INTERGOVERNMENTAL AGREEMENT FOR PROGRAM MANAGEMENT

This Intergovernmental Agreement ("Agreement") is made as of ***[date to be determined]***, by and between the GRAND PRAIRIE WATER COMMISSION, an Illinois regional water commission, municipal corporation and body politic and corporate, (***"Commission"***) and the CITY OF JOLIET, an Illinois home rule municipal corporation (***"Joliet"***) (each a ***"Party"*** and collectively, ***"Parties"***).

In consideration of the recitals and the mutual covenants and agreements set forth in this Agreement, the Parties agree as follows:

ARTICLE 1
RECITALS[1]

1.1 Article VII, Section 10 of the 1970 Constitution of the State of Illinois authorizes units of local government to contract or otherwise associate among themselves and with certain other governments "to obtain or share services and to exercise, combine or transfer any power or function, in any manner not prohibited by law or by ordinance" as well as to use their revenues, credit and other resources for such activities.

1.2 The Intergovernmental Cooperation Act, 5 ILCS 220/1 *et seq*., (***"IC Act"***) also authorizes the joint use and enjoyment of the powers, privileges, functions and authority of such governments.

1.3 Pursuant to the Regional Water Commissions Act, 65 ILCS 5/11-135.5-1 *et seq*. (***"RWC Act"***), the Grand Prairie Water Commission has been established by the Village of Channahon, the City of Crest Hill, the City of Joliet, the Village of Minooka, the Village of Romeoville, and the Village of Shorewood (each a ***"Member"*** and collectively ***"Members"***) in order to provide adequate supplies of water on an economical and cost-effective basis for the Members individually, including without limitation to provide a joint waterworks system and common source of supply of Water for use as provided in this Agreement.

[1]All defined terms initially appear in bold and italics and thereafter as capitalized words and phrases throughout this Agreement. They shall have the meanings set forth in the preamble, in Articles 1 and 2, and elsewhere in this Agreement.

1.4 The Parties have authority to enter into this intergovernmental agreement pursuant to the RWC Act, the IC Act, Article VII, Section 10 of the 1970 Illinois Constitution of the State of Illinois and other applicable law.

1.5 A Program has been developed and agreed upon by the Members for the development of a joint waterworks system and common source of supply of Water as described in the Basis of Design.

1.6 The Commission and its Members have reviewed the scope of the Program and recognize that Joliet has been managing the Program commencing in February 2021 through the Effective Date in order to implement the Program to bring Water to the Commission and its Members.

1.7 The Commission has determined that Joliet has the necessary resources and skills to assist the Commission in implementing the Program for the Commission and desires to enter into this Agreement with Joliet pursuant to which Joliet will serve as the Program Manager.

1.8 Pursuant to Section 7.1(b) of the Water Supply Agreement, the Commission and the Members have agreed to retain Joliet as the Program Manager.

1.9 The Commission and Joliet have agreed that Joliet will implement the Program with the cooperation and support of the Commission pursuant to this Agreement, in order to enable completion of the initial Commission System in sufficient time to allow the delivery of Water to the Commission and its Members by the Targeted Water Delivery Date.

1.10 The Commission recognizes that it will be necessary for the Commission to perform certain functions and obligations following formation but has determined that it is not practical or cost-effective for the Commission to hire employees until the later phases of the Program. During the initial time period, the Commission will procure services from consulting firms to perform some of the necessary administrative and financial functions of the Commission. Joliet has agreed to perform certain additional functions necessary for Commission operations

and will manage and/or coordinate with other consulting firms retained by the Commission, only until such time as the Commission is able to employ or retain personnel for those functions.

ARTICLE 2
DEFINITIONS

Whenever used in this Agreement and Exhibit A attached, the following terms shall have the following meanings unless a different meaning is required by the context:

"Agreement" means this agreement.

"Basis of Design" means the document containing the rationale, principles, criteria, considerations, assumptions, special requirements, and constraints, to be used for the design of the initial Commission System and implementation of the Program and establishes a baseline for Program costs, a copy of which is attached as Exhibit A. The Basis of Design may be amended from time to time as provided in this Agreement and the Bylaws.

"Bylaws" means the bylaws of the Commission as adopted and as amended from time to time by the Board of Commissioners.

"Commission" means the Grand Prairie Water Commission, Illinois and established by the IGA.

"Commission Management Services" means the services described in Section 4.3.

"Commission System" means the waterworks and water supply system of the Commission to bring Water to the Members, as it may be modified from time to time.

"Effective Date" means the date on which this Agreement is executed by all of the Parties.

"Fiscal Year" means the Commission's fiscal year.

"IC Act" means the Intergovernmental Cooperation Act, 5 ILCS 220/1 *et seq*.

"IGA" means the "Intergovernmental Agreement to Establish the Grand Prairie Water Commission" dated June ____, 2024, as amended from time to time.

"Management Fee" means the fee paid to Joliet for the Services, as described in Article 6.

"Member" or ***"Members"*** means all municipalities that are Charter Members or that become Additional Members of the Commission pursuant to the IGA. The term "Members" does not include municipalities that have withdrawn from the Commission pursuant to the IGA. Member or Members does not include Customers.

"Municipal System" means the waterworks or combined waterworks and sewage system of a Member.

"Operations and Maintenance Liaison" means the Joliet employee designated in Section 5.1.

"Program" means all activities necessary for design, acquisition, construction, start-up and commissioning of the initial Commission System which will be designed and constructed by the Commission consistent with the Basis of Design, and also includes certain items necessary for the delivery of Water and for which the cost of construction will be paid by the City of Chicago and which will be owned by the City of Chicago pursuant to that certain Water Supply Agreement between the City of Chicago and the City of Joliet dated May 1, 2023, which has been or will be assigned to the Commission by Joliet.

"Program Budget" means the budget for the performance of the Program, as it may be amended from time to time, as approved by the Board of Commissioners.

"Program Director" means the Joliet employee designated in Section 5.1.

"Program Finance Director" means the Joliet employee designated in Section 5.1.

"Program Management Services" means the services described in Section 4.2.

"Program Manager" means the City of Joliet.

"Program Schedule" means the schedule for the performance of the Program, as it may be amended from time to time, as approved by the Board of Commissioners.

"Program Team" means the professional service and consultant firms retained by Joliet for implementation of the Program.

"RWC Act" means the Regional Water Commissions Act, 65 ILCS 5/11-135.5-1 *et seq*., as amended from time to time.

"Services" means the Commission Management Services and the Program Management Services.

"Targeted Water Delivery Date" means May 1, 2030, unless amended or modified as provided in this Agreement and the Bylaws.

"Water" means Lake Michigan water.

"Water Supply Agreement" means the "Water Supply Agreement between the Grand Prairie Water Commission and its Members" dated _____, 2024, as amended from time to time.

ARTICLE 3
TARGETED WATER DELIVERY DATE; SCHEDULE AND BUDGET

3.1 Targeted Water Delivery Date. The Program will be implemented by Joliet in coordination with the Commission pursuant to a Program Schedule to enable the commissioning and start-up of the initial Commission System by the Targeted Water Delivery Date. The Commission agrees to coordinate and cooperate with Joliet in order to achieve the delivery of Water in the manner described in the Water Supply Agreement by the Targeted Water Delivery Date.

3.2 Schedule and Budget. Joliet will manage the Program from and after the Effective Date and throughout the Term in a manner consistent with the Program Schedule and Program Budget.

3.3 Term. This Agreement will commence on the Effective Date and terminate on the date on which all Program-related contracts, including without limitation construction contracts and professional services contracts, are closed or concluded, which is anticipated to be May 1, 2031 (***"Term"***). Joliet shall notify the Commission when all Program-related contracts have been closed or concluded. The Term and the Management Fee may be amended by mutual agreement of the Commission and Joliet.

ARTICLE 4
PROGRAM MANAGEMENT

4.1 Scope of Services. Joliet shall provide, perform and complete all of the Services described in this Article, including Program Management Services and Commission Management Services (except as provided in Section 4.3). Except where otherwise provided, the term "management" when referring to actions by Joliet includes Program-related contracts entered into by Joliet, including without limitation those identified in Section 5.2. Joliet shall act for the mutual benefit of the Commission and the Members at all times in the performance of the Services.

4.2 Scope of Program Management Services. Joliet shall provide, perform and complete the following in connection with the management of the Program for the purpose of enabling the delivery of Water from the City of Chicago to the Commission for delivery to the Members, all of which are referred to in this Agreement as the ***"Program Management Services"***.

A. Design:

i. Management of preliminary design and final design, including activities necessary for the completion of design, such as field testing and investigation of factors that may impact the design, performed by the Program Team. The initial Commission System will be designed in a manner consistent with the Basis of Design.

ii. Review all Program deliverables prepared by the Program Team.

iii. Review Program design documents for conformance with the Basis of Design and for analysis of anticipated operation and maintenance matters for the initial Commission System.

B. Permitting and Land Acquisition:

i. Permitting: Management of the process of the Commission applying for and obtaining permits and other governmental approvals on behalf of the

Commission.

ii. Land Acquisition: Management of the process of the Commission acquiring necessary land and other interests in real estate on behalf of the Commission for the construction and installation of the initial Commission System. Land acquisition will be in accordance with all applicable federal and state funding requirements (such as the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970).

iii. Approvals: The Program Director is authorized to approve and execute all applications and all permits and related agreements for activities pertaining to the Program. Unless otherwise determined by the Board of Commissioners, the Board of Commissioners shall approve all fee simple acquisitions of land for the Commission and shall be provided a reasonable time for review and discussion of any such acquisitions prior to approval. The Program Director is authorized to execute agreements for easements and other interests in land (excluding fee simple interests) on behalf of the Commission in a form substantially similar to a form of agreement approved by the Commission and in amounts not to exceed the value of each easement or other interest in land plus twenty-five percent (25%) of the value up to a maximum of fifty thousand dollars ($50,000.00). The value shall be determined by appraisal or by waiver valuation as required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, (42 U.S.C. §4601 *et seq*.) and regulations implementing the Act. The Program Director will review the log of such permits and agreements and easement agreements with the Technical Advisory Committee.

iv. Cooperation: The Commission will cooperate with Joliet in connection with acquisition of land or other interests in real estate, and will not unreasonably refuse to accept assignment of such permits, approvals, and land and other interests in real estate from Joliet that were obtained, acquired or put under contract by Joliet prior to the establishment of the Commission.

C. Program Schedule and Budget: Facilitate, oversee and manage the preparation of an updated Program Schedule and an updated Program Budget on an annual basis and present the updated Program Schedule and updated Program Budget as part of adjusting and establishing a revised baseline schedule and budget each year, or more frequently if required. The updated Program Schedule and updated Program Budget may be presented separately or concurrently. The Program Schedule and Program Budget as of the Effective Date are included as part of the Basis of Design attached as Exhibit A.

D. Procurement: Management of the procurement process for contracts for implementation of the Program and provision of services from Joliet in support of Commission procurements to implement the procurement process. Bidding and award will be consistent with Section 4.9 of this Agreement.

E. Management of Pre-Construction Services. Management of the pre-construction services being provided for a portion of the Program known as the Chicago connection facilities.

F. Construction Management: Management of construction-related engineering and other services provided in connection with all Program construction contracts.

G. Start-up and Commissioning: Management of the commissioning of the initial Commission System, including start-up, training, and the assistance described in Section 4.10 of the Water Supply Agreement.

H. Financial Matters: Management of Program-related budget development and controls, funding strategy implementation, debt, loan and grant issuance and management, and funding compliance; coordinate with Program Team on Program insurance requirements; administer financing for Program development costs being financed by Joliet (pursuant to loans from the U.S. Environmental Protection Agency's program under the Water Infrastructure Finance and Innovation Act (WIFIA) and revenue bonds); administer financing for Program construction costs including WIFIA loans, state public water supply revolving fund loans and revenue bonds by the Commission.

I. Public Education/Outreach: Management of public education and provision of information to the public on the work of the Program and support Members in connection with their public education and outreach efforts regarding the Program.

J. Professional/Industry Outreach: Represent and promote the Commission and the Program by attending and/or making presentations about the Program at programs, meetings and conferences of technical, professional and industry organizations related to the mission of the Program and the Commission.

K. Governmental Outreach: Management of and participation in governmental affairs and related activities in connection with the Program, and coordinate with the government advocacy team retained by the Commission for federal, state and local advocacy in support of Program activities, including legislation, rules and ordinances, funding opportunities, permitting and land acquisition. Joliet may, at its expense, retain its own government advocacy team for matters pertaining to activities that are unique to Joliet in particular, including legislation, rules and ordinances, funding opportunities, permitting and land acquisition.

L. Legal: Management of legal services provided by legal counsel to the Program which will be coordinated as needed with legal counsel to the Commission.

M. Oversight: Management of Program activities, including risk management, product and material sourcing, Program controls, cost forecasting and tracking, schedule development and management, reporting, independent review activities, and value engineering.

4.3 Scope of Commission Management Services. Joliet shall provide, perform and complete the following in connection with the management of the Commission, all of which are referred to in this Agreement as the ***"Commission Management Services"***. The Commission, in its sole discretion, and in coordination with Joliet, may hire employees or consultants to assume portions of the Commission Management Services during the Term as the initial Commission System is designed and constructed. Upon notice from the Commission of its intent to appoint or retain one or more of such employees or consultants, Joliet and the Commission will coordinate regarding (i) the extent of the Commission Management Services to be performed by the employee(s) or consultant(s) and plan for the transition of that portion of the Commission Management Services and (ii) adjustment of the Management Fee pursuant to Section 6.1.B.

A. Commission Administrative Support: Management of administrative tasks and activities necessary to support the Commission's operation as a regional water commission, municipal corporation and body politic and corporate, including without limitation: preparation of meeting agendas for the Board of Commissioners and Technical Advisory Committee; acting as the Commission's Freedom of Information Act officer; develop and present administrative rules and orders; develop and present operational procedures and practices; recommend Commission policies, plans and procedures; and purchase of materials and services pursuant to Commission purchasing policy.

B. Financial Matters: Management of and coordination with the provider of financial and accounting services retained or hired by the Commission; manage preparation of the Commission budget; manage preparation of the monthly Commission financial report and present to the Technical Advisory Committee and Board of Commissioners; manage Commission insurance matters; development and maintenance of Commission purchasing policies; manage non-Program procurement by the Commission.

C. Human Resources: Management of and coordination with the Commission regarding (i) development and preparation of job descriptions for positions to be held by future employees of the Commission and recruitment of candidates for the positions, including advertising of positions, managing the recruitment and interview process, review of credentials of candidates for positions and assist the Board of Commissioners in hiring of Commission employees and (ii) development and preparation of requests for qualifications and/or proposals for consultants to perform a portion of the Commission Management Services, including advertising of the request for qualifications and/or proposals, manage the review of credentials and the interview process, and assist the Board of Commissioners in the retention of such consultants.

D. Public Education/Outreach: Management of public education and provision of information to the public on the work of the Commission and support Members in connection with their public education and outreach efforts regarding the Commission.

E. Commission Operational Support: Serve as the Commission's responsible operator in charge of the initial Commission System as required by law, and provide input on Commission operational procedures and practices during construction of the initial Commission System.

4.4 Joliet Roles and Responsibilities. In connection with providing the Services, Joliet will provide Joliet personnel to fill the following roles: Program Director, Program Finance Director, and Operation and Maintenance Liaison. Joliet agrees that while it is serving as Program Manager, the Program Director and Program Finance Director will not be a Delegate or Alternate Delegate to the Technical Advisory Committee.

4.5 Joliet Reports and Information to the Commission

A. Joliet will provide the following reports to the Commission regarding the Program:

i. Monthly written Program Manager reports to the Commission, which will include updates regarding the status of and progress on the Program and its progress toward completion of the initial Commission System. The Program Manager reports will include a narrative summary of Program highlights, Program Schedule updates, and updates related to various Program activities, including program management, independent review, funding, coordination with Chicago, procurement, advocacy, and public outreach. Reports will also include tables summarizing information related to the Program Budget and Program Schedule status (baseline budget, current commitments, costs-to-date, estimate-at-completion, and baseline and projected finish dates) at both (a) the Program level and (b) the level of individual work packages.

ii. Periodic construction cost reports (which shall be monthly after commencement of construction and which may be part of the monthly Program Manager report or submitted separately) comparing the Program Budget to the engineers' final opinions of probable construction cost for the construction bid packages, contract prices at time of award, adjustments made to original contract prices through change orders, actual amounts expended on construction contracts to date and funds available for completion of construction.

iii. An annual report summarizing overall progress, highlights, accomplishments, expenditures, and status of the Program and the initial Commission System.

iv. Periodic reports regarding Commission Management Services performed on behalf of the Commission.

B. Supporting Documents. Joliet will provide to the Commission materials requested by the Commission that pertain to the Program and/or the Commission System that Joliet may have in connection with Joliet's provision of Services under this Agreement for inspection and audit, such as copies of the plans and specifications for the initial Commission System, invoices and pay requests, and Program deliverables such as reports and technical materials. Members of the Board of Commissioners may request that the Board of Commissioners request such documents from Joliet.

4.6 Commission Opportunities for Review and Input on Services.

A. The Program Director and Program Finance Director shall attend all meetings of the Technical Advisory Committee and the Board of Commissioners as part of the performance of the Services. The Program Director shall attend the Members' meetings of their Village Boards and City Councils upon request.

B. The updated Program Schedule and Program Budget prepared pursuant to Section 4.2.C will be presented to the Board of Commissioners for review, discussion and approval. Prior to action by the Board of Commissioners, the updated Program Schedule and Program Budget will be presented to the Technical Advisory Committee for review and discussion, and the Technical Advisory Committee shall make a recommendation to the Board of Commissioners regarding action thereon. Upon approval by the Board of Commissioners, the new Program Schedule and Program Budget may be referred to as the re-baselined Program Schedule and re-baselined Program Budget, respectively.

C. The Technical Advisory Committee will perform the functions and duties provided in the Bylaws and the Program Director and Program Finance Director shall receive and consider input from the Technical Advisory Committee on those items.

4.7 Advanced Development Costs and Advanced Construction Costs. Joliet will provide financing sufficient to advance on the Commission's behalf for payment of the Advanced Development Costs and Advanced Construction Costs as described in the IGA and the Water Supply Agreement, which include Services provided under this Agreement.

4.8 Cost Controls. Joliet will monitor the relevant markets for materials, equipment, and construction services and develop strategies to control costs and identify other potentially beneficial cost control measures for implementation in connection with the management of the Program. The Technical Advisory Committee will review and discuss pending elements of the initial Commission System, bidding conditions and contracting strategies for cost and schedule implications prior to issuance of any construction bid packages and make recommendations, in coordination with the Program Director, to the Board of Commissioners.

4.9 Construction Contracts.

A. Commission to Contract for Construction. Unless otherwise agreed by the Parties, the Commission will approve and enter into contracts with construction contractors and other vendors as necessary and provide financing sufficient to pay all costs associated with construction of the initial Commission System.

B. Bidding and Award of Contracts. Contracts will be bid and awarded pursuant to the process established in the RWC Act, and in compliance with all state and federal funding requirements, other applicable law, and internal rules adopted by the Board, if any. In the event of any conflict between the requirements of this Agreement and the requirements of any internal rules adopted by the Board, the requirements of this Agreement shall control. Joliet shall manage the process for contract bidding, evaluation and award in accordance with the following:

i. The plans and specifications for a construction contract work package (or advance purchase of equipment for a future construction contract) will be submitted to Joliet by the design professionals on the Program Team at the one hundred percent (100%) complete design stage. Following review by the independent review firm retained by Joliet, Joliet in its role as Program Manager shall review the plans and specifications and other materials submitted to determine whether the materials are approved and complete and ready to release for bidding by contractors. At such time, Joliet will:

a. notify the Technical Advisory Committee that the contract for the work package is ready to be released for bidding and the planned schedule for submission of bids by contractors;

b. advertise for bids on behalf of the Commission using the Joliet procurement and bidding system, which is anticipated to be performed electronically;

c. manage the process of receipt and response to questions from bidders, issuance of addenda and conducting a pre-bid conference for potential bidders on behalf of the Commission, which is anticipated to be performed electronically; and

d. receive and open bids for the contract, which is anticipated to be performed electronically.

ii. Upon opening of bids for each contract, Joliet will notify the Technical Advisory Committee of the results of the bid opening and direct the Program Team to review and evaluate the bids, including qualifications of bidders and other relevant information, and provide to the Program Director the results of that review and evaluation and a recommendation as to the lowest responsible bidder based on such review.

iii. The Program Finance Director shall review the amount of the bid from the lowest responsible bidder for each contract to confirm that sufficient Commission funds

(or, if the Commission and Joliet have agreed that Joliet will provide Advanced Construction Costs for a contract, that sufficient Joliet funds for Advanced Construction Costs) will be available to pay the contract amount for that contract plus the lesser of an additional three percent (3%) or two million five hundred thousand dollars ($2,500,000.00) for potential change orders pursuant to Section 4.10.

iv. The Program Director will present a recommendation for the proposed award of the contract with any recommended conditions on the award of the contract, or the rebidding of the work package and/or rejection of bids, to the Technical Advisory Committee for review at a meeting of the Committee. If the proposed contract amount for a work package exceeds the engineers' opinion of probable construction cost (OPCC) for that work package by ten percent (10%) or more, the Program Director will provide a written explanation containing either (a) the reasons for determining that the award of the contract at that contract amount is in the best interests of the Commission, or (b) a recommendation to re-bid the contract for the work package and/or reject bids.

v. The Technical Advisory Committee will review the Program Director's recommendation and shall provide a recommendation to the Board of Commissioners to (a) award the contract, or (b) re-bid and/or reject bids for the work package, accompanied by any recommended conditions on the award of the contract. If no recommendation is provided by the Technical Advisory Committee, the Program Director shall present the Program Director's recommendation to the Board of Commissioners.

vi. All contracts approved as described in Section 4.9.A shall be executed on behalf of the Commission by the Chair and Secretary of the Commission unless otherwise authorized by the Board of Commissioners. Following execution, the Program Director is authorized to sign and issue all notices of award and notices to proceed for such contracts on behalf of the Commission.

C. Failure to Award Construction Contract. If the Board of Commissioners does not approve a construction contract with the lowest responsible, qualified bidder meeting the requirements of the RWC Act within the period of time recommended by the Program Director for contract approval as necessary to be consistent with the Program Schedule (which shall be not less than forty-five (45) days), and the completion of the initial Commission System could be delayed to a date later than the Targeted Water Delivery Date due to the failure to approve that contract within such time, then the Board of Commissioners must concurrently approve the establishment of a new Targeted Water Delivery Date that is later than the then-current Targeted Water Delivery Date by the unanimous vote of Commissioners representing all the Members. Any newly established Targeted Water Delivery Date must provide a sufficient period of time to allow the Program to be completed by that new Targeted Water Delivery Date. The Parties recognize that a short-term delay in award of a construction contract may occur due to unfavorable bidding conditions, receipt of bids substantially exceeding the engineer's opinion of probable construction cost, or matters related to land acquisition, where the delay does not extend the start-up of the initial Commission System beyond the Targeted Water Delivery Date.

4.10 Construction Contract Modifications.

A. Joliet is authorized to make decisions on behalf of the Commission in connection with construction contracts entered into by the Commission as part of the Program, in accordance with this Section.

i. The Program Director may approve, and may authorize the resident engineer assigned to a construction contract to approve, field orders. Field orders are minor changes in the work under a construction contract that do not involve an adjustment in the contract price or the contract times and are germane to the design specifications and drawings of the work under the construction contract, as indicated by the construction contract documents. If a contractor believes that the field order requires

a change in contract price or contract time, the field order shall be considered a change order subject to the provisions for change orders below.

ii. The Program Director may approve change orders for each construction contract for various purposes related to the Program, subject to the following:

a. No single change order shall be equal to or exceed the amount of five hundred thousand dollars ($500,000.00). The Board of Commissioners may increase or decrease this amount from time to time but in no event may the amount be decreased to less than two hundred fifty thousand dollars ($250,000.00);

b. The total amount of all change orders on any contract shall not exceed (a) the lesser of three percent (3%) of the original contract amount (prior to any change orders) or two million five hundred thousand dollars ($2,500,000.00); and

c. The total change in contract time for completion of the contract in all change orders shall not exceed an increase in time equal to or greater than thirty (30) days.

iii. The Program Director shall consider such change orders in consultation with the Program Finance Director as well as two persons (who are employees of a Member and who may but are not required to be members of the Technical Advisory Committee and shall not be employees of Joliet) identified by the Technical Advisory Committee from time to time to assist the Program Director, on behalf of Members of the Commission, in the review and approval of change orders within the limits of the Program Director's authority to approve. No change order shall be approved by the Program Director unless the Program Director and at least one of such persons identified by the Technical Advisory Committee agree that the change order should be approved. Any change orders on which there is not such agreement may be presented by the Program Director to the Board of Commissioners. In an emergency, such consultation may be waived with notification by the Program Director to the Technical Advisory Committee

and to persons identified by the Technical Advisory Committee as described above. For the purposes of this Section 4.10, an emergency means an urgent, sudden, and serious event, or an unforeseen change in circumstances that necessitates immediate action to avert imminent danger to life, health, or property or to remedy or prevent delay to the work under the contract or financial harm to the Commission or its Members.

iv. Approvals by Joliet must be germane to the design specifications and drawings for the work specified in the contract and the intended function of the portion of the initial Commission System when completed, and consistent with the Basis of Design, unless otherwise approved or agreed by the Board of Commissioners.

v. From time to time it may be necessary to issue a work change directive for work under a construction contract. A work change directive does not change the contract price or contract time but is evidence that the Commission and the contractor expect that the modification ordered by the work change directive will result in the need for a change order to modify the contract price or contract time. The Program Director shall consider and may approve work change directives pursuant to the process and consistent with the requirements of Subsections ii through iv of this Subsection 4.10.A.

vi. A report of all change orders and work change directives that have been approved by the Program Director between meetings of the Board of Commissioners shall first be presented at the next regular meeting to the Technical Advisory Committee and thereafter to the Board of Commissioners. In addition, if deemed necessary, the Technical Advisory Committee may review actions by the persons identified in subsection iii above in connection with review and approval of change orders and make recommendations to the Board of Commissioners regarding such actions, and the Board of Commissioners may review such recommendations and determine if it is necessary to take any action.

B. Joliet shall present the change orders listed below to the Board of Commissioners for review and approval:

i. Any single change order that would increase the original contract amount by an amount equal to or greater than five hundred thousand dollars ($500,000,00) (or such other amount as exceeds the Program Director's authority to approve pursuant to Subsection 4.2.A.ii.a) or which increases total contract time by thirty (30) days or more.

ii. Any change order that, when combined with all previously approved change orders for the contract, results in (a) an increase of the total contract amount (prior to any change orders) by greater than three percent (3%) or two million five hundred thousand dollars ($2,500,000.00).

iii. Any change order that, when combined with all previously approved change orders for the contract, results in a change in the total contract time for completion of the contract by greater than thirty (30) days.

iv. Any change order that results in a change in the scope of the work under the contract.

C. The Board of Commissioners may approve an increase in (i) change order authority of the Program Director for a particular construction contract as to the contract price or contract time as provided in this Section 4.10 and (ii) any previously authorized change order authority of the Program Director for a particular construction contract as to contract price or contract time.

D. The Program Director or designee is authorized to make decisions on behalf of the Commission to order that work on a construction contract be stopped or delayed for various purposes related to the Program, including without limitation the need to protect public health and safety, protect property, limit any public inconvenience arising from the construction, an emergency, or other reason authorized by the construction contract.

4.11 Disadvantaged Business Enterprises. A local and disadvantaged business enterprises strategy will be used in connection with the design and construction of the initial Commission System, as provided in the Basis of Design.

4.12 Construction Contract Payments. Payments to contractors under the construction contracts shall be processed in the following manner:

A. The contractor for each active construction contract work package submits a pay request to the Commission; Joliet shall direct the Program Team to review all such requests.

B. The Program Team reviews each pay request and, if it meets the requirements of the construction contract, submits a recommendation for payment to the Program Director and, if not, returns comments on the pay request to the contractor for correction.

C. The Program Director reviews the pay request and recommendation. If the Program Director disagrees with the recommendation, the Program Director returns the pay request to the Program Team for further review and recommendations. If the Program Director agrees with the recommendation, the Program Director submits the pay request and recommendation to the Program Finance Director.

D. The Program Finance Director reviews the pay request and confirms that there is sufficient funding from available Commission funding source(s) for the payment.

E. If the Program Director agrees with the recommendation and the Program Finance Director has confirmed that sufficient Commission funding is available, the Program Director presents the recommendation for payment to the Technical Advisory Committee for review at a Technical Advisory Committee meeting. If the Technical Advisory Committee agrees, the Technical Advisory Committee approves the recommendation to Board of Commissioners to approve the payment. If the Technical Advisory Committee has questions or requires additional information about the requested payment, the pay request shall be returned to the Program Director for additional information.

F. The Technical Advisory Committee's recommendation to approve the payment is presented to the Board of Commissioners for review and approval. If the Board of Commissioners has questions or requires additional information about the requested payment prior to approval, the pay request shall be returned to the Technical Advisory Committee for additional information.

G. The Program Director, Technical Advisory Committee and Board of Commissioners will work together to coordinate the schedule of public meetings in order to facilitate the Commission making payments within statutory and contractual time frames.

H. The Program Director or Program Finance Director coordinates each approved pay request with the Commission's provider of financial services or third-party payment disbursing agent to arrange for payment to the contractor.

4.13 Confidential Information. From time to time during implementation of the Program, it may be necessary to enter into agreements to protect confidential information of the Commission, such as information about the initial Commission System, or confidential information of third-parties who request confidential treatment of their information, such as proprietary and confidential trade secrets or security-related information about the systems of other utilities or land owners along the route of the initial Commission System. The Program Director is authorized to execute, on behalf of the Commission, agreements to protect such confidential information which are (A) in a form substantially similar to a form of agreement approved by the Commission or (B) in a form that has been reviewed and approved by Commission legal counsel.

ARTICLE 5
KEY CONSULTANTS AND PERSONNEL

5.1 Key Personnel and Roles. Joliet shall provide persons who shall be primarily responsible to perform the following roles in connection with Joliet's provision of Services:

Program Director: Joliet's Director of Public Utilities

Program Finance Director: Joliet's Finance Director

Operation and Maintenance Liaison: Joliet's Deputy Director of Plant Operations in the Department of Public Utilities

In the case of an absence of the Program Director for three weeks or less, the Program Finance Director shall perform the functions of the Program Director under this Agreement. In the event of an absence of the Program Director for three weeks or more but six months or less,

Joliet shall notify the Commission of the anticipated duration of the absence and the person assuming the role. In the event of a change in personnel in the positions of Program Finance Director or Operation and Maintenance Liaison, Joliet shall notify the Commission of the person assuming that role. In the event of an absence of the Program Director for more than six months, Joliet shall propose a replacement for that role and Joliet and the Commission shall meet and discuss whether such replacement is mutually acceptable. If so, the Board of Commissioners will consent to Joliet's proposed replacement, which consent shall not be unreasonably withheld or delayed. In the event that the position title of an individual filling one of the above roles is changed, Joliet shall notify the Commission that the individual's title has changed and that the individual will continue to perform the above role under this Agreement.

5.2 Key Consultants and Roles. Joliet will manage the Program, including the design, bidding, construction inspection and administration, and start-up and commissioning of the initial Commission System, performed by the Program Team consisting of consultants and advisors retained by Joliet, which shall include the following firms:

A. Engineering and program management consultants: Stantec Consulting Services, Inc., which has retained the following entities as subconsultants:

i. Crawford, Murphy & Tilly, Inc.

ii. Engineering Enterprises, Inc.

iii. Strand Associates, Inc.

iv. Cornwell Engineering Group, Inc.

v. V3 Companies, Ltd.

vi. Images, Inc.

B. Independent review: Burns & McDonnell

C. Financial Consultant: Speer Financial

D. Program Legal Counsel: Donahue & Rose, P.C.

E. Bond Counsel: Katten, Muchin, Rosenman, LLP

F. Underwriter: JP Morgan

Third-party beneficiary status for the Commission will be established under the relevant engineering contracts for the initial Commission System. Additional subconsultants may be retained by Stantec Consulting Services, Inc. where appropriate for matters within the scope of the Program in order to implement the local and disadvantaged business enterprises strategy recognized in Section 4.11. Additional firms may be retained by Joliet as required for the Services. For any contracts entered into by Joliet in addition to the contracts with the entities described in this Section 5.2, Joliet will notify the Commission of any such contracts prior to approval and execution of such contracts.

5.3 Coordination with Others. In its performance of the Services, Joliet will coordinate with other firms that are anticipated to be retained by the Commission to perform additional functions. These other firms may perform functions that include, without limitation, administration related to the Board of Commissioners; administration related to the Technical Advisory Committee; financial services; insurance; Commission legal services; and governmental advocacy.

ARTICLE 6
MANAGEMENT FEE

6.1 Management Fee.

A. The Commission shall pay to Joliet, in accordance with and subject to the terms and conditions set forth in this Article, and Joliet will accept in satisfaction for providing, performing, and completing the Services during the initial Program Term, a fee for the Services provided by Joliet pursuant to this Agreement in the amount of Two Million Eight Hundred Ninety Thousand Dollars ($2,890,000.00) (***"Management Fee"***), subject to any amendments, adjustments, additions, deductions or withholdings provided for in this Agreement. Joliet will only charge the Commission the Management Fee and will not charge the Commission for other direct costs and expenses associated with the provision of Services under this Agreement.

B. The Management Fee assumes that the Commission employs or retains a licensed water operator no later than January 1, 2027 and an executive director no later than January 1, 2029 to perform the Commission Management Services being performed by Joliet. If these persons are not employed or retained and performing work for the Commission by the dates stated in this Section, the Commission and Joliet shall agree to amend this Agreement to increase the Management Fee for Joliet's continued provision of the Commission Management Services by Joliet employees. If these persons are employed or retained and performing work for the Commission as Commission Management Services prior to the dates stated in this Section, the Commission and Joliet shall agree to amend this Agreement to decrease the Management Fee paid to Joliet for the portion of the Commission Management Services that will no longer be provided by Joliet. Any such increase or decrease in the Management Fee for the Commission Management Services shall be in the following amounts per month for the additional or reduced number of months for each of the following: (i) if a licensed water operator is employed or retained and performing work for the Commission prior to or after January 1, 2027, the Management Fee shall increase or decrease by Nine Hundred Dollars ($900.00) per month; and (ii) if an executive director is employed or retained and performing work for the Commission prior to or after January 1, 2029, the Management Fee shall increase or decrease by Two Thousand Two Hundred Fifty Dollars ($2,250.00) per month.

6.2 Manner of Payment. Joliet shall receive payment of the Management Fee in the form of a credit in the amount of the Management Fee, which amount will be applied to the amount of advanced development costs and advanced construction costs paid by Joliet pursuant to the IGA and Water Supply Agreement. The Management Fee shall be deemed earned by Joliet in pro-rated shares on a monthly basis during the initial Program Term and shall be considered part of the advanced development costs and advanced construction costs paid by Joliet on the Commission's behalf as described in the IGA and the Water Supply Agreement.

6.3 Additional Fee. If the Program is not complete by May 1, 2031, the Commission and Joliet shall agree to amend this Agreement to add an additional fee or fees for continued Services during any extended Term.

ARTICLE 7
LEGAL RELATIONSHIPS AND REQUIREMENTS

7.1 Dispute Resolution.

A. Negotiation. The Parties desire to avoid and settle without litigation any future disputes that may arise between them relative to this Agreement. Accordingly, the Parties agree to engage in good faith negotiations to resolve any such dispute. The process in this Section 7.1 shall apply and be complied with prior to the exercise of other provisions in this Article.

B. Notice and Meeting. If either Party has a dispute about a violation, interpretation, or application of a provision of this Agreement, or a dispute regarding a Party's failure to comply with this Agreement, then that Party may serve on the other Party notice, by Certified Mail or personal service and, if desired by the Parties, may also be given by electronic communications, setting forth in detail the dispute, the provisions of this Agreement to which the dispute is related, and all facts and circumstances pertinent to the dispute. The Parties then, within seven (7) days, shall schedule a date certain for representatives of the Parties to meet in a conference to resolve the dispute. Such conference shall be conducted within fifteen (15) days after notice of the dispute has been delivered as provided in this Subsection 7.1.B.

C. Mediation. If the matter remains unresolved for more than ten (10) additional days following such a conference, the Parties may mutually agree to submit the matter to non-binding mediation pursuant to the then-current Commercial Mediation Procedures of the American Arbitration Association (AAA). If so submitted, it shall be submitted jointly and the mediation shall be administered as mutually agreed by the Parties. The mediation shall be convened not more than thirty-five (35) days after the date of initial discussions between the Parties' representatives under this Section 7.1 and concluded not more than fifty (50) days after such date of initial discussions.

D. Continuation of Services and Payments. During all negotiation proceedings and any subsequent proceedings provided for in this Section 7.1, the Commission and Joliet shall continue to fulfill the terms of this Agreement to the fullest extent possible. Joliet shall continue to provide Services to the Commission and the Commission shall continue to credit the pro rata shares of the Management Fee to Joliet as provided by this Agreement. The Parties may mutually agree to extend the time periods under this Section 7.1 in order to facilitate resolution of the dispute.

E. Remedies. Provided that the Parties have met their obligations under this Section 7.1, the Parties shall have the right to enforce this Agreement and shall be entitled to pursue such remedies as may be available in law and equity and as provided under the IGA and the Water Supply Agreement. The requirements of Subsection 7.1.B and C shall be waived in the event of either significant risk of irreparable harm or significant jeopardy to public health and safety.

7.2 Force Majeure. In case, by reason of Force Majeure, any Party hereto shall be rendered unable, wholly or in part, to carry out its obligation under this Agreement, then, if such Party shall give notice and full particulars of such Force Majeure in writing to the other Party within a reasonable time after occurrence of the event or cause relied on, the obligation of the Party giving such notice, so far as it is affected by such Force Majeure shall be suspended during the continuance of the inability then claimed, but for no longer period. Such notice shall include an explanation of how the Force Majeure in fact interferes with the ability of the Party to discharge its obligations under this Agreement. Any such Party shall endeavor to remove or overcome such inability with all reasonable dispatch. The above requirement that any Force Majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes and lockouts by acceding to the demands of opposing parties when, in the judgment of the Party having the difficulty, such settlement would be unfavorable to it.

ARTICLE 8
MISCELLANEOUS PROVISIONS

8.1 Execution; Counterparts. Each of the Parties represents that the persons executing this Agreement on behalf of such Party is duly authorized to do so. This Agreement may be executed in multiple identical counterparts, and all of said counterparts will, individually and taken together, constitute one and the same Agreement. Any such counterpart may be signed by one or more of the Parties so long as each of the Parties has signed one or more of such counterparts.

8.2 Entire Agreement. There are no representations, covenants, promises, or obligations not contained in this Agreement that form any part of this Agreement or upon which any of the Parties is relying in entering into this Agreement, other than the Intergovernmental Agreement, the Water Supply Agreement and the Bylaws.

8.3 Amendment. This Agreement may be amended or modified only by written agreement of the Parties approved by the Board of Commissioners and the Joliet City Council; provided, however, that the provisions in Sections 4.9 and 4.10 may be modified in writing upon approval of the Board of Commissioners and the Joliet City Manager.

8.4 Severability. If any part, term, or provision of this Agreement is held invalid, void or unenforceable by a court of competent jurisdiction for any reason, the remainder of this Agreement shall be interpreted, applied and enforced as to achieve, as near as may be, the purpose and intent of this Agreement to the maximum extent possible.

8.5 Binding Effect. The terms of this Agreement shall bind and inure to the benefit of the Parties hereto and their agents, successors, and assigns.

8.6 Time. Time is of the essence in the performance of this Agreement.

8.7 Regulatory Bodies. This Agreement will be subject to all valid rules, regulations, and laws applicable to this Agreement passed and promulgated by the United States of America, the State of Illinois, or any other governmental body or agency having lawful jurisdiction, or any authorized representative or agent of any of them; provided, however, that this Section will not

be construed as waiving the right of any Party to challenge the validity of any such rules, regulations, or laws on any basis, including the impairment of this Agreement. The Parties through this Agreement seek to exercise and maintain all sovereign rights granted to them under and through the Constitution and laws of the State of Illinois.

8.8 Governing Law. This Agreement shall be governed by, and enforced in accordance with, the internal laws, but not the conflicts of laws rules, of the State of Illinois.

8.9 Non-Assignability. The Parties agree that this Agreement shall not be assigned or transferred by any Party without the prior written consent of the other Party.

8.10 Waiver. No waiver of any provision of this Agreement shall be deemed to or constitute a waiver of any other provision of this Agreement (whether or not similar) nor shall any such waiver be deemed to or constitute a continuing waiver unless otherwise expressly provided in this Agreement.

8.11 No Third-Party Beneficiaries. Except for the third-party beneficiary rights described in Section 5.2, nothing in this Agreement shall create, or be construed to create, any third-party beneficiary rights.

8.12 Notice. All notices and other communications in connection with this Agreement shall be in writing and will be deemed delivered to the addressee thereof when delivered in person, by a reputable overnight courier, or by messenger at the address set forth below, or three business days after deposit thereof in any main or branch United States post office, certified or registered mail, return receipt requested, postage prepaid, properly addressed to the Party, respectively, at such Party's contact information as provided with its signature. A Party may change its contact information by giving notice to the other Party pursuant to this Section.

8.13 Exhibits. Exhibit A is attached to and, by this reference, incorporated in and made a part of this Agreement. In the event of a conflict between Exhibit A and the text of this Agreement or the Water Supply Agreement, the text of this Agreement and the Water Supply Agreement shall control.

8.14 Rights Cumulative. Unless expressly provided to the contrary in this Agreement, each and every one of the rights, remedies, and benefits provided by this Agreement shall be cumulative and shall not be exclusive of any other such rights, remedies, and benefits allowed by law.

[signatures on following pages]

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date written below.

Grand Prairie Water Commission, an Illinois regional water commission, municipal corporation and body politic and corporate

By:_____

Its: _____

Date: _____

ATTEST:

By:_____

Its: _____

Contact Party for Grand Prairie Water Commission:

Name: _____

Address: _____

_____

Telephone: _____

Email: _____

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date written below.

City of Joliet, an Illinois home rule municipal corporation

By:_____

Its: _____

Date:

_____

ATTEST:

By:_____

Its: _____

Contact Party for the City of Joliet:

Name: _____

Address: _____

_____

Telephone: _____

Email: _____

EXHIBIT A

BASIS OF DESIGN

Grand Prairie Water Commission

2024 Basis of Design

Alternative Water Source Program

June 2024

GRAND PRAIRIE
WATER COMMISSION

2024 Basis of Design

Alternative Water Source Program

June 2024

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ABBREVIATIONS AND ACRONYMS

ATS	Automatic Transfer Switch
AWSP	Alternative Water Source Program
AWWA	American Water Works Association
BCSDC	Buildout Commission System Design Capacity
CDWM	Chicago Department of Water Management
CIP	Capital Improvement Project
CMAR	Construction Manager at-Risk
CMT	Crawford, Murphy & Tilly, Inc.
CMU	Concrete Masonry Unit
CNC	Coilable Non-Metallic Conduit
CSRA	Cost and Schedule Risk Analysis
CSU	Commissioning and Start-up Contractor
DBE	Disadvantaged Business Enterprise
DIP	Ductile Iron Pipe
ft	feet
fps	feet per second
GMP	Guaranteed Maximum Price
gpm	gallons per minute
GPWC	Grand Prairie Water Commission
HGL	Hydraulic Grade Line
HSPS	High Service Pump Station
ICSDC	Initial Commission System Design Capacity
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
IGA	Intergovernmental Agreement
IPS	Intermediate Pump Station

ISF	Intermediate Storage Facility
MBE	Minority Business Enterprise
MGD	million gallons per day
OM&R	Operation, Maintenance and Replacement
PCCP	Prestressed Concrete Cylinder Pipe
PLC	Programmable Logic Controller
Ppm	parts per million
psi	pounds per square inch
PS	Pump Station
SCADA	Supervisory Control and Data Acquisition
SRF	State Revolving Fund
SUE	Subsurface Utility Engineering
SWPS	Southwest Pumping Station
VBE	Veteran Business Enterprise
WBE	Women Business Enterprise
WIFIA	Water Infrastructure Finance and Innovation Act
WPP	water purification plant

1 Introduction

1.1 Basis of Design Objective

Since the GPWC Members' decision in February 2022 to proceed with development of a new Lake Michigan water source and a *Preliminary Agreement Regarding Formation of a Water Commission*[1], significant commission formation, engineering, and supporting efforts have been undertaken. These efforts have focused on the advancement of agreements, land acquisition, financing arrangements, and detailed engineering for the purchase of treated Lake Michigan water from the City of Chicago, the governance and membership of a Grand Prairie Water Commission (GPWC), the infrastructure required to bring Chicago water to the southwest suburban area, and complete delivery of the Alternative Water Source Program by 2030. Particular emphasis has been placed on the development of a quality system that is reliable, resilient, and economical for GPWC Members and their residents. Throughout this document the Alternative Water Source Program is referred to by its initials, AWSP, or simply the Program.

This 2024 Basis of Design presents a current description of the configuration, features, and key design criteria of the proposed system to deliver the new Lake Michigan water source. It is intended to replace the Basis of Design document included as Exhibit C to the *Preliminary Agreement* and provide GPWC Members and other AWSP stakeholders with an updated understanding of the Program design criteria being used to establish estimated program costs. The 2024 Basis of Design also documents the way in which the Program will be developed and implemented. The document defines the baseline for design and associated costs of the infrastructure to be designed and constructed by the GPWC.

This 2024 Basis of Design is an exhibit to the Intergovernmental Agreement for Program Management ("Program Management Agreement") between the Grand Prairie Water Commission and the City of Joliet. These materials should be considered with the Water Supply Agreement - City of Chicago and City of Joliet[2] and other key commission formation documents including:

- Intergovernmental Agreement to Establish the Grand Prairie Water Commission (*IGA*)
- Grand Prairie Water Commission Water Supply Agreement (*WSA*)
- Grand Prairie Water Commission Bylaws (Bylaws)

[1] *Preliminary Agreement Regarding Formation of a Regional Water Commission. Final Executed Copy. February 22, 2022.* www.gpwc-il.org. Information Center/Reports.
[2] *Water Supply Agreement – City of Chicago and City of Joliet.* Execution Copy. May 1, 2023. www.gpwc-il.org. Information Center/Reports.

In the event of a conflict between this 2024 Basis of Design and the provisions of any of the agreements listed above, the provisions in the respective executed agreement shall control.

1.2 Alternative Water Source Program Team

The Program Team charged with the development and implementation of the Alternative Water Source Program is being led by the City of Joliet (Program Manager), but includes multiple other entities including:

- The Stantec-CMT Team of engineering and program management consultants,
- An Independent Review firm (Burns & McDonnell), and
- Legal, and financial specialists retained by the City of Joliet.

The Stantec-CMT Team was retained by the City of Joliet in April 2020[3] to serve as the lead engineering and program management consultant for AWSP design, bidding, construction, and commissioning activities after a thorough, competitive selection process. Primary members of the Stantec-CMT Team include:

- Stantec Consulting Services, Inc. (Prime Consultant)
- Crawford, Murphy & Tilly, Inc. (Lead Subconsultant to Stantec)
- Engineering Enterprises, Inc. (Subconsultant to Stantec)
- Strand Associates, Inc. (Subconsultant to Stantec)
- Cornwell Engineering Group, Inc. (Subconsultant to Stantec – Corrosion Control Expert)
- V3 Companies, Ltd. (Subconsultant to Stantec)
- Images, Inc. (Subconsultant to Stantec – Public Outreach/Communications)

The Stantec-CMT Team has and will continue to engage additional subconsultants for specialized support (e.g., geotechnical field investigations, engineering support services, strategic communications, etc.) where appropriate for matters within the scope of the Program and in order to implement the local and disadvantaged business enterprises strategy recognized in the Program Management Agreement.

The Stantec-CMT Team's role is to work with Joliet to provide the overall coordination, management, engineering design, permitting, financial consulting, and construction management services required to drive the completion of the AWSP.

[3] While the Program Team was retained in 2020, work on the new Lake Michigan water source from the City of Chicago did not begin until February 2021.

Legal and financial service providers retained separately by Joliet to support Program activities include:

- Donahue & Rose (Special Legal Counsel)
- Speer Financial (Financial Consultant)
- Katten, Muchin Rosenman, LLP (Bond Counsel)
- JP Morgan (Underwriter)

The Program Team also continues to receive valuable input from technical, administrative, and elected representatives of the GPWC Member communities regarding the development and formation of a regional water commission. The City of Joliet, with the support of its consultants, is leading current efforts related to the formation of the GPWC. Details related to Joliet's authority and responsibilities as the Program Manager are defined in its Program Management Agreement with the GPWC.

1.3 Changes to the Basis of Design

Within this document, minimum design criteria are noted for each system component. Table 1-1 below presents the current design level of each of the program components as they have been grouped into capital improvement projects (CIP) and further divided into construction work packages. Given the current level of design and uncertainty regarding certain elements of the proposed system, design criteria presented may, in some cases, need to change as design progresses to address regulatory, permitting, environmental, or site-specific conditions. It is understood that these changes will be communicated with GPWC Members.

Changes to design criteria that are not required, but which may be beneficial to the GPWC, can be made by the Program Team at the direction of the Program Manager if neither program costs nor program schedule are increased/lengthened. As of the date of this 2024 Basis of Design, Section 5.6.C.ii of the GPWC Bylaws provides that modifications to the Basis of Design that increase Program costs (other than modifications due to requirements of applicable laws, rules, or regulations, or by written agreement necessary for the implementation of the Project, such as easements or intergovernmental agreements that were not anticipated at the time of the Basis of Design) require the unanimous approval of the GPWC Board of Commissioners. In addition, any modifications to the Basis of Design that alter the design criteria in a manner that decreases reliability or quality also require unanimous approval of the GPWC Board of Commissioners. Finally, any modifications to the Basis of Design that extend schedule beyond the Targeted Water Delivery Date also require unanimous approval of the GPWC Board of Commissioners.

Table 1-1 Current Design Level (As of the date of this 2024 Basis of Design)

Capital Improvement Project (CIP)	Work Package	Work Package Description	Current Level of Design as of June 2024
CIP #1 – Chicago Connection Facilities	AWSP-01-01	Tunnel Extension	90%
	AWSP-01-02	Suction Well	60%
	AWSP-01-03	Low Service and High Service Pump Stations	60%
CIP #2 – Finished Water Transmission Main	AWSP-02-01	Finished Water Transmission Main – Segment A	30%
	AWSP-02-02	Finished Water Transmission Main – Segment B	30%
	AWSP-02-03	Finished Water Transmission Main – Segment C	30%
	AWSP-02-04	Finished Water Transmission Main – Segment D	30%
	AWSP-02-05	Finished Water Transmission Main – Segment E	30%
	AWSP-02-06	Finished Water Transmission Main – Segment F	30%
CIP #3 – Intermediate Pump Station 1/Storage Facility 1	AWSP-03-01	Intermediate Pump Station 1/Storage Facility 1	30%
CIP #4 – Intermediate Storage Facility 2	AWSP-04-01	Intermediate Storage Facility 2	30%
CIP #5 – Regional SCADA and Communications System	AWSP-05-01	Fiber and Network Installation	30%
	AWSP-05-02	SCADA Programming/Integration	30%
	AWSP-05-03	Video Surveillance	30%
	AWSP-05-04	Security System	30%
CIP #6 – Regional Water Transmission Main	AWSP-06-01	Regional Water Transmission Main – Segment A	30%
	AWSP-06-02	Regional Water Transmission Main – Segment B	30%
	AWSP-06-03	Regional Water Transmission Main – Segment C	30%
	AWSP-06-04	Regional Water Transmission Main – Segment D	30%

Capital Improvement Project (CIP)	Work Package	Work Package Description	Current Level of Design as of June 2024
	AWSP-06-05	Regional Water Transmission Main – Segment E	30%
	AWSP-06-06	Water Delivery Structures – Group 1	30%
	AWSP-06-07	Water Delivery Structures – Group 2	Preliminary
	AWSP-06-08	Water Delivery Structures – Group 3	Preliminary
	AWSP-06-09	Water Delivery Structures – Group 4	Preliminary
CIP #7 Mega Crossings	AWSP-07-01	Water Transmission Main: Cal-Sag Crossing	30%
	AWSP-07-02	Water Transmission Main: Des Plaines River Crossing	30%
CIP #10 Commission Office	AWSP-10-01	GPWC Commission Office	Preliminary
CIP #11 System-wide Commissioning and Start-up	AWSP-11-01	System-wide Commissioning and Start-up	Preliminary

1.4 Grand Prairie Water Commission

1.4.1 Basis for the Grand Prairie Water Commission

The Regional Water Commissions Act (*65 ILCS 5/11-135.5-1* et seq.) defines the legal framework under which the Grand Prairie Water Commission is created and will operate. The Act defines the mechanism by which a new water commission is formed, the structure for organization and governance of the commission, and provisions for funding efforts related to commission development. The *Preliminary Agreement Regarding Formation of a Water Commission* approved by the Cities of Joliet and Crest Hill and the Villages of Channahon, Minooka, Romeoville, and Shorewood in February 2022 built upon the Act and established key principles and an overall plan for the development of a new regional water commission to purchase treated water from the City of Chicago and convey it to the Water Delivery Structure(s) for each of the Member communities. The Intergovernmental Agreement to Establish the Grand Prairie Water Commission (*IGA*) supersedes the Preliminary Agreement and provides for formal creation of the GPWC.

1.4.2 GPWC Member Water Allocations

The Preliminary Agreement required each of the Commission Members to apply for and work to obtain from the Illinois Department of Natural Resources (IDNR) a Lake Michigan water allocation permit granting the Member the right to use Lake Michigan water as its source of water supply. As of February 9, 2024, all six Members had received their

allocation orders from the IDNR and no appeals were taken so all are final orders. Table 1-2 summarizes characteristics of the Member allocations.

Table 1-2 Member Lake Michigan Water Allocations

	Allocation Order or Permit Date	Authorized 2050 Water Allocation (MGD)	NRW Conditions
Channahon	11-14-2023	1.467	NRW < 10% of Water Supplied for 1 year prior to beginning use of Lake Michigan water
Crest Hill	12-12-2023	2.584	NRW < 10% of Water Supplied for 1 year prior to beginning use of Lake Michigan water
Joliet	11-17-2021	18.604	NRW < 10% of Water Supplied by 09-30-2030
Minooka	11-14-2023	1.483	NRW < 10% of Water Supplied for 1 year prior to beginning use of Lake Michigan water
Romeoville	12-11-2023	4.695	NRW < 10% of Water Supplied for 1 year prior to beginning use of Lake Michigan water
Shorewood	02-28-2006[1]	1.817[1]	Annual Water Supply Improvement Plan required if NRW > 10% of Water Supplied

[1] 2050 allocation amount for Shorewood based on update report (May 4, 2022) published by IDNR.

1.5 Alternative Water Source Program Overview

1.5.1 Program Mission

The direction and actions associated with implementation of the Alternative Water Source Program are guided by the mission statement presented in the *Alternative Water Source Program Implementation Strategic Plan*. The mission of the AWSP is:

> *To provide a sustainable, reliable and high-quality water supply for our communities by 2030 and beyond in order to support public health, safety, economic interests and quality of life.*

Data and analysis clearly indicate the groundwater aquifers in the upon which the Members rely will be impacted by either depletion of the deep aquifer or the deterioration of shallow aquifer water quality. Therefore, groundwater is not sustainable as a long-term source of potable water for the Members. The Alternative Water Source Program is a collaborative, regional effort among the GPWC Members to accomplish

their stated mission and provide their communities a reliable source of high quality, treated Lake Michigan water sufficient to meet existing and future demands associated with long-term growth and development.

1.5.2 Alternative Water Source Program Infrastructure Configuration

The infrastructure needed to bring water from Chicago to the GPWC Member communities includes four major system components:

1. Existing water supply and production facilities (owned by Chicago). The existing water supply and production facilities include the 68th Street/Dunne Crib complex, a 14-foot-diameter intake tunnel that connects the crib complex to shore facilities, the 720 million gallons per day (MGD) Eugene Sawyer Water Purification Plant (WPP), and the South Tunnel System segments that convey treated water from the Sawyer WPP to the Southwest Pumping Station (SWPS) site.

2. New water transmission infrastructure to convey the water to the Southwest Suburbs (including facilities owned by Chicago and facilities owned by the GPWC). The new water transmission system infrastructure will include a tunnel connection, tunnel extension, low service pump station, and service valve that will be owned by the City of Chicago. It will also include a meter vault, suction well and high service pump station adjacent to the Chicago Department of Water Management (CDWM) Southwest Pumping Station, approximately 37 miles of large diameter water transmission main (66" & 60" diameter), approximately 25 miles of smaller diameter transmission main (less than 60" diameter), transmission pumping and storage facilities to be owned by the GPWC, and space for an office and control center. No final decision regarding the location of the office space and control center has been made as of June, 2024. For the purpose of the budget presented in this 2024 Basis of Design, it is assumed that office space and a control center will be constructed as an addition to a proposed GPWC facility at a location to be determined.

3. New water delivery infrastructure through which water is provided to individual GPWC Members (owned by the GPWC). Water will be provided to each Member of the GPWC through one or more Water Delivery Structures designed according to a standard template, with 3 types based on range of flows anticipated, to provide for effective metering and water supply.

4. Existing and new water distribution infrastructure through which water is delivered by GPWC Members to their individual customers (owned by the individual GPWC Members). Each GPWC Member will continue to operate the local pumping, storage, and distribution infrastructure needed to serve their individual water customers. Member responsibility begins at the first valve located on the combined discharge line downstream of each Water Delivery Structure.

Figure 1-1 shows a schematic representation of the system components and the infrastructure that make up each component. Future Water Delivery Structures and infrastructure are not shown below.

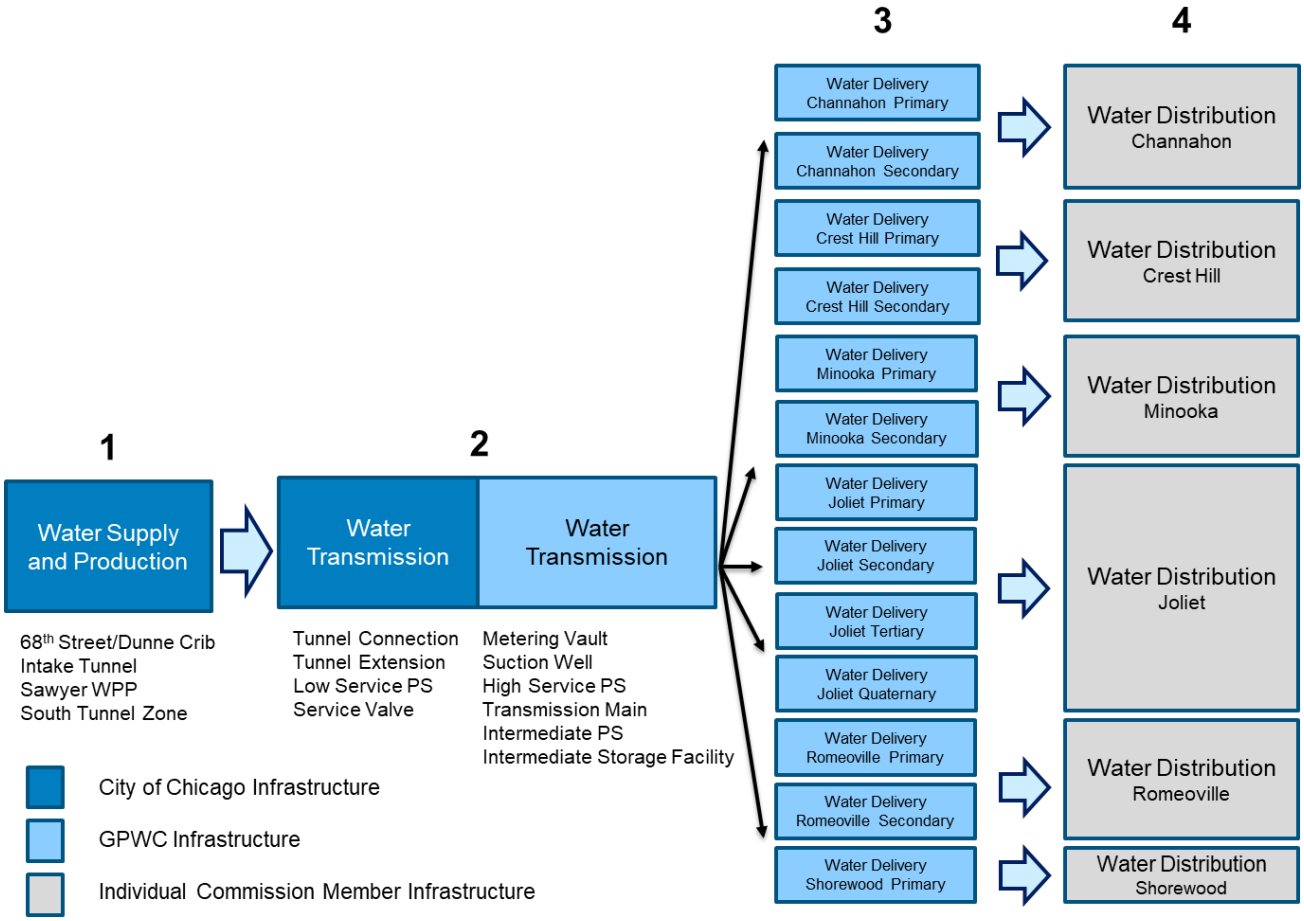


Figure 1-1 Alternative Water Source Program System Configuration

1.5.3 Alternative Water Source Program Implementation Schedule

The Alternative Water Source Program is structured to provide for the delivery of Lake Michigan water to the Member Water Delivery Structures by May 1, 2030. This date is driven by groundwater modeling analyses that suggest some Members' wells may not be able to supply sufficient water to meet projected maximum day demands by 2030. Meeting Member needs will be pursuant to an established Program Schedule. The future GPWC Members adopted Baseline Program Schedule 1.0 for implementation of the Program in August 2023.The Baseline Program Schedule was reviewed in early 2024, and an updated Baseline Program Schedule 2.0 was adopted in March 2024. Future re-baselining of the schedule will be presented annually to the GPWC Board of Commissioners for approval pursuant to the Program Management Agreement.

Exhibit 1-1 shows the current Baseline Program Schedule 2.0. This exhibit illustrates the planned timing for design, bidding, and construction of the multiple work packages that make up the AWSP.

1.5.4 Alternative Water Source Program Responsibilities and Features

Successful implementation and operation of the AWSP will require the coordinated collaboration of the City of Chicago, the GPWC, and the GPWC Member communities. These entities all have specific roles and responsibilities related to development of this new water system as outlined below.

1.5.4.1 City of Chicago Roles and Responsibilities

Under the Water Supply Agreement negotiated between the City of Chicago and City of Joliet dated May 1, 2023 ("Chicago-Joliet Water Supply Agreement"), Chicago will have responsibility for supplying treated water to the site of the proposed connection between the Chicago Water System and the GPWC infrastructure to be located adjacent to Chicago's existing Southwest Pumping Station. A schematic of Chicago water supply and production facilities required to deliver treated water the GPWC water system is shown in Figure 1-2. City of Chicago facilities include:

- 68th Street/Dunne Intake Crib and 14-foot-diameter Intake Tunnel (existing)
- 720 MGD Eugene Sawyer WPP (existing)
- Portions of the South Tunnel System (existing)
- A new Tunnel Connection to the South Tunnel System (to be constructed by the City of Chicago))
- A new Tunnel Extension (proposed as Work Package AWSP-01-01)
- A new Low Service Pump Station (proposed as part of Work Package AWSP-01-03)
- A new Chicago Service Valve (proposed as part of Work Package AWSP-01-03)

The Chicago Service Valve will be the point of demarcation between the City of Chicago water system and the GPWC system. Descriptions of the existing City of Chicago facilities that will treat and supply water to GPWC are presented in Section 3.

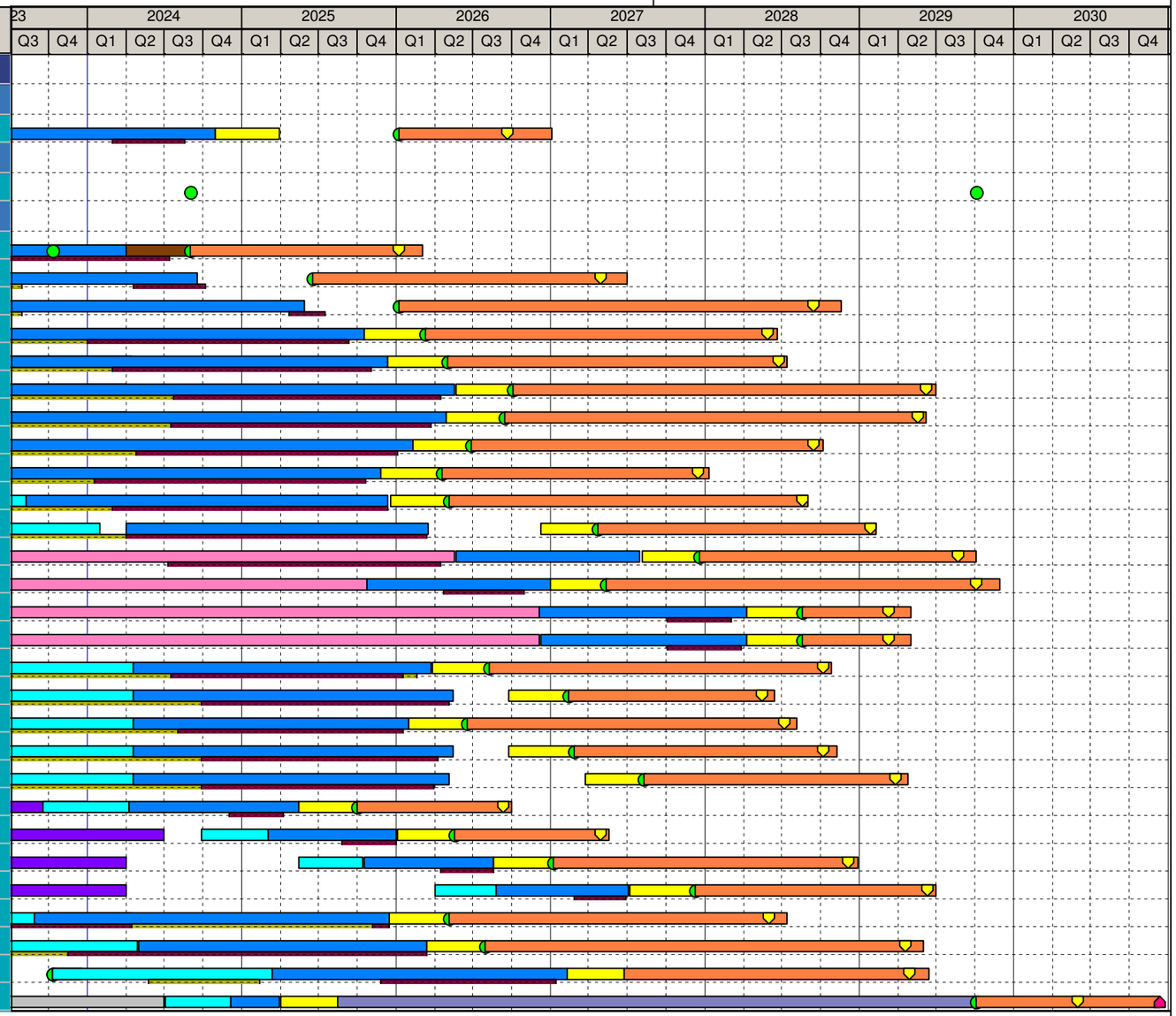
As required by the Chicago-Joliet Water Supply Agreement, Chicago has granted to Joliet (for assignment to the GPWC once it is formed) the temporary and permanent easements, access rights, and other necessary property interests to allow for construction of the required infrastructure at the Southwest Pumping Station site and adjacent Durkin Park site in Chicago (Completed in July 2023).

GRAND PRAIRIE WATER COMMISSION

Grand Prairie Alternative Water Source Program

Data Date: 01-Jan-24 Layout: JAWSP Single Line Projects Layout Com

Activity Name	Start	Finish
AWSP Alternative Water Source Program	01-Jan-21 A	10-Apr-31
Chicago Chicago Activities	01-Jan-21 A	04-Jan-27
CDWM-01-01 Tunnel Connection	01-Jan-21 A	04-Jan-27
Program Administration	04-Jan-21 A	10-Apr-31
PGM01 AWSP Program Activities	04-Jan-21 A	10-Apr-31
RWCAWSP Water Commission AWSP	04-Jan-21 A	10-Apr-31
AWSP-01-01 Tunnel Extension	21-Jan-21 A	16-Apr-26
AWSP-01-02 Suction Well	21-Jan-21 A	03-Aug-27
AWSP-01-03 Low Service Pump Station and High Service Pump Station	04-Jan-21 A	04-Jan-29
AWSP-02-01 Finished Water Transmission Main - Segment A	15-Feb-21 A	01-Aug-28
AWSP-02-02 Finished Water Transmission Main - Segment B	15-Feb-21 A	24-Aug-28
AWSP-02-03 Finished Water Transmission Main - Segment C	03-May-21 A	10-Aug-29
AWSP-02-04 Finished Water Transmission Main - Segment D	03-May-21 A	20-Jul-29
AWSP-02-05 Finished Water Transmission Main - Segment E	03-May-21 A	20-Nov-28
AWSP-02-06 Finished Water Transmission Main - Segment F	03-May-21 A	24-Feb-28
AWSP-03-01 Intermediate Pump Station 1 & Intermediate Storage Facility 1	15-Jan-21 A	13-Oct-28
AWSP-04-01 Intermediate Storage Facility 2	15-Jan-21 A	23-Mar-29
AWSP-05-01 Fiber and Network Installation	17-Feb-21 A	15-Nov-29
AWSP-05-02 SCADA Programming and Installation	16-Feb-21 A	11-Jan-30
AWSP-05-03 Video Surveillance	17-Feb-21 A	30-May-29
AWSP-05-04 Security System	15-Sep-22 A	11-Jan-30
AWSP-06-01 Regional Transmission Main - Segment A	12-Feb-21 A	12-Dec-28
AWSP-06-02 Regional Transmission Main - Segment B	12-Feb-21 A	26-Jul-28
AWSP-06-03 Regional Transmission Main - Segment C	12-Feb-21 A	18-Sep-28
AWSP-06-04 Regional Transmission Main - Segment D	12-Feb-21 A	21-Dec-28
AWSP-06-05 Regional Transmission Main - Segment E	12-Feb-21 A	07-Jun-29
AWSP-06-06 Water Delivery Structures - 1	01-Mar-21 A	13-Nov-26
AWSP-06-07 Water Delivery Structures - 2	01-Mar-21 A	30-Jun-27
AWSP-06-08 Water Delivery Structures - 3	01-Mar-21 A	09-Feb-29
AWSP-06-09 Water Delivery Structures - 4	01-Mar-21 A	13-Aug-29
AWSP-07-01 Cal-Sag Crossing	15-Mar-21 A	23-Aug-28
AWSP-07-02 Des Plaines River Crossing	01-Feb-22 A	12-Jul-29
AWSP-10-01 Commission Office	12-Oct-23 A	24-Jul-29
AWSP-11-01 System-wide Start-up and Commissioning	01-Nov-22 A	10-Apr-31



Start MS
Planning
Preliminary Design
Design Coordination
General Delivery Structure Pre-Design
Final Design
ROW
PERMIT
CMAR GMP
Bid/Award
CX Maintenance
Construction
Substantial
Final W/ Delivery Structures
HOLD

Exhibit
1-1

Title
AWSP Program Implementation Schedule

Date	Revision	Checked	Approved
14-Nov-23	UPDATE OCT'23	JJG	
14-Dec-23	UPDATE Nov'23	JJG	
13-Feb-24	UPDATE Dec23 with Prop...	JJG	

Other select Chicago responsibilities related to the Alternative Water Source Program include:

- supply treated water at the Chicago Service Valve for a term through at least December 31, 2123,
- supply water that meets federal, state, and local standards for public water supplies and is commensurate in quality with that furnished to customers within the City of Chicago municipal limits, and
- completion of an annual cost of service study to serve as the basis for determination of the volumetric rate at which the GPWC will be charged for water purchased from the City of Chicago.

Details related to the supply of water to the GPWC from the City of Chicago are contained in the previously referenced Chicago-Joliet Water Supply Agreement.

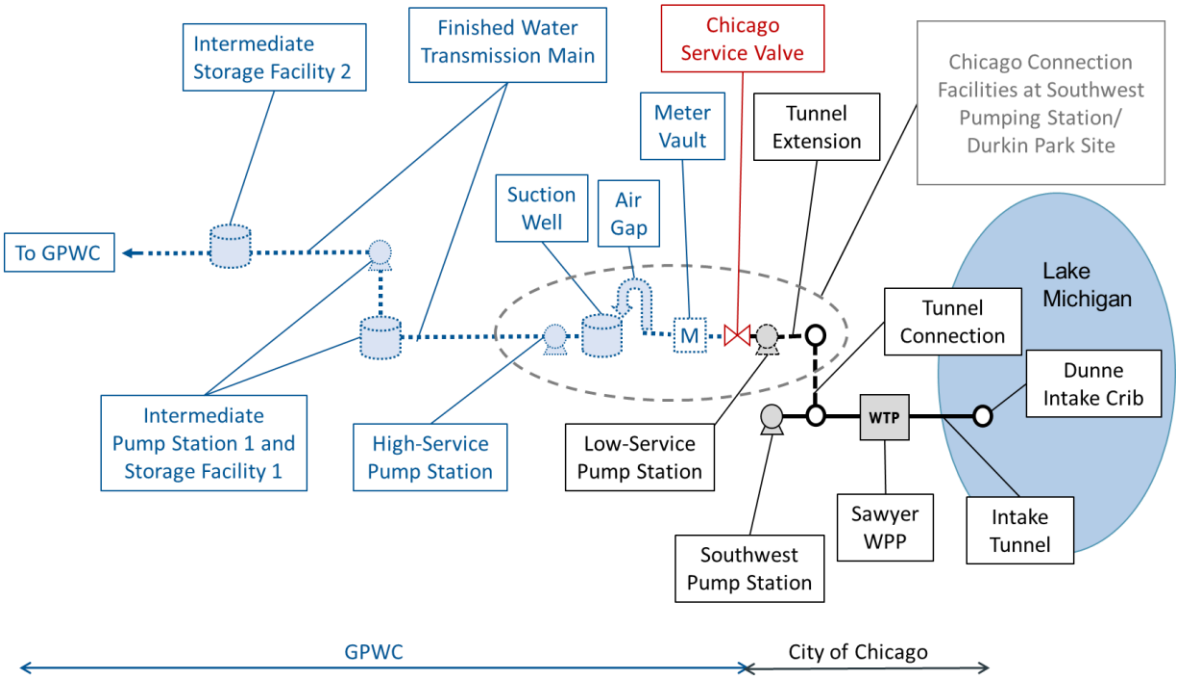


Figure 1-2 City of Chicago Water Supply for the Grand Prairie Water Commission

Overall responsibilities related to the planning, design, construction, financing, and operation of the facilities to be owned and operated by the City of Chicago are summarized in Table 1-4. The City of Chicago is responsible for the design and construction of the new Tunnel Connection. As noted previously, Joliet is serving as the overall Program Manager for implementation of the Program and will contract for and finance engineering design and construction engineering services for the new Tunnel Extension, new Low Service Pump Station, and new Chicago Service Valve that will

eventually be owned and operated by the City of Chicago. The GPWC will contract for construction of these facilities while Chicago will finance the construction and will take over ownership along with responsibilities for operation and maintenance once the improvements have been constructed and start-up/commissioning has been completed.

Table 1-3 Responsibilities for Alternative Water Source Program Supply and Production Facilities to be Owned by the City of Chicago

	Design and Construction Engineering Activities	Design and Construction Engineering Costs	Construction Contracting	Construction Costs	Facility Ownership	Operation & Maintenance
Intake Crib and Tunnel	Not Applicable – Existing Facilities				Chicago	Chicago
Sawyer WPP					Chicago	Chicago
South Tunnel System					Chicago	Chicago
Tunnel Connection	Chicago	Chicago	Chicago	Chicago	Chicago	Chicago
Tunnel Extension	Joliet*	Joliet*	GPWC	Chicago	Chicago	Chicago
Low Service Pump Station	Joliet*	Joliet*	GPWC	Chicago	Chicago	Chicago
Chicago Service Valve	Joliet*	Joliet*	GPWC	Chicago	Chicago	Chicago

Note:
* Retained as Program Manager working on behalf of the GPWC

Key:
GPWC = Grand Prairie Water Commission
WPP = water purification plant

1.5.4.2 Grand Prairie Water Commission Roles and Responsibilities

The GPWC will purchase treated Lake Michigan water from the City of Chicago and accept the water at the Chicago Service Valve for delivery to Water Delivery Structures of Commission Members. The Program Management Agreement between the GPWC and Joliet defines Joliet's authority and responsibilities as the overall Program Manager for completion of the Program including design, construction, start-up and commissioning of the Project Facilities. GPWC Member communities will participate in the Program as identified in the *IGA* and described in the following section.

Infrastructure that will be constructed as part of the AWSP and owned, operated, and maintained by the GPWC includes:

- Chicago Connection Facilities Meter Vault (part of Work Package AWSP-01-03)
- Chicago Connection Facilities Suction Well (reservoir) in Durkin Park (Work Package AWSP-01-02)
- Chicago Connection Facilities High Service Pump Station adjacent to Chicago's Southwest Pumping Station (part of Work Package AWSP-01-03)
- New water transmission main (60- and 66-inch diameter) from Chicago Connection Facilities to the region (Work Packages AWSP-02-01/02/03/04/05/06 and AWSP-07-01/02)
- Intermediate Pump Station (IPS1) and Storage Facility (ISF1) (Work Package AWSP-03-01)
- Intermediate Storage Facility 2 (ISF2) (Work Package AWSP-04-01)
- New water transmission main 48-inch and smaller diameter to convey water to Commission Member Water Delivery Structures located throughout the GPWC service area (Work Packages AWSP-06-01/02/03/04/05)
- Water Delivery Structures for each commission Member (Work Packages AWSP-06-06/07/08/09), and
- a Commission Office (CIP #10).

The GPWC will construct, own, and operate all infrastructure downstream of the Chicago Service Valve through the Point of Delivery located at the first valve located on the combined discharge line downstream of each Water Delivery Structure. Costs for the infrastructure required to establish one primary Water Delivery Structure for each commission Member (including transmission main and Water Delivery Structure) will be included in the total Program costs to be shared by all GPWC Members. Costs associated with the provision of additional Water Delivery Structures for any Member (non-primary Points of Delivery), will be paid by that Member. This includes the cost of the Connecting Main from the GPWC transmission main to non-primary Water Delivery Structures as well as the cost of the non-primary Water Delivery Structures and associated SCADA communication equipment. Figure 1-3 is a general schematic of the proposed GPWC system (not all proposed Commission Infrastructure is shown in the figure). Responsibilities related to the planning, design, construction, financing, and operation of these facilities are summarized in Table 1-5. Efforts related to the acquisition of land or right-of-way for improvements will be led by Joliet in its role as Program Manager. Ownership of land rights acquired by Joliet prior to Commission formation will be formally assigned to the GPWC after the Commission is established.

The City of Joliet has been leading efforts related to the development of the GPWC water system since February 2022. Joliet will continue in this role, as the GPWC Program Manager, throughout the completion of the design, permitting, land acquisition, construction, start-up and commissioning activities required to implement the Program

as described in the Program Management Agreement. The GPWC will hold all construction contracts for commission infrastructure and be responsible for operation and maintenance of the new infrastructure once constructed and start-up/commissioning is completed. Once start-up, commissioning, and water quality monitoring during an appropriate transition period are completed and all Program contracts are completed and closed, Joliet's management of the Program will conclude as provided in the Program Management Agreement.

Once the GPWC system is operational, the GPWC will be responsible for purchasing treated Lake Michigan water from the City of Chicago and conveying that water to the Water Delivery Structures for all its Members. The GPWC will deliver water to Members at a minimum pressure and minimum chlorine residual per regulatory requirements which are currently a minimum normal working pressure of 20 pounds per square inch (psi) on all transmission main finished water (Title 35 IL Admin. Code, Section 604.1415.a.2) and a minimum free chlorine residual of 0.5 parts per million (Title 35 IL Admin. Code, Section 604.725.a)and agreed upon level of orthophosphate for corrosion control. The target free chlorine residual and orthophosphate level (with maximum upper limit) will be determined in consultation with the Member communities. However, the target free chlorine residual and orthophosphate level will not be lower than the free chlorine residual and orthophosphate level supplied by Chicago at the Chicago Service Valve.

Figure 1-3 GPWC System General Arrangement

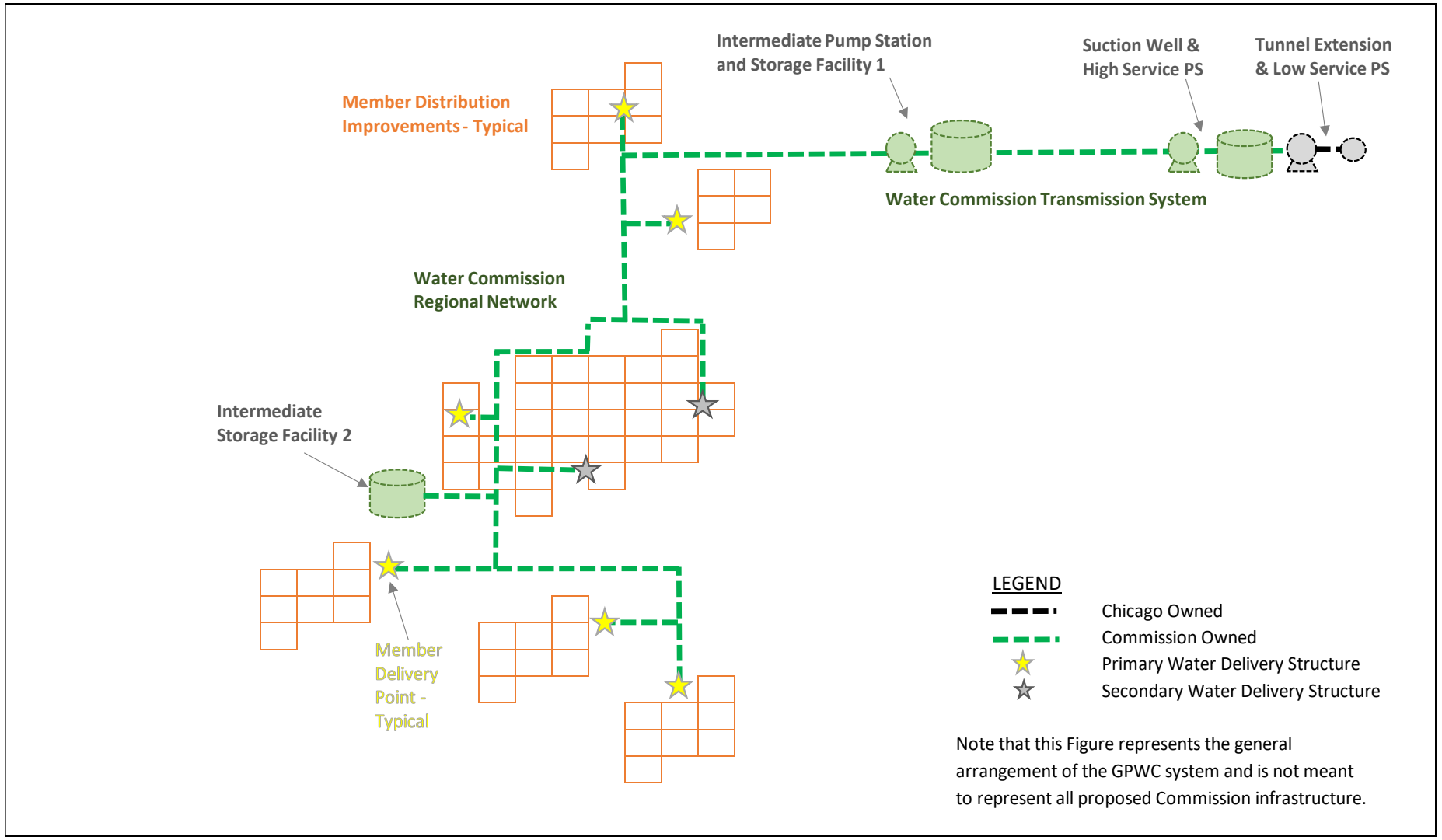


Table 1-4 Responsibilities for Alternative Water Source Program Facilities to be Owned by the Grand Prairie Water Commission

	Design and Construction Engineering Activities	Design and Construction Engineering Costs	Construction Contracting	Construction Costs	Facility Ownership	Operation & Maintenance
Meter Vault	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
Suction Well	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
High Service Pump Station	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
Transmission Main	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
Intermediate Pump Station/ Storage Facility 1	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
Intermediate Storage Facility 2	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
Regional Transmission Main	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
Water Delivery Structures (Primary)	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC
Water Delivery Structures & Piping (non-Primary)	Joliet*	Joliet**	GPWC	GPWC/ Member***	GPWC	GPWC
Commission Office (addition to IPS1)	Joliet*	Joliet**	GPWC	GPWC	GPWC	GPWC

Note:

* Retained as Program Manager working on behalf of the GPWC

** Joliet expenditures for Design and Construction Engineering Costs will be treated as Advanced Development Costs as described in the Water Supply Agreement.

*** Construction costs for non-primary Water Delivery Structures (and associated Connecting Main) will be allocated to the respective Member requiring non-primary Water Delivery Structures in the overall allocation of costs for GPWC infrastructure.

Key:
GPWC = Grand Prairie Water Commission

1.5.4.3 Grand Prairie Water Commission Member Responsibilities and Timeline

The specific responsibilities of GPWC Members are defined in detail in the *IGA* and the *WSA*.

As of the date of this 2024 Basis of Design, all Members are coordinating with the Program Team to define the detailed location of the easements required for their Water Delivery Structures and provide supporting information (survey, geotechnical investigation results) for design of the facilities in accordance with the Program schedule.

During implementation of the Program, GPWC Members will provide input to the Program as described in the *PMA* and make payments to the GPWC pursuant to the *WSA* including for Commission administration costs, Commission capital and debt service costs, and Commission operation, maintenance, and replacement (OM&R) reserve.

1.5.4.4 Member Responsibilities for Local Distribution Infrastructure

Throughout Program implementation and after start-up of the GPWC system, each Member community will retain full responsibility for the operation and maintenance of its own public water supply downstream of the Point of Delivery to the Member. Each GPWC Member must plan, design, permit, and construct improvements downstream of its respective Points of Delivery to provide for the effective and reliable operation of its system. At a minimum, these improvements will include pumping facilities required to maintain service pressures in its system, water storage facilities with a total volume equal to two times its IDNR Lake Michigan Allocation (i.e., average day demand), and provisions for an alternate water supply source(s) for use in the event of a primary supply outage which exceeds two days in duration.

GPWC Members will also each have to complete their system-specific Water Source Transfer Plans and implement actions required to obtain regulatory approvals for their planned 2030 change in water source.

Efforts to plan, design, and implement needed local distribution system improvements, and complete individual water source transfer testing programs are currently in progress in all the Member communities.

1.6 Alternative Water Source Program Key Design Standards

A prudent approach to the design of a new system to serve existing and future demands over the next 100 years requires the use of adaptive management. Adaptive management allows for the flexibility to address unknown future conditions that cannot be contemplated at this time. This philosophy is being incorporated into design of the Program infrastructure.

As the GPWC System will be a public water supply, the Program infrastructure will be subject to issuance of permits by the Illinois Environmental Protection Agency (IEPA) and will have to be designed in accordance with Title 35 of the Illinois Administrative Code (Part F- Public Water Supplies), and the Great Lakes - Upper Mississippi River Board (GLUMRB) Standards (Ten States Standards), except where exceptions to specific requirements are obtained from IEPA or as otherwise required by law.

1.7 Program Level Strategies

1.7.1 Sustainability and Resiliency Strategy

In support of the overall mission of the AWSP, the Program Team has drawn upon principles from the Institute for Sustainable Infrastructure's Envision Framework[4] and crafted a strategy for sustainable and resilient design. The Envision framework encourages changes in the planning, design, and delivery of projects to create more sustainable, resilient, and equitable infrastructure. For the AWSP, the Program Team has adopted, as goals, specific sustainability and resiliency priorities from all five categories included in the Envision framework as listed below. These priorities are being used by the Program Team throughout AWSP implementation to maintain a focus on sustainability and resiliency.

Quality of Life

Advancing Equity and Social Justice – Ensure that equity and social justice are fundamental considerations within project process and decision making through stakeholder engagement and discussion among Program Team members.

Minimize Construction Impacts – Identify and manage the temporary impacts of construction on adjacent neighborhoods and properties at Program sites through outreach and coordination during design, as well as incorporation of impact mitigation measures into construction documents.

Leadership

Provide for Stakeholder Involvement – Develop, monitor, and refine plans for early and sustained stakeholder engagement and involvement in project decision making.

Foster Collaboration and Teamwork – Schedule and conduct regular meetings to promote early and consistent collaboration between designers, contractors, operators, and Grand Prairie Water Commission Members. Drive focus on the common goal of Program delivery by 2030.

[4] *Envision Sustainable Infrastructure Framework. Version 3.* Institute for Sustainable Infrastructure. 2018. https://sustainableinfrastructure.org/wp-content/uploads/EnvisionV3.9.7.2018.pdf

Resource Allocation

Reduce Operational Energy Consumption – Incorporate measures for managing energy usage at AWSP facilities into project designs. When the project is complete, energy use will likely be the largest recurring cost of operation for the water system. Reducing energy usage may be the best way to reduce the long-term cost of operation of the system.

Preserve Water Resources – Reduce regional use of the deep aquifer and plan for the efficient use of the new Lake Michigan source through promotion of best practices for water loss management and water conservation. Water quality and availability are a concern across the US and around the world. Increased usage, limited ground water recharge, and variability in the hydrologic cycle present significant challenges for many communities.

Commission and Monitor Energy Systems – Prepare standard guidelines and design details for monitoring energy use at AWSP facilities after they are constructed. Monitoring the system is important for maintaining operational efficiency over the life of the project. Commissioning provides assurance that the system is functioning as intended at startup, while monitoring equipment and software allows operators to identify and isolate issues to maintain that energy efficiency over the life of the project.

Reduce Operational Water Consumption – Perform annual reviews of non-revenue water and customer water use trends to confirm that water is being used efficiently. Decreasing non-revenue water and reducing overall water consumption means less water treated and pumped, and more water for future generations.

Monitor Water Systems – Perform regular reviews of water system performance (water loss audits, reviews of power usage, pressure variation tracking, etc.) to monitor/identify changes in performance. Similar to the benefits of monitoring energy usage, monitoring flow and usage of water and detecting leaks early can save money in operations, reduce non-revenue water, and decrease energy consumption associated with treatment and pumping.

Natural World

Managing Stormwater – Minimize the impact of project improvements on stormwater runoff quantity, rate, and quality. Identify opportunities for incorporating stormwater best management practices into site designs for individual AWSP projects.

Preserve Sites of High Ecological Value – Implement National Environmental Policy Act (NEPA) guidelines and requirements

including the mitigation hierarchy of Avoidance, Minimization, Protection, and Offsetting.

Climate and Resilience

Evaluate Risk and Resilience – Conduct and review regularly a comprehensive risk evaluation to understand potential hazards or threats to program success. Risk is a factor of the probability of a threat/hazard occurrence, the potential impact on the Program, and the associated consequence of failure.

Improve Infrastructure Integration – Enhance the operational relationships and strengthen the functional integration of the project into connected, efficient, and diverse infrastructure systems.

The AWSP is a multi-faceted effort with multiple design teams. This strategy for sustainable and resilient design is intended to facilitate and provide a consistent framework for incorporating sustainability and resiliency into the planning, design, construction, and operation of the required infrastructure improvements. A summary of the *Sustainable and Resilient Design Strategy* for the Alternative Water Source Program is available on the GPWC website at: *GPWC Sustainable and Resilient Design Strategy*.

1.7.2 Local and Disadvantaged Business Enterprise Engagement Strategy

The AWSP represents one of the largest single investments in public infrastructure undertaken within the southwest suburbs of Chicago. In addition to providing the region with a reliable, long-term source of high-quality drinking water, the AWSP will create significant economic opportunity for businesses in the construction, technical, and financial sectors.

Given the importance of the AWSP to the region, it is recognized that the program must include a well-defined strategy for the effective engagement of local and Disadvantaged Business Enterprises (DBE) during final design and construction of the AWSP improvements**.** Engagement of local and DBE firms in the Program will benefit the region through:

- the injection of capital investment dollars into key sectors in the regional economy providing return on that investment in terms of economic and workforce development,
- the participation of entities with diverse backgrounds, perspectives, and capabilities in the analysis of challenges and effective delivery of the Program, and
- compliance with participation criteria used by state and federal agencies in evaluating programs for grant and/or low interest loan programs.

Elements of the *Local and Disadvantaged Business Enterprise Utilization Plan*, including outreach to potential local and DBE firms and plans for procurement of services, are tailored to the phases of the Program and structured to achieve compliance with

requirements for external funding programs including the Water Infrastructure Finance and Innovation Act (WIFIA) and the State Revolving Fund Loan Program. As of the date of this 2024 Basis of Design, WIFIA has not set quantitative metrics for DBE involvement for non-construction activities (e.g., design, engineering, etc.); rather, WIFIA loan recipients must demonstrate compliance with USEPA's Six Good Faith Efforts.[5] WIFIA goals for minority participation on construction work are county dependent. The current goal for Cook and Will Counties is 16.9%; for Grundy and Kendall Counties, the current minority participation goal is 18.4%. The goal for female participation nationwide is 6.9%. DBE engagement goals used by the Illinois Environmental Protection Agency for the State Revolving Fund Loan Program are currently 5% Minority Business Enterprise (MBE) and 12% Women Business Enterprise (WBE).

The Chicago-Joliet Water Supply Agreement also requires that the bidding and contractor selection process for work related to the Chicago Connection Facilities be conducted in accordance with the requirements of Articles III through and including IX of Chapter 2-92 of the Municipal Code of Chicago. This portion of the code includes requirements for participation by minority-owned business enterprises (MBE) of 26% and women-owned business enterprises (WBE) of 6% and local workforce development.

Chicago's requirements will apply to the following AWSP work packages being constructed within the City of Chicago:

- AWSP-01-01 Tunnel Extension
- AWSP-01-02 Suction Well
- AWPS-01-03 Low Service and High Service Pump Stations (which includes the Chicago Service Valve and Meter Vault)

The core AWSP Program Team includes one WBE firm (Images, Inc.) and one local firm (Strand Associates, Inc.). During the current design phase of the Program, the Team has conducted two specific solicitations to prequalify DBE or local firms to support ongoing design efforts, and engaged two additional DBE firms (one MBE, one WBE) to provide specialized support for specific Program activities.

In January 2022, the Team issued a Request for Qualifications for firms to provide geotechnical field investigation services for the Program. Qualifications packages were received from six firms including three WBE firms. Five of the six firms, including two of the WBE firms, were determined to be qualified to provide services for the Program. The sixth firm was determined to be qualified, but only for assignments not involving rock coring. To date, the Team has provided the firms with the opportunity to submit proposals for eight separate field investigation assignments.

[5] https://19january2017snapshot.epa.gov/sites/production/files/2013-09/documents/good_faith_efforts.pdf

A second solicitation specifically targeting DBE and local firms capable of providing engineering support for design activities was issued in October 2022. A total of 22 qualifications statements were received and reviewed. Of those, 21 firms including four local firms, nine MBE firms, six WBE firms, and three VBE firms were deemed qualified to be considered for design support tasks. As of February 2024, the Team has executed one subcontract with a qualified firm to provide maintenance of traffic design support for two conveyance work packages. In addition, a WBE firm (Waterwell) was recently retained to support community outreach activities in Chicago. Efforts are in progress to prepare and issue RFPs for additional design support activities. In addition, the Program Team will have an additional solicitation for DBE and local firms to support construction engineering activities.

Detailed plans for continued local and DBE firm engagement efforts during the multi-year construction phase of the AWSP will be developed as the overall schedule for bidding, award, and construction of individual work packages is defined. Activities that are anticipated to be essential to the success of this effort include:

- active engagement of local and DBE subconsultants and subcontractors as members of the Program Team providing support of overall program management and construction management activities.
- early, clear, and ongoing communication related to the scope and schedule for bid packages to the general and local/DBE contracting communities.
- monitoring, assessment, and refinement of bidding and contract documents especially as they relate to engagement of local and DBE firms.
- regular monitoring of local and DBE involvement in AWSP projects and the overall Program.
- recognition of local and DBE firms that successfully complete key program assignments as prime contractors or major subcontractors.

2 Alternative Water Source Program Design Flows

2.1 GPWC Members and System Configuration

Design flows for the AWSP presented in this 2024 Basis of Design are based on the sum of declared and estimated water demands provided by the six GPWC Member communities.

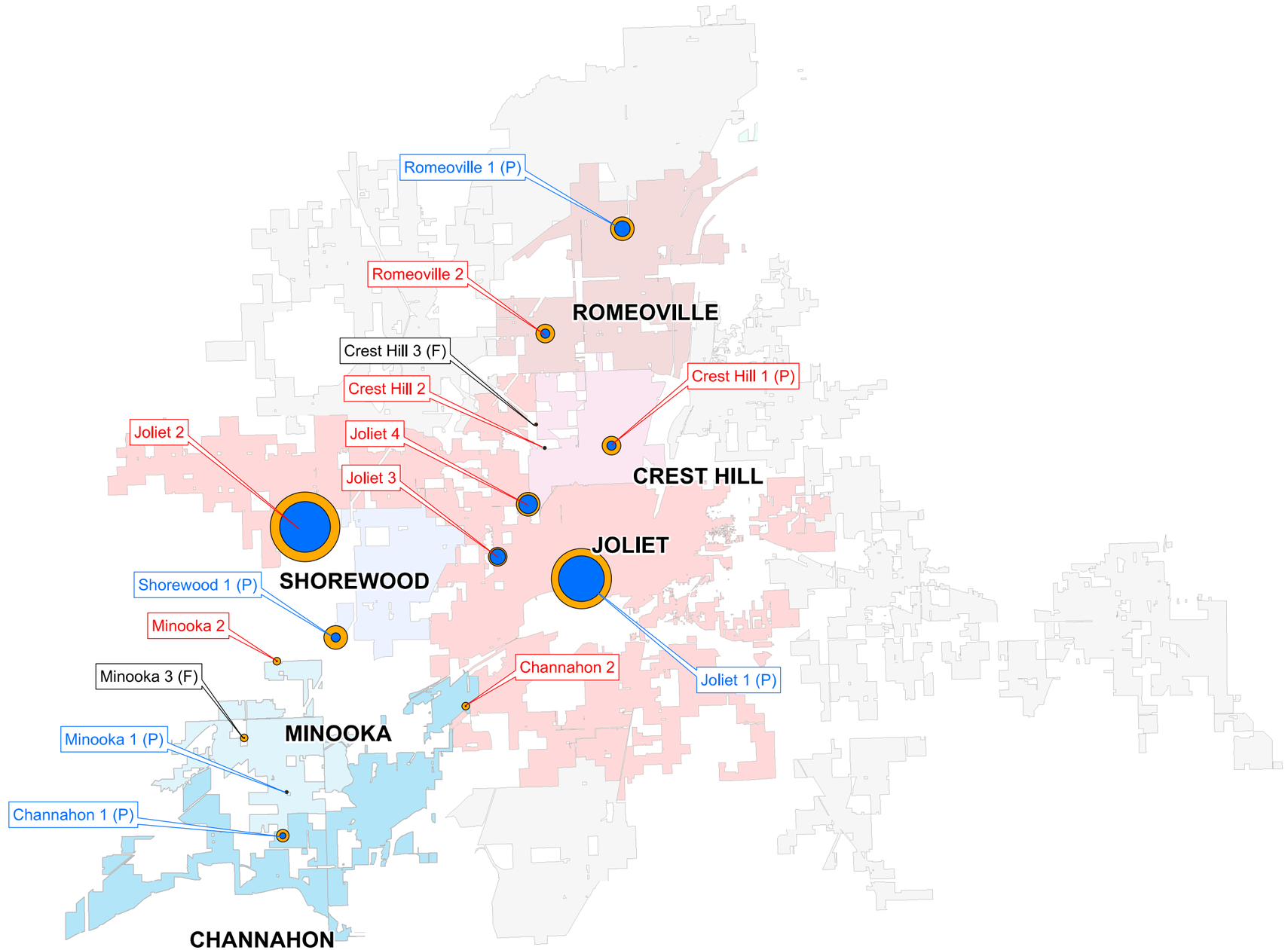
- Channahon
- Crest Hill
- Joliet
- Minooka
- Romeoville
- Shorewood

Key design capacity values used throughout the balance of this document are defined as follows:

- The Initial Commission System Design Capacity (ICSDC) is equal to the sum of the Members' 2050 Declared Maximum Day Demand values and is the capacity for which the initial Commission System will be designed and constructed.
- The Buildout Commission System Design Capacity (BCSDC) is equal to the sum of the Members' Estimated Buildout Maximum Day Demand values and will be considered in the design where appropriate to facilitate future expansion and operation of the Commission System.

Exhibit 2-1 shows the boundaries (as of the date of this 2024 Basis of Design) of the Commission Members as well as general locations of Member-identified Water Delivery Structures for each. The size of the circle used to designate the location of each Water Delivery Structure is representative of the projected 2050 Average Day Demand and Declared 2050 Maximum Day Demand to be supplied at that site. Projected 2030, 2050, and Buildout water demands provided by the communities for each Water Delivery Structure are summarized in Table 2-1.

The number and location of Water Delivery Structures required for each GPWC Member were determined through collaboration with Member water system representatives. As indicated previously, all piping connecting the Commission system to the Water Delivery Structures and the Water Delivery Structures will be designed, constructed, owned, and operated by the GPWC. Costs for the construction of infrastructure required to bring water to one Primary Water Delivery Structure for each community will be included in the costs shared by all GPWC Members. Where a GPWC Member requires more than one Water Delivery Structure, that Member will pay the costs for construction of any connection piping, including appurtenances, and structures associated with those Non-primary Water Delivery Structure.



GRAND PRAIRIE
WATER COMMISSION

Exhibit No.
2-1

Title
Member
2050 Average Day & Maximum Day Demands

Client/Project
GPWC
Alternative Water Source Program

Project Location
Will and Cook Counties

Prepared by JV on 3/29/2024

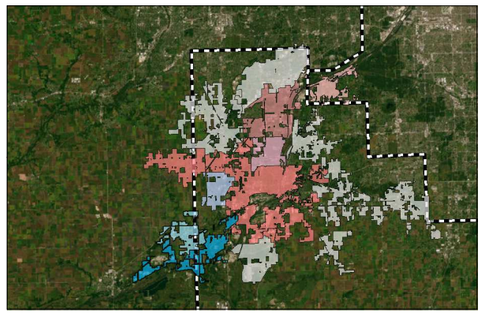
N

0 1.5 3 6 Miles

(At original document size of 22x34)
1 Inch = 8000 Ft

Legend

- 2050 Average Day Demand
- 2050 Maximum Day Demand



Location Map: Not to Scale

Notes
1. Coordinate System: NAD 1983 StatePlane Illinois East FIPS 1201 Feet
2. Data Sources: WILL CO., COOK CO., IDOT, INDOT, INDNR and USFWS DATA DOWNLOADED FROM WEB 3/11/2019 to 8/26/2019
3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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Document Path: J:\Joliet\20092094-00_JolietAWSPPrelimDesign\GIS\Maps\2050 Demand Heat Map 3-29.mxd

REV. JUNE 2024

Table 2-1 Projected 2030, 2050, and Buildout Demands: GPWC Members

GPWC Member	Water Delivery Structure Label*	2030 Demands (MGD)			2050 Demands (MGD)			Buildout Demands (MGD)		
		Min Day	Average Day	Max Day	Min Day	Average Day	Max Day	Min Day	Average Day	Max Day
Channahon	Primary	0.48	0.87	1.65	0.85	1.56	2.67	1.42	2.60	4.18
	Secondary (Wheeled through Joliet)	0.24	0.45	0.85	0.44	0.81	1.37	0.73	1.34	2.16
	TOTAL	***0.72***	***1.32***	***2.50***	***1.29***	***2.37***	***4.04***	***2.15***	***3.94***	***6.34***
Crest Hill	Primary	1.23	1.96	2.89	1.40	2.25	3.34	1.40	2.25	3.34
	Secondary	0.14	0.22	0.32	0.18	0.28	0.42	0.18	0.28	0.42
	Future	-	-	-	0.18	0.28	0.42	0.18	0.28	0.42
	TOTAL	***1.36***	***2.18***	***3.21***	***1.76***	***2.81***	***4.18***	***1.76***	***2.81***	***4.18***
Minooka	Primary	0.54	0.69	1.20	0.47	0.60	1.00	1.16	1.47	2.35
	Secondary (1)	0.66	0.84	1.46	0.66	0.84	1.40	1.62	2.05	3.29
	Future (1)	-	-	-	0.76	0.96	1.60	1.85	2.35	3.76
	TOTAL	***1.21***	***1.53***	***2.66***	***1.89***	***2.40***	***4.000***	***4.63***	***5.87***	***9.39***
Joliet	Primary	5.86	7.32	9.08	7.22	9.03	11.41	10.80	13.50	16.95
	Secondary	5.06	6.32	7.84	7.89	9.86	12.23	8.85	11.06	13.71
	Tertiary	0.84	1.20	1.78	1.92	2.67	3.67	3.51	4.81	6.46
	Quaternary	2.62	3.28	4.07	2.62	3.28	4.07	4.16	5.20	6.45
	Future (WCHPZ)	-	-	-	-	-	-	8.30	10.38	12.87
	Future (SWHPZ)	-	-	-	-	-	-	7.04	8.81	10.71
	TOTAL (3)	***14.13***	***17.67***	***21.92***	***19.21***	***24.03***	***30.000***	***41.94***	***52.42***	***65.00***
Romeoville	Primary	1.82	2.76	4.13	2.11	3.19	4.79	2.11	3.19	4.79
	Secondary (4)	1.32	2.00	2.99	1.52	2.31	3.47	1.52	2.31	3.47
	TOTAL	***3.14***	***4.75***	***7.13***	***3.63***	***5.50***	***8.25***	***3.63***	***5.50***	***8.25***
Shorewood	Primary	1.58	1.80	3.60	2.10	2.40	4.80	4.55	5.20	10.40
	Future (5)	-	-	-	-	-	-	0.88	1.00	2.00
	TOTAL (5)	***1.58***	***1.80***	***3.60***	***2.10***	***2.40***	***4.80***	***4.55***	***5.20***	***10.40***
GPWC TOTAL		**22.14**	**29.25**	**41.01**	**29.88**	**39.51**	***55.27***	**58.66**	**75.74**	**103.56**

*Water Delivery Structure Locations to be provided by Member after approval of the Water Supply Agreement.

(1) Minooka's Tertiary Water Delivery Structure became its Secondary Water Delivery Structure and the Secondary Water Delivery became a Future Water Delivery Structure.
(2) Joliet's Tertiary Water Delivery Structure demand includes Joliet demand and Channahon's Secondary Water Delivery Structure demand (being wheeled through Joliet).
(3) The total for Joliet does not include the demands for the Channahon's Secondary Water Delivery Structure being wheeled through the Joliet's Tertiary Water Delivery Structure.
(4) Romeoville's Secondary Water Delivery Structure is being sized to accept a higher flow if their Primary Water Delivery Structure is out of service.
(5) Shorewood's future Water Delivery Structure is being sized at 1.0 MGD Average Day Demand. Since the timing is unknown, Shorewood's Primary Water Delivery Structure will be sized for Shorewood's full demands to Buildout.

The projected demands in Table 2-1 are consistent with the demands declared by the individual Members with the exception of the City of Joliet and Village of Romeoville. The final declared demands for the City of Joliet and the Village of Romeoville reflect the conditions defined in the Memorandum of Understanding Regarding Water System Capacity Allocation, dated February 23, 2022, under which Joliet has agreed to declare 2 MGD of additional 2050 Maximum Day Demand for use by Romeoville in the event that expansion increases Romeoville's Declared Maximum Day Demand. Table 2-2 presents the declared demands for each Member with consideration of this arrangement between Joliet and Romeoville.

Table 2-2 GPWC Member Declared 2050 and Estimated Buildout Maximum Day Demands

Member	Declared 2050 Maximum Day Demand (MGD)	Initial Commission System Design Capacity (%)	Estimated Buildout Maximum Day Demand (MGD)
Channahon	4.04	7.3%	6.34
Crest Hill	4.18	7.6%	4.18
Joliet	32.00[1]	57.9%	65.00
Minooka	4.00	7.2%	9.39
Romeoville	6.25[2]	11.3%	8.25
Shorewood	4.80	8.7%	10.40
Total Declared Demands	**55.27**	**100.0%**	**103.56**

[1] 2050 Declared Maximum Day Demand for Joliet includes 2.00 MGD to be "loaned" to Romeoville
[2] 2050 Declared Maximum Day Demand for Romeoville does not include 2.00 MGD "loaned" by Joliet

Based on these values, design capacities for the AWSP are as follows:

- Initial Commission System Design Capacity (ICSDC) = 55.27 MGD
- Buildout Commission System Design Capacity (BCSDC) = 103.56 MGD

If the Village of Lemont enters into an agreement with GPWC for development of the 12550 Bell Road property in Lemont and an option to purchase water from the GPWC by November 30, 2024, then the Initial Commission System Design Capacity will be increased by 4 MGD and the Buildout Commission System Design Capacity would be increased by 6 MGD. These capacities would be reserved for Lemont until the first to occur of (i) such time as Lemont determines whether (or not) to be a non-Member Customer of the Commission or (ii) Lemont's option to purchase water expires. If such increases are implemented, the capacities noted in the following Sections of this Basis of Design will be adjusted accordingly.

3 City of Chicago Existing Supply and Production Facilities

Existing Chicago facilities will provide water service to the GPWC. Pursuant to the Chicago-Joliet Water Supply Agreement, these facilities are all owned, operated, and maintained by Chicago.

Treated Lake Michigan water will be supplied to the GPWC by the City of Chicago. Raw water will be drawn from Lake Michigan at the 68th Street/ Edward F. Dunne Crib complex located approximately 2.2 miles east of Jackson Park Harbor in Lake Michigan. Lake water will flow from the crib structure to the Eugene Sawyer Water Purification Plant (SWPP) via a 14-foot-diameter tunnel constructed below the bed of the lake.

Chicago's Department of Water Management (CDWM) proactively assesses risks to the quality of Lake Michigan and evaluates both point and nonpoint sources of contamination.

CDWM has in place a 10-step source water Emergency Response Protocol to respond to water quality threats in Lake Michigan. Raw water quality samples are collected by CDWM, as needed, and the results are used to determine any necessary water treatment adjustments (including the need for the addition of powdered activated carbon) to ensure the continuous delivery of safe, high quality drinking water.

CDWM also has the ability to use an independent, shore intake to supply raw water to the SWPP if concerns exist regarding water quality at the Dunne Crib complex. The availability of this shore intake provides redundancy for Chicago's raw water supply.

The SWPP, constructed in 1947, is a 720 MGD conventional surface water treatment plant that uses coagulation, flocculation, sedimentation, filtration, and disinfection processes to produce potable water. Historic data indicates that the water produced at the SWPP is of excellent quality and meets all current state and federal water quality regulations. In addition, CDWM conducts quarterly comprehensive chemical analyses of its source water and treated water, and regularly monitors raw and treated water quality for potential parameters of concern. Past studies have focused on parameters including Endocrine Disrupting Chemicals, Pharmaceuticals & Personal Care Products, Hexavalent Chromium, Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA), and more recently, microplastics. These data have consistently shown Lake Michigan to be a high-quality source for raw water.

Water treated at the SWPP is conveyed to the CDWM's Southwest Pumping Station site through 12-foot, and 16-foot diameter tunnels that form the backbone of the City's South Tunnel Systems. The 12-foot diameter Columbus Avenue/84th Street Tunnel serves as the supply for the Southwest Pumping Station and will also supply the proposed tunnel connection and tunnel extension that will serve the GPWC.

4 AWSP Basis of Design - Key Design Principles

4.1 Key Design Principles

The primary function of the GPWC water system ("Commission System") is to convey treated Lake Michigan water from Chicago to the Water Delivery Structures for the GPWC Members. A map of the proposed Commission System is Shown in Exhibit 4-1.

Key design principles developed for the Commission System include the following:

- The City of Chicago requires that an air gap be created between the CDWM system and the Commission System to protect the CDWM system from any potential backflow from the Commission System.
- GPWC withdrawals from the CDWM water system, and GPWC Member withdrawals from the Commission System will be maintained at a uniform daily rate. The system is not designed to support pump on-demand operations or meet peak hour demand conditions.
- New infrastructure at the Chicago Connection Facilities site will be designed for the Initial Commission System Design Capacity while considering space for future equipment upgrades needed to meet Buildout Commission System Design Capacity.
- The proposed Suction Well to be constructed in Durkin Park will be sized to provide the storage volume needed for controlled shutdown of the High Service Pump Station when operating at Buildout Commission System Design Capacity.
- Transmission system pumping facilities will be designed to maintain minimum operating pressure of 25 psi between the High Service Pump Station and Member Water Delivery Structures under all normal operating conditions. Pumping stations required along the transmission main will be designed to deliver the Initial Commission System Design Capacity. It is assumed that pumping capacity required to meet the Buildout Commission System Design Capacity will be created through upgrade/expansion of the Low Service Pump Station, High Service Pump Station, and Intermediate Pump Station 1 along with the construction of Intermediate Pump Stations 2, 3, and 4 and Intermediate Storage Facilities 3 and 4 as shown in Exhibit 4-1.
- Sizing of the proposed water transmission main from Chicago to the Member Water Delivery Structures will be based on the following design velocity criterion. Transmission main will be sized to maintain a minimum velocity of 1 foot per second (fps) under 2030 Minimum Day Demand conditions. For the Buildout Commission System Design Capacity, velocity will be below a maximum of 8 fps. Additional capacity for meeting projected buildout demands will be achieved through the future upgrade/expansion/addition of pump stations along the water transmission system.

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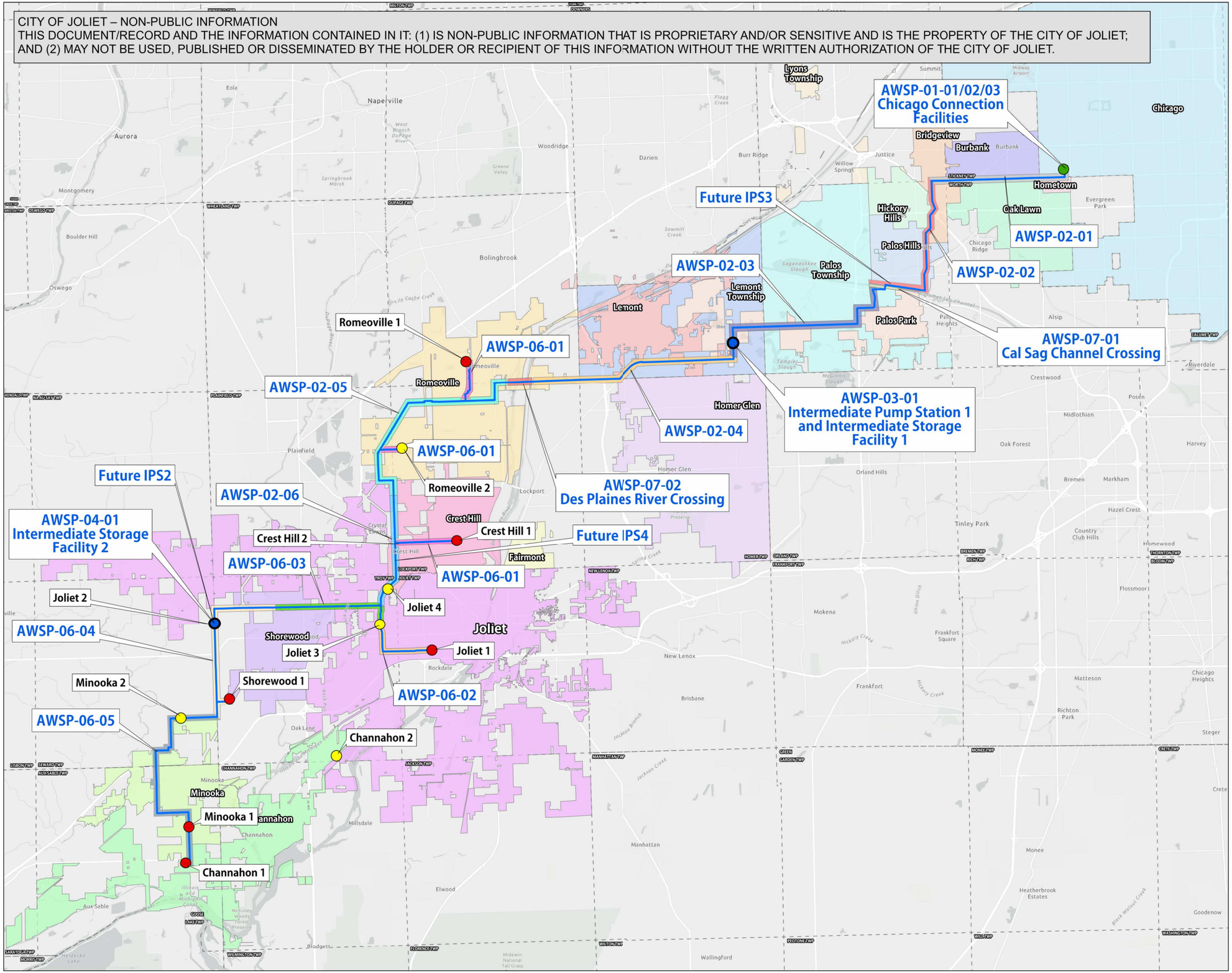


Exhibit 4-1

GRAND PRAIRIE WATER COMMISSION

Title

Proposed Commission System

Client/Project GPWC
Alternative Water Source Program

Project Location
Will, Cook, Kendall, and Grundy Counties

N

0 2 4 8 Miles

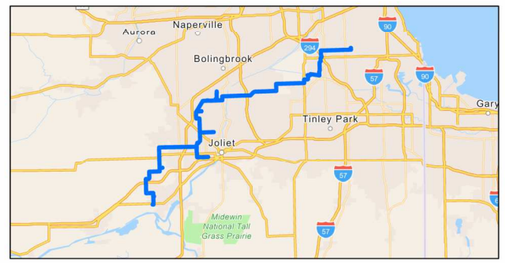
(At original document size of 22x34)
1 inch equals 8000 FT

Legend

Delivery Point
- Chicago Connection
- Primary
- Non-Primary
- Intermediate Location

Member Community
- Channahon
- Crest Hill
- Joliet
- Minooka
- Romeoville
- Shorewood

Work Package ID - Construction Contracts
- AWSP-02-01
- AWSP-02-02
- AWSP-02-03
- AWSP-02-04
- AWSP-02-05
- AWSP-02-06
- AWSP-06-01
- AWSP-06-02
- AWSP-06-03
- AWSP-06-04
- AWSP-06-05
- AWSP-07-01
- AWSP-07-02



Location Map: Not to Scale

Notes
1. Coordinate System: NAD 1983 State Plane Illinois East
2. Data Sources: WILL CO., COOK CO., IDOT, DOWNLOADED FROM WEB
3. Background: County of Will, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, FAO
4. Location for facilities are conceptual and do not indicate final locations for the proposed infrastructure. Final siting and routing analyses are ongoing as part of the engineering design process.

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REV. JUNE 2024

- Proposed Intermediate Storage Facility 1 (Located just upstream of Intermediate Pump Station 1) will be designed to support operation and controlled shut down of IPS1 at the Initial Commission System Design Capacity, provide additional volume for operational flexibility, and provide up to 2 hours of supplemental supply (at average demands) for Water Delivery Structures between IPS1 and Intermediate Storage Facility 2 during an upstream supply outage.
- Proposed Intermediate Storage Facility 2 (ISF2) will be designed to provide operational flexibility in the western portion of the transmission main system and provide up to 2 hours of supplemental supply (at average demands) for Water Delivery Structures downstream of ISF2 during an upstream supply outage.
- Metering and flow control facilities will be constructed at all Water Delivery Structures, and Members will be required to take water at a uniform rate. GPWC Members are responsible for adjusting pressure at their Points of Delivery to support operation of their local water distribution networks.

4.2 Chemical Addition for Water Quality Maintenance

Given the high-quality Lake Michigan water being purchased from Chicago, no additional water treatment will be provided by GPWC. GPWC will have the ability to boost free chlorine and orthophosphate concentrations in order to maintain water quality provided by Chicago.

- The GPWC system will be operated to provide a free chlorine residual of at least 0.5 parts per million (ppm) at Member Water Delivery Structures
- It is currently anticipated that GPWC facilities will also have the ability to maintain a target orthophosphate level at Member Water Delivery Structures in the range of 2.5 – 3.0 ppm. The final target orthophosphate concentration will depend upon results from corrosion control testing currently being performed by the City of Chicago and all GPWC Members. The GPWC system will be operated to maintain the greater of the concentration of orthophosphate in the water supplied by Chicago or the lowest orthophosphate dosage determined to be required for optimal corrosion control treatment by any of the Members through completion of their Water Source Transfer Plans.

4.3 Transmission Main Sizing

Pipeline velocity is a primary driver for the sizing of the proposed transmission main from Chicago to the GPWC Member Water Delivery Structures. As noted above, the transmission main is sized to keep maximum velocities below 8 fps at the Buildout Commission System Design Capacity, and to maintain minimum velocities above 1 fps under projected 2030 Minimum Day Demand conditions. Based on hydraulic modeling performed, anticipated transmission main velocity is approximately 3 to 4 fps at the Initial Commission System Design Capacity. Additional capacity for meeting Buildout

Commission System Design Capacity will be achieved through the future upgrade/expansion/addition of pump stations.

Table 4-1 shows the range of flows that can be readily conveyed by various sizes of transmission main while meeting the design velocity criteria. Based on the projected 2030 Minimum Day Demand (22.14 MGD) and Buildout Commission System Design Capacity (103.56 MGD), a 66-inch-diameter pipe is planned for the primary segments of the GPWC transmission main.

Table 4-1 Transmission Main Size and Velocity Parameters

Pipe Size (inches)	Assumed Pipe Material	Inside Diameter (inches)		Design Flow (MGD)									
				20	30	40	50	60	70	80	90	100	110
20	DI	20.65	Flow Velocity (ft/s)	13.3	20.0								
24	DI	24.75		9.3	13.9	18.6							
30	DI	30.8		6.0	9.0	12.0	15.0	18.0					
36	DI	36.93		4.2	6.3	8.3	10.4	12.5	14.6	16.6	18.7		
42	PCLCP	42		3.2	4.8	6.4	8.1	9.7	11.3	12.9	14.5	16.1	17.7
48	PCLCP	48		2.5	3.7	4.9	6.2	7.4	8.6	9.8	11.1	12.3	13.5
54	PCCP	54		1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.8	9.7	10.7
60	PCCP	60		1.6	2.4	3.2	3.9	4.7	5.5	6.3	7.1	7.9	8.7
66	PCCP	66		1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.5	7.2
72	PCCP	72		1.1	1.6	2.2	2.7	3.3	3.8	4.4	4.9	5.5	6.0
78	PCCP	78		0.9	1.4	1.9	2.3	2.8	3.3	3.7	4.2	4.7	5.1
84	PCCP	84		0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4
90	PCCP	90		0.7	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9
96	PCCP	96		0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.8	3.1	3.4

Notes:

(1) Pipe materials shown were assumed as the basis for velocity calculations. Final selection of pipe material will be made during detailed design.

(2) Velocity values assume constant inside diameter for pipelines over their useful life.

4.4 Transmission System Hydraulics

4.4.1 Pumping, Storage, and Pressure Requirements

Pumping and storage requirements along the GPWC transmission main reflect consideration of the preliminary engineering basis of design flows, ground surface elevations along the proposed transmission main alignment, and the hydraulic design principles related to minimum pipeline operating pressures summarized in Section 4.1.

Other hydraulic design criteria used for the current analysis of system hydraulics include:

- Minimum Pipeline Pressure: 25 psi
- Target Maximum Pipeline Pressure: 120 psi (may be exceeded at trenchless crossings and pump station discharges)
- Pipeline Roughness C-factor (2030): 130
- Pipeline Roughness C-factor (Future): 110

Consideration of a lower, future C-factor for the transmission main is important as other regional utilities in northeastern Illinois have experienced instances of C-factor decline resulting from water chemistry-related deposition on the interior of their pipelines. Coordination with the City of Chicago in an effort to avoid such problems is anticipated.

As shown in Exhibit 4-2, ground elevations along the proposed transmission main alignment range from approximately 620 feet above sea level at the point of connection to the Chicago water system near 84th Street and Kedvale Avenue to a high point of approximately 755 feet above sea level along Bell Road in the Village of Lemont. This high point is about 14 miles from the starting point for the proposed finished water transmission main at the Chicago Connection Facilities and establishes the static head that the proposed pumping facilities must overcome. Ground elevations west of this high point vary, but trend downward with elevations at the proposed Water Delivery Structures being in the range of about 600 to 685 feet above sea level. The total distance along the transmission main from the Chicago Connection Facilities site to the most distant Water Delivery Structure is approximately 56 miles. The total length of Commission pipeline (including Member connections) is approximately 62 miles, with 37 miles of transmission main being 60- to 66-inches in diameter. The remaining 25 miles of transmission main will be 48-inches in diameter and smaller.

Exhibits 4-2, 4-3 and 4-4 shows the projected hydraulic grade line profiles along the current transmission main alignment for the design 2030 Maximum Day Demand conditions, 2050 Maximum Day Demand conditions (Initial Commission System Design Capacity), and projected Buildout Maximum Day Demand conditions (Buildout Commission System Design Capacity).

For demands up to the Initial Commission System Design Capacity, the HGL and pressures within the system will be controlled at three points. Pumping from the High Service Pump Station will establish the HGL and pressures between the High Service Pump Station discharge and the IPS1/ISF1. Between IPS1 and ISF2, the HGL and system

pressures will be controlled by the level in ISF1 or pumping from IPS1. HGL levels and pressures downstream of ISF2 will be controlled by the level at that facility.

4.4.2 Transmission Main Hydraulics: Flow up to 2050 Average Day Demand

At demands up to approximately 41 MGD (2050 Average Day Demand) pumping at the High Service Pump Station will be sufficient to maintain needed minimum levels in both ISF1 and ISF2. Service to Water Delivery Structures downstream of the ISF2 will be by gravity based on the water level in the tank. As the 2050 Average Day Demand is only slightly lower than the 2030 Maximum Day Demand for the system, Exhibit 4-2 provides an indication of the anticipated hydraulic profile for the system under these conditions.

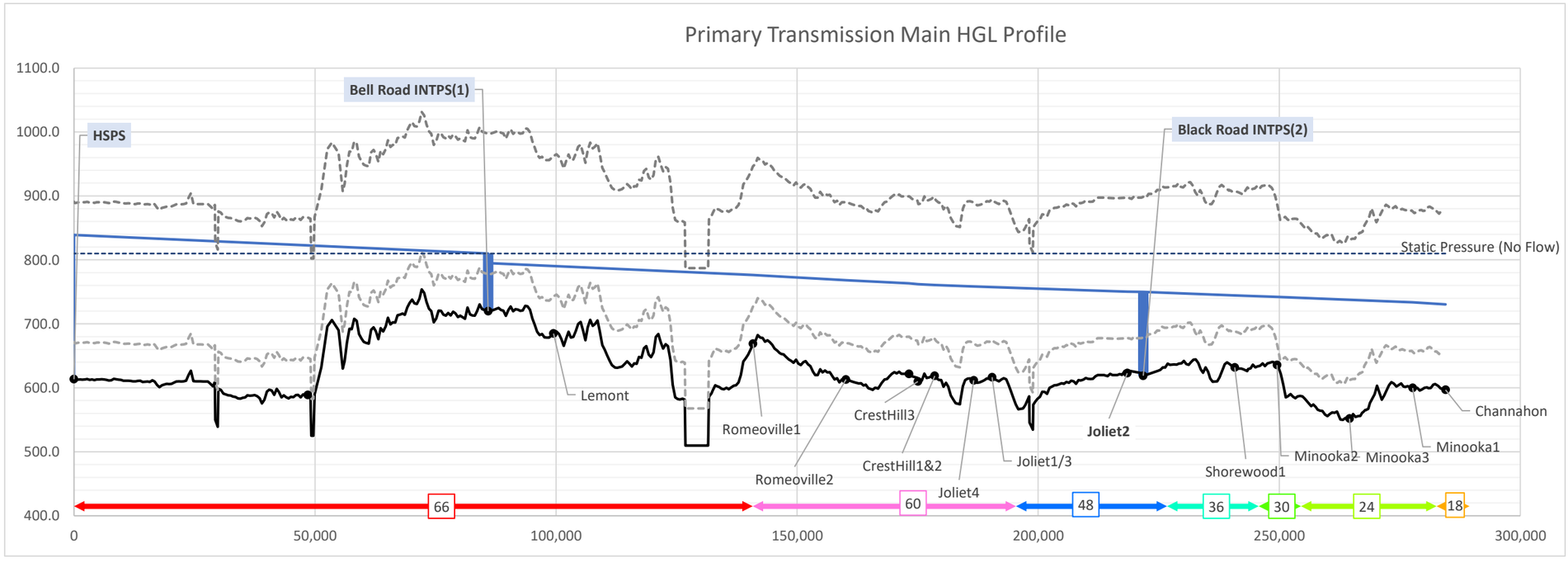
4.4.3 Transmission Main Hydraulics: Flow up to 2050 Maximum Day Demand (Initial Commission System Design Capacity)

Once system demands increase beyond 41 MGD (2050 Average Day Demand), head loss between the High Service Pump Station and ISF1 will increase, eventually reaching a point where pumping at IPS1 will be needed. For the Initial Commission System Design Capacity, the energy required to convey the flow from the Chicago Connection Facilities site to the Water Delivery Structures will be provided by the High Service Pump Station at the Chicago Connection Facilities and IPS1 as shown in Exhibit 4-3.

The total pumping head and discharge pressure required at the High Service Pump Station under Initial Commission System Design Capacity conditions are estimated to be the order of 275 feet and 115 psi, respectively, based on a required discharge hydraulic grade line of about 880 feet above sea level. Design discharge requirements for the High Service Pump Station are controlled by a combination of static head and minimum pressure requirements along with a need to maintain a minimum HGL elevation of 810 feet at ISF1. The storage facility minimum HGL level is required for surge control at the High Service Pump Station (discussed later in this section of the report).

For Initial Commission System Design Capacity demand conditions pumping head and discharge pressure at IPS1 are estimated to be on the order of 40 feet and 50 psi, respectively, based on an assumed ground elevation of approximately 720 feet and a discharge hydraulic grade line of about 840 feet above sea level.

Segment Start	Segment End	Flow (MGD)	Demand at Segment Start (MGD)	Diameter (in)	Segment Length (ft)	From Station	To Station	Sum of Minor Loss Coefficients	# of Valves	Segment Velocity (ft/s)	Total Headloss (ft)	Headloss Gradient (ft/1000ft)	Standpipe Fixed HGL (ft)	Start HGL (ft)	Pressure Along Pipeline (psi)
HSPS						0							-	613.2	-0.2
HSPS	INTPS(3)	41.01		66	48,515	0	48,515	8.50	10	2.67	16.4	0.34	-	839.1	97.6
INTPS(3)	Bell Road INTPS(1)	41.01		66	37,384	48,515	85,900	7.80	8	2.67	12.8	0.34	-	822.8	101.2
Bell Road INTPS(1)		41.01				85,900	85,900						810.00	810.0	39.0
Bell Road INTPS(1)	Romeoville1	41.01		66	54,944	85,900	140,844	8.85	11	2.67	18.4	0.34	-	794.8	32.4
Romeoville1	Romeoville2	36.88	4.13	60	19,272	140,844	160,116	1.40	4	2.91	8.2	0.42	-	776.4	46.5
Romeoville2	INTPS(4)	33.89	2.99	60	13,064	160,116	173,180	2.05	3	2.67	4.9	0.37	-	768.2	67.2
INTPS(4)	CrestHill3	33.89		60	1,872	173,180	175,052	5.35	1	2.67	1.3	0.68	-	763.4	61.2
CrestHill3	CrestHill1&2	33.89	0.00	60	3,470	175,052	178,522	0.35	1	2.67	1.3	0.37	-	762.1	65.9
CrestHill1&2	Joliet4	30.68	3.21	60	8,095	178,522	186,617	0.70	2	2.42	2.5	0.30	-	760.8	61.5
Joliet4	Joliet1/3	26.61	4.07	60	3,796	186,617	190,413	0.35	1	2.10	0.9	0.23	-	758.4	63.5
Joliet1/3	Joliet2	15.75	10.86	48	28,054	190,413	218,467	2.10	6	1.94	7.2	0.26	-	757.5	60.9
Joliet2	Black Road INTPS(2)	7.91	7.84	48	3,298	218,467	221,765	1.35	1	0.97	0.3	0.08	-	750.3	55.1
Black Road INTPS(2)		7.91				221,765	221,765						750.00	750.0	56.7
Black Road INTPS(2)	Shorewood1	7.91		36	18,993	221,765	240,758	6.40	4	1.73	5.7	0.30	-	750.0	56.7
Shorewood1	Minooka2	4.31	3.60	30	8,776	240,758	249,534	0.70	2	1.36	2.0	0.23	-	744.3	48.6
Minooka2	Minooka3	2.85	1.46	24	15,024	249,534	264,557	1.05	3	1.40	4.7	0.31	-	742.3	46.1
Minooka3	Minooka1	2.85	0.00	24	13,088	264,557	277,645	1.05	3	1.40	4.1	0.31	-	737.6	80.4
Minooka1	Channahon	1.65	1.20	18	6,828	277,645	284,473	1.70	2	1.44	3.2	0.46	-	733.6	57.8
Channahon		0.00	1.65			284,473							-	730.4	**57.8**
Totals			41.01		**284,473**			**49.70**	**62.00**		**93.6**	**0.33**			



GRAND PRAIRIE WATER COMMISSION

Exhibit No.
4-2

Title
Hydraulic Profile:
2030 Maximum Day Demand

Client/Project
GRAND PRAIRIE WATER COMMISSION
Alternative Water Supply Program

Project Location
Will County, Cook County, Kendall County, and Grundy County (Illinois)

Legend
- Hydraulic Gradeline
- Ground Elevation
- Min Pressure HGL (ft) @ 25psi
- Max Pressure HGL (ft) @ 120 psi
- Delivery Point Lateral

Pipeline Diameter (in)
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"
- 42"
- 48"
- 60"
- 66"

PS	Standpipe HGL (ft)	Height (ft)	Active?	Flow (MGD)
HSPS	**n/a**	n/a	Yes	41.01
Bell Road INTPS(1)	**810**	90	Yes	41.01
Black Road INTPS(2)	**750**	131	Yes	7.91

Notes:
1. C=130 for 2050 Hydraulics

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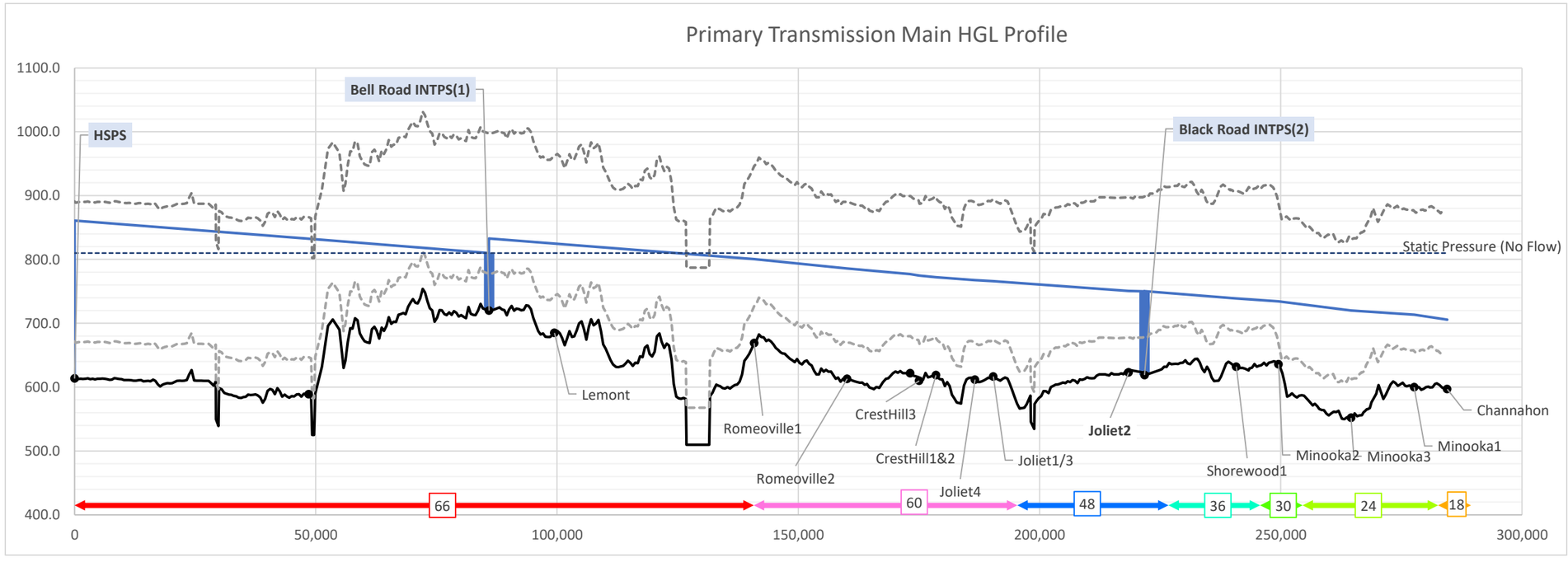
Segment Start	Segment End	Flow (MGD)	Demand at Segment Start (MGD)	Diameter (in)	Segment Length (ft)	From Station	To Station	Sum of Minor Loss Coefficients	# of Valves	Segment Velocity (ft/s)	Total Headloss (ft)	Headloss Gradient (ft/1000ft)	Standpipe Fixed HGL (ft)	Start HGL (ft)	Pressure Along Pipeline (psi)
HSPS						0							-	613.2	-0.2
HSPS	INTPS(3)	55.28		66	48,515	0	48,515	8.50	10	3.60	28.6	0.59	-	860.8	
INTPS(3)	Bell Road INTPS(1)	55.28		66	37,384	48,515	85,900	7.80	8	3.60	22.3	0.60	-	832.3	105.3
Bell Road INTPS(1)		55.28				85,900	85,900						810.00	810.0	39.0
Bell Road INTPS(1)	Romeoville1	55.28		66	54,944	85,900	140,844	8.85	11	3.60	32.2	0.59	-	832.8	48.8
Romeoville1	Romeoville2	50.49	4.79	60	19,272	140,844	160,116	1.40	4	3.98	14.7	0.76	-	800.6	57.0
Romeoville2	INTPS(4)	47.02	3.47	60	13,064	160,116	173,180	2.05	3	3.71	9.0	0.69	-	786.0	74.9
INTPS(4)	CrestHill3	47.02		60	1,872	173,180	175,052	5.35	1	3.71	2.4	1.28	-	777.0	67.1
CrestHill3	CrestHill1&2	46.60	0.42	60	3,470	175,052	178,522	0.35	1	3.67	2.3	0.67	-	774.6	71.3
CrestHill1&2	Joliet4	42.84	3.76	60	8,095	178,522	186,617	0.70	2	3.38	4.6	0.57	-	772.3	66.4
Joliet4	Joliet1/3	38.77	4.07	60	3,796	186,617	190,413	0.35	1	3.06	1.8	0.47	-	767.7	67.5
Joliet1/3	Joliet2	23.70	15.07	48	28,054	190,413	218,467	2.10	6	2.92	15.4	0.55	-	765.9	64.6
Joliet2	Black Road INTPS(2)	11.47	12.23	48	3,298	218,467	221,765	1.35	1	1.41	0.5	0.15	-	750.5	55.2
Black Road INTPS(2)		11.47				221,765	221,765						750.00	750.0	56.7
Black Road INTPS(2)	Shorewood1	11.47		36	18,993	221,765	240,758	6.40	4	2.51	11.4	0.60	-	750.3	56.9
Shorewood1	Minooka2	6.67	4.80	30	8,776	240,758	249,534	0.70	2	2.10	4.5	0.51	-	738.9	46.3
Minooka2	Minooka3	5.27	1.40	24	15,024	249,534	264,557	1.05	3	2.60	14.6	0.97	-	734.4	42.7
Minooka3	Minooka1	3.67	1.60	24	13,088	264,557	277,645	1.05	3	1.81	6.5	0.50	-	719.8	72.7
Minooka1	Channahon	2.67	1.00	18	6,828	277,645	284,473	1.70	2	2.34	7.7	1.13	-	713.3	49.1
Channahon		0.00	2.67			284,473							-	705.6	**47.0**
Totals			55.27		**284,473**			**49.70**	**62.00**		**178.4**	**0.63**			



GRAND PRAIRIE WATER COMMISSION

Exhibit No.
4-3

Title
Hydraulic Profile:
2050 Maximum Day Demand

Client/Project
GRAND PRAIRIE WATER COMMISSION
Alternative Water Supply Program

Project Location
Will County, Cook County, Kendall County, and Grundy County (Illinois)

Legend

- Hydraulic Gradeline
- Ground Elevation
- Min Pressure HGL (ft) @ 25psi
- Max Pressure HGL (ft) @ 120 psi
- Delivery Point Lateral

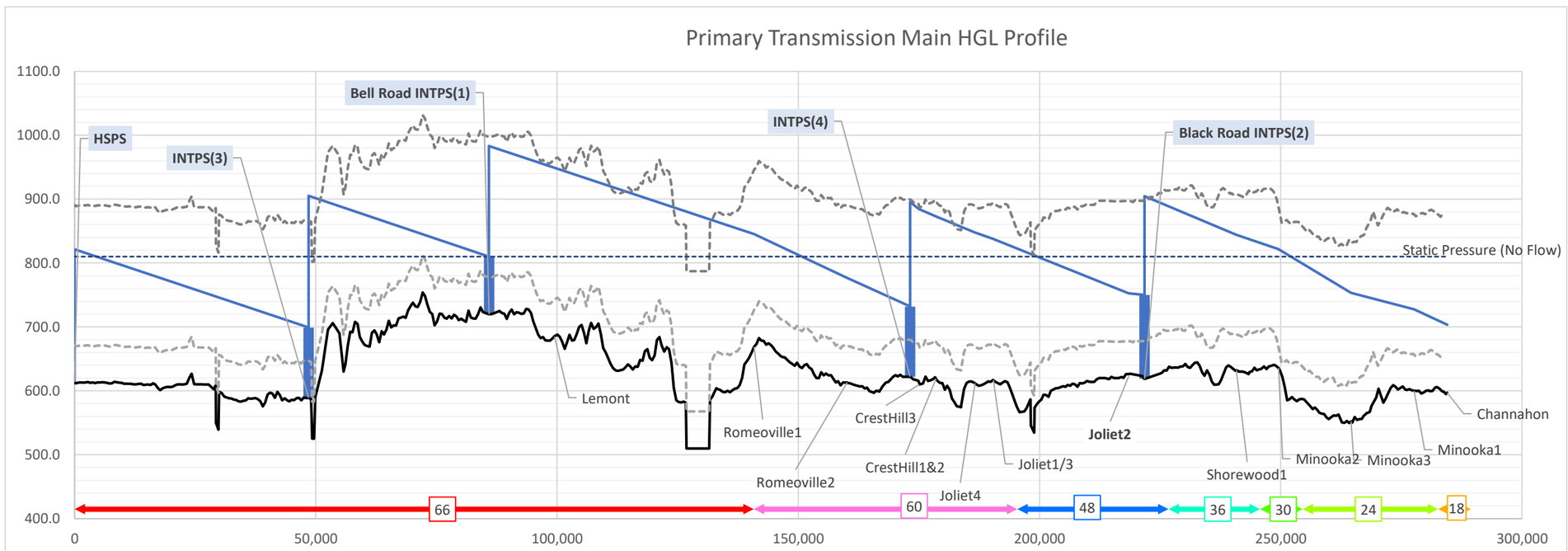
Pipeline Diameter (in)
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"
- 42"
- 48"
- 60"
- 66"

PS	Standpipe HGL (ft)	Height (ft)	Active?	Flow (MGD)
HSPS	**n/a**	n/a	Yes	55.28
Bell Road INTPS(1)	**810**	90	Yes	55.28
Black Road INTPS(2)	**750**	131	Yes	11.47

Notes:
1. C=130 for 2050 Hydraulics

Stantec · CMT Crawford, Murphy & Tilly · Engineering Enterprises, Inc. · STRAND ASSOCIATES® · CORNWELL ENGINEERING GROUP

Segment Start	Segment End	Flow (MGD)	Demand at Segment Start (MGD)	Diameter (in)	Segment Length (ft)	From Station	To Station	Sum of Minor Loss Coefficients	# of Valves	Segment Velocity (ft/s)	Total Headloss (ft)	Headloss Gradient (ft/1000ft)	Standpipe Fixed HGL (ft)	Start HGL (ft)	Pressure Along Pipeline (psi)
HSPS						0							-	613.2	-0.2
HSPS	INTPS(3)	103.56		66	48,515	0	48,515	8.50	10	6.74	122.4	2.52	-	821	90.0
INTPS(3)		103.56				48,515	48,515						699.00	699	47.6
INTPS(3)	Bell Road INTPS(1)	103.56		66	37,384	48,515	85,900	7.80	8	6.74	95.3	2.55	-	905	136.9
Bell Road INTPS(1)		103.56				85,900	85,900						810.00	810	39.0
Bell Road INTPS(1)	Romeoville1	103.56		66	54,944	85,900	140,844	8.85	11	6.74	138.0	2.51	-	983	113.9
Romeoville1	Romeoville2	98.78	4.79	60	19,272	140,844	160,116	1.40	4	7.78	68.6	3.56	-	845	76.3
Romeoville2	INTPS(4)	95.31	3.47	60	13,064	160,116	173,180	2.05	3	7.51	44.6	3.41	-	777	70.8
INTPS(4)		95.31				173,180	173,180						732.00	732	47.6
INTPS(4)	CrestHill3	95.31		60	1,872	173,180	175,052	5.35	1	7.51	11.0	5.87	-	895	118.4
CrestHill3	CrestHill1&2	94.90	0.42	60	3,470	175,052	178,522	0.35	1	7.48	11.6	3.35	-	884	118.8
CrestHill1&2	Joliet4	91.13	3.76	60	8,095	178,522	186,617	0.70	2	7.18	25.0	3.09	-	873	109.9
Joliet4	Joliet1/3	84.68	6.45	60	3,796	186,617	190,413	0.35	1	6.67	10.3	2.70	-	848	102.2
Joliet1/3	Joliet2	50.56	34.12	48	28,054	190,413	218,467	2.10	6	6.23	84.9	3.03	-	838	95.6
Joliet2	Black Road INTPS(2)	23.97	26.59	48	3,298	218,467	221,765	1.35	1	2.95	2.7	0.81	-	753	56.1
Black Road INTPS(2)		23.97				221,765	221,765						750.00	750	56.7
Black Road INTPS(2)	Shorewood1	23.97		36	18,993	221,765	240,758	6.40	4	5.25	60.2	3.17	-	904	123.5
Shorewood1	Minooka2	13.57	10.40	30	8,776	240,758	249,534	0.70	2	4.28	22.7	2.58	-	844	91.9
Minooka2	Minooka3	10.29	3.29	24	15,024	249,534	264,557	1.05	3	5.07	68.5	4.56	-	822	80.4
Minooka3	Minooka1	6.53	3.76	24	13,088	264,557	277,645	1.05	3	3.22	25.7	1.97	-	753	87.0
Minooka1	Channahon	4.18	2.35	18	6,828	277,645	284,473	1.70	2	3.66	24.1	3.53	-	727	55.1
Channahon		0.00	4.18			284,473							-	703	**46.0**
Totals			103.56		**284,473**			**49.70**	**62.00**		**815.3**	**2.87**			



GRAND PRAIRIE WATER COMMISSION

Exhibit No.
4-4

Title
Hydraulic Profile:
Buildout Maximum Day Demand

Client/Project
GRAND PRAIRIE WATER COMMISSION
Alternative Water Supply Program

Project Location
Will County, Cook County, Kendall County, and Grundy County (Illinois)

Legend
- Hydraulic Gradeline
- Ground Elevation
- Min Pressure HGL (ft) @ 25psi
- Max Pressure HGL (ft) @ 120 psi
- Delivery Point Lateral

Pipeline Diameter (in)
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"
- 42"
- 48"
- 60"
- 66"

PS	Standpipe HGL (ft)	Height (ft)	Active?	Flow (MGD)
HSPS	**n/a**	n/a	Yes	103.56
INTPS(3)	**699**	110	Yes	103.56
Bell Road INTPS(1)	**810**	90	Yes	103.56
INTPS(4)	**732**	110	Yes	95.31
Black Road INTPS(2)	**750**	131	Yes	23.97

Notes:
1. C=110 for Build Out Hydraulics

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4.4.4 Transmission Main Hydraulics: Flow up to Buildout Maximum Day Demand (Buildout Commission System Design Capacity)

For systemwide demands greater than the Initial Commission System Design Capacity, additional pumping capacity will be required to meet minimum service pressures across the overall transmission system. Exhibit 4-4 shows one possible pump station configuration for meeting the Buildout Commission System Design Capacity. Under this configuration, the High Service Pump Station plus a total of four intermediate pump stations would be used to convey water to the Water Delivery Structures along the transmission system.

- High Service Pump Station (HSPS) would continue to pump water from the GPWC Suction Well in Durkin Park through the segments of finished water transmission main between the Suction Well and the HSPS. Pumping equipment installed at the HSPS as part of initial Commission System construction would need to be replace/upsized to support pumping at the Buildout Commission System Design Capacity. (Note that Chicago would also need to replace/upsize pumping equipment at the Low Service Pump Station (LSPS) to support pumping at the Buildout Commission System Design Capacity.)

- Intermediate Pump Station 3 (IPS3) is a future intermediate pump station not required to meet the Initial Commission System Design Capacity (2050 Maximum Day Demand). IPS3 and an adjacent storage facility (ISF3) will need to be constructed as flows and head loss in the initial segments of the finished water transmission main increase (anticipated to be after 2050). Land for IPS3/ISF3 will be acquired in the vicinity of the Cal-Sag channel crossing during implementation of the AWSP. The transmission main design will include tees, valves, and bulkheads for future connections from the transmission main to IPS3/ISF3.

- Intermediate Pump Station 1 (IPS1) will continue to boost pressures along the segments of transmission main roughly between Lemont and Crest Hill as demands increase (anticipated to be after 2050). Pumping equipment installed at IPS1 as part of initial Commission System construction would need to be modified to support pumping at the Buildout Commission System Design Capacity.

- Intermediate Pump Station 4 (IPS4) is a future pump station not required to meet the Initial Commission System Design Capacity (2050 Maximum Day Demand). IPS4 and an adjacent storage facility (ISF4) will need to be constructed as flows and head loss in the middle segments of the finished water transmission main increase (anticipated to be after 2050). Land for IPS4/ISF4 will be acquired in the vicinity of Crest Hill during initial implementation of the AWSP. The transmission main design will include tees, valves, and bulkheads for future connections from the transmission main to IPS4/ISF4.

- Intermediate Pump Station 2 (IPS2) will need to be constructed adjacent to Intermediate Storage Facility 2 (ISF2) after 2050. As demands increase after 2050,

pumping at this location will be required to maintain minimum pressures at the Water Delivery Structures downstream of the ISF2 site. The transmission main design will include tees, valves, and bulkheads for future connections from the transmission main to IPS2.

Final decisions related to the design and timing for construction of the future intermediate pump stations anticipated to be required after 2050 can be made as development within the GPWC Member communities continues and demands increase. The current design is intended to provide a suitable basis for eventual implementation of these improvements through appropriate design and sizing of the High Service Pump Station, Intermediate Pump Station 1, Intermediate Storage Facilities 1 and 2, and transmission main, along with acquisition of land for potential future facilities.

4.5 Surge Control Requirements

The hydraulic design for the GPWC system must also consider the potential impacts of pressure surges or transients associated with the pumping operations on a long water transmission main. Given the configuration of the proposed system, a sudden loss of power at the High Service Pump Station could lead to significant pressure transients, including a potentially damaging down surge. For the purpose of the current design, surge control measures are proposed to protect the integrity of the transmission main pipeline under a surge condition (loss of primary power while operating pumps to meet ICSDC). The minimum allowable transient pressure adopted for use in the sizing of surge control facilities for the GPWC system is 0 psi. While this value is significantly lower than the minimum design pressure for the system under normal operating conditions, it is still above levels that could potentially pose a threat to the integrity of certain pipeline elements.

Simulations of transient pressures within the GPWC system under the ICSDC indicate that approximately 55,000 gallons of pressurized air chamber volume or equivalent surge control method is needed at or near the High Service Pump Station discharge to protect the transmission main in the event of a power loss that results in a full trip of the operating pumps. As currently contemplated, this storage would consist of pressure vessels equipped with air compressors and connecting piping and designed to allow water to rapidly enter the transmission main in the event of a pump trip so as to mitigate the potential magnitude of the down surge caused by the sudden pump stop.

4.5.1 GPWC System Operational Approach

GPWC Members are required to take water from the Commission System at a uniform rate. This approach to system operation allows for smaller transmission main, pump station, and storage capacity to accommodate maximum day demands instead of requiring capacity to deliver peak hour demands.

The Commission System operational approach has been established based on requirements in the Chicago-Joliet Water Supply Agreement and includes the following assumptions:

- GPWC Members will communicate to the GPWC operators their daily water demand at each Water Delivery Structure each day.
- GPWC will sum the demand values provided by the Members and provide CDWM with the desired Low Service Pump Station flow each day to inform CDWM's planning for system operations.
- CDWM will operate the Low Service Pump Station based on the GPWC desired flow.
- GPWC will set target flow rates at all the Member Water Delivery Structures based on the flow amount requested.
- The High Service Pump Station will be operated by GPWC operators to maintain the level in the Suction Well located downstream of the Low Service Pump Station, effectively matching the flow being supplied by the City of Chicago. High and low level setpoints will be established for the Suction Well, and both GPWC and CDWM will be provided with automatic notifications in the event that levels vary outside of the desired range.
- GPWC will control pumps at the High Service Pump Station and IPS1 to maintain a uniform supply and meet minimum levels at the ISF1 and ISF2. Flows and upstream pressures at the Member Water Delivery Structures will be monitored along with tank levels and operating pressures along the water transmission main. Operating data will be used by GPWC operators to make decisions regarding adjustments in pump speed and operation at both the High Service Pump Station and IPS1.
- GPWC Members will be required to take water at a uniform rate (*WSA* Section 4.3(e)) unless there is an emergency such as fire or watermain break.
- The GPWC will operate a flow control valve at each Water Delivery Structure to control water supply to the respective Member.
- GPWC Members will be provided real-time data from the flow meter and downstream pressure transmitter at each of their Water Delivery Structures where possible (*WSA* Section 5.6(b)).
- GPWC Members will have responsibility for operation of their local water facilities downstream of the Point of Delivery (10-ft from first valve on the combined discharge line downstream of each Water Delivery Structure) so as to meet regulatory requirements and local expectations for pressure and flow.

4.6 Transmission Main General Design Requirements

Additional factors beyond those described in Sections 4.1 through 4.5 are also important to the overall plan, budget, and schedule for implementation of the AWSP.

4.6.1 Routing Analyses

While a general alignment for the transmission main between the Chicago Connection Facilities and the Member Water Delivery Structures was defined in Exhibit 6-1 of the 2022 Basis of Design document and served as the starting point for design efforts, additional routing analyses have been performed to refine the alignment as design has progressed. These analyses have focused on a range of issues including:

- Opportunities to reduce probable construction costs or risks to schedule
- Transmission main hydraulics and surge control
- Right-of-way availability, utility interferences and constructability concerns
- Avoidance and/or mitigation of impacts in sensitive environmental areas
- Use of permanent easements to minimize the risk of future relocation demands
- Final siting of Member Water Delivery Structures

The updated routing and budgetary costs presented in this 2024 Basis of Design reflect adjustments made based on these analyses. Additional adjustments to the alignment are likely as detail is added to the designs and reviewed with right-of-way entities; however, at this point in the Program the intent is to manage further changes to the transmission main alignment and drive progress toward the completion of design and bidding of schedule-sensitive work packages.

4.6.2 Permitting

Permitting efforts related to the completion of the AWSP will be significant. Extensive outreach to key permitting agencies has been completed and is ongoing. At the Program level, a Programmatic Environmental Assessment (PEA) Questionnaire has been completed and submitted to USEPA as part of the WIFIA loan application for GPWC construction costs, and a comprehensive *Assessment of Environmental Resources for USACE Permitting* has been completed and submitted to the U.S. Army Corps of Engineering (USACE). The environmental resources document is important in obtaining overall USACE support for the Program and confirming plans for USACE to use nationwide permits for the majority of the various waterway crossings required. Presently, individual USACE permits are anticipated to be required only for the crossings of federal waterways (Cal-Sag Channel, Sanitary and Ship Canal).

At the work package level, more than 260 permits have been identified as being required for completion of the AWSP. The largest number of these include the

nationwide permits required from the USACE, other waterway crossing or environmental permits required from the Illinois Department of Natural Resources – Office of Water Resources, and permits required from local, county, and state transportation agencies for roadway crossings. As permit requirements are defined, they are entered into the Program permitting database and schedule milestones related to permit preparation, submittal, review, and approval are established in the detailed work package schedules. Workflows are currently being established to facilitate maintenance and reporting related to the progress of permitting efforts as part of monthly work package reviews.

4.6.3 Land Acquisition

The acquisition of land rights through the purchase of property, easements, or other types of access/right-of-way agreements was recognized as an important element of the Program early in its development. Significant progress has been made toward the acquisition of land for key GPWC facilities. Easement agreements for the CIP #1 facilities have been executed with the City of Chicago and efforts related to acquisition of land for the CIP #3 IPS1/ISF1 facilities and the CIP #4 ISF2 facilities are progressing toward completion. Costs included in the Baseline Budget presented in Section 13 reflect actual/negotiated costs for land and easements already acquired or nearing final acquisition. Land acquisition costs for potential easements and other agreements along the transmission main remain early estimates but will continue to be updated as design and discussions with right-of-way entities and property owners' progress.

4.6.4 Utility Relocation

Extensive Subsurface Utility Engineering (SUE) efforts are presently in progress to obtain detailed, accurate data regarding the horizontal and vertical location of existing utilities along the alignment corridor. These data are then used by the Design Teams to attempt to minimize utility interferences and establish horizontal and vertical alignments for pipeline construction.

Despite these efforts, it is anticipated that there will be locations along the water transmission main alignment where relocation of utilities owned by other entities is required to allow for construction of the proposed large diameter pipe. As of the date of this 2024 Basis of Design, the number and type of existing utilities along the proposed route are continuing to be determined. As such, the scope for relocation of utilities owned by other entities as part of the Program remains undefined. Based on initial assessments, an allowance of $15 million has been included in the GPWC budget for utility relocations by others. In the Baseline Budget presented in Section 13, this allowance is distributed across the CIP #2 and CIP #6 conveyance work packages.

5 Chicago Connection Facilities (CIP #1) Basis of Design

5.1 Function

New infrastructure is required to establish a connection between the existing City of Chicago water system and the proposed GPWC finished water transmission main. This infrastructure, referred to collectively as Capital Improvement Project #1, CIP #1, or the Chicago Connection Facilities, will be constructed on land adjacent to the City of Chicago's Southwest Pumping Station and west of the pumping station site in Durkin Park. The Chicago Connection Facilities will enable the GPWC to draw water from Chicago's South Tunnel system and pump it through the new transmission main to the Member Water Delivery Structures.

5.2 Components

The Chicago Connection Facilities will be constructed adjacent to the City of Chicago's existing Southwest Pumping Station located near the intersection of 84th Street and Kedvale Avenue. Specific components that make up the Chicago Connection Facilities are listed in Table 5-1. Exhibit 5-1 shows a conceptual layout of the proposed CIP #1 Chicago Connection Facilities.

Joliet has secured permanent easements from the City of Chicago for the Meter Vault, Suction Well, and High Service Pump Station to be owned and operated by the GPWC. Joliet has also secured temporary easements from the City of Chicago and the Chicago Park District for use during construction of the Chicago Connection Facilities. These temporary and permanent easements are detailed in: "Easement Agreement for Two (2) Permanent Easements and Seven (7) Temporary Easements at the City of Chicago Southwest Pumping Station Property" dated July 31, 2023, and "Easement Agreement for Durkin Park" and the "Agreement for Construction Easements for Durkin Park" dated July 31, 2023. All easements will be assigned to the GPWC upon its formation.

Joliet, on behalf of GPWC, has also paid $1.75 million to the Chicago Park District to compensate for the disruption of Chicago's residents' use of Durkin Park due to the proposed construction. This payment will be used by the Chicago Park District to construct improvements at other Park District locations in the area. This amount, along with the amount of payments made for acquisition of temporary and permanent easements for CIP #1 will be included in the Advanced Development Costs paid by Joliet.

Table 5-1 Chicago Connection Facilities (Capital Improvement Project #1)

Component	Description	Responsibility
Tunnel Connection	New connection between existing tunnel shaft north of the existing Southwest Pumping Station and the new Tunnel Extension	• Design, Construction, Ownership, Financing, Operation by CDWM
Tunnel Extension	New Tunnel Extension from the Tunnel Connection to the new Low Service Pump Station	• Design*, Construction by GPWC** • Ownership, Financing, Operation by CDWM
Low Service Pump Station	Pump station to lift water from the new Tunnel Extension to the Suction Well Reservoir	• Design*, Construction by GPWC** • Ownership, Financing, Operation by CDWM
Chicago Service Valve	A new valve outside and downstream of the Low Service Pump Station, which will serve as the point of demarcation between CDWM-owned and GPWC-owned facilities	• Design*, Construction by GPWC** • Ownership, Financing, Operation by CDWM
Meter Vault	Meter facilities for measuring water pumped by the Low Service Pump Station to GPWC	• Design*, Construction, Ownership, Financing, Operation by GPWC**
Suction Well	Suction Well Reservoir to provide storage to support pump operations	• Design*, Construction, Ownership, Financing, Operation by GPWC**
High Service Pump Station	Pump station to convey water from the Suction Well into transmission system for delivery to GPWC	• Design*, Construction, Ownership, Financing, Operation by GPWC**

* As Program Manager Joliet shall provide, perform and complete design, permitting and land acquisition, procurement, construction management, and start-up and commissioning for specified facilities.

**GPWC will hold the construction contract for the specified facilities.

Key:
CDWM = Chicago Department of Water Management
GPWC = Grand Prairie Water Commission

GRAND PRAIRIE
WATER COMMISSION

Title

Exhibit 5-1
Conceptual Layout Chicago Connections Facilities

Client/Project GPWC
Alternative Water Source Program

Project Location

Will, Cook, Kendall, and Grundy Counties

Stantec
CMT Crawford, Murphy & Tilly
Engineering Enterprises, Inc. Outstanding Service ~ Every Client ~ Every Day
STRAND ASSOCIATES®
CORNWELL ENGINEERING GROUP
V3

5.3 Design Flow and Capacity

The proposed Chicago Connection Facilities will be designed, constructed, and equipped to supply the Initial Commission System Design Capacity (ICSDC) for the GPWC Members. Consideration will be given during the design process to provisions for upgrade of the facilities to meet the Buildout Commission System Design Capacity (BCSDC). However, as space available for future construction adjacent to Chicago's Southwest Pumping Station is limited, it is anticipated that capacity increases for the LSPS and HSPS will be achieved through replacement of the existing pumps versus an expansion of the pump stations with the addition of pumps. Consideration for sizing of the component of the facilities has taken into account the life of the asset. For the initial Commission System construction, the components of the facilities will be sized as noted below.

- AWSP-01-01 Tunnel Extension
  - Tunnel Design Flow BCSDC
- AWSP-01-02 Suction Well
  - Yard Piping Design Flow: BCSDC
  - Suction Well Overflow: BCSDC
- AWSP-01-03 Low and High Service Pump Stations
  - Pump Station Structure: BCSDC
  - Pumps, Process/Mechanical Equip.: ICSDC
  - Yard Piping Design Flow: BCSDC

5.4 Operation (Normal / Emergency)

5.4.1 Normal Operation

A detailed description of normal operation of the Commission system has been included in Section 4. Highlights that include operation of the facilities at the Chicago Connection Facilities are noted below.

- GPWC will sum the demand values provided by the Members for at each Water Delivery Structure and provide CDWM with the desired Low Service Pump Station flow each day.
- CDWM will operate the Low Service Pump Station based on the GPWC desired flow.
- The High Service Pump Station will be operated by GPWC operators to maintain the level in the Suction Well located downstream of the Low Service Pump Station, effectively matching the flow being supplied by the City of Chicago. High and low level setpoints will be established for the Suction Well, and both GPWC and CDWM will be provided with automatic notifications in the event that levels vary outside of the desired range.

- GPWC will control pumps at the High Service Pump Station and IPS1 to maintain a uniform supply and meet minimum levels at the ISF1 and ISF2. Flows and upstream pressures at the Member Water Delivery Structures will be monitored along with tank levels and operating pressures along the water transmission main. Operating data will be used by GPWC operators to make decisions regarding adjustments in pump speed and operation at both the High Service Pump Station and IPS1.

5.4.2 Emergency Operation

The need for operation of the Chicago Connection Facilities under emergency conditions could stem from one of several potential scenarios:

- Restriction or curtailment of supply in the Chicago South Tunnel system at the Tunnel Connection

- Loss of power to either the Low Service or High Service Pump Station

In the event of insufficient supply in the Chicago South Tunnel system at the Tunnel Connection, a reduction in flow or shut down of both the Low Service Pump Station and the High Service Pump Station could be required. The Suction Well has been sized to provide adequate water volume to support the orderly shut-down of either or both pump stations under these conditions. In the event of a curtailment, each Member will be entitled to receive its pro-rata share of the water available as described in the Water Supply Agreement.

Both the Low Service and High Service Pump Stations are designed with dual electrical power feeds and standby generators (including automatic transfer switches) to limit the risk of a loss of power and resulting station shutdown. The standby generators for each pump station are sized to support continued operation of the facilities for design conditions up to the 2050 Average Day Demand. Should operation of one or both of the pump stations using the generators be required, the GPWC operator would notify the Member communities and, if necessary, each Member will be entitled to receive its pro-rata share of the water available until normal operations at the facilities were restored.

If the High Service Pump Station experiences a loss of power and the Low Service Pump Station continues to operate, overflow ports have been included in the design of the Suction Well. The following considerations have been made and coordinated with CDWM:

1. Provide systems and controls to minimize the likelihood of any overflow from the Suction Well,

2. Provide systems and controls to minimize the volume of water that would be associated with an overflow event, and

3. Provide for the management of water from an overflow in a manner that manages the risk of impacts to adjacent properties.

In the unlikely event of a full shut-down of either the Low Service Pump Station or the High Service Pump Station, supply from the GPWC system to the Member Water Delivery Structures would be curtailed and Members would be required to rely on the storage in their own distribution systems or their alternative source of supply.

5.5 Design Criteria

Design principles for the Chicago Connection Facility are described below. These principles reflect design criteria contained in the *2020 Basis of Design Report*, updated during the course of preliminary design efforts, and submitted to, reviewed by, and approved by the City of Chicago in a 10% Basis of Design document. While these principles will govern the overall design efforts, certain design details and preferences for components that will be owned by Chicago (Tunnel Extension, Low Service Pump Station, Service Valve) are still being defined and negotiated and may change as design efforts progress. To date, Chicago Department of Water Management has reviewed and signed off on 90% design documents for the AWSP-01-01 Tunnel Extension and 60% design documents for Low Service Pump Station portion of AWSP-01-03.

5.5.1 Tunnel Connection

A new connection to Chicago's South Tunnel System must be constructed to create a supply point for the GPWC. The connection is anticipated to be made to an existing shaft near the north end of the Southwest Pumping Station as shown in Exhibit 5-1. Due to the configuration of the tunnel supply to the pump station, this connection will have to be made while the existing tunnel shaft remains in service.

Given the sensitive nature of this construction relative to operation of the Chicago South Tunnel System and the Southwest Pumping Station, Chicago will design and construct the new Tunnel Connection. Detailed design criteria for the Tunnel Connection will be developed by Chicago's design consultant. The AWSP design team has communicated with Chicago's consultant throughout the design process to coordinate design for the Tunnel Connection and Tunnel Extension. The Tunnel Connection consultant has recommended an 8-foot diameter Tunnel Connection (versus 10-foot diameter as compared to the Tunnel Extension) and the AWSP design team has reviewed hydraulics and determined that this smaller diameter does not have a significant impact on the head loss of these improvements. The Tunnel Connection being designed by Chicago's consultant will include a sluice gate to provide for isolation between Chicago's South Tunnel system and the facilities being constructed to serve the GWPC.

5.5.2 Tunnel Extension

A segment of new water tunnel will be required to convey flow from the new Tunnel Connection to the proposed Low Service Pump Station south of Chicago's Southwest

Pumping Station. The tunnel will be approximately 510 feet long with a 10-foot finished diameter to convey the Buildout Commission System Design Capacity flow from the new Tunnel Connection to the new Low Service Pump Station. Based on available data, the tunnel will be constructed in rock at aa depth of approximately 110 feet below grade.

Two shafts (one permanent shaft at the north end of the site and one at the south end of the site to facilitate construction) will be required along the Tunnel Extension to allow for changes in alignment and support construction and finished access to Southwest Pumping Station.

Upon completion of construction and start-up/ commissioning, the Tunnel Extension will be transferred to CDWM prior to commencement of initial water delivery and normal operations.

5.5.3 Low Service Pumping Station, Chicago Service Valve and Meter Vault

Vertical pump shafts will be constructed to connect the Tunnel Extension to the proposed Low Service Pump Station. Vertical turbine pumps will be installed in the shafts to lift the water from the tunnel and convey it to the Suction Well to be constructed in Durkin Park, west of the existing Southwest Pumping Station site. The Low Service Pump Station will be designed for unstaffed operation.

Flow from the Low Service Pump Station to the Suction Well will pass through the Chicago Service Valve that will serve as the point of demarcation between Chicago-owned and GPWC-owned facilities. The rate and volume of water purchased from Chicago by the GPWC will be measured in a Meter Vault located downstream of the Chicago Service Valve and upstream of the Suction Well. The Meter Vault will be a below grade concrete vault housing magnetic flow meters owned and maintained by the GPWC. The vault will include parallel piping with a meter and isolation valves on each segment to allow for full flow through a single line while the other line is out of service for maintenance. Data from the Meter Vault will be viewable by both GPWC and Chicago.

Upon completion of construction and start-up/ commissioning, the Low Service Pump Station and Chicago Service Valve will be transferred to CDWM prior to commencement of initial water delivery and normal operations pursuant to the Chicago *WSA*.

Key criteria that will serve as the basis for final design of the Low Service Pump Station are summarized in Table 5-4. Final design details may be adjusted as design proceeds based on Chicago preferences, building code requirements, and site zoning constraints.

Table 5-2 Key Design Criteria: Low Service Pump Station

Design Parameter	Design Parameter Value
Design Capacity (MGD)	55.27 (Initial Commission System Design Capacity)
Design Head (feet)	59 feet
Pump Type	Vertical Turbine
Motor Control	Variable Frequency Drive
No. of Pumps, Pump Redundancy	4, N+1
Pump Capacity (MGD)	18.42**
Flow Metering – Individual Pump Discharge	Venturi flow meter
Flow Metering	Magnetic flow meter (2 parallel meters located in Meter Vault outside of Pump Station)
Piping and Valve Velocity (ft/s)	5 to 8
Pump Removal Method	Overhead Gantry Crane and Hoist System
Electrical Equipment	4160V (to be verified upon final pump / motor selections)
Primary Power Supply	Two new electrical service feeds (300 Amp, 12.47kV, 3 Phase, 3 Wire)
Backup Power	Generators w/ Automatic Transfer Switch sized for 2050 Average Day Demand
SCADA Architecture	PLC-based control w/ gigabit fiber optic ethernet network
SCADA Local Interface	Yes
Chicago Security Requirements	Real-time video surveillance and access control w/ local server
Restroom	Gender-neutral with toilet and sink
Building Materials	
Foundation	Cast-in-place Reinforced Concrete
Exterior Walls	CMU Block w/ Masonry Brick
Interior Walls	CMU Block
Roof System	Bar Joist with Metal Deck
Interior Ceilings – General	Exposed Roofing System
Interior Ceilings – SCADA Room	Suspended Tile

Notes:
* Pump station structure and yard piping will be sized to accommodate Buildout Commission System Design Capacity.
** May be adjusted based on final pump selection.
Key:
CMU = Concrete Masonry Unit
ft/s = feet per second
MGD = million gallons per day
SCADA = Supervisory Control and Data Acquisition

5.5.4 Suction Well

Flow from the Low Service Pump Station will discharge through an air gap downstream of the Meter Vault and into the Suction Well to be constructed within Durkin Park immediately west of the Southwest Pump Station site. The City of Chicago and Chicago Park District have provided GPWC with temporary and permanent easements within Durkin Park for construction, operation, and maintenance of the Suction Well. The permanent easement for the Suction Well includes provisions for continued use of the land area over the Suction Well by the Chicago Park District through a lease between Chicago and Chicago Park District.

The Suction Well is intended to provide 4 MG capacity to support flexible pump operations and controlled shut down of either the High Service or Low Service Pump Stations. The Suction Well is not intended to provide emergency storage capacity to sustain High Service Pump Station operations in the event of an extended CDWM supply outage. Storage to provide supplemental supply capacity for the GPWC during an extended CDWM outage is within the GPWC Members' distribution systems.

Suction Well storage volume will be provided in a partially below-grade, two-cell structure constructed of cast-in-place, reinforced concrete. A dividing wall between the cells will allow one of the cells to be taken off-line for maintenance without impacting operation of the other cell. The maximum water depth for the suction well is 20 feet. Note that a design exception waiver for the Suction Well was obtained from IEPA to allow for deviation from various Title 35 IL Administrative Code requirements including the requirement to have 50% of the storage volume above ground.

In the event that one cell is to be taken offline and the groundwater level must be lowered, underdrains will be constructed at the base of the foundation for the Suction Well and drain to a submersible pump station which will then discharge the underdrain water to the existing sewer manhole in 85th Street. The underdrain piping and submersible pump station will be owned, operated and maintained by GPWC.

Due to the need for a positive overflow and the Chicago Park District's desire to allow for continued use of the park, the Suction Well will extend above grade approximately six (6) feet. Fill will be placed on top of the structure to allow for grass covering. The top slab of the Suction Well will be sloped to drain stormwater runoff to the perimeter, away from the Suction Well. An underground stormwater detention system, to be owned and operated by CDWM, will be included to capture storm runoff and divert it to the storm sewer on West 85th Street. Grading around the remaining three wall faces will facilitate a gradual slope from the top of the structure back to existing grade. The storm sewer piping and structures in the temporary and permanent easements around the Suction Well will be constructed by GPWC and owned, operated and maintained by the Park District.

A gradual pathway will be provided on eastern side to allow access to the top of suction well from South Keeler Avenue. The south wall of the Suction Well will remain

exposed to allow for overflow weirs from each cell to discharge freely through the southern wall. At this stage in design, GPWC team is coordinating with CDWM to explore grading plans to initially promote flow west in the park in the event of an overflow.

5.5.5 High Service Pump Station

A new High Service Pump Station will be constructed just south of Chicago's Southwest Pumping Station to pump water from the Suction Well to the GPWC Members. Site piping will convey water from the Suction Well to a wet well beneath the High Service Pump Station. Vertical turbine pumps will draw water from the wet well and discharge it to the GPWC transmission main. The High Service Pump Station will be designed for unstaffed operation.

Bypass piping (with an air gap) from the Meter Vault to the HSPS will be provided so the station could be operated with the Suction Well out of service.

A water quality monitoring panel will be installed in the High Service Pump Station to monitor water quality characteristics of the treated water supplied to the GPWC by the City of Chicago. The panel will be fed by a water sample tap located in the meter vault downstream of the Chicago Service Valve.

As discussed in Section 4.3.2, surge control measures including 55,000 gallons of compressed air surge tank volume will be installed at the High Service Pump Station to mitigate pressure transients that could result from a sudden loss of power and shut down of the high service pumps.

An alternate control interface (SCADA workstation) will be provided at the High Service Pump Station so that a GPWC operator could operate the entire system from that location if desired or necessary.

An underground stormwater detention system, to be owned and operated by CDWM, will be included to capture storm runoff from the SWPS site and divert it to the storm sewer on West 85th Street.

Key criteria anticipated to be the basis for final design of the High Service Pump Station are summarized in Table 5-3. Final design details may be adjusted as design proceeds based on Chicago building code requirements and site zoning constraints.

Table 5-3 Key Design Criteria: High Service Pump Station

Design Parameter	Design Parameter Value
Design Capacity (MGD)	55.27 (Initial Commission System Design Capacity) *
Design Head (feet)	262
Pump Type	Vertical Turbine
Motor Control	Variable Frequency Drive
No. of Pumps, Pump Redundancy	6, N+1
Pump Capacity (MGD)	11.05**
Flow Metering	Magnetic flow meter
Piping and Valve Velocity (fps)	5-8
Pump Removal Method	Removable Skylights/Outside Crane
Surge Control Design Condition	Power loss at 2050 Maximum Day Flow
Surge Control System	Compressed Air Surge Tanks (To be sized based on final hydraulics)
Electrical Equipment	4160 V
Primary Power Supply	Two 600 Amp, 12.47kV, 3-Phase, 3 Wire underground metered services
Backup Power	Generators w/ Automatic Transfer Switch sized for 2050 Average Day Demand
SCADA Architecture (for Commission)	PLC-based control w/ gigabit fiber optic ethernet network
SCADA Local Interface	Yes, with Alternate Control Interface
Chicago Security Provisions	Real-time video surveillance, access control w/ local server
Restroom	Gender-neutral with toilet and sink
Building Materials	
Foundation	Cast-in-place Concrete
Exterior Walls	CMU Block w/ Masonry Brick
Interior Walls	CMU Block
Roof System	Bar Joist with Metal Deck
Interior Ceilings – General	Exposed Roofing System
Interior Ceilings – SCADA Room	Suspended Tile

Notes:
* Pump station structure and yard piping will be sized to accommodate Buildout Commission System Design Capacity.
** May be adjusted based on final pump selection.

Key:
ATS = Automatic Transfer Switch
CMU = Concrete Masonry Unit
MGD = million gallons per day
PLC = programmable logic controller
SCADA = Supervisory Control and Data Acquisition

5.6 CIP #1 Delivery Strategy

The CIP #1 improvements are currently planned for implementation through a Construction Manager at-Risk (CMAR) delivery model to allow for early involvement of the construction contractor in the planning and coordination of work at the site. A CMAR contractor was selected by the GPWC based upon a competitive, two-phase procurement process requiring separate submittals of the firm's qualifications and price proposal. Joliet entered into a Pre-construction Services Contract with the CMAR and issued a notice-to-proceed with preconstruction services in late 2023.

The goal of the CMAR process is to leverage coordination between the Program Team and the CMAR ahead of the start of construction so as to provide for an efficient overall strategy for completion of the work for a defined price and for management of construction impacts on the surrounding neighborhood. A draft guaranteed maximum price (GMP) for the tunnel extension and suction well portions of CIP #1 is scheduled to be submitted by the CMAR in mid-June. Following evaluation of the draft GMP, the Program Team will either proceed with negotiations of a final GMP and authorization of construction services or end the CMAR process and move to implement the CIP #1 work through a traditional design-bid-build approach.

The Baseline Budget (2.0) for the proposed CIP #1 improvements is summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

6 Transmission Main (CIP #2, #6, #7) Basis of Design

6.1 Function

Water transmission main is required to establish a connection between the proposed Chicago Connection Facilities and GPWC Member Water Delivery Structures. At its northeastern end, the transmission main will be supplied with water from the Chicago Connection Facilities High Service Pump Station constructed adjacent to Chicago's existing Southwest Pumping Station near the intersection of 84th Street and Kedvale Avenue. Details of the Chicago Connection Facilities are described in Section 5.

As shown in Exhibit 6-1, the GPWC transmission system is currently estimated to include a total of approximately 62 miles of pipeline (37 miles of 60-inch and 66-inch diameter main and 25 miles of additional smaller diameter transmission main extending to the Water Delivery Structures for all of the GPWC Members). Details of the transmission main alignment may change as design coordination progresses, but preliminary design drawings have been developed based on the current alignment. For design purposes, 36 miles of the 60- and 66-inch diameter pipe are included under six CIP #2 work packages, approximately 1 mile of additional 66-inch diameter pipe is included in the two tunnel crossing work packages that make up CIP #7, and the remaining 25 miles of smaller diameter piping (48-inch diameter and smaller) are included in five CIP #6 work packages.

6.2 Components

GPWC Transmission Main components are listed in Table 6-1. Transmission main includes a 66-inch-diameter pipeline between the Chicago Connection Facilities and the branch to the first Romeoville Water Delivery Structure. Transmission main beyond this point will include additional 66-inch and 60-inch diameter transmission main as well as smaller diameter transmission main.

Initial planning for the proposed GPWC transmission main improvements assumed that construction of the proposed water transmission main in public rights-of-way would reduce the need for acquisition of permanent easements from private property owners, reducing costs and schedule. While managing the number of easements required remains a goal for the Program, additional design and right-of-way coordination efforts have determined that alternative alignments may be warranted in areas where space is readily available outside of existing public right-of-way or in areas where issues such as extensive utility conflicts, planned roadway widening, constructability issues, pavement restoration costs, or risks related to potential future demands for transmission main relocation are of concern. Options for final pipeline alignments are being evaluated across all work packages as 60% design efforts continue. Where acquisition of a reasonable number of easements is found to be feasible and result in potential cost savings and/or reduction in the risk of future relocation demands, plans for construction of transmission main in easements will be pursued.

Exhibit No.
6-1

GRAND PRAIRIE
WATER COMMISSION

Title

GPWC Regional Water Transmission System

Client/Project
GPWC
Alternative Water Source Program

Project Location
Will, Cook, Kendall, and Grundy Counties

N

0 4,000 8,000 16,000 24,000 32,000 40,000 Feet

(At original document size of 22x34)
1 inch equals 8000 FT

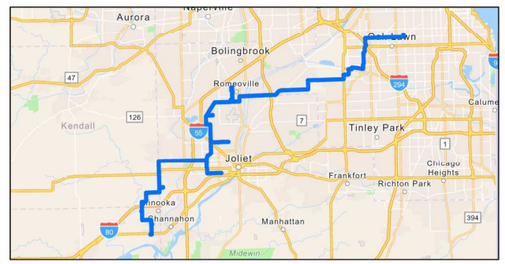
Legend

- Transmission Main

Delivery Point
- Chicago Connection
- Primary
- Non-Primary
- Intermediate Location

Member Community
- Channahon
- Crest Hill
- Joliet
- Minooka
- Romeoville
- Shorewood

Work Package ID - Construction Contracts
- AWSP-02-01
- AWSP-02-02
- AWSP-02-03
- AWSP-02-04
- AWSP-02-05
- AWSP-02-06
- AWSP-06-01
- AWSP-06-02
- AWSP-06-03
- AWSP-06-04
- AWSP-06-05
- AWSP-07-01
- AWSP-07-02



Location Map: Not to Scale

Notes
1. Coordinate System: NAD 1983 State Plane Illinois East
2. Data Sources: WILL CO., COOK CO., IDOT, DOWNLOADED FROM WEB
3. Background: County of Will, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, FAO
4. Location for facilities are conceptual and do not indicate final locations for the proposed infrastructure. Final siting and routing analyses are ongoing as part of the engineering design process.

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REV. JUNE 2024

Table 6-1 Transmission Main Components

Component	Description
Transmission Main	Pipeline to convey finished water. Possible materials for 66-inch diameter transmission main include prestressed concrete cylinder pipe (PCCP) and steel. Ductile iron pipe will be considered for smaller diameter pipe as conditions warrant.
Isolation Valves	Butterfly valves to isolate sections of the transmission main for maintenance and repair. Direct bury w/ structures for access to valve operators
Air Release Valves	Valves to release trapped air, primarily at high points or long vertical runs of pipe. Valves to be installed in pre-cast structures
Access Ports	Hatches to allow access to pipe for maintenance. Structures will be required to house the access ports.
Blow Off/Flushing Valves	Valves provided at low points to flush debris from transmission main. Blow-off valves will be installed in pre-cast structures to allow for operation of the valve and access to the drain connection.
Thrust Restraint	Restrained joint pipe will be used as the primary means for managing thrust forces on the pipeline. Structural provisions for exterior thrust restraint will be considered where necessary.
Conduit, Handholes, Manholes for Fiber Optic Cable	Conduit for installation of fiber optic cable for the GPWC SCADA and Communications infrastructure will be installed as part of transmission main construction between the Chicago Connection Facilities and ISF2. The fiber optic cable will be installed in the conduit separately under Work Package AWSP-05-01.

The final transmission main installation will require a mix of open cut and trenchless construction methods. Open cut construction, with a minimum bury depth of 5 feet, (unless site conditions and permitting allow for a shallower bury depth) is expected to be the predominant method of pipeline installation, but trenchless installation will be required at a number of locations including railroads, waterways, major county or state routes, high traffic intersections, and complex crossings. The design teams are coordinating with various right-of-way and permitting agencies to obtain concurrence on the most appropriate and cost-effective means for pipeline construction at these locations.

Particularly complex crossings along the proposed alignment are anticipated to include:

- Tri-State Tollway (I-294) Crossing
- Cal-Sag Channel Crossing
- Veterans Memorial Tollway (I-355) Crossing
- Des Plaines River/Sanitary and Ship Canal/I&M Canal Crossing
- I-55/DuPage River Crossing
- I-80 Crossing

Conduit, handholes, and manholes for later installation of fiber optic cable along the transmission main route under work package AWSP-05-01 will be installed in conjunction with construction of the transmission main segments between the High Service Pump Station and ISF2. The design team is continuing to evaluate the relative costs and benefits of PVC conduit and lower cost HDPE coilable non-metallic conduit (CNC) for carrying the fiber. While CNC material costs are lower than those for PVC, contractors have expressed some concern regarding the effort that may be required to install a material rolled off a spool into open trench. A final decision regarding the type of conduit to be specified will be made based on analysis conducted in conjunction with detailed design of the transmission main and associated conduit.

Access handholes/manholes for the fiber optic cable will be provided at about 1,000-foot intervals along the cable route, at major road crossings, and at each end of the tunnel crossings of the Calumet Sag Channel or the Des Plaines River/Chicago Sanitary and Ship Canal. Where transmission main is being installed using trenchless methods, it is anticipated that a primary conduit as well as at least one spare conduit will be installed with the pipeline inside the tunnel or trenchless casing.

The Baseline Budget (2.0) costs for the proposed CIP #2, #6, and #7 conveyance improvements are summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

6.3 Design Flow and Capacity

As noted previously, the Chicago-Joliet Water Supply Agreement requires that the GPWC take water at a uniform rate during each day. Members will be responsible for accommodating normal diurnal variations in demand through the use of their own storage and pumping facilities. The GPWC transmission system has minimal operational storage and is not sized to deliver peak flows to the Members.

While the design capacity for pumping and storage facilities in the GWPC system will be the Initial Commission System Design Capacity (ICSDC); the transmission main infrastructure will be designed with adaptive management to supply demands for the next 100 years, up to the Buildout Commission System Design Capacity (BCSDC).

Table 6-2 lists the design flow and pipe diameter for each segment of the proposed transmission main system.

Table 6-2 AWSP Transmission Main Length by Work Package

Work Package	Transmission Main Length: Main Line (Miles)	Transmission Main Length: Member Connections (Miles)	Estimated Buildout Commission System Design Capacity (MGD)	Transmission Main Diameter
AWSP 02-01 – FWTM[1] – Segment A	4.5		103.56	66-inch
AWSP 02-02 – FWTM – Segment B	5.0		103.56	66-inch
AWSP-07-01 – Cal-Sag Crossing	0.1		103.56	66-inch
AWSP 02-03 – FWTM – Segment C	6.8		103.56	66-inch
AWSP 02-04 – FWTM – Segment D	6.8		103.56	66-inch
AWSP-07-02 – Des Plaines River Crossing	0.9		103.56	66-inch
AWSP 02-05 – FWTM Segment E				
Upstream of Romeoville Primary	2.0		103.56	66-inch
Romeoville Primary to Romeoville Secondary	3.6		98.8	60-inch
Downstream of Romeoville Secondary	1.9		95.3	60-inch
AWSP 02-06 – FWTM – Segment F				
Upstream of Future Crest Hill	2.4		95.3	60-inch
Future Crest Hill to Crest Hill Primary/Secondary	0.7		94.9	60-inch
Crest Hill Primary/Secondary to Joliet Quaternary	1.6		91.1	60-inch
Downstream of Joliet Quaternary to N 129th Infantry Rd and Black Rd	0.7		84.7	60-inch
AWSP 06-01 – RWTM[2] – Segment A				
To Romeoville Primary WDS		1.5	4.8	20-inch
To Romeoville Secondary WDS		0.7	3.5	20-inch
To Crest Hill Secondary WDS		0.33	3.8	16-inch
From Crest Hill Secondary WDS to Crest Hill Primary WDS		1.8	3.3	16-inch

Work Package	Transmission Main Length: Main Line (Miles)	Transmission Main Length: Member Connections (Miles)	Estimated Buildout Commission System Design Capacity (MGD)	Transmission Main Diameter
AWSP 06-02 – RWTM Segment B				
To Joliet Tertiary WDS		0.33	34.1	42-inch
To Joliet Primary WDS and Future Joliet (SWHPZ)		2.33	27.7	36-inch
AWSP 06-03 – RWTM Segment C				
Regional Transmission Main Downstream of AWSP-02-06	3.66		50.6	48-inch
Connection for Joliet Primary and Tertiary		0.5	34.1	42-inch
AWSP 06-04 – RWTM Segment D				
Regional Transmission Main to Joliet Secondary, Future Joliet (WCHPZ), and Future Shorewood	11.8		50.6	48-inch
Regional Transmission Main to Shorewood Primary	33.1		24.0	36-inch
Downstream of Shorewood Primary	0.5		13.6	30-inch
To Shorewood Primary WDS	0.44		10.4	3030-inch
AWSP 06-05				
Regional Transmission Main to Minooka Secondary	1.4		13.6	30-inch
Minooka Secondary to Minooka Future	2.66		10.3	24-inch
To Minooka Secondary WDS		0.1	3.3	20-inch
Minooka Future to Minooka Primary	2.33		6.5	24-inch
Minooka Primary to Channahon Primary	1.55		4.2	18-inch

Notes: [1] FTWM: Finished Water Transmission Main
[2] RTWM: Regional Water Transmission Main

6.4 Operation (Normal / Emergency)

Under normal operating conditions Lake Michigan water will be pumped through the transmission system from the High Service Pump Station at the Chicago Connection Facilities to each of the Member Water Delivery Structures. Intermediate pump stations will be used as necessary to maintain required pressures within the system as demands increase. Storage facilities along the transmission main will provide limited buffer and reserve capacity for operational flexibility or emergency conditions.

6.4.1 Transmission Main Break – Chicago Connection Facilities to ISF1

In the event of a break or leak requiring a shut-down of the finished water transmission main between the Chicago Connection Facilities and ISF1, GPWC operators could maintain service to the Members for a limited time by using the intermediate storage facilities in the system. Storage could also be used to maintain service to Members in the event of an outage at the High Service Pump Station. Table 6-3 shows the projected storage required to maintain supply to the Member communities for up to two hours at average day demand conditions.

Table 6-3 Emergency Storage Requirements for 2-hour Supply

	2030 Average Day Demand	2050 Average Day Demand	Buildout Average Day Demand
Between HSPS and Intermediate Storage Facility 1	No member connections in this section of transmission main. Inlet riser at Intermediate Storage Facility 1 will maintain minimum pressure during HSPS outage.		
Between Intermediate Pump Station 1 and Intermediate Storage Facility 2[1] - Romeoville - Crest Hill - Joliet - Channahon 2	2.6 MG	3.5 MG	6.5 MG
Downstream of Intermediate Storage Facility 2[1] - Shorewood - Minooka - Channahon 1	0.4 MG	0.7 MG	1.4 MG

[1] *Assumes 80% of storage available*

GPWC is also currently investigating the potential for construction of an interconnection with another regional water utility in the vicinity of IPS1. Implementation of an interconnection could provide additional emergency supply capacity and extend the time period for which service could be maintained in the event of an outage upstream of the interconnect.

As details related to the interconnect are still in development, no costs for an interconnection are included in this 2024 Basis of Design or the current Baseline Program Budget.

6.4.2 Transmission Main Break – IPS1 to ISF2

An outage in the transmission main between IPS1and ISF2 in Shorewood would have significant impacts on operation of the Commission system as it could isolate certain Romeoville, Crest Hill, Joliet and Channahon Water Delivery Structures from both the primary supply from Chicago and IPS1. Under this scenario, water supply to affected Members would be curtailed and the Members would need to make use of their own internal storage and/or alternate water source (such as backup wells).

6.4.3 Transmission Main Break – Downstream of ISF2

Should a leak or break occur in the regional water transmission main downstream of ISF2, only the Water Delivery Structures downstream of the break would be impacted. Supply to facilities upstream of the break would be maintained through normal operation of the HSPS, IPS1, and upstream segments of water transmission main.

Water Delivery Structures downstream of the break would be isolated from both the Chicago supply and GPWC transmission system storage. Members served from these Water Delivery Structures would need to operate using their own internal storage and/or alternate water source (such as backup wells).

6.4.4 Transmission Main Break – Member Connection

Each Member Water Delivery Structure will be served via a single pipeline connection to the commission water transmission main. Should a break occur in the pipe connecting a Water Delivery Structure to the transmission main, the Water Delivery Structure would need to be shut down until the pipe was repaired. In communities with more than one Water Delivery Structure, adjustments may be possible in the supply to unaffected Water Delivery Structures to maintain some level of supply to the Member system. For communities with only one Water Delivery Structure, an outage in the piping between the primary transmission main and the Water Delivery Structure would require a Member to switch to operation using their own internal storage and/or alternate water source (such as backup wells).

6.5 Design Criteria

The proposed GPWC transmission main will be designed based on consideration of:

- System Hydraulics (minimum/maximum velocity and pressure)
- Protection of treated water quality
- Structural Requirements (pipe strength to accommodate internal pressure as well as external loadings associated with depth of bury or site conditions)
- Construction Requirements (especially related to complex crossings)
- Projected construction costs
- Operation and Maintenance requirements
- Protection from Damage and Deterioration

The intent is to provide a transmission main system with a design life of 100 years.

These considerations will be applied consistently in the design of all GPWC water transmission main. Select transmission main design criteria are summarized in Table 6-4.

Table 6-4 Key Design Criteria: Transmission Main

Design Parameter	Design Parameter Value
Design Velocity – Minimum for 2030 Minimum Day Demand (fps)	1.0
Design Velocity – Maximum (fps)	8.0
Design C-factor (2030)	130
Design C-factor (Future)	110
Transmission Main Maximum Pressure (psi)	120 (Except at trenchless crossings and near pump station discharges)
Transmission Main Minimum Pressure (psi)	25
Pipeline Material (dependent upon pipe size and construction conditions)	Prestressed Concrete Cylinder Pipe (PCCP), AWWA 304 Steel Pipe, AWWA C200 with cement mortar lining Ductile Iron Pipe (DIP), AWWA C150 with cement mortar lining
Minimum Pipeline Depth of Bury (ft)	5**
Isolation Valve Spacing*	1 per mile
Air Release Valve Spacing*	At high points or long vertical runs of pipe. (Assumed spacing 1 per ½ mile for estimating costs)
Access Port Spacing*	1 per 2 miles
Blow Off/Flushing Valves*	At low points to flush debris from transmission main. (Assumed spacing 1 per ½ mile for estimating costs)

Note:
*Final spacing may be more or less than assumed based on final transmission main alignment, profile, and crossings.
**Conditions and permitting in certain segments of the transmission main alignment may allow for installation at cover depths less than 5 feet

Key:
fps = feet per second
psi = pounds per square inch

7 Intermediate Pump Station 1 and Intermediate Storage Facility 1 (CIP #3) Basis of Design

7.1 Function

Due to the total length and ground profile of the proposed GPWC transmission main, intermediate pumping and storage facilities are required to boost the flow and maintain pressure between the Chicago Connection Facilities and GPWC Member Water Delivery Structures under certain demand conditions. The storage facility will regulate pressure on the suction side of the pump station and provide supplemental water for temporary (up to 2-hour duration) supply to downstream Water Delivery Structures in the event of a loss of upstream supply. The storage facility will also serve to maintain a minimum hydraulic grade line elevation (approximately 810 feet above mean sea level) in the upstream transmission main as part of the surge control strategy for the system.

As shown previously in Exhibit 6-1, IPS1 and ISF1 will be located along the water transmission main approximately 16 miles south and west of the Chicago Connection Facilities along Bell Road in Lemont. It is assumed that approximately 2,500 feet of 66-inch diameter water main will be required to connect the proposed IPS1/ISF1 with the finished water transmission main. Costs for this piping are included in the cost for CIP #3.

7.2 Components

The major components of the CIP #3 improvements include a 4 MG water storage standpipe (ISF1) and a booster pumping station (ISP1) designed to supply the ICSDC. These items and related components included in CIP #3 are listed in Table 7-1.

The Baseline Budget (2.0) costs for the proposed CIP #3 improvements are summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

7.3 Design Flow and Capacity

Pumps, piping, valves, electrical equipment for IPS1 and ISF1 are being designed for the ICSDC. However, some components (site piping and large diameter valves) intended to have a long (> 50 year) design life will need to be constructed to accommodate the BCSDC. It is also important that the design considers the likely need for expansion of the pump station (after 2050) to support projected future increases in demand. Specifically, the pump station building will be designed to allow for a future addition and increase in station pumping capacity from the initial capacity to the buildout capacity.

The 4 MG volume of ISF1 is based on the volume of water required to allow for controlled shut down of the station in the event of an upstream supply outage, and the volume required to support up to 2 hours of emergency supply (at 2050 average day demand conditions) to the Member Water Delivery Structures between IPS1 and ISF1 in

Shorewood. Approximately 2.5 MG of additional storage would need to be constructed after 2050 to provide 2 hours of emergency supply under Buildout average day demand conditions. Space has been reserved on the site for construction of this additional storage when it is determined to be needed by the Commission.

Table 7-1 Intermediate Pump Station 1 and Storage Facility 1 Components

Component	Description
Intermediate Storage Facility 1	4 MG standpipe. Capacity of storage tank sized to allow for a sequenced shutdown of pumps and support emergency operation to Water Delivery Structures between ISF1 and ISF2 under average day demand conditions. Inlet riser required to maintain minimum HGL is set at 810 feet in upstream transmission main. Normal operating level anticipated will be 805 feet with an operating range from 780 feet to 805 feet. Overflow height at 820 feet and total tank height at 100 feet.
Intermediate Pump Station 1	New pump station with horizontal split case pumps, expandable to buildout capacity.
Chemical Feed Facilities	Space for sodium hypochlorite and orthophosphate chemical feed systems will be provided. Storage and dose requirements are based on information available as of February 2024. For Sodium Hypochlorite a maximum anticipated feed rate of up to 1 ppm at 2050 Average Flow is used. For Orthophosphate the maximum feed rate is currently anticipated to be in the range of 1.0 – 1.5 ppm at 2050 Average Flow based on a maximum required level of 4 ppm from Joliet corrosion control testing to date and an assumed Chicago feed rate of 2.5 to 3.0 ppm. The final feed rate for Orthophosphate will be determined upon completion of corrosion control testing by all members and confirmation of a design feed rate from Chicago.
Standby Generators	Generators will accommodate powering pumps to meet Average Day Demand
Bypass Piping	Piping at the site will be configured to allow flow to bypass the pump station, standpipe, or both. This arrangement will maximize operational flexibility and allow for system operation during required maintenance.
Connecting Piping	Approximately 2,500 feet of 66-inch diameter pipe is assumed to be required to convey flow from the finished water transmission main to the storage facility and pump station and return the flow to the transmission main.

Key:
MG = million gallons

7.4 Operation (Normal / Emergency)

Under normal conditions, all flow from the HSPS will pass through the proposed Intermediate Storage Facility 1 via an inlet riser to maintain a minimum hydraulic grade

line of 810 feet above mean sea level upstream of the standpipe. Maintaining this grade line elevation is an important element of the surge control strategy for the HSPS.

IPS1 will be operated as needed to maintain a target hydraulic grade line/pressure setpoint at the connection to the ISF2 (754' HGL). Current analyses indicate that the IPS1 will not need to be operated until transmission main flows reach approximately 45 MGD.

The IPS1 site will also include equipment for the potential feed of sodium hypochlorite (for maintenance of a disinfectant residual) and/or orthophosphate (for corrosion control). The system will be designed to allow for addition of one or both chemicals regardless of whether pumps are being operated at IPS1.

IPS1 is being designed with provisions to minimize the potential for an outage at the facility due to loss of power (dual electrical feed from utility, if available, and standby generator capacity). Should some other factor result in an outage at the facility, there would be no impact on the hydraulic performance of the system for flows up to about 45 MGD since the station is not required to maintain desired pressures for those flows. Should an outage occur when IPS1 is in use, flow up to the full design capacity of the High Service Pump Station could still be conveyed to all Member Water Delivery Structures. However, the pressure at the Water Delivery Structures between the IPS1 and the ISF2 in Shorewood would be reduced by approximately 15-25 psi.

7.5 Design Criteria

It is anticipated that ISF1 will be constructed of welded steel and will include separate inlet and outlet piping to maintain a minimum hydraulic grade line of approximately 810 feet above mean sea level upstream of the tank and facilitate turnover of the stored water. The water level in the standpipe will be monitored via a pressure transducer in the adjacent piping and reported to the Control Center at Intermediate Storage Facility 2 via the GPWC Supervisory Control and Data Acquisition (SCADA) system.

IPS1 will be designed to serve as a booster pumping station within the GPWC water transmission system. When necessary, IPS1 will be operated to boost pressure in the transmission main segments leading to GPWC Member Water Delivery Structures. Based on the current hydraulic evaluation, surge control is not anticipated to be needed at this station. Transmission main piping at the IPS1 site will be designed to include a bypass for use during demand periods when operation of IPS1 is not required. Bypass piping will also be provided to allow for operation of the transmission main and pump station when the standpipe is out of service for maintenance or painting. Exhibit 7-1 shows the process flow diagram for the IPS1. The exhibit also shows the configuration of a potential interconnection at the IPS1/ISF1 site. Discussions related to the establishment of an interconnection at this location are in their early stages and will need to be refined should arrangements for an interconnection be finalized.

Select design criteria for IPS1 are summarized in Table 7-2. Select design criteria for ISF1 are summarized in Table 7-3. Joliet, as Program Manager on behalf of the GPWC, will be responsible for the design and construction engineering of the proposed IPS1 and ISF1. The GPWC will finance, own, operate, and maintain IPS1 and ISF1.

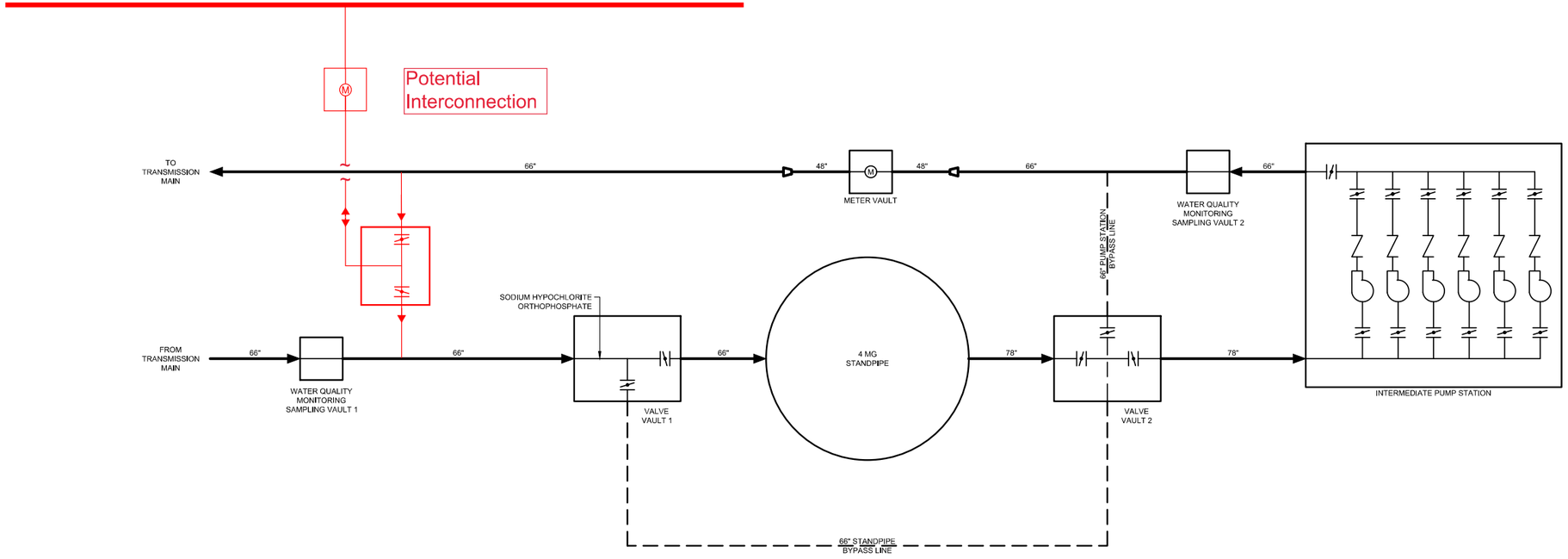


Exhibit No.
7-1

GRAND PRAIRIE
WATER COMMISSION

Title
Intermediate Standpipe 1 & Pump Station Process Flow Diagram

Client/Project GPWC
Alternative Water Source Program

Project Location
Will, Cook, Kendall, and Grundy Counties

Stantec
CMT Crawford, Murphy & Tilly
Engineering Enterprises, Inc.
Outstanding Service – Every Client – Every Day
STRAND ASSOCIATES®
CORNWELL ENGINEERING GROUP

Table 7-2 Key Design Criteria: Intermediate Pump Station 1 (IPS1)

Design Parameter	Design Parameter Value
Design Capacity – Pump Station (MGD)	55.27 (2050 Maximum Day Demand) *
Design Head (feet)	60 (to be confirmed based on final hydraulics)
Pump Type	Horizontal Split Case
Motor Control	Variable Frequency
No. of Pumps, Pump Redundancy	6, N+1
Pump Capacity (MGD)	11.05**
Piping and Valve Velocity (fps)	3 to 5 (Suction), 5 to 8 (Discharge)
Pump Removal Method	Overhead Crane and Hoist
Chemical Feed	Sodium Hypochlorite & Orthophosphate feed
Electrical Equipment	480V (To be confirmed based on final hydraulics)
Primary Power Supply	New electrical service
Backup Power	Generator w/ Automatic Transfer Switch sized for 2050 Average Day Demand
SCADA Architecture (for Commission)	PLC-based control w/ gigabit fiber optic ethernet network
SCADA Local Interface	Yes
Security Provisions	Real-time video surveillance and access control with local server
Restroom	Gender-neutral with toilet and sink
Building Materials	(to be finalized based on Lemont Building, planning / zoning requirements)
Foundation	Cast-in-place Concrete
Exterior Walls	CMU Block w/ Masonry Brick
Interior Walls	Glazed CMU Block
Roof System	Bar Joist with Metal Deck
Interior Ceilings - General	Exposed Roofing System
Interior Ceilings – SCADA Room	Suspended Tile

Notes:
* This will be equal to the total of all Members' Declared 2050 Maximum Day Demand.
** May be adjusted based on final pump selection but will approximately equal design capacity divided by 5.

Key:
ATS = Automatic Transfer Switch
CMU = Concrete Masonry Unit
MGD = million gallons per day
PLC = programmable logic controller
SCADA = Supervisory Control and Data Acquisition

Table 7-3 Key Design Criteria: Intermediate Storage Facility 1

Design Parameter	Design Parameter Value
Design Capacity (MG)	4 MG
Design Overflow Elevation (ft)	830 feet above mean sea level*
Approx. Ground Elevation (ft)	732 feet above mean sea level*
Tank Diameter (ft)	94 feet
Height to Overflow (ft)	98 feet*
Material of Construction	Welded Steel

Notes:
* All elevations are dependent upon final system hydraulics as defined during final design.

Key:
MG = million gallons

8 Intermediate Storage Facility 2 (CIP #4) Basis of Design

8.1 Function

Hydraulic analyses of the system configuration indicated that a second water storage facility is required along the GPWC transmission main downstream of IPS1. This ISF2 will serve to stabilize pressures in the downstream portion of the transmission system and provide stored water to supply downstream Member Water Delivery Structures (Shorewood, Minooka, Channahon 1) in the event of a brief (up to 2-hour) outage in the upstream transmission main system.

Based on the hydraulic analysis for the ICSDC and BCSDC, the ISF2 should be located about 41 miles south and west of the Chicago Connection Facilities near the intersection of Black Road and County Line Road in the Village of Shorewood as shown in Exhibit 6-1. Efforts associated with final acquisition of property for the facilities are ongoing and are expected to be completed later in 2024. Current plans are for ISF2 to be constructed downstream of the City of Joliet's secondary Water Delivery Structure and upstream of future Water Delivery Structure for the Village of Shorewood.

Given the current uncertainty as to the final location of the CIP #4 improvements, budgetary costs for CIP #4 include an allowance for up to about 4,000 feet of 36-inch diameter piping to connect the storage facility to the regional water transmission main. If the final site selected for CIP #4 allows the storage facility to be constructed closer to the regional main, costs for this piping will be reduced accordingly.

8.2 Components

The CIP #4 infrastructure will include a new 1.5 MG elevated storage tank as listed in Table 8-1. Water levels in the elevated storage tank will "float" on the hydraulic grade line in the water transmission main, Exhibit 8-1 presents the preliminary hydraulic profile.

Table 8-1 Intermediate Storage Facility Components

Component	Description
Intermediate Elevated Storage Tank	1.5 MG elevated storage tank. Capacity of storage tank sized to provide operational flexibility and limited reserve supply for the downstream portion of the water transmission system. Inlet riser required to maintain minimum HGL is set at 754 feet in upstream transmission main. Overflow height at 764 feet and total tank height at 150 feet.
Connecting Piping	Approximately 4,000 feet of 36-inch diameter pipe is assumed to be required to convey flow from the regional water transmission main to the storage facility and back to the transmission main.

Key:
MG = million gallons

Under future conditions associated with expansion of the GPWC system, a full flow, 24 MGD pump station (IPS2) will be needed downstream of ISF2 to support delivery of BCSDC demands and maintenance of minimum pressures at the Shorewood, Minooka, and Channahon Water Delivery Structures downstream of the facility. The 1.5 MG elevated water storage tank provides sufficient volume for up to 2 hours of reserve supply capacity for the Water Delivery Structures downstream of ISF2 at Buildout average day demands. Site acquisition efforts for ISF2 and a future IPS2 are focused on securing sufficient space for the possible construction of additional storage should the Commission desire it as the system expands.

The Baseline Budget (2.0) costs for the proposed CIP #4 elevated water storage tank are summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

8.3 Design Flow and Capacity

ISF2 will be an elevated tank with a volume of 1.5 MG. The elevated tank will "float" on the transmission main hydraulic grade line to provide stable pressures and reserve supply capacity for the downstream Water Delivery Structures. Current hydraulic analyses indicate that an elevated storage tank with an overflow elevation of approximately 760 feet above mean sea level and an upstream control valve will meet these conditions and allow for operation at a target HGL of about 754 feet. The final operating range and tank height for ISF2 will be determined once the site for the facility is finalized.

8.4 Operation (Normal / Emergency)

ISF2 is designed to provide reliable service pressures to Water Delivery Structures for Shorewood, Minooka and to the Primary Water Delivery Structure for Channahon. Service pressures at these Water Delivery Structures will depend upon the level in the tank, head loss in the transmission main downstream of the tank, and ground elevations at each of the Water Delivery Structures. Hydraulic analysis indicates that operation of the elevated storage tank at levels between about 650 feet and 660 feet will provide the required pressures at the downstream Water Delivery Structures for flows up to the ICSDC.

Hydraulic grade line elevations in the regional transmission main system just upstream of ISF2 will vary depending on operation of IPS1/ISF1 and friction losses along the pipeline. For system demands up to about 41 MGD (projected 2050 Average Day Demand), the HGL in the transmission main upstream of ISF2 is projected to be higher than the overflow elevation of the tank. A control valve on the transmission main is proposed to control the HGL at the inlet to the tank and prevent overflows at ISF2.

As system demands increase beyond 41 MGD, the HGL in the transmission main will approach the normal operating range of ISF2 and reduce the need for use of the transmission main control valve.

Should an emergency interrupt flow in the transmission main upstream of ISF2, the tank will continue to supply flow to the Shorewood, Minooka, and Channahon 1 Water Delivery Structures by gravity. As shown in Table 6-3, the water volume stored at ISF2 would be adequate to support continued supply to the downstream Water Delivery Structures for more than 2 hours at 2050 Average Day Demand conditions.

8.5 Design Criteria

While ISF2 will be an elevated water storage tank rather than a standpipe (as at ISF1), fundamental design principles for the two facilities are similar. In both cases, it is anticipated that the storage facilities will be constructed of welded steel and will include separate inlet and outlet piping to facilitate turnover of the stored water. The water level in ISF2 will be measured and reported to the Control Center via the GPWC SCADA system. Piping and valving will be designed to allow ISF2 to be isolated from the transmission main and to allow for a future connection to IPS2.

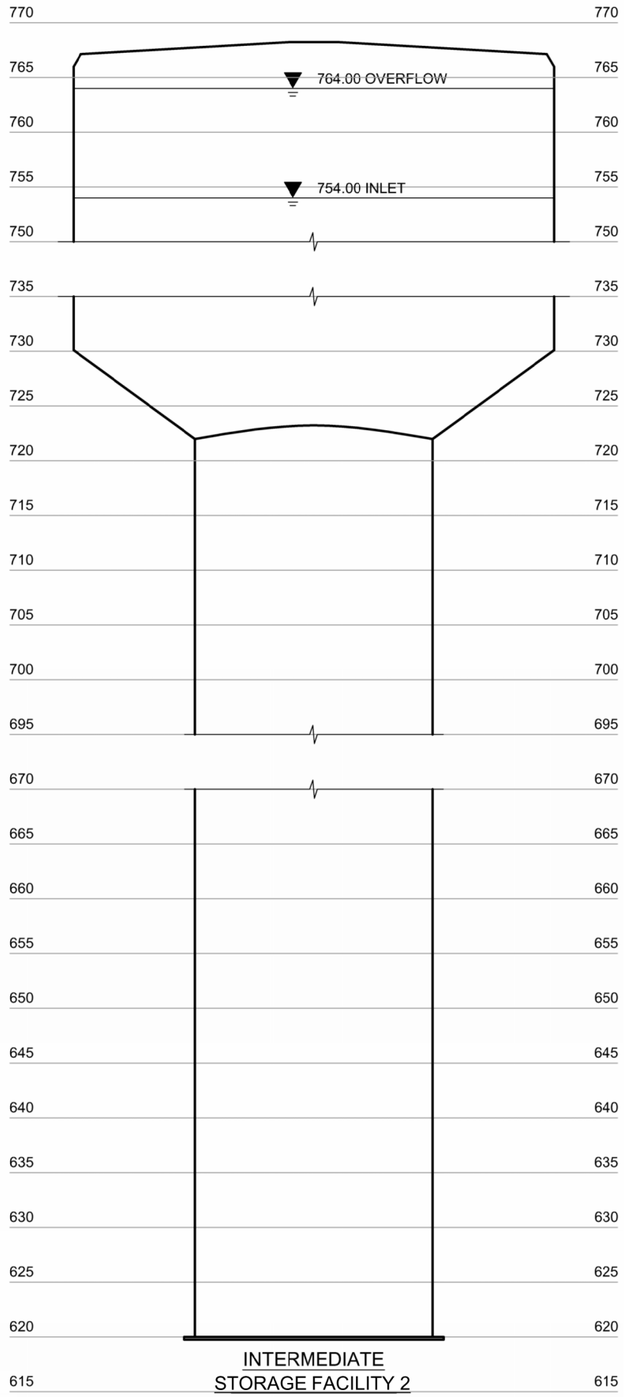
Select design criteria for ISF2 are summarized in Table 8-2.

Table 8-2 Key Design Criteria: Intermediate Storage Facility 2

Design Parameter	Design Parameter Value
Design Capacity (MG)	1.5 (Subject to change based on final demands and hydraulics)
Design Overflow Elevation (ft)	764 feet above mean sea level*
Approx. Ground Elevation (ft)	620 feet above mean sea level*
Height to Overflow (ft)	144 feet*
Material of Construction	Welded Steel

Notes:
* All elevations are dependent upon final system hydraulics and will be refined after final site selection.

Key:
MG = million gallons



GRAND PRAIRIE
WATER COMMISSION

Exhibit No.
8-1

Title

Intermediate Storage Facility 2 - Preliminary Hydraulic Profile

Client/Project
GPWC
Alternative Water Source Program

Project Location
Will, Cook, Kendall, and Grundy Counties

Stantec
CMT Crawford, Murphy & Tilly
Engineering Enterprises, Inc.
Outstanding Service ~ Every Client ~ Every Day
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9 GPWC Water Delivery Structure (CIP #6) Basis of Design

9.1 Function

Infrastructure is required to control the delivery of Lake Michigan water to GPWC Members. The design for the GPWC system will provide this control at Water Delivery Structures which will be constructed, owned, and operated by the GPWC.

The GPWC is required to take water from City of Chicago at a uniform rate over a 24-hour period. The rate for each period will be based on the sum of the flow rates requested by all the GPWC Members. Per the Water Supply Agreement, each Member shall notify the Commission on a daily basis as to its requested rate of flow for the day at each of its Water Delivery Structures. The total daily flow requested by each Member shall not exceed the lesser of the Member's Declared Maximum Day Demand or the amount allowed by the Member's Maximum Peaking Factor. Upon receiving flow requests from the Members, the GPWC system operator will adjust the setpoint for the flow control valves at each Water Delivery Structure. Each structure will serve to control the flow to the Member system at that location, provide for metering of the flow for operational and billing purposes, and monitor upstream pressures at each location. No chemical addition or water quality monitoring equipment will be installed at Water Delivery Structures.

Each Water Delivery Structure will be constructed within permanent and temporary easements, and using temporary easements, granted to the GPWC by each Member at no cost. Details about the easements are in Section 9.6 of this document. The schedule for construction of the Water Delivery Structures has been developed with input from the Members to allow for the coordinated construction of the Water Delivery Structures and receiving facilities to be constructed by each Member.

The division of responsibility for the construction and operation of these Water Delivery Structures is as follows:

- Costs associated with the construction of transmission piping and standard (vault-style) infrastructure to support one Primary Water Delivery Structure for each GPWC Member will be included in the overall GPWC infrastructure capital costs. The GPWC infrastructure capital costs are to be shared by Members based on Declared 2050 Maximum Day Demands.
- All costs associated with the design and construction of additional, non-primary infrastructure requested by a GPWC Member, including the Water Delivery Structure and the main leading to it from the GPWC mainline transmission main, will be paid by the Member. All infrastructure will be designed by the Program Team and constructed, owned, operated, and maintained by the GPWC.

While pressure at individual Water Delivery Structures may be greater, the hydraulic design of the Commission System is based on maintaining a minimum delivery pressure

of 25 psi at all Water Delivery Structures under all normal operating conditions. Members may desire to utilize the energy of the delivered water, but all Members are expected to make provisions for pressure boosting within their own distribution systems.

9.2 Components

Water Delivery Structures will be below grade, cast-in-place concrete vaults designed to accommodate required piping, valves, meter, instrumentation, and communication hardware. Entry to the station will be via a hatch at grade with steps to the lower level.

During preliminary design, three varying Water Delivery Structure types were designed, each to operate at varying ranges of flow. Each of these structures was designed to fully encapsulate all piping, equipment, and structure access below grade, with the exception of select electrical equipment. The structures are subject to flooding which requires select electrical equipment to be housed in an above grade enclosure. A process flow diagram is presented in Exhibit 9-1.

Although the structures are designed to accommodate a specific flow range, they have been designed with the ability to upsize internal piping and equipment in the event a community requires more flow than projected.

The Water Delivery Structures will be climate-controlled using unit heaters, ventilation, dehumidification, and a sump pump. Stations will also have SCADA and telemetry components so that the equipment, including the flow control valves, meters, and pressure transmitters may be continuously monitored and remotely controlled by the GPWC system operator.

The proposed Water Delivery Structures are planned for construction through four separate work packages to allow their construction to be coordinated with the construction of water receiving, pumping, and storage facilities by individual Members. The scope of construction for the early work packages (AWSP-06-06 and AWSP-06-07) is limited to vault construction and site civil activities so that mechanical, electrical, and plumbing (MEP) components are not installed years before they are expected to be put into service. Installation of the MEP components for the Water Delivery Structures included in packages AWSP-06-06 and AWSP-06-07 are to be installed as part of work packages AWSP-06-08 and AWSP-06-09. The list below summarizes the plan for design and construction of the Water Delivery Structures as of the date of this Basis of Design report. The list is subject to change during further design. Budgets for each work package are summarized in Section 13.

<u>AWSP-06-06 (Construction 2025-2026)</u>

- Joliet Primary Water Delivery Structure (Vault and Site Civil Only)
- Channahon Primary Water Delivery Structure (Vault and Site Civil Only)
- Minooka Primary Water Delivery Structure (Vault and Site Civil Only)
- Minooka Secondary Water Delivery Structure (Vault and Site Civil Only)

AWSP-06-07 (Construction 2026-2027)

- Joliet Secondary Water Delivery Structure (Vault and Site Civil Only)
- Romeoville Primary Water Delivery Structure (Vault and Site Civil Only)
- Romeoville Secondary Water Delivery Structure (Vault and Site Civil Only)
- Joliet Quaternary Water Delivery Structure (Vault and Site Civil Only)

AWSP-06-08 (Construction 2027-2028)

- Mechanical, Electrical, and Plumbing Installation (AWSP-06-06 WDS)
- Shorewood Primary Water Delivery Structure
- Joliet Tertiary Water Delivery Structure
- Crest Hill Secondary Water Delivery Structure

AWSP-06-09 (Construction 2027-2029)

- Mechanical, Electrical, and Plumbing Installation (AWSP-06-07 WDS)
- Crest Hill Primary Water Delivery Structure
- Channahon Secondary Water Delivery Structure

The Baseline Budget (2.0) costs for the proposed CIP #6 Water Delivery Structure improvements are summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

9.3 Design Flow and Capacity

To balance a desire for standardization of the Water Delivery Structure designs with the need to accommodate a wide range of flows for GPWC Members, three designs have been developed. Each design is sized to support a different flow range. Table 9-1 shows the design flow ranges adopted for each station type.

Table 9-1 Water Delivery Structure Type and Flow Range

Station Type	Minimum Flow (gpm)	Maximum Flow (gpm)
Type A	490	3,420
Type B	1,250	8,780
Type C	1,960	13,700

Note: Table 9-1 does not include the increased range possible via internal piping upsizing

A summary of projected 2030, 2050 and Buildout demands at each Water Delivery Structure is presented earlier in this report as Table 2-1. A consolidated table of Water Delivery Structure design flows and types is shown in Table 9-2.

GRAND PRAIRIE
WATER COMMISSION

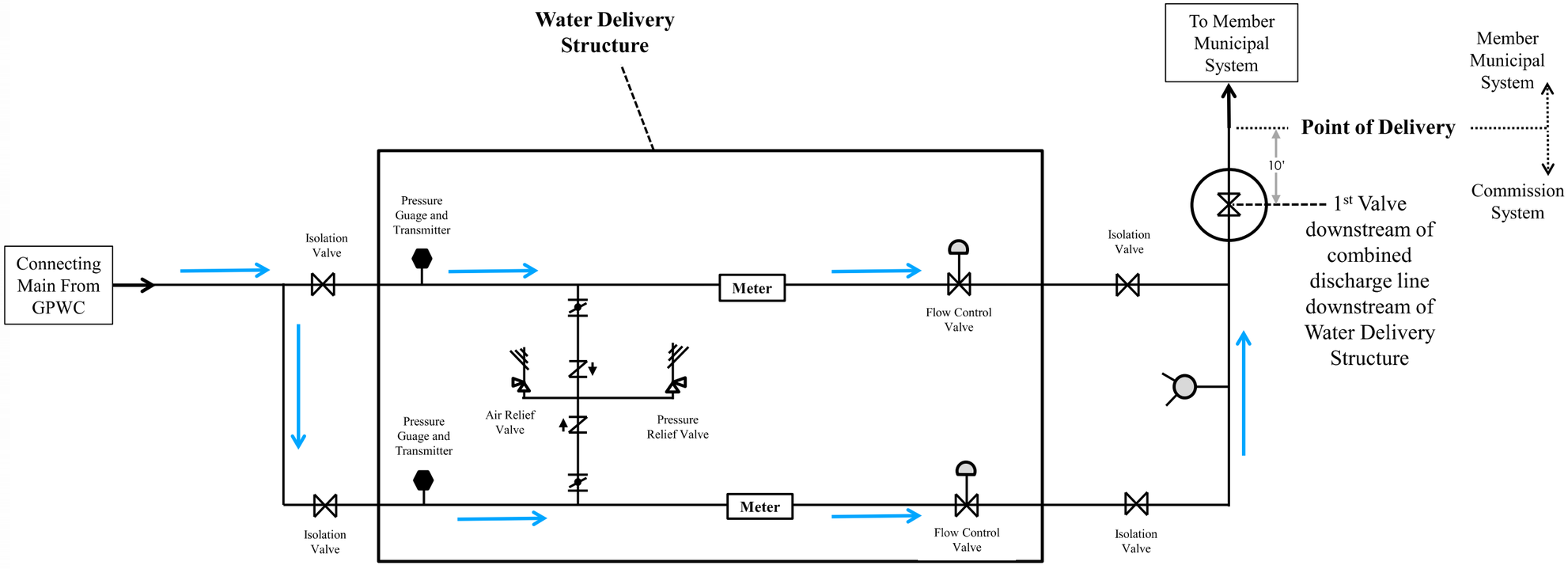
Exhibit No.
9-1

Title

Water Delivery Structure Configuration

Client/Project GPWC
Alternative Water Source Program

Project Location
Will, Cook, Kendall, and Grundy Counties



REV. JUNE 2024

Table 9-2 Water Delivery Structure Design Flow and Type

GPWC Member	Water Delivery Structure Label	2050 Max Day		Buildout Max Day		Water Delivery Structure Type		
		MGD	gpm	MGD	gpm	A	B	C
Channahon	Primary	2.67	1,854	4.18	2,903	X		
	Secondary	1.37	951	2.16	1,500	X		
	TOTAL	***4.04***	2,806	***6.34***	4,403			
Crest Hill	Primary	3.34	2,319	3.34	2,319	X		
	Secondary	0.42	292	0.42	292	X		
	Future	0.42	292	0.42	292	X		
	TOTAL	***4.18***	2,903	***4.18***	2,903			
Minooka	Primary	1.00	694	2.35	1,632	X		
	Secondary	1.40	972	3.29	2,285	X		
	Future	1.60	1,111	3.76	2,611	X		
	TOTAL	***4.01***	2,785	***9.39***	6,521			
Joliet	Primary	11.40	7,917	16.95	11,771			X
	Secondary	12.23	8,491	13.71	9,521			X
	Tertiary	2.30	1,597	4.30	2,986		X	
	Quaternary	4.07	2,826	6.45	4,479		X	
	Future WCHPZ	0.00	0	12.87	8,938			X
	Future SWHPZ	0.00	0	10.71	7,438			X
	TOTAL	***30.00***	20,833	***65.00***	45,139			
Romeoville	Primary	4.79	3,326	4.79	3,326		X	
	Secondary	3.47	2,410	3.47	2,410		X	
	TOTAL	**8.25**	5,729	***8.25***	5,729			
Shorewood	Primary	4.80	3,333	10.40	7,222		X	
	Future [(1)]	0.00	0	2.00	1,389	X		
	TOTAL	***4.80***	3,333	**10.40**	7,222			

(1) Shorewood's future Water Delivery Structure is being sized at 1.0 MGD Average Day Demand. Since the timing is unknown, Shorewood's Primary Water Delivery Structure will be sized for Shorewood's full demands to Buildout.

9.4 Operation (Normal / Emergency)

GPWC Members are required to take water at a uniform flow rate to be set by the GPWC system operator daily in consultation with the Members. The Members' requested supply rates will be used by the GPWC system operator to assign setpoints for the flow control valve at each Water Delivery Structure. Assigned flow rates will be maintained for each 24-hour period unless an emergency situation, such as a main break or fire event, requires a Member to request a flow rate adjustment. It is expected that the GPWC system operator will, in most cases, be able to support an emergency request for a flow rate adjustment from a Member within the process and constraints in the Water Supply Agreement.

Members will be responsible for determining the necessary flow rate requests and adjustments for their own systems by using operating judgment and looking at previous day flow rates and tower levels. For operation with a constant supply rate, peak demands will need to be met from each individual Member's internal storage. It is anticipated there will be enough storage volume within the Members' systems to accommodate demand fluctuations due to the minimum storage requirements for all GPWC Members in the Water Supply Agreement.

Emergency conditions that could impact the operation of Water Delivery Structures include a loss of communication between the Water Delivery Structure and the GWPC Control Center, or a failure of piping or equipment in or upstream of the Water Delivery Structure requiring the structure to be taken out of service.

In the event of a loss of communication, local control at each Water Delivery Structure will maintain the flow setpoint in place at the time communication was lost. Meter, pressure, and other instrumentation data being collected at each site will be logged by the local PLC at each station for upload once communications are re-established.

Installation of parallel control valves at all Water Delivery Structures will provide redundancy to allow each structure to continue to supply flow even if one valve or meter must be taken out of service for maintenance or repair. As such, the likelihood that a Water Delivery Structure would need to be taken completely off-line is small. However, should circumstances require a Water Delivery Structure to be taken completely out of service, the GPWC system operator would work with the affected Member to direct additional flow to its other Water Delivery Structures as supply and structure capacity allow.

Through 2050, only Shorewood is dependent upon a single Water Delivery Structure. In the unlikely event that the Shorewood Water Delivery Structure had to be taken out of service, the Village would need to rely on its internal storage or its backup wells to sustain its supply until the structure could be brought back online.

9.5 Design Criteria

Given the wide range of flows to be accommodated at GPWC Member Water Delivery Structures and the relatively limited capacity of most flow control valves, each Water Delivery Structure is designed to include two parallel pipes to support minimum, average, and maximum day design flows through 2050. The installation of parallel piping will also allow delivered flow to be metered if maintenance requires that one line be taken out of service.

In some cases, GPWC Members anticipate significant buildout growth and may need to add additional Water Delivery Structures in the future. Each Water Delivery Structure has been designed to accommodate the upsizing of one, or both, of the parallel pipes to support additional growth. Water main within Type A Water Delivery Structures may be upsized to 12-inch diameters while maintaining 5 upstream and 2 downstream pipe diameters around flow meters. Type B Water Delivery Structures may be upsized to 18-inch diameters, and Type C may be upsized to 24-inch diameters.

The standardized Water Delivery Structure design includes a flow control valve, meter (with a means of in situ calibration of the meters), and pressure transmitters. A single pressure relief valve will be used between the parallel lines to release pressure surges in the GPWC system.

Head loss, lay length, accuracy, allowable flow ranges, and maintenance will need to be considered for equipment selection during final design. Flow control valve options include hydraulically actuated diaphragm style, such as Cla-Val or OCV, and electrically actuated ball valve style. Due to the smaller diameter piping anticipated in the Water Delivery Structures, electromagnetic flow meters are proposed for this application. Electromagnetic (mag) flow meters are capable of operating within acceptable levels of accuracy (0.18% to 0.5%) over a large flow range, allowing many Water Delivery Structures to not need meter replacement or additional lines added to their Water Delivery Structure prior to 2050. The GPWC will perform annual calibration or multi point verification to maintain meter accuracy as indicated in the Water Supply Agreement.

9.6 Member & GPWC Obligations for the Water Delivery Structure Sites

9.6.1 General

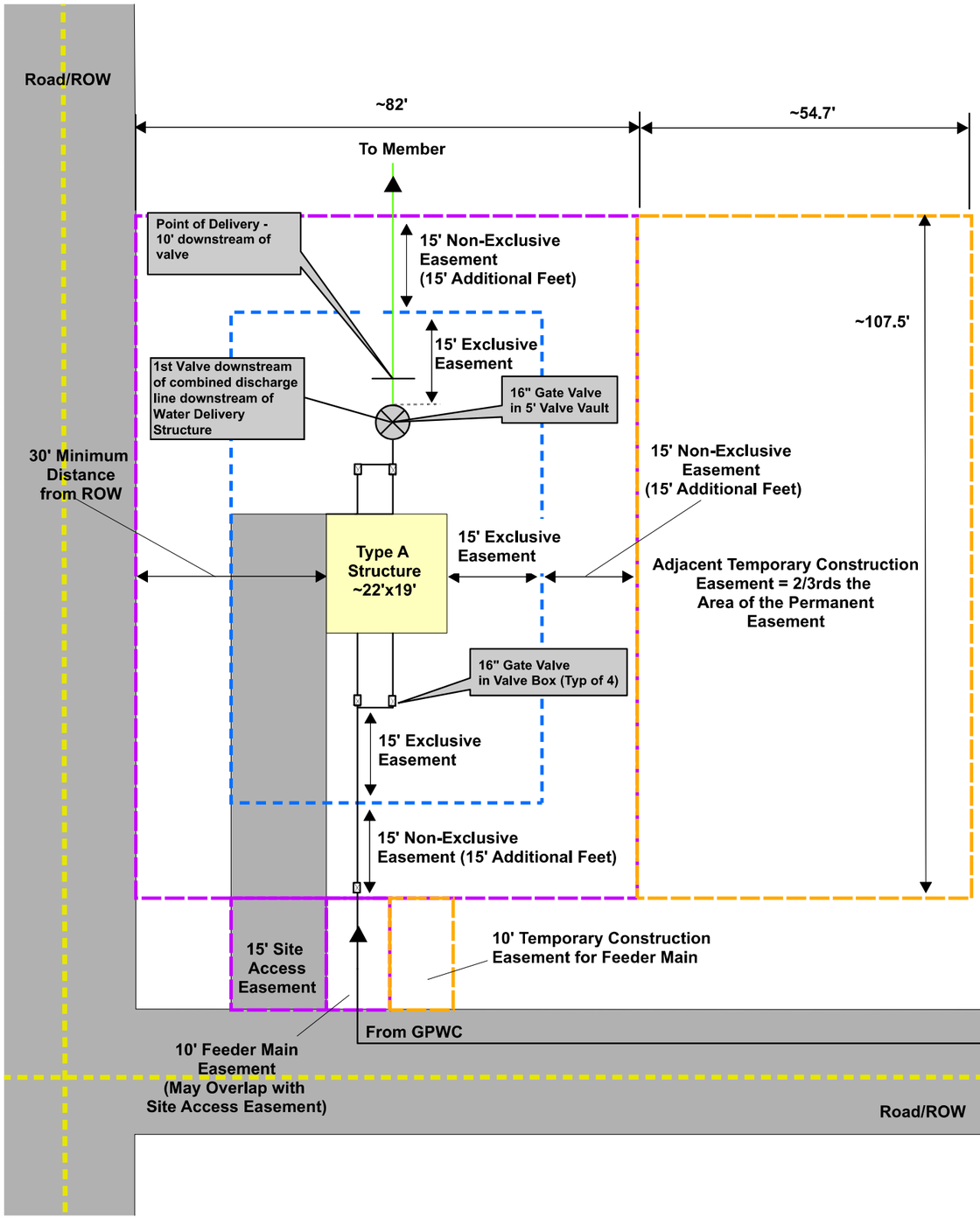
Member & GPWC Obligations for Water Delivery Structure Sites are summarized in Table 9-3.

Table 9-3 Member & GPWC Responsibilities for Water Delivery Structures

	Member Responsibilities	GPWC Responsibilities
Land Rights	Acquire land	*IGA* Prepare Model Easement Agreement Between GPWC and Member
	Grant temporary & permanent Easement(s) to GPWC	
Geotechnical Investigations	Geotech investigation Information (if Member building Tank/PS on site)	Geotech investigation (if Member not building Tank/PS on site)
Site Suitability Summary	Prepare site suitability summary	Review site suitability summary including conceptual site layout
Design of GPWC Improvements	Survey site	Establish design standards and site requirements
	Develop conceptual site layout	Design of GPWC Infrastructure
		Opinion of Probable Construction Cost (OPCC)
Construction of GPWC Improvements	Coordinate with GPWC on phasing of GPWC & Member improvements at the site	Bidding, contracting and construction of GPWC Infrastructure

9.6.2 Land Rights

Member community to identify Primary and Non-Primary Water Delivery Structure Site locations and obtain land rights for proposed site (if the site is not currently owned by the Member). The *WSA* requires that the temporary/permanent easements for the Water Delivery Structures are provided at no cost to the Commission on land owned by the members and also recognizes the other alternative of the Member obtaining easements on land owned by someone else, which would be at the Member's cost but no cost to the Commission. The template for various easements to be provided by the Member to the GPWC are shown in Exhibit 9-2 and described in the following sections. In particular cases, site conditions may result in some adjustments to the required easement locations and dimensions.



Legend

- GPWC Owned Water Main
- Member Owned Water Main
- Non-Exclusive Easement
- Road/ROW
- Structure

Easements

- Temporary Construction Easement
- Exclusive Easement

Permanent Easement Requirements

1. 15-ft-wide easement (potentially non-exclusive) from public R.O.W. to the proposed site for an access drive.
2. 30-ft easement (15-ft exclusive, 15-ft non-exclusive) outside of physical dimensions of structure and manholes to allow for future excavation, if necessary.
3. 10-ft to 20-ft-wide easement from transmission main to delivery structure location for feeder main, dependent upon piping size.
4. A minimum 30-ft distance from property lines and R.O.W. must be maintained.

Temporary Construction Easement Requirements

1. An area adjacent to 30-ft permanent easement, approximately 2/3 the area of permanent easement, for construction staging.
2. 10-ft to 20-ft-wide easement from transmission main to delivery structure location for feeder main.

In particular cases, site conditions may result in some adjustments to the required easement locations and dimensions.

N W E S

0 10 20 40
Feet

GRAND PRAIRIE
WATER COMMISSION

Exhibit No.
9-2

Title
Template for Easements at Member Water Delivery Structure

Client/Project
GPWC
Alternative Water Source Program

Project Location
Will, Cook, Kendall, and Grundy Counties

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V3

REV. JUNE 2024

9.6.2.1 Water Delivery Structure Site Easements

The Member community will grant permanent/temporary easement(s) at no cost to the GPWC as follows:

- A permanent 30' easement measured from the outside of the physical dimensions of the structure and easement for the Water Delivery Structure and a valve vault to allow for future excavation as follows:
    - The first 15-ft outside of the physical dimensions of the structure and valve vaults shall be exclusive to GPWC except for infrastructure necessary to support the structure and the Member watermain extending away from the Water Delivery Structure. If the exclusive easement area is not clear of other utilities or infrastructure, the Member community shall remove and relocate those items to locations outside of the exclusive permanent easement area. The point of delivery will be considered 10-ft downstream of the valve within the valve vault.
    - The area that is 15-ft beyond the exclusive easement shall be a non-exclusive easement. The non-exclusive easement shall be restricted to only allow for subsurface installations. If the non-exclusive easement area is not clear of other aboveground infrastructure, the Member community may propose additional areas adjacent to the exclusive easement for the non-exclusive easement, subject to GPWC approval. If the non-exclusive easement area is not clear of other aboveground infrastructure, the Member community may propose additional areas adjacent to the exclusive easement for the non-exclusive easement, subject to GPWC approval.
- A temporary easement adjacent to permanent easement, approximately 2/3 of the area of permanent easement, for construction staging.

9.6.2.2 Connecting Main Easements

If the proposed Water Delivery Structure site is not adjacent to a public right-of-way, the Member shall provide a permanent 10' to 20'-wide (depending upon pipe size) exclusive easement from transmission main to the proposed site. In addition, the Member shall provide a temporary 10' to 20'- wide easement from GPWC transmission main to the proposed site. Width of the temporary easement will depend on pipe size and site conditions and shall be subject to GPWC approval.

9.6.2.3 Access Drive Easement

If the proposed site is not adjacent to a public right-of-way, the Member shall also provide a permanent 12' to 15'- wide easement from public R.O.W. to proposed site for access drive. This easement may be non-exclusive, subject to GPWC approval.

9.6.3 Site Layout

9.6.3.1 Setbacks

The Water Delivery Structure and valve vaults shall be located at the site to maintain a minimum 30-ft setback from property lines and public right-of-way. In addition, a minimum setback of 30-ft shall be maintained from existing, proposed and future above grade structures and features, other than paving.

9.6.3.2 Site Fencing

Fencing installed will enclose the Water Delivery Structure and associated valve vault for security. If there is no existing or proposed Member fencing, GPWC will construct, own and maintain fencing of Water Delivery Structure. If the existing/proposed fencing is shared between the GPWC and the Member, the fencing shall be constructed, owned and maintained by Member. If the fencing is shared, the Member shall provide GPWC with a key and open access.

Fencing shall be a general industrial/commercial type of fence with the following features, unless otherwise required by local standards:

- Construction Type – black metallic chain link or steel or black aluminum "wrought iron" style
- % Visual Opening - ~90%
- Height - 8 feet
- Post Construction - Steel or aluminum

A higher quality fencing may be provided by the Member or requested by the Member at the Member's cost.

9.6.3.3 Site Security

While the site will be shared, it is important to maintain security and control access to the GPWC and Member facilities. To that end, there will be separate access keying/locks for GPWC and Member-owned infrastructure. Members will not have keys for Water Delivery Structure and GPWC will not have keys for Member-owned infrastructure.

9.6.3.4 Field Investigations

In most cases, the Member will also be constructing improvements at the shared site. With this understanding, the Member shall provide any geotechnical investigation information to GPWC to allow for design of the Water Delivery Structure. If the Member is not constructing improvements at the site, GPWC will perform geotechnical investigations, prior to design of the Water Delivery Structure. GPWC will coordinate with the Member for performance of the geotechnical investigations.

9.6.3.5 Site Suitability Summary

Members shall provide a site suitability summary addressing the following:

- Member's zoning and land use requirements, including minimum setback requirements (side yard, front yard, etc.)
- Location of existing buildings and utilities
- Suitability of site for construction based on results of geotechnical information
- Proposed layout of Member's infrastructure at the site (storage, pumping station, piping, etc.)
- Proposed extents for fencing indicating whether it is shared and, if so, how access will be controlled.

The Member shall provide the following supporting information for the site suitability summary:

- Narrative addressing the items noted above
- Commitment for Title Insurance, site data, ALTA Surveys, Plats, unrecorded documents affecting the land, such as farm leases, environmental constraints (floodplain, wetlands. etc.)
- Zoning and land use requirements
- Geotechnical information for the site
- Exhibit showing the following:
    - Site Layout (existing and proposed)
    - Property lines and setbacks

- Permanent and temporary construction easements to GPWC for Water Delivery Structure, watermain, and access
- Member or Water Delivery Structure fencing location

9.6.4 Design

The GPWC Program Team will prepare the design of the Water Delivery Structure and site based on information provided by the Member.

9.6.4.1 Information Required from Member (prior to design)

Prior to the scheduled timeframe for design for each work package, the Members shall provide the following for the Water Delivery Structure site in that work package:

- Site acquired (including provision of title and legal descriptions and any existing easements or other documents on or affecting the site)
- GPWC Approved Site Suitability Summary (as noted in Section 9.6.3.5)
- GPWC Approved Easements (as noted in Section 9.6.2)
- Any available Geotech info (If the Member site has a proposed tank or pump station, complete Geotech for Member facilities and provide information to GPWC)
- Completed 30% Design for Delivery Site showing the location of the Member's existing and proposed facilities and access at the site in order to establish the location of the Water Delivery Structure and incoming/outgoing piping
    - Topographic Survey (CAD file) including boundary survey
    - Member Proposed Improvements including proposed grading (CAD file)

The GPWC Program Team will review the information provided in order to determine whether a site is suitable and the design of the Water Delivery Structure can proceed.

9.6.5 Construction

The Water Delivery Structure and GPWC Connecting Main will be contracted for and constructed by GPWC. GPWC and the Member shall coordinate on the phasing of the improvements at the site in order to avoid multiple contractors on site at the same time. In addition, GPWC and the Member shall coordinate between construction phases for site access, temporary fencing, restoration, etc.

The GPWC Program Team will provide construction engineering services including onsite resident engineering services for the construction of the GPWC facilities.

9.6.6 Operation & Maintenance of Shared Site

The GPWC will be responsible for operation and maintenance of the GPWC Water Delivery Structure Site and Connection Main upstream of and including the Point of Delivery. The Member will not have access to the GPWC facilities and the GPWC will not have access to the Member facilities on the site. Maintenance of the shared site shall be the responsibility of Member including landscaping, roadway repair, and snow plowing.

Since the site will be shared by the GPWC and the Member, the following notifications will be required as appropriate:

- Notification by GPWC and the Member is not required for regular operation and maintenance of a party's own facilities.
- Access to other party's facilities requires request and notification.
- Notification will be required for activities of a party that will affect the other party; details to be provided in easement agreement between GPWC and Member.

10 System-wide SCADA/Communications (CIP #5) Basis of Design

10.1 Function

System-wide Supervisory Control and Data Acquisition (SCADA) and communications are required for control and monitoring of the physical facilities (e.g., pump stations, storage facilities, transmission main, delivery structures) that make up the GPWC water system. The System-wide SCADA/Communication system will allow processes and facilities to be controlled and remotely monitored. The SCADA/Communication system will also support real time video surveillance and centralized access control at the major pumping and storage facilities in the system.

SCADA infrastructure for the Tunnel Extension and Low Service Pump Station will be defined by City of Chicago. SCADA for these facilities will not be a part of the GPWC SCADA system.

Discussions related to the location of the communications hub, control center, and primary operator interface for the GPWC are ongoing. The current basis of design for the System-wide SCADA/Communications system can support a location anywhere along the fiber optic cable planned to run between the Chicago Connection Facilities and the ISF2 site in Shorewood.

The function and design of the SCADA/Communications system reflect key principles adopted by the GPWC for the operation of the water transmission system as described below.

- System operations will be controlled from the GPWC control center. Final decisions regarding the location of the control center have not yet been made. For the purpose of this document, it is assumed that office space and control center will be constructed as an addition to a proposed GPWC facility at a location to be determined. The primary operator interface will be at this location.

- The control center will be staffed 24 hours per day, 7 days per week, 365 days per year. Long-term plans for operation of the system will be reviewed periodically by the Commission and may change.

- Secure alternate operator interfaces will be provided at the High Service Pump Station and one other location (to be determined).

- The regional transmission system SCADA network will be a closed system with no direct connection to the control system of any other entity (including Chicago and GPWC Members) or to the internet.

- A separate enterprise/business network will be established for use by GPWC operators and personnel. The enterprise/business network will provide access to records, GPWC materials, and reference information such as operating procedures, manuals, drawings, etc. as well as the internet.

- The GWPC enterprise/business network and SCADA network will use the same communication infrastructure but will be designed and operated as completely independent systems.

10.2 Components

Major components of the System-wide SCADA/Communications system are listed in Table 10-1 and shown in Exhibit 10-1. The Baseline Budget (2.0) costs for the proposed System-wide SCADA and Communications improvements are summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

Table 10-1 System-wide SCADA and Communications Components

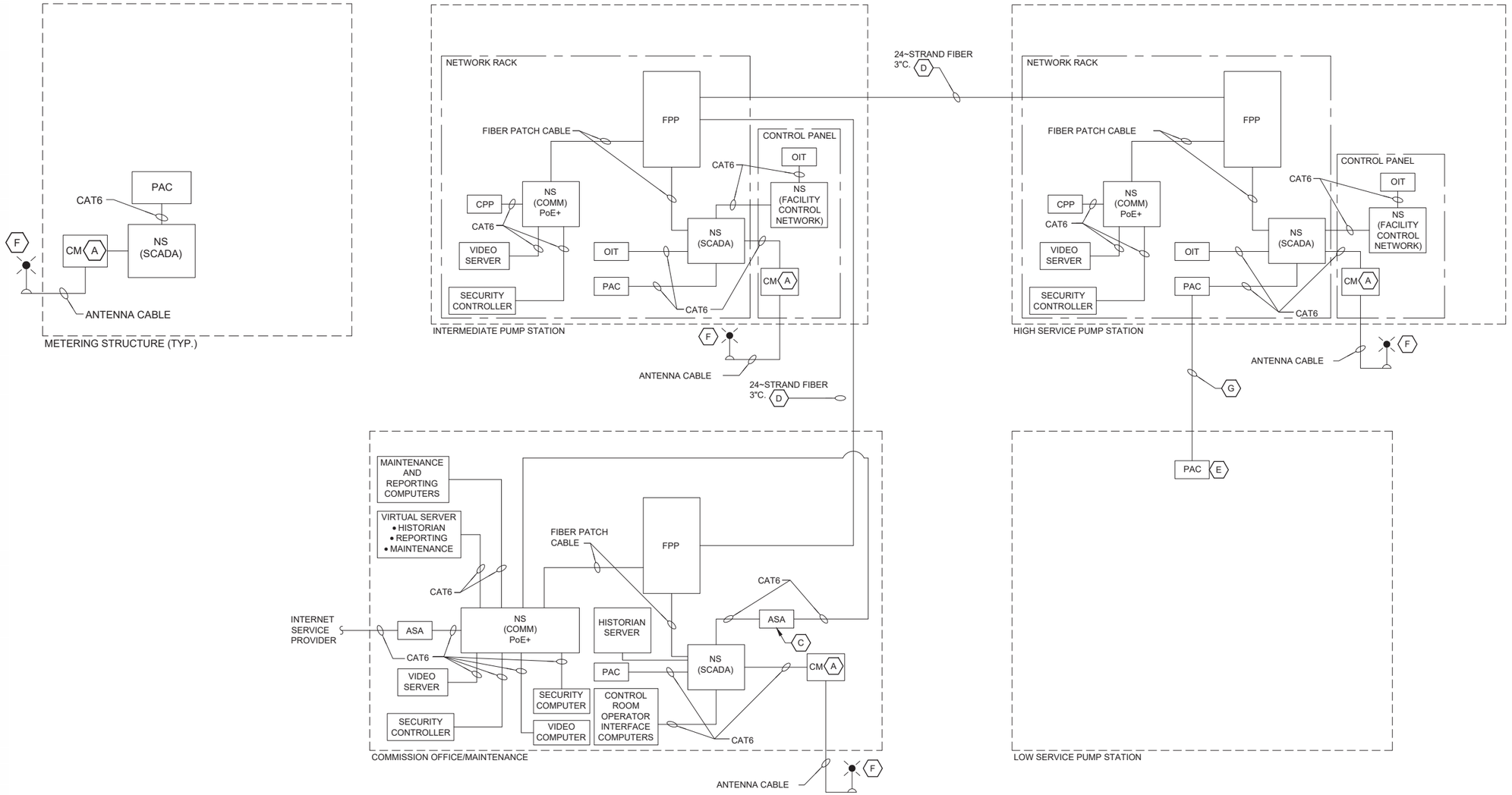
Component	Description
Control Center	The primary operator interface for the GPWC system and associated communications hardware will be located at a centralized Control Center. The Control Center will also serve as the primary data repository.
Alternate Operator Interface Sites	Alternate operator interface equipment will be installed at the High Service Pump Station and one other location (to be determined). Equipment at these sites will allow for full control and monitoring of the system.
Fiber Optic Cable	Communications between the Control Center, the Suction Well and High Service Pump Station, IPS1/ISF1, ISF2, and potential future pump stations IPS2, IPS3, and IPS4 will be established through the installation of fiber optic cable along the proposed water transmission main route. The cable will be installed in conduit constructed with transmission main improvements that are part of CIP #2, #7, and #6.
Cellular Communications System	Cellular communication hardware and software will be installed to provide primary communication between the Water Delivery Structures and the Control Center, and backup communications between the other GPWC facilities and the Control Center.
Facility SCADA and Communications Hardware	SCADA, fiber optic, and cellular (backup) communications hardware will be installed at the Suction Well and High Service Pump Station, IPS2/ ISF1, ISF2. Equipment will be specified for installation along with the local instrumentation at the site.
Water Delivery Structure SCADA and Communications Hardware	SCADA and cellular communications hardware will be installed at all the Member Water Delivery Structures. Equipment will be specified for installation along with the local instrumentation at each facility.

GENERAL SHEET NOTES

1. PULL POINTS FOR FIBER CABLES PROVIDED EVERY 2,000 FEET ALONG FIBER ROUTE.

SHEET KEYNOTES

A. CELLULAR MODEM FOR BACKUP COMMUNICATION.
B FIBER TO METERING STRUCTURE SPLICED TO 24~STRAND FIBER TO CREATE CONTINUOUS LOOP FOR BOTH SCADA AND COMMISSION FIBERS.
C CONNECTION TO THE COMMISSION NETWORK IS FOR REMOTE ACCESS.
D SEE FIBER SCHEDULE.
E CHICAGO DEPARTMENT OF WATER MANAGEMENT (CDWM) EQUIPMENT PROVIDED BY CDWM.
F EXTERIOR BUILDING MOUNTED ANTENNA
G HARDWIRED SIGNALS AS REQUIRED BY CDWM IN BURIED 3" CONDUIT.



GRAND PRAIRIE WATER COMMISSION

Title
Exhibit 10-1
Conceptual SCADA Network Architecture

Client/Project
City of Joliet Department of Public Utilities
Alternative Water Source Program

Project Location
Will, Cook, Kendall, and Grundy Counties

LEGEND:

FPP	-	FIBER PATCH PANEL
NS	-	MANAGED NETWORK SWITCH
OIT	-	OPERATOR INTERFACE TERMINAL
PAC	-	PROGRAMMABLE AUTOMATION CONTROLLER
CM	-	CELLULAR MODEM
FW	-	FIREWALL
ASA	-	SECURITY APPLIANCE
	-	CELLULAR ANTENNA
CPP	-	COPPER PATCH PANEL

FIBER SCHEDULE (TYP.)

SCADA SYSTEM FIBERS		COMMUNICATION SYSTEM FIBERS	
FIBER NO.	DESCRIPTION	FIBER NO.	DESCRIPTION
1	SCADA TX1	13	COMMISSION TX1
2	SCADA RX1	14	COMMISSION RX1
3	SCADA TX2	15	COMMISSION TX2
4	SCADA TX2	16	COMMISSION RX2
5	SPARE	17	SPARE
6	SPARE	18	SPARE
7	SPARE	19	SPARE
8	SPARE	20	SPARE
9	SPARE	21	SPARE
10	SPARE	22	SPARE
11	SPARE	23	SPARE
12	SPARE	24	SPARE

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10.3 Design Flow and Capacity

Not applicable for the System-wide Communications and SCADA infrastructure.

10.4 Operation (Normal / Emergency)

Under normal operating conditions, communications between the GPWC Control Center and the GPWC facilities will be provided by a combination of fiber optic cable and secure cellular connections. A summary of select anticipated data to be communicated via the SCADA system is presented in Table 10-2.

Communication between the Control Center and the Chicago Connection Facilities (Suction Well, High Service Pump Station), IPS1/ISF1, and ISF2 will be provided via the fiber optic cable. In the event of an outage affecting the fiber optic system, backup cellular equipment installed at each facility will serve to maintain secure communications for critical data. The cellular equipment will not provide for transmission of real-time video data. The primary operator interface for system operation and control will be at the Control Center. Alternate operator interfaces will be established at the High Service Pump Station and one other location (to be determined). These alternate control facilities are intended to provide redundancy in the event of an issue affecting the control center and allow operators visiting sites away from the Control Center with the ability to monitor and operate any system elements.

Communication between the Control Center and the Water Delivery Structures will be provided using secure cellular communications equipment. The decision to use cellular communications between the Control Center and the Water Delivery Structures is based on the lesser amount and density of data transfer required for reliable operation of these facilities. Control actions at the Water Delivery Structures are anticipated to consist of the daily communication of a flow setpoint to the control valve at each site. Once the setpoint for the valve is provided, the local control system at each structure will operate to monitor conditions at the site and adjust the valve to maintain the desired flow. Control to the established setpoint will continue until a new setpoint is established, even if there is a temporary outage in the communication with the Control Center.

The current Baseline Budget for the System-wide SCADA/Communications System includes intrusion, equipment, flooding, and power/communications status alarms but does not include the transmission of real-time video data from the Water Delivery Structures to the Control Center at this time.

Table 10-2 Select Anticipated Data Requirements

Facility	Control Parameters	Monitoring Data Points	Security/Alarm Signals
Meter Vault		Flow	Entry/Intrusion Alarm Flooding Alarm
Suction Well		Water Level	Entry/Intrusion Alarm Low Level Alarm Overflow Alarm
High Service Pump Station	Pump Start/Stop Pump Speed Change Valve Setting	Discharge Flow Discharge Pressure Pump Status Valve Position Power Supply Status Generator Status Communication Status Wet Well Water Level	Equipment Alarms Entry/Intrusion Alarm Fire Alarm Flooding Alarm Int Video Monitoring Ext Video Monitoring
Intermediate Pump Station 1/Intermediate Storage Facility 1	Pump Start/Stop Pump Speed Change Valve Setting Chemical Feed On/Off Chemical Feed Rate	Tank Water Level Discharge Flow Discharge Pressure Pump Status Valve Position Chemical Tank Level Water Chemistry Power Supply Status Generator Status Communication Status	Equipment Alarms Entry/Intrusion Alarm Chemical Alarm Fire Alarm Flooding Alarm Int Video Monitoring Ext Video Monitoring
Intermediate Storage Facility 2	Valve Setting	Tank Water Level Valve Position Power Supply Status Communication Status	Equipment Alarms Entry/Intrusion Alarm Int Video Monitoring Ext Video Monitoring
Water Delivery Structures	Valve Setting	Flow Upstream Pressure Downstream Pressure Valve Position Power Supply Status Communication Status	Equipment Alarms Entry/Intrusion Alarm Fire Alarm Flooding Alarm

10.5 Design Criteria

The proposed system will utilize industrial Ethernet switches at each of the major physical facilities (e.g., High Service Pump Station, Intermediate Pump Station, Intermediate Storage Facility) that are connected via single mode fiber optic cable as shown in Exhibit 10-1. A total of 41 miles of fiber optic cable is required to cover the distance between the Chicago Connection Facilities and the ISF2 site.

Communications between the control center and the Water Delivery Structures serving each Member will be via a private cellular network. Nodes on the private cellular network will also be provided at the High Service Pump Station, ISP1/ISF1 and, and ISF2 to serve as a backup means of communication to the fiber network. The availability and reliability of cellular service at all sites will be evaluated during detailed design. Where determined to be necessary, improvements such as antennae will be incorporated to the design to improve cell service at specific sites.

The fiber optic cable will be installed in conduit generally parallel to the GPWC transmission main. Conduit, handholes, and manholes for the fiber optic communication system will be installed as part of the CIP #2, CIP #6, and CIP #7 conveyance work packages as noted in Section 6. Where possible, the conduit will be installed in the same trench as the transmission main. However, in some locations the conduit alignment will diverge from the transmission main to allow for placement of handholes or manholes. As construction of conveyance elements is completed, installation of the fiber optic cable under work package AWSP 05-01 will begin.

The switches and associated equipment will be installed in dedicated racks located in controlled access network rooms. Uninterruptible power supplies will provide power to allow the network equipment to continue to operate for at least 12 hours in the absence of utility power.

CIP #5 includes additional work packages for SCADA Programming and Integration (AWSP 05-02), Video Surveillance (AWSP 05-03), and Security Systems (AWSP 05-04).

11 Commission Office (CIP #10) Basis of Design

11.1 Function and Planning

Discussions related to the size and characteristics of a Commission Office for the GPWC are ongoing. The January 2022 Basis of Design attached to the *Preliminary Agreement Regarding Formation of a Water Commission* assumed that the Commission Office would consist of approximately 4,000 square feet of space added on to one of the other Commission facilities. The initial space requirement was based on a conceptual estimate of the area required for the Commission Control Center and limited other office space. Since the office space was assumed to be collocated with another Commission facility, no additional allowances for land acquisition or site improvements costs were included with the budget for this item.

During 2023, Commission Members reviewed options for the planning and development of the Commission Office based on consideration of possible Commission staffing and operational needs, and discussions with staff from other regional water utilities. Figure 11-1 presents a conceptual organization chart developed for the GPWC based on these discussions. While this chart reflects the general output of Member discussions, details such as the final number of supervisors required (one vs. two) remain to be finalized.

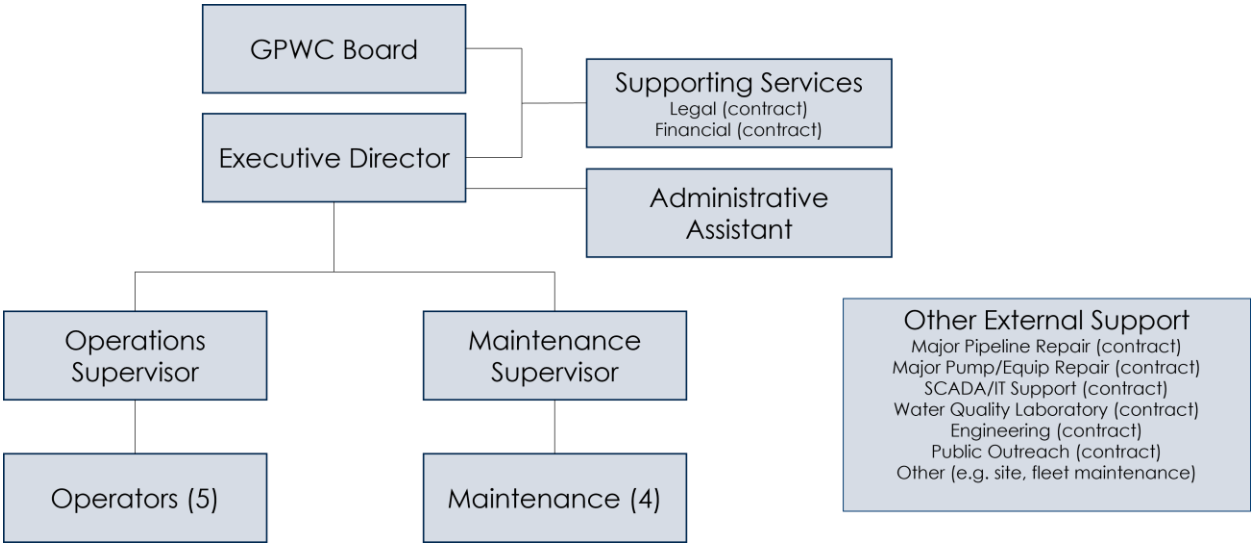

Figure 11-1 Conceptual GPWC Organization Chart

To further support discussions regarding the need for and characteristics of a new Commission Office, a space-needs assessment was performed using the organization chart above as a key input. The assessment identified a range of functions and associated space requirements to be considered in the final planning of the office as listed below.

- Control Center

- Other Secured Areas
    - Director Office
    - Assistant/Receptionist Work Space
    - Supervisor Offices and spare
    - Small Conference Room
    - Copier/Plotter Room, Archives
    - Kitchen/Breakroom
    - Staff Restrooms
    - Janitor Storage
    - Mechanical/Electrical
    - Storage

- Public Space
    - Lobby/Vestibule
    - Meeting Room
    - Conference Room
    - Restrooms

- Commission Garage
    - Vehicle Storage
    - Staff Restrooms/Lockers
    - Shop/Maintenance Space
    - Janitor, Mechanical/Electrical, Storage

The space-needs analysis determined that providing space for all the functions listed above would require more than double the area assumed in the 2022 Basis of Design. Given this finding, Commission Members are continuing discussions regarding plans for the Commission Office. Pending a decision, it is assumed that office space and control center will be constructed as an addition to a proposed GPWC facility at a location to be determined. This is consistent with the assumptions and budgetary costs included in the 2022 Basis of Design.

The Baseline Budget (2.0) costs for the proposed CIP # improvements are summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

12 Commissioning and Start-up Strategy

12.1 Function

Commissioning and Start-up is an integral element of overall Program implementation. As the infrastructure associated with each work package is completed, it will need to be inspected and tested to confirm that it has been constructed in accordance with the design plans and specifications, and that it can operate as intended. However, in some cases, construction of individual infrastructure elements will be completed some months or potentially years before all the other elements of the GPWC system are complete. Therefore, the Program must also provide for maintenance of infrastructure completed early in the overall schedule, and eventual commissioning and start-up of the overall system. System-wide commissioning and start-up includes the full range of testing, commissioning, start-up, training, and documentation activities needed to establish the overall GPWC system as fully operational and able to deliver water from Chicago to the Member Water Delivery Structures.

The current GPWC strategy for Commissioning and Start-up will involve the coordinated efforts of the Program Construction Management Team (led by the City of Joliet as defined in the Program Management Agreement with the Commission), the construction contractors responsible for delivery of individual construction contracts, and a System-wide Commissioning and Start-up Contractor (CSU Contractor).

12.2 Components

The overall Commissioning and Start-up strategy for the GWPC system is anticipated to include three specific phases as described below.

12.2.1 Work Package Level Testing and Acceptance

With the exception of the CIP 1 Chicago Connection Facilities, the infrastructure associated with each of the individual work packages that make up the overall Alternative Water Source Program is anticipated to be constructed under its own construction contract. The bidding documents for each construction contract will include specific requirements for inspection, testing, and eventual acceptance of the work covered by the contract. Completion of the construction and the inspection, testing, and acceptance activities by the construction contractor will be required to meet substantial and final completion milestones for the work and close out each individual contract. The Program Construction Management Team will be responsible for confirming that the requirements for construction and the inspection, testing, and acceptance are completed in accordance with the contract documents. The CSU Contractor will also be engaged during this process to confirm that the required activities are completed in a manner consistent with the overall plan for infrastructure maintenance and eventual system-wide commissioning.

12.2.2 Infrastructure Maintenance

Once infrastructure associated with a specific work package has been constructed and accepted by both the GPWC and the CSU Contractor, the CSU Contractor will take on responsibility for maintenance of the infrastructure required to have it ready for system-wide commissioning and start-up. The intent of this phase of the work is to confirm that infrastructure completed early in the Program schedule remains in appropriate condition until it is time to be brought-on line.

12.2.3 System-wide Commissioning and Start-up

System-wide commissioning and start-up of the overall GPWC water transmission system is projected to begin in mid-2029 as construction of the majority of the infrastructure work packages is completed. It is anticipated that this work will be led by the CSU Contractor with oversight by the Construction Management Team. Between mid-2029 and the end of 2029, commissioning and start-up activities will likely focus on preparation of the physical and communications/control infrastructure for full integration, testing, and commissioning. Where water is required for testing of individual or groups of elements, provisions will have to be made for the use of temporary sources as the City of Chicago is not required to begin supplying water to the GPWC for testing until January 1, 2030.

Beginning after January 1, 2030, the CSU Contractor will transition commissioning and start-up activities toward sequential testing, start-up, and commissioning of portions of the GPWC system using water supplied by Chicago through its new tunnel connection.

Individual GPWC Members will have primary responsibility for commissioning and start-up of their local distribution systems, including implementation of approved source water transfer plans.

Costs related to system-wide commissioning and start-up including initial development of an overall commissioning and start-up plan, preparation of procurement documents for solicitation of proposals and selection of a CSU Contractor, and delivery of CSU services by the selected contractor are summarized in Section 13 Baseline Program Schedule, Budget, and Financials.

Costs for services related to inspection, testing, and acceptance of individual work packages by the Construction Management Team and individual construction contractors are included in other elements of the Baseline Budget.

13 Baseline Program Schedule, Budget, and Financial Strategy

13.1 Program Baseline Overview

Effective management of a major capital program requires the development and maintenance of a Program Baseline. The Program Baseline establishes expectations for overall delivery and provides metrics against which progress toward completion can be monitored. Variances between actual or forecast performance and the baseline serve as indications that adjustments in the approach to Program delivery may be warranted. The Alternative Water Source Program Baseline includes a Baseline Program Schedule and a Baseline Program Budget. The Baseline Schedule and Budget also serve as important inputs to the overall strategy for funding of the Program.

Schedule and budget data presented in this document reflect Baseline Schedule and Budget 2.0 adopted in May 2024. The Baseline Program Schedule and Budget will be reviewed, and if necessary, adjusted annually to reflect changes encountered during Program delivery.

13.2 Baseline Program Schedule

The Baseline Schedule for the Alternative Water Source Program defines the sequence, duration, and dependencies of the tasks and activities that must be performed to complete the Program including both programmatic tasks and tasks associated with the design and construction of individual work packages. Exhibit 1-1 (presented in the first section of this document) shows a summary of the current Baseline Schedule (Baseline Schedule 2.0) for delivery of the AWSP organized by construction work packages. Exhibit 1-1 also shows the planned progression of tasks related to each work package from planning through preliminary and final design to bidding, substantial completion, and construction.

While Exhibit 1-1 provides a relatively simple overview of the Baseline Schedule, each element shown represents a large number of interdependent tasks and activities that make up the detail of the schedule. In total, the current Baseline Schedule contains more than 2700 individual activities associated with specific program level tasks or construction work packages that are linked by logical connections. The use of this structured approach to scheduling allows for tracking of actual progress against the Baseline Schedule at a detailed level and supports analysis of the impacts of actual or potential changes that occur as the Program progresses. Differences between milestone dates shown in the Baseline Schedule and actual or forecast milestone dates are tracked as variances against the Baseline.

The current Baseline Schedule reflects an intensive focus on design-related activities for all work packages through 2024 and 2025. Construction activities are forecast to begin in the second half of 2024 with the start of construction for the Tunnel Extension (AWSP-01-01). Construction activities related to other work packages are planned to start in 2025, 2026, and 2027. Major infrastructure construction activities are planned to be substantially complete by mid-2029 to allow for the start of system-wide commissioning and start-up. Commissioning and start-up activities during the second half of 2029 will focus on individual components or groups of components in the transmission system, as the GPWC will not have access to Chicago water through the Tunnel Connection until January 1, 2030. Once water is available through the Tunnel Connection, system-wide commissioning and start-up will proceed. The current Baseline Program schedule illustrates how activities related to the various work packages are planned to enable the Commission to be ready to supply Lake Michigan water to the Member Water Delivery Structures by May 2030.

13.3 Baseline Program Budget

The Baseline Program Budget for the Alternative Water Source Program is the total projected cost of the Program in actual dollars at its completion. It includes all costs associated with design, construction, and financing issuance of all Commission-owned infrastructure.

The Baseline Program Budget is built upon the Baseline Program Schedule so that the time value of money is accurately reflected in the budgeting process. All costs associated with delivery of the Program are estimated and then assigned to the tasks and activities in the Program Schedule through a process called "cost-loading". Cost loading of the schedule allows for the dynamic consideration of the impacts of schedule changes and cost escalation on projected Program costs. Once costs have been loaded into the schedule, a projection of expenditures required over time to fund Program delivery can be generated. Baseline Budget (2.0) assumes a consistent 4.0% per year escalation in capital costs through completion of the AWSP in 2030.

Unknowns and uncertainty related to the final schedule and costs that will be associated with Program delivery must also be considered in the development of the Baseline Program Budget. For the Alternative Water Source Program, a cost and schedule risk analysis (CSRA) process has been adopted to provide guidance as to the potential impacts that various factors could potentially have on the time or money required to complete the Program. In the CSRA, factors that could potentially impact the schedule or cost of the Program are identified and characterized in terms of their likelihood and potential impacts. These factors are then assigned to specific tasks or activities in the Program schedule and evaluated through a probabilistic analysis to provide forecasts of potential impacts to schedule and/or cost.

The output from the CSRA serves two primary purposes. First, it provides the Program Team with insights as to the factors that could potentially have the greatest impact on the Program. This information is used to formulate potential actions or strategies that can be implemented to reduce the likelihood and/or consequence of these critical conditions. Secondly, the output from the CSRA is used to inform decisions regarding the need for and size of a management reserve to be included in the Baseline Program Budget. The management reserve is controlled by the Commission and can be used where appropriate to offset unanticipated changes to the Program Budget. Baseline Budget (2.0) includes a management reserve of approximately $53 million.

Figure 13-1 illustrates the general process used to formulate the Baseline Program Budget for the Alternative Water Source Program. Table 13-1 shows a summary breakdown of the components that make up the Baseline Program Budget and the total Baseline Budget amount. Detailed breakdowns of budget components organized by Program CIP and work package are presented in Tables 13-3 through 13-10.

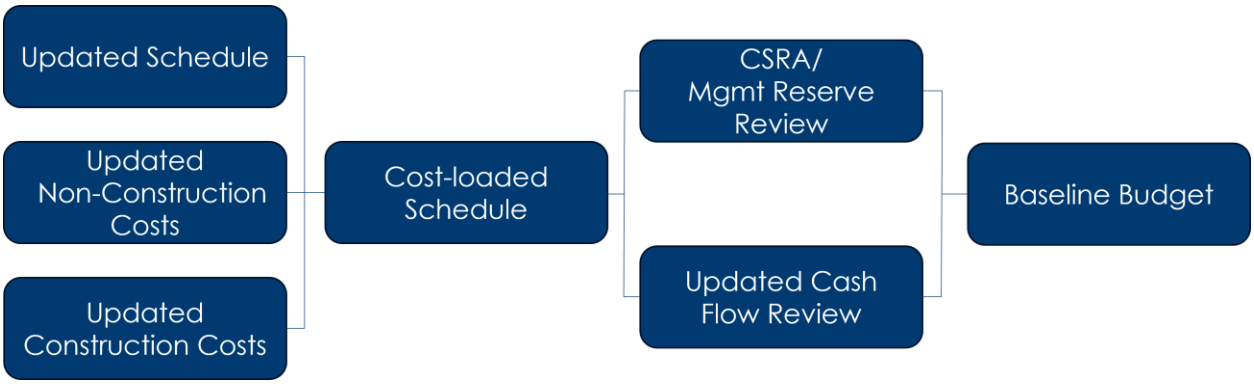

Figure 13-1 Baseline Program Budget Development Process

As shown in Table 13-2, AWSP costs included in the Baseline Program Budget are split into development costs (non-construction) and construction costs. In February 2021, the City of Joliet began to expend funds for AWSP development including engineering, land acquisition, permitting, legal, and financial (advisory and financing) costs incurred for the Program and GPWC formation. The GPWC will recognize these development costs as a direct capital contribution by Joliet as costs are allocated to the Commission Members. Details of the arrangements for sharing of Program costs between the Members are defined in detail in the Water Supply Agreement between the GPWC and its Members.

It is important to note that the Baseline Program Budget includes only those costs that are the responsibility of the GPWC. Costs for construction of improvements that will be owned by the City of Chicago will be paid by the City of Chicago and are not included in the total shown in Table 13-1.

Table 13-1 Baseline Program Budget 2.0

Baseline Program Budget Uses	Baseline Program Budget Amount
Construction Costs GPWC Construction (including Contingencies) Utility Relocation Costs	$1,173,404,311
Non-Construction Costs Program Management/Engineering Design Legal/Advocacy Financial (including issuance costs) Engineering during Construction/Construction Mgmt Land Acquisition Independent Review	$218,814,430
Management Reserve	$53,898,393
Baseline Program Budget	**$1,446,117,135**

Table 13-2 Baseline Program Budget - Uses and Financing Sources

	Construction Costs (GPWC Finances)	Development/ Non-Construction Costs (Joliet Finances)	Total
Primary Capital Costs: Costs shared based on Declared 2050 Maximum Day Demand	$1,145,965,015	$267,480,290	$1,413,445,305
Non-Primary Capital Costs: Costs assigned based on non-primary connection requirements	$27,439,296	$5,232,533	$32,671,829
Total	$1,173,404,311	$272,712,823	**$1,446,117,135**

13.4 Alternative Water Source Program Funding Strategy

A comprehensive strategy for funding of anticipated team costs is essential to the successful completion of the Alternative Water Source Program. Early in the process of developing the Program it was determined that a combination of several different mechanisms could be used to effectively fund the required expenditures and manage financing and interest costs so as to limit the overall burden on Member communities and their water customers. The funding strategy adopted for the AWSP includes the use of the following primary sources:

- Water Infrastructure Finance and Innovation Act (WIFIA) low interest loans – Assumed terms: 4% interest, up to 35 years to maturity
- Drinking Water State Revolving Fund Loan Program (SRF) – Assumed terms: 2% interest, up to 30 years to maturity
- Revenue Bonds: 4.5% interest, up to 30 years to maturity

The Program Team is also working to track and pursue opportunities for external funding of elements of the Program including federal funds designated for specific projects (earmarks), targeted grant funding, and potential funding associated with major infrastructure funding programs.

13.4.1 Funding for AWSP Development Costs

The City of Joliet is currently funding development (non-construction) costs for the Alternative Water Source Program through a combination of cash-on-hand, short-term borrowing (Bond Anticipation Note), WIFIA low interest loan funds, and grant funds. Joliet intends to continue using these mechanisms to fund development costs through the completion of design and provision of construction management and engineering services during construction. As noted previously and provided in the *WSA*, Joliet's expenditures on behalf of the Commission will be treated as an initial capital contribution in the analysis and allocation of debt service costs among the GPWC Members.

13.4.2 Funding for AWSP Construction Costs

The current strategy for funding of the construction costs associated with implementation of the AWSP reflects consideration of the required timing for construction funding and the terms associated with the various sources of funds to be used. Under the current strategy, the GWPC expects to execute a WIFIA loan with the USEPA in 2024 for Program-related construction activities. However, since no interest is accrued on the credit available through the WIFIA loan until draws are made, and then only on the amount that is drawn, the current strategy is to defer any draws from WIFIA until the first half of 2026. In addition to deferring accrual of interest for the WIFIA loan, this approach allows the GPWC to keep open the option of resetting the WIFIA loan rate if interest rates drop between 2024 and 2026.

The Commission intends to make efforts to maximize the use of SRF loans for funding AWSP construction projects. Compared to other assumed sources, SRF loan interest rates are presently below market rates and provide a lower cost of capital. The baseline funding strategy assumes SRF funding will be applied to specific work packages and that applications for SRF loans will be submitted in calendar years 2025, 2026 and 2027 in the hopes of securing funding from IEPA either through being included on the intended use plan or through the use of bypass funds[6].

While the Commission is positioning for SRF, a revenue bond issue in 2025 is anticipated to be required to provide the Commission with funding for early construction activities. The SRF and WIFIA loans are reimbursement programs. The Commission must incur costs and submit invoices to the IEPA and U.S. EPA WIFIA team for reimbursement. Having the bond proceeds in place provides adequate funds to pay early invoices.

It has been assumed that once the initial revenue bond and SRF loans have been depleted, the Commission will begin drawing on the WIFIA loan during the third quarter of 2026. WIFIA and SRF loans are anticipated to be used to fund construction costs during 2026, 2027 and the first quarter of 2028. During the second quarter of 2028, a large revenue bond is anticipated to be issued to cover the remaining construction costs.

Member payments to the GPWC are anticipated to begin in early 2025 to prepare for initial payments associated with the 2025 bond issue, fund debt service, and begin building up the needed debt service reserve. The Baseline Program Budget will be reviewed and "re-baselined" annually as part of the overall management process for the Program. Updated projections of monthly Member cost obligations are planned to be generated and distributed in September of each year to facilitate budget planning by the Members.

This blend of funding sources described is projected to provide the GPWC with an attractive overall weighted cost of capital for the Program as well as flexibility in the sculpting of debt repayment. Financial modeling of funding scenarios will continue as details related to overall Program requirements and costs are further defined so that the overall funding strategy maximizes the value and benefits of the available funding sources.

[6] If IEPA SRF money reserved for projects on the Intended Funding List (IFL) is not used by December 31st, it may become available for other projects that are ready to proceed. During the bypass period (between January 1 and June 30), loan applicants that were not on the IFL can obtain an IEPA SRF loan. IEPA Funding Cycle and Availability Explanation.

Table 13-3 Baseline Program Budget – CIP #1 Chicago Connection Facilities

Category	AWSP 01-01	AWSP 01-02	AWSP 01-03	Total CIP #1
Engineering / Design	$1,685,446	$1,560,750	$2,703,588	$5,949,785
Eng Services During Construction/Constr Mgmt	$1,907,531	$2,162,962	$6,813,845	$11,342,861
Land/ROW/Easement Acquisition	$0	$1,862,617	$979,700	$2,842,317
Construction [1]	$27,528,506	$35,423,927	$95,943,946	$158,896,379
Total	**$31,121,483**	**$41,468,779**	**$106,441,079**	**$179,031,341**
Costs to be paid by Chicago	$25,553,506	$0	$41,691,932	$67,245,438
Costs to be paid by GPWC	$5,567,977	$41,468,779	$64,749,147	$111,785,903

(1) Preconstruction costs for CMAR Contractor included in construction total for AWSP 01-01

Table 13-4 Baseline Program Budget – CIP #2/#6/#7 Conveyance Improvements

Category	AWSP 02-01	AWSP 02-02	AWSP 02-03	AWSP 02-04	AWSP 02-05	AWSP 02-06	AWSP 06-01	AWSP 06-02	AWSP 06-03	AWSP 06-04	AWSP 06-05	AWSP 07-01	AWSP 07-02	Total Conveyance
Engineering / Design	$4,179,117	$3,609,815	$4,034,246	$3,284,561	$3,102,228	$3,779,894	$2,212,817	$3,585,435	$3,908,104	$2,768,606	$2,857,729	$1,061,539	$2,397,750	$40,781,842
Eng Services During Construction/Constr Mgmt	$7,253,605	$6,532,120	$8,975,937	$8,638,061	$8,520,217	$4,880,704	$2,427,819	$2,740,178	$4,354,348	$3,837,265	$3,251,894	$2,775,790	$3,637,785	$67,825,722
Land/ROW/Easement Acquisition	$176,174	$529,534	$1,434,222	$716,195	$178,183	$177,704	$26,945	$27,016	$53,706	$459,507	$648,390	$279,249	$274,166	$4,980,991
Construction	$103,503,826	$93,646,682	$132,371,237	$127,081,854	$122,987,879	$69,273,811	$35,039,351	$39,507,923	$62,551,716	$56,056,222	$48,547,444	$39,094,616	$52,417,940	$982,080,501
Total	**$115,112,721**	**$104,318,151**	**$146,815,641**	**$139,720,671**	**$134,788,508**	**$78,112,113**	**$39,706,932**	**$45,860,552**	**$70,867,872**	**$63,121,601**	**$55,305,457**	**$43,211,194**	**$58,727,642**	**$1,095,669,056**
Primary Capital Costs	$115,112,721	$104,318,151	$146,815,641	$139,720,671	$134,788,508	$78,112,113	$33,333,604	$36,596,365	$70,867,872	$63,121,601	$54,435,570	$43,211,194	$58,727,642	$1,079,161,655
Non-Primary Capital Costs	$0	$0	$0	$0	$0	$0	$6,373,328	$9,264,187	$0	$0	$869,886	$0	$0	$16,507,400

Table 13-5 Baseline Program Budget – CIP #3 Intermediate Pump Station 1/ Storage Facility 1

Category	AWSP 03-01
Engineering / Design	$1,908,691
Eng Services During Construction/Constr Mgmt	$3,040,887
Land/ROW/Easement Acquisition	$2,207,004
Construction	$42,914,801
Total	**$50,071,382**

Table 13-6 Baseline Program Budget – CIP #4 Intermediate Storage Facility 2

Category	AWSP 04-01
Engineering / Design	$1,111,369
Eng Services During Construction/Constr Mgmt	$923,816
Land/ROW/Easement Acquisition	$515,408
Construction	$13,458,628
Total	**$16,009,221**

Table 13-7 Baseline Program Budget – CIP #6 Water Delivery Structures

Category	AWSP 06-06	AWSP 06-07	AWSP 06-08	AWSP 06-09	Total Delivery Structures
Engineering / Design	$770,335	$545,063	$729,885	$744,833	$2,790,116
Eng Services During Construction/Constr Mgmt	$363,247	$352,463	$678,080	$493,647	$1,887,437
Land/ROW/Easement Acquisition	$0	$0	$0	$0	$0
Construction	$4,264,707	$4,774,210	$9,058,138	$7,000,258	$25,097,313
Total	**$5,398,289**	**$5,671,736**	**$10,466,102**	**$8,238,738**	**$29,774,865**
Primary Capital Costs	$4,275,483	$1,300,495	$5,106,575	$2,927,884	$13,610,436
Non-Primary Capital Costs	$1,122,806	$4,371,241	$5,359,527	$5,310,854	$16,164,429

Table 13-8 Baseline Program Budget – CIP #5 System-wide SCADA/ Communications

Category	AWSP 05-01	AWSP 05-02	AWSP 05-03	AWSP 05-04	Total CIP #5
Engineering / Design	$265,406	$277,681	$171,449	$171,465	$886,002
Eng Services During Construction/Constr Mgmt	$858,986	$27,145	$73,216	$41,262	$1,000,609
Land/ROW/Easement Acquisition	$0	$0	$0	$0	$0
Construction	$12,804,905	$400,708	$1,096,808	$618,115	$14,920,535
Total	**$13,929,297**	**$705,534**	**$1,341,474**	**$830,842**	**$16,807,146**

Table 13-9 Baseline Program Budget – CIP #10 Commission Office

Category	CIP #10
Engineering / Design	$100,000
Eng Services During Construction/Constr Mgmt	$111,573
Land/ROW/Easement Acquisition	$523,298
Construction	$1,639,858
Total	**$2,374,729**

Table 13-10 Baseline Program Budget – CIP #11 System-wide Commissioning and Start-up

Category	CIP #11
Engineering / Design	$260,906
Eng Services During Construction/Constr Mgmt	$394,067
Land/ROW/Easement Acquisition	$0
Construction	$1,641,735
Total	**$2,296,708**