MADISON Indiana

# WATER UTILITY IMPROVEMENTS MASTER PLAN


***Presented by:***
***Robert M. Bellucci, P.E.***

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COMMONWEALTH ENGINEERS, INC.

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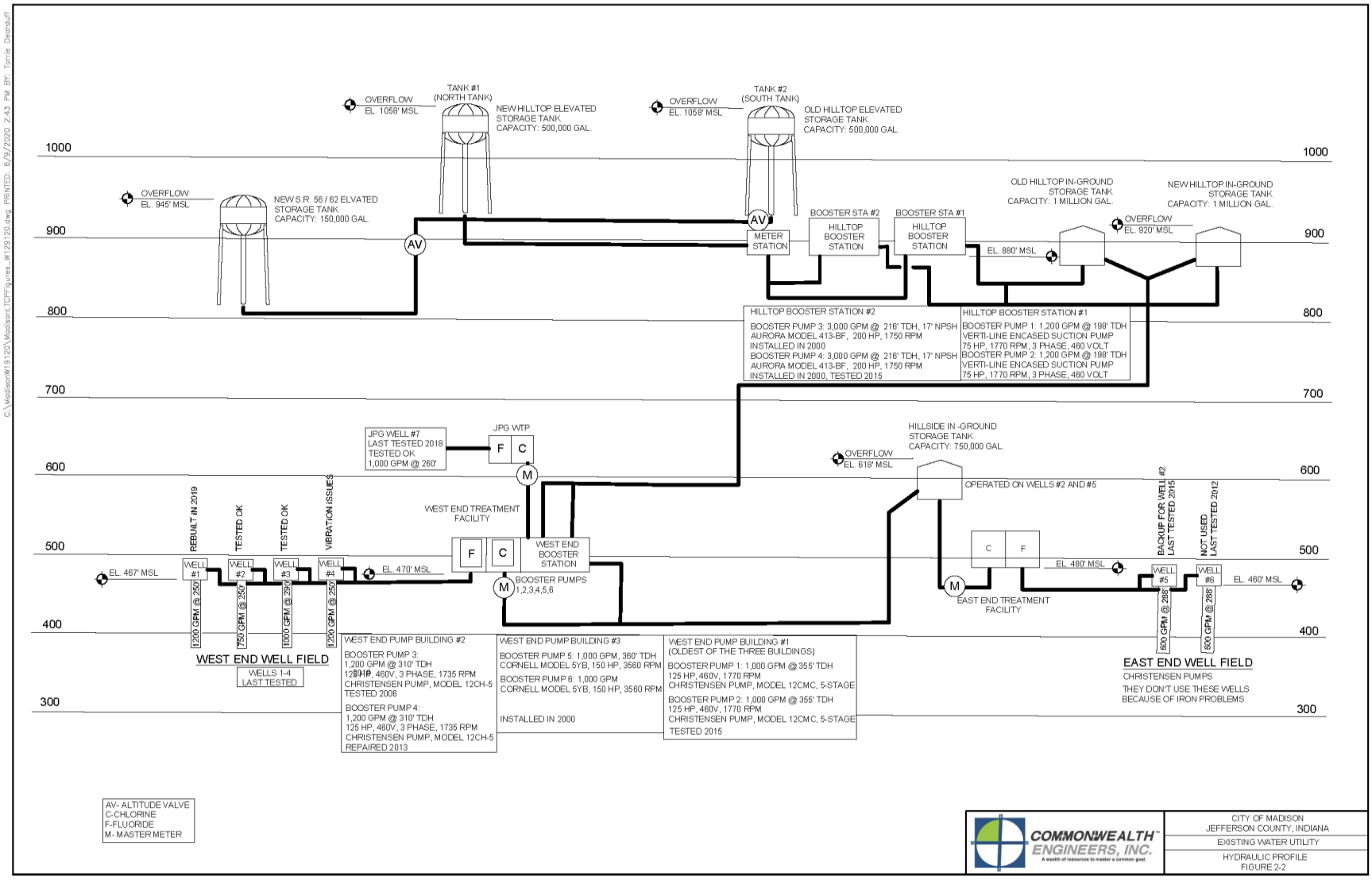
# Purpose / Goal

- The fundamental purpose of a Drinking Water Utility is to provide a safe, reliable water supply, which is adequate in terms of quantity, delivery, pressure, and is aesthetically pleasing and affordable to the Utility's customer base.
- Commonwealth Engineer's Inc. (CEI) was retained by the City of Madison (CITY) to assemble a Water Utility Master Plan / Preliminary Engineering Report which evaluated the condition of the existing water utility infrastructure and identify areas of necessary infrastructure improvements while taking into consideration the future needs of the Utility. The results of this evaluation provide a recommended course of action to ensure the quality and reliability of the City's drinking water facilities.
- We are seeking the City Council's concurrence to allow the Board of Public Works to make application to the Indiana Finance Authority's Drinking Water State Revolving Fund (SRF) Program. The purpose of this application is to identify the best possible funding scenario that can be offered by the State in support of needed Water Utility Infrastructure Improvements. Acceptance of the City's application by the SRF program in no way commits the City to acceptance. Once a proposed funding package is offered by the SRF, the City will have the opportunity to evaluate and make a decision as to whether or not the offer, as presented, will be acceptable.

# Existing Facilities

- The City's water utility infrastructure consists of seven (7) groundwater production wells, three (3) treatment facilities, six (6) storage tanks, five (5) booster pump stations, and nearly 600,000 LF of water mains ranging in size from 2-inch to 16-inch diameter. Water main materials of construction include PVC, cast iron (CI), ductile iron (DI), and asbestos cement (AC).
- Much of the City's existing water main distribution system dates back to the early 1950's and has reached the end of its useful life. Many of these existing water mains are undersized to support current demands and emergency conditions.
- The City's water supply wells and treatment facilities were originally constructed in the 1950's (Well Nos. 1,2) and 1980's (Well Nos. 3, 4, 5, 6) and the JPG Well (No. 7) was constructed in 2000. Most of the electrical components are from the original construction and replacement parts are no longer available. Upgrades to the existing electrical and control systems are needed to improve overall operational efficiency and reliability. The chemical feed equipment at the treatment plant sites has reached or exceeded the end of their useful life and are recommended for replacement. Master flow meters for each supply well are recommended to afford Utility Staff better control and avoid unnecessary wear and tear on any single supply well as well as affording better accountability with respect to overall system water loss.

# Existing Facilities



# Chronology

- Well Nos. 1 & 2 (West End) were constructed in 1953.
- Well Nos. 5 & 6 (East End) were constructed in 1980.
- Well Nos. 3 & 4 (West End) were constructed in 1982.
- Well No. 7 (JPG) & the associated treatment plant was constructed in 2000.
- The original downtown Hillside storage tank was constructed in the 1860's. The remaining tanks were added during the 1980's, 90's, and early 2000's.
- Much of the City's existing distribution system piping network was installed in the early to mid 1950's.

# Chronology

- The last major infrastructure improvements project for the City's storage facilities was completed in 2001.
- The last adjustment to user rates was adopted in 2008 / 2009.
- In 2016, the City participated in a State-sponsored Utility Infrastructure Needs Survey.
  - The State used the results from this survey to plan for anticipated future funding needs to support and maintain these facilities.
- In 2019, the City retained Commonwealth to develop a Water Utility Asset Management Plan.
  - Inclusive of a complete asset inventory, criticality analysis, and hydraulic model of the distribution system.
- In January 2020, the Indiana Department of Environmental Management (IDEM) completed an inspection of the City's water utility and noted deficiencies at the existing storage facilities.
- In late 2020, the City completed an extensive inspection of all six (6) water storage tanks.
- In 2021, Commonwealth completed the current Water Utility Master Plan.

# Asset Management and Utility Master Plans

- The purpose of a Water Utility Asset Management Plan is to ensure long term sustainability of the Utility.
- Effectively managed Utilities are more efficient, less fiscally volatile, and have a reduced risk of system failure.
- Master Plans function as a “Road Map” for Utilities to identify existing infrastructure improvements needed to support day to day operations and budget for large capital expenditures required to accommodate planned future growth.

# Project Approach

- CEI worked closely with the City's Utility staff to prioritize specific areas within the distribution which require immediate attention. The areas selected (Flint Road, Hillcrest Drive, Sunrise Drive, Franks Drive, and East Street) consist of a combination of undersized, AC, and CI water mains that are subject to frequent main breaks and constantly in need of repair. In order to reduce the frequency of outages, improve fire flow conditions, and eliminate older / undersized sections of AC and CI water mains, it is recommended to replace the water mains in these areas with larger 6-inch and 8-inch PVC water mains. In addition to water main replacement, there are over thirty (30) fire hydrants within the distribution that are recommended for replacement. Historically Utility staff has painted fire hydrants black if they are unable to produce sufficient flows for fire protection needs. The recommend project will include an allowance for targeted fire hydrant replacement.

# Project Approach

- The City completed an extensive evaluation and inspection of all six (6) water storage tanks in 2020. The results for each tank inspection are included as Appendix H to the Master Plan and recommendations for each site are incorporated into the proposed project. Representative improvements include tank cleaning, sandblasting, painting, along with safety upgrades (OSHA) and access modifications (confined space) for each location.
- In support of assembly of the Asset Management Plan, extensive site inspections of all the Utility's electrical and controls components was completed. Much of the existing electrical infrastructure dates back to the original construction of each component and as such has reached or exceeded the end of its individual useful life. The recommendations outlined in the City's Master Plan include upgrading these facilities to current day standards and codes.

# Recommended Project

- **Phase 1**
  - **Water Storage Improvements**
    - Complete rehabilitation of all six (6) water storage facilities inclusive of controls upgrade.
  - **Water Treatment Improvements**
    - New master flow meters.
    - New permanent emergency generator at the Hilltop Booster Site.
    - Updated WTPs at JPG well field as well as the West End well field. Complete with new electrical, controls, in-kind rehabilitation of gas chlorine equipment, and fluoride injection equipment.
    - New integrated controls that will automate the treatment process.
    - New Energy-efficient variable frequency drives.
  - **Primary Water Main Replacement**
    - Installing new 6-inch and 8-inch transmission mains to replace existing transmission mains along Flint Road, Hillcrest Drive, Sunrise Drive, Franks Drive, and East Street. This will provide a greater capacity for fire flow as well as reduce water main breaks in the system. The recommended improvements are inclusive of new fire hydrants and isolation valves.
    - Materials for customer meter replacement.

# Estimated Project Costs

| Work Item | Total Cost |
|---|---|
| **Construction Costs** | |
| Water Utility Improvements | $9,703,000 |
| Construction Contingency (10%) | $970,300 |
| **Subtotal, Estimated Construction Costs:** | **$10,673,000** |
| **Estimated Non-Construction Costs** | |
| Design | $825,000 |
| Bidding | $35,000 |
| Construction Engineering | $175,000 |
| Post-Construction Assistance | $10,000 |
| Inspection | $300,000 |
| Field Work/Survey | $50,000 |
| Geotech | $25,000 |
| Regulatory Assistance | $30,000 |
| Asbuilts | $25,000 |
| Start-up Assistance | $10,000 |
| Erosion Control Plan | $10,000 |
| Legal/Financial Assistance | $20,000 |
| Fiscal sustainability Plan | $5,000 |
| American Iron & Steel | $10,000 |
| Water Model Update | $15,000 |
| Labor Standards | $16,500 |
| Legal Council | $20,000 |
| Bond Council | $36,000 |
| Rate Consultant | $30,000 |
| IBB Fee | $20,000 |
| **Subtotal, Estimated Project Cost** | **$1,667,500** |
| **Total Estimated Project Cost:** | **$ 12,340,800** |

# Next Steps

- Submit application for project funding to the Indiana Finance Authority's Drinking Water State Revolving Loan Fund (DWSRF) Program.
  - DWSRF has specific requirements for inclusion within funding application submittal packages:
    - Public Meeting Documentation (proof of publication; minutes; sign-in sheet)
    - Two (2) separate resolutions for PER project acceptance and authorized project signatory
- Review existing user rates and identify potential impacts associated with project funding package offered by the DWSRF.
- Conduct Public Meeting to present proposed rate impacts.
- Adopt proposed rates and close on project financing.
- Transition to construction phase activities (fall of 2022).
- Anticipate construction completion by early 2024.

# In Conclusion

- The fundamental purpose of a Drinking Water Utility is to provide a safe, reliable water supply, which is adequate in terms of quantity, delivery, pressure, and is aesthetically pleasing and affordable to the Utility's customer base.
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# QUESTIONS

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