

APPENDIX

This appendix contains supplementary infrastructure requirements and planning level estimates in the form of memos from the sanitary sewer, flood control, and water infrastructure planners. The immense amount of infrastructure required to support new development for the Kyle Canyon Special Plan Area is estimated to be up to \$650 million. Completing infrastructure construction of this magnitude may not be feasible by individual developers. This information is being provided to demonstrate the benefits of a master planned development, whether by a single developer assembling significant parcels within the area, or through a conglomeration of individual property owners, in order to facilitate alternative funding for these improvements such as through creation of a Special Improvement District.

**City of Las Vegas Public Works Sanitary Sewer
Engineering**

**Future Sewer Infrastructure
Kyle Canyon Special Area Plan**

December 2024



Introduction

A vast majority of the remaining undeveloped land in the City of Las Vegas Jurisdiction is located in the Northwest area of town, more specifically in the Kyle Canyon and Nu Wav Kaiv Regions. Within these Regions are undeveloped acres of land north and south of Kyle Canyon Road, as well as north of the Moccasin alignment on the east side of the US-95 freeway. Per the latest approved City of Las Vegas Sewer Masterplan Update (MPU), there is a substantial amount of sewer infrastructure necessary to provide sewer service to these areas, varying in size from 10" to 30", and projected to be required from a capacity standpoint within the next 15 years. Please see Exhibits A-25, Comprehensive Alternative Plan #1 Focus Map #4, and A-29, Comprehensive Alternative Plan #2 Focus Map #4, included in this package for a summary of these areas and what is projected per the MPU. A more detailed overview of the planned sewer infrastructure adjacent Kyle Canyon Road can be referenced on Exhibit E-1, Kyle Canyon Road Sewershed Map. Within the Kyle Canyon Region are Masterplanned Communities and Planned Developments already in construction. East of the Red Rock Natural Conservation Area, between Iron Mountain Road and Grand Teton Drive is Skye Canyon, East of US-95, south of Moccasin Road is Sunstone, and North of Kyle Canyon Road, west of US-95 is Kyle Canyon Gateway. For an overview of the Northwest Area, its Regions, and the developments in construction, please see Exhibit E-2, City of Las Vegas Northwest Area Overview.

North and South of Kyle Canyon Road, West of the US-95 Freeway

- Approximately 1,025 acres are undeveloped
- Portions of the extensions in this area have been completed by the Kyle Canyon Gateway Planned Development
- Although Exhibit A-29 only shows extensions in Kyle Canyon Road and Moccasin Road, there will be additional trunk lines in both Rocky Avenue and Log Cabin Way to assist with the coverage of the area
- Additional sewer capacity anticipated by 2029
- Estimated cost of required infrastructure based on 2019 MPU: \$31,349,000
 - 2024 Estimate per CPI Inflation: \$39,186,250

North of Moccasin Road, East of the US-95 Freeway

- Approximately 4,410 acres are undeveloped
- A portion of the sewer extensions in this area are underway to be constructed by Olympia for the triangular shaped piece of developable land adjacent and southeast of the Paiute Golf Course (Area known as the 'Golden Triangle')
- The sewer layout in this area is contingent upon whether or not the City will be granted an easement through the Paiute Golf Course. If an easement is not granted, sewer flow has to be pumped and routed around City owned parcels in the Nu Wav Kaiv Region to eventually gravity drain southerly adjacent to US-95. The estimated cost of both options are provided
- Additional sewer capacity to serve the Golden Triangle sewer anticipated by 2039
- Commercial Area north of Paiute Golf Course to need sewer capacity by 2069
- Estimated cost of infrastructure with easement (Exhibit A-29) based on 2019 MPU: \$68,728,000
 - 2024 Estimate per CPI Inflation: \$85,910,000
- Estimated cost of infrastructure with Lift Station (Exhibit A-25) based on 2019 MPU: \$83,270,000
 - 2024 Estimate per CPI Inflation: \$104,087,500

Conclusion

Construction of the sewer infrastructure is dependent on capacity needs of the CLV Sewer MPU. If capacity is needed within a 5-year horizon, the facilities are scheduled in the city's 5-year Capitol Projects Plan and associated projects would be funded through Sewer Enterprise Funds. Alternatively, construction may happen sooner than projected per the MPU if driven by private development demands. Total Estimated Cost of Build-Out without any Developer Contributions: \$125,096,250 - \$143,273,750.

FINAL

Exhibit A-25

Comprehensive Alternative Plan #1

Focus Map #4

City of Las Vegas
2019 Wastewater Master Plan Update

Project Location



0 0.6 1.2 Mile

(At original document size of 11x17)

1:50,000

Legend

CIP Horizon

2024
2029
2039
2049
2069



Notes

1. Coordinate System: NAD 1983 StatePlane Nevada East FIPS 2701 Feet
2. Data Sources: City GIS and CLV InfoSWMM Model
3. Background Esri: HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community Esri: HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community



Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Starzec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Starzec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

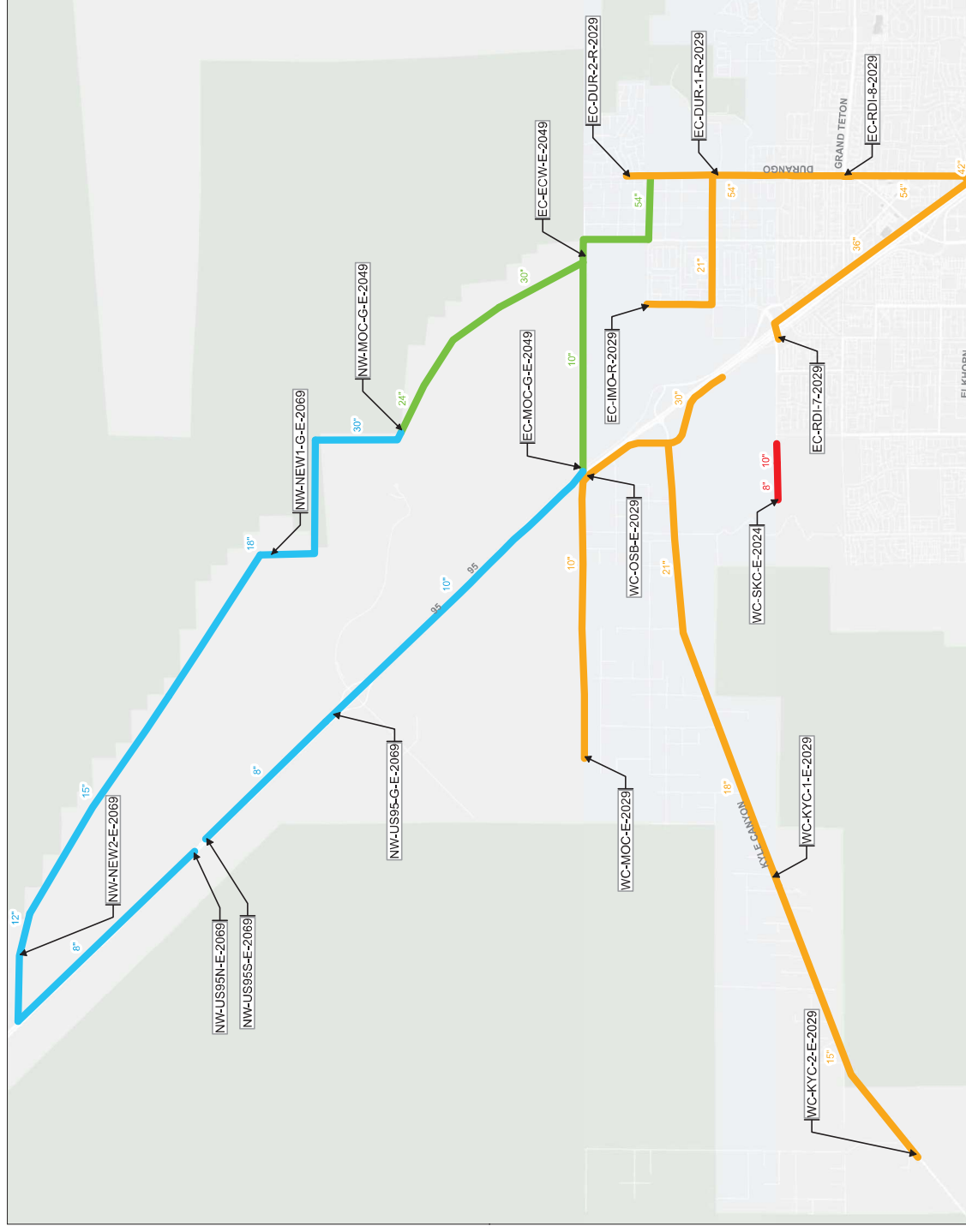
FINAL
Exhibit A-29
Comprehensive Alternative Plan #2
Focus Map #4

City of Las Vegas
2019 Wastewater Master Plan Update

Project Location
Las Vegas, NV



Legend
CIP Horizon

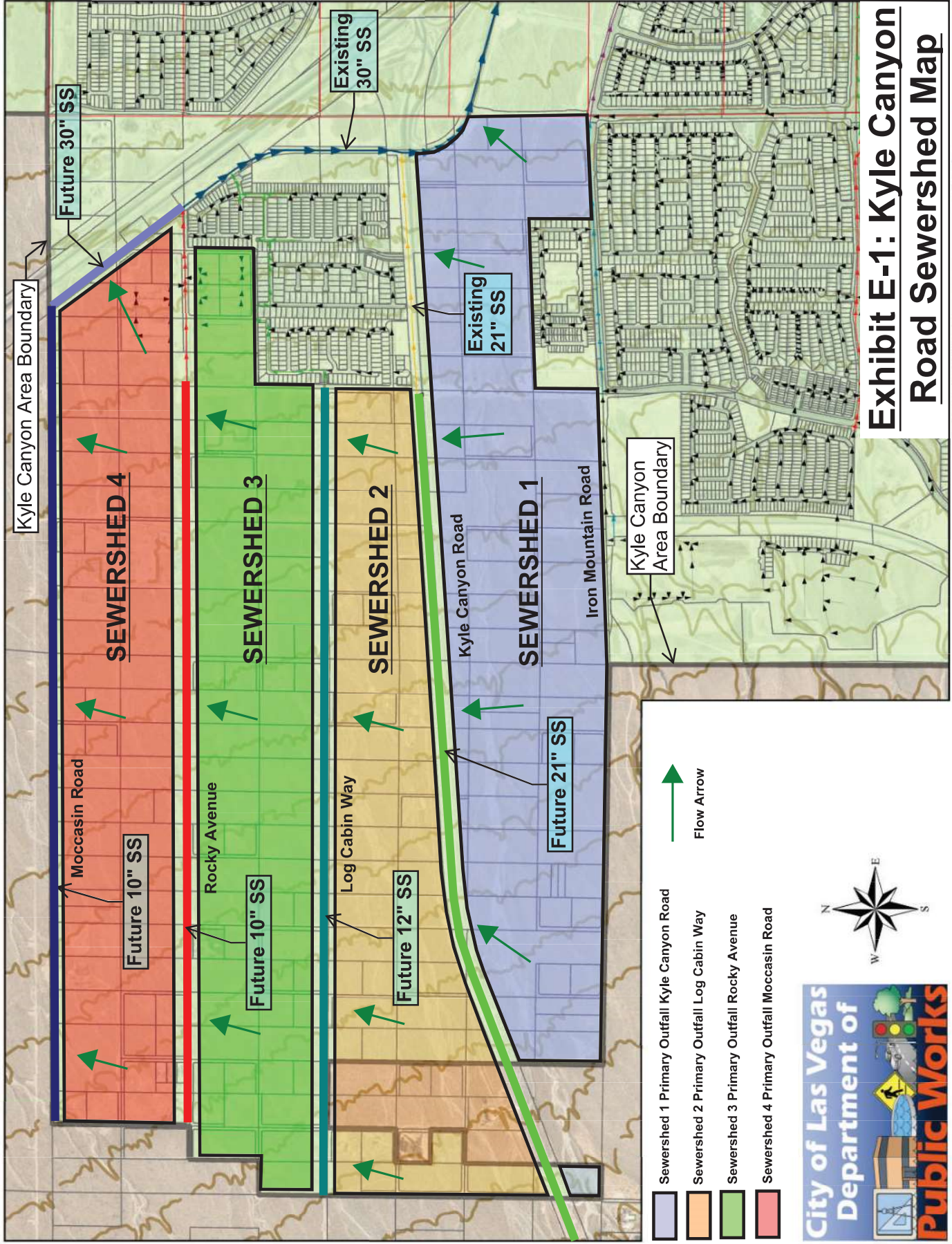


Notes

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3. Background Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community



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**Exhibit E-1: Kyle Canyon
Road Sewershed Map**

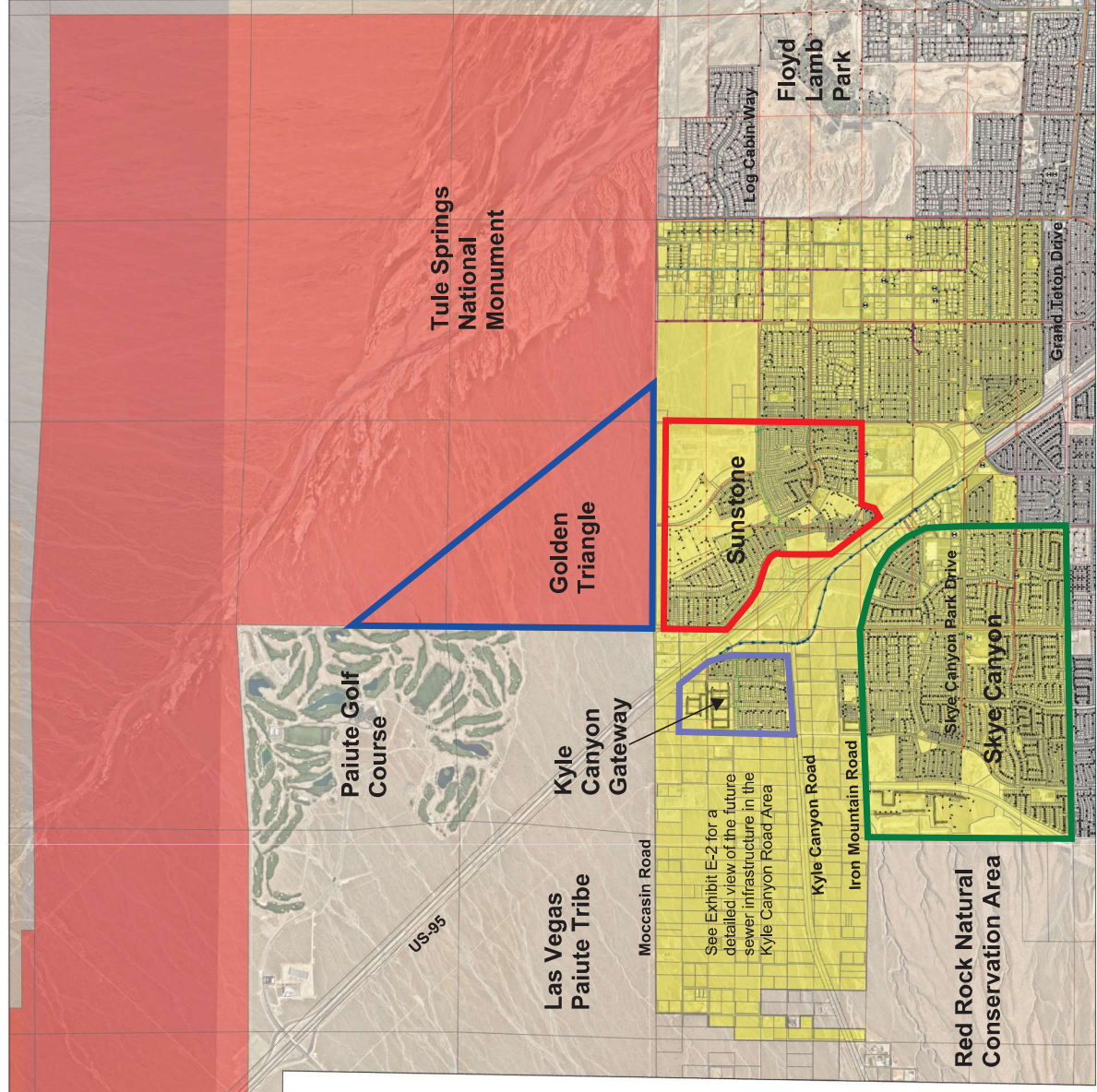
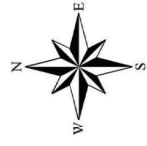
Exhibit E-2: City of Las Vegas Northwest Area Overview

Existing and Future
Masterplan/Planned
Developments

- Golden Triangle
- Sunstone
- Kyle Canyon Gateway
- Skye Canyon

CLV Regional Areas

- Kyle Canyon
- Nu Wav Kaiv



**City of Las Vegas Public Works Flood Control
Engineering**

**Future Storm Drain Infrastructure
Kyle Canyon Special Area Plan**

December 2024



Kyle Canyon Special Area Plan

Storm Drain Infrastructure

Flood Control Introduction

The Las Vegas Valley is geographically diverse from steep mountains, natural desert and a thriving urban metropolitan area. Typical annual rainfall of 4.18-inches, combined with steep slopes, poor soil, and urbanization can create rapid storm runoff during periods of intense rainfall causing loss of life, as well as significant property and infrastructure damage.

In 1986, the Clark County Regional Flood Control District was created to develop and coordinate a comprehensive flood control master plan to alleviate flooding in the Las Vegas Valley and outlying Clark County areas. The latest master plan for the Las Vegas Valley, 2023 Clark County Regional Flood Control (CCRFCD) Master Plan Update (MPU), has identified storm drain infrastructure in the Kyle Canyon Special Plan area that will provide flood protection from 100-year storm events for the areas bounded by Moccasin Road to the north, US95 to the east, Iron Mountain Road to the south, and Witch Mountain Street to the west. The two main storm drain systems identified in the MPU are Moccasin Road Storm Drain facility and Kyle Canyon Road Storm Drain facility.

The existing downstream storm drain infrastructure is currently at its maximum capacity thus is unable to accommodate additional storm runoff that would be generated from the new Kyle Canyon Special Plan area. Therefore, in order to provide flood protection to the Kyle Canyon Special Plan area and downstream storm drain infrastructure, the two new storm drain systems mentioned above are required to be constructed with development.

Moccasin Road Storm Drain System

The Moccasin Road Storm Drain facility can be developed as either an Ultimate Condition facility, or an Interim Condition facility.

The Ultimate Condition facility is based on the 2023 CCRFCD MPU plan projecting storm runoff from north of Moccasin Road along US95 and storm runoff from west of US95 along Moccasin Road combining at the intersection of US95 and Moccasin Road. This combined storm runoff drains easterly along Moccasin Road to the Upper Las Vegas Wash Levee. The Ultimate Condition storm drain facility consists of a combination of underground storm drain box along Moccasin Road from the Upper Las Vegas Wash Levee to US95 with an at grade concrete lined channel along Moccasin Road from US95 to Ambulance Boundary Road. It continues along Ambulance Boundary Road from Moccasin Road to Kyle Canyon Road. See Exhibit A, Kyle Canyon Special Area Plan (Ultimate Condition) for facility Identification Mile (ID Mile) and location.

The Interim Condition facility is an alternative solution to address storm runoff from the Kyle Canyon Special Plan area without addressing storm runoff generated north of Moccasin Road along US95. The Interim Condition facility discharges to the natural desert at the southeast corner of Moccasin Road and

Bridgestone Trail rather than discharging at the Upper Las Vegas Wash Levee. See Exhibit B, Kyle Canyon Special Area Plan (Interim Condition) for facility Identification Mile (ID Mile) and location.

Kyle Canyon Road Storm Drain System

The Kyle Canyon Road Storm Drain facility is necessary to provide flood protection to the Kyle Canyon Special Plan area in conjunction with Moccasin Road Storm Drain facility. The Kyle Canyon Road Storm Drain facility begins at the existing CCRFCD MPU facility, just south of Skye Village Road and Oso Blanca Road and continues westerly along Kyle Canyon Road to Cardenas Way. The storm drain facility consists of a combination of underground storm drain box and pipe with a large sediment basin. Exhibit A reflects both the Moccasin and Kyle Canyon systems.

Summary

The flood control facility needed to provide flood protection for the development of the Kyle Canyon Special Plan area is summarized above. The development of a portion of area south of Kyle Canyon Road requires completion of the Kyle Canyon Road Storm Drain facility. The development of a portion of area north of Kyle Canyon Road requires completion of both Moccasin Road Storm Drain facility and Kyle Canyon Road Storm Drain facility due to limited capacity of the existing downstream flood control network.

See Exhibit C, Kyle Canyon Area Plan Storm Drain Infrastructure Cost Estimate, for a detailed breakdown of cost with facility sizes based on ID Miles.

The Interim Condition Cost is approximately \$145 million and the Ultimate Condition Cost is approximately \$293 million. The cost is based on 2023 CCRFCD MPU cost tool and subject to change based on the inflation and detail design of the proposed storm drain facilities.

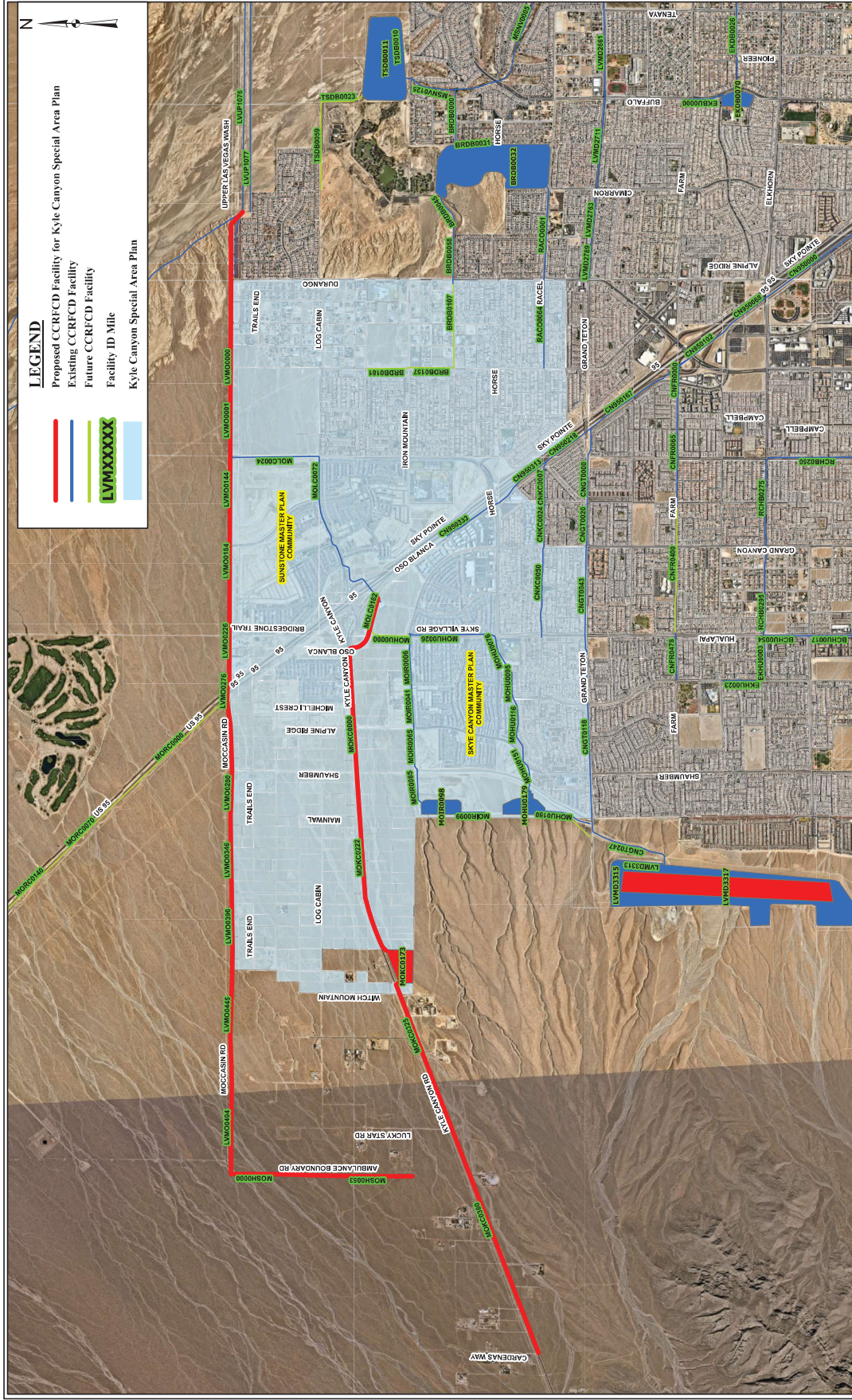


EXHIBIT A
Kyle Canyon Special Area Plan
(Ultimate Condition)

SCALE: 1:30,000
DRAWING NAME: Kyle Canyon Planned Community_Ultimate
DRAWN BY: JRT
DATE: 12/17/2024
SHEET NUMBER 1 OF 1

Due to continuous development activity, this map is for reference only

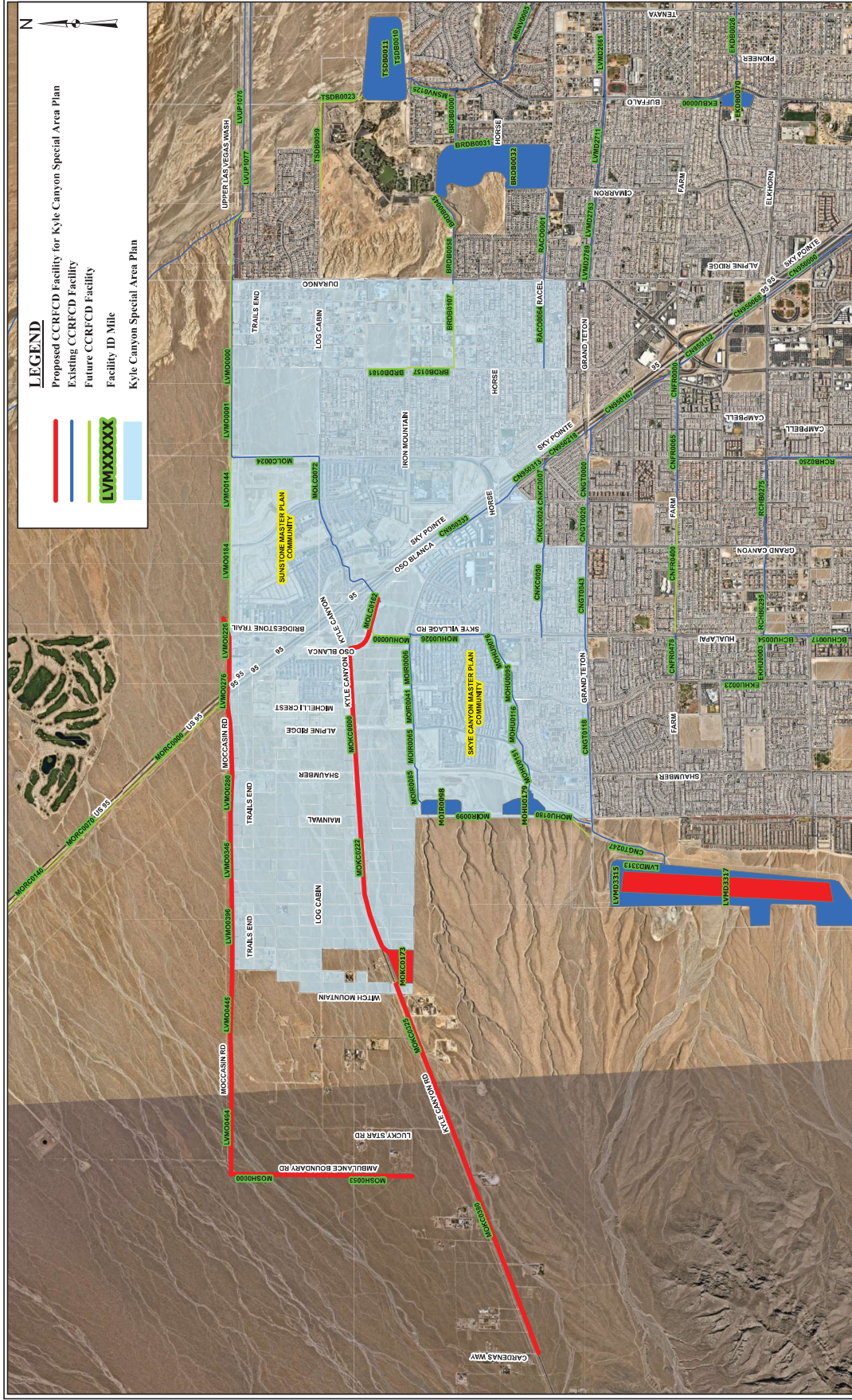


EXHIBIT B
Kyle Canyon Special Area Plan
(Interim Condition)

SCALE: 1:30,000
DRAWING NAME: 1
DRAWN BY: JRT
DATE: 12/17/20
SHEET NUMBER 1 OF

Due to continuous development activity, this map is for reference only.



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EXHIBIT C**KYLE CANYON SPECIAL AREA PLAN
STORM DRAIN INFRASTRUCTURE COST ESTIMATE**

LINE ITEM (ID MILE)	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
MOCCASIN WEST SIDE OF US95 - ULTIMATE CONDITION COST					
CCRFGD MOCCASIN FACILITY					
LVMO0280	CONC CHNL 16"W X 5.5'D 0:1 SS	3500	LF		\$ 7,781,561.44
LVMO0346	CONC CHNL 16"W X 5.5'D 0:1 SS	2600	LF		\$ 5,780,588.50
LVMO0396	CONC CHNL 16"W X 5.5'D 0:1 SS	2600	LF		\$ 5,780,588.50
LVMO0445	CONC CHNL 16"W X 5.5'D 0:1 SS	2600	LF		\$ 5,780,588.50
LVMO0494	CONC CHNL 16"W X 5.0'D 0:1 SS	2800	LF		\$ 6,126,912.60
SUB TOTAL					\$ 31,250,239.54
CCRFGD MOCCASIN SOUTH FACILITY					
MORC0000	CONC CHNL 12"W X 6.0'D 0:1 SS	2640	LF		\$ 5,684,085.99
MORC0053	CONC CHNL 12"W X 6.0'D 0:1 SS	2640	LF		\$ 5,684,085.99
SUB TOTAL					\$ 11,368,171.98
SUB TOTAL					\$ 42,618,411.52
30% CONTINGENCY					\$ 12,785,523.46
TOTAL					\$ 55,403,934.98
MOCCASIN EAST SIDE OF US95 - ULTIMATE CONDITION COST					
CCRFGD MOCCASIN FACILITY					
LVMO0001	2-16'X10' RCB	7530	LF		\$ 60,184,126.79
LVMO0144	2-15'X10' RCB	1915	LF		\$ 14,532,389.75
LVMO0184	2-15'X10' RCB	2440	LF		\$ 18,484,567.10
LVMO0226	2-15'X10' RCB	2500	LF		\$ 18,927,283.20
LVMO0276	30'X9.5' Bridge	400	LF		\$ 4,495,162.85
SUB TOTAL					\$ 116,623,529.69
30% CONTINGENCY					\$ 34,987,058.91
TOTAL					\$ 151,610,588.60
MOCCASIN EAST SIDE OF US95 - INTERIM CONDITION COST					
CCRFGD MOCCASIN FACILITY (ADJUSTED COST BASED ON THE TOTAL FLOW VS. KYLE CANYON PLAN AREA FLOW FOR RATIO OF 13.6%)					
LVMO0226	2-15'X10' RCB	2500	LF		\$ 2,574,110.52
LVMO0276	30'X9.5' Bridge	400	LF		\$ 611,342.15
SUB TOTAL					\$ 3,185,452.66
30% CONTINGENCY					\$ 955,635.80
TOTAL					\$ 4,141,088.46
KYLE CANYON WEST SIDE OF US95 - ULTIMATE CONDITION COST					
CCRFGD KYLE CANYON FACILITY					
MOLC0162	13'X6' RCB	1018	LF		\$ 3,065,946.32
MOKC0000	11'X8' RCB	6140	LF		\$ 19,604,960.10
MOKC0222	10'X8' RCB	3991	LF		\$ 12,079,904.14
MOKC0173	KYLE CANYON SEDIMENT BASIN	1	LS		\$ 5,210,095.37
MOKC0325	9'X8' RCB	3035	LF		\$ 8,684,643.57
MOKC0380	90" RCP	8700	LF		\$ 16,894,666.84
TOTAL					\$ 65,540,216.34
30% CONTINGENCY					\$ 19,662,064.90
TOTAL					\$ 85,202,281.24
TOTAL ULTIMATE CONDITION COST \$ 292,216,804.82					
TOTAL INTERIM CONDITION COST \$ 144,747,304.68					

DRAFT FOR INFORMATION ONLY

Las Vegas Valley Water District

**Water Infrastructure
Capital Improvements in the Northwest**

October 2024

Infrastructure Management Department

Contents

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I. Introduction

There have been an increasing number of inquiries from Developers desiring to improve parcels of land in the Northwest portion of the Las Vegas Valley Water District (LVVWD) Service Area. The Northwest Area is generally located between the western edge of existing development, west to the BLM disposal boundary, and from the Kyle Canyon/Paiute Golf Course boundary south to Ann Road.

- The system is approaching capacity for storage in the existing 3090 and 3205 Pressure Zones. At the historical rate of development, it is estimated that there is approximately one year or less before storage limits are reached in the 3090 and 3205 Pressure Zones.
- There is no existing infrastructure to serve development in zones higher than the 3205 Pressure Zone.
- As outlined in previous meetings with the City of Las Vegas, additional infrastructure is needed to serve future development.
- It is estimated that it could take up to three to four years from the start of design for new facilities to be completed to add capacity to serve new development.
- To date, no developer has come forward with a plan to fund the design and construction of the required facilities.
- None of these facilities are in the LVVWD CIP.

Below is a summary of the infrastructure required to develop this portion of the Northwest Area which is further split into three subareas due to geographical constraints.

- Northwest (NW) 3090 and 3205 Pressure Zones
 - 1,767 Undeveloped Acres
 - Total 2024 Estimated Cost of Required Water Infrastructure = \$45.7M
 - Minimum Timeline to Construct = 3 to 4 years
 - The 3090 and 3205 Pressure Zones are currently the highest existing pressure zones in the District's northwest area and extend from Moccasin Road at the north boundary to Ann Road at the south boundary.
- Kyle Canyon West 3320-3550 Pressure Zones
 - 1,269 Undeveloped Acres
 - Total 2024 Estimated Cost of Required Water Infrastructure = \$93.0M
 - Minimum Timeline to Construct = 5 to 6 years
 - This area is bounded by Moccasin Road on the north, Iron Mountain Road and the conservation area boundary on the south, the current 3205 Pressure Zone boundary on the east, and the future 3550 Pressure Zone boundary on the west.
- Paiute Area 2975-3435 Pressure Zones
 - 1,016 Undeveloped Acres
 - Total 2024 Estimated Cost of Required Water Infrastructure = \$47.5M
 - Minimum Timeline to Construct = 5 to 6 years

- This area is bounded by the Paiute land boundary on the north, Moccasin Road on the south, the 2975 Pressure Zone boundary on the east, and the BLM disposal boundary on the west.

To provide service to future development in the above areas, capital improvements and a funding mechanism to build infrastructure are needed. A cost summary and required facilities for each subarea is provided in the following section.

The total 2024 estimated cost to construct all required facilities for all three subareas is \$186.2M.

II. Required Facilities and Costs

Facility requirements for future development are based on the total undeveloped acreage in each subarea/pressure zone and includes the construction of reservoirs, pumping stations, pressure reducing valves (PRVs), and pipelines. Calculations for the required facilities are based on Systemwide Demand Factors for mixed-use development type and density and a fire flow of 4,000 gpm. Systemwide Demand Factors are routinely modified based on actual consumer water use, and therefore, subject to change.

The required facilities and total costs for each subarea are listed as follows:

NW 3090-3205 Pressure Zones

- Total 2024 Estimated Cost of Required Water Infrastructure = \$45.7M
- 5 MG Log Cabin 3205 Zone Reservoir
- (2) PRVs
- Inlet/Outlet and Transmission Pipelines

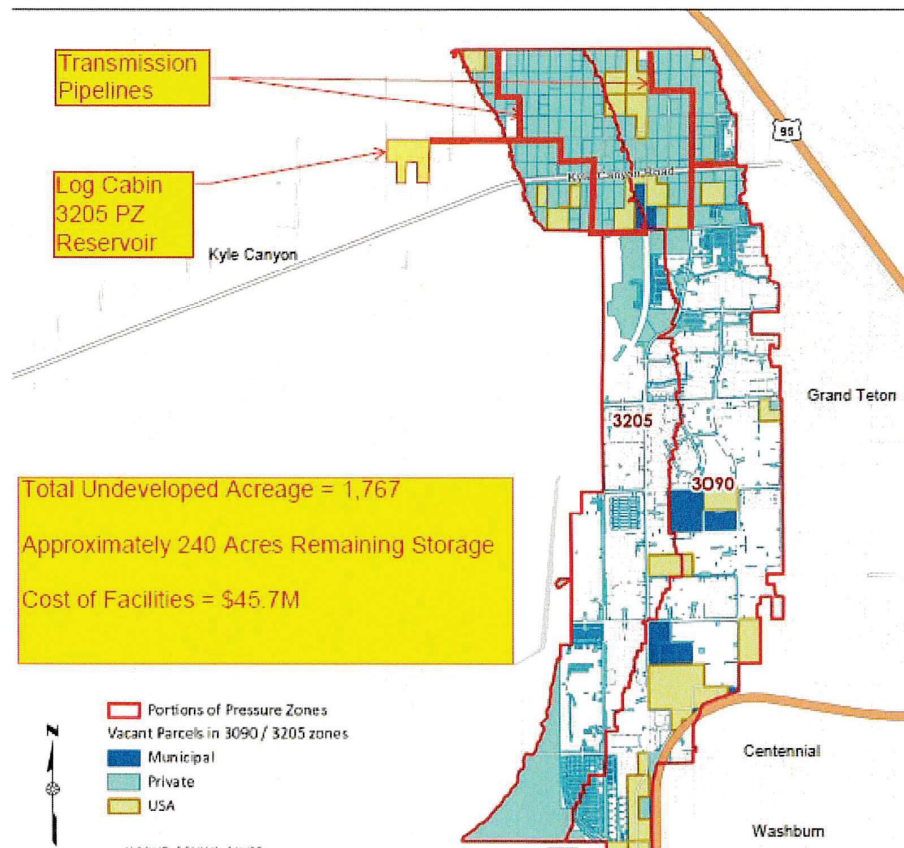


Figure 2 – NW Area 3090-3205 Pressure Zones

Kyle Canyon West 3320-3550 Pressure Zones

- Total 2024 Estimated Cost of Required Water Infrastructure = \$93.0M
- 5 MG Kyle Canyon 3550 Zone Reservoir
- Log Cabin 3550 Zone Pumping Station
- Elkhorn 3205 Zone Pumping Station Upgrades
- (4) PRVs
- Inlet/Outlet and Transmission Pipelines

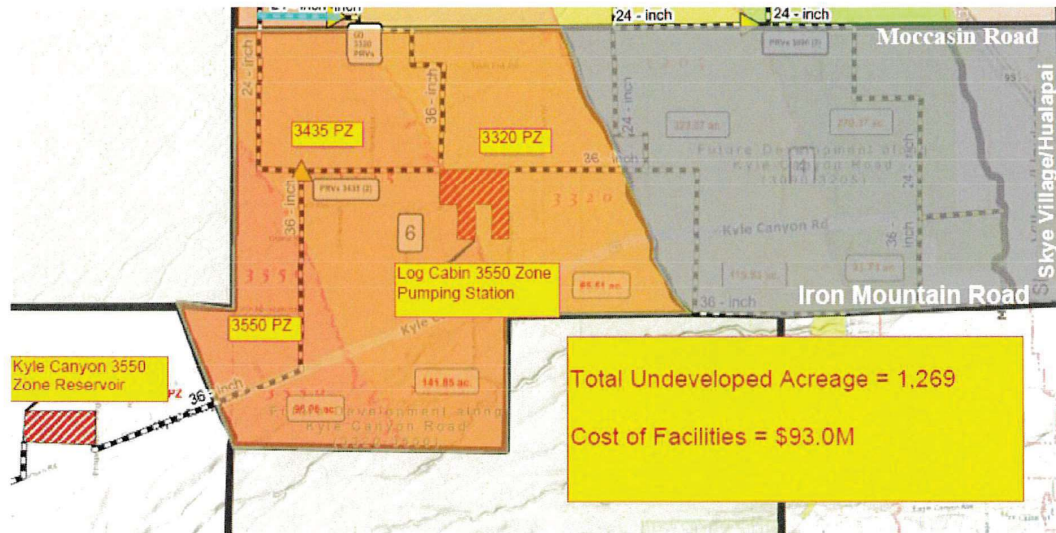


Figure 3 – Kyle Canyon West 3320-3550 Pressure Zones

Paiute Area 2975-3435 Pressure Zones

- Total 2024 Estimated Cost of Required Water Infrastructure = \$47.5M
- 5 MG Expansion at Existing Reservoir Site
- (2) PRVs
- Inlet/Outlet and Transmission Pipelines

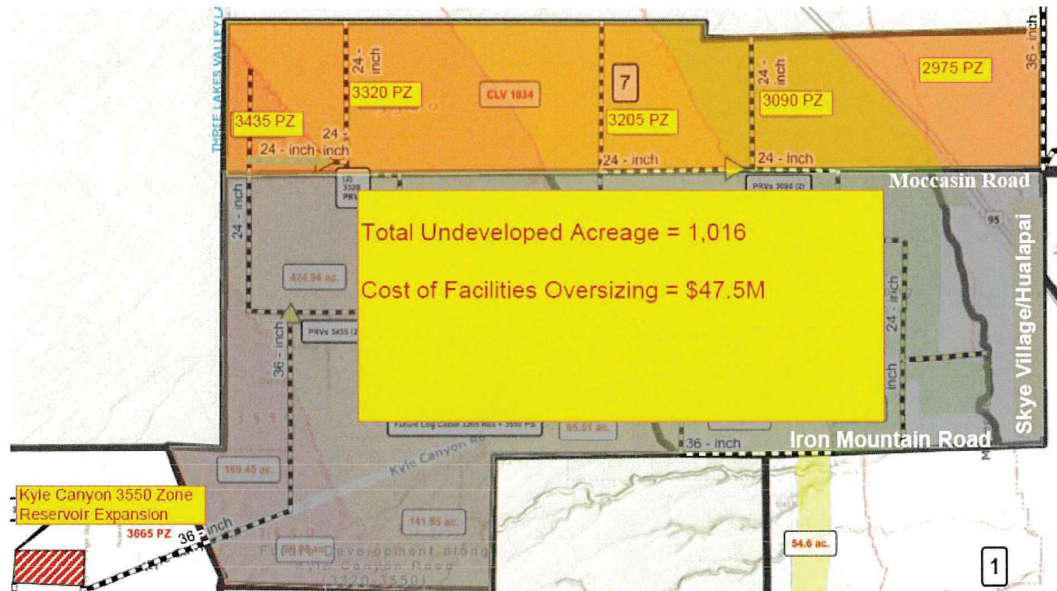


Figure 4 – Paiute Area 2975-3435 Pressure Zones