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To:	Allison Swisher	From:	Joe Johnson, Brian Kazyak, Emily Saban
	City of Joliet		Stantec
File:	mem_oper_staff_20201119.docx	Date:	November 19, 2020

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**Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020****Introduction**

Joliet is working to complete an evaluation of two alternatives for the development of a new water source by the year 2030. The alternatives being evaluated include:

- Lake Michigan Water – Chicago Department of Water Management (CDWM) Alternative, which involves the purchase and transmission to Joliet of treated water from CDWM.
- Lake Michigan Water – New Indiana Intake Alternative which would involve the construction of a new water supply system including a new Lake Michigan intake in Indiana, a new surface water treatment plant, and transmission infrastructure to deliver the water to the City of Joliet.

Presently the City of Joliet Department of Public Utilities is responsible for the operation and maintenance of 26 groundwater wells, 11 treatment plants and pumping, storage, and conveyance infrastructure within Joliet's water distribution system. Regardless of the alternative source option selected, implementation of the associated improvement program will require adjustments to the operational approach and organizational structure of Joliet's current Department of Public Utilities.

This memo describes the general nature of the adjustments in operation and staffing that are anticipated to be required as Joliet works to implement the selected alternative source option. It is recognized that operations and maintenance roles within the Department of Public Utilities are governed by negotiated labor agreements. The adjustments presented in this memo are intended to provide a conceptual basis for comparison between the two new source alternatives being considered by the City; they are not intended as formal proposals for changes to job descriptions or responsibilities defined in the City's existing labor agreements.

**Background Information**

The City of Joliet Department of Public Utilities is responsible for the water and wastewater infrastructure that serves residents, institutions, businesses, and government facilities throughout the City of Joliet. The Department is currently the largest entity in the State of Illinois that provides all four key water and wastewater services: 1) water treatment, 2) water distribution, 3) wastewater collection, and 4) wastewater treatment.

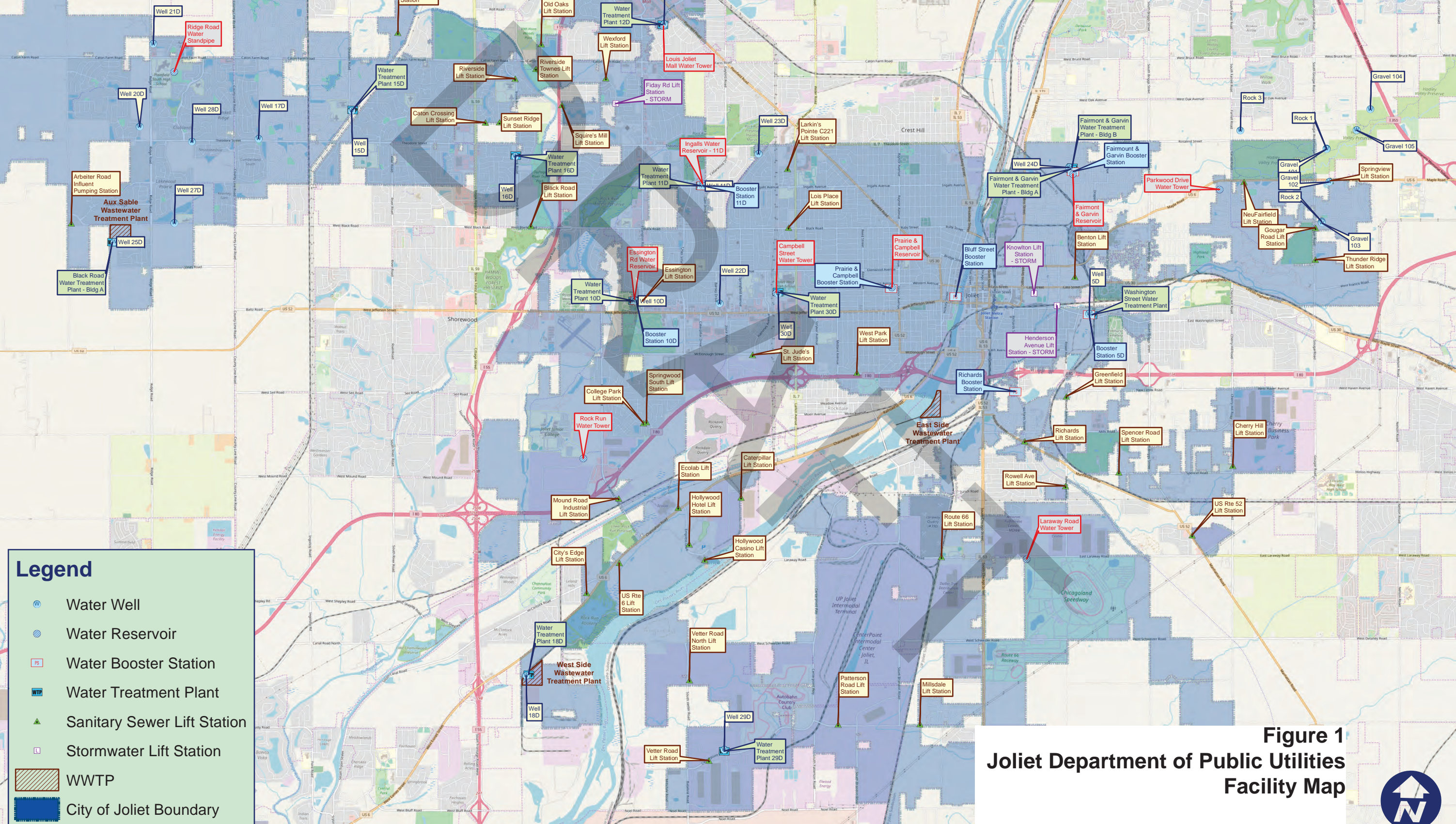
Currently a team of four managers and 78 full-time equivalent staff working under the direction of the Director of Public Utilities operate and maintain the City's 26 groundwater wells, 11 treatment plants, and approximately 665 miles of water distribution main, as well as three wastewater treatment plants, 41 wastewater pumping stations, 594 miles of sanitary sewer, and 551 miles of storm sewer. Figure 1 shows the general distribution of existing Public Utilities' facilities across the City of Joliet. Figure 2 is an overview of the organizational structure of the Department. More detailed organization charts for the teams overseen by each of the four managers are included as Figures 11 through 14 at the end of this memo.



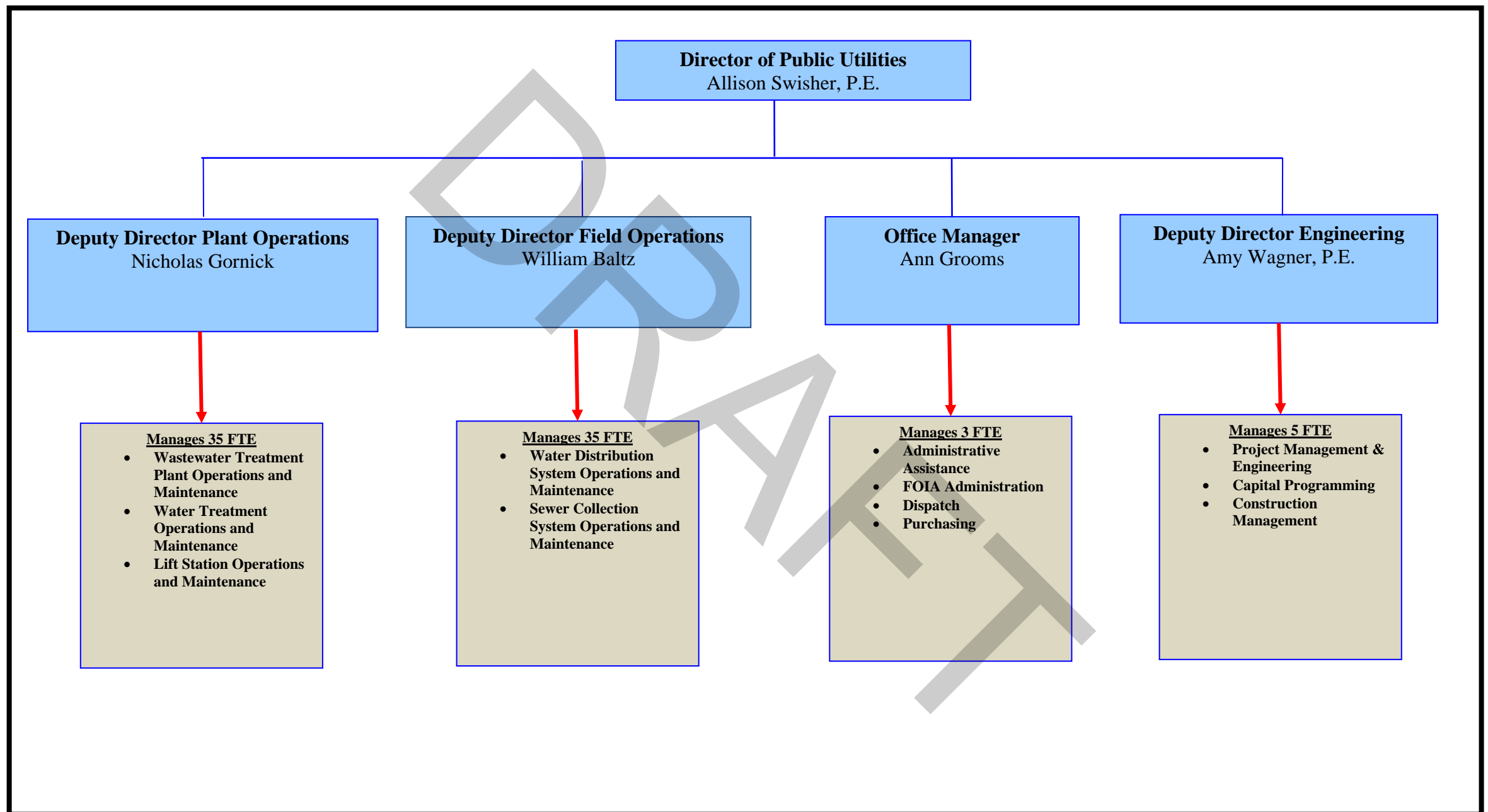


# FACILITY MAP

## PUBLIC UTILITIES DEPT







Source: City of Joliet Department of Public Utilities

**Figure 2**  
**Joliet Department of Public Utilities**  
**Organizational Overview**

Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020

Within the Department, most personnel and responsibilities are assigned separately to water and wastewater infrastructure, except in the case of extreme conditions or emergency obligations. Within the Department, 28 staff are specifically assigned to the water system. This staff includes a Chief Water Plant Operator (Class A license) and four Water Plant Operators (Class C license) who share responsibility for operation of the 11 decentralized water treatment plants. A separate team of operators is responsible for the operation of the City's three wastewater treatment facilities: 3 Chief Wastewater Plant Operators (Class 2 license), 10 Wastewater Plant Operator IIs (Class 3 license), and 4 Wastewater Plant Operator Is (Class 4 license). Through the use of a rotating schedule of weekday, overnight, and weekend assignments, and a patterned schedule of days on/days off, the City is able to provide 24 hour/7 day per week/365 day per year coverage with a minimum of two operators on duty.

Water system operations are currently monitored and controlled from the City's Central Control Center at the East Side Wastewater Treatment Plant (WWTP). Key control activities within the existing water system include selection of well pumps required to meet demands, monitoring/adjustment of water treatment plant operations, and monitoring/adjustment of pumping operations as required to maintain desired service pressures and water levels in storage facilities. Water Plant Operators visit the City's water treatment plants regularly to assess/document conditions, adjust operations, and collect water quality samples.

#### **Operations and Staffing Evaluation Approach**

As Joliet considers its options for bringing Lake Michigan water to its customers, important questions must be answered:

- What changes in operational philosophy or approach will be required to support operation and maintenance of the new infrastructure associated with the water source alternatives? What different changes will be required depending upon the alternative selected?
- What adjustments in Department of Public Utilities organizational structure and/or staffing capacity will be required to support design, construction, start-up, and long-term operation and maintenance of the new infrastructure associated with the selected water source alternative? Will the required adjustments differ depending on the alternative selected?

The balance of this memorandum presents a high-level description of the anticipated operational and staffing adjustments associated with each of the water source options. The purpose of this analysis is to provide a consistent, objective comparison of the changes that would be associated with each option. Once an option is selected, assumptions and conclusions regarding operational and staffing requirements will be revisited and refined in conjunction with preliminary design efforts.

It is also important to note that for the purpose of this comparison, the overall staffing requirements associated with the proposed alternative water source infrastructure and the City of Joliet's existing water distribution system infrastructure are considered. Since Joliet's intent is to pursue the formation of a regional water commission to drive the development, implementation, and eventual operation of major components of the new alternative source system, actual operational and staffing responsibilities may be divided between Joliet's Department of Public Utilities and the future water commission. Decisions regarding the future division of responsibilities between the Department of Public Utilities and the proposed water commission will be made as efforts related to commission formation proceed during 2021.

Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020

### **Lake Michigan Water - Chicago Department of Water Management Alternative**

Under the Lake Michigan Water - CDWM Alternative, Joliet will assume responsibility for the operation and maintenance of new water transmission infrastructure including: a new suction well and pump station at the Chicago connection point (within the City of Chicago), an intermediate pumping station, 31 miles of new transmission main from Chicago to Joliet, new pumping and storage facilities at the existing Public Utilities site at Fairmount and Garvin, and new transmission system SCADA and communications equipment. Approximately 20 million gallons of new water storage volume and associated pumping facilities will also be added to the system at multiple locations within the City. Joliet's existing groundwater treatment plants will be abandoned, but the existing wells will be maintained to provide backup water supply should there be an extended outage in the CDWM supply, pump stations, or transmission main. To maintain wells as part of the backup supply, Public Utilities staff will need to run each well for approximately one hour and collect a water quality sample one time per month. Figures 3 through 6 show the anticipated configuration of the new facilities associated with the 30 MGD (Joliet Only) and 60 MGD (Regional Supply) versions of the CDWM Alternative.

Operations of the new infrastructure will be coordinated with the operation of Joliet's existing water distribution system. New instrumentation, control, SCADA, and communications equipment will be installed at the proposed facilities to enable operators to monitor and control the transmission system from the City's Central Control Center. The current conceptual design for the CDWM Alternative also includes the installation of fiber along the transmission main to allow for real-time video monitoring of conditions at these remote facilities. The facilities making up the CDMW Alternative transmission main and distribution system will be considered a Class C community water supply per Illinois Title 35 Administrative Code (35 IL. Admin Code) Section 681.200 since the facilities include pumpage, storage, and distribution facilities as well as chemical addition. As such the facilities must be supervised, at a minimum, by an operator with a Class C certification.

While implementation of this option will add major components to Joliet's inventory of water facilities, the new pumping, storage, and local distribution infrastructure will be generally similar, both mechanically and in terms of the type of the assets, to the City's current water infrastructure. The operator certification/licensure held by the current Water Plant Operators will be sufficient for operating the CDWM Alternative system (Class C community water supply). In addition, the time and effort required of the City's water plant operators for operation of the existing wells and groundwater treatment plants will be greatly reduced by the conversion of wells from primary source to backup supply and decommissioning of the water treatment plants. As such, it is expected that the City will be able to provide for the operation and maintenance of the new transmission facilities associated with the CDWM Alternative by assigning responsibility for the needed activities to its current Water Plant Operators. In effect, the responsibilities of the current Public Utilities staff assigned to the Plant Operations Team would simply shift from operation of the existing groundwater supply to operation of the new treated water transmission system, including daily visits to the new High Service Pump Station in Chicago and the Intermediate Pump Station located along the transmission main route. Between site visits, conditions at both pump stations will be monitored by operations staff in Joliet using the proposed SCADA and video monitoring capabilities. Public Utilities staff assigned to the Field Operations – Distribution Team would continue to be responsible for management and maintenance of Joliet's expanded water distribution system.

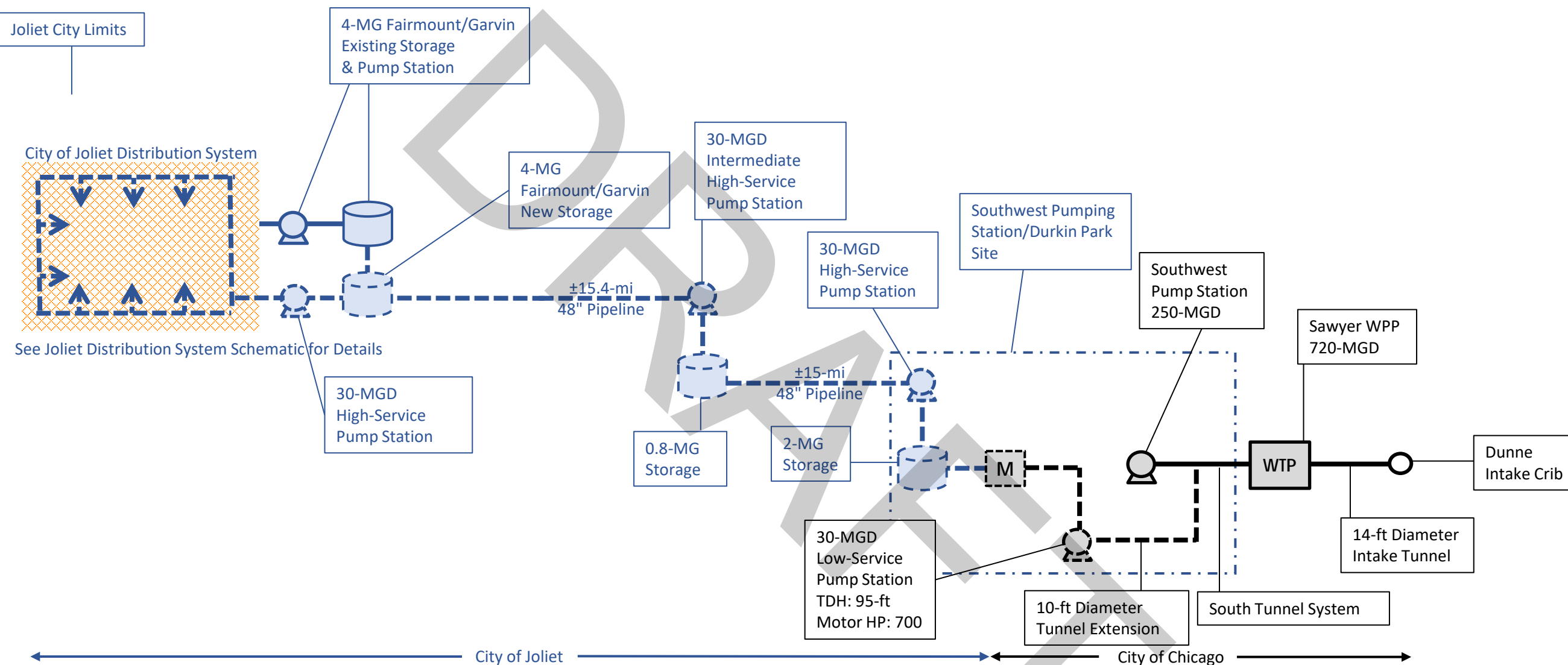
However, Joliet does not currently have and does not intend to develop the resources to support maintenance or repair of large diameter water transmission main. Therefore, the City of Joliet will need to establish an on-call service agreement with a specialized external contractor for the maintenance of the 48-inch to 60-inch diameter transmission main and valves between the City of Chicago connection and the City of Joliet. As part of the agreement, the contractor will be required to maintain the materials (including segments of pipe) and

Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020

equipment needed to promptly respond to and address maintenance needs along the transmission main system.

Through this process of staff transition and utilization of a specialized external contractor, it is anticipated that Joliet will be able to implement the Lake Michigan Water – CDWM Alternative without the addition of new operations or maintenance staff.

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Description	Water Treatment Plant	Water Storage Facility	Water Pumping Station	Water Pipeline	Water Metering Station	Raw Water Intake
Existing Infrastructure	WTP				M	
Proposed Infrastructure	WTP				M	

Figure 3  
Lake Michigan Water – CDWM 30 MGD  
Overall System Schematic

City of Joliet  
Alternative Water Source Program - 2020  
Operations and Staffing Memo  
Nov. 2020

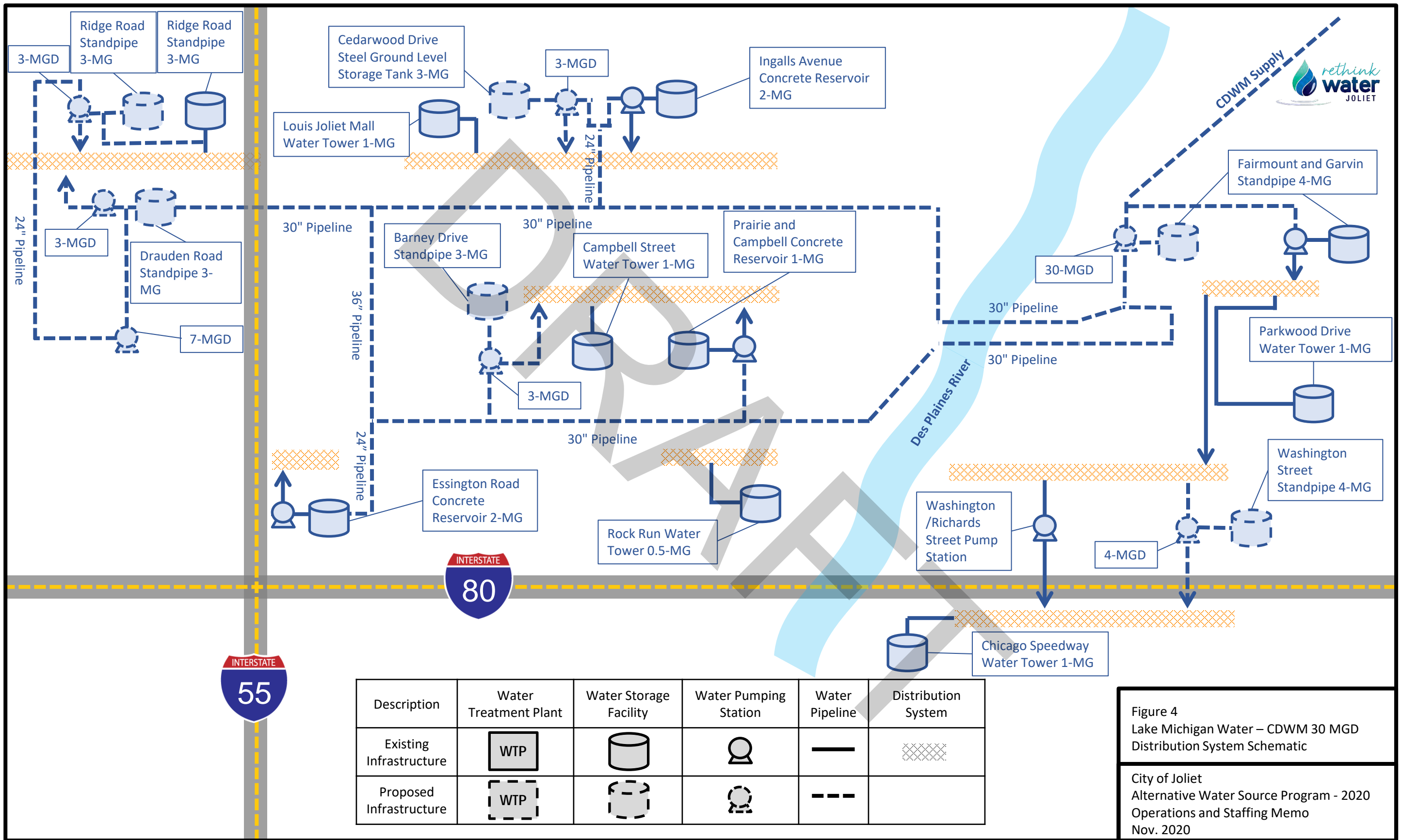
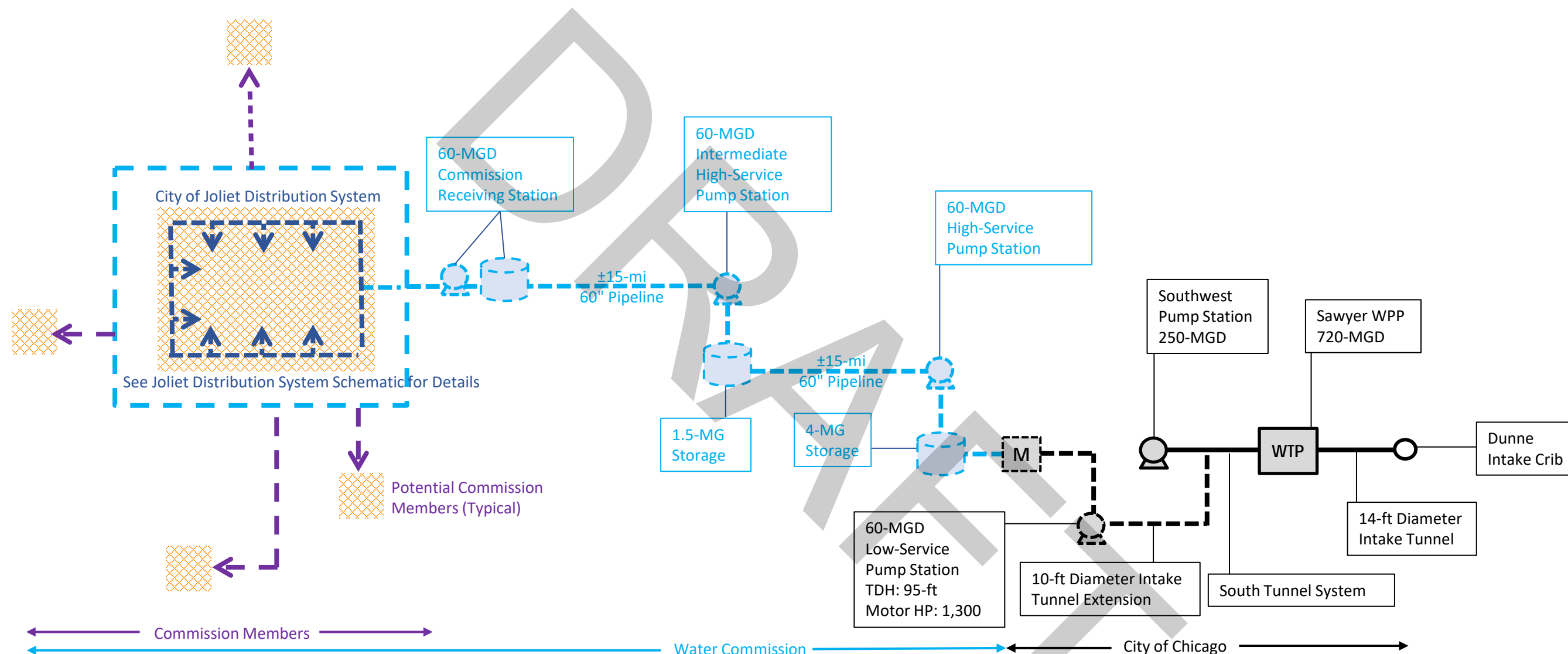


Figure 4  
 Lake Michigan Water – CDWM 30 MGD  
 Distribution System Schematic

City of Joliet  
 Alternative Water Source Program - 2020  
 Operations and Staffing Memo  
 Nov. 2020





Description	Water Treatment Plant	Water Storage Facility	Water Pumping Station	Water Pipeline	Water Metering Station	Raw Water Intake
Existing Infrastructure						
Proposed Infrastructure						

Figure 5  
Lake Michigan Water – CDWM 60 MGD  
Overall System Schematic

City of Joliet  
Alternative Water Source Program - 2020  
Operations and Staffing Memo  
Nov. 2020

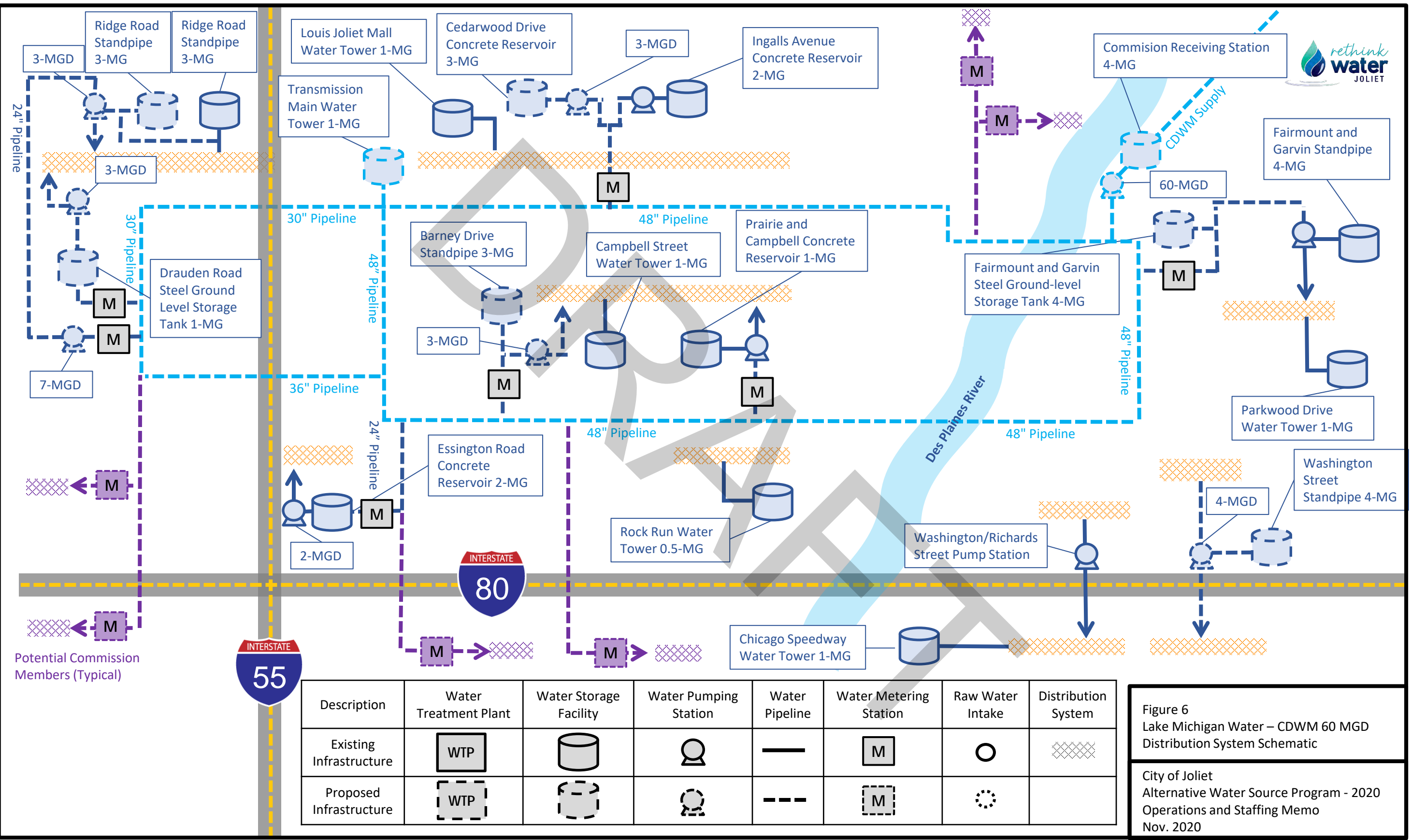


Figure 6  
Lake Michigan Water – CDWM 60 MGD  
Distribution System Schematic

City of Joliet  
Alternative Water Source Program - 2020  
Operations and Staffing Memo  
Nov. 2020

Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020

### **Lake Michigan Water - New Indiana Intake Alternative**

In contrast to the CDWM Alternative, the Lake Michigan Water - New Indiana Intake Alternative would introduce extensive new infrastructure responsibility to the City of Joliet Department of Public Utilities. In addition to the transmission conveyance, pumping, storage, SCADA infrastructure, and local distribution improvements required for the CDWM Alternative, the Indiana Intake Alternative will require construction of a new Lake Michigan intake and raw water pumping station in Northwest Indiana, approximately 16 miles of additional large diameter transmission main, and a new advanced surface water treatment plant. Earlier in 2020, City of Joliet staff and council members decided to incorporate advanced treatment capabilities into the conceptual design for the new water treatment facility to provide greater capabilities for treatment of emerging contaminants that may be regulated under future water quality standards.

As under the CDWM Alternative, Joliet's existing groundwater treatment plants will be abandoned and the existing wells will be maintained to provide backup water supply should there be an extended outage in the Indiana Intake supply, pump stations, transmission main, or treatment plant. To maintain wells as part of the backup supply, Public Utilities staff will need to run each well for approximately one hour and collect a water quality sample one time per month. Figures 7 through 10 show the anticipated configuration of the new facilities associated with the 30 MGD (Joliet Only) and 60 MGD (Regional Supply) versions of the New Indiana Intake Alternative.

It is assumed that the primary control center for the Indiana Intake Alternative and Joliet's water distribution system facilities would be based at the new surface water treatment plant rather than at the existing Joliet's East Side Central Control Center. This would allow for on-site monitoring and control of both the treatment system and the high service pumping equipment that will drive treated water through either the Joliet only distribution improvements or the regional water network. As under the CDWM Alternative, new instrumentation, control, SCADA, and communications equipment will be installed at the remote pumping facilities (Raw Water Pump Station, Intermediate Pump Station) to enable operators to monitor and control those elements of the transmission system from the water treatment plant. The Indiana Intake Alternative also includes provisions for the installation of fiber along the transmission main to allow for real-time video monitoring of conditions at the remote pumping facilities.

The need for a new lake intake and 30-60 MGD advanced surface water treatment plant as part of the New Indiana Intake Alternative differentiates this alternative from the CDWM Alternative. The new WTP will be a Class A facility as defined by 35 Ill. Adm. Code Section 681.200 as it will include coagulation and sedimentation processes. 35 Ill. Adm. Code Section 681 requires that a Class A certified operator supervise the operations of Class A facilities. In addition, a treatment facility of this size and complexity will require full-time operation and maintenance to monitor raw water characteristics, treatment process equipment performance, overall plant operations, and treated water quality. Based on this monitoring, 2 operators will need to be available 24 hours/7 days per week/365 days per year to adjust unit processes as required to produce reliable, high-quality treated water. The conceptual analysis of process options prepared earlier in 2020 for Joliet and input from current City staff suggest that the advanced water treatment plant would require a staff of 9 plant operators and support from 5 maintenance personnel (including one mechanic) to run, manage, and maintain the water treatment facility consistent with current practice at the WWTPs. The anticipated level of certification (license) for the 9 plant operations staff are as follows:

- 1 – Chief Operator or Operator in Charge with Class A Certification
- 4 – Level 2 Operators with Class B Certification
- 4 – Level 1 Operators with Class C Certification



Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020

Since the existing water treatment plants will be coming offline as part of the program, there may be an opportunity to shift current water production staff into the positions listed above. The City currently has one Chief Plant Operator with a Class A license and four operators with Class C licenses. Depending on how the City plans to operate its existing well system, some of this staff may be able to shift over to the new WTP. However, at this stage of the evaluation it is recommended that the City plan on filling 9 additional operator positions listed above in addition to the staff required to operate the backup well system. Additional training will likely be necessary for any of the current water treatment operators employed by the City who wish to be involved with operating the new WTP if they do not have previous experience operating a surface water treatment plant.

In addition to operation of the WTP and raw water transmission system (raw water screens, Raw Water Pump Station, and Intermediate Pump Station), the operations staff will also need to complete surface water source monitoring, which will expand the current monitoring operations of the existing ground water system. The IEPA requires that new sources of surface water be monitored on an approved schedule once the initial round of source water monitoring is complete. The initial round of source water monitoring will last 24 months per 35 Ill. Adm. Code Section 611.1001 and is expected to be completed prior to startup of the new WTP. The specific source water monitoring and schedule requirements after the initial round of monitoring are not known at this time as they will be dependent on the outcome of the initial round of monitoring. However, the source water monitoring requirements during operation of the WTP are expected to be similar to the requirements for the initial round of source water monitoring outlined below in Table 1.

**Table 1: Anticipated Source Water Monitoring Requirements**

Source Water Parameter	Monitoring Frequency
pH, Temperature, & Turbidity (measured with online instruments)	Continuous
E. Coli	Monthly
Cryptosporidium & Giardia lamblia	Monthly

The City would likely retain an electrician/IT technician on a contract basis to support the maintenance team. This position would be required along with the 14 new positions at the water treatment plant (nine new operator positions, and five new maintenance/mechanic positions) and the 5 staff needed for operation and maintenance of the additional transmission conveyance, pumping, and storage facilities including regular visits to the Raw Water Pump Station in Northwest Indiana and the Intermediate Pump Station located along the transmission main route. Even with the transition of Joliet's five existing water plant operators into some of these roles, it is anticipated that the City would need to increase its Plant Operations staff by as many as 14 positions to reliably operate the complete Indiana Intake system.

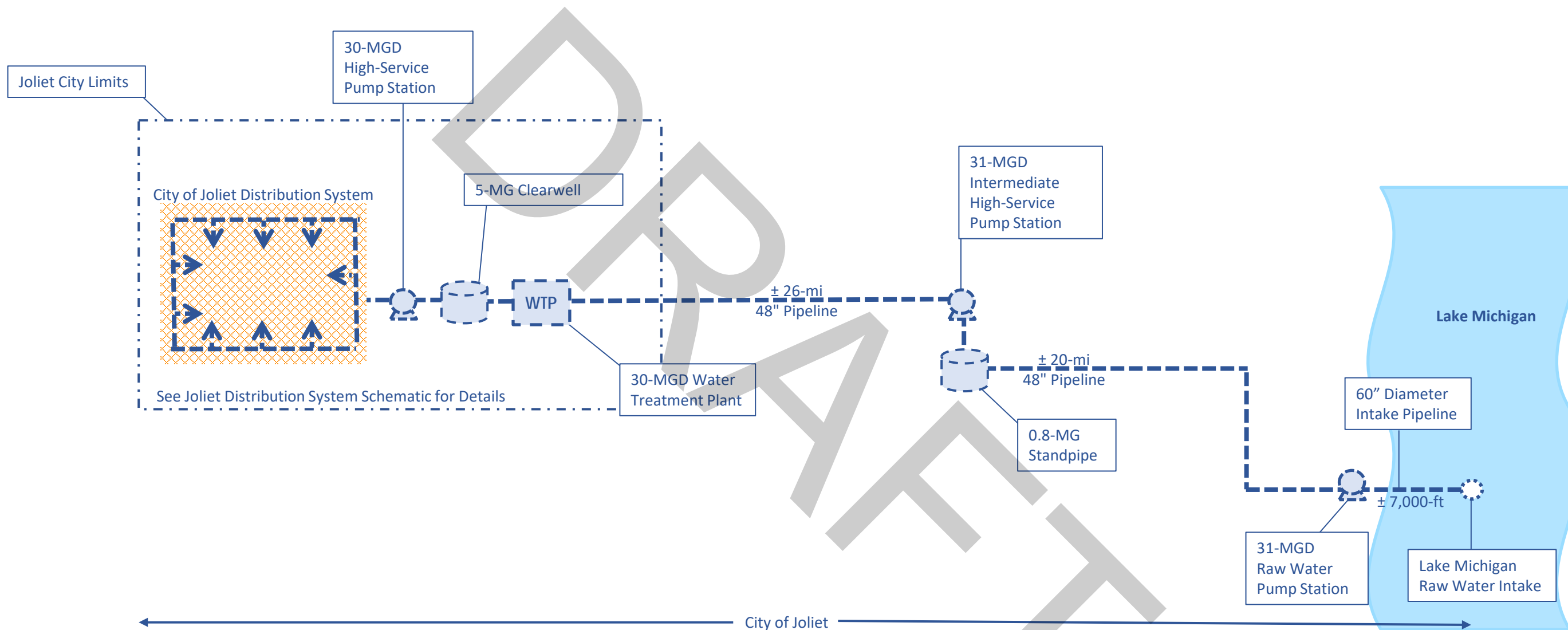
No additional on-site laboratory staff are anticipated at the new WTP or the Raw Water Pump Station. Required grab samples with simple analytical methods (e.g., turbidity, chlorine residual) will be performed by the duty shift operator. Samples requiring advanced analytical methods will be completed using the current laboratory technicians employed by the City or by an off-site laboratory similar to the current practice at the WWTPs.

Management and administrative duties associated with the new WTP will be completed by the current management/administrative personnel. It is anticipated that the new WTP Chief Operator will report directly to the Deputy Director of Plant Operations.

Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020

Should the Indiana Intake Alternative be selected, it is recommended that the City investigate filling the Chief Operator position during the design phase so that input from the operations perspective can be incorporated into the design of the facilities.

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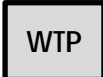





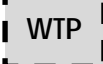





Description	Water Treatment Plant	Water Storage Facility	Water Pumping Station	Water Pipeline	Water Metering Station	Raw Water Intake
Existing Infrastructure						
Proposed Infrastructure						

Figure 7  
Lake Michigan Water – New Indiana Intake  
30 MGD - Overall System Schematic

City of Joliet  
Alternative Water Source Program - 2020  
Operations and Staffing Memo  
Nov. 2020



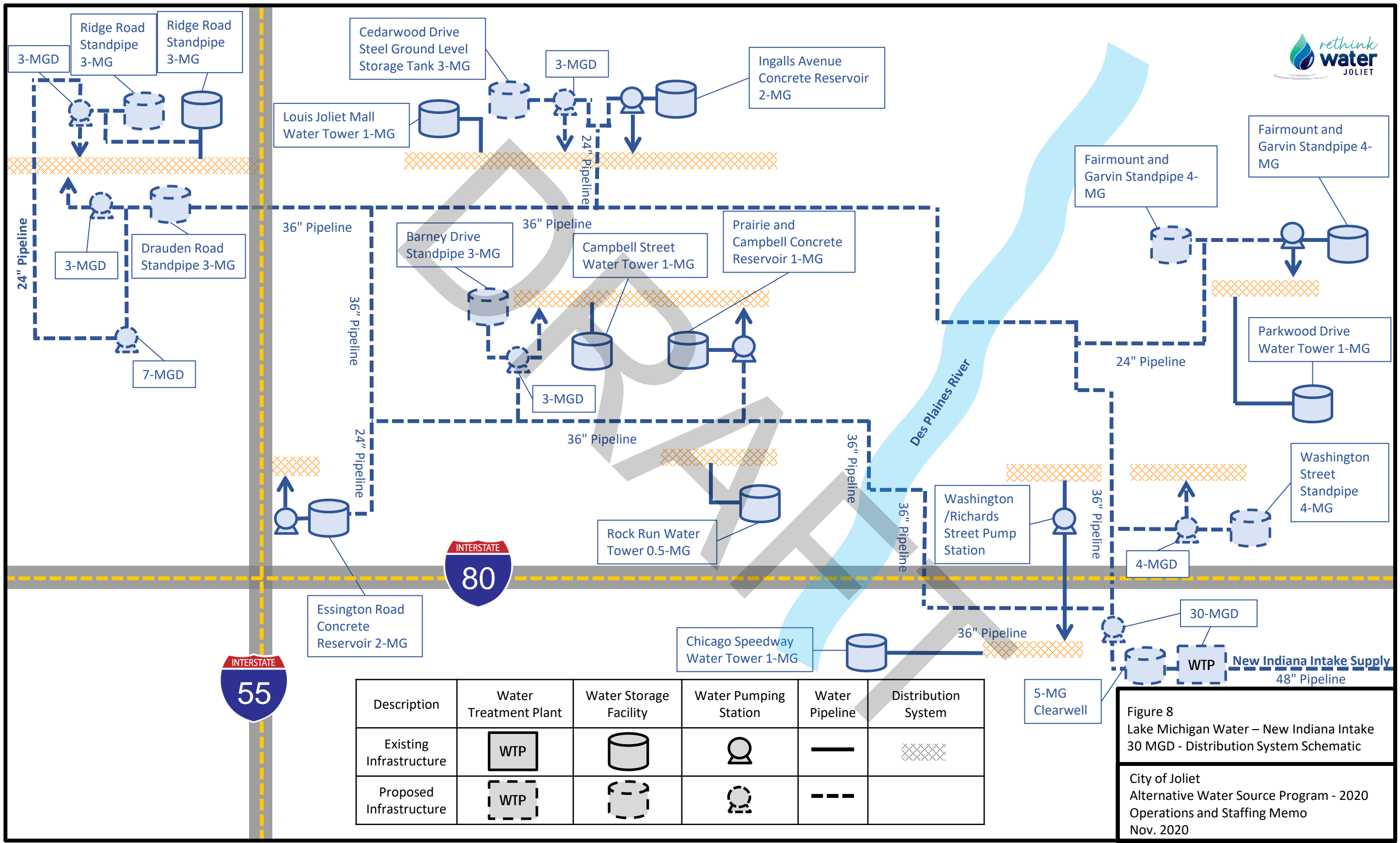
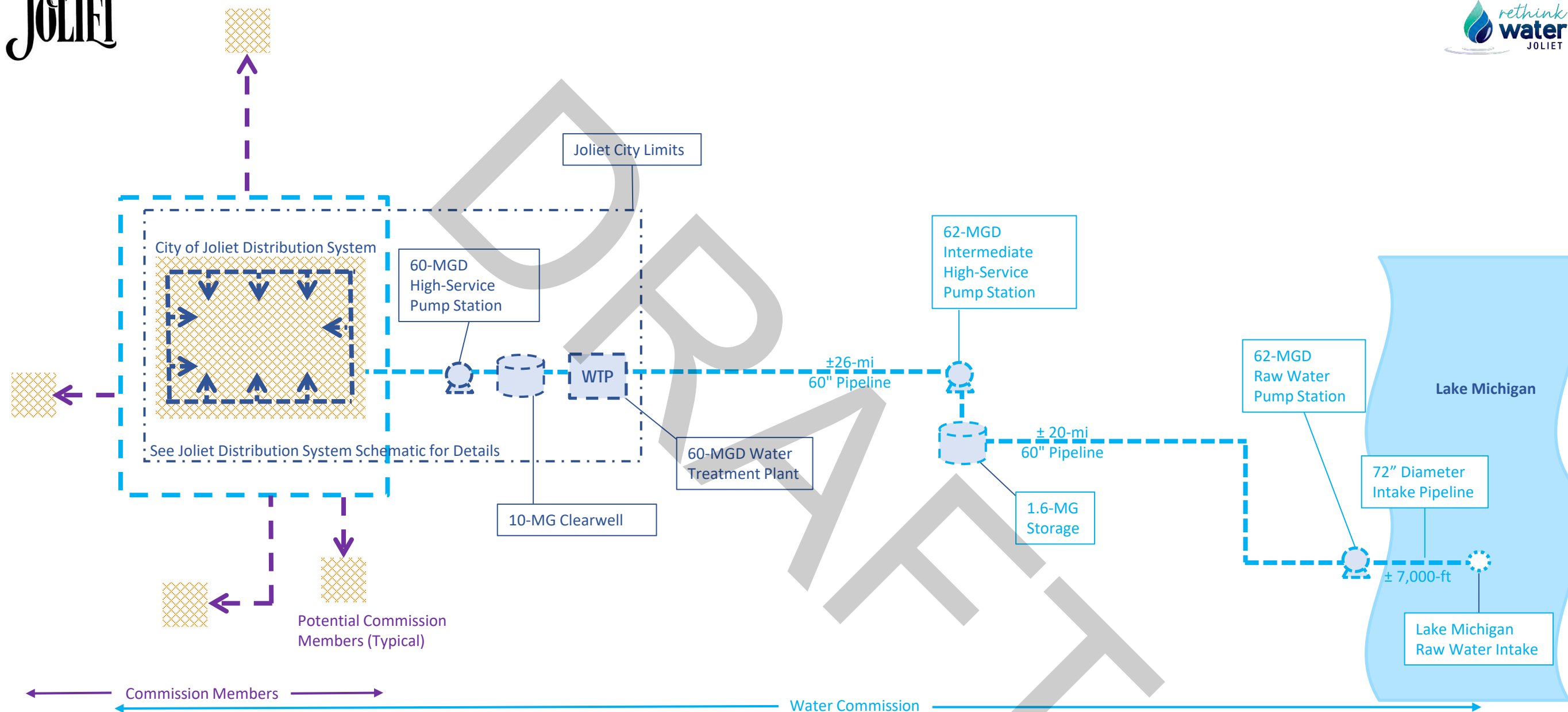


Figure 8  
Lake Michigan Water – New Indiana Intake  
30 MGD - Distribution System Schematic

City of Joliet  
Alternative Water Source Program - 2020  
Operations and Staffing Memo  
Nov. 2020



Description	Water Treatment Plant	Water Storage Facility	Water Pumping Station	Water Pipeline	Water Metering Station	Raw Water Intake
Existing Infrastructure						
Proposed Infrastructure						

Figure 9  
Lake Michigan Water – New Indiana Intake  
60 MGD - Overall System Schematic

City of Joliet  
Alternative Water Source Program - 2020  
Operations and Staffing Memo  
Nov. 2020





Reference: Operations Planning and Staffing Strategy, Alternative Water Source Program – 2020

Similar to the CDWM Alternative, Public Utilities staff currently assigned to the Field Operations – Distribution Team would continue to be responsible for management and maintenance of Joliet's existing water distribution system infrastructure under the Indiana Intake Alternative. Joliet would also need to supplement its in-house capabilities for water main maintenance and repair by establishing one or possibly two on-call agreements with specialized external service contractors for the maintenance of the 48-inch to 60-inch diameter transmission main and valves between the Raw Water Pump Station and Joliet. For the Indiana Intake Alternative, it may be advantageous for the City to have one agreement to cover transmission main in Indiana and a separate agreement to cover the transmission main in Illinois. In either case, as part of the agreement the contractor(s) will be required to maintain the materials (including segments of pipe) and equipment needed to promptly respond to and address maintenance needs along the transmission main system.

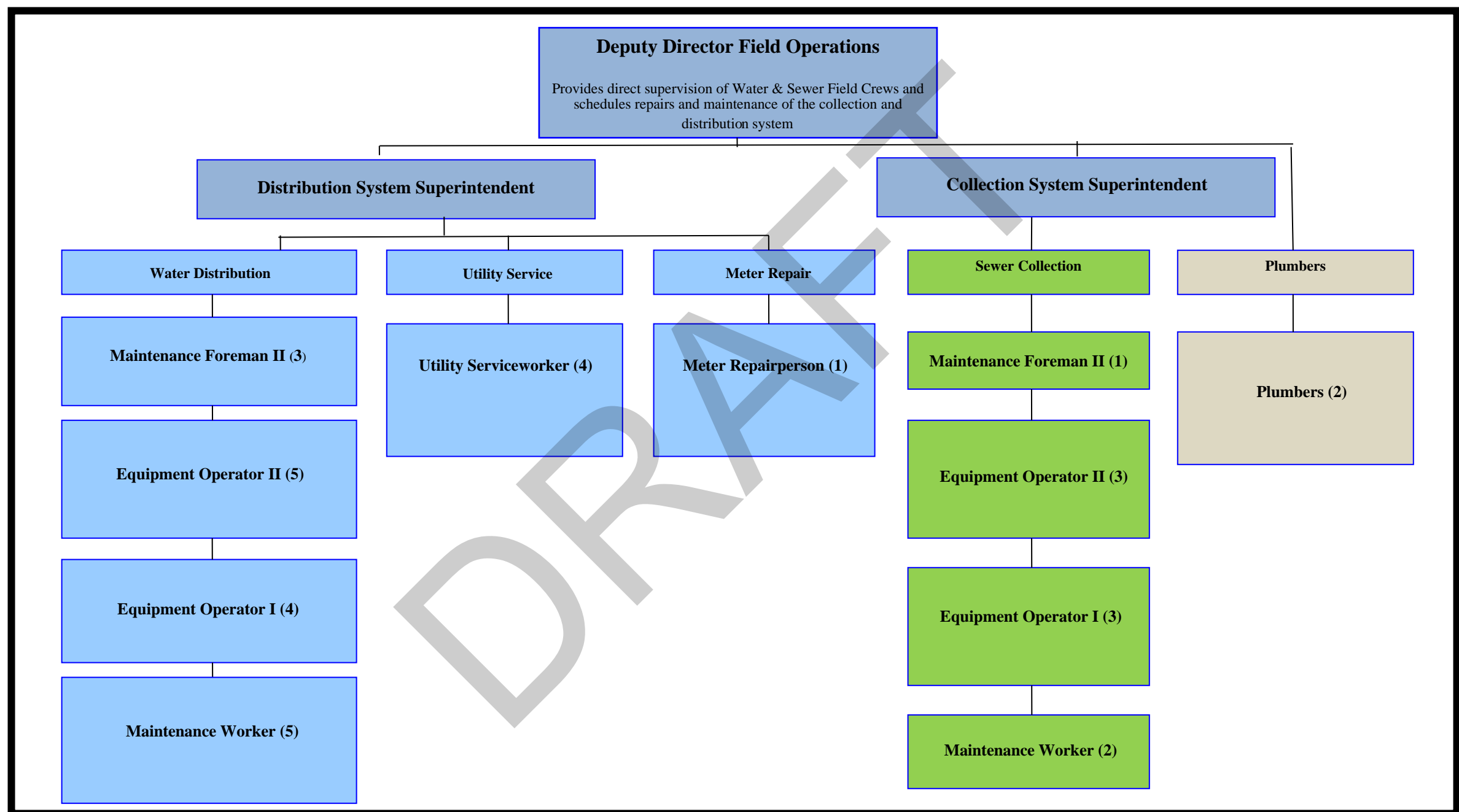
### **Summary**

Each of the new water source alternatives being considered by Joliet will require significant adjustments in the City's approach to water system operations and staffing. The size and geographic distribution of the new infrastructure will require development of select new technical skills by operations and maintenance staff, and adaptation of the City's approach to regular facility rounds. Instrumentation, control, and video monitoring capabilities designed into the new facilities can help to reduce the time and effort associated with monitoring remote sites, but regular, in-person visits to all facilities will continue to be required.

Also, a new agreement with a contractor specializing in the maintenance and repair of large diameter transmission main will be required for both options. Two such contracts may be appropriate for the Indiana Intake Alternative given that the City will have transmission main in both Indiana and Illinois.

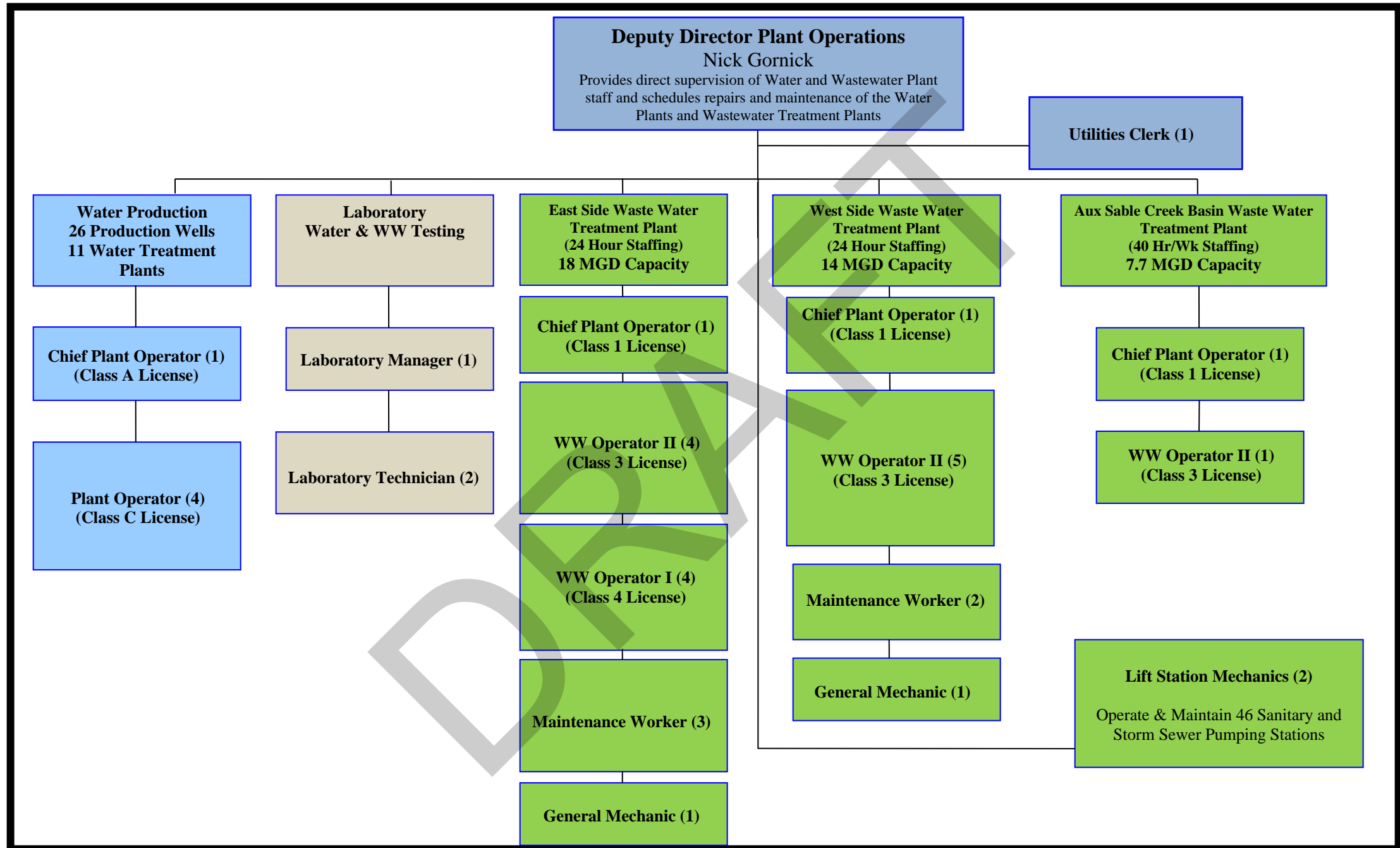
However, looking beyond the similarities noted above, there are significant differences in the anticipated future staffing requirements associated with the two options. Under the CDWM Alternative, it is likely that existing water plant operators who will no longer need to operate the City's groundwater treatment plants can be transitioned into new roles that include responsibility for operation and maintenance of new pumping and storage facilities along the Chicago to Joliet transmission system. As a result, no new operating and maintenance positions are projected to be required for the CDWM Alternative. Under the Indiana Intake Alternative, the need for additional dedicated operations and maintenance staff at the new surface water treatment plant will require Joliet to expand its Plant Operations staff by about 14 positions.

Differences in the labor costs associated with the two water source alternatives have been estimated and incorporated into the total cost of water and rate analyses described in the Alternative Prospectus Documents and supporting Funding Strategy.



Source: City of Joliet Department of Public Utilities

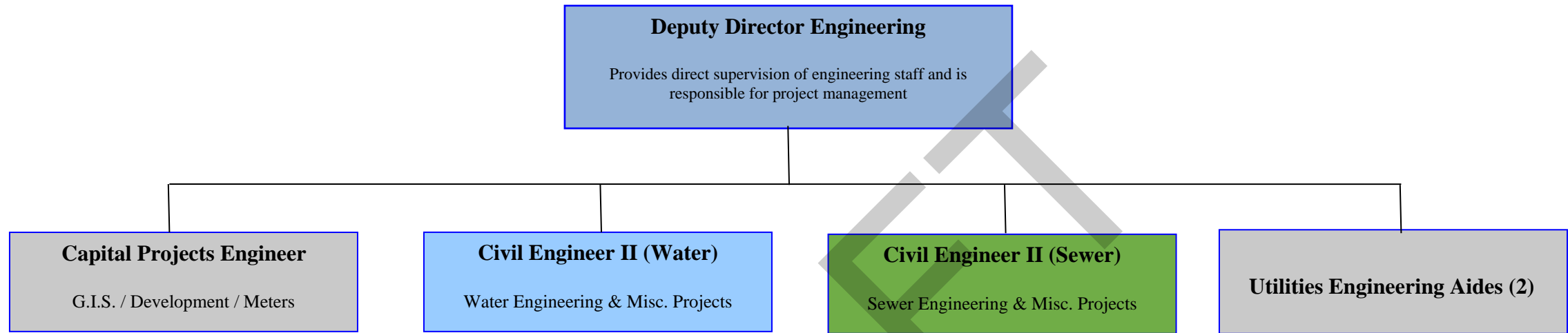
**Figure 11**  
**Joliet Department of Public Utilities**  
**Field Operations Organization**

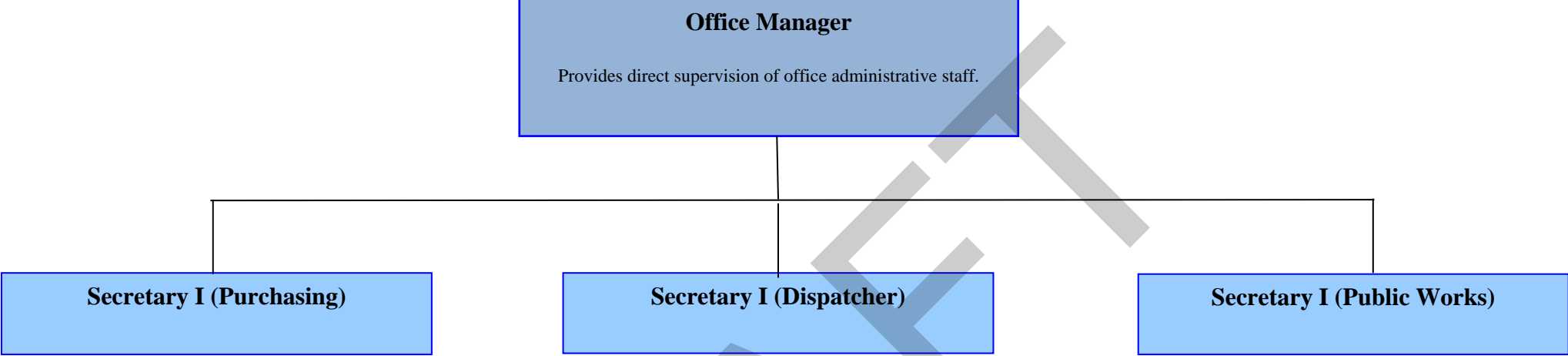


Source: City of Joliet Department of Public Utilities

**Figure 12**  
**Joliet Department of Public Utilities**  
**Plant Operations Organization**







Source: City of Joliet Department of Public Utilities

**Figure 14**  
**Joliet Department of Public Utilities**  
**Office Management Organization**