

Appendices

Appendix P: Water Supply Assessment

Appendices

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December 2021 | Water Supply Assessment

Brea Mall Mixed Use Project

for City of Brea

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City of Brea

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APPENDICES

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Abbreviations and Acronyms

| | |
|-------|--|
| AF | acre-foot, acre-feet |
| AFY | acre-feet per year |
| CDWC | California Domestic Water Company |
| CEQA | California Environmental Quality Act |
| CRA | Colorado River Aqueduct |
| DWR | [California] Department of Water Resources |
| ETWU | estimated total water use |
| gpcd | gallons per capita daily |
| gpm | gallons per minute |
| LHMP | local hazard mitigation plan |
| MAWA | maximum applied water allowance |
| MG | million gallons |
| MWD | Metropolitan Water District of Southern California |
| MWDOC | Municipal Water District of Orange County |
| MWELO | Model Water Efficient Landscape Ordinance |
| OSY | operating safe yield |
| SB | Senate Bill |
| SF | square foot, square feet |
| SWP | State Water Project |
| UWMP | urban water management plan |
| WEROC | Water Emergency Response Organization of Orange County |
| WSA | water supply assessment |
| WSAP | water supply allocation plan |
| WSCP | water shortage contingency plan |
| WSDM | Water Surplus and Drought Management [Plan] |

Abbreviations and Acronyms

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1. Introduction

1.1 INTRODUCTION

This Water Supply Assessment (WSA) has been prepared for the City of Brea to meet the requirements of Senate Bill (SB) 610. The water demand for the Brea Mall Mixed-Use Project, Option 2 (“proposed project or Option 2”) was calculated to determine whether available water supplies are sufficient to serve the demand generated by Option 2 as well as the reasonably foreseeable cumulative demand in the region over the next 20 years under normal year, single dry year, and multiple dry year conditions. Although Option 1 does not meet the requirements for preparing a WSA, since there would be less than 500 residential units, it is included in this analysis for comparison purposes.

SB 610 established the legal standards for assessing the sufficiency of water supplies for new development projects. As part of the environmental review conducted for a qualifying project pursuant to the California Environmental Quality Act (CEQA), the public water supplier—in this case, the City of Brea—must prepare a WSA that documents “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 proposed project, in addition to the water system’s existing and planned future uses, including agricultural and manufacturing uses.”¹

Under Water Code Section 10912, a WSA is required if the project meets at least one of three criteria:

- A proposed residential development of more than 500 dwelling units.
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- A mixed-use project that includes one or more of the projects specified in this subdivision.

The proposed project (Option 2) will be a mixed-use project with more than 500 dwelling units and therefore meets the criteria for preparation of a WSA. Further details regarding the project are provided in Section 1.2.

References used in preparing this document include:

- City of Brea, *2020 Urban Water Management Plan (UWMP)*, prepared by Arcadis, June 2021.
- City of Brea, *2021 Water Master Plan*, prepared by Civiltec Engineering Inc., May 2021.

¹ California Water Code Section 10910(c)(3).

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- The Municipal Water District of Orange County (MWD OC), *2020 Urban Water Management Plan*, prepared by Arcadis, June 2021.
- Orange County Water District, *Basin 9-1 Alternative*, prepared by the Orange County Water District, City of La Habra, and Irvine Ranch Water District, submitted to California Department of Water Resources, January 1, 2017.
- CDM Smith, Orange County Water Demand Forecast for MWD OC and OCWD, March 30, 2021.

1.2 SITE LOCATION AND PROJECT DESCRIPTION

The project site is in the City of Brea. The Brea Mall encompasses approximately 74 acres and is generally bounded by State College Boulevard and State Route 57 to the east, Imperial Highway (State Route 90) to the south, South Randolph Avenue to the west, the City of Brea City Hall and Embassy Suites by Hilton to the northwest, and East Birch Street to the north. Regional and local vicinity maps are provided in Figure 1, *Regional Location*, and Figure 2, *Aerial Photograph*, respectively.

The Brea Mall currently contains 1,291,433 square feet (SF) of commercial leasable space. On January 4, 2018, Sears announced that it would close its Brea Mall store, which was a major anchor on the southwest side, and Simon Properties, the majority landowner and operator of the Brea Mall, acquired the property. Simon Properties proposed a mixed-use project on a 17.5-acre portion of the Brea Mall that would include new retail and restaurant spaces, for-rent residential apartments, a resort-type (lifestyle) fitness center, and a large central green that could be used as a plaza/gathering space for community events. The project proposed a net increase of 149,625 SF of commercial square footage and 312 residential units. This project was the subject of a Draft Environmental Impact Report (DEIR) issued by the City in January 2020 (SCH No. 20190800299).

The project proponent requested that the City place the application on hold in March 2020, due to statewide restrictions imposed in response to the Covid-19 pandemic. In late 2020, Simon Properties informed the City that it would like to continue processing the application but had made modifications to the project and site plan in response to the changing retail, commercial, and residential project.

The newly revised project would include the same mix of retail, commercial, residential, and recreational uses but on a slightly smaller scale and involves two options (Option 1 and Option 2) on an approximately 15-acre site. Both options involve demolishing the now-closed Sears department store and associated auto center (161,990 SF) and approximately 7.5 acres of surface parking to accommodate the mixed-use project. Option 1 proposes an increase of 85,425 SF of new commercial uses (including a lifestyle fitness center) and 383 apartment units, compared to a net increase of 149,625 SF of new commercial uses and 312 residential units in the original application. Option 2 would not include the lifestyle fitness center, which would be replaced by a second residential building for a total of 652 residential units. Option 2 would also reduce commercial/retail square footage by 42,575 SF. Figure 3, *Conceptual Site Plan – Option 1*, and Figure 4, *Conceptual Site Plan – Option 2*, shows the overall conceptual site plan, including both the residential and retail components for Option 1 and Option 2. Table 1, *Brea Mall Mixed Use Project Land Use Summary*, identifies the existing and proposed improvements.

1. Introduction

Table 1 Brea Mall Mixed Use Project Land Use Summary

| Land Use Designation | New Construction: Option 1 (SF) | New Construction: Option 1 Proposed DU | New Construction: Option 2 (SF) | New Construction: Option 2 Proposed DU |
|--|------------------------------------|---|------------------------------------|---|
| Existing Sears, demolition | (-161,990) | - | (-161,990) | - |
| Mall | 119,415 | - | 119,415 | |
| Fitness Center | 128,000 | - | - | |
| Net Increase in Commercial Uses | 85,425 | - | (-42,575) | - |
| Medium-Density Residential | -- | 383 | -- | 652 |
| Notes: DU = dwelling unit, SF = square feet. | | | | |

1. Introduction

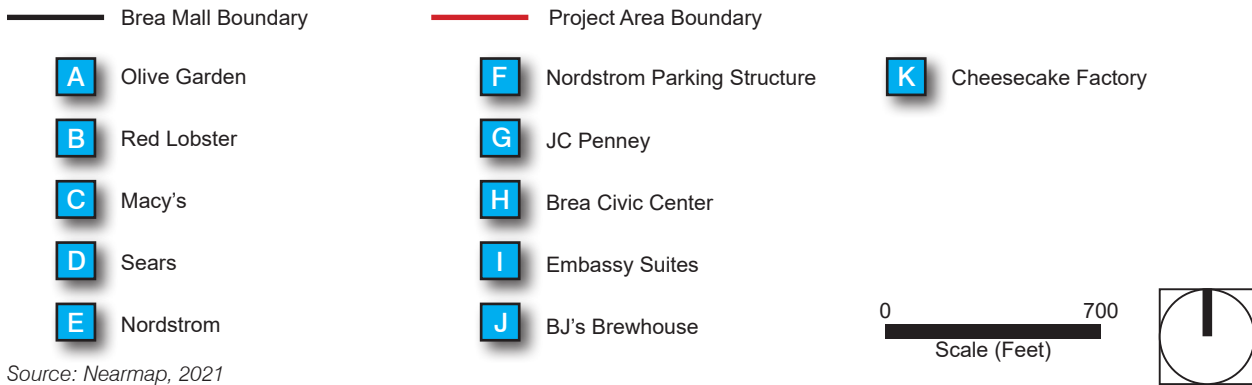
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1. Introduction

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Figure 2 - Aerial Photograph



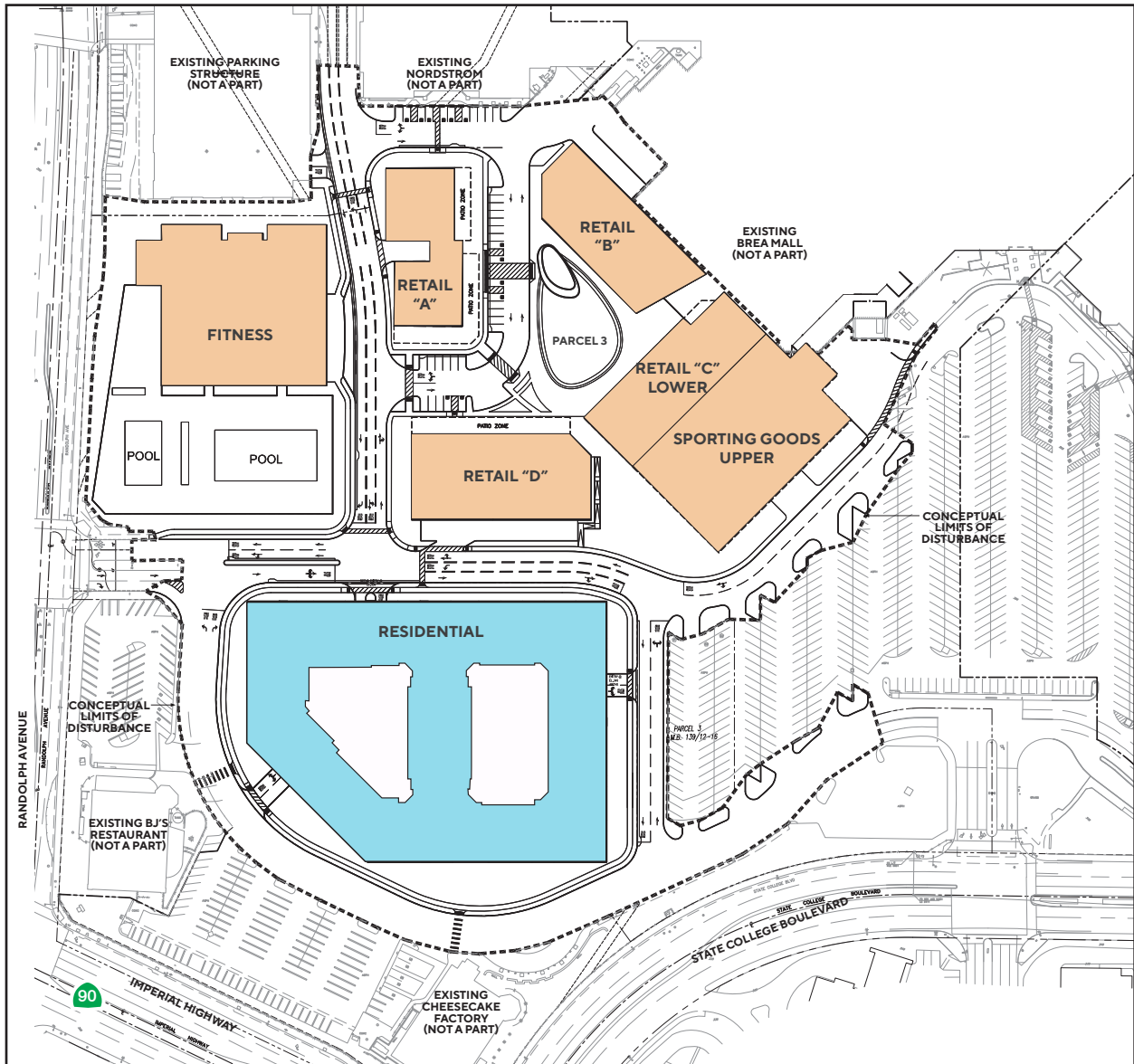
Source: Nearmap, 2021

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Figure 3 - Conceptual Site Plan - Option 1



- Project Area Boundary
- Proposed New Development
- Proposed Residential

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Scale (Feet)



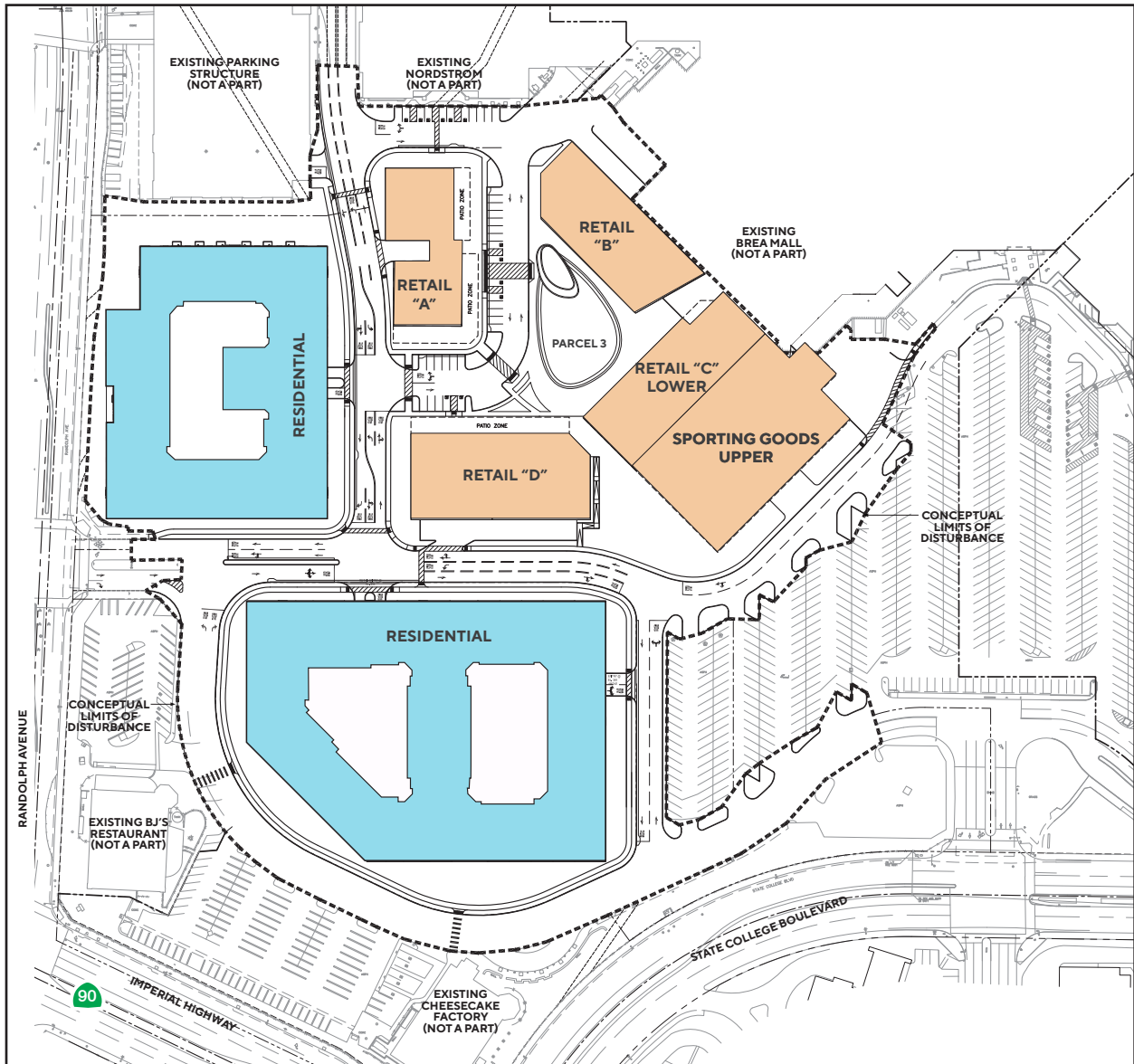
Source: AO, 2021

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1. Introduction

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Figure 4 - Conceptual Site Plan - Option 2



- Project Area Boundary
- Proposed New Development
- Proposed Residential

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Scale (Feet)



Source: AO, 2021

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2. Water Supply Assessment

2.1 WATER PURVEYOR

The City of Brea provides water to residents, businesses, and other users in the city, including the project site. The City receives its water from three main sources: 1) imported groundwater from the Main San Gabriel Basin, which is managed by the California Domestic Water Company (CDWC), 2) imported surface water from the Municipal Water District of Orange County (MWDOC), and 3) local groundwater from the La Habra Basin for irrigation (nonpotable). MWDOC is Orange County's wholesale supplier and is a member agency of the Metropolitan Water District of Southern California (MWD). There are currently no recycled water uses in the City's service area, and there are no plans to provide recycled water in the near future.

The city's water system consists of 228.3 miles of water mains and seven storage reservoirs with a combined storage capacity of 69.5 million gallons (MG).² The system is supported with five booster pump stations with a capacity of approximately 14,800 gallons per minute (gpm), serving 18 pressure zones in the city. The city also has 97 pressure-reducing stations to regulate the pressure zones, an irrigation well, and 4 connections with MWD and CDWC. Additionally, the City maintains five emergency interconnections with neighboring water purveyors, including the City of La Habra (2), City of Fullerton, City of Yorba Linda, and Golden State Water Company.³

For the 2019-2020 fiscal year, approximately 99 percent of the city's water came from imported groundwater through CDWC.⁴ The City operates one nonpotable well in the La Habra Basin for irrigation of the Brea Creek Golf Course and Arovista Park.⁵ According to the 2020 UWMP, the City's total water demand was 9,131 acre-feet (AF) in 2020, with 9,039 AF from CDWC and 92 AF pumped from the La Habra Basin.

It is required that every urban water supplier assess the reliability to provide water service to its customers under normal, single dry, and multiple dry years. As discussed in the City's urban water management plan (UWMP), the City is capable of meeting the water demands of its customers in normal, single dry, and multiple dry years through the year 2045.

2.2 LEGAL REQUIREMENTS

SB 610 established the primary legal standards for assessing the sufficiency of water supplies for new development projects. Affected land developments are those that meet certain size thresholds. As discussed previously in Section 1.1, Option 2 meets the threshold as a mixed-use project with a residential component

² City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

³ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

⁴ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

⁵ City of Brea, 2021 Water Master Plan, prepared by Civiltect Engineering Inc., May 2021.

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that includes more than 500 dwelling units. Therefore, the proposed project, as described in Section 1.2, meets the criteria for preparation of a WSA.

The basic requirement is that a WSA must “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 proposed project, in addition to the water system’s existing and planned future uses, including agricultural and manufacturing uses.” In the following sections, this WSA estimates the additional water demand with implementation of the proposed Brea Mall Mixed Use Project, Option 2. The WSA compares the additional water demand to the future water demands of the City, as specified in the 2020 UWMP, and determines if there are sufficient water supplies to meet these demands over the next 20 years.

The WSA must include additional analysis if any portion of the water purveyor's water supplies include groundwater. The analysis must include a description of any groundwater basin or basins from which the proposed project will be supplied in addition to a detailed description and analysis of the amount and location of groundwater pumped by the public water system for the past five years. The WSA must also include an analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. Since the City relies heavily on groundwater to meet its water demand, this additional analysis is included in Section 2.4.2.

Upon adoption, the WSA is incorporated into the CEQA document being prepared for the project, and the lead agency must determine, based on the entire record, whether projected water supplies will be sufficient to satisfy demands for the project, in addition to existing and future uses.⁶

2.3 WATER DEMAND ANALYSIS

Section 10910(c)(2) of the California Water Code states:

... if the projected water demand associated with the proposed 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).

The 2020 UWMP included the expansion of the Brea Mall in its future water demand estimates. However, it was based on a smaller project encompassing 2.28 acres and consisting solely of commercial land use. The UWMP assumed an increased water demand of 2.19 acre-feet per year (AFY) for the project. Therefore, the current project configuration in terms of land use and water demand for Options 1 and 2 were not included in the 2020 UWMP but have been characterized and analyzed in the following sections.

⁶ California Water Code Sections 10910(b) and (c).

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2.3.1 City of Brea Water Demands

The primary source of water for the proposed project would be existing water supplies provided by the City to its customers. The current water supply consists primarily of imported groundwater purchased through CDWC (99 percent).

Based on the City's 2020 UWMP, the current and projected potable water demands by customer class are presented in Table 2. The city's total water demand in 2020 was 9,131 AFY. The projected 2045 potable water demand is 9,745 AFY. With future water conservation efforts and water-efficient fixtures in accordance with new CALGreen building codes, the future water demand is likely to be lower than these amounts.

Table 2 Current and Projected Potable Water Demands for the City of Brea (AFY)

| Use Type | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Single Family | 3,627 | 3,692 | 3,640 | 3,583 | 3,535 | 3,522 |
| Multifamily | 1,048 | 1,105 | 1,084 | 1,063 | 1,068 | 1,100 |
| Commercial | 1,041 | 1,095 | 1,182 | 1,211 | 1,241 | 1,241 |
| Industrial | 733 | 772 | 833 | 854 | 875 | 875 |
| Institutional | 848 | 893 | 963 | 987 | 1,012 | 1,012 |
| Landscape ^a | 92 | 115 | 115 | 115 | 115 | 115 |
| Landscape | 1,280 | 1,417 | 1,416 | 1,417 | 1,416 | 1,416 |
| Losses | 462 | 454 | 462 | 461 | 463 | 464 |
| Total | 9,131 | 9,543 | 9,695 | 9,691 | 9,725 | 9,745 |

Source: City of Brea 2020 UWMP, 2021.

AFY = acre-feet/year

a Irrigation water pumped from La Habra Basin (nonpotable).

2.3.2 Existing and Proposed Project Water Demands

The proposed project consists of an approximately 15-acre site planned for mixed-use redevelopment within the boundaries of the existing Brea Mall. Buildout of Option 1 would include 383 dwelling units, 119,415 SF of new retail space, and a 128,000 SF fitness center. Buildout of Option 2 would include 652 dwelling units, 119,415 SF of new retail space, and no fitness center. The proposed development would connect to the city's existing water main for domestic water use.

2.3.2.1 EXISTING WATER DEMAND

To calculate the existing water demand, a baseline year of 2018 was assumed, per the DEIR, and the water demand included the operation of the Sears store and surrounding landscaping. The indoor water demand factor used a water demand rate of 0.96 AFY per acre for commercial land use, as specified in the City's 2021 water master plan update. Outdoor water use for landscaping was calculated using the California Department of Water Resources' (DWR) Model Water Efficient Landscape Ordinance (MWELO) water budget workbook

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for nonresidential landscapes. The existing outdoor water demand was based on the maximum applied water allowance (MAWA) equation:

$$Demand = (ETo - Eppt) \times 0.62 \times Landscaped\ Area\ (SF) \times 0.45$$

The MAWA calculation included an evapotranspiration factor (ETo) of 48.2 inches per year, an effective precipitation (Eppt) of 3.75 inches per year (25 percent of annual precipitation), and a landscape area of 34,864 SF.⁷ Table 3 shows the total water demand estimate for the southwest portion of the mall, including the Sears store and landscaping.

Table 3 Existing Water Demand

| Land Use | Units | Water Demand Rate | Total Water Usage (AFY) |
|--------------|-------------------------|-------------------|-------------------------|
| Retail | 3.72 ac (161,900 SF) | 0.96 AFY/ac | 3.57 |
| Landscaping | 34,864 SF | - | 1.33 ^a |
| Total | | | 4.90 |

Sources: City of Brea, 2021 Water Master Plan, prepared by Civiltec Engineering Inc., May 2021; R. A. Smith, Preliminary Hydrology Memo, November 8, 2021.

Notes: AFY = acre-feet per year

AFY/ac = acre-feet per year per acre

SF = square feet

^a Maximum Applied Water Allowance (MAWA) from DWR Model Water Efficient Landscape Ordinance (MWELO) Water Budget for Nonresidential Landscapes.

The existing water demand for the 15-acre project site is estimated to be approximately 4.9 AFY.

2.3.2.2 PROPOSED WATER DEMAND

The water demand for Options 1 and 2 of the proposed project are provided in this section. The indoor water demand was calculated using the commercial water use factor of 0.96 AFY/acre from the City's 2021 Water Master Plan and multifamily residential water demand of 55 gallons per capita per day from the 2020 UWMP. The average household size in the City of Brea for renters who live in structures with 50 or more units is 2.01 persons per unit, as described in Chapter 5.9 of the Brea Mall Mixed Use Project DEIR.⁸

Outdoor water use for landscaping was calculated using the estimated total water use (ETWU) methodology, as described in DWR's MWELO water budget workbook for nonresidential landscapes. Annual irrigation demands are based on the ETWU equation:

$$Demand = \frac{ETo \times Plant\ Factor \times Landscaped\ Area\ (SF) \times 0.62}{Irrigation\ Efficiency}$$

The ETWU calculation included an evapotranspiration factor (ETo) of 48.2 inches per year, plant factors based on the water use for different plant types from the landscaping plan, and an irrigation efficiency of 0.75 for overhead spray (turf areas) and 0.81 for drip irrigation (trees and shrubs). A landscaped area of 98,010 SF was

⁷ R. A. Smith, Preliminary Hydrology Memo, November 8, 2021.

⁸ 2.01 people per unit is based on US Census data for the City of Brea from the American Community Survey, as specified in the DEIR.

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assumed based on the landscape plans that noted a minimum of 15 percent of the net site area would be landscaped.⁹ Table 4 shows the proposed water demand for Option 1 and Option 2.

Table 4 Proposed Water Demand, Options 1 and 2

| Land Use | Units | Water Demand Rate | Total Water Usage (AFY) |
|-------------------------|--|-------------------|-------------------------|
| Option 1 | | | |
| Commercial | 5.68 ac (247,415 SF) | 0.96 AFY/ac | 5.45 |
| Multifamily Residential | 770 residents ^a (383 DU) | 55 gpcd | 47.4 |
| Landscaping | 98,010 SF ^b | - | 3.68 ^c |
| Total | | | 56.6 |
| Option 2 | | | |
| Commercial | 2.74 ac (119,415 SF) | 0.96 AFY/ac | 2.63 |
| Multifamily Residential | 1,311 residents ^a (652 DU) | 55 gpcd | 80.8 |
| Landscaping | 98,010 SF ^b | - | 3.68 ^c |
| Total | | | 87.1 |

Source: City of Brea, 2021 Water Master Plan, prepared by Civiltex Engineering Inc., May 2021; City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

Notes:

AFY = acre-feet per year

gpcd = gallons per capita per day

AFY/ac = acre-feet per year per acre

DU = dwelling unit

SF = square feet

^a Conversion rate of 2.01 people per unit from Chapter 5.9 of the Brea Mall Mixed Use Project Draft Environmental Impact Report.

^b According to Site Plan L-1.00 under Notes, the minimum landscape area will be 15 percent of the net site area. Therefore, 15 percent of 15 acres is 2.25 acres or 98,010 SF. The total landscaping area of 98,010 SF was assumed with 24,300 SF of overhead spray landscaping (turf grass) and 73,710 SF of drip irrigation areas (planting areas).

^c Estimated Total Water Use (ETWU) from DWR Model Water Efficient Landscape Ordinance (MWELO) Water Budget for Non-Residential Landscapes.

As shown in Table 4, the total water demand for the proposed project is estimated to be 56.6 AFY for Option 1 and 87.1 AFY for Option 2. The increase in water demand compared to existing conditions is 51.7 AFY for Option 1 and 82.2 AFY for Option 2. Since the 2020 UWMP included a water demand of 2.19 AFY for the Brea Mall expansion project, the net increase in water demand unaccounted for in the UWMP is 49.5 AFY for Option 1 and 80.0 AFY for Option 2. The major portion of the water demand for this project is for the residential land use.

2.4 WATER SUPPLY ANALYSIS

This section identifies the sources of water used by Brea and evaluates the water supplies that could be used by the city and the proposed project during normal, single dry, and multiple dry years through the year 2045.

⁹ According to Site Plan L-1.00 under Notes, the minimum landscape area will be 15 percent of the net site area. Therefore, 15 percent of 15 acres is 2.25 acres or 98,010 SF. The total landscaping area of 98,010 SF was assumed with 24,300 SF of overhead spray landscaping (turf grass) and 73,710 SF of drip irrigation areas (planting areas).

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Brea relies on a combination of imported water and local groundwater to meet its water needs. The City works with CDWC and MWD OC to ensure a safe and reliable water supply that will continue to serve the community in periods of drought and shortage. The sources of imported water supplies include the Colorado River and the State Water Project (SWP), which is provided by MWD and delivered by MWD OC.

The City's main source of water supply (99 percent in 2020) is groundwater from the Main San Gabriel Basin. The imported water is supplied from CDWC through three connections. By 2045, it is projected that the water supply portfolio will be approximately 92.5 percent imported water from CDWC, 6.5 percent from MWD OC, and 1 percent from local groundwater. The projected water supply sources for the city are summarized in Table 5.

Table 5 Water Supply Sources for the City of Brea (AFY)

| Water Source | 2025 | 2030 | 2035 | 2040 | 2045 |
|------------------------|--------------|--------------|--------------|--------------|--------------|
| Imported Groundwater | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 |
| Imported Surface Water | 428 | 580 | 576 | 610 | 630 |
| Local Groundwater | 115 | 115 | 115 | 115 | 115 |
| Total | 9,543 | 9,695 | 9,691 | 9,725 | 9,745 |

Source: City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.
AFY = acre-feet per year

It is required that every urban water supplier assess the reliability to provide water service to its customers under normal, dry, and multiple dry water years. The City depends on a combination of imported and groundwater supplies to meet its water demands and has taken numerous steps to ensure that it has adequate supplies. Water supplies available to the City are projected to meet full-service demands. The UWMP states that the City will be able to meet projected supplies between 2025 and 2045 during normal years, single dry years, and multiple dry years (see Table 6).¹⁰

¹⁰ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

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Table 6 Normal, Single Dry, and Multiple Dry Year Supply and Demand (AFY)

| | | 2025 | 2030 | 2035 | 2040 | 2045 |
|--------------------------|-------------------|----------|----------|----------|----------|----------|
| Normal Year | | | | | | |
| Supply Totals | | 9,543 | 9,695 | 9,691 | 9,725 | 9,745 |
| Demand Totals | | 9,543 | 9,695 | 9,691 | 9,725 | 9,745 |
| Difference | | 0 | 0 | 0 | 0 | 0 |
| Single Dry Year | | | | | | |
| Supply Totals | | 10,115 | 10,277 | 10,272 | 10,309 | 10,330 |
| Demand Totals | | 10,115 | 10,277 | 10,272 | 10,309 | 10,330 |
| Difference | | 0 | 0 | 0 | 0 | 0 |
| Multiple Dry Year | | | | | | |
| First Year | Supply Totals | 9,766 | 10,147 | 10,276 | 10,279 | 10,313 |
| | Demand Totals | 9,766 | 10,147 | 10,276 | 10,279 | 10,313 |
| | Difference | 0 | 0 | 0 | 0 | 0 |
| Second Year | Supply Totals | 9,854 | 10,180 | 10,275 | 10,287 | 10,317 |
| | Demand Totals | 9,854 | 10,180 | 10,275 | 10,287 | 10,317 |
| | Difference | 0 | 0 | 0 | 0 | 0 |
| Third Year | Supply Totals | 9,941 | 10,212 | 10,274 | 10,294 | 10,322 |
| | Demand Totals | 9,941 | 10,212 | 10,274 | 10,294 | 10,322 |
| | Difference | 0 | 0 | 0 | 0 | 0 |
| Fourth Year | Supply Totals | 10,028 | 10,244 | 10,273 | 10,302 | 10,326 |
| | Demand Totals | 10,028 | 10,244 | 10,273 | 10,302 | 10,326 |
| | Difference | 0 | 0 | 0 | 0 | 0 |
| Fifth Year | Supply Totals | 10,115 | 10,277 | 10,272 | 10,309 | 10,330 |
| | Demand Totals | 10,115 | 10,277 | 10,272 | 10,309 | 10,330 |
| | Difference | 0 | 0 | 0 | 0 | 0 |

Source: City of Brea, 2020 UWMP, 2021.

Table 6 reflects a 6 percent increase in water demand during single and multiple dry years. As documented in the 2020 UWMP, the City is able to meet all customers' demands with significant reserves held by MWD, local groundwater supplies, and conservation measures in multiple dry years from 2025 to 2045. Table 6 shows that the water demand would increase from 9,543 AFY to 10,115 AFY in 2025 under drought conditions and would increase from 9,745 AFY to 10,330 AFY under drought conditions in 2045.

For normal years, the City has entitlements to receive imported water from MWD, which is delivered by MWDOC via connections to MWD's regional distribution system. Although pipeline and connection capacity rights do not guarantee the availability of water, they do guarantee the ability to convey water when it is available to the MWD distribution system. All imported water supplies are assumed available to the City from existing water transmission facilities.

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The supplies also include imported and local groundwater supplies that are available to the City through CDWC by a predetermined pumping percentage. For single dry and multiple dry years, the City would supplement a demand increase of 6 percent from normal demand with significant reserves held by MWD and conservation.¹¹

2.4.1 Surface Water Analysis

Imported surface water is projected to represent approximately 6.5 percent of the city's total water supply by 2045. The principal sources of water are the Colorado River via the Colorado River Aqueduct (CRA) and the Lake Oroville watershed in Northern California through the SWP. The raw water obtained from these sources is treated locally at the Robert B. Diemer Filtration Plant north of Yorba Linda. Typically, the Diemer Filtration Plant receives a blend of Colorado River water from Lake Mathews through the Metropolitan Lower Feeder and SWP water through the Yorba Linda Feeder.

MWD provides imported water supplies to the City through its member agency, MWDOC. MWD is the wholesale water agency that provides imported water from the Colorado River and SWP to its 26 member agencies in Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. The Colorado River was MWD's original source of water after MWD's establishment in 1928. The CRA, which is owned and operated by MWD, transports water from the Colorado River to its terminus at Lake Mathews in Riverside County. The actual amount of water per year that may be conveyed through the CRA to MWD's member agencies is subject to the availability of Colorado River water for delivery.

The SWP transports Feather River water stored in and released from Oroville Dam and conveyed through the Bay-Delta as well as unregulated flows diverted directly from the Bay-Delta south via the California Aqueduct. The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR. This water supply infrastructure provides water to 29 urban and agricultural agencies throughout California.¹²

Through the 1996 Integrated Resources Plan and subsequent updates, MWD has worked toward identifying and developing water supplies to provide 100 percent reliability. MWD has recently increased its ability to supply water, particularly in dry years, through implementation of storage and transfer programs.

MWDOC was formed in 1951 to provide imported water to much of Orange County. MWDOC is the second largest member agency of MWD, providing imported water to 30 retail water agencies and cities. Imported water represents approximately 35 percent of the total water supply in the MWDOC service area. MWDOC and its retail agencies work together to improve the water reliability within the service area by developing additional local supplies and by implementing water use efficiency programs. According to the its 2020 UWMP, MWDOC has the capacity to meet demands under normal, single dry, and multiple dry years through the year 2045.¹³

¹¹ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

¹² California Department of Water Resources, State Water Project Delivery Capability Report 2019, August 26, 2020.

¹³ MWDOC, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

2. Water Supply Assessment

2.4.2 Groundwater Analysis

Since most of the potable water supplied by the City comes from groundwater, SB 610 requires a groundwater analysis to be included as part of the WSA. The Water Code requires that the WSA include:

- Groundwater information from the 2020 UWMP.
- Groundwater basin description, including the legal rights to pump.
- Historical use of groundwater from the 2020 UWMP.
- Projected use of groundwater.
- Sufficiency of groundwater.

2.4.2.1 GROUNDWATER INFORMATION FROM THE 2020 UWMP

The City's 2020 UWMP was prepared by Arcadis and adopted by the City in June 2021. It contains descriptions of the Main San Gabriel Basin and the La Habra Groundwater Basin, the reliability of the groundwater supply, the MWD groundwater replenishment program, groundwater recharge facilities, the MWD Conjunctive Use Program with Orange County Water District, groundwater historical extraction, and a discussion of overdraft conditions.

2.4.2.2 GROUNDWATER BASIN DESCRIPTION

The Main San Gabriel Basin underlies a large portion of the San Gabriel Valley in eastern Los Angeles County and is managed by the Main San Gabriel Basin Watermaster. It covers approximately 107,000 acres and is bordered by the San Gabriel Mountains to the north, the Raymond Basin to the northwest, the Puente Basin to the southeast, and the Central Basin to the south.

The CDWC provides groundwater from the Main San Gabriel Basin to each of its member agencies. The operating safe yield (OSY) for the Main San Gabriel Basin is set at 150,000 AF for the fiscal year 2020-2021, and the CDWC prescriptive pumping rights are 9,383 AF. Groundwater levels are managed within a safe basin operating range to protect the long-term sustainability of the Main San Gabriel Basin and to protect against land subsidence.¹⁴

The La Habra Groundwater Basin underlies the Coyote Creek Watershed, which covers portions of Los Angeles County and Orange County. Portions of the La Habra Groundwater Basin are in the Central Basin of Los Angeles County and the Orange County Basin. The City of La Habra has been deemed the exclusive Groundwater Sustainability Agency for the La Habra-Brea Management Area. The City of Brea pumps a small amount of groundwater from this groundwater basin (92 AF in 2020) for irrigation purposes only.

2.4.2.1 LEGAL RIGHTS TO PUMP

The Main San Gabriel Basin was adjudicated in 1973. The judgment defined the water rights for the basin, created the Main San Gabriel Basin Watermaster as the governing body, and described program management within the basin. The Main Basin Watermaster establishes an annual OSY for the basin that is then used to

¹⁴ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

2. Water Supply Assessment

allocate to each water agency its portion of the pumped groundwater.¹⁵ If a water producer extracts water that exceeds the OSY, the producer must pay a “replacement water assessment” and purchase one AF of supplemental water to be spread in the basin for each AF of excess production.¹⁶

The Main San Gabriel Basin is currently in an extended period of drought—that is, below-average rainfall limits groundwater recharge and surface runoff. Therefore, basin recovery is dependent on management actions of the Main Basin Watermaster. Overall, long-term water demand has decreased since its peak in 2006, with groundwater levels at one of the key groundwater monitoring wells rising 6.3 feet in fiscal year 2019-20. The groundwater level rise in the basin is attributed to increases in the Cyclic Storage program, which allows agencies to store imported supplemental water in the Main San Gabriel Basin, and Resource Development Assessment fees, which allow the Watermaster to collect funds on all production and purchase replenishment water for storage in the basin.¹⁷

The La Habra Basin is not adjudicated. The City of La Habra operates under a “safe yield” of 4,500 AFY for the management and future planning of the La Habra Basin. The “safe yield” is the groundwater volume that can be pumped without depleting the aquifer to a point where it cannot recover through natural recharge over a reasonable amount of time.¹⁸

2.4.2.2 HISTORICAL USE OF GROUNDWATER

The City owns and operates one groundwater well in the La Habra Groundwater Basin for irrigation purposes only and imports most of its groundwater from CDWC in the Main San Gabriel Basin. The amount of groundwater pumped by CDWC from the Main San Gabriel Basin and by the City of Brea from the La Habra Basin in recent years is listed in Table 7.

Table 7 Historical Groundwater Production

| Calendar Year | Main San Gabriel Basin Groundwater Produced (AFY) | La Habra Groundwater Basin Groundwater Produced (AFY) |
|----------------|--|--|
| 2016 | 11,753 | 57 |
| 2017 | 12,434 | 96 |
| 2018 | 14,059 | 107 |
| 2019 | 14,790 | 95 |
| 2020 | 14,870 | 92 |
| Average | 13,581 | 89 |

Sources: MWD OC, 2020 UWMP, 2021; City of Brea, 2020 UWMP, 2021.

The projected use of groundwater for the City of Brea is provided in Table 5 through the year 2045. As shown in Table 5, imported groundwater from the Main San Gabriel Basin is projected to remain at 9,000 AFY, and local groundwater from the La Habra Basin is projected at 115 AFY through year 2045.

¹⁵ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

¹⁶ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

¹⁷ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

¹⁸ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

2. Water Supply Assessment

2.5 SUPPLY AND DEMAND ANALYSIS

The existing and proposed water demand for the Brea Mall Mixed Use project are provided in Sections 2.3.2.1 and 2.3.2.2. The net increase in water demand is 49.5 AFY for Option 1 and 80.0 AFY for Option 2. This is approximately 0.5 percent of the City's water demand in 2045 for Option 1 and about 0.8 percent for Option 2.

However, to evaluate water supply vs. demand on a citywide basis, the proposed water demand for this project should be included with the proposed buildout in other areas of the city as well as any anticipated future development. The city is almost completely built out, and the population is projected to increase over the next 25 years by 5.7 percent.¹⁹ The city's current population of 45,629 would increase by 2,607, for a total population of 48,236 in 2045. The estimated population increases of 770 for Option 1 and 1,311 residents for Option 2 are within the forecast population growth for the city that was assumed in the 2020 UWMP.

Water usage in the City's service area has been relatively stable over the past 10 years, even with an increase in population. This is due to water conservation efforts and a relatively low annual growth rate because the city is essentially built out. However, the 2020 UWMP assumed that the total water demand would increase 6.7 percent between 2020 and 2045, which is higher than the projected population increase and conservative for the following reasons:

- Recent legislation (SB 606 and AB 1668) establishes guidelines and standards for urban water use efficiency. Water purveyors will be required to meet a indoor water use standard of 55 gallons per capita daily (gpcd) until 2025, when it will drop to 50 gpcd. Standards will also be set for outdoor residential water use; commercial, industrial, institutional (CII) water use; and water loss standards.
- New construction is subject to CalGreen Building Code requirements, which typically result in a 20 percent reduction in indoor water use.
- SB 407 requires all buildings in California to meet current plumbing fixture standards within the next 10 years, which will require retrofitting existing homes and businesses.
- Increases in water service costs will provide an incentive for additional water cost savings.

Other projects in the city would also increase water demands in the service area. However, all new development would be required to conserve water use and implement water efficiency measures, per the CalGreen Building Code and the MWELo outdoor irrigation requirements. In addition, future development would be required to pay water service connection fees to the City. These charges are used to offset the costs of system maintenance and capital upgrades to support new development in the City's service area. Water supply assessments would also be required for large development projects to ensure that there is adequate water available for those projects.

Although the 2020 UWMP states that there is adequate water supplies to meet the City's water demand in normal, single-dry, and multiple-dry years, the water shortage contingency plan (WSCP), which is discussed in

¹⁹ City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

2. Water Supply Assessment

detail in Section 2.8, and other water conservation plans would be implemented during drought conditions. Existing regulations would reduce per capita water use over time, which would ensure that there is adequate water available for the proposed project as well as future development in the City's service area.

2.6 WATER SHORTAGE CONTINGENCY PLANNING

Recent water supply challenges throughout the Southwest and the State of California have resulted in the development of various policy actions that water agencies implement in the event of a water shortage. In southern California, such policies apply at both the wholesale and retail level. This section describes new and existing policies that MWD, MWDOC, and the City have in place to respond to water supply shortages, including a catastrophic interruption and up to a 50 percent reduction in water supply.

2.6.1 Metropolitan Water District

Water supply challenges have impacted the reliability of MWD's imported supplies. In response, MWD has documented the sequence of actions that it would undertake in response to water supply shortages, including up to a 50 percent reduction in available water supplies. MWD has documented this planning in its Water Surplus and Drought Management (WSDM) Plan, which guides MWD's planning and operations during both shortage and surplus conditions. Furthermore, MWD developed a water supply allocation plan (WSAP), which provides a standardized methodology for allocating supplies during times of shortage.²⁰

2.6.2 MWDOC

To prepare for the potential allocation of imported water supplies from MWD, MWDOC worked collaboratively with its 28 member agencies to develop its own WSAP, adopted January 2009 and amended in 2020, to allocate imported water supplies at the retail level. The MWDOC WSAP lays out the essential components of how MWDOC will determine and implement each member agency's allocation during a time of shortage. The MWDOC WSAP uses a similar method and approach as MWD's WSAP. However, MWDOC's plan is flexible, and an alternative approach may be used if MWD's method produces a significant unintended result for the member agencies.²¹

2.6.3 City of Brea

The City of Brea adopted its Water Shortage Contingency Response Ordinance No. 1221 on June 1, 2021, which established a phased water conservation program that would encourage reduced water consumption within the city through conservation, enable effective water supply planning, ensure reasonable and beneficial use of water, prevent waste of water, and maximize the efficient use of water in the city. Along with permanent water conservation requirements, the City's WSCP consists of six stages or shortage levels that would be implemented to respond to a reduction in the availability of potable water (as shown in Table 8).²²

²⁰ The Metropolitan Water District of Southern California, 2020 Urban Water Management Plan, 2021.

²¹ MWDOC, 2020 Water Shortage Contingency Plan, prepared by Arcadis, 2021.

²² City of Brea, 2020 Urban Water Management Plan, prepared by Arcadis, June 2021.

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Table 8 Levels of Water Shortage Contingency Plan

| Shortage Level | Percent Supply Shortage Range | Shortage Response Actions |
|----------------|-------------------------------|--|
| 1 | Up to 10% | Condition exists when the City of Brea notifies its water users that due to drought, supply reductions, or City promoted conservation, a consumer demand reduction of up to 10% is necessary to make more efficient use of water and respond to existing water conditions. The City of Brea shall implement the mandatory Level 1 conservation measures identified in this WSCP. The type of event that may prompt the City of Brea to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider calls for extraordinary water conservation. |
| 2 | 11 to 20% | Condition exists when the City of Brea notifies its water users that due to drought, supply reductions, or City promoted conservation, a consumer demand reduction of up to 20% is necessary to make more efficient use of water and respond to existing water conditions. The City of Brea shall implement the mandatory Level 2 conservation measures identified in this WSCP. The type of event that may prompt the City of Brea to declare a Level 2 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider calls for extraordinary water conservation. |
| 3 | 21 to 30% | Condition exists when the City of Brea declares a water shortage emergency condition pursuant to California Water Code Section 350 and notifies its residents and businesses that up to 30% consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. The City of Brea must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code Section 350. |
| 4 | 31 to 40% | Condition exists when the City of Brea declares a water shortage emergency condition pursuant to California Water Code Section 350 and notifies its residents and businesses that up to 40% consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. |
| 5 | 41 to 50% | Condition exists when the City of Brea declares a water shortage emergency condition pursuant to California Water Code Section 350 and notifies its residents and businesses that up to 50% or more consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. |
| 6 | > 50% | Condition exists when the City of Brea declares a water shortage emergency condition pursuant to California Water Code Section 350 and notifies its residents and businesses that 50% or more consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. |

Source: City of Brea, 2020 UWMP, 2021.

2. Water Supply Assessment

2.6.4 Catastrophic Supply Interruption

MWD has comprehensive plans for actions it would undertake to address a catastrophic interruption in water supplies through its WSDM Plan and WSAP. MWD also developed an Emergency Storage Requirement to mitigate against potential interruption in water supplies resulting from catastrophic occurrences in the Southern California region, including seismic events along the San Andreas Fault.

In 1983, the Orange County water community identified a need to develop a plan on how agencies would respond effectively to disasters impacting the regional water distribution system. The collective efforts of these agencies resulted in the formation of the Water Emergency Response Organization of Orange County (WEROC) to coordinate emergency response on behalf of all Orange County water and wastewater agencies, develop an emergency plan to respond to disasters, and conduct disaster training exercises for the Orange County water community. Within the Orange County Operational Area, WEROC is the recognized contact for emergency response for the water community, including the City of Brea.

The MWDOC's Local Hazard Mitigation Plan (LHMP) was included in the City of Brea's WSCP in lieu of conducting a specific seismic risk assessment in the City's 2020 UWMP.²³ The LHMP evaluates hazards application to all jurisdictions, including the City of Brea, and identifies vulnerabilities to its water supply due to disaster events. It has developed a list of actions that can be taken in preparation of such events. These events include non-drought-related emergencies such as earthquakes, acts of terrorism, and regional power outages.²⁴ In the event of an earthquake, the City will be notified by MWDOC through the Standardized Emergency Management System and a coordinated incident command system.

2.7 WATER EFFICIENCY STRATEGIES

There are many water efficiency strategies that have been implemented by the City with the assistance of MWDOC to promote water conservation. The City adopted Ordinance No. 1123 in 2009, revising the its Water Conservation and Water Supply Shortage Program. The ordinance established permanent water conservation standards, such as limiting watering hours and watering duration, drinking water served upon request only, and no installation of single pass cooling systems. It was revised in 2015 in response to drought conditions and then-Governor Brown's Executive Order to achieve a statewide 25 percent reduction in potable water usage. The City is currently under Phase 1 of the Water Ordinance, which calls for a 10 percent reduction in water usage. The City has also adopted conservation pricing, which results in increased unit prices with increased consumption.

The City's public education and outreach program is administered by MWDOC and includes print and electronic materials, tool kits, and newsletters; public events; and water education programs for school children. The City also performs water audits and offers leak surveys to all water customers. The City has maintained a full-time position of Conservation Coordinator since 2009 to support the water conservation programs.

²³ City of Brea, 2020 Water Shortage Contingency Plan, prepared by Arcadis, 2021.

²⁴ MWDOC, Orange County Regional Water and Wastewater Hazard Mitigation Plan, 2019.

2. Water Supply Assessment

Through MWDOC, the following retrofit programs and rebates are available for existing customers to improve landscape and indoor water use efficiency:

- High Efficiency Clothes Washer Rebate Program
- Premium High Efficiency Toilet Rebate Program
- Water Savings Incentive Program for CII Customers
- Multi-Family Premium High Efficiency Toilet Incentive Program
- Turf Removal Program
- Landscape Design and Maintenance Plan Assistance Program
- Smart Timer Rebate Program
- Rotating Nozzles Rebate Program
- Spray-to-Drip Rebate Program
- SoCal WaterSmart Rebate Program for Landscape
- Landscape Training Classes
- Qualified Water Efficient Landscape Certification (Commercial)
- OC Water Smart Gardens Resource Page

With the incentives and rebates provided by the City and MWDOC, existing residences and buildings will be retrofitted with low-flow plumbing fixtures and more efficient landscaping irrigation, which will reduce future water demand. Similarly, new construction in the city will comply with CalGreen Building Code requirements and MWELO outdoor irrigation standards. These cumulative efforts will reduce the future per capita water demands for the city.

2. Water Supply Assessment

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3. Summary

A water supply assessment (WSA) was prepared to assess the water demand and supply conditions with implementation of the proposed project. As shown in Table 4, the total water demand for the proposed project is estimated to be 56.6 AFY for Option 1 and 87.1 AFY for Option 2. The net increase in water demand compared to existing conditions is 51.7 AFY for Option 1 and 82.2 AFY for Option 2. Since the 2020 UWMP included a water demand of 2.19 AFY for the Brea Mall expansion project, the net increase in water demand unaccounted for in the UWMP is 49.5 AFY for Option 1 and 80.0 AFY for Option 2. This is approximately 0.5 percent of the City's water demand in 2045 for Option 1 and about 0.8 percent for Option 2.

As discussed in Section 2.5, the city's current population of 45,629 people would increase by 2,607 people (4.7 percent), for a total population of 48,236 in 2045. The estimated population increases of 770 residents for Option 1 and 1,311 residents for Option 2 are within the forecast population growth for the city that was assumed in the 2020 UWMP. Implementation of the proposed project as well as buildout of the other areas in the city will not obstruct the City's ability to meet water demands of its customers in normal, single dry, and multiple dry years. In addition, future development in the city would take place over 20 to 30 years, and therefore the incremental increases in water demand would not overtax the City's ability to supply water to all of its customers.

This WSA concludes that the City will have sufficient water supplies available during normal, single dry, and multiple dry years through the year 2045 to meet all projected water demands associated with its existing and future customers, including the proposed project. In the unlikely event of a water shortage, implementation of the City's Water Shortage Contingency Plan and water efficiency strategies would ensure that sufficient water supplies were available to serve its customers, including the project and existing and future users.

3. Summary

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Appendix

Appendix A Project Water Demand Calculations

Appendix

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Water Demand Calculations

City of Brea, Brea Mall Mixed-Use Project

| Commercial | Size | Unit | | Expansion Area |
|----------------|---------|------|------------------|--|
| Sears | 161,900 | SF | To be demolished | 15 acres |
| Fitness Center | 128,000 | SF | Option 1 only | 2.19 AFY accounted for in 2020 UWMP, Brea Mall Expansion |
| Mall | 69,415 | SF | Option 1 and 2 | |
| Sporting Goods | 50,000 | SF | Option 1 and 2 | |

| Existing Water Demand (with Sears) | | | | | | | |
|------------------------------------|---------|------|---------------|--------|------|--|--|
| LU Type | Size | Unit | Demand Factor | Unit | AFY | | Source |
| Commercial | 161,900 | SF | | | | | |
| | 3.72 | ac | 0.96 | AFY/ac | 3.57 | | Source: Demand Factor from City's 2021 Water Master Plan |
| | | | | | | | |
| Outdoor | 34,864 | SF | MWELO | | 1.33 | | Source: Area from 2021 Preliminary Hydrology Memo, R.A Smith |
| | | | | | | | Source: MWELO Non-Res, MAWA, overhead |
| Total | | | | | 4.90 | | |

| Option 1 - Water Demand | | | | | | | |
|-------------------------|---------|-----------|---------------|--------|------|--------|--|
| LU Type | Size | Unit | Demand Factor | Unit | AFY | GPD | |
| MFR | 383 | du | | | | | |
| | 770 | residents | 55 | gpcd | 47.4 | 42,350 | Source: 55 gpcd from 2020 UWMP for MFR; 2.01 res/du |
| | | | | | | | |
| Commercial | 247,415 | SF | | | | | |
| | 5.68 | ac | 0.96 | AFY/ac | 5.45 | | Source: Demand Factor from City's 2021 Water Master Plan |
| | | | | | | | |
| Outdoor | 2.25 | ac | | | | | Source: Acreage minimum 15% of net area (15 acres) |
| | 98,010 | SF | MWELO | | 3.68 | | Source: MWELO Non-Res, ETWU, drip irrigation (73,710 SF) and overhead for turf (24,300 SF) |
| Total | | | | | 56.6 | | |

Net Increase over Existing Uses

51.7

Net Increase from AFY accounted for in 2020 UWMP

49.5

| Option 2 - Water Demand | | | | | | | |
|-------------------------|---------|-----------|---------------|--------|------|--------|--|
| LU Type | Size | Unit | Demand Factor | Unit | AFY | GPD | |
| MFR | 652 | du | | | | | |
| | 1,311 | residents | 55 | gpcd | 80.8 | 72,105 | Source: 55 gpcd from 2020 UWMP for MFR; 2.01 res/du |
| | | | | | | | |
| Commercial | 119,415 | SF | | | | | |
| | 2.74 | ac | 0.96 | AFY/ac | 2.63 | | Source: Demand Factor from City's 2021 Water Master Plan |
| | | | | | | | |
| Outdoor | 98,010 | SF | MWELO | | 3.68 | | Source: MWELO Non-Res, ETWU, drip irrigation (73,710 SF) and overhead for turf (24,300 SF) |
| Total | | | | | 87.1 | | |

Net Increase over Existing Uses

82.2

Net Increase from AFY accounted for in 2020 UWMP

80.0



| Maximum Applied Water Allowance Calculations for New and Rehabilitated Non-Residential Landscapes | | |
|---|--|---|
| Enter value in Pale Blue Cells | | |
| Tan Cells Show Results | | |
| Messages and Warnings | | |
| Click on the blue cell on right to Pick City Name ET _o of City from Appendix A | Santa Ana | Name of City |
| | 48.20 | ET _o (inches/year) |
| | 34864 | Overhead Landscape Area (ft ²) |
| | 0 | Drip Landscape Area (ft ²) |
| | 0 | SLA (ft ²) |
| | 34,864 | Total Landscape Area |
| | Results: | |
| | (ET _o) x (0.62) x [(0.45 x LA) + (1.0 - 0.45) X SLA] | |
| | - | Gallons |
| | - | Cubic Feet |
| - | HCF | |
| - | Acre-feet | |
| - | Millions of Gallons | |
| MAWA calculation incorporating Effective Precipitation (Optional) | | |
| <u>Precipitation (Optional)</u> | | |
| ET _o of City from Appendix A | 48 | ET _o (inches/year) |
| Total Landscape Area | 34,864 | LA (ft ²) |
| Special Landscape Area | 0 | SLA (ft ²) |
| | 15 | Total annual precipitation (inches/year) |
| Enter Effective Precipitation | 3.75 | Eppt (in/yr)(25% of total annual precipitation) |
| Results: | | |
| MAWA = [(ET _o - Eppt) x (0.62)] x [(0.45 x LA) + ((1.0 - 0.45) x SLA)] | | |
| | 432,368 | Gallons |
| | 57,799.34 | Cubic Feet |
| | 577.99 | HCF |
| | 1.33 | Acre-feet |
| | 0.43 | Millions of Gallons |



Estimated Total Water Use

Equation: $ETWU = ET_o \times 0.62 \times [((PF \times HA)/IE) + SLA]$; Considering precipitation $ETWA = (ET_o - Eppt) \times 0.62 \times [((PF \times HA)/IE) + SLA]$

Enter values in Pale Blue Cells

Tan Cells Show Results

Messages and Warnings

| | | | |
|--|--|--------------|--|
| Irrigation Efficiency Default Value for overhead 0.75 and drip 0.81. | | | |
| Plant Water Use Type | | Plant Factor | |
| Very Low | | 0 - 0.1 | |
| Low | | 0.2 - 0.3 | |
| Medium | | 0.4 - 0.6 | |
| High | | 0.7 - 1.0 | |
| SLA | | 1.0 | |

| Hydrozone | Select System From the Dropdown List click on cell below | Plant Water Use Type (s) (low, medium, high) | Plant Factor (PF) | Hydrozone Area (HA) (ft ²) Without SLA | Enter Irrigation Efficiency (IE) | (PF x HA (ft ²))/IE |
|-----------|--|--|-------------------|--|----------------------------------|---------------------------------|
| Zone 1 | Overhead Spray | Medium | 0.50 | 24,300 | 0.75 | 16,200 |
| Zone 2 | Drip | | 0.40 | 36,855 | 0.81 | 18,200 |
| Zone 3 | Drip | Low | 0.20 | 36,855 | 0.81 | 9,100 |
| Zone 4 | | | | | | |
| | | | | | | 43,500 |
| | | SLA | | 0 | | 0 |
| | | Sum | | 98,010 | | |

Results

MAWA = 1,215,476

ETWU = 1,198,817 Gallons
160,259 Cubic Feet
1,602.59 HCF
3.68 Acre-feet
1.20 Millions of Gallons

ETWU complies with MAWA



| Maximum Applied Water Allowance Calculations for New and Rehabilitated Non-Residential Landscapes | | |
|---|---------------------|---|
| Enter value in Pale Blue Cells | | |
| Tan Cells Show Results | | |
| Messages and Warnings | | |
| Click on the blue cell on right to Pick City Name ET _o of City from Appendix A | Santa Ana | Name of City |
| | 48.20 | ET _o (inches/year) |
| | 24300 | Overhead Landscape Area (ft ²) |
| | 73710 | Drip Landscape Area (ft ²) |
| | 0 | SLA (ft ²) |
| | 98,010 | Total Landscape Area |
| | - | Gallons |
| | - | Cubic Feet |
| | - | HCF |
| | - | Acre-feet |
| - | Millions of Gallons | |
| MAWA calculation incorporating Effective Precipitation (Optional) | | |
| Precipitation (Optional) | | |
| ET _o of City from Appendix A | 48 | ET _o (inches/year) |
| Total Landscape Area | 98,010 | LA (ft ²) |
| Special Landscape Area | 0 | SLA (ft ²) |
| | 15 | Total annual precipitation (inches/year) |
| Enter Effective Precipitation | 3.75 | Eppt (in/yr)(25% of total annual precipitation) |
| Results: | | |
| MAWA = [(ET _o - Eppt) x (0.62)] x [(0.45 x LA) + ((1.0 - 0.45) x SLA)] | 1,215,476 | Gallons |
| | 162,486.04 | Cubic Feet |
| | 1,624.86 | HCF |
| | 3.73 | Acre-feet |
| | 1.22 | Millions of Gallons |