

Preliminary Sewer Report

For:

**Wingfield Commons
Sparks, Nevada**

Prepared for:

Foothills at Wingfield, LLC

Prepared by:



20 Vine Street
Reno, NV 89503

March 6, 2018



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1.0 Introduction

The purpose of this preliminary report is to address the sanitary sewerage impacts that may result from the proposed Wingfield Commons development, in accordance with the City of Sparks development standards and sound engineering practices. This report will quantify the estimated sanitary sewer flows to be generated by the proposed project and will analyze the impacts of this development on the existing downstream facilities. Potential mitigation measures will also be discussed. It is anticipated that a more in-depth sewer report will be provided during the Tentative Map phase of the project.

2.0 Location and Background

The proposed development is located approximately eight miles north of Interstate 80 off of Vista Boulevard, within Section Eighteen (18), Township Twenty (20) North, Range Twenty-One (21) East, Mount Diablo Meridian, City of Sparks, County of Washoe, State of Nevada. The site is southeast of the existing Wingfield Springs Planned Development, south of the existing Foothills Planned Development, and directly east of Golden Eagle Regional Park. The property consists of three parcels identified by the Washoe County Assessor's Office as APN 084-550-02, 084-550-07 and 084-550-08.

The site is located in a broad, relatively flat valley east of Spanish Springs Valley, surrounded by the Pah Rah Range to the east, Spanish Springs Canyon to the south and Canoe Hill to the west. Surface drainage through the site is generally south-to-north, with an eventual connection to the main drainage channel that flows in a southerly direction through Spanish Springs Valley to the Truckee River via the North Truckee Drain along Sparks Boulevard.

The subject property is generally vacant with an unoccupied single-family residence and several outbuildings. The area to the west is developed as Golden Eagle Regional Park (GERP), opened in 2008. The area to the south, east and north is currently undeveloped BLM land. The site also abuts four smaller parcels that are outside of the city's incorporated limits.

The previous 2009 draft planned-development handbook, consisted of a mixed-use project containing residential, commercial and open space components, with an estimated peak sewer flow of approximately 563,000 gallons per day.

3.0 Project Description and Assumptions

The currently-proposed Wingfield Commons development will consist of up to 500 single-family dwelling units. Utilizing an average daily dry weather wastewater flow (ADWF) of 210 gallons per day per dwelling unit, the estimated daily flow for the project is 105,000 gallons per day. This is consistent with the November 2016 Sewer Model Update Report, prepared by Atkins. It is anticipated that the project will be phased over several years, with approximately 100 single-family homes built per phase.

4.0 Existing Sanitary Sewer Infrastructure

The subject property is not currently connected to the city sewer system. The nearest potential connection point is located approximately 1,800 feet northwest of the site, adjacent to the City of Sparks maintenance facility for GERP. This location currently contains a small lift station that conveys sewer flows from GERP via a force main to a gravity manhole located on the nearby fire station property. The gravity trunk main then flows generally in a northwesterly direction through several residential streets and cross-country easements to Cinnamon Drive, then west to Wingfield Springs Road, then southwest through the Wingfield Springs development to the existing 30-inch interceptor in Vista Boulevard, and eventually to the Truckee Meadows Water Reclamation Facility (TMWRF).

Based on information provided in a preliminary sewer capacity analysis prepared by Atkins on January 12, 2018, there are portions of the existing trunk sewer main that currently do not meet the city's "d/D" dry-weather flow (DWF) capacity criteria. These d/D criteria violations exist without the additional flows that would be generated by the proposed Wingfield Commons project. To address these violations, the November 2016 Sewer Model Update Report, prepared by Atkins proposed Capital Improvement Projects (CIP) #12 and #14 to upsize two existing segments of gravity sewer mains along Cinnamon Drive and Wingfield Springs Road. (Refer to the January 12, 2018 Atkins Report in Appendix A for maps and diagrams of the offsite trunk sewer main).

5.0 Proposed Sanitary Sewer Infrastructure

The proposed project will consist of a network of 8-inch gravity sewer mains located within the various proposed streets to collect flows from the individual dwelling units. The sewer mains shall be designed to provide a minimum velocity of 2 feet per second flowing half full. Sewer manholes will be provided at junctions and angle points, with spacings of no more than 400 feet for maintenance access. Because of an elevation conflict with the existing trapezoidal drainage channel located west of the site, a gravity connection cannot be provided to the nearest existing sewer manhole located on the fire station property. Therefore, it is anticipated that the existing lift station located east of the city maintenance building will need to be rebuilt, with a deeper wet well to allow a gravity connection from the proposed Wingfield Commons development. This scenario is preferred over having two separate lift stations.

Additionally, based on the January 12, 2018 Atkins Report, there is an existing section of cross-county 8-inch sewer main located southwest of Centaurus Drive that will require upsizing under full buildout conditions of the proposed Wingfield Commons development.

It is anticipated that a more in-depth analysis, based actual sewer flows will be required to establish a timeframe for the required off-site improvements, based on the number of lots constructed during each proposed phase of the project. Foothills at Wingfield, LLC will work with the city through the Tentative Map process to ensure all required offsite sewer improvements are properly planned and conditioned.

6.0 Conclusions

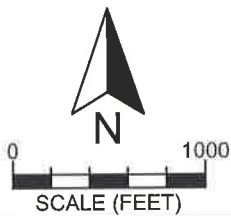
Full buildout of the proposed Wingfield Commons development will require certain off-site improvements to existing sewer infrastructure, including completion of CIP #12 and #14, upgrade of the existing lift station located adjacent to the city maintenance building, and upsizing of a section of 8-inch cross-county gravity sewer main located near Centaurus Drive.

The proposed improvements noted above will ensure there is adequate capacity within the city's sewer network to serve full buildout of the proposed development. The final implementation schedule of all offsite sewer system improvements will be coordinated with the City through the Tentative Map process.

Enclosures

Exhibit A – Wingfield Commons Preliminary Land Plan

Appendix A – January 12, 2018 Atkins Report prepared for the City of Sparks



PRELIMINARY LAND PLAN

WINGFIELD COMMONS
SPARKS, NEVADA

MARCH 2018

EXHIBIT
"A"

Memo

To: Andy Hummel, P.E., City of Sparks

From: Brian Janes, P.E., Atkins

Date: January 12, 2018

Subject: Golden Eagle Development-Capacity Analysis
City of Sparks Sewer Model Update

Per the request of the City, Atkins performed a preliminary capacity analysis of the existing sanitary sewer system downstream of the proposed Golden Eagle Development (herein referred to as the "Project"). The purpose of this analysis was to determine the potential impacts to the existing sanitary sewer system resulting from the planned single family housing development proposed at the 59.92 acre parcel (APN: 084-550-02) located east along the Golden Eagle Trail (see attached **Figure 1**). This Project was originally planned to have 330 Single Family Residential dwelling units but per the latest information from the City of Sparks, the Project will now comprise of 500 dwelling units. The Project flows in the *2016 Sewer Model Update Technical Report* entered the hydraulic model at manhole SSN004820 at the intersection of the Spanish Springs Trail and Wingfield Comm Trail. However, as part of this study an 8 inch sewer line from SSN035828 (near Vista Blvd) to SSN004820 was modeled, and now the Project flow from this parcel enters the hydraulic model at SSN035828. This memorandum summarizes the preliminary findings from the analysis of the 8 inch sewer line and the additional number of dwelling units associated with the Project.

Wastewater Flows and Hydraulic Model

In modeling the wastewater generated from the proposed development, Atkins used the average daily dry weather wastewater flow (ADWF) unit generation rates recommended in **Table 3-7** of the *2016 Sewer Model Update Technical Report*. **Table 1** below summarizes the estimated wastewater flows generated from the new development.

Table 1 Wastewater Generation Model Loading

Proposed Development Land Use ¹	Recommended Unit Wastewater Generation Rate ²	Average Daily Flow (gpd)
Single Family Residential (500 DU)	210 gpd/DU	105,000
Total ADWF =		105,000

Notes:

¹ Total number of dwelling units (500) provided by City of Sparks in December 2017, is more than the units assumed (330) for this parcel at the time of developing buildout land use model for the *2016 Sewer Model Update Technical Report*

² Recommended unit wastewater generation rates referenced from the *2016 Sewer Model Update Technical Report*

• ADWF = average daily dry weather flow

These wastewater flows were loaded into the current version of a City of Sparks InfoSWMM hydraulic model (originally completed by Atkins, November 3, 2016 as part of the *2016 Sewer Model Update Technical Report*). The following models scenarios were simulated to determine the impact of the project: (1) existing condition dry weather flow (DWF) and wet weather flow (WWF) models (including the proposed Project anticipated flows) and (2) buildout condition dry and wet weather flow models (including the proposed Project anticipated flows).

Based on calibrated diurnal patterns for typical single family residential developments, the estimated peak dry weather flow (PDWF) from this development is approximately 0.143 MGD. Additionally, based on calibrated wet weather flow parameters determined in the *2016 Sewer Model Update Technical Report*, the estimated peak wet weather flow (PWWF) for this development is approximately 0.189 MGD.

Existing Condition Model Results

Figure 2 compares the d/D modeling results for the sewer system between the existing condition scenario and the existing condition plus the proposed development scenario to determine the potential downstream capacity impacts from the development. The existing condition plus the proposed development scenario includes the

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estimated ADWF of 0.105 MGD from the proposed Project in the model simulation. The criteria used to evaluate the sewer system are listed in **Table 4-6** of the *2016 Sewer Model Update Technical Report*.

In the existing condition (without project), there is a d/D violation occurring at SSL015161, and immediately downstream of this conduit, the d/D values are close to 0.5, from Centaurus Dr to Cinnamon Dr. To address these violations, the 2016 Report proposed CIP 12 in Section 5.3.1 of the *2016 Sewer Model Update Technical Report*. The existing condition CIP consists of upsizing the sewer from Centaurus Dr to Cinnamon Dr (SSL015161 to SSL002982) from 10 inch and 12 inch to 15 inches.

As shown in **Figure 2**, the sewer flows from the proposed development results in minor d/D DWF criteria violations at multiple conduits from SSL015161 to SSL002987 (d/D = 0.52 to 0.64) along the Centaurus Dr to Cinnamon Dr sewer. These violations also include a violation (d/D = 0.64) at the end of the newly modeled 8 inch sewer line at SSL015546. In the existing condition model (without project), this line has a d/D of 0.5 which is at the criteria limit.

Buildout Condition Model Results

Figure 3 compares the d/D modeling results for the sewer system between the original buildout condition scenario developed in the 2016 Report and the buildout condition with the proposed development scenario to determine the potential future downstream capacity impacts from the 170 dwelling units proposed with the development.

The original buildout scenario in 2016 had assumed a total of 330 dwelling units for the Project which generated an ADWF value of 0.0693 MGD. However, per the latest City of Sparks information, the development will have 500 dwelling units and generates higher wastewater flows as compared to the original buildout condition, with an ADWF value of 0.105 MGD (ADWF increase of 0.0357 MGD).

In the original buildout condition, there are d/D DWF criteria violations occurring at multiple conduits from Centaurus Dr to Cinnamon Dr, from SSL001561 and SSL005781, caused by the proposed developments of Wingfield Springs and The Foothills at Wingfield springs, where the Project is located. To address these violations, the 2016 Report proposed buildout condition CIP 14 in Section 5.3.2 of the *2016 Sewer Model Update Technical Report*. The CIP consists of upsizing the Wingfield Springs Rd sewer (SSL002986 to SSL005755) from a 15 inch size to a 18 inch size pipe. Implementation of CIP 12 and 14 eliminate d/D violations downstream of the newly modeled 8 inch sewer line.

The 8 inch sewer line modeled as part of this study indicates there will be d/D violations towards its junction with Centaurus Dr sewer at SSL015546 and SSL002985. Implementing both CIPs (CIP 12 and CIP 14) reduces the d/D violations to 0.53 at SSL015546 and 0.51 at SSL002985 but does not eliminate the violations. If an additional improvements are constructed to increase these 3 pipe segments to 10 inches, the d/D violations are reduced to less than 0.42.

Conclusions

The updated higher number of dwelling units results in higher sewage generation from the Project, when compared with the original buildout condition. The higher flows result in d/D DWF criteria violations in the Centaurus Dr to Cinnamon Dr sewer line in the existing condition. There is also a violation in the 8 inch sewer line that has been modelled at its junction with the Centaurus sewer. CIP 12 was proposed in Section 5.3.1 of the *2016 Sewer Model Update Technical Report* and addresses the d/D violations in the Centaurus Dr sewer.

In the buildout condition in the 2016 Sewer Model Update, the Golden Eagle development combined with the other Wingfield Springs developments in the vicinity, and the consequent wastewater flows and d/D DWF criteria violations, triggered the formulation of CIP 14. The latest City information for the higher dwelling units on the Project parcels increases the generation of wastewater flows, and results in marginally higher d/D criteria violations, when compared with original buildout condition. Applying CIP 12 and CIP 14 addresses the d/D violations occurring in the Centaurus Dr to Wingfield Springs sewer, however does not address criteria violations in the newly modeled 8 inch sewer line.

The 8 inch sewer line from SSSN035828 to SSSN004820 has marginal d/D violations even after implementing CIP 12 and CIP 14 near its junction with the Centaurus Dr sewer. Two pipes on this line, SSL015546 and SSL002985 have d/D values of 0.53 and 0.51 respectively. Increasing the pipe size from SSL002985 to

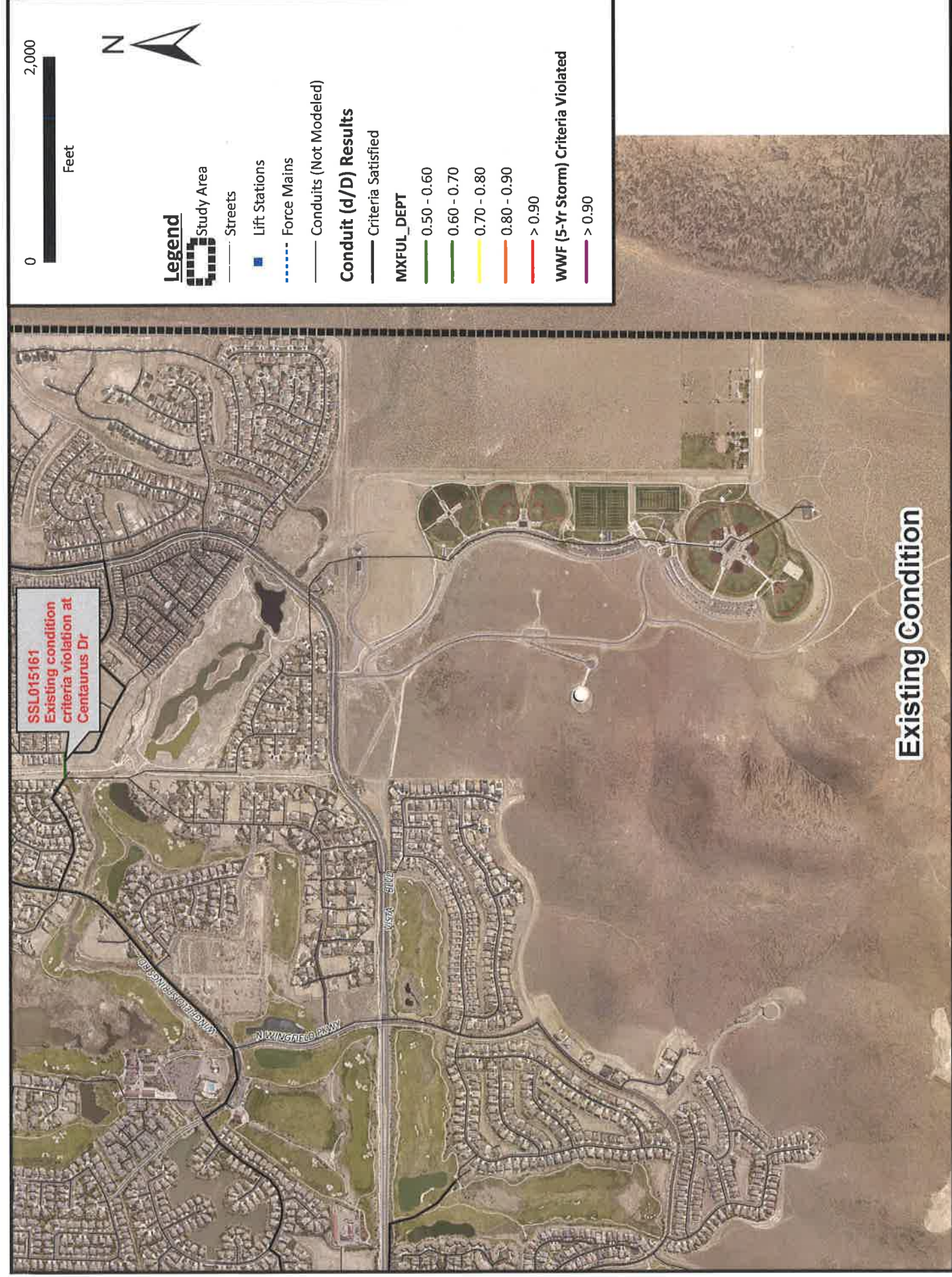
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SSL015546 from 8 inches to 10 inches (total length 615 ft) removes these violations. However, these 8 inch sewer violations can be approached in different ways.

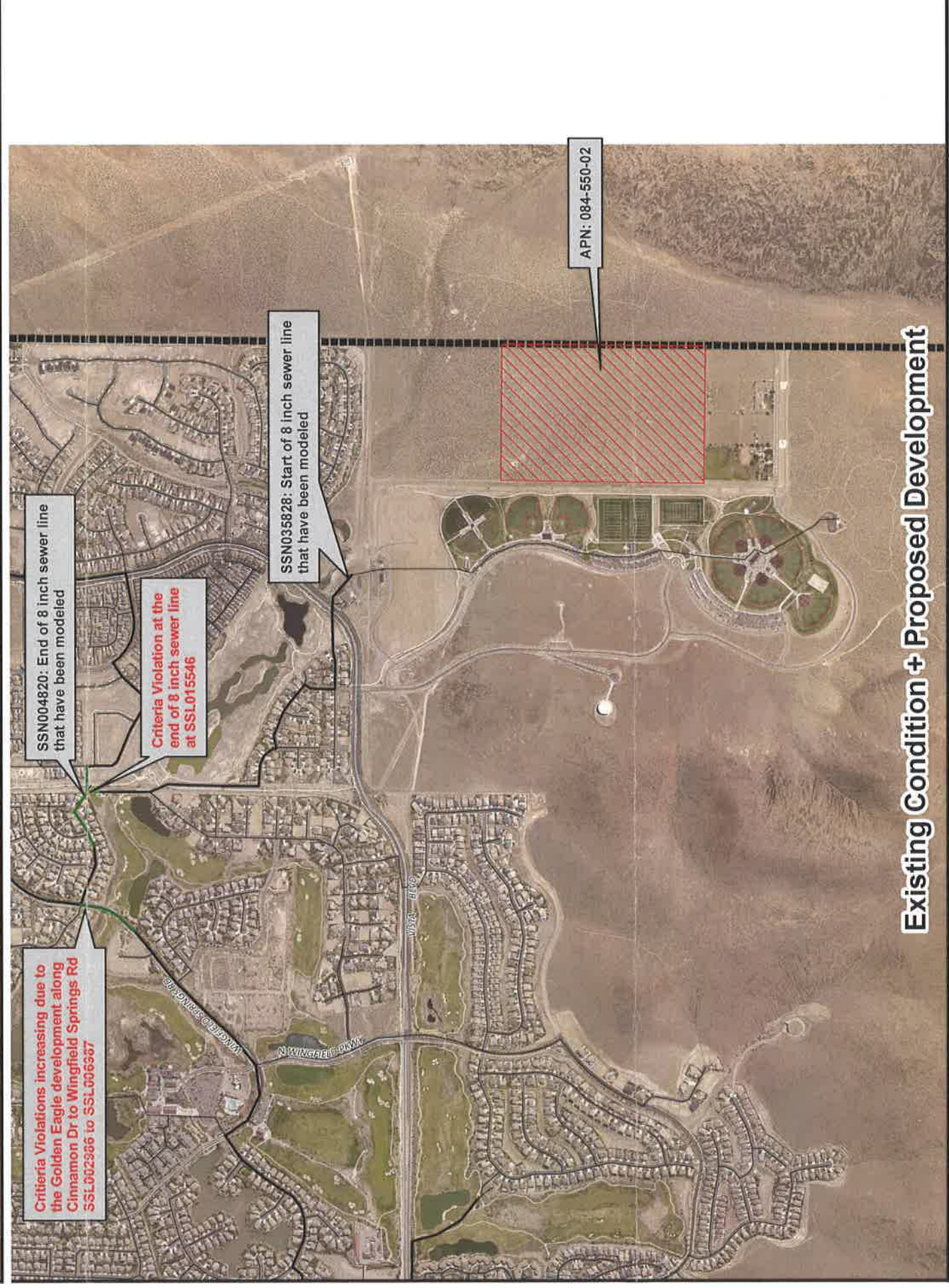
- Since, the criteria violations in the 8 inch sewer line are marginal, and are localized, with no further violations to the system downstream after the implementation of CIP 12 and CIP 14, the City may want to confirm model criteria violations with actual performance data prior to deciding whether to upsize the 8 inch sewer line.
- Upgrade the 8 inch sewer from SSL002985 to SSL015546 to 10 inches. This completely removes the d/D violations in this line

The existing system does not have adequate capacity to convey the project flows and meet criteria without implementation of CIPs. In the buildout condition without CIPs, the criteria violations increase. Implementing planned CIPs 12 and 14 appear to adequately address sewer lines modeled with the master plan however minor criteria violations remain in the newly modeled 8 inch sewer line to the project. Increasing three sections of the 8 inch sewer line to 10 inches is expected to adequately address these violations in both the existing condition and buildout condition.





Existing Condition



Existing Condition + Proposed Development



Sewer Model Update

Existing Condition Comparison - Golden Eagle Development



