLIN Medina. In reference to the Great Notch Reservoir, a Phase IB cultural resources survey is recommended for terrestrial archaeological resources. In addition, drowned or submerged archaeological resources could be present in the Great Notch Reservoir. The potential for impacts on

such resources should be considered in project planning. Should former upland surfaces be exposed and impacted by the undertaking, a Phase IB cultural resources survey is recommended to determine the presence or absence of archaeological resources. An intensive-level survey of the Great Notch Reservoir is recommended to assess the National Register eligibility of the reservoir. If the reservoir is determined eligible, then the effects of the alternatives on the Great Notch Reservoir will need to be assessed.

Prior to the construction of the New Street Reservoir, the original topography in the APE-Archaeology appears to have included upland areas containing level, well drained soils and it is possible that drowned or submerged archaeological resources could be present within the current reservoir footprint. The potential for impacts on such resources should be considered in project planning. Should former upland surfaces be exposed and impacted by the undertaking, a Phase IB cultural resources survey is recommended to determine the presence or absence of archaeological resources. A review of National Register files at the HPO revealed one property previously determined eligible for the National Register in the APE-Architecture, Garret Mountain Park (SHPO Opinion: 10/26/1979; DOE: 1/30/1980). The alternative under consideration in the feasibility study will have no adverse effect on Garret Mountain Park, provided that the vegetative buffer between the reservoir and the park is enhanced through planting of additional trees along Mountain Avenue. An intensive-level survey of the New Street Reservoir will likely be required by the HPO to assess the National Register eligibility of the 85-year-old reservoir. If the New Street Reservoir is determined eligible for the National Register, then the effects on the project will need to be assessed.

In reference to the Levine Reservoir, background research revealed that the APE-Architecture lies within the Great Falls/Society for Useful Manufactures (SUM) Historic District, which is both listed on the State and National Registers of Historic Places and as a National Historic Landmark (SR 5/27/1971; NR 4/17/1970; Addendum SR 10/15/1974, NR 1/8/1975; NHL 5/11/1976). It is the opinion of RGA that the circa 1885 Levine Reservoir contributes to the significance of the Great Falls/SUM Historic District. As a result, consultation with the HPO to minimize project effects on the historic district through context-sensitive design and/or enhancing vegetative buffers on the property is recommended. Recordation of the reservoir to Historic American Engineer Record standards may also be required prior to construction.

In this study, a detailed and structured decision analysis process was utilized to identify, evaluate and select the preferred alternative. All aspects of this decision were identified, including the decision makers and the criteria to be used. Alternatives, such as reservoir covers and liners, new storage facilities at the reservoirs, treatment of the reservoirs, addition of standby power, and a combination of these alternatives were all reviewed and analyzed. As a result, eight (8) alternatives were developed through various workshop meetings with the PVWC project team.

The evaluation criteria utilized for each of the eight (8) alternatives in the feasibility study included reliability, regulatory acceptance, water quality, and constructability. The alternatives were then ranked based on the ratings that were assigned to the criteria attached to the alternatives.

A Preliminary Budget Analysis was then performed using preliminary costs developed for each of the options. A total cost for each alternative was developed and based on the criteria rankings, in combination with the relative costs, the alternatives were then reduced down to two alternatives.

The final selection process involved a hard look at the advantages and disadvantages along with the cost opinions where Alternative 7 became the final selected alternative. The total life cycle cost opinion for Alternative 7 is \$116,600,000 in net present value.

The following is a listing of the major components of Alternative 7:

1. Great Notch Reservoir
  - a.) Two (2) - 20 mg prestressed concrete storage tanks, 365 feet in diameter, High WSEL = 447.5 feet, Low WSEL = 422 feet
  - b.) Demolition of existing dam
  - c.) Access road
  - d.) Miscellaneous piping modifications
  - e.) Appropriate stormwater facilities
2. New Street Reservoir
  - a.) Two (2) - 15 mg prestressed concrete storage tanks, 255 feet in diameter, High WSEL = 330 feet, Low WSEL = 290 feet
  - b.) Demolition of existing dam
  - c.) Access Road
  - d.) Miscellaneous piping modifications
  - e.) Appropriate stormwater facilities
3. Levine Reservoir
  - a.) Two (2) - 2.5 mg prestressed concrete storage tanks, 160 feet in diameter, High WSEL = 192 feet, Low WSEL = 175 feet
  - b.) Access drive with parking area
  - c.) Reservoir isolation wall
  - d.) Miscellaneous piping modifications
  - e.) Appropriate stormwater facilities
4. Back-up Power at the Little Falls Water Treatment Plant
  - a.) Four (4) 2,500 kW generators
  - b.) New generator and switchgear building
5. Great Notch Pump Station
  - a.) Add a third pump to existing station (12 mgd total firm capacity)
6. New Street Pump Station
  - a.) Two (2) Horizontal split case pumps (8 mgd total firm capacity)
7. New Verona Tank
  - a.) 1 - 2 mg tank, 40'H X 92' Diameter) - Matches existing tank

## 8. Miscellaneous systemwide upgrades

A complete project schedule has been prepared and included at the end of this Executive Summary. The schedule lists all facets of the project, from the NJDEP approval of the feasibility study, through conceptual design, final design, permitting, NJEIT funding process, the bidding of the individual project components, including the construction duration. This schedule is also in line with the scheduling contained in the rate impact analysis performed on the selected alternative and provided herein.

It must be noted that the adherence to this schedule will be dependant on numerous factors that are beyond the control of the Passaic Valley Water Commission. Factors such as construction sequencing, coordination with the City of Newark's Cedar Grove Reservoir project schedule, public interests, regional water supply issues, weather conditions, and permitting issues may or may not affect the outlined schedule.

In regards to stormwater and environmental impacts of the selected alternative, a permit coordination meeting with the NJDEP was held on August 11, 2010, where permits and stormwater management measures were discussed. NJDEP will require that all stormwater measures adhere to the upcoming revised regulations. Additional input from local municipalities will need to be pursued where local review and approval of the proposed stormwater measures will be necessary.

NJDEP is requiring that all post-development conditions adhere to the NJ Stormwater Management Rule N.J.A.C. 7:8. Stormwater Management Measures should be implemented to address stormwater runoff quality and quantity. NJDEP will not require groundwater recharge due to existing reservoir bottom conditions (bedrock).

NJDEP permits and applications presently expected to be obtained are Flood Hazard Area Applicability for Levine Reservoir, Letter of Interpretation (Verification) for all three reservoir projects, Flood Hazard Area Individual Permit for New Street and Great Notch Reservoirs. Individual Wetlands permits for New Street and Great Notch Reservoirs. Dam Construction Permit (Removal) for New Street and Great Notch Reservoirs. Historic Preservation Office permit for Levine Reservoir.

New Jersey Flood Hazard Area regulations have jurisdiction over all streams that drain over 50 acres. Any modification of a channel or construction within a floodplain will require a permit. Any modification of freshwater wetlands, including the destruction of wetlands that occurs when a lake is drained due to dam removal, will require a wetlands permit issued by the NJDEP Bureau of Land Use.

In relation to the Newark/Great Notch Alternative, other options are being considered concurrently with this study to explore shared projects with the City of Newark and other purveyors which may or may not have any impacts on the selected alternative.

Public involvement pertaining to the selected alternative will be addressed once this feasibility study has been approved by the NJDEP and during the conceptual design phase of this project.