



TECHNICAL MEMORANDUM

Date: 01/17/2022 **BKF Job Number: 20201331**

Deliver To: City of Belvedere

From: Chris Mills, PE
Associate
BKF Engineers
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Subject: MALLARD POINTE - PRELIMINARY UILITY DESIGN MEMO

The purpose of this technical memo is to provide sizing calculations to support the preliminary Storm Drain, Sanitary Sewer, and Water utility design.

Existing Conditions

The existing Mallard Pointe project site is located at 1-22 Mallard Road, in Belvedere Tiburon. The property is located on 3 separate parcels which contain 23 apartment units. The site is bounded by the Belvedere Lagoon on the north and east sides, Community road on the west side, and residential units on the south side. The total site area is approximately 2.75-Acres (120,079-SF), with 2.63-Acres of that area being developable (0.12-Acres are portions of the Lagoon). Within this developable area, roughly 78% is impervious area with 22% pervious area.

In the existing condition, the site roadway drainage is conveyed southwest to northeast via surface flow in the gutters along Mallard Road. This drainage is then carried to the lagoon via storm drain pipes. There are approximately 3 existing storm drain outfalls (#O1 - #O3) and one concrete swale that diverts portions of surface drainage into the lagoon (#O4). These outfall locations are approximate and are based on a combination of visual inspections and available information per the Marin County GIS Mapper. For the purposes of this report, the outfalls will be designated as #O1 at the eastern most end of the project site to #O4 at the western most end of the site (See Exhibit A attached). The remaining drainage from the apartments and associated yards appear to drain directly into the Lagoon.

The existing Sanitary Sewer utilities within the site is a private system that discharges to the public sewer owned and maintained by Sanitary District #5 on Community Road. Each apartment has its own sewer lateral that connects to the private main in Mallard Road.

The existing water utilities are owned and operated by Marin Municipal Water District (MMWD) and are located within Mallard Road. The water system, is fed by a 6-inch water main along Community Road. Per available information, the Mains within the project site are 4-inch cast iron pipe with sections of 4" ACP pipe. Each apartment unit has its own separate 5/8" water meter. Currently there is a single fire hydrant that services the site which is located at the north entrance to the site adjacent to unit 1.

Proposed Storm Drain Design

Storm Drain utilities will be designed per the Marin County Municipal Code Section 24.04.510 for Drainage Facilities. In the proposed condition, the site will be comprised of roughly 71% impervious area with 29% pervious area (of the developable area). With a reduction in impervious area out falling into the lagoon, it is assumed that no changes in the outfall sizing will be required. The proposed storm drain alignment along the new private roadway will be a minimum of 15-inches.

Additional hydrologic and hydraulic studies will be required for further analysis for future permit submittals.

Proposed Sanitary Sewer Design

Sanitary Sewer utilities will be designed per the Marin County Sanitary District No.5 Code Title 5 Standard Specifications Chapter 5.20 Design Standards. The project proposes to build 10-duplexes, 6-single-family homes and one new apartment building. There will be 16 dwelling units combined from the single-family homes (SFH) and duplexes. The proposed apartment building will contribute an additional 23 dwelling units, totaling 39 dwelling units all together. A factor of 400 gallons per day will be applied to the 39 dwelling units, which results in a total design flow of 0.02 CFS (10.8 GPM). Per the Sanitation District No.5 Standards, for areas less than 2,000 people, the unit design flow shall be 400 gallons per capita per day (This factor includes appropriate allowance for stormwater infiltration). These sewer lines will be sized to a minimum of 6-inches at 0.006 slope.

Proposed Water Design

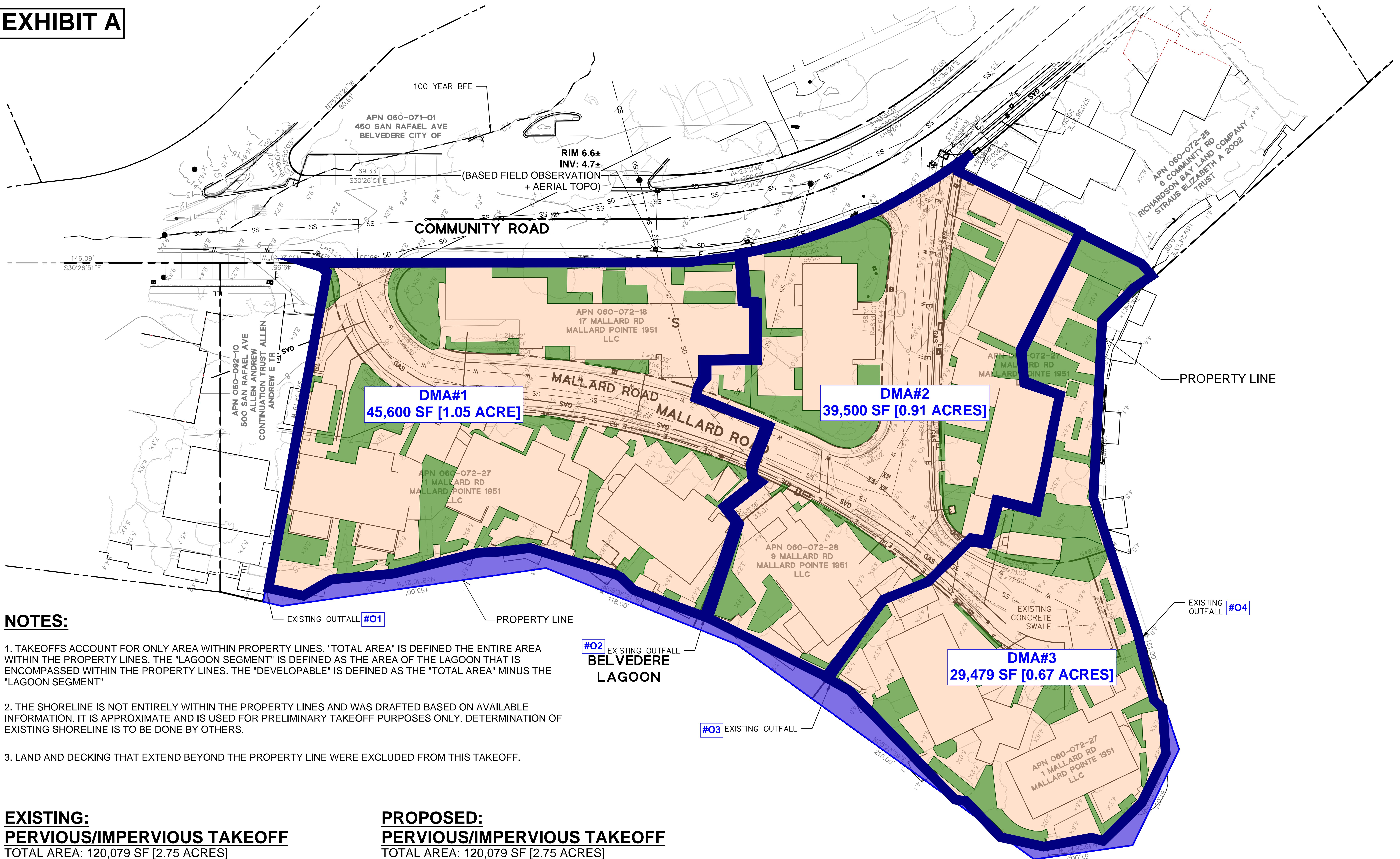
The Water utilities will be designed per the Marin Municipal Water District (MMWD) Standard Specifications and Details. The preliminary sizing of each meter is per the 2019 California Plumbing Codes, Section 610.8. Final sizing is to be determined by MMWD. The project proposes to reduce the number of buildings and water services from 23 to 17 (16 SFH/Duplexes + 1 Apartment Building). The existing 23 building meters are 5/8-inch in size with an approximate total cross-sectional area of 7.1-square inches. The new 16 SFH/Duplex meters are sized to 5/8-inch, while the apartment building is sized to 1.5-inches, for a proposed total cross-sectional area of 6.7-square inches. With this reduction in cross-sectional area, it is assumed that the existing water system will have capacity to service this new development (See **Table 1** below for comparison).

TABLE 1. COMPARISON OF EXISTING AND PROPOSED WATER SERVICE

| | UNITS | SERVICE SIZE (INCHES) | TOTAL CROSS SECTIONAL AREA (SQUARE INCHES) |
|--|---------|-----------------------|--|
| EXISTING CONDITIONS | 23 | 5/8 | 7.1 |
| PROPOSED CONDITIONS (16 DPLX/SFH + 1 APARTMENT) | 16 1 | 5/8 1.5 | 6.7 |



EXHIBIT A



NOTES:

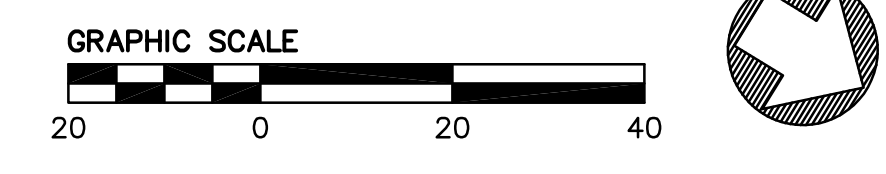
1. TAKEOFFS ACCOUNT FOR ONLY AREA WITHIN PROPERTY LINES. "TOTAL AREA" IS DEFINED THE ENTIRE AREA WITHIN THE PROPERTY LINES. THE "LAGOON SEGMENT" IS DEFINED AS THE AREA OF THE LAGOON THAT IS ENCOMPASSED WITHIN THE PROPERTY LINES. THE "DEVELOPABLE" IS DEFINED AS THE "TOTAL AREA" MINUS THE "LAGOON SEGMENT"
2. THE SHORELINE IS NOT ENTIRELY WITHIN THE PROPERTY LINES AND WAS DRAFTED BASED ON AVAILABLE INFORMATION. IT IS APPROXIMATE AND IS USED FOR PRELIMINARY TAKEOFF PURPOSES ONLY. DETERMINATION OF EXISTING SHORELINE IS TO BE DONE BY OTHERS.
3. LAND AND DECKING THAT EXTEND BEYOND THE PROPERTY LINE WERE EXCLUDED FROM THIS TAKEOFF.

EXISTING:
PERVIOUS/IMPERVIOUS TAKEOFF
 TOTAL AREA: 120,079 SF [2.75 ACRES]
 DEVELOPABLE AREA: 114,579 SF [2.63 ACRES]

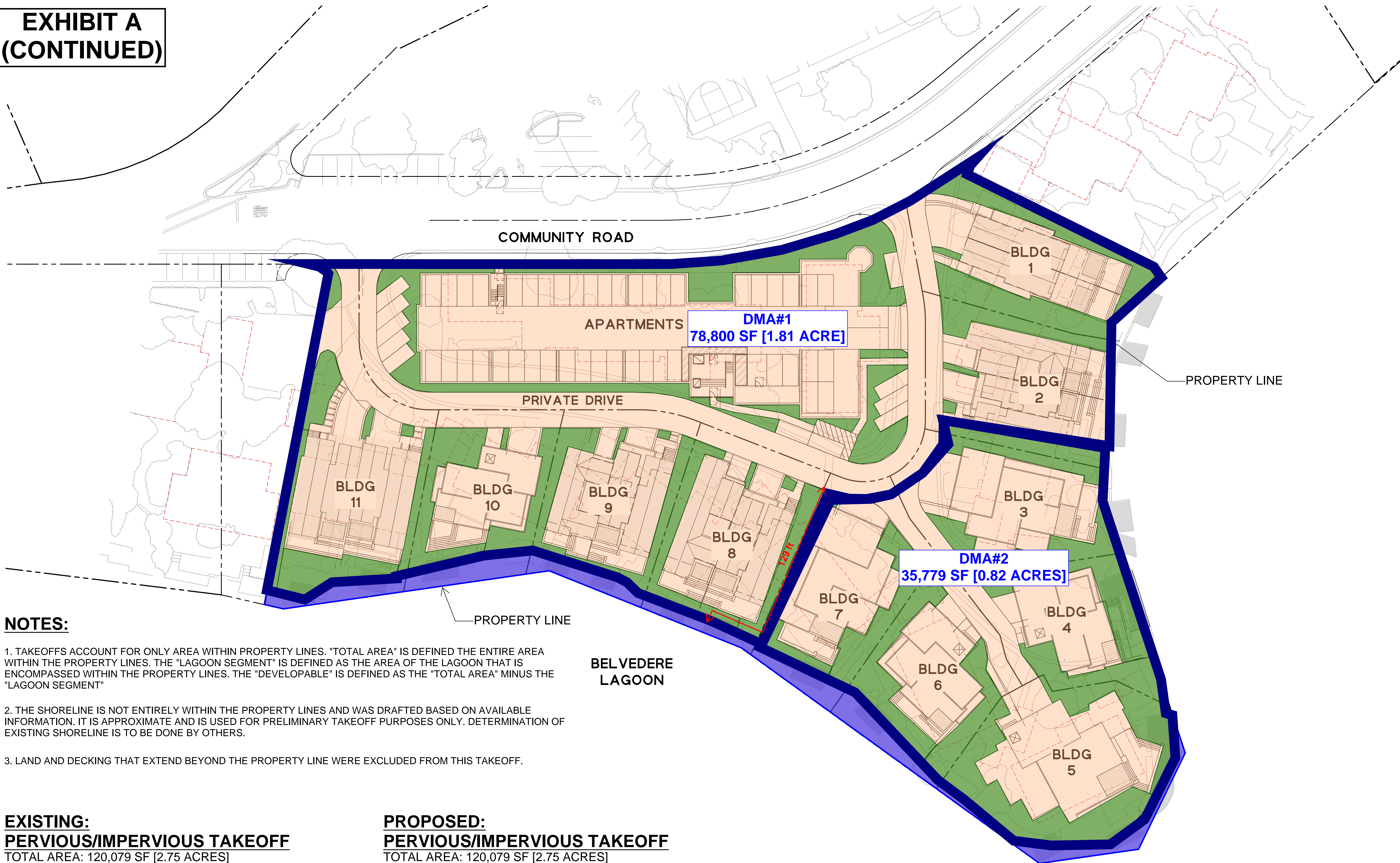
PERVIOUS: 24,979 SF [0.57 ACRES]
IMPERVIOUS: 89,600 SF [2.06 ACRES]
LAGOON SEGMENT: 5,500SF [0.12 ACRES]

PROPOSED:
PERVIOUS/IMPERVIOUS TAKEOFF
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 DEVELOPABLE AREA: 114,579 SF [2.63 ACRES]

PERVIOUS: 32,900 SF [0.75 ACRES]
IMPERVIOUS: 81,800 SF [1.88 ACRES]
LAGOON SEGMENT: 5,500SF [0.12 ACRES]



**EXHIBIT A
(CONTINUED)**



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PROPOSED CONDITIONS – IMPERVIOUS VS PERVIOUS TAKEOFF

