

October 10, 2019

Smoke Tree Resort

7101 East Lincoln Drive
Paradise Valley, Arizona 85253

Wastewater Capacity Study

Prepared for:

Gentree LLC

3620 East Campbell Avenue
Suite B
Phoenix, AZ 85018
Contact: Sam Robinson

Prepared by:

Coe & Van Loo Consultants, Inc.

4550 N. 12th Street
Phoenix, AZ 85014

Contact: Cassandra Alejandro, P.E.
602.285.4763



Job # 1.01.0315301



WASTEWATER CAPACITY STUDY

Table of Contents

| | | |
|------------|---|-----------|
| 1.0 | INTRODUCTION..... | 1 |
| 1.1 | GENERAL DESCRIPTION | 1 |
| 1.2 | PROJECT LOCATION | 1 |
| 1.3 | TOPOGRAPHIC CONDITIONS | 1 |
| 1.4 | EXISTING SEWER CAPACITY | 1 |
| 2.0 | WASTEWATER SYSTEM DESIGN CRITERIA | 6 |
| 2.1 | DESIGN CRITERIA | 6 |
| 2.2 | DESIGN CALCULATIONS..... | 6 |
| 3.0 | EXISTING AND PROPOSED INFRASTRUCTURE | 8 |
| 3.1 | EXISTING SEWER LINES | 8 |
| 3.2 | PROPOSED INFRASTRUCTURE..... | 8 |
| 4.0 | SUMMARY | 10 |

FIGURES

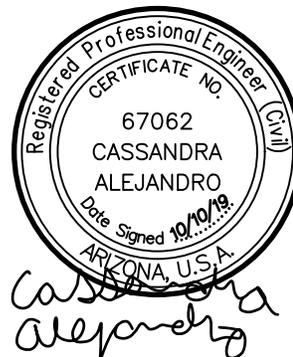
| | |
|---|---|
| Figure 1 – Vicinity Map..... | 2 |
| Figure 2 – Proposed Site Plan – Ground Level..... | 3 |
| Figure 3 – Proposed Site Plan – Second Level..... | 4 |
| Figure 4 – Proposed Site Plan – Third Level..... | 5 |
| Figure 3 – Wastewater System Layout..... | 9 |

Tables

| | |
|---|---|
| Table 1 - Design Flow Criteria | 6 |
| Table 2 – Hydraulic Design Criteria..... | 6 |
| Table 3 – Wastewater Flow Generation..... | 7 |

Appendices

- Appendix A: City of Scottsdale “Will-Serve” Letter
- Appendix B: Applicable Pages from the *Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)*
- Appendix C: Sewer Quarter Section Maps
- Appendix D: Sewer Analysis Results



1.0 INTRODUCTION

1.1 General Description

The Smoke Tree Resort is a proposed 5.36 acre redevelopment of an existing resort complex located in Town of Paradise Valley, Arizona. A total of 122 new rental rooms are proposed. Room counts have not been approved by the Town of Paradise Valley's Town Council. Room counts may be revised. The site will also include a Restaurant, Market, and Coffee Shop with square footages estimated and may be revised at 3,300; 2,000; and 4,200 respectively.

This report addresses sewer capacity requirements for the proposed development. The sewer system will outfall to the City of Scottsdale Sewer System. The system's design will adhere to the *City of Scottsdale Design Standards and Policies Manual, January 2018* and the *International Plumbing Code*.

1.2 Project Location

Smoke Tree Resort is located in Section 10 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian. The development is bordered by East Lincoln Drive to the north and Quail Run Road to the west. See Figure 1, 2, 3, and 4.

1.3 Topographic Conditions

Smoke Tree Resort ranges in elevation from approximately 1,318 feet above mean sea level (MSL) on the southwest corner of the property to approximately 1,313 feet MSL on the northeast corner of the property. Overall, the property generally slopes to the north northeast toward Lincoln Drive.

1.4 Existing Sewer Capacity

The Town of Paradise Valley has two wastewater providers, the City of Phoenix and the Town of Paradise Valley. The Town of Paradise Valley's wastewater system is operated, maintained, and treated by the City of Scottsdale through an intergovernmental agreement. Appendix A contains the City of Scottsdale "Will-Serve" letter. Smoke Tree Resort will be served by the City of Scottsdale per the *Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)*. Appendix B includes applicable Pages from the *Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)* depicting the direction of flow into the City of Scottsdale's wastewater system. Appendix C includes City of Scottsdale Wastewater Quarter Section Maps depicting the location and flow direction of the existing gravity sewer network servicing the Smoke Tree Resort.



PROGRAM:

- A. Pedestrian entry
- B. Resort Reception Entry Plaza and Valet
- C. Resort Reception and Lobby
- D. Pavilion
- E. Event Lawn
- F. Event Terrace
- G. Restaurant
- H. Market
- I. Coffee Shop
- J. Outdoor Patio
- K. Resort Pool
- L. Pool Lounge
- M. Entry Lounge
- N. Resort Suites (guest rooms)
- O. Meeting Room
- P. Resort Villas (guest rooms)
- Q. Signage
- R. Surface Parking
- S. Quail Road Access Point
- T. Garbage Bins
- U. Delivery Location
- V. Employee Break Area
- W. Back of House

RESORT UNITS - 122 KEYS

| | | |
|----------------------|---|-----------------|
| Main Hotel | | |
| 1st Level | = | 42 keys |
| 2nd Level | = | 45 keys |
| 3rd Level | = | 15 keys |
| | | <u>102 keys</u> |
| Resort Villas | | |
| 4 villas with 3 keys | = | 12 keys |
| 2 villas with 4 keys | = | 8 keys |
| | | <u>20 keys</u> |
| Total Keys | | = 122 keys |

SURFACE PARKING

Total Self-Park Space = 170
 Dimensions: 9' x 18' + 2' overhang

or

Total Valet Spaces = 185

PHX
ARCHITECTURE

GREY|PICKETT

BEUS
GILBERT


CREATIVE DESIGNS
IN LIGHTING


CVL
CONSULTANTS



PROPOSED SITE PLAN - GROUND LEVEL

the smoke tree resort

7101 E LINCOLN DR, PARADISE VALLEY, AZ 85253
 SPECIAL USE PERMIT | MAJOR AMENDMENT APPLICATION

A8

SEP 6, 2019
 11 x 17 format
 REVISED
 OCT. 9, 2019



PROGRAM:

- C. Resort Reception and Lobby
- N. Resort Suites (guest rooms)
- O. Meeting Room
- P. Resort Villas (guest rooms)



GREEY|PICKETT



CREATIVE DESIGNS
IN LIGHTING



PROPOSED SITE PLAN - SECOND LEVEL

the smoke tree resort

7101 E LINCOLN DR, PARADISE VALLEY, AZ 85253
SPECIAL USE PERMIT | MAJOR AMENDMENT APPLICATION

A9

SEP 6, 2019
11 x 17 format
REVISED
OCT. 9, 2019



PROGRAM:

- N. Resort Suites (guest rooms)
- O. Meeting Room
- X. Top Floor Lounge
- Y. Rooftop Bar
- Z. Deck Lounge



GREEY|PICKETT



CREATIVE DESIGNS
IN LIGHTING



PROPOSED SITE PLAN - THIRD LEVEL

the smoke tree resort

7101 E LINCOLN DR, PARADISE VALLEY, AZ 85253
SPECIAL USE PERMIT | MAJOR AMENDMENT APPLICATION

A10

SEP 6, 2019
11 x 17 format
REVISED
OCT. 9, 2019

2.0 WASTEWATER SYSTEM DESIGN CRITERIA

The following criteria was be used in developing the sewer capacity study.

2.1 Design Criteria

This sewer study is based on criteria from the *City of Scottsdale Design Standards & Policies Manual, January 2018* and *Integrated Wastewater Master Plan, March 2008*. Design flow criteria are presented in Table 1 and hydraulic design criteria are presented in Table 2.

Table 1 - Design Flow Criteria

| Description | Unit | Average Day Flow (gpd/unit) | Peak Day Flow (gpm/pool) | Peak Day Flow (gpd/unit) | Peaking Factor |
|--------------------------------|-------------|-----------------------------|--------------------------|--------------------------|----------------|
| Resort Hotel Room ¹ | Room | 380 | - | 1,710 | 4.5 |
| Pool Backwash ² | Pool | N/A | 60 | - | - |
| Commercial/Retail | Square Foot | 0.5 | - | - | 3.0 |
| Restaurant | Square Foot | 1.2 | - | - | 6.0 |

¹Includes site amenities

²Assumes backwash rate of 60 gpm/small pool for a 10 minute duration.

Table 2 – Hydraulic Design Criteria

| Description | Criteria |
|--------------------------------|--|
| Minimum Sewer Diameter | 8-inch |
| Minimum Full Pipe Velocity | 2.5 fps |
| Minimum Slope | |
| 8-inch Sewer | 0.0052 ft/ft |
| Manning's "n" | 0.013 |
| Maximum Pipe Velocity | 10 fps |
| d/D (≤ 12-inch) at Peak Flow | 0.65 |
| d/D (> 12-inch) at Peak Flow | 0.70 |
| Manhole Spacing (8 to 15-inch) | 500 ft |
| Minimum Drop Across Manhole | 0.1 ft |
| Change in Sewer Diameter | Top invert of upstream pipe ≥ top invert of downstream |
| Minimum Depth of Cover | 4 ft |

2.2 Design Calculations

Table 3 contains the wastewater flow generation calculations for flows for the Smoke Tree Resort.

Table 3 – Wastewater Flow Generation

| Land Use | Description | Unit | No. of Units | Average Day Unit Flow (gpd/unit) | Average Flow (gpd) | PF | Peak Flow (gpm/pool) | Peak Flow (gpd) |
|----------------------|----------------------------|---------|--------------|----------------------------------|--------------------|-----|----------------------|-----------------|
| Room | Resort Hotel ¹ | Room | 122 | 380 | 46,360 | 4.5 | N/A | 208,620 |
| Pool | Backwash Rate ² | Pool | 1 | N/A | N/A | N/A | 60 | 86,400 |
| Market & Coffee Shop | Commercial/Retail | Sq. Ft. | 6,200 | 1.2 | 7,440 | 3.0 | N/A | 22,320 |
| Restaurant | Restaurant | Sq. Ft. | 3,300 | 0.5 | 1,650 | 6.0 | N/A | 9,900 |
| | | | | | | | | |
| Total | | | | | 55,450 | | | 327,240 |

¹Includes site amenities.

²Assumes backwash rate of 60 gpm/small pool for a 10 minute duration.

As shown, the peak flow calculations include peak flows calculated per the City of Scottsdale design criteria.

3.0 EXISTING AND PROPOSED INFRASTRUCTURE

3.1 Existing Sewer Lines

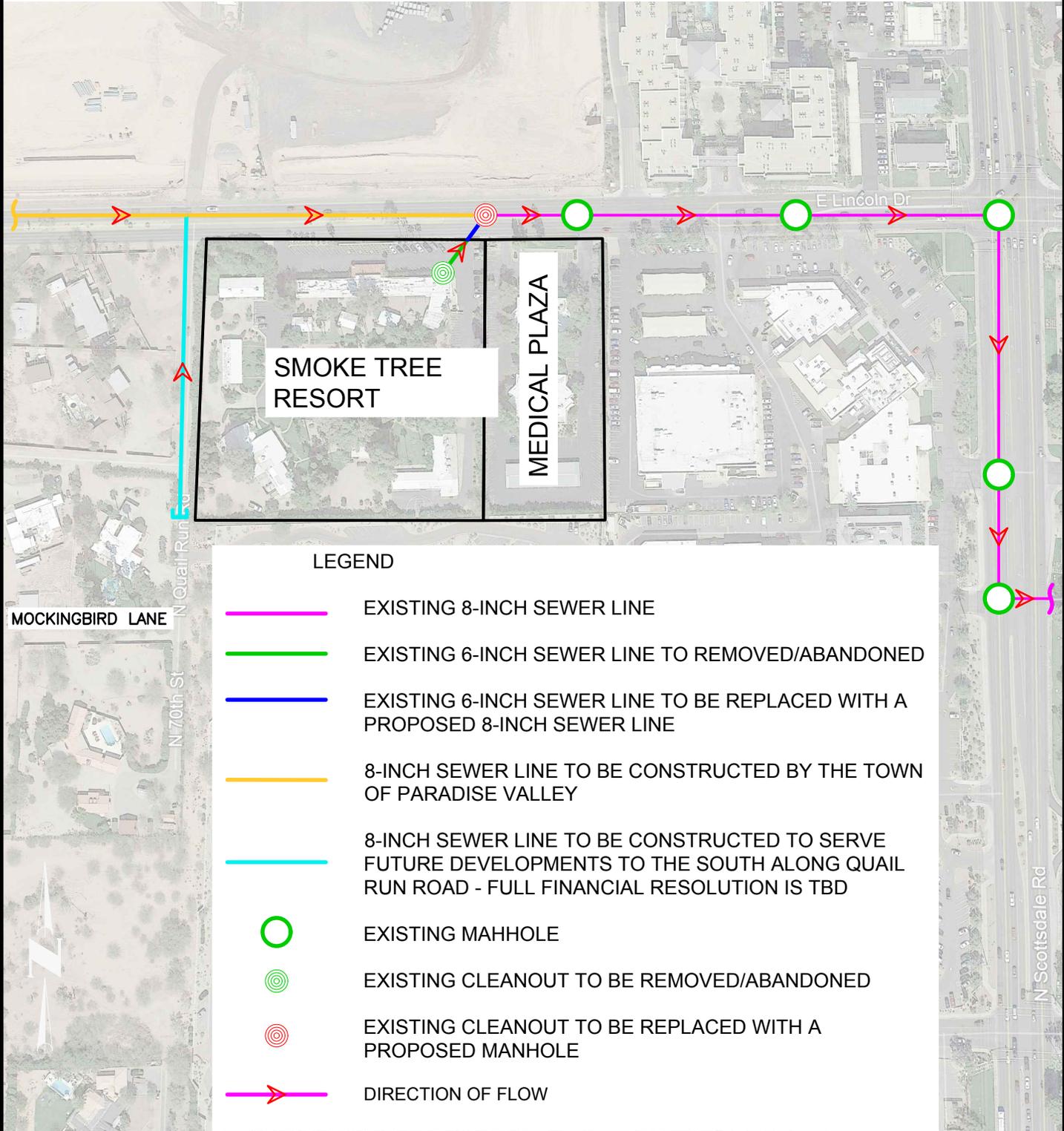
An existing 8-inch gravity sewer is adjacent to the site in Lincoln Drive and accepts flows from the existing 6-inch VCP gravity sewer serving the Smoke Tree Resort. Wastewater flows east within the existing 8-inch sewer line in Lincoln Drive to North Scottsdale Road. From here the wastewater flows south along North Scottsdale Road to McDonald Drive flowing east. (See Figure 3 and Appendix C for direction of flow.) Flow is ultimately treated at the 91st Avenue Regional Wastewater Treatment Plant in west Phoenix, which is owned and operated by the Sub-Regional Operating Group (SROG).

3.2 Proposed Infrastructure

The existing 6-inch VCP gravity sewer serving the Smoke Tree Resort will be replaced by 21.02-feet of 8-inch gravity sewer as designed by T.Y. Lin at a slope of 0.0052 ft/ft per the Town of Paradise Valley Arizona Roadway and Utility Improvements – Lincoln Drive Project No. 2016-14. Smoke Tree Resort will reimburse the Town of Paradise Valley for the replacement off the 6-inch VCP gravity sewer with the 8-inch gravity sewer and manhole as part of the Lincoln Road Improvement Project No. 2016-14.

The on-site collection system will consist of sewer service lines and is designed to convey wastewater from the south to the north where it will connect to the 8-inch gravity sewer service designed by T.Y. Lin and flow into the existing 8-inch gravity sewer line in Lincoln Drive. Wastewater will flow east within the existing 8-inch sewer line in Lincoln Drive to North Scottsdale Road. From here the wastewater flows south along North Scottsdale Road eventually to McDonald Drive flowing east. All sewer lines will be located in major streets or in easements dedicated for that use. Project No. 2016-14 is going to stub out an 8-inch gravity sewer line in Quail Run Road which will not be utilized by the development of the Smoke Tree Resort. This 8-inch stub will be extended to the south end of the proposed Quail Run Road improvements adjacent to the Smoke Tree development for use by future development to the south. Full financial resolution for the extension of the 8-inch gravity sewer along Quail Run Road adjacent to the Smoke Tree Resort is yet to be determined.

A sewer capacity analysis was completed to design the wastewater line for Smoke Tree Resort. The analysis may be seen in Appendix D. The sewer mains will be sized according to the anticipated cumulative flows as the lines are routed to the existing 8-inch gravity sewer within Lincoln Drive. The pipe size and minimum and maximum slope required will be determined based on the criteria established in Section 2.1. Manholes within the development are assumed to have 6 feet of depth to verify cover depth and allow for slope design.



NOT TO SCALE
 1.01.0315301
 4550 North 12th Street
 Phoenix, Arizona 85014
 Phone 602-264-6831
<http://www.cvlci.com>

WASTEWATER SYSTEM LAYOUT

SMOKE TREE RESORT



FIGURE 3

4.0 SUMMARY

This wastewater system analysis presents the collection system design criteria and proposed wastewater infrastructure for the Smoke Tree Resort. This wastewater system will be owned by the City of Paradise Valley and operated by the City of Scottsdale. The sewer infrastructure conforms to the City of Scottsdale's minimum standards and is consistent with the City's current *Design Standards and Policies Manual, January 2018*.

The results of this analysis are summarized as follows:

- The proposed collection system is designed to meet the *City of Scottsdale Design Standards and Policies Manual, January 2018*.
- The proposed collection system will discharge to the 8-inch gravity sewer service designed by T.Y. Lin connecting the Smoke Tree Resort to the existing 8-inch gravity sewer line in Lincoln Drive.
- Smoke Tree Resort will reimburse the Town of Paradise Valley for the replacement off the 6-inch VCP gravity sewer with the 8-inch gravity sewer and manhole as part of the Lincoln Road Improvement Project No. 2016-14.
- Full financial resolution for the extension of the 8-inch gravity sewer along Quail Run Road adjacent to the Smoke Tree Resort is yet to be determined.
- Minimum and maximum pipe velocities were met for all proposed sewer lines.
- The average daily flow for Smoke Tree Resort is estimated at 55,450 gpd.
- The peak flow for Smoke Tree Resort including pool backwash is estimated at 327,240 gpd.
- Wastewater demands include site amenities within the Resort Hotel Room demand of 380 gpd for average daily flow and 1,710 gpd for peak flow. The Restaurant, Market, and Coffee Shop have been added as individual land uses beyond site amenities as requested by the City of Scottsdale.

APPENDIX A

City of Scottsdale “Will-Serve” Letter

APPENDIX B

***Applicable Pages from the Town of Paradise
Valley Wastewater Master Plan (Arcadis, May
2015)***



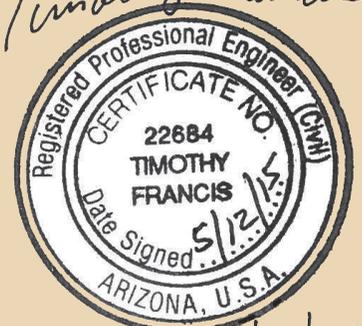
FINAL REPORT

WASTEWATER MASTER PLAN

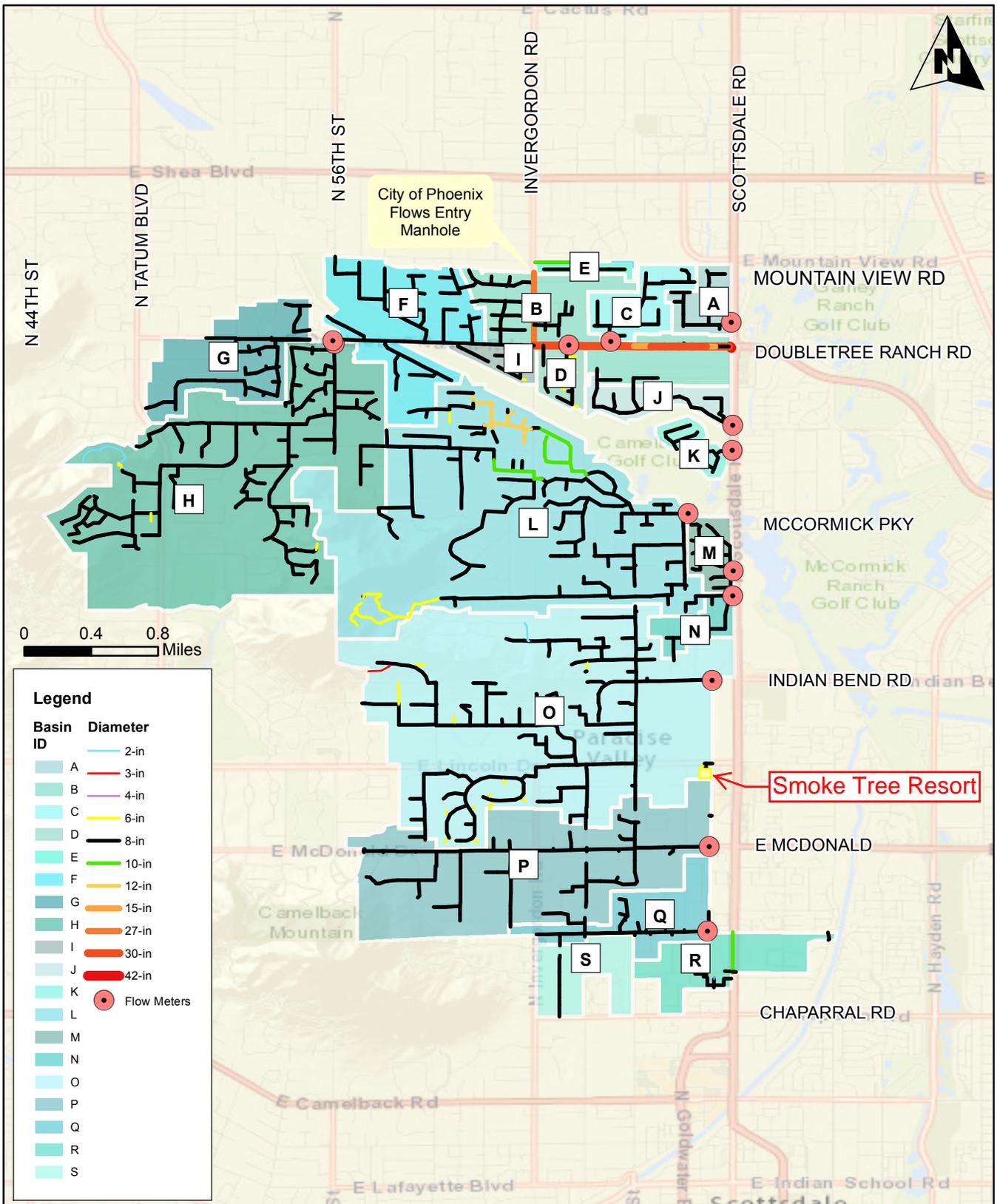
MAY 2015

Welcome
Town of
Paradise Valley

Timothy Francis



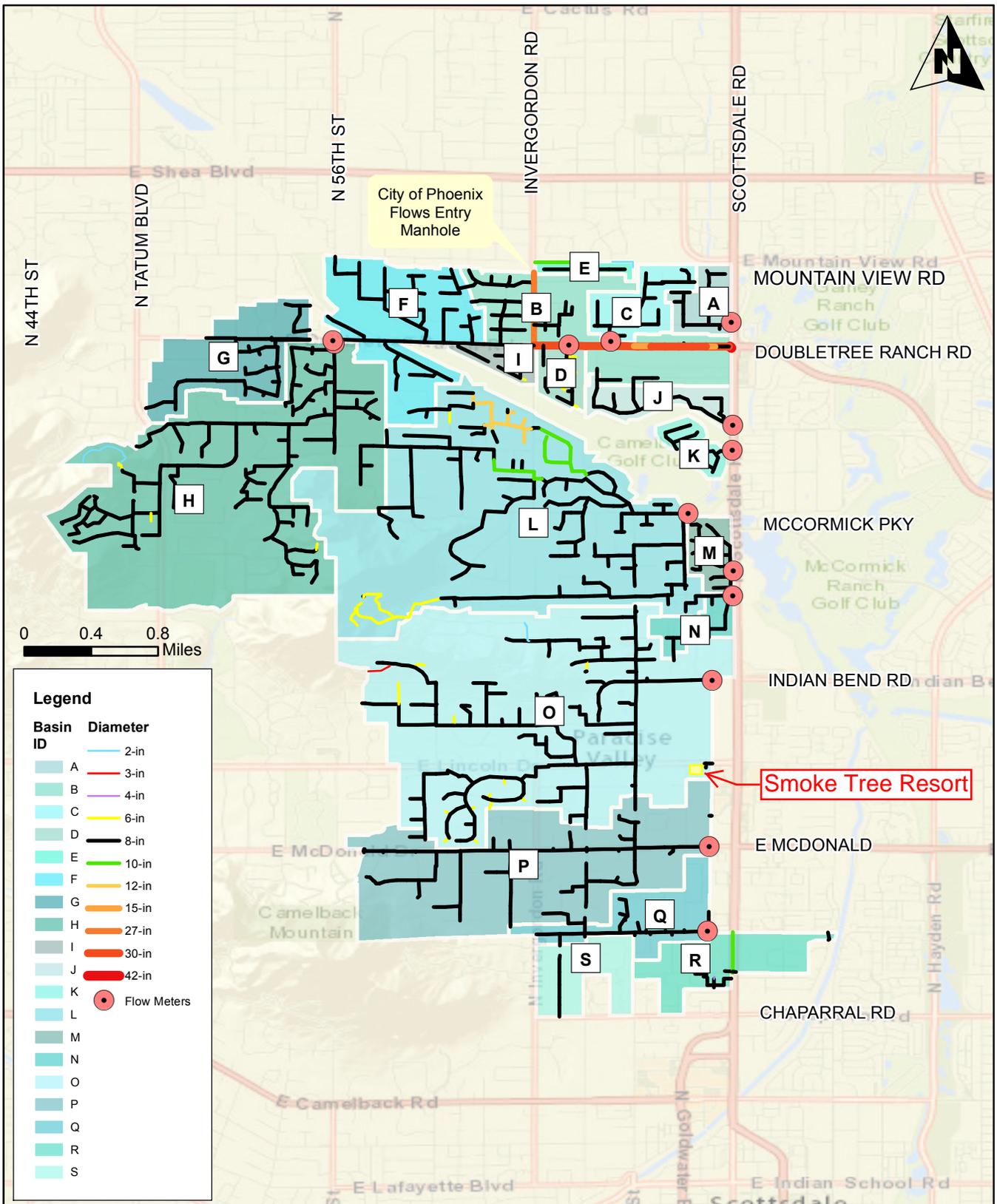
Expires 12/31/17



TOWN OF PARADISE VALLEY, ARIZONA
 WASTEWATER MASTER PLAN
 Existing Collection System



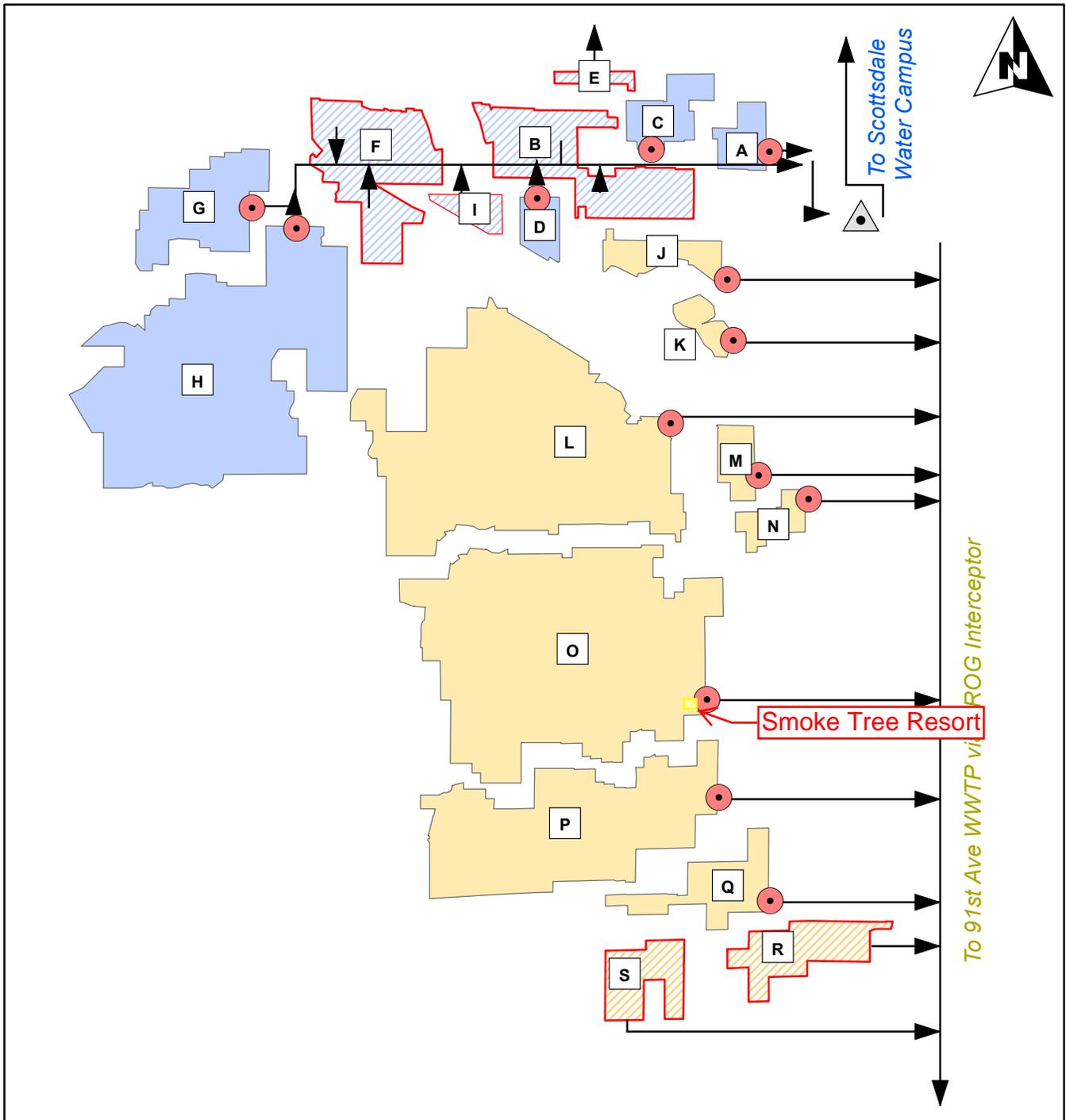
May 2015
 FIGURE 3-1



TOWN OF PARADISE VALLEY, ARIZONA
 WASTEWATER MASTER PLAN
 Existing Collection System



May 2015
 FIGURE 3-1



Legend

-  Scottsdale Lift Station
-  Flow Meters
-  Schematic Basin Connectivity
-  Flows to Scottsdale Water Campus, Metered
-  Flow to Scottsdale Water Campus, Unmetered
-  Flows to 91st Ave WWTG via SROG Interceptor, Metered
-  Flows to 91st Ave WWTG via SROG Interceptor, Unmetered



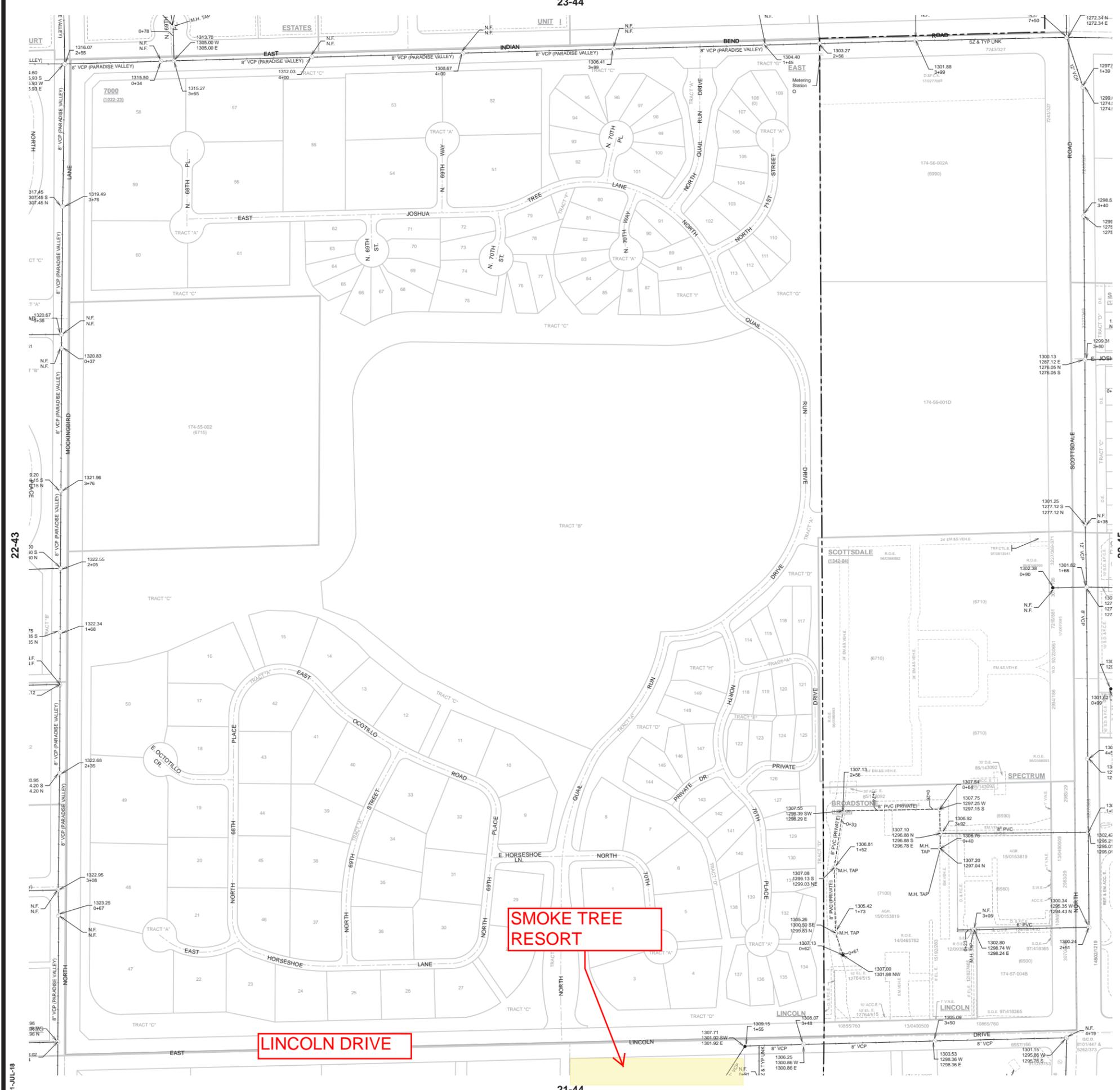
TOWN OF PARADISE VALLEY, ARIZONA
WASTEWATER MASTER PLAN
Schematic of Existing Basin Connectivity



May 2015
FIGURE 3-2

APPENDIX C

Sewer Quarter Section Maps



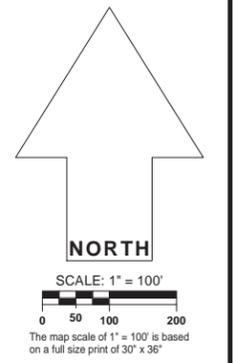
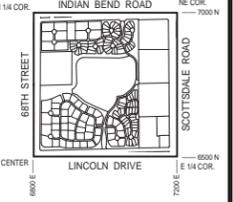
THIS DOCUMENT IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT ITS ACCURACY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.
 THE CITY OF SCOTTSDALE
 01-JUL-18

GENERAL NOTES:
 • THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 313-7762.
 • THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS CALCULATED ON THE MAP.

LEGEND:

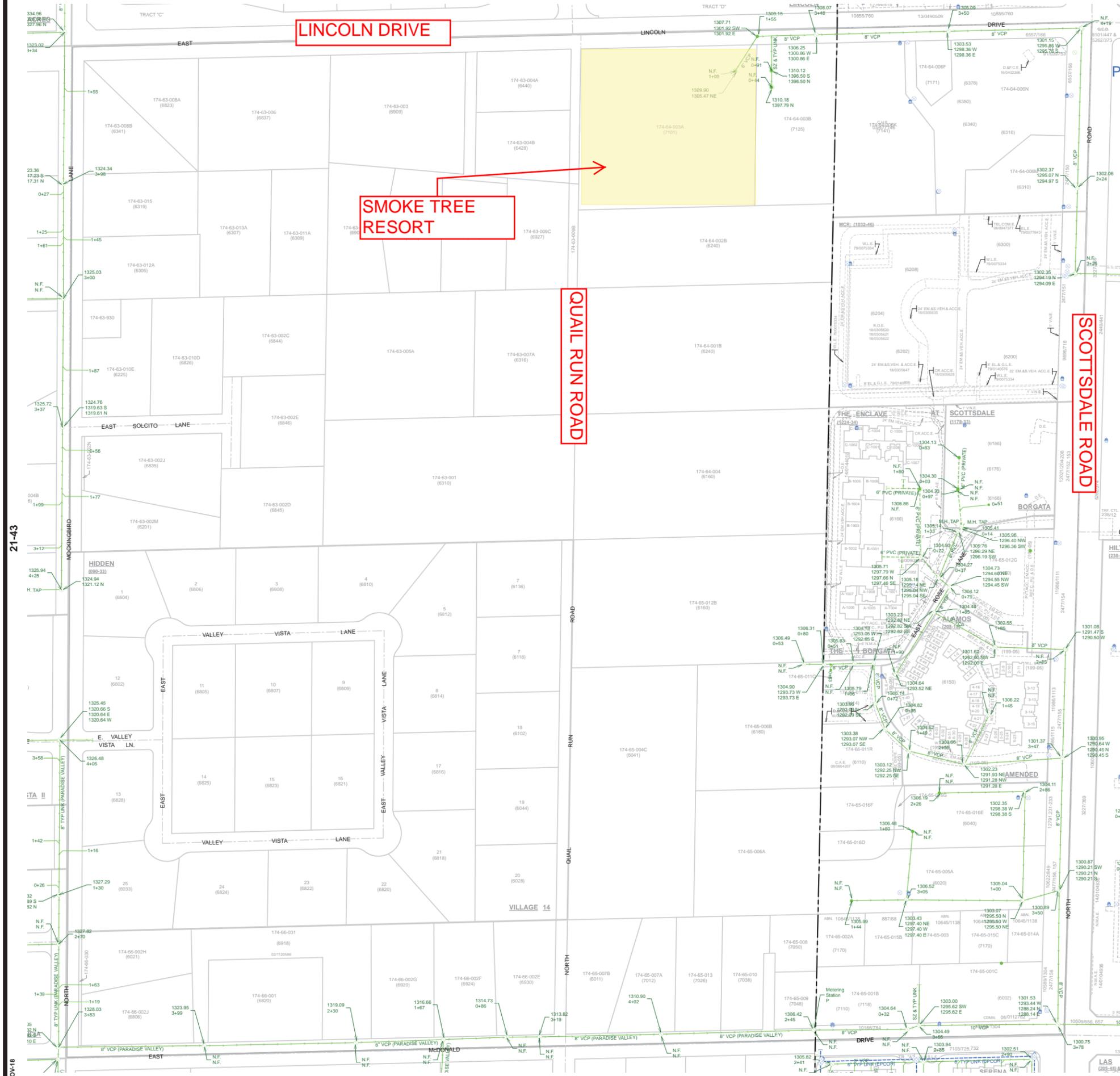
- Cleanout
- Lift Station
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Sewer Main - Private

VICINITY MAP



SEWER
QUARTER SECTION MAP
22-44
 NE 1/4 SEC. 10 T2N R4E

CITY OF SCOTTSDALE
SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
 3629 North Drinkwater Boulevard
 Scottsdale, Arizona 85251

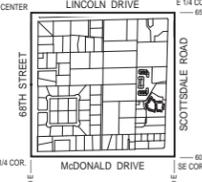


GENERAL NOTES:
 • THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7752.
 • THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS CALCULATED ON THE MAP.

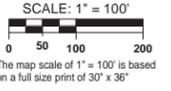
LEGEND:

- Water Valve
- Non-potable Water Valve
- Fire Hydrant
- Water Blowoff
- Water Main Reducer
- Water Sample Station
- Water Air Release Valve
- Non-potable Water Air Release Valve
- Water Pressure Reducing Valve
- Water Vault
- Water Manhole
- Non-Potable Water Manhole
- Water Pump
- Water Main
- Non-Potable Water Main
- Fire Line
- Water Service
- Non-Scottsdale Water Main
- Sewer Manhole
- Sewer Cleanout
- Sewer Lift Station
- Sewer Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Non-Scottsdale Sewer Main
- Sewer Service

VICINITY MAP



NORTH



WATER & SEWER
 QUARTER SECTION MAP
21-44
 SE 1/4 SEC. 10 T2N R4E

THIS DOCUMENT IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT ITS ACCURACY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.
 THE CITY OF SCOTTSDALE
 25-NOV-18

CITY OF SCOTTSDALE
 SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
 3629 North Drinkwater Boulevard
 Scottsdale, Arizona 85251

APPENDIX D

Sewer Analysis Results

Table B-1: Smoke Tree Resort System Calculations

| Upstream MH | Downstream MH | DU or Units | Average Day Unit Factor (gpcpd) | Average Daily Flow (gpd) | Cumulative Average Daily Flow | Peak Factor | Sewer Lines Peak Flow (gpd) | Upstream Peak Flow (gpd) | Peak Flow (gpd) | Total Estimated Peak Flow (gpd) | Estimated Ground Elevation (feet) | Estimated Length (feet) | Line Diameter (inches) | Sewer Line Slope (ft/ft) | Estimated Upstream MH Depth (feet) | Estimated Upstream Invert Elevation (feet) | Drop Through Manhole/Meeting Crowns (feet) | Estimated Downstream Invert Elevation (feet) | Sewer Line Capacity (gpd) | % Full (Q/Qf) | Velocity Flowing Full (fps) | Actual Peak Velocity (fps) | d/D |
|-------------|----------------------|-------------|---------------------------------|--------------------------|-------------------------------|-------------|-----------------------------|--------------------------|-----------------|---------------------------------|-----------------------------------|-------------------------|------------------------|--------------------------|------------------------------------|--|--|--|---------------------------|---------------|-----------------------------|----------------------------|------|
| stub | MH 7 | 122 | 380.00 | 55,450 | 55,450 | 4.50 | 327,240 | 0 | 327,240 | 327,240.00 | 1309.14 | 21 | 8 | 0.0052 | 6.14 | 1302.33 | 0.10 | 1302.22 | 563,106 | 58% | 2.5 | 2.60 | 0.55 |
| | Pool Backwash | 1 | 60 gpm/pool Peak Day Demand | | | | 86,400 | | | | | | | | | | | | | | | | |
| | Restaurant | 3300 | 0.5 gpm/sq ft | | | | 6 | | | | | | | | | | | | | | | | |
| | Market & Coffee Shop | 6200 | 1.2 gpm/sq ft | | | | 3.00 | | | | | | | | | | | | | | | | |

Existing invert information from T.Y. Lin Plans for the Town of Paradise Valley Arizona Roadway and Utility Improvements Lincoln Drive Project No. 2016-14

Average Day Unit Factor includes all site amenities