Appendix D

Updated Geotechnical Report

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October 3, 2024
Project No. 4089-CR

3rd & Dexter, LLC
18100 Von Karman Avenue, Suite 870
Irvine, California 92612

Attention: Mr. James Walters

Subject: **Updated Geotechnical Report**
Proposed Multi-Family Residential Development
Dexter Village Project
Assessor's Parcel Numbers 377-090-013, -037, -039 and -040
Dexter Avenue and 3rd Street
City of Lake Elsinore, Riverside County, California

References: See Page 9

Dear Mr. Walters:

As requested, GeoTek, Inc. (GeoTek) has prepared this report to update the referenced Geotechnical and Infiltration Evaluation report (GeoTek, 2022) prepared for the subject project.

Site Description

The approximate 23.44-acre rectangular-shaped project site is located adjacent to the southeast corner of Dexter Avenue and 3rd Street, in the City of Lake Elsinore, Riverside County, California (see Figure 1). Access to the project is available from 3rd Street, Dexter Avenue or 2nd Street, all paved improved streets located adjacent to the northern, western and southern boundaries of the site, respectively. The project is located in an area mostly described as mixed-use development and vacant land. Topographically, the site slopes gently downward to the southwest at an approximate two (2) percent gradient. The elevation of the site ranges from approximately 1,293 to 1,325 feet. Based upon a review of recent aerial photographs, the site is essentially geotechnically unchanged since the issuance of the referenced report dated January 18, 2022.

Project Description

Based upon review of an *Illustrative Site Plan*, prepared by Urban Arena and dated September 25, 2024, site development for the project will consist of 451 residential units (townhomes and apartments) (see Figure 2). Other project improvements are anticipated to include storm water disposal facilities, swimming pools, recreation buildings, underground utilities, interior street/parking/drive areas and landscape/hardscape improvements. Perimeter/interior walls are anticipated as part of the tract development.

Based on review and GeoTek's knowledge of the project, the proposed development remains essentially geotechnically unchanged since issuance of the referenced report (GeoTek, 2022).

Project Design

The 2022 California Building Code (CBC) has not introduced any changes to the procedures used to determine generalized geotechnical design recommendations, slope stability or for structural analysis or design. Based upon review, the recommendations contained in the referenced report (GeoTek, 2022) remain valid and applicable to the design and construction of the subject project, unless specifically superseded in this report. The following text provides a summary of some of the recommendations provided in the referenced report and updated as necessary herein.

Remedial Grading

Due to the non-uniform nature and loose condition of the upper younger fan deposits, it is recommended that the soils be removed beneath the planned building footprint of the proposed structures and any screen wall or retaining wall footings to a depth of at least three (3) feet below existing grades, or two (2) feet beneath the base of the proposed foundations, whichever is greater. Removal bottoms should be relatively uniform in soil type which is not adversely porous and having an in-place density of at least 85 percent of the soil's maximum dry density as determined by ASTM D 1557 test procedures. A representative of this firm should observe and approve the bottom of all remedial excavations. The lateral extent of this recommended over-excavation should extend at least 5 feet beyond the building or foundation limits.

A minimum of 24 inches of engineered fill should be provided below asphaltic concrete pavement and Portland cement concrete hardscape areas. The horizontal extent of removals should extend at least two feet beyond the edge.

Following site clearing operations, over-excavation and lowering of site grades, where necessary, it is recommended that the exposed subgrade soils beneath all surface improvements be proof rolled with a heavy rubber-tired piece of construction equipment approved by and in the presence of the geotechnical engineering representative. All soil that ruts or excessively deflects during proof rolling should be removed as recommended by the GeoTek representative. Following proof rolling and removal of any unsuitable bearing soil, the exposed subgrade should be scarified to a depth of about 12 inches, be moisture conditioned to slightly above the soil's optimum moisture content and then be compacted to at least 90 percent of the soil's maximum dry density as determined by ASTM D 1557 test procedures.

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation (including roots), debris, oversized materials (6-inch diameter or greater) and other deleterious material. All areas should be brought to final subgrade elevations with fill materials that are placed and compacted in general accordance with minimum project standards. Engineered fill should be placed in 6-to-8-inch loose lifts, moisture conditioned to slightly above the optimum moisture content and compacted to a minimum relative compaction of 90 percent as determined by ASTM D-1557 test procedures.

If wet soils are encountered during remedial grading, methods for drying soils such as stockpiling or mixing with dry soils may be required to bring the soils to the required moisture content for placement as engineered fill. Placement of engineered fill should be observed and tested on a full-time basis by a GeoTek representative during grading activities.

Seismic Design Parameters

The site is located at approximately 33.6894 degrees Latitude and -117.3308 degrees West Longitude. Based on the relatively dense soil conditions encountered across the site, a Site Class "D" is considered appropriate for this project. Site spectral accelerations (S_a and S_1), for 0.2 and 1.0 second periods for a Class "D" site, was determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format.

The following seismic design parameters, based on the 2015 National Earthquake Hazards Reduction Program (NEHRP)/ASCE 7-16/2022 CBC, are presented below:

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_S	2.018g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.725g
Site Coefficient for Site Class "D", F_a	1.0
Site Coefficient for Site Class "D", F_v	1.7**
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, S_{MS}	2.018g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, S_{M1}	1.848g*
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	1.346g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	1.233g*
Site Modified Peak Ground Acceleration, PGA_M	0.946g
Seismic Design Category	D

*ASCE 7-16 Supplement 3 Section 11.4.8 requires a ground motion hazard analysis for structures on Site Class "D" for values of S1 greater than or equal to 0.2g. However, a ground motion hazard analysis is not required where the values of SM1 and SD1 are increased by 50%. The SM1 and SD1 values shown above already include the 50% increase, so that exception can be obtained.

**ASCE 7-16 Supplement 3 Section 11.4.8 indicates that the value of Fv should only be used for calculation of Ts, determination of Seismic Design Category, linear interpolation for intermediate values of S1, and when taking the exceptions under Items 1 and 2 of Section 11.4.8 for the calculation of SD1.

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

Foundation Design

The site soils were tested as posing a "Very Low" (0-20) expansion index in accordance with ASTM D 4829. Therefore, it is GeoTek's opinion that conventional foundations supported by engineered fill may be used for this site. Foundation design criteria for a conventional foundation system, in general conformance with the 2022 CBC, are presented herein. These are typical design criteria and are not intended to supersede the design by the structural engineer. A summary of GeoTek's preliminary foundation design recommendations for conventional foundations is presented in the table below:

Design Parameter	"Very Low" Expansion Index (0≤EI≤21)
Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade)	12 - One- and -Two Stories 24 - Three Stories
Minimum Foundation Width (Inches)*	12 - One-Stories 15 - Two-Stories 18 - Three Stories
Minimum Slab Thickness (actual)	4 inches
Minimum Slab Reinforcing	6" x 6" / W1.4 x W1.4 welded wire fabric, or No. 3 bars on 18-inch centers each way, placed in middle of slab
Minimum Footing Reinforcement	Two (2) No. 4 Reinforcing Bars, one top and one bottom**
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum 100% to a depth of 12 inches prior to placement of concrete

*Code minimums per Table 1809.7 of the 2022 CBC.
**It should be noted that the criteria provided are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions.

The following criteria for design of foundations are preliminary and should be re-evaluated based on the results additional laboratory testing of samples obtained at/near finish pad grade.

An allowable bearing capacity of 2,500 pounds per square foot (psf) may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 18 inches deep. This allowable soil bearing capacity may be increased by 500 psf for each additional foot of footing depth and 300 psf for each additional foot of footing width to a maximum value of 3,500 psf. An increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads). This bearing capacity contains a minimum factor of safety of three (3).

Structural foundations should be designed in accordance with the 2022 CBC, and to withstand a total static settlement of 1 inch and maximum differential static settlement of one-half of the total settlement over a horizontal distance of 40 feet.

The passive earth pressure may be computed as an equivalent fluid having a density of 350 psf per foot of depth, to a maximum earth pressure of 3,500 psf for footings founded on engineered fill or competent native soil. The allowable passive earth pressure contains a factor of safety of 1.5. A coefficient of friction between soil and concrete of 0.35 may be used with dead load forces. Passive pressure and frictional resistance may be combined without reduction. The upper one foot of soil should be ignored in the passive pressure calculations unless the surface is covered with pavements.

Structural Slab Moisture and Vapor Retarding System

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2022 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2022 CBC Section 1907.1 and ACI 360R-10. The vapor retarder design and construction should also meet the requirements of ASTM E 1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

The effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures. These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6-mil vapor retarder membrane, a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties such as thickness, composition, strength, and permeability to achieve the desired performance level.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as a flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within buildings be consulted to evaluate the general and specific moisture and vapor transmission paths and associated potential impact on the proposed construction. That person should provide recommendations relative to the slab moisture and vapor retarder systems and for migration of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate.

In addition, the recommendations in this report and GeoTek's services in general are not intended to address mold prevention, since GeoTek, along with geotechnical consultants in

general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

Miscellaneous Foundation Recommendations

It is recommended that control joints be placed in two directions spaced approximately 24 to 36 times the thickness of the slab in inches. These joints are a widely accepted means to control cracks and should be reviewed by the project structural engineer.

To minimize moisture penetration beneath the slab-on-grade areas, utility trenches should be backfilled with engineered fill, lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.

Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement. All foundation excavations should be reviewed by a representative of the geotechnical consultant prior to placement of reinforcement.

Minimum setbacks for all foundations should comply with the 2022 CBC or City of Lake Elsinore requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movement and/or differential settlement. If large enough, these movements can compromise the integrity of the improvements.

- The outside top edge of all footings should be set back a minimum of H/3, where H is the slope height, from the face of any descending slope. The setback should be at least five feet and need not exceed 40 feet.

- The bottom of any proposed foundations should be deepened so as to extend below a 1:1 upward projection from the bottom edge of the nearest excavation and the bottom edge of the closest footing.

Soil Corrosivity

The soil resistivity at this site was tested in the laboratory on a sample collected during the field investigation (GeoTek, 2022). The results of the testing indicate that the on-site soils are considered "mildly corrosive" (10,720 ohm-cm) (Roberge, 2000) to buried ferrous metal in accordance with current standards used by corrosion engineers. Recommendations for protection of buried ferrous metal should be provided by a corrosion engineer. Additional corrosion testing should be performed at the time of site grading to assess the corrosion of potential of the as-graded soils.

Soil Sulfate Content

The sulfate content was determined in the laboratory on a sample collected during the field investigation (GeoTek, 2022). The results indicate that the water-soluble sulfate result is less than 0.1 percent by weight, which is considered "negligible" as per Table 4.2.1 of ACI 318. Based on the test results and Table 4.3.1 of ACI 318, no special recommendations for concrete are required for this project due to soil sulfate exposure. Additional soil sulfate content testing should be performed at the time of site grading to assess the site soil sulfate exposure of the as-graded soils.

Closure

This report is intended to be made a part of, and incorporated with, the referenced report (GeoTek, 2022). All conclusions, recommendations, and limitations of that report, except as amended in this report or future reports for the project by GeoTek, remain valid and apply to this report.

The opportunity to be of continued service on this project is sincerely appreciated. If you should have any questions, please do not hesitate to call GeoTek's office.

Respectfully submitted,
GeoTek, Inc.

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Attachments: Figure 1 – Site Location Map
Figure 2 – Illustrative Site Plan

Distribution: (1) Addressee via email (one PDF file)

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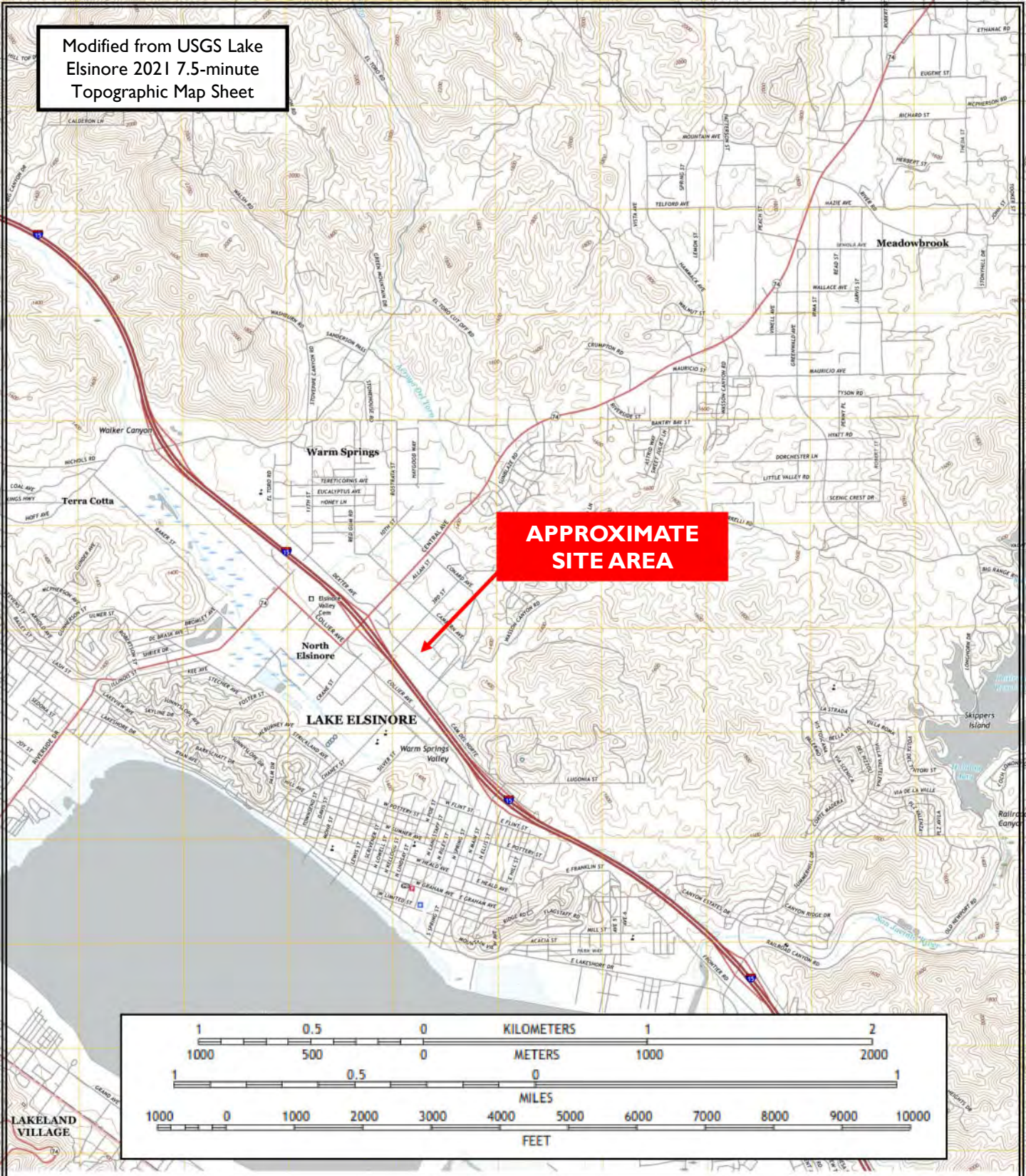
REFERENCES

Urban Arena, 2024, "Illustrative Site Plan, Dexter Village, Lake Elsinore, CA," dated September 24.

GeoTek, Inc., 2022, "Geotechnical and Infiltration Evaluation, Proposed Cove Apartment Project, Assessor's Parcel Numbers (APNs) 377-090-013, -037, -039 and -040, Dexter Avenue and 3rd Street, Lake Elsinore, Riverside County, California," Project No. 2967-CR, dated January 18.

U.S. Seismic Design Maps (http://earthquake.usgs.gov/designmaps).



3rd & Dexter, LLC
Dexter Village Project
APNs 377-090-013, -037, -039 and -040
Lake Elsinore, Riverside County, California

Project No. 4089-CR

NORTH

Figure 1

Site Location Map

GEOTEK

OVERALL SITE SUMMARY

Total units	451	units	(22 Affordable units or 5% of 422 base units)
Total gross area:	23.05	ac	Zone: CMU-Commercial Mixed Use
Total net area:	22.35	ac	
Avg net density:	20.18	du/ac	
Total buildable SF:	566,703	sf	
Rec Centers:	1.12	ac	(0.46 ac SFD Rec Center + 0.66 M.F. Rec Center)

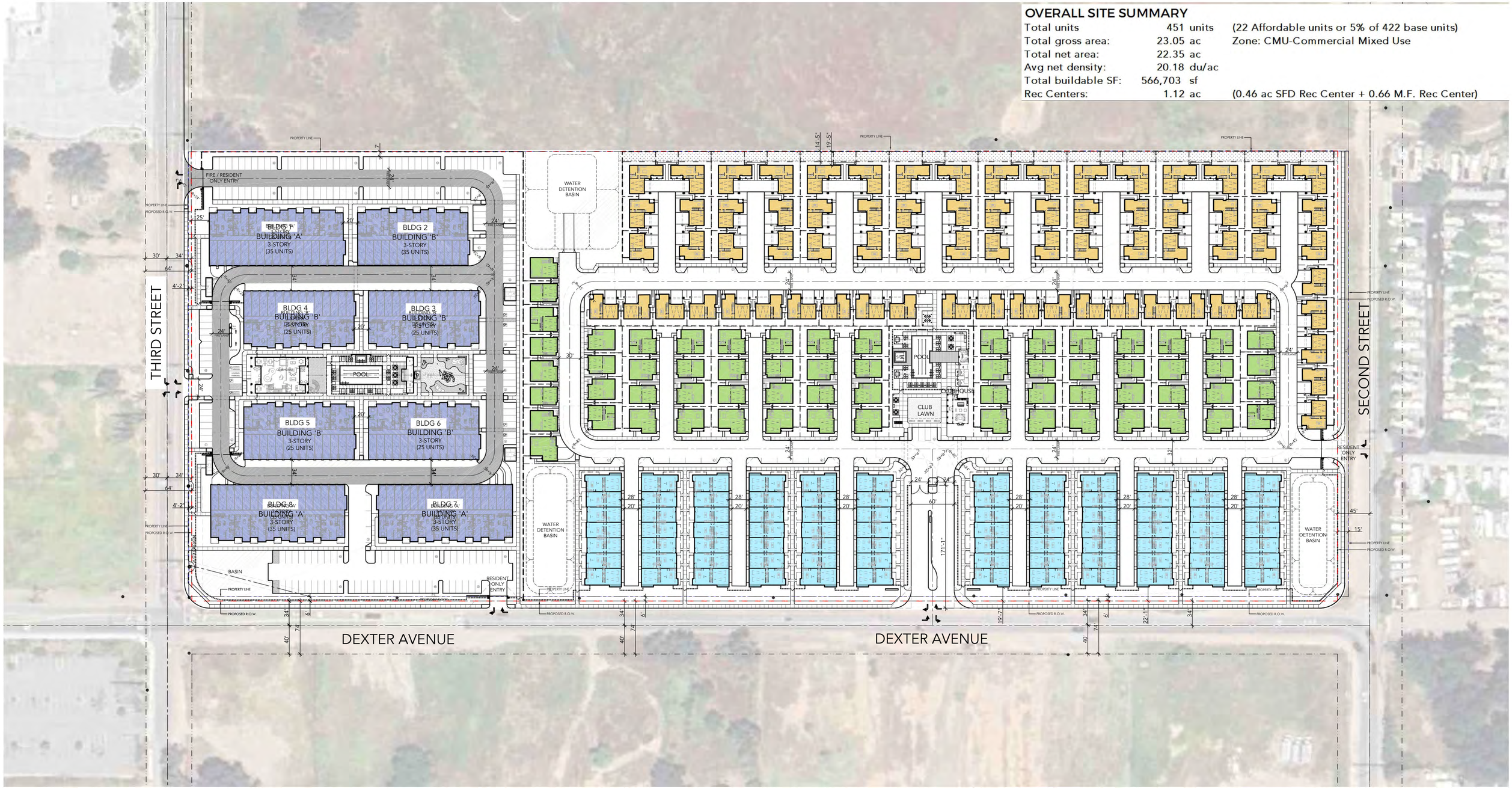


Figure 2

NOTES:

- SEE SHEET SP2 FOR MULTIFAMILY RESIDENTIAL SITE - (40 SCALE PLAN)
- SEE SHEET SP3 FOR SFD RESIDENTIAL SITE - (40 SCALE PLAN)
- SEE SHEET SP4 FOR ADDITIONAL SITE SUMMARIES & CALCULATIONS

DEXTER VILLAGE

LAKE ELSINORE | CA

FAIRBROOK COMMUNITIES | 24-046

DATE 09 | 25 | 24

1"=60'-0" SCALE

0 60 120

NORTH

ILLUSTRATIVE SITE PLAN | SP1

URBAN ARENA