APPENDIX 5.17 BIG-2

WATER SUPPLY ASSESSMENT

GOLDEN STATE WATER COMPANY
BARSTOW SERVICE AREA

Water Supply Assessment and Verification
BARSTOW INTERNTIONAL GATEWAY

November 26, 2024

VERIFICATION

This Water Supply Assessment and Verification has been prepared by Golden State Water Company and its representatives as of the date set forth below. The undersigned hereby represents that he has the authority on behalf of Golden State Water Company to execute and make effective this Water Supply Assessment and Verification.

Patrick Kubiak Digitally signed by Patrick Kubiak
Date: 2024.12.23 08:59:22 -08'00'

______________________ By:______________________________

Date

Patrick M. Kubiak
Vice President Asset Management
Golden State Water Company

Water Supply Assessment for Barstow International Gateway

Golden State Water Company
Barstow Service Area

Originally Submitted: 29 March 2024

Revised: 21 November 2024

EKI C30084.00

EKI ENVIRONMENT & WATER, INC.

www.ekiconsult.com

2001 Junipero Serra Blvd, Suite 300 • Daly City, CA 94014

Golden State Water Company

March 29, 2024

Revised: November 21, 2024

James R. Hamm
Project Manager
TranSystems
2400 Pershing Rd, Ste 400
Kansas City, MO 64108

Dear Mr. Hamm,

This letter serves as the Golden State Water Company – Barstow Service Area (GSWC Barstow) formal approval of the Water Supply Assessment for the BNSF Railway Company's Barstow International Gateway Project on the western side of the City of Barstow and in unincorporated San Bernardino County, California.

Sincerely,

Name: Patrick Kubiak Digitally signed by Patrick Kubiak Date: 2025.01.06 09:11:32 -08'00'

Title: ______________________

Date: ______________________

Water Supply Assessment

Barstow International Gateway
Golden State Water Company – Barstow Service Area

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APPENDICES

1 INTRODUCTION

Included herein is a Senate Bill 610-compliant water supply assessment (WSA) in support of the BNSF Railway Company's (BNSF) Barstow International Gateway Project (BIG). The BIG site, which totals approximately 4,750 acres, is located on the western side of the City of Barstow (City) and in unincorporated San Bernardino County (County), California located south of State Highway 58 and northwest of Interstate 15 and between Route 66 and the Mojave River (**Figure 1**). Approximately 1,600 acres of the BIG site are within the City and 3,000 acres are within the unincorporated County.

BIG construction is expected to start in Quarter 3 (Q3) 2025 and extend until Q3 2028. Non-potable water for construction purposes will be provided by private, on-site groundwater wells. Potable water for the construction workers will be provided via temporary connections to the Golden State Water Company Barstow (GSWC Barstow) system. BIG operations are expected to start in Q2 2028 and become fully operational by 2048. **Figure 2** shows adjacent water providers near the BIG site, but it is assumed that only GSWC Barstow will supply potable water to the site, following annexation of approximately 2,700 acres of the BIG site into the GSWC Barstow service area.

Pursuant to California Water Code (CWC) §10910, BIG meets the criteria for requiring preparation of a WSA. The information provided in this WSA is consistent with CWC §10910-10912 requirements and the California Department of Water Resources' (DWR's) Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 (DWR, 2003). The text of specific sub-sections of the CWC is included as indented and italicized font at the beginning of specific sections of this WSA. The information presented in those respective sections, and the associated tables and figures, respond directly to CWC requirements.

1.1 Purpose of This WSA

The purpose of this WSA is to evaluate whether sufficient water supplies are available to meet all future demands within the GSWC Barstow service area, including demands associated with BIG, during normal, single dry, and multiple dry hydrologic years for a 20-year time horizon. More specifically, this WSA includes:

- A summary of the WSA requirements articulated in CWC §10910-10912 and a description of how they apply to BIG;
- A description of the water demand for existing land uses within the BIG site and the estimated water demands for BIG through buildout (assumed to be 2028 for purposes of this WSA, although BIG is only anticipated to be fully operational by 2048);
- A description and analysis of the historical, current, and projected future water demands for the GSWC Barstow service area through the year 2045;
- A description and analysis of the current and projected future water supplies for the GSWC Barstow service area through the year 2045; and
- A comparison of the water supplies and demands for the GSWC Barstow service area, including the projected water demands associated with BIG.

Legend

Major Highways

Project Boundary

City of Barstow

N

0 4 8

(Scale in Miles)

Notes

1. All locations are approximate.

Sources

1. Basemap is ESRI's World Topographic Map, obtained on 7 December 2023.

Barstow International Gateway Project Location

Barstow International Gateway
Barstow, CA
March 2024 | Revised November 2024
C30084.00

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Figure 1

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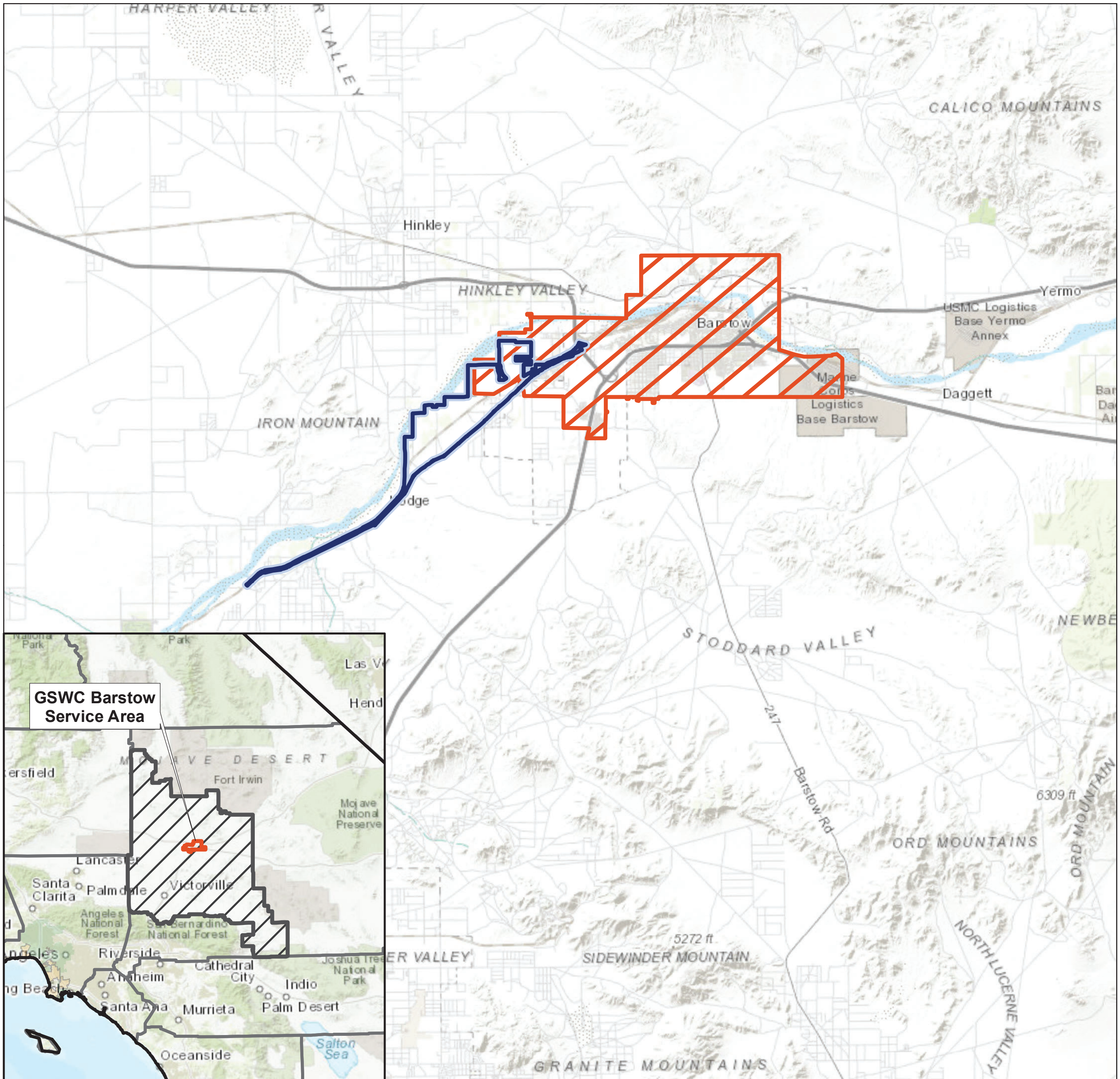

Legend

- Project Boundary
- Golden State Water Company - Barstow
- Mojave Water Agency

N

0 4.5 9

(Scale in Miles)

Notes

1. All locations are approximate.

Abbreviations

GSWC = Golden State Water Company

Sources

1. Basemap is ESRI's World Topographic Map, obtained on 7 December 2023.

GSWC Barstow Service Area and Project Location

Barstow International Gateway
Barstow, CA
March 2024 | Revised November 2024
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Figure 2

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Additionally, this WSA conducts an analysis of the sufficiency of BNSF's groundwater supplies to meet the non-potable construction demands associated with the development of BIG.

The information contained in this WSA is based primarily on information provided by BNSF, the GSWC Barstow Service Area 2020 Urban Water Management Plan (2020 GSWC Barstow UWMP), the Mojave Water Agency (MWA) 2020 UWMP (2020 MWA UWMP), and the MWA Annual Water Availability reports.

1.2 Summary of Findings

Construction Phase: The water demand anticipated over BIG's short-term construction phase (potable and non-potable) is estimated to be 6,764 acre-feet (AF), as follows:

- BIG's non-potable water demand for the construction phase (i.e., for dust control and concrete mixing) for onsite and offsite rail and non-rail improvements is estimated to total approximately 6,453 AF. While the construction phase is expected to occur between Q3 2025 and Q3 2028, approximately 90% of the non-potable water will be needed in the first 12 to 15 months. Therefore, it is assumed that 50% (3,227 AF) of the non-potable water demand will be needed in 2025, 40% (2,581 AF) will be needed in 2026 and the remaining 10% (322 AF for two years) will be needed through 2028. The non-potable water for the construction phase will be provided by private, on-site groundwater wells.
- BIG's potable water demand for the construction phase (i.e., to meet the drinking water and sanitary needs of the construction workers) is estimated to total approximately 311 acre-feet per year (AFY)[1] between Q3 2025 and Q3 2028. The potable water for the construction phase is anticipated to be supplied though temporary connections to the GSWC Barstow system.

Operational Phase: BIG's long-term operational potable water demand for the onsite workers, landscaping, cleaning, etc. is estimated to total 404 AFY[1]. While BIG's full operational buildout is not expected until 2048, the full volume of potable water demand is conservatively assumed to be required starting in Q2 2028. All potable water for BIG will be supplied though connections to the GSWC Barstow system, following annexation of approximately 2,700 acres of the BIG site into the GSWC Barstow service area.

This WSA concludes that, based on the currently available information, sufficient water supply is available to meet the current and future demands within the GSWC Barstow service area, including the potable demands anticipated for BIG, through 2045 under all hydrologic conditions.

This WSA further concludes that sufficient groundwater supply is available to BNSF to meet the short-term, non-potable construction water demands for BIG.

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[1] Includes distribution system losses.

2 GENERAL REQUIREMENTS FOR THE PREPARATION OF A WATER SUPPLY ASSESSMENT

The purpose of this section is to outline what types of projects require the preparation of a WSA, who is responsible for its preparation, and the necessary components of a WSA.

2.1 Applicability of Senate Bill 610 to BIG

☑ ***CWC § 10910 (a)***

Any city or county that determines that a Project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

☑ ***CWC § 10912***

For the purposes of this part, the following terms have the following meanings:

(a) " Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

(4) A proposed hotel or motel, or both, having more than 500 rooms.

(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use Project that includes one or more of the Projects specified in this subdivision.

(7)A Project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit Project.

(b) If a public water system has fewer than 5,000 service connections, then "Project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use Project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

BIG involves the development of 4,750 acres of industrial land uses that will be staffed by approximately 5,373 employees. Based on these proposed project elements and the associated operational water demands, BIG meets the definition of a project under CWC §10912(a)(5) above, and therefore requires a WSA.

2.2 Responsibility for Preparation of the Water Supply Assessment

> ☑ ***CWC § 10910 (b)***
>
> *The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any Project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the Project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the Project. If the city or county is not able to identify any public water system that may supply water for the Project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the Project site, the local agency formation commission, and any public water system adjacent to the Project site.*

Approximately 2,000 acres of the BIG site are within the current GSWC Barstow service area (**Figure 2**). The remaining approximately 2,700 acres are within the unincorporated County and are served by private groundwater wells.

All non-potable construction water demands for BIG will be met using private, on-site groundwater wells. However, this WSA assumes that GSWC Barstow will supply potable water for construction purposes through temporary connections to its system and will expand its service area to supply potable water for BIG operations. Therefore, in accordance with CWC §10910(b), GSWC Barstow is the entity responsible for preparation of the WSA for BIG.

2.3 Components of a Water Supply Assessment

☑ ***CWC § 10910 (c) (4)***

If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the Project shall include a discussion with regard to whether the total Projected water supplies, determined to be available by the city or county for the Project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the Projected water demand associated with the Project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

☑ ***CWC § 10911***

(b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the Project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether Projected water supplies will be sufficient to satisfy the demands of the Project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the Project.

As listed above in CWC §10910(c)(4), a WSA's primary purpose is to evaluate whether sufficient water supply is available to meet all future demands within the water supplier's service area, including those associated with a proposed project, during normal, single dry and multiple dry hydrologic years for a 20-year time horizon. Therefore, the following information is included in this WSA:

- A description of the water demand for existing land uses within the BIG site and estimated water demands for BIG through the year 2045;
- A description and analysis of the historical, current, and projected future water demands for the GSWC Barstow service area through the year 2045;
- A description and analysis of the current and projected future water supplies for the GSWC Barstow service area through the year 2045; and
- A comparison of the water supplies and demands for the GSWC Barstow service area, including the projected water demands associated with BIG.

Additionally, this WSA conducts an analysis of the sufficiently of BNSF's groundwater supplies to meet the non-potable construction demands associated with the development of BIG.

3 PROJECT DESCRIPTION

The following project description is based the project summary excerpt of the draft BIG Environmental Impact Report (EIR) as provided by the project team on 22 August 2023 and information received from the project team through a request for information and other correspondence.[2]

The BIG site is approximately 4,750 acres and consists of a rail yard with an intermodal facility (IMF) and "block swap" yard and a transload warehouse center. Additionally, to serve the proposed rail yard and transload warehouse center, BNSF is proposing offsite rail improvements (including lead track extensions) and offsite non-rail improvements (including drainage, utilities, and roadways). The BIG's proposed components are depicted in **Figure 3** and further described below.

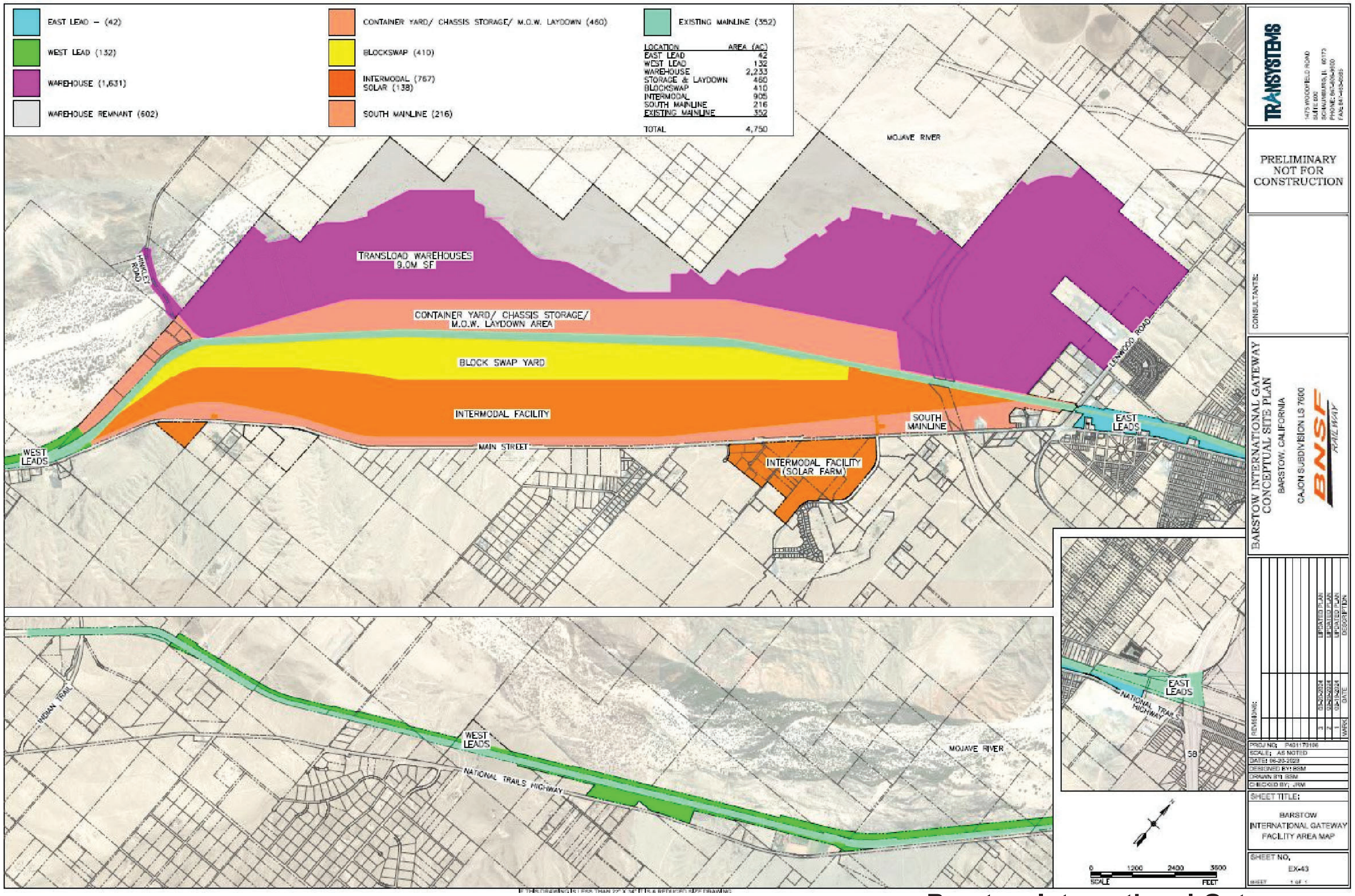
BIG is anticipated to employ approximately 8,188 construction workers per year during the 34-month construction phase. During operations, BIG is anticipated to employ approximately 4,248 transload warehouse workers and approximately 1,125 rail yard workers that will operate electric hostler trucks, maintain the cranes, and work the tracks for interbox connectors, etc. (AECOM, 2023)

3.1 Rail Yard – Intermodal Facility

The IMF is proposed at the BIG site's southern extent, on approximately 767 acres of the rail yard's total 1,648 acres, including the area for a container yard, chassis storage, and equipment maintenance area. The IMF's primary purpose will be to transfer containers between rail cars and electric hostler vehicles for cross-dock movements at adjacent warehousing, and vice versa, as described in more detail below in Section 3.1.1. This is different than the operations at a traditional intermodal facility where the primary purpose is to transfer containers from over-the-road trucks to rail cars, and vice versa.

Like other rail yards, the proposed BIG rail yard, including the IMF, will operate 24 hours a day, 365 days per year. The IMF will be composed of various components including railroad tracks, cargo handling equipment, an automated gate system, circulation roadways, yard equipment parking, container parking, stormwater detention ponds, electric vehicle charging stations, and buildings and ancillary support facilities. Portions of the IMF will also be "electric locomotive ready," by including electric and other infrastructure needed for future electric locomotives. The intermodal facility's anticipated support buildings and structures are detailed in **Table 1.**

[2] The project overview of BIG is tentative and subject to modification. The final project description will be provided as part of the formal application submittal.



Path: X:\C30084\Maps\2023\06\Fig3_Layout.mxd

Barstow International Gateway Site Layout

Notes

1. All locations are approximate.

Sources

1. TranSystems, updated site layout EX-43. Received on 20 March 2024.

Barstow International Gateway Barstow, CA
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Figure 3

Table 1
Intermodal Facility Structures

Building/Canopy	**Anticipated Square Footage**
Administration Building	35,000
Electric Hostler Employee and Maintenance Building	15,000
Drivers Assist Building	5,000
Crane Maintenance Employee and Storage Building	5,000
Crane Maintenance Canopies	22,500
Container Safe Haven Canopies	2,500
Quick Repair Canopy	10,000
AGS Kiosk Canopies	20,000
AGS Portals	2,000
Emergency Fuel Station Canopy for Hybrid Vehicles	5,000
Total	**122,000**

Abbreviations:

"AGS" = Automated Gate System

Containers will be stored in parking spaces and low stacks at the IMF and at the cross-dock warehouse locations. The rail yard will include approximately 8,200 parking spaces for wheeled/chassis storage and 5,688 stacked spaces, totaling 13,888 container spaces.

3.1.1 Rail Yard IMF: Cross-Dock Intermodal Operations

Under existing conditions, containers arrive at the ports of Long Beach and Los Angeles on 20-foot and 40-foot international containers. A portion of these containers are unloaded from container ships onto trucks, hauled to local warehouses in the Los Angeles basin, Orange County, and Inland Empire and repackaged into 53-foot domestic containers, then trucked to railroad intermodal facilities to be put on a train and transported by rail in the 53-foot domestic containers.

Under project conditions, the 20-foot and 40-foot international containers will be loaded directly onto trains at the ports and moved to the BIG IMF. At the BIG IMF, containers will be unloaded from the train, transported by electric holsters on private roads to the transload warehouse center, be cross-docked into 53-foot domestic containers, and transported by electric hostlers back over to the BIG IMF to be put on a train for eastward movement. All hostler trucks hauling containers between the IMF and transload warehouse center will be electric. The electric hostler vehicles will not leave BIG or access public roads; instead, they will drive on private roads between the IMF and the transload warehouses located within BIG. This will reduce the number of over-the-road truck trips in Southern California as containers will arrive at BIG by train directly from the ports, and be transloaded at BIG, instead of trucked to warehouses in the Los Angeles and Inland Empire areas or moved by truck out of state.

3.1.2 Rail Yard IMF: Traditional Intermodal Facility Operations

A small percentage of containers will arrive at the IMF via over-the-road truck to reduce the travel distance and/or travel time due to traffic conditions that the container will otherwise travel coming to/from other destinations. For example, under current conditions, a container coming from Las Vegas will travel through Barstow to BNSF's San Bernardino or Hobart/Commerce Yard IMFs, and then be transferred to a train for transport by rail to its destination. With the addition of BIG, that container will stop short at the BIG IMF rather than continuing to the San Bernardino or Hobart/Commerce IMFs. Similar to operations at a traditional intermodal facility, this small percentage of containers arriving at BIG via over-the road truck will be transferred from a truck to a rail car (and vice versa) and transported by rail to its final destination. This will eliminate additional distance and/or over-the-road travel time for these containers to existing intermodal facilities within the Southern California basin.

3.2 Rail Yard – Block Swap

The block swap yard is proposed within the middle of the BIG site, on approximately 410 acres of the rail yard's total approximately 1,648 acres. The proposed block swap yard will allow for the transfer of blocks of intermodal rail cars between trains. A block is defined as rail cars of a similar type moving to a similar destination that are already connected and can be combined with other blocks to the same destinations to produce more efficient train movements. The entire block of cars will remain coupled together and be moved en masse, permitting the reassembling of trains into optimal lengths, and the synchronizing of trains to their destinations, such that each individual train will travel to the same destination. Certain train blocks may stage at the block swap yard until another train arrives with sufficient length to achieve the optimal train length for the cargo's destination allowing for optimized train lengths depending on destination. The proposed block swap yard facilitates the switching and transfer of lengthy blocks of railcars between tracks for assembling departing trains. Thus, by optimizing train length and synchronizing trains to their destinations, the block swap yard will improve train efficiency eastbound and westbound.

The block swap yard's function is unique compared to a typical classification yard, such as the existing BNSF classification yard in Barstow. Classification yards are used for processing non-intermodal railcars consisting of individual boxcars, gondolas, open and closed hopper cars, automobile railcars, tank cars, and other non-intermodal railcars. BNSF designates these trains with a different train identification than those that will be using BIG. The block swap yard located adjacent to the IMF will disassemble and assemble lengthy blocks of railcars with intermodal containers to similar destinations, compared to a classification yard which will assemble and dissemble trains with individual manifest railcars as described above.

3.3 Transload Warehouse Center

The transload warehouse center is proposed at the BIG site's northern extent, on approximately 2,233 acres of BIG's total 4,750 acres. Of the approximately 2,233-acre area, approximately 465 acres will remain ungraded within and adjacent to the Mojave River. The transload warehouse center will only serve containers processed at or destined for the BIG IMF.

The transload warehouse center will include approximately nine million square feet (sq ft) of transload warehouses. These transload warehouses will be primarily dedicated to processing the contents of the 20-foot and 40-foot international containers into 53-foot domestic containers, as described in the cross-dock intermodal operations above. The transload warehouse center will be comprised of a mixture of building sizes depending on the specific user's needs.

Each transload warehouse will include container parking/storage areas, employee parking, stormwater/hydrology improvements, electric vehicle charging stations, and landscaping. Transload facilities will include dock doors on opposite sides of the buildings. International 20-foot and 40-foot containers arriving at the IMF will be loaded from trains onto electric hostler vehicles for movement on private road(s) to one of the warehouses. Upon arriving at the warehouse, the electric hostlers will deliver the 20-foot and 40-foot containers to one side of the building, where the containers will be unloaded into the transload warehouse.

A small percentage of traditional over-the-road trucks will also access the transload warehouses to deliver 40-foot containers to/from the Ports. The primary reason a container will arrive at the transload warehouse center via truck instead of rail/electric hostler will be due to time restrictions/priority of that container or it is originating from a terminal that doesn't have rail service today. Freight will then be processed and put into domestic 53-foot containers on the building's other side, then transferred back to the intermodal facility via electric hostler vehicles using the proposed private road, thus, containers will be moved from the intermodal yard to the transload warehouse center and back to the railyard in a "closed loop" within the BIG. Transload warehouses will also include container parking/storage areas to the south for the 20-foot and 40-foot containers after they are emptied and to the north for empty 53-foot containers waiting to be filled.

3.4 Utility Improvements

The BIG will require local utility relocations and new and/or expanded connections to existing facilities on the BIG site's eastern portion. Proposed BIG utility improvements include the following:

The BIG site is within the Mojave Basin Area Adjudication of which the MWA is the Watermaster. The MWA owns and operates a 48-inch recharge water line that crosses the BIG site north of the transload warehouse center. This line will be relocated to avoid conflict with rail yard improvements and the transload warehouses. The relocated line will run along the north side of the warehouses until the west end of the BIG site before extending along the north side of the

BNSF main line right-of-way for approximately 8.3 miles total. An easement will be granted to MWA along the route including a gravel drive for access.

In addition, up to six temporary groundwater production wells will be constructed on-site to provide non-potable water for construction activities. Water for construction activities is needed to condition the soil for proper placement and compaction, and also to provide dust control. BNSF will own and operate the wells through the contractor during construction and the wells will be abandoned in compliance with applicable law once the water requirements for construction have been met. The wells will be located within the BIG site, within the transload warehouse center portion of the site.

Domestic water and fire water will be provided by directly connecting to facilities owned and operated by the GSWC Barstow. Potable needs during construction will be supplied via temporary connections to the GSWC Barstow system. During operations, and following annexation into the GSWC Barstow service area, the warehouses will connect to an existing main in Jasper Road on the east end of the BIG site and the IMF will connect to an existing main on the east end of the BIG site near Lenwood Road on the south side of Route 66.

3.5 Project Construction Activities

Construction is anticipated to occur over approximately 34 months beginning in Q3 2025 and ending in Q3 2028. The anticipated construction phase timing for all onsite components except the solar farm, and all offsite components except the Tortilla Substation improvements, are shown in **Table 2.**

Table 2
Construction Schedule

Phase	Start Date	End Date
Demo, Site Prep, Mobilization	August 2025	September 2025
Mass Grading	August 2025	May 2026
Fine Grading	November 2025	March 2027
Bridges and Box Culverts	September 2025	November 2027
Subballast, Drainage, and Utilities	October 2025	November 2027
Building Construction	January 2026	September 2027
Paving	March 2026	December 2026
Tracks and Signal Work	February 2026	July 2028

3.6 Offsite Improvements

In addition to onsite improvements, BIG includes offsite rail improvements and offsite non-rail improvements (e.g., stormwater drainage, utilities, and circulation/roadways). Offsite rail improvements would include lead track extensions to the west approximately seven miles, and lead track extensions to the east approximately two miles. Offsite rail improvements would parallel the existing BNSF mainline and primarily be within BNSF right-of-way. Offsite non-rail improvements would consist of circulation/roadways improvements including the construction of a bridge over Lenwood Channel for Route 66, to replace the existing low water crossing and accommodate widening of Route 66 in that immediate area, as well as installation of traffic signals. Other offsite non-rail improvements include utility relocations, expansions, and construction.

4 BIG WATER DEMAND

BIG's water demand will occur over two phases for the purpose of the analysis: (1) construction water that will be needed from Q3 2025 to Q3 2028; and (2) operational water starting in Q2 2028.

The average annual water demand for BIG is estimated herein based on: (1) water demand estimates provided by the BNSF project team based on information for similar uses in other BNSF projects (**Appendix A**), (2) literature values for water demands for different land uses, and (3) landscape irrigation area and efficiency assumptions (DWR, 2015; WUCOLS, 2023). **Table 3** and the sections below include a summary of BIG's expected construction and operational water demands associated with each land use, including assumed distribution system losses.

4.1 Construction Phase Water Demand

BIG construction is expected to begin in Q3 2025 and end in Q3 2028. BIG's water demand during the construction phase includes non-potable water for onsite and offsite construction activities and potable water for onsite and offsite construction workers. Only the potable water demand for construction workers will be supplied by GSWC Barstow. The non-potable construction water demand for construction activities will be supplied from private, on-site groundwater wells (TranSystems, 2023a).

4.1.1 Non-Potable Construction Water Demand

Construction requires significant amounts of water for various purposes. Water is used for mixing concrete, equipment cooling, and general site cleaning. Water is also used to condition the soil for proper placement and compaction, and to provide dust control. BIG's non-potable water demand for construction activities (for both onsite construction and offsite improvements) is estimated to total approximately 6,453 AF (details are provided in **Appendix A**). It is anticipated that 90% of the non-potable water demand for construction activities will occur in the first 12 to 15 months of construction for mass grading and dust control. Therefore, it is assumed that 50% (3,227 AF) of the non-potable water demand will be needed in 2025, 40% (2,581 AF) will be needed in 2026 and the remaining 10% (322 AF for two years) will be needed through 2028. Since non-potable water will not be supplied by GSWC Barstow, the distribution system loss (explained in Section 4.3) does not apply.

4.1.2 Potable Construction Water Demand

BNSF estimates that a total of 23,200 full-time equivalent (FTE) construction jobs will be generated over the 34-month construction period, or approximately 8,188 workers annually performing onsite and offsite construction activities (AECOM, 2023). Although the offsite improvement construction activities are likely to occur outside the area expected to be annexed by GSWC Barstow, it is conservatively assumed that GSWC Barstow will supply all the potable water required for construction workers, both onsite and offsite.

BNSF estimates an average potable demand of 30 gallons per day per person (gpd/person) to meet the drinking and sanitary needs of construction workers (**Appendix A**). Therefore, the potable water demand for BIG is estimated to be 275 AFY. Since potable construction water will be sourced from GSWC Barstow, the distribution system loss (Section 4.3) of 13%, or 36 AFY, is added to the potable water demand for construction. Therefore, the total potable water demand for construction is estimated to be 311 AFY over the 2025 to 2028 time period.

4.2 Operational Phase Water Demand

Potable water demands during BIG operations will be provided by directly connecting to the GSWC Barstow system starting in Q2 2028, assuming annexation. As shown in **Table 3**, BIG operational water demand includes water used for employees, buildings, electric hostler truck washing, solar panel maintenance (i.e., solar farm and building rooftops), landscaping, and crane maintenance pads. In addition, operational demands include water that is lost during distribution (i.e., “distribution system losses”).

4.2.1 Rail Yard Employees Water Demand

BNSF estimates that 1,125 employees will work across the BIG rail yard operating electric hostler trucks, maintaining the cranes, working the tracks for interbox connectors, etc. Some of these employees will work in the IMF buildings. The number of rail yard employees is in addition to the number of transload warehouse workers described in Section 4.2.3. For sanitary water usage, the U.S. Environmental Protection Agency (USEPA) estimates a water demand of 10 to 25 gallons per person per shift in industrial settings or 20 to 35 gpd/person for domestic demands (not including kitchens) in commercial and industrial settings. BNSF estimates 30 gpd/person for employees (**Appendix A**), which is consistent with the USEPA estimates. Therefore, using 30 gpd/person for the 1,125 rail yard employees results in an estimated demand of 38 AFY.

4.2.2 IMF Water Demand

The IMF includes four buildings totaling 60,000 sq ft (approximately 1.4 acres). The majority of the water demand for these buildings is associated with the water demand for the buildings’ employees, which is accounted for above in Section 4.2.1

The IMF also includes 10 canopies and two portal sheds, covering approximately 55,000 sq ft (approximately 1.3 acres). Water demand associated with this space is anticipated to be minimal, limited to cleaning of the canopies/sheds. It is assumed that 0.02 gallons per sq ft will be used per each cleaning event (City of Los Angeles Bureau of Engineering, 2012) and that the canopies and sheds will be cleaned twice a year. Thus, the water demand for the purpose of cleaning the covered areas is estimated to total 2.5 AFY.

In addition, the IMF will have an electric hostler truck wash bay. The wash bay’s water demand is estimated to total 6,000 gpd or approximately 6.7 AFY (TranSystems, 2023b). The IMF also includes six crane maintenance pads which are estimated to require a total of 75 gpd or approximately 0.084 AFY.

Other support facilities including employee parking, electric vehicle charging, and roadways do not require the use of water for operations and maintenance. Therefore, the water demand for IMF support facilities is not included in the estimated water demand.

4.2.3 Transload Warehouse Center Water Demand

The transload warehouse center site plan shows 26 to 30 transload warehouses covering an area of approximately 207 acres and totaling approximately nine million sq ft (TranSystems, 2023a). BNSF estimates that 4,248 workers will be employed at the transload warehouse center (**Appendix A**). BSNF estimates a water demand of 30 gpd/person for transload warehouse workers (**Appendix A**), which is consistent with the U.S. Energy Information Administration (USEIA) water consumption estimates for warehouse workers of 29.7 gpd/person (USEIA, 2012). Therefore, using 30 gpd/person, the water demand for transload warehouse center employees is estimated to total 143 AFY.

The transload warehouse center includes several support facilities such as employee parking, storage, and electric vehicle charging station. Other than landscaping (which is covered in Section 4.2.6), the transload warehouse center support facility operations do not use water for operations and maintenance and are not included in the estimated water demand.

4.2.4 Block Swap Yard Water Demand

The operations of the block swap yard to transfer rail cars between trains do not require the use of water for cleaning or maintenance. Therefore, water demand for the block swap yard is not included in the estimated water demand.

4.2.5 Container Yard, Chassis Storage, and Maintenance Laydown

The container yard will be used to park and store containers, chassis, and maintenance equipment. Any expected water demand within the container yard for landscaping or potable water for the employees is included in Sections 4.2.6 and 4.2.1, respectively. The operations and maintenance of the container yard, chassis storage, and maintenance laydown do not require any water. Therefore, this area is not included in the estimated water demand.

4.2.6 Landscape Irrigation

BNSF estimates that the total area for landscaping across BIG's rail yard and transload warehouse center is 309 acres, which includes perimeter landscaping around the transload warehouse center and on the IMF's main entrance off of Route 66/Main Street. BNSF estimates that 20% (62 acres) of the landscaped areas will be planted and will require water and the remainder (247 acres) will be xeriscape with gravel. Planted areas include key drive aisles, approaches/entrances, and infiltration basins (**Figure 4**).

To calculate the estimated water demand for landscaping, it is assumed that BIG will use low to medium water use plant types that will be irrigated using drip irrigation. The landscape irrigation water use was calculated using the Model Water Efficient Landscape Ordinance (MWELO) framework. MWELO requires that the annual landscape irrigation water use not exceed the Maximum Applied Water Allowance (DWR, 2015). Using annual reference evapotranspiration rate of 71. inches for Zone 18[3] (DWR, 2012), and assuming drip irrigation and a conservative plant factor of 0.30 (WUCOLS, 2023), the estimated total water use for landscaping was calculated as 136 AFY and the maximum applied water allowance was estimated as 165 AFY (**Table 4**). The WSA conservatively assumes the maximum applied water allowance of 165 AFY to estimate BIG's landscaping water demand.

4.2.7 Solar Power

BIG includes a solar power generation site (approximately 100 acres) on the east south end of the IMF south of Route 66. In addition, solar power generation may be supplemented by installing rooftop solar panels on the transload warehouses (TranSystems, 2023a). BIG's proposed solar panels are expected to generate a total of 20.7 megawatts (MW) of power. Using a solar capacity factor of 24.4% (USEIA, 2023), the expected 20.7 MW of power is roughly equivalent to 44,970 megawatt hours per year (MWh/year) (Freeing Energy, 2023). It is estimated that approximately 20 gallons of water per MWh is needed to clean solar collection and reflection surfaces like mirrors, heliostats, and photovoltaic panels (Solar Energy Industries Association, 2023). Applying this water demand factor, BIG's solar power-related water demand is estimated to total approximately 2.7 AFY.

4.3 Distribution System Losses

Water distribution systems experience a degree of water loss over the course of transmission from the source to the end-use due to leaks, system maintenance, etc. It is noted that while these losses represent a demand on the system, distribution system water losses return to the underlying groundwater basin and thus are not a true demand on groundwater supply. However, all water losses are conservatively considered a demand herein. GSWC Barstow reported an average of 71.1 gal/connection/day of losses between 2018 and 2020, or an average of 13% of supplied potable water (DWR, 2023a). Therefore, consistent with GSWC Barstow reported system water losses, the distribution system water loss of 13%, or 36 AFY during construction and 46 AFY during operations, are added to BIG's potable water demand estimates (**Table 3**).

Table 3 does not include potential losses for non-potable water needed for construction because that water will be sourced from private, on-site groundwater wells and the GSWC Barstow distribution system loss percentage does not apply.

[3] Zone 18 describes low desert areas with high sunlight and considerable heat advection.

2. OPERATIONAL WATER DEMANDS								
modal Facility								
ngs (f)	1.4	-	-	-	-	-	-	-
pies and sheds (g)	1.3	-	0.02 (h)	gpd/sqft/ cleaning	-	2.5	2.5	2.5
er wash (i)	-	-	-	-	-	6.7	6.7	6.7
rt facilities (j)	-	-	-	-	-	-	-	-
maintenance pads (k)	-	-	-	-	-	0.084	0.084	0.084
k Swap Facility (l)	**410**	-	-	-	-	-	-	-
sload Warehouse Center								
oad warehouses (m)	207	4,248	30 (e)	gpd/person	**-**	142.8	142.8	142.8
rt facilities (n)	2,026	-	-	-	-	-	-	-
ainer yard, chassis storage and enance laydown (o)	**410**	-	-	-	-	-	-	-
scaping (p)	**62**	-	0.30	gal	**-**	165	165	165
r Components								
oyees	-	1,125	30 (e)	gpd/person	**-**	37.8	37.8	37.8
panels (q)	100	43,450 MWh/yr (r)	20 (s)	gal/MWh	-	2.7	2.7	2.7
ad tracks	768	-	-	-	-	-	-	-
water detention ponds (t)	80	-	-	-	-	-	-	-
s (u)	-	-	-	-	-	-	-	-
oution System Losses [only applies to [1.b, 2]	(v)			-	36	46	46	46
g BIG Site Demand	-	(w)		-	0	0	0	0
				Total Non-Potable Water Demand	3,227	-	-	-
				Total Potable Water Demand	311	404	404	404
				Net Annual Water Demand (x)	**3,538**	**404**	**404**	**404**

tions:
acre-feet per year
cre-feet
Automated Gate System
Barstow International Gateway
California Department of Water Resources
allon
gallons per day
= Golden State Water Company

"MWELO" = Model Water Efficient Landscape Ordinance
"MW" = megawatt
"MWh" = megawatt-hour
"Q" = fiscal year quarter
"sqft" = square feet
"WUCOLS" = Water Use Classification of Landscape Species
"yr"= year

mated number of employees and construction workers based on Reference (1) and (2). All construction workers are assumed to be onsite within the project
print (**Figure 3**). The 1,125 employees will work across the project site operating hostlers, maintaining the cranes, working the tracks, etc.
s proposed construction timeline is Q3 2025 to Q3 2028.Operations water demand will not occur until Q2 2028.
-potable water demand for construction is based on the calculations provided in Reference (1) (**Appendix A**). Water demand is in AF for the construction ph
ween Q3 2025 to Q3 2028. All water for construction activities (dust suppression) will be sourced from private groundwater wells.
ble water for 8,188 construction worker per year, per References (1) and (12), will be provided through temporary connections to GSWC Barstow, per Refer

and factor per worker is based on the BNSF estimates for water demand for employees/workers per Reference (1) (**Appendix A**).
modal facility includes 4 buildings as listed in Table 1. Water demand for buildings is estimated based on number of employees (line 2.f).
opies and portable sheds are listed in Table 1.
er demand for canopies and sheds is estimated per Reference (13). Estimated to be cleaned 2 times every year.
ler wash water demand is provided per Reference (1) (**Appendix A**) as 6,000 gpd.
rmodal facility support facilities include employee parking, electric vehicle charging, and roadways. No water demand is expected for the operations and
ntenance of these facilities.
er demand for the crane maintenance pads is estimated conservatively as 75 gpd per Reference (15) for 11 rubber-tired gantry cranes.
k swap facility is used to transfer blocks of cars between trains. No water demand is expected for the operations and maintenance of this facility.
BIG site plan includes 26 - 30 transload warehouses of different sizes and will include 4,248 transload warehouse workers, per References (1) and (2).
sload warehouse center support facilities include employee parking, storage, and electric vehicle charging station. Water demand for these areas is negligib
ming there won't be cleaning events. See Note (p) below regarding landscaping.
ainer yard is used to park and store containers, chassis, and maintenance equipment. No water demand is expected for the operations and maintenance of
s.
l landscaping area across the BIG site is 309 acres, 20% of which (62 acres) will be planted and the rest (247 acres) will be graded with gravel. Estimated Tot
(ETWU) calculations are shown in Table 2. Landscape irrigation demand per References (11) and (14).

onservatively assumed that distribution system losses for BIG are consistent with the average percentage of real loss per the validated water loss audits su
WR from 2018-2020 (i.e., 13% of supplied water) per Reference (7).
existing water demands associated with current land uses are conservatively assumed to be zero. BIG's incremental water demand calculations (i.e., net ne
and) do not take credit for any of the existing water demands associated with the current land uses that would be removed, per Reference (4).
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es:

F Railway Company BIG Water Usage Calculations Spreadsheet - Tab "26M", draft 5 July 2023.
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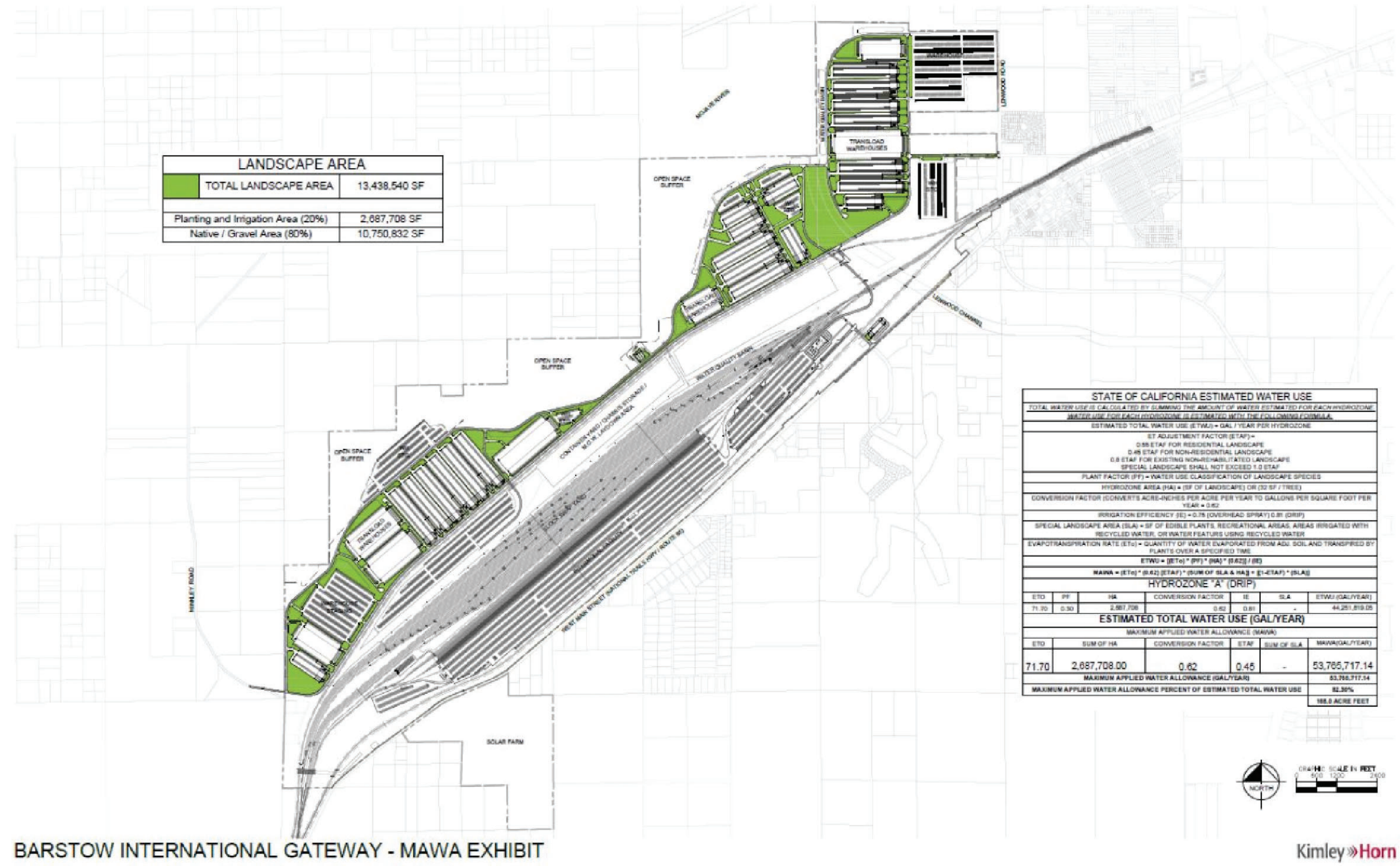


Barstow International Gateway
Landscape Plan

Notes
1. All locations are approximate.

Sources
1.TranSystems, 2023a. Response to Request for Information, received via email on 20 September 2023.

Barstow International Gateway
Barstow, CA
March 2024 | Revised November 2024
C30084.00

eki environment & water

Figure 4

Path: X:\C30084\Maps\2023\06\Fig4_landscape.mxd

Table 4
Estimated Landscaping Water Demand
Barstow International Gateway

Land Use	[A] Area of Land Use (ac) (a)	[B] Annual Reference Evapotranspiration Rate (in) (b)	[C] Irrigation Efficiency (c)	[D] Plant Factor (d)	[E] Evapotranspiration Adjustment Factor (ETAF) (e)	[F] Estimated Total Water Use (ETWU) (AFY) (f)	[G] Maximum Applied Water Allowance (MAWA) (AFY) (g)
Landscaped Area	62	71.7	0.81	0.30	0.37	135.8	165.0

Abbreviations:
"ac" = acre
"AFY" = acre-feet per year
"DWR" = California Department of Water Resources
"ETAF" = Evapotranspiration Adjustment Factor
"ETWU" = Estimated Total Water Use
"in" = inches
"MAWA" = Maximum Applied Water Allowance
"WUCOLS" = Water Use Classification of Landscape Species

Notes:
(a) Landscaped area per References (1) and (2).
(b) Annual reference evapotranspiration (Eto) rate for Zone 18 per Reference (3).
(c) Irrigation Efficiency is 0.81 for drip per Reference (4).
(d) For non-residential areas, 100% of the plants, excluding edibles and areas using recycled water, shall consist of plants with an average WUCLOS plant factor of 0.3, per Reference (5).
(e) Evapotranspiration Adjustment Factor (ETAF) = [D]/[C], per Reference (4).
(f) ETWU = [A] x [B] x [E] x 0.62, where 0.62 is a conversion factor that converts acre inches per acre per year to gallons per square foot per year, per Reference (4). The number in column [F] is converted to AFY.
(g) MAWA should meet or exceed the ETWU. MAWA = [A] x [B] x ETAF x 0.62. ETAF is 0.45 for non-residential areas, per Reference (4). The number in column [G] is converted to AFY.

References:

1. BNSF, 2023. Project Description. Excerpt from the Barstow International Gateway Environmental Impact Report, draft 4 August 2023.
2. TranSystems, 2023a. Response to Request for Information, received by via email on 24 May 2023.
3. DWR, 2012. California Irrigation Management Information System Reference Evapotranspiration Zones, accessed on June 7, 2023. https://cimis.water.ca.gov/Content/pdf/CimisRefEvapZones.pdf.
4. DWR, 2015. California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance, effective 1 December 2015, accessed on 7 June 2023.
5. WUCOLS, 2023. California Center for Urban Horticulture, University of California, Davis. http://ucanr.edu/sites/WUCOLS/. Accessed on 8 June 2023.

4.4 Existing Water Demand on the BIG Site

The BIG site is mostly vacant except for the eastern portion, which is within the City and unincorporated Lenwood community and contains 85 single-family dwelling units, 10 multi-family dwelling units, and 57,157 sq ft of commercial uses. The transload warehouse center portion of the BIG site is primarily vacant except approximately 128,000 sq ft of industrial uses on the far eastern portion, and approximately 312 acres of agricultural uses. The existing water demands associated with current land uses are served by GSWC Barstow or private groundwater wells.

As of June 2023, BNSF either already owns or is in the process of purchasing all lands within the BIG site, including the water rights associated with existing developments. BNSF will not retain any of the existing land uses. However, for the purpose of calculating BIG's net water demand in this WSA, the existing water demands associated with these land uses are conservatively not subtracted from BIG's water demands even though all the existing uses and associated water demands will be removed.

4.5 Total BIG Water Demand

Based on the above methodologies and assumptions in **Table 3**, BIG's annual water demand is estimated as follows:

Construction Phase: The water demand anticipated over BIG's short-term construction phase (Q3 2025 to Q3 2028) is estimated as follows:

- BIG's non-potable water demand for the construction phase (i.e., for dust control and concrete mixing) for onsite construction and offsite improvements is estimated to total approximately 6,453 AF. While the construction phase is expected to occur between Q3 2025 and Q3 2028, approximately 90% of the non-potable water will be needed in the first 12 to 15 months. Therefore, it is assumed that 50% (3,227 AF) of the non-potable water demand will be needed in 2025, 40% (2,581 AF) will be needed in 2026 and the remaining 10% (645 AF total, or approximately 322 AFY for two years) will be needed through 2028.
- BIG's potable water demand for the construction phase (i.e., to meet the drinking water and sanitary needs of the construction workers) is estimated to total approximately 311 AFY[4] between Q3 2025 and Q3 2028.

Operational Phase: BIG's long-term operational potable water demand for onsite workers, landscaping, and operations and maintenance is estimated to total 404 AFY[4]. While BIG's full operational buildout is not expected until 2048, the full volume of potable water demand is conservatively assumed to be required starting in Q2 2028.

[4] Includes distribution system losses.

5 GSWC BARSTOW SERVICE AREA WATER DEMAND

☑ ***CWC § 10910 (c)***

(1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a Project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected water demand associated with the Project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the Project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the Project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the Project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Consistent with the UWMP Act (CWC §10610-10656), the 2020 GSWC Barstow UWMP prepared by GSWC presents estimates of projected future water demand for the GSWC Barstow service area in five-year increments, between the years 2025 and 2045 (GSWC, 2021). Projected water demand is subdivided between the following seven customer sectors or use types: (1) single-family, (2) multi-family, (3) commercial, (4) industrial, (5) landscape, (6) other, and (7) water loss. As discussed further below, the 2020 GSWC Barstow UWMP demand projections account for: (1) demands for the existing service area and accounts, (2) projected growth based on historical growth in accounts, and (3) all anticipated new development based on information currently available to GSWC Barstow, including adopted general plans.

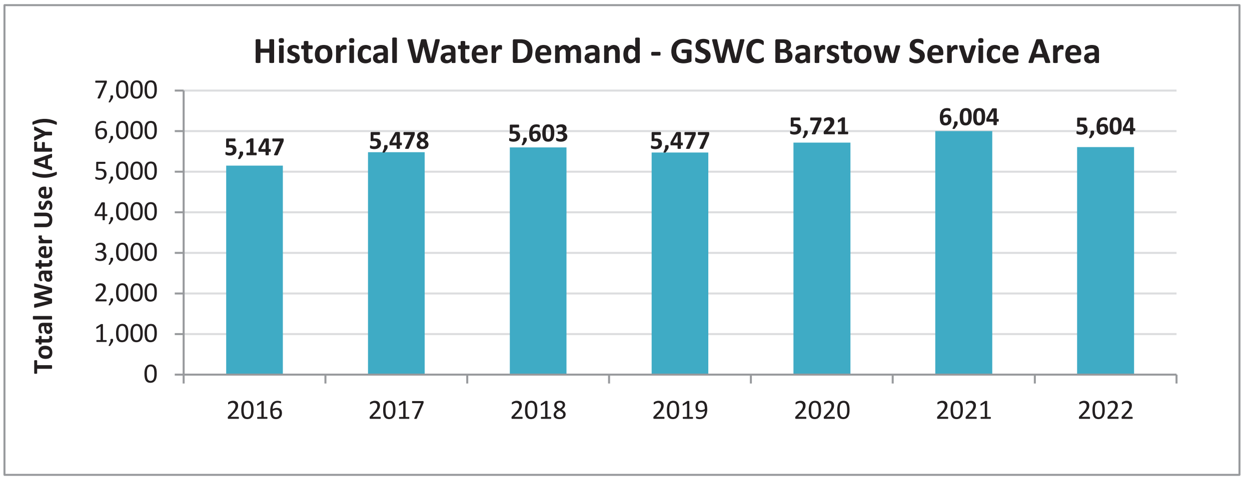
5.1 Current and Historical Water Demand Within the GSWC Barstow Service Area

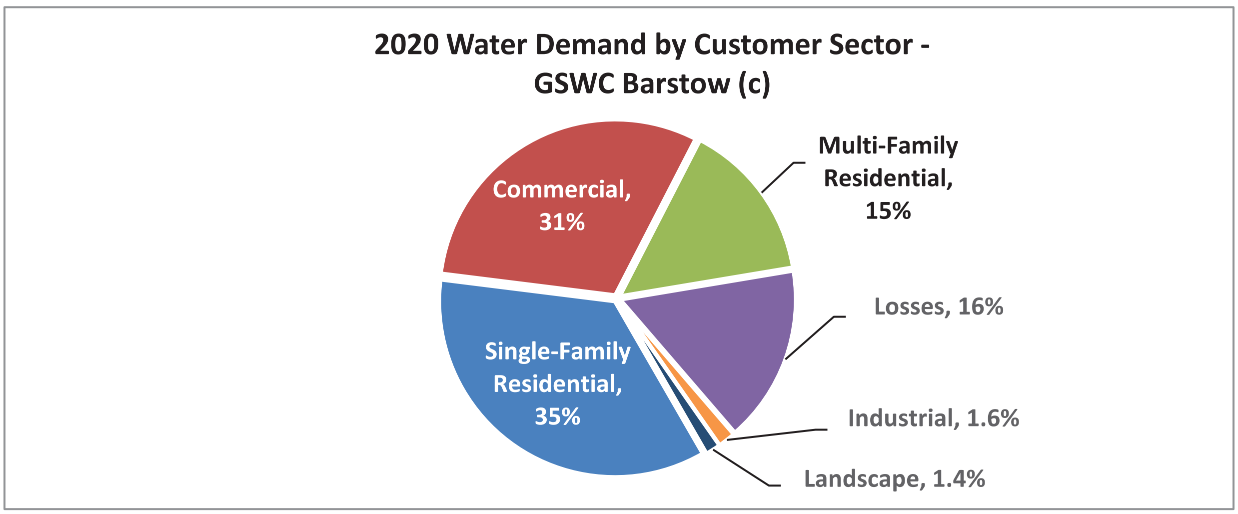
Historical water demand within the GSWC Barstow service area from 2016 through 2022 is shown in **Table 5.** Historical demand from 2016 to 2020 is based on the 2020 GSWC Barstow UWMP (GSWC, 2021) and demands for 2021 and 2022 are based on reported water production (DWR, 2023b).

Based on 2020 water use, the single-family residential and commercial/institutional sectors have the greatest water demand of all use types, at 35% and 31% of the GSWC Barstow service area's total demand, respectively, followed by multi-family residential at 15%. Water demand for landscaping represented just 1.4% of total water demand (GSWC, 2021). Between 2016 and 2022, total water demand within the GSWC Barstow service area remained relatively stable, averaging 5,576 AFY.

Table 5
Historical Water Demand for GSWC Barstow Service Area
Barstow International Gateway

	Historical Water Demand (AFY) (a)						
	2016	2017	2018	2019	2020	2021 (b)	2022 (b)
Water Demand	5,147	5,478	5,603	5,477	5,721	6,004	5,604





Abbreviations:
"AFY" = acre feet per year
"GSWC" = Golden State Water Company

Notes:
(a) Historical water demands from 2016-2020 per Reference (1).
(b) Historical water demands for 2021 and 2022 Reference (2).
(c) The 2020 water use by customer sector is provided in Reference (1).

References:

1. GSWC, 2021. Urban Water Management Plan, Barstow Service Area, prepared by Tully & Young Comprehensive Water Planning and Zanjero, dated 16 July 2021.
2. California State Water Resources Control Board (SWRCB), 2023. SWRCB Water Conservation and Production Portal, data reported through March 2023, accessed on 13 June 2023.

5.2 GSWC Barstow Service Area Demand Projections

The 2020 GSWC Barstow UWMP water demand projections account for growth within the GSWC Barstow service area through 2045. The 2020 GSWC Barstow UWMP includes population growth estimates based on the MWA population projections, which are based on historical growth in accounts and adopted general plans. The GSWC Barstow service area population, estimated at 32,154 persons in 2020, is expected to grow by about 6.0% through 2045 (i.e., up to 34,135 people). The 2020 GSWC Barstow UWMP expects that the greatest projected increase in water demand will be due to population growth.

Based on a review of historical growth in accounts, adopted general plans, and the projected population, the 2020 GSWC Barstow UWMP projected the growth in accounts by sector and applied unit demand factors for each customer category to estimate future water demands. The demand projections for the GSWC Barstow service area are presented in **Table 6**, by water use sector in five-year increments through 2045. The 2020 GSWC Barstow UWMP estimates that the total water demand for the GSWC Barstow service area will be approximately 5,815 AFY in 2045.

5.3 Planned Development Projects Within the GSWC Barstow Service Area

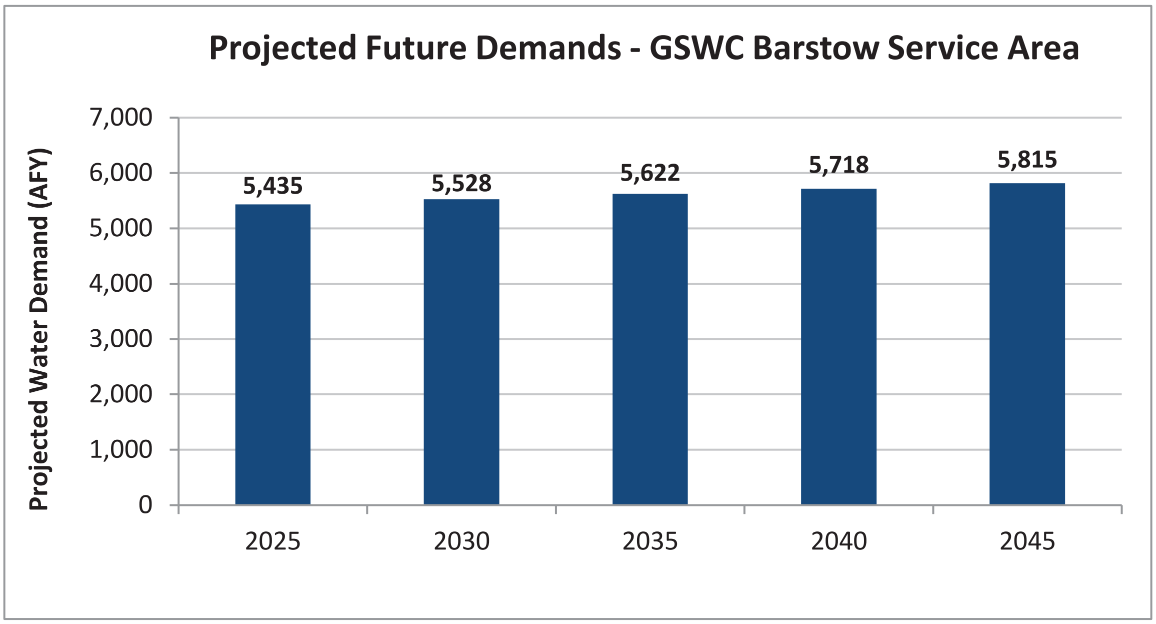
EKI Environment & Water, Inc. (EKI) understands that GSWC Barstow tracks future planned water uses through service applications that it receives for new developments. Based on verbal communications with GSWC Barstow, EKI confirmed that no WSAs have been prepared since the 2020 GSWC Barstow UWMP.

Based on a review of the GSWC Barstow service area water demand projections and assumptions, it was determined that BIG's water demands were <u>not included</u> in the 2020 GSWC Barstow UWMP demand projections. Therefore, consistent with CWC §10910(c)(3), the WSA includes a discussion (Section 0) with regard to whether GSWC Barstow's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet BIG's estimated total potable and non-potable water demand, in addition to the GSWC Barstow's existing and planned future uses.

We further note that the City of Barstow is currently preparing a General Plan Update (GPU) that was not included in the 2020 GSWC Barstow UWMP. The GPU is still in its early-development phase, but it is expected to include BIG as a central project to the potential growth of the City. As of April 2023, the GPU development process has identified potential significant growth in residential homes and jobs between 2015 and 2045 (City of Barstow, 2023), but a preferred land use alternative has not yet been selected and associated technical and environmental analysis, including water demand estimates, has not yet been completed. Therefore, no water demand estimates associated with the GPU can be directly factored into this WSA.

Table 6
Projected Future Water Demand for GSWC Barstow Service Area
Barstow International Gateway

Customer Category	Projected Annual Water Demand (a) (AFY)				
	2025	2030	2035	2040	2045
Single Family Residential	1,954	1,988	2,021	2,056	2,091
Multi-family Residential	833	847	862	877	891
Commercial/Institutional	1,854	1,885	1,917	1,950	1,983
Industrial	98	100	102	103	105
Landscape	66	68	69	70	71
Other	0	0	0	0	0
Losses (Non-Revenue Water)	630	640	651	662	674
Total Water Demand (b)	**5,435**	**5,528**	**5,622**	**5,718**	**5,815**



Abbreviations:
"AFY" = acre feet per year
"GSWC" = Golden State Water Company
"BIG" = Barstow International Gateway

Notes:
(a) Projected annual water demand per Reference (1) do not include the BIG water demand estimates.
(b) Totals may not sum due to rounding.

Reference:

1. GSWC, 2021. Urban Water Management Plan, Barstow Service Area, prepared by Tully & Young Comprehensive Water Planning and Zanjero, dated 16 July 2021.

6 GSWC BARSTOW SERVICE AREA WATER SUPPLY

The water supply for the GSWC Barstow service area is primarily groundwater from the Lower Mojave River Valley subbasin (Lower Mojave) that is part of the groundwater basins covering the broader Mojave Region (**Figure 5**). Per the 2020 GSWC Barstow UWMP, GSWC Barstow also participates in local transfer and exchange programs to augment groundwater supplies. Specifically, GSWC Barstow pumps groundwater from the Centro Subarea, which is a subarea of the Mojave Basin Area, as defined in the Mojave Basin Area Adjudication (Adjudication). The MWA is the Watermaster for the Adjudication. Every year, the MWA evaluates water supply conditions and projected demand across the Mojave Basin Area and prepares an annual report to determine water allocations for each water producer in addition to transfers of water rights and special provisions to protect the environment.

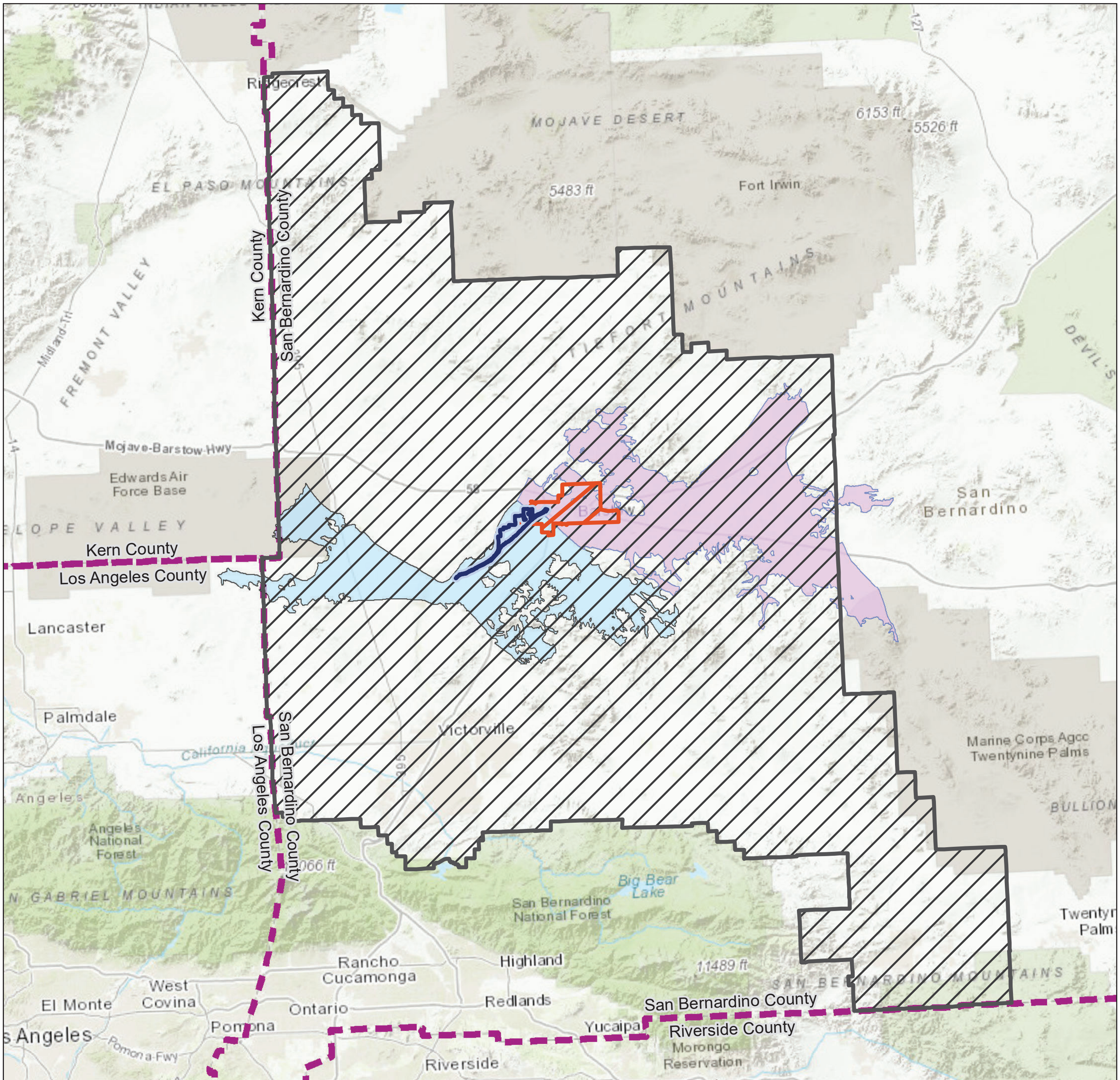
To determine whether sufficient potable water supply is available for BIG, this assessment considers GSWC Barstow's current and future water rights in the Mojave Basin Area.

6.1 Identification of Water Supply Rights

☑ ***CWC § 10910 (d)(1)***

The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the Project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

Pursuant to CWC §10910(d)(1), a WSA is required to include identification of all water supply entitlements, water rights, and water service contracts relevant to the identified water supply for a proposed project. In accordance with these requirements, this WSA includes a summary of GSWC Barstow's water supply sources for its service area, including its current and projected available supply. The discussion is based on review of relevant information contained within the 2020 GSWC Barstow UWMP, 2020 MWA UWMP, and MWA Integrated Regional Water Management (GSWC, 2021; MWA, 2021b; MWA, 2014).



Legend

- Project Boundary
- Mojave Water Agency
- Golden State Water Company - Barstow
- County Boundary

Groundwater Subbasin

- Lower Mojave River Valley (6-040)
- Middle Mojave River Valley (6-041)

Notes

1. All locations are approximate.

Sources

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained on 7 December 2023.
2. DWR groundwater basins are based on the boundaries defined in California's Groundwater, Bulletin 118-2016 Update.

N

0 15 30

(Scale in Miles)

Regional Setting and Groundwater Basin

Barstow International Gateway
Barstow, CA
March 2024 | Revised November 2024
C30084.00

eki environment & water

Figure 5

Path: X:\C30084\Maps\2023\06\Fig4_DWRGWBasinLocation.mxd

6.2 Groundwater Supply

☑ ***CWC § 10910 (f)***

If a water supply for a Project includes groundwater, the following additional information shall be included in the water supply assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the Project.

(2)(A) A description of any groundwater basin or basins from which the Project will be supplied.

(B) For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree.

(C) For a basin that has not been adjudicated that is a basin designated as high- or medium-priority pursuant to Section 10722.4, information regarding the following:

(i) Whether the department has identified the basin as being subject to critical conditions of overdraft pursuant to Section 12924.

(ii) If a groundwater sustainability agency has adopted a groundwater sustainability plan or has an approved alternative, a copy of that alternative or plan.

(D) For a basin that has not been adjudicated that is a basin designated as low- or very low priority pursuant to Section 10722.4, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the Project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the Project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the Project will be supplied to meet the projected water demand associated with the Project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the Project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

The GSWC Barstow service area is in the center of the Mojave River Basin, overlying the Centro and Baja Subareas, which are within the Mojave Basin Adjudication area. Although the GSWC Barstow service area overlies the Centro and Baja Subareas, GSWC Barstow uses only Centro Subarea water supplies to serve the GSWC Barstow service area. Water supply is determined by the Adjudication's terms and structure and GSWC Barstow's efforts to cooperatively work with the MWA to augment water supplies for use in GSWC Barstow's service area. GSWC Barstow participates in local transfer and exchange programs and continues to explore opportunities to purchase water supplies from other water agencies and sources (GSWC, 2021).

6.2.1 Basin Description

Groundwater basins along the Mojave River and adjacent areas are referred to collectively as the Mojave River Basin. The Mojave River Basin encompasses 1,400 square miles and has an estimated total water storage capacity of nearly five million AF. The geology of the Mojave River Basin is characterized by sedimentary alluvial basins bordered by igneous and metamorphic mountain ranges and uplands.

The Mojave Basin Area is essentially a closed basin meaning that very limited amounts of groundwater enter or exit the basin. However, within the basin, groundwater movement occurs between the different Subareas, as well as groundwater-surface water and groundwater-atmosphere interchanges. Approximately 80% of the basin's natural recharge is through infiltration from the Mojave River and its watershed through storm runoff, snowmelt, and irrigation return flows. Other sources of supplemental recharge include imported water from the State Water Project (SWP).

GSWC Barstow overlies the Lower and Middle Mojave subbasins. DWR determined that neither of the subbasins are in critical overdraft condition and designated them as very low priority basins under DWR's 2019 Phase 2 Basin Prioritization (DWR, 2019). As such, the Middle and Lower Mojave subbasins are not subject to the Sustainable Groundwater Management Act.

6.2.2 Mojave Basin Area Adjudication

The Adjudication of the Mojave Basin Area was the legal process that allocated the right to produce water from the available natural water supply.[5] Triggered by the rapid growth within the Mojave Basin Area, the City of Barstow and the Southern California Water Company (name changed to Golden State Water Company in 2005) filed a complaint in 1990 against upstream water users claiming that the increased withdrawals and lowering of groundwater levels reduced the amount of natural water available to downstream users. The complaint requested that 30,000 AFY of water be made available to the GSWC Barstow service area and that the MWA obtain supplemental water for use in other areas of the MWA's service area. The MWA filed a cross-complaint that declared native waters of the Mojave River and underlying groundwater

[5] All relevant documents related to the Mojave Basin Area adjudication are available here: [Mojave Basin Area Watermaster - Mojave Water Agency]

insufficient to meet current and future demands. In 1993, the Riverside Superior Court (Court) offered an equitable ruling to alleviate overdrafts and maximize beneficial uses. The Court's Stipulated Judgment (Judgment) appointed the MWA as Watermaster of the Mojave Basin Area. The MWA is a special act jurisdiction that was created to ensure there is enough water for the region.

For management purposes, the Mojave Basin Area is divided into five (5) Subareas: Oeste, Este, Alto, Centro, and Baja. The Subarea boundaries are based on hydrological, geological, engineering, and political considerations (MWA, 2021b). The Judgment assigned Base Annual Production (BAP) rights to each producer using 10 acre-feet or more, based on historical production during the period 1986-1990. Parties to the Judgment are assigned a variable Free Production Allowance (FPA), which is a percentage of the BAP set annually by the Court for each Subarea based on the recommendation of the Watermaster. The BAP is reduced or "ramped-down" over time until FPA comes within 5% of the Production Safe Yield (PSY) as defined by the Judgment.

It is noted that, for the purpose of balancing supply and demand, the MWA is currently ramping down FPA allocations for each Subarea by 5% each year. The purpose of the ramp down is not to cause a reduction in pumping, but a reduction in FPA so that the MWA increases imported water supply purchased to offset the deficit (MWA, 2023).

Any producer that pumps more than their FPA must purchase replacement water from the Watermaster equal to the amount of production in excess of their total available FPA or transfer unused FPA from another party within their Subarea.

6.2.3 GSWC Barstow System Description

As of January 1, 2024, GSWC Barstow operates 16 active wells that extract water from the Centro Subarea, which is managed by the MWA as the Watermaster for the Mojave River Basin. Water is treated with sodium hypochlorite at the wellheads and pumped directly into the delivery system, which consists of 12 storage tanks and 182 miles of distribution pipelines. GSWC Barstow's entire system is potable. Imported water from the MWA is not directly available for potable use and is only used to recharge local groundwater supplies.

6.2.4 GSWC Barstow Available Supply

GSWC Barstow uses supplies derived from the Centro Subarea to serve the GSWC Barstow system. GSWC Barstow's water supply portfolio is governed by the structure of the Adjudication, regional collaboration, and MWA imported supplies and projects. As shown in **Table 7**, there are two components to GSWC Barstow's available supply: (1) FPA and (2) Carryover groundwater supplies, both of which are expected to be available at the stated levels irrespective of year type.

Free Production Allowance

GSWC Barstow's BAP is 14,407 AFY. The GSWC Barstow service area is categorized as municipal and industrial and therefore was allocated an FPA of 70% of its BAP (i.e., 10,085 AFY) for 2020-

2021. This FPA aligns with the existing PSY and was, therefore, considered as GSWC Barstow's FPA for normal and dry years in the 2020 GSWC Barstow UWMP (GSWC, 2021).

The Watermaster continues to assess supply availability for all adjudicated purveyors against the Centro Subarea's long-term health and PSY. The PSY is based on long-term average water supply (1931 – 1990). On 16 September 2022, the Court ordered a review of the PSY for the five Subareas. MWA is in the process of reevaluating the Centro Subarea's PSY and will provide recommendations by February 2024 (MWA, 2023).

Based on the Watermaster's Twenty-Third (2015-2016) through the Twenty-Ninth (2021-2022) Annual Reports, GSWC Barstow's FPA was ramped down by 5% per year. Since the Centro Subarea's 2022-2023 FPA level exceeds the PSY by 19.9% of the BAP additional ramp down is warranted (MWA, 2023). Based on the 2020 GSWC Barstow UWMP, GSWC Barstow expects their FPA to continue to drop by 5% per year until 2025 and then stabilize at 50% of the BAP (or 7,204 AFY) through 2045 (GSWC, 2021). While supply is theoretically affected by drought, the MWA's annual allocations are expected to be reliable even in drought conditions because of the Watermaster's management and planning efforts (MWA, 2021a).

If GSWC Barstow pumps more than its FPA, and assuming it does not acquire more FPA by transfer, it will pay a replacement assessment to the MWA who will then acquire surface water to recharge the increased pumping. The MWA has an allocation under a SWP contract and has water stored both in the basin and in water banks outside of the basin and uses the replacement assessment funds to buy water to replenish the basin.

Carryover

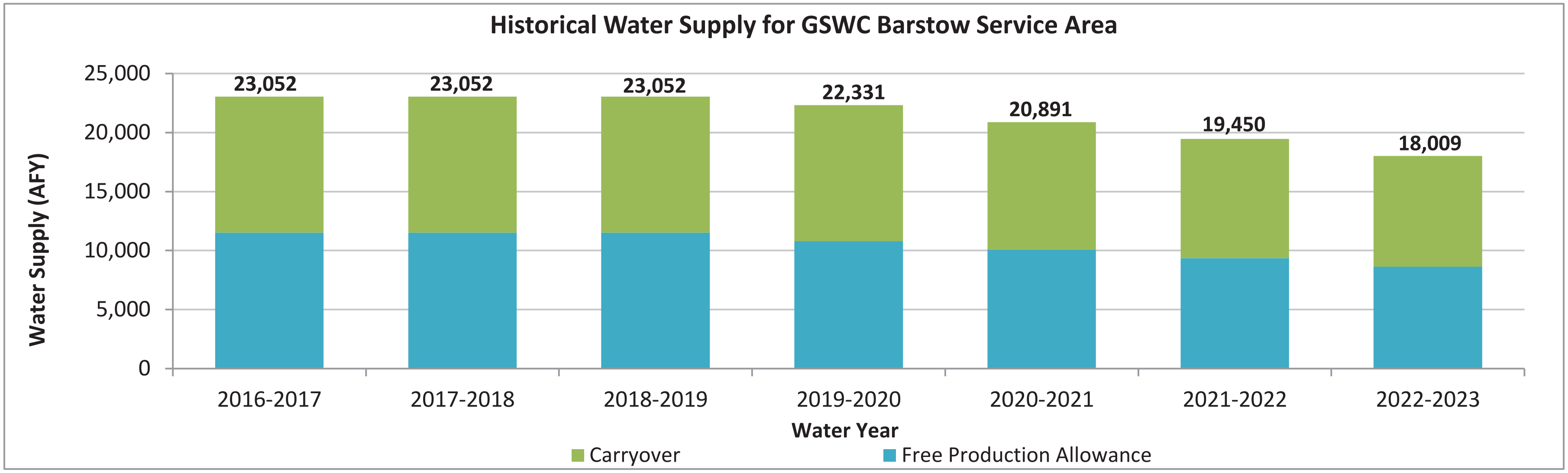
GSWC Barstow protects its available supply by storing water for future use through the Judgement's carryover provisions. The carryover water supplies are stored from GSWC Barstow's unused FPA each year. This carryover supply, however, cannot exceed the previous year's FPA. As such, any unused carryover supply is returned to the Centro Subarea to be considered in the Watermaster's annual reports for the basin (GSWC, 2021). Carryover from 2017 to 2020 was recorded as 11,525 AFY (MWA, 2021a). Consistent with the rampdown to the FPA, carryover was ramped down to 10,806 in 2021, 10,085 in 2022, and 9,365 in 2023 (MWA, 2023). As the FPA volume decreases, GSWC Barstow expects the carryover supplies to diminish every year, with 7,204 AFY available by 2045.

6.3 Recycled Water

GSWC Barstow does not currently use any recycled water in its service area. Approximately 64% of the wastewater generated within GSWC Barstow service area is collected and treated in the Barstow Regional Wastewater Treatment Facility (WWTF), owned and operated by the City of Barstow. The remaining effluent is treated by private septic systems. Treated wastewater is disposed of in percolation ponds. The City plans to develop and expand the West Side Wastewater Treatment Plant by 2030. The new facility will include tertiary treatment and reclaimed water for potential local reuse (GSWC, 2021).

Table 7
Historical Water Supply for GSWC Barstow Service Area
Barstow International Gateway

Water Supply Source	Historical Water Supply Water Year (AFY) (a)							
	2016-2017	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024 (b)**
Free Production Allowance (%)	80%	80%	80%	75%	70%	65%	60%	55%
[A] Free Production Allowance (c)	11,526	11,526	11,526	10,805	10,085	9,365	8,644	7,924
[B] Carryover from Previous Year	11,526	11,526	11,526	11,526	10,806	10,085	9,365	NA (d)
Total Water Supply = [A] + [B]	**23,052**	**23,052**	**23,052**	**22,331**	**20,891**	**19,450**	**18,009**	**NA**



Abbreviations:
"AFY" = acre feet per year
"GSWC" = Golden State Water Company

Notes:
(a) Historical water supply values from 2016-2021 per Reference (1).
(b) Free production allowance for 2023-2024 is subject to court approval, per Reference (1).
(c) Free Production Allowance is a percentage of GSWC Barstow Base Annual Production of 14,407 AFY.
(d) Carryover volumes for 2023 - 2024 will be released on 1 May 2024, per Reference (1).

Reference:

1. Twenty-Third through Twenty-Ninth Annual Reports of the Mojave Basin Area Watermaster for Water Years 2016-2017 through 2021-2022. Appendix H.

7 BNSF GROUNDWATER SUPPLY

BNSF plans on pumping groundwater from temporary, on-site wells to supplement non-potable water for construction activities. The proposed on-site groundwater wells are within the adjudicated Mojave Basin Area (i.e., within the Centro Subarea). Hence, BIG's pumping rights for construction activities would be subject to the Judgement's pumping rules.

This section identifies the water supplies available to BNSF that will be used to meet the non-potable construction demands associated with BIG. The BNSF supplies are separate from the supplies available to GSWC Barstow to meet BIG potable demands as previously discussed in Section 6.

7.1 Identification of BNSF Water Supply Rights

The Mojave Basin Judgment assigned BAP rights to each producer using 10 AF or more, based on historical production from 1986 to 1990. As of June 2023, BNSF holds 1,465 AFY of BAP from acquired property within the BIG site and 120 AFY of BAP from the existing BNSF Barstow Yard well (WestWater Research, 2022).

7.2 Free Production Allowance

As described in Section 6, the Mojave Basin is an adjudicated basin managed under the Judgment. Parties to the Judgment are assigned a variable FPA, which is a percentage of the BAP set annually by the Court for each Subarea based on the recommendation of the Watermaster. The FPA is reduced or "ramped-down" over time until the FPA comes within 5% of the PSY.

The 2020 GSWC Barstow UWMP expects the FPA of the Centro Subarea to drop by 5% per year until 2025 and then stabilize at 50% through 2045. Consistent with this assumption, for the purposes of this WSA, the BNSF FPA in 2025 is assumed to be 793 AFY (i.e., 50% of the total BNSF BAP of 1,585 AFY).

The Judgment stipulates that any producer that pumps more than their FPA must purchase replacement water from the Watermaster equal to the amount of production in excess of their total available FPA or transfer unused FPA from another party within their Subarea.

7.3 Unused FPA

It is noted that the Mojave Basin has been sustainably managed under the Judgment, and there is significant unused FPA in the Centro Subarea. In its most recent (29th) Annual Report, dated May 2023, the Watermaster reported that the Centro Subarea had 29,839 AF of unused FPA for the 2021-22 water year (MWA, 2023). Similarly, in the 28th Annual Report, dated May 2022, the Watermaster reported that the Centro Subarea had 32,749 AF of unused FPA for the 2020-21 water year (MWA, 2022) **(Table 8)**.

Table 8
Historical Unused FPA in the Centro Subarea

Water Supply Source	Historical Unused FPA (AF)					
	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Unused FPA in the Centro Subarea	36,885	37,268	36,517	34,592	32,749	29,839

Abbreviations:

"AF" = acre feet "FPA" = Free Production Allowance

7.4 Total BNSF Supplies

As noted in Section 4.1.1, BIG's total non-potable water demand for construction activities is estimated to total approximately 6,453 AF over three years. Of the total non-potable water demand for construction activities, it is assumed that 50% (3,227 AF) of the non-potable water demand will be needed in 2025, 40% (2,581 AF) will be needed in 2026 and the remaining 10% (322 AFY for two years) will be needed through 2028. Therefore, non-potable water demand for construction activities will exceed the established FPA in 2025 and 2026. The Judgment and Watermaster Rules and Regulations, however, provide BNSF with replacement obligation options to address the need to pump additional water. As described in the Judgment, BNSF has the option to either:

- Obtain temporary transfers from other parties in the Centro Subarea to increase their FPA share, or
- Pump water in excess of its FPA and purchase replacement water from the Watermaster equal to the amount of production in excess of their total available FPA.

Given the above alternatives, as shown in **Table 9** this WSA assumes that BNSF will continue to have rights to 793 AFY of FPA[6] and can secure the additional groundwater rights needed to supply the non-potable construction water demands (i.e., up to cumulative total of 5,660 AF) through either of the above mechanisms through 2028. This water is assumed to be available at consistent volumes in normal and dry years because of the Watermaster's management and planning efforts (MWA, 2021b). If BNSF has carryover available from the prior year, BNSF may also use available carryover to offset assumed BNSF use of unused FPA in the Centro Subarea in 2025; however, it is conservatively assumed that no carryover will be used.

[6] Since 2000, the water rights within BIG's site have consistently accumulated annual unused FPA because the available supplies exceeded demands. Per the 2020 GSWS Barstow UWMP, the unused FPA for BIG's area has ranged from 74 AF to 1,892 AF and averaged 1,028 AF per year from 2000-2021.

Table 9
Total BNSF Supply to Meet Non-Potable Construction Demands

Water Supply Sources	2025	2026	2027	2028
BNSF FPA (AFY)	793	793	793	793
Assumed BNSF Use of Unused FPA in the Centro Subarea (AFY)	2,434	1,788	-	-
Total	**3,227**	**2,581**	**793**	**793**

Abbreviations:

"AFY" = acre feet per year

"FPA" = Free Production Allowance

"BNSF" = BNSF Railway Company

8 COMPARISON OF SUPPLY AND DEMAND

☑ ***CWC § 10910 (c)(3)***

If the projected water demand associated with the Project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the Project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the Project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

☑ ***CWC § 10911 (a)***

If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water supply assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.

(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.

(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional water supplies.

☑ ***CWC § 10911 (c)***

The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the Project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the Project.

Pursuant to CWC §10910(c)(3), this section compares GSWC Barstow's projected available water supply in normal, single dry, and multiple dry years for a 20-year projection against all future demands in GSWC Barstow's service area including those of the BIG, as well as the availability of local groundwater to meet the non-potable construction phase demands. The comparison here is the basis for the determination of available and reliable water supply for BIG.

8.1 Comparison of Potable Demand and Supply in Normal, Single Dry, and Multiple Dry Years

The 2020 GSWC Barstow UWMP analyzed water supply reliability in a normal, single dry, and five consecutive dry years over a 20-year planning horizon. While supply is theoretically affected by drought, supply to GSWC is primarily controlled by the MWA's annual allocations, which is expected to be reliable even in drought conditions because of the Watermaster's management and planning efforts (MWA, 2021b). The MWA 2020 UWMP concluded that "MWA's diverse surface water supply portfolio, combined with its coordinated management of groundwater resources with retail purveyors, provide stable and reliable water supplies to meet MWA's current and 2065 future water demands in its service area" (MWA, 2021b).

GSWC Barstow's 2020 GSWC Barstow UWMP concur with this statement and concluded that extremely arid climate and lack of precipitation in the GSWC Barstow service area (even in average and wet years) means that changes in hydrologic conditions are unlikely to impact either available water supply or consumer demands. In addition, the Watermaster's discretion over the amount of groundwater pumped also allows GSWC Barstow to augment supplies to match demands, resulting in zero shortfalls. Therefore, the 2020 GSWC Barstow UWMP assumes that normal and dry conditions will have similar unconstrained supply and demand projections and that unconstrained demand can be met during normal, single dry, and multiple dry years.

The 2020 GSWC Barstow UWMP analyzed projected supply and demand through 2045 during normal, single dry, and five consecutive dry years without BIG's estimated demand. **Table 10, Table 11** and **Table 12** reflect the same supply and demand comparison with the addition of BIG's potable water demands during construction (for workers only) and operations at buildout for normal, single dry, and multiple dry years, respectively. The tables show that GSWC Barstow's projected supplies (14,408 AFY) are sufficient to meet all projected potable water demand in the GSWC Barstow's service area (6,219 AFY), inclusive of BIG, under current and future conditions, for normal, single dry, and multiple dry years through 2045.

Further, while Section 5.3 notes that the 2020 GSWC Barstow UWMP demand projections to do not explicitly account for the growth anticipated as part of the GPU, we note that projected surplus supplies of 8,189 AFY are available to GSWC Barstow through 2045 after accounting for BIG, which should be sufficient supply to accommodate significant additional growth. Therefore, the anticipated increase in demand under the GPU is not expected to change the conclusion that GSWC Barstow has sufficient supply to meet future demand through 2045.

8.2 Comparison of Non-Potable Demand and Supply

As described previously, non-potable construction water demand is expected to be 3,227 AF in 2025 and 2,581 AF in 2026. After that, the demand will be limited to approximately 322 AFY through 2028. The non-potable water demand for onsite and offsite construction activities will be supplied from private, on-site groundwater wells, using BNSF existing water rights in the Centro Subarea Mojave Basin and additional purchased unused FPA within the Centro Subarea.

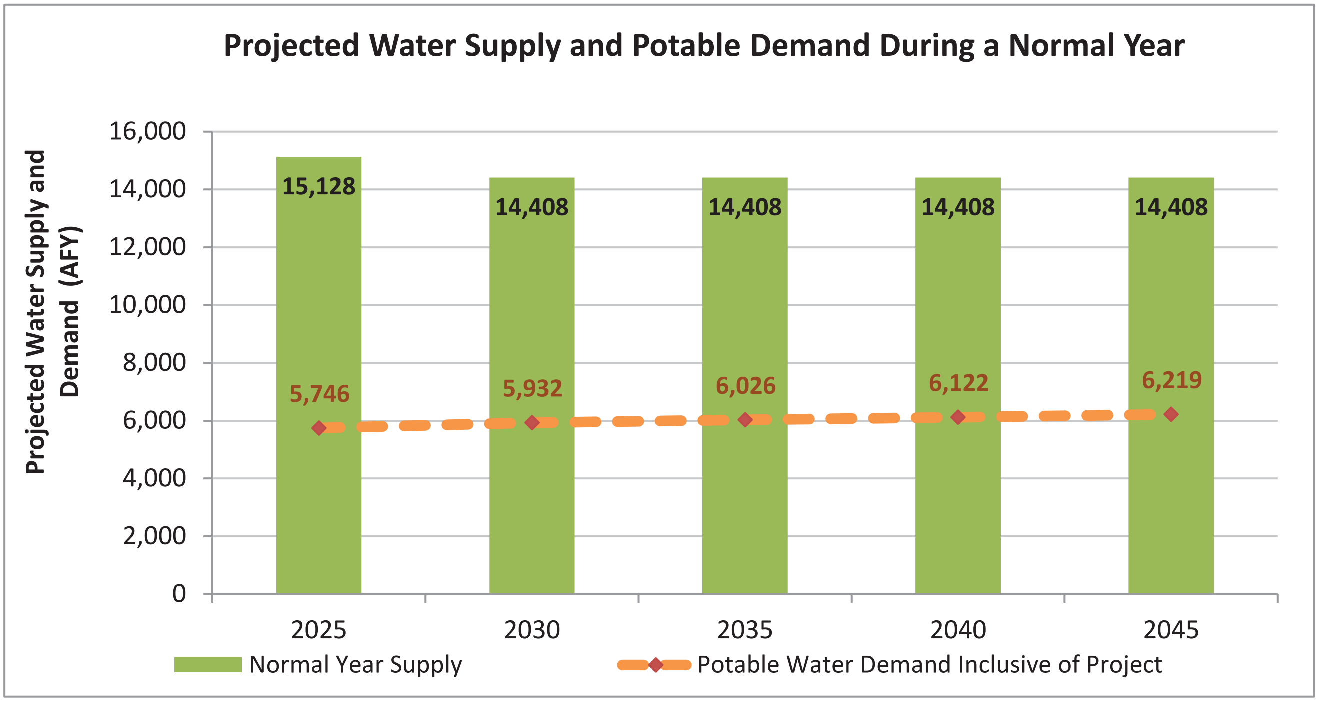
Based on BNSF's FPA (**Table 13**) and the options available to BNSF based on the Judgment and the Watermaster's Rules and Regulations to secure additional groundwater rights (Section 7.3), it is determined that available groundwater supplies are sufficient to meet non-potable construction demand for BIG through 2028. Similar to potable water supply, changes in hydrologic conditions are unlikely to impact available water supply.

Table 10

Comparison of Normal Year Water Supply and Demand for GSWC Barstow Service Area

Barstow International Gateway

Water Demand and Supply		Projected Normal Year Supply and Demand (AFY)				
		2025	2030	2035	2040	2045
Supply	**Normal Year Supply (a)**	**15,128**	**14,408**	**14,408**	**14,408**	**14,408**
Demand	1. Projected Demand per the UWMP (b)	5,435	5,528	5,622	5,718	5,815
	2. BIG Projected Potable Demand (c)	311	404	404	404	404
	Total Potable Demand Inclusive of BIG Project [1 + 2]	**5,746**	**5,932**	**6,026**	**6,122**	**6,219**
	Supply Shortfall as % demand	***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:

"AFY" = acre feet per year

"BAP" = Base Annual Production

"BIG" = Barstow International Gateway

"FPA" = Free Production Allowance

"GSWC" = Golden State Water Company

"MWA" = Mojave Water Agency

"UWMP" = Urban Water Management Plan

Notes:

(a) Water supply projections for the GSWC Barstow Service Area are available in Reference (1). Projected available supply in 2025 is composed of an FPA of 7,204 AFY, which represents 50% of the BAP (14,407 AFY) in addition to 7,924 AFY carryover from the previous year, for a total projected supply of 15,128 AFY. For the following years, carryover is reduced to 7,204 AFY because MWA does not allow carryover supplies to exceed previous year's FPA.

(b) Water demand projections for the GSWC Barstow Service Area per Table 6 and Reference (1).

(c) BIG projected demand per Table 3.

Reference:

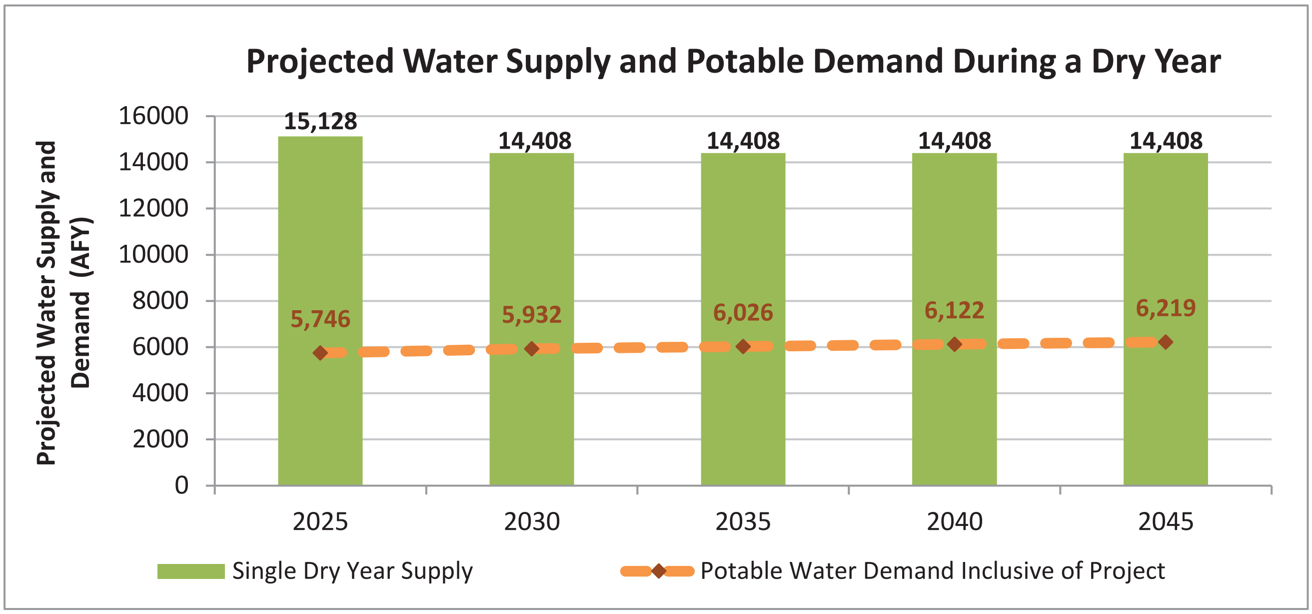
1. GSWC, 2021. Urban Water Management Plan, Barstow Service Area, prepared by Tully & Young Comprehensive Water Planning and Zanjero, dated 16 July 2021.

Table 11

Comparison of Single Dry Year Water Supply and Potable Demand for GSWC Barstow Service

Barstow International Gateway

Water Demand and Supply		Projected Water Supply and Demand (AFY)				
		2025	2030	2035	2040	2045
Supply	**Single Dry Year Supply (a)**	**15,128**	**14,408**	**14,408**	**14,408**	**14,408**
Demand	1. Projected Demand per the UWMP (b)	5,435	5,528	5,622	5,718	5,815
	2. BIG Projected Potable Demand (c)	311	404	404	404	404
	Total Potable Demand Inclusive of BIG Project [1 + 2]	**5,746**	**5,932**	**6,026**	**6,122**	**6,219**
	Supply Shortfall as % demand	***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:

"AFY" = acre feet per year
"BAP" = Base Annual Production
"BIG" = Barstow International Gateway
"FPA" = Free Production Allowance
"GSWC" = Golden State Water Company
"MWA" = Mojave Water Agency
"UWMP" = Urban Water Management Plan

Notes:

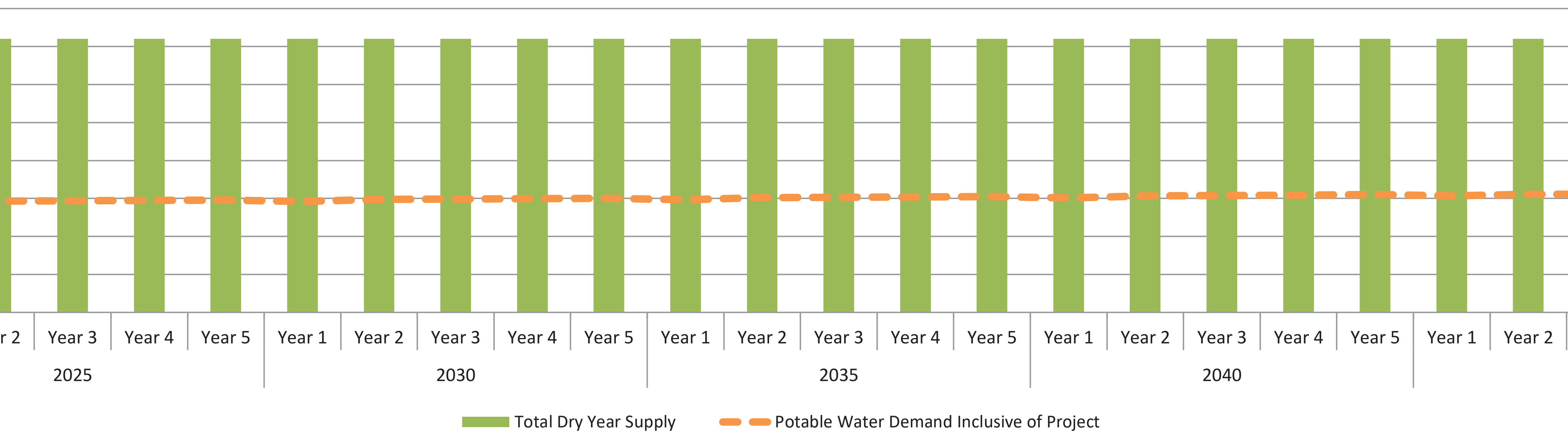
(a) Water supply projections for the GSWC Barstow Service Area are available in Reference (1). Projected available supply in 2025 is composed of an FPA of 7204 AFY, which represents 50% of the BAP (14,407 AFY) in addition to 7,924 AFY carryover from the previous year, for a total projected supply of 15,128 AFY. For the following years, carryover is reduced to 7,204 AFY, because MWA does not allow carryover supplies to exceed previous year's FPA.
(b) Water demand projections for the GSWC Barstow Service Area per Table 6 and Reference (1).
(c) BIG projected demand per Table 3.

Reference:

1. GSWC, 2021. Urban Water Management Plan, Barstow Service Area, prepared by Tully & Young Comprehensive Water Planning and Zanjero, dated 16 July 2021.

	Projected Water Supply and Demand During Multiple Dry Years (AFY)																				
	2025					2030					2035					2040					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Ye
	15,128	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14,408	14
he UWMP (b)	*5,435*	*5,454*	*5,472*	*5,491*	*5,509*	*5,528*	*5,547*	*5,565*	*5,584*	*5,603*	*5,622*	*5,641*	*5,660*	*5,679*	*5,699*	*5,718*	*5,737*	*5,757*	*5,776*	*5,796*	*5,*
emand (c)	*311*	*404*	*404*	*404*	*404*	*311*	*404*	*404*	*404*	*404*	*311*	*404*	*404*	*404*	*404*	*311*	*404*	*404*	*404*	*404*	*3*
usive of BIG Project [1+2]	**5,746**	**5,858**	**5,876**	**5,895**	**5,913**	**5,858**	**5,951**	**5,969**	**5,988**	**6,007**	**5,933**	**6,045**	**6,064**	**6,083**	**6,103**	**6,029**	**6,141**	**6,161**	**6,180**	**6,200**	**6,**
or (surplus) as % demand	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0***

Projected Water Supply and Potable Demand During Multiple Dry Years



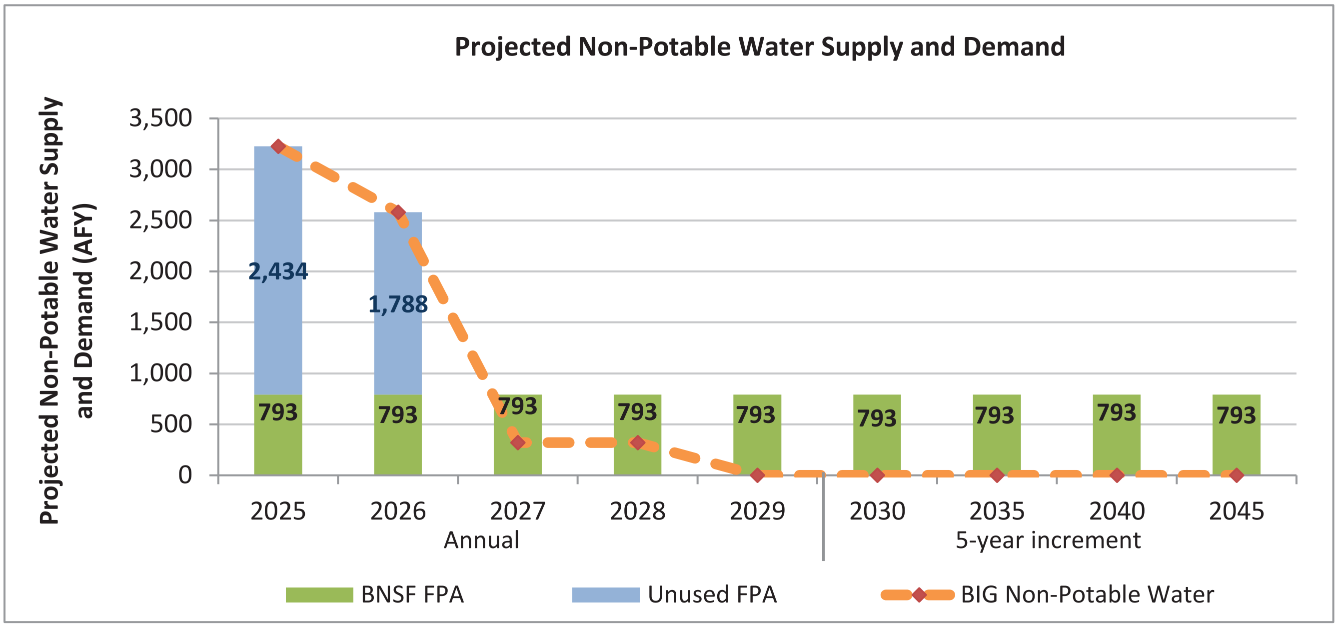
"GSWC" = Golden State Water Company
"MWA" = Mojave Water Agency
"UWMP" = Urban Water Management Plan

WC Barstow Service Area are available in Reference (1). Projected available supply in 2025 is composed of an FPA of 7204 AFY, which represents 50% of the BAP (14,407 AFY) in addition to 7,924 AFY carryover f
the following years, carryover is reduced to 7,204 AFY, because MWA does not allow carryover supplies to exceed previous year's FPA.

ondition lasting five consecutive years as one that requires GSWC Barstow to reduce water service to its customers. Water demand projections for the GSWC Barstow Service Area per Table 6 and Reference (1).

Table 13
Comparison of Non-Potable Water Supply and Demand for BNSF
Barstow International Gateway

Water Supply and Demand		Projected Normal Year Supply and Demand (AFY)								
		Annual						5-Year Increment		
		2025	2026	2027	2028	2029	2030	2035	2040	2045
Supply	1. BNSF FPA (a)	793	793	793	793	793	793	793	793	793
	2. Assumed BNSF Use of Unused FPA in the Centro Subarea (b)	2,434	1,788	-	-	-	-	-	-	-
	Total Non-Potable Supply [1 + 2]	**3,227**	**2,581**	**793**	**793**	**793**	**793**	**793**	**793**	**793**
Demand	**BIG Projected Non-Potable Demand (c)**	**3,227**	**2,581**	**322**	**322**	**-**	**-**	**-**	**-**	**-**
	Supply Shortfall as % demand	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:
"AF" = acre feet
"AFY" = acre feet per year
"BAP" = Base Annual Production
"FPA" = Free Production Allowance
"GSWC" = Golden State Water Company
"Q" = fiscal year quarter

Notes:
(a) BNSF available BAP is 1,585 AF per Reference (1). Consistent with Reference (2), the 2025 FPA is assumed at 50% of BAP (or 793 AFY) through 2045.
(b) Unused FPA in the Centro Subarea is assumed to equal remaining non-potable demand. Based on Table 8, the Centro Subarea latest 2021/2022 unused FPA was 29,839 AF.
(c) Non-potable water demand for construction activities (Q3 2025 - Q3 2028) per Table 3.

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2. GSWC, 2021. Urban Water Management Plan, Barstow Service Area, prepared by Tully & Young Comprehensive Water Planning and Zanjero, dated 16 July 2021.

9 CONCLUSIONS

As specified in CWC §10910(c)(4), the primary purpose of this WSA is to evaluate whether sufficient water supply is available to meet all future water demands within the water supplier's service area, including those associated with a proposed project, during normal, single, and multiple dry hydrologic years for a 20-year time horizon. As described in Section 2, BIG is partially located in GSWC Barstow service area. This WSA assumes that, if BIG is approved, GSWC Barstow will modify its service area boundaries to annex approximately 2,700 acres of the BIG site.

As described in Section 4.1, BIG's temporary and total non-potable water demand for the construction phase (Q3 2025 to Q3 2028) is approximately 6,453 AF (3,227 AF in 2025; 2,581 AF in 2026; and 322 AFY in 2027 and 2028). The non-potable water for the construction phase will be provided by private groundwater wells. BIG's potable water demand for the construction phase is 311 AFY, which will be supplied through temporary connections to GSWC Barstow system.

BIG's long-term operational potable water demand is estimated to total 404 AFY. While BIG's full operational buildout is not expected until 2048, the full volume of potable water demand is conservatively assumed to be required starting in Q2 2028. All potable water for BIG will be supplied though connections to the GSWC Barstow system, assuming annexation into the GSWC service area.

Section 5 described the GSWC Barstow historical and projected water demands. Section 6 described GSWC Barstow supply sources and Section 7 described available groundwater supply for BNSF construction activities. Section 8 compared projected available water supply in normal, single dry, and multiple dry hydrologic years against anticipated potable and non-potable demand within the GSWC Barstow service area, inclusive of BIG.

This WSA concludes that, based on the currently available information, sufficient water supply is available to meet the current and future demands within the GSWC Barstow service area, including the potable demands anticipated for BIG, through 2045 under all hydrologic conditions.

This WSA further concludes that sufficient groundwater supply is available to BNSF to meet the short-term, non-potable construction water demands for BIG.

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APPENDIX A

BIG Potable and Non-Potable Construction Activities Water Demand Estimates

Updated: 5 November 2024

CONSTRUCTION WATER NEEDS
11/4/2024

EARTHWORK:

Qnty of Matl (CY):	26,000,000			Water Conversions:	
Max Dry Density (#/CF):	129			1 gallon = 8.34 lbs	
In Situ Moisture Content (%):	1.00%			1 CF of water weighs 62.4 lbs	
Optimum Moisture Content (%):	8.70%			1 CF of volume contains 7.48 gallons of water	
				1 CCF = 100 CF = 748 gallons	
Water Needed (Gallons):	836,087,050			1 Acre-Foot = 325,851 gallons	
Water Needed (Gal/CY):	32				

OTHER:

Dust Control (Days):	400.00				
Dust Control (Lds/Day)	180.00				
Haul Rd Maint (Days)	400.00				
Haul Rd (Lds/Day):	90.00				
Gallons/Load	11,000	1,188,000,000	46	Dust/Haul Maint (Gal/CY)	2,970,000
Concrete Water	20,902,176	64.14642355			
Subballast/Base Rock	57,882,950	177.6362498	78	Gal/CY Total	196,963

Water Needed (Gallons)	1,266,785,126
Water Needed (Gal/Day)	1,583,481

Total Construction Water	**2,102,872,176 Gal**			
Total Construction Water (A-F)	**6,453 Acre-Feet**			

	Gal	GPD (One Year)	GPM (24-Hour)
	2,628,590,220	7,201,617	5,001

90% anticipated to occur over first 12-15 months of construction (single shift)

BNSF BARSTOW INTERNATIONAL GATEWAY (BIG) DOMESTIC WATER NEEDS

Warehouses (North Side)	9,000,000	SF Total Warehouse				
	4,248	Employees	(Using Traffic Assumptions, greater than published 1,500 SF/Employee = 6,000 Employees)			
	30	GPD/Person				
	128,040	**GPD**	46,734,600	Annual Gal	143	Annual A-F
Intermodal (South Side)	1,125	Employees				
	30	GPD/Person				
	33,750	GPD	12,318,750		38	
Hostler Wash	6,000	GPD				
	39,750	**GPD**	14,508,750	Annual Gal	45	Annual A-F
Total Domestic	**167,790**	**GPD**				
Annual Gal	61,243,350	Gallons				
Annual Domestic	**188**	**Acre-Feet**				

Fire Line Requirements will be based on eventual building needs and fire safety coordination
20psi static @ 4,000 gpm for 4 hours