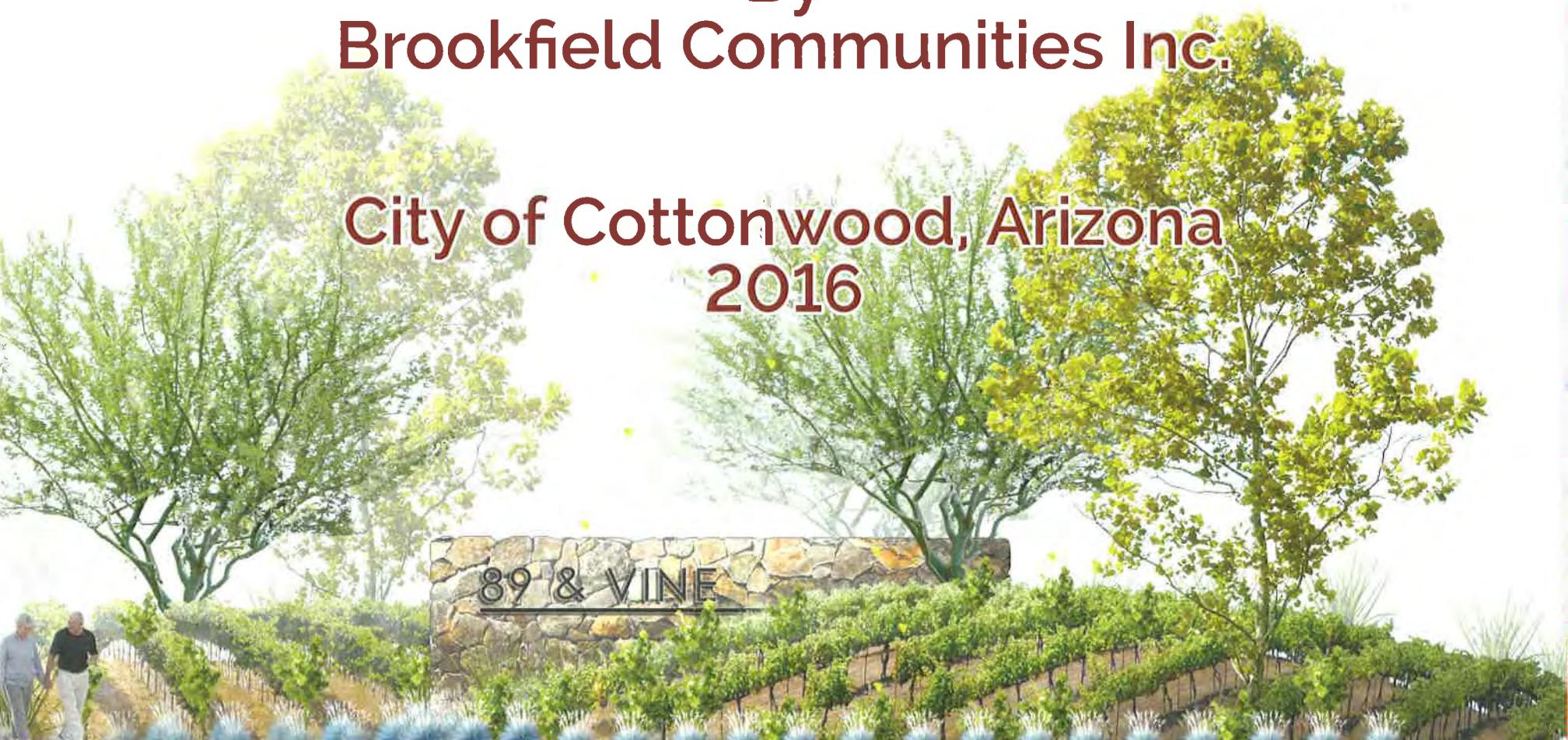


# 89 & VINE

## A PHASED Master Development Plan

By  
Brookfield Communities Inc.

City of Cottonwood, Arizona  
2016



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# TITLE PAGE

**Project Name:**

**89 & VINE**

**Project Location:**

**An approximately 460 acre portion (The Residential Property), which is part of an approximately 680 acre parcel of land (The 89 & VINE Project) and located on the northeast corner of the intersection of Highway 89A and Cornville Road, in Cottonwood, Arizona**

**Applicant/Developer**

**Name and Contact Information:**

**Brookfield Communities, Inc.**

**Philip V. Petersen**

**3550 North Central Avenue, Suite 1101**

**Phoenix, AZ 85012**

**Telephone: 602-265-4400**

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**Email: [philp@brookfieldcommunities.com](mailto:philp@brookfieldcommunities.com)**

**Engineering Firm Information:**

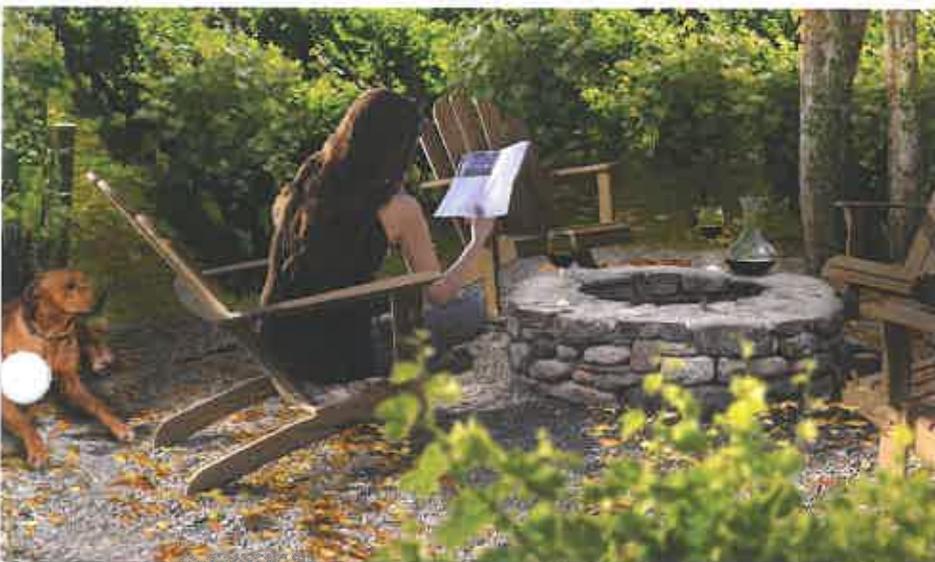
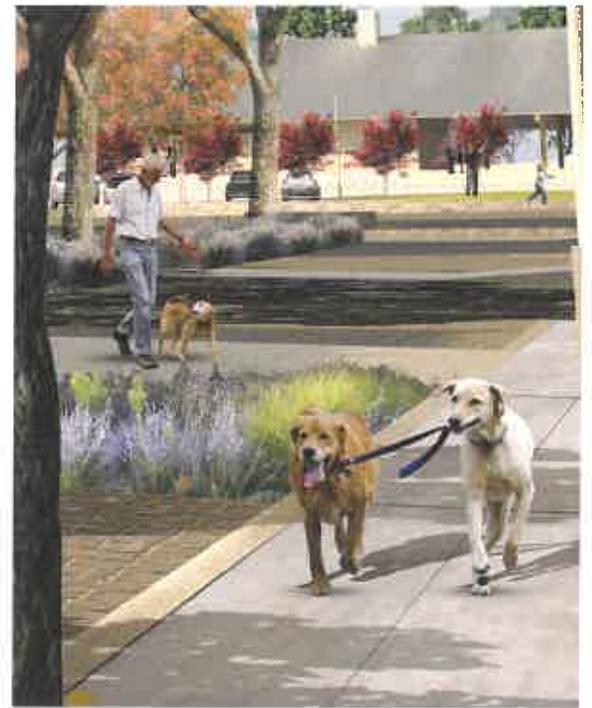
**Goodwin and Marshall, Inc.**  
**Matt Goodwin**  
**Warren Russell**  
**2405 Mustang Drive**  
**Grapevine, TX 76051**  
**Telephone: 817-329-4373**  
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**Email: [info@gmcivil.com](mailto:info@gmcivil.com)**

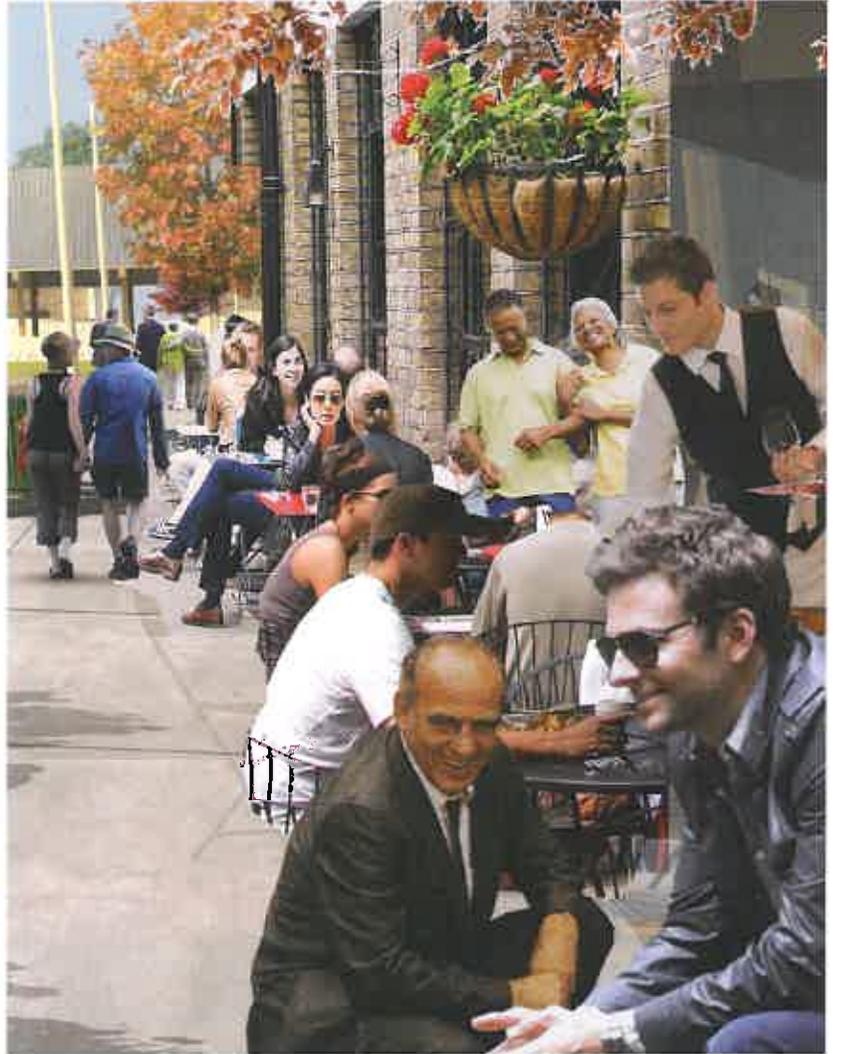
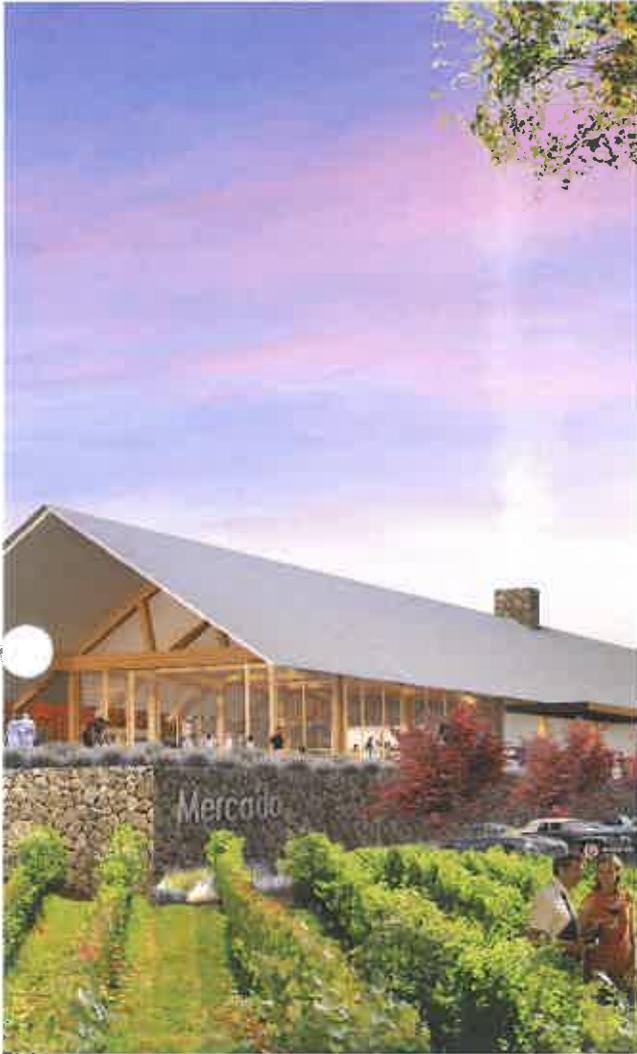
**Date of Submittal: January 13, 2016**

# A CONCEPTUAL VISUAL INTRODUCTION TO

# 89 & VINE







## **PROJECT NARRATIVE**

**Name:** The name of the master planned development is **89 & VINE** to identify the community and its Cottonwood wine country theme.

### **Contact Information For Property Owner:**

**Verde Santa Fe Limited Partnership  
c/o Republic Companies  
Jay C. Stuckey, Jr.  
P. O. Box 874202  
Phoenix, AZ 85080  
Telephone: 602-494-0202  
Fax: 928-204-5667  
Email: [stuckeyjc@aol.com](mailto:stuckeyjc@aol.com)**

### **Contact Information For Developer:**

**Brookfield Communities, Inc.  
Philip V. Petersen  
3550 North Central Avenue, Suite 1101  
Phoenix, AZ 85012  
Telephone: 602-265-4400  
602-263-1900  
Fax: 602-263-8078  
Email: [info@brookfieldcommunities.com](mailto:info@brookfieldcommunities.com)  
Email: [philp@brookfieldcommunities.com](mailto:philp@brookfieldcommunities.com)**

**LOCATION:** The location of the project is in the northeast quadrant of State Highway 89A and Cornville Road. (Legal Description follows this section.)

**The remainder of the Project Narrative has been divided into the following sections in which all of the required information is addressed. Full Water, Wastewater, Traffic and Drainage Reports are included in the MDP submittal. An Appendix is also included. ALL IMAGES OF WINE TASTING AND VILLAGE CENTER FACILITIES ARE INTENDED TO BE CONCEPTUAL DEPICTIONS ONLY. The architectural design and site plans for these facilities will be finalized and submitted in future phases of the MDP's development.**

**Exhibit "A"**

**LEGAL DESCRIPTION OF THE 89 & VINE PROJECT**

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF YAVAPAI, STATE OF ARIZONA, AND IS DESCRIBED AS FOLLOWS:

That part of Section 31. Township 16 North. Range 4 East of the Gila and Salt River Base and Meridian, Yavapai County, Arizona, lying Southeast of U.S. Highway 89-A, together with that part of Section 6. Township 15 North, Range 4 East of the Gila and Salt River Base and Meridian, Yavapai County, Arizona, lying North of the Cornville Road (Yavapai County Route No.30) more particularly described as follows:

BEGINNING at the Northeast corner of said Section 31, marked by a 1938 G.L.O. brass cap;

Thence South 01 degrees, 15 minutes, 53 seconds East along the East line of said Section 31, a distance of 2615.63 feet to the East Quarter corner of said Section 31, marked by a 1938 G.L.O. brass cap;

Thence South 00 degrees, 00 minutes, 18 seconds West along said East line, a distance of 2675.89 feet to the Southeast corner of said Section 31 and also being the Northeast corner of said Section 6, marked by a 1938 G.L.O. brass cap;

Thence South 01 degrees. 05 minutes, 22 seconds West along the East line of said Section 6, a distance of 2301.97 feet to the centerline of the said Cornville Road (Yavapai County Route No.30);

Thence North 68 degrees, 12 minutes, 18 seconds West along said centerline, a distance of 5657.58 feet to the intersection with the West line of said Section 6;

Thence North 00 degrees, 10 minutes, 23 seconds East along said West line, a distance of 177.85 feet to the Northwest corner of said Section 6, and also being the Southwest corner of said Section 31, marked by a 1938 G.L.O. brass cap;

Thence North 00 degrees, 22 minutes, 08 seconds West along the West line of said Section 31, a distance of 1990.09 feet to a point on curve of the centerline of U.S. Highway 89-A, the center of which bears South 57 degrees, 52 minutes, 39 seconds East;

Thence North and East along said curve, having a radius of 17188.73 feet through a central angle of 13 degrees, 22 minutes, 38 seconds for an arc length of 4013.17 feet to the point of said curve (Engineer Station 295 + 09.00 p.t.);

Thence North 45 degrees, 29 minutes, 59 seconds East along said centerline, a distance of 291.78 feet to the intersection with the North line of said Section 31;

Thence South 89 degrees, 59 minutes, 10 seconds East along said North line, a distance of 2533.98 feet to the TRUE POINT OF BEGINNING.

EXCEPT that portion conveyed to the State of Arizona by Final Order of Condemnation recorded in Book 4523 of Official Records, page 127, records of Yavapai County, Arizona.

## THE PHASING OF 89 & VINE

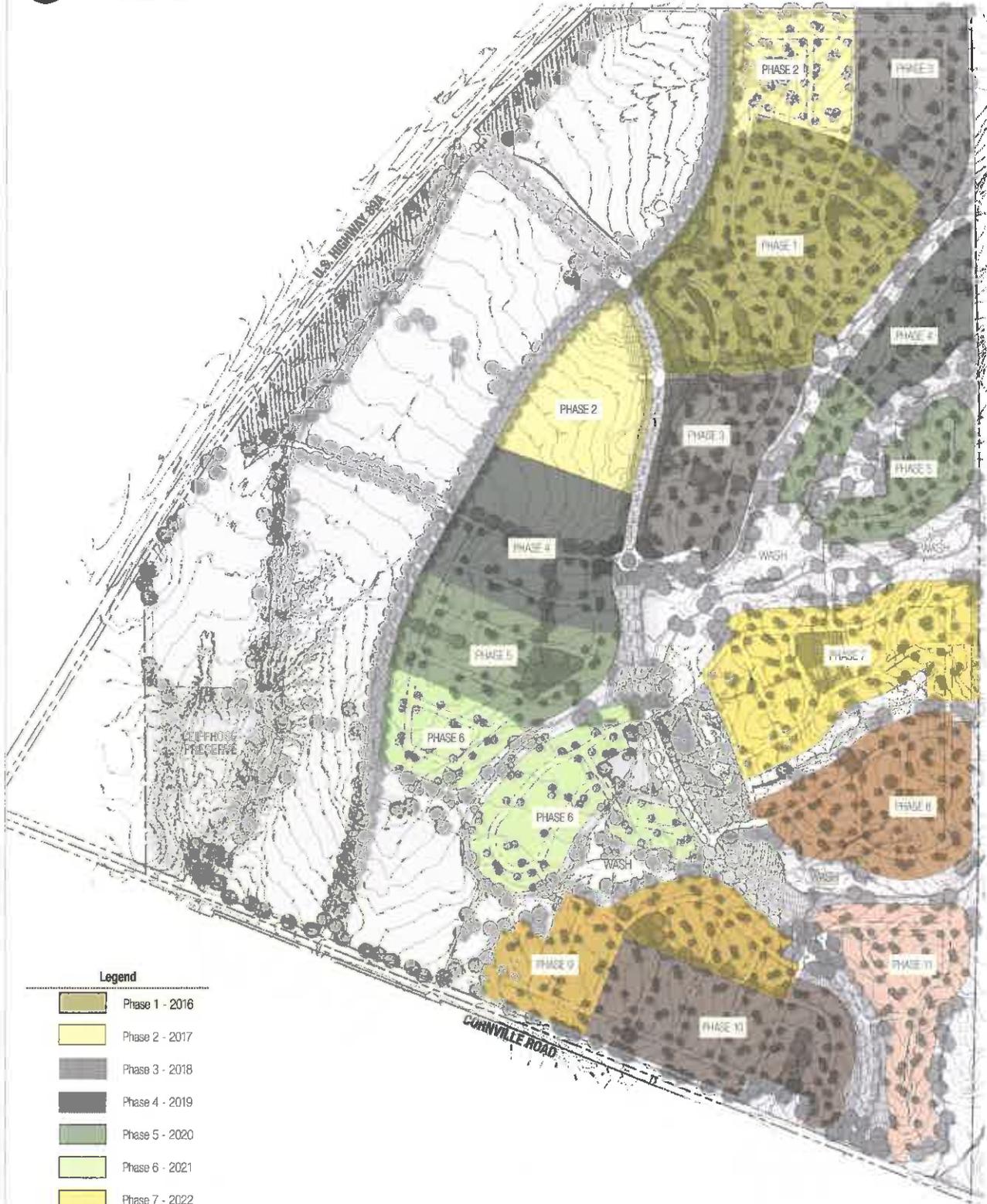
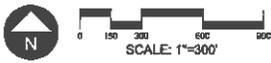
As a result of lessons learned in the past economic downturn, developers and municipalities have recognized the need to plan more prudently for implementation of large master planned communities that will develop over a five to ten year period. The phased development of such communities, including the accompanying infrastructure and utilities, reduces the potential for having such large developments interrupted and sitting idle in the event of a turndown. Phased development of utilities avoids prematurely installing infrastructure with larger capacities than needed in each phase that would remain underutilized and a financial drain on communities in a prolonged downturn.

Brookfield Communities has developed an appealing vision for 89 & VINE. We have designed the vision and phasing process for the entire project to illustrate what we are committed to achieving with the ultimate development of 89 & VINE. That overall conceptual vision, as presented in this document, will be shaped and refined over the next decade, as the market dictates the area's housing and commercial needs. *(The Projected Multi-year Phasing Plan Exhibit follows this section.)*

In this MDP document we are providing:

- 1. A Project Narrative with information on the first phase of 89 & VINE  
(Preliminary plat to be submitted shortly.)*
- 2. Conceptual illustrations of the 89 & VINE vision.*
- 3. Detailed wastewater plans, including how the project is phased and  
treatment provided from the very first home until the last home is built.*
- 4. A detailed plan for providing water through the various phases.*
- 5. A traffic impact analysis.*
- 6. Drainage studies.*
- 7. All other required studies and documents necessary to move to our first  
phase preliminary plat.*

The project has been very carefully designed to provide very positive economic, social and even recreational opportunities for the area.



**Legend**

- Phase 1 - 2016
- Phase 2 - 2017
- Phase 3 - 2018
- Phase 4 - 2019
- Phase 5 - 2020
- Phase 6 - 2021
- Phase 7 - 2022
- Phase 8 - 2023
- Phase 9 - 2024
- Phase 10 - 2025
- Phase 11 - 2026



89 & VINE  
PAD EXHIBITS

CONCEPTUAL PHASE 1 VICINITY MAP



Scale: NTS



Legend

-  Lot 1
-  Lot 2

## **COTTONWOOD’S “WINE COUNTRY” FOCUS AND LAND USE AREA SUMMARIES**

The City of Cottonwood General Plan 2025 describes Cottonwood as the “Heart of Arizona Wine Country”, the “primary destination in Arizona Wine Country” and the “central hub for the industry as a whole within the state”. The Land Use Element of the Plan supports the continuation and expansion of the City’s efforts to promote the success of Verde Valley vineyards and encourages vineyards, wineries, commercial outlets and the viticulture and enology programs at Yavapai College. According to the Vision Statement of the General Plan, Cottonwood:

**...will continue to celebrate and maintain our role as the premier wine community of the Arizona wine industry, promoting its greatest growth and health by shaping our City as its leading champion so that it can serve as the state’s central hub and clear focal point for this valuable product, resource and culture.**

Consistent with the Cottonwood Wine Country focus, this approved PAD for a master planned community on approximately 682 acres located at the northeast quadrant of State Highway 89A and Cornville Road has been renamed 89 & VINE. 89 & VINE is proposed to be developed with a vineyard theme and envisioned to include future elements that will showcase the City’s burgeoning wine making

industry. Located at a major gateway to the community on 89A and Cornville Road the property is ideally suited to introduce visitors to Cottonwood's vintners and their wines. Vineyards will provide open space along 89A and will be featured both at the entry to the project and throughout the development, giving the community a unique identity reflective of the City's goal to be identified as the center of the Arizona wine industry.

89 & VINE Arizona Partners L.L.C., a joint venture between Brookfield Communities and Journey Land is proposing to implement the approved 2007 PAD Land Use Plan on the residential portion of the site beginning with the Phase 1 subdivision plat. The development team has vast experience in Master Plan Communities throughout Arizona. Brookfield Communities was the home builder of Verde Santa Fe and has been active in the Cottonwood area since 1998.

The property is bounded by Cornville Road on the south, State Highway 89A on the west, Arizona State Trust Land on the north and east and Coconino National Forest on the east. (*Appendix Tab A 89 & VINE Regional Location Map and Site Aerials*). The site slopes naturally from northeast to southwest at an average of 3%. The approximate elevation range is 3,585' to 3,365'. The site is crossed by several well incised washes (*Appendix Tab B – Topographic Map*). The current

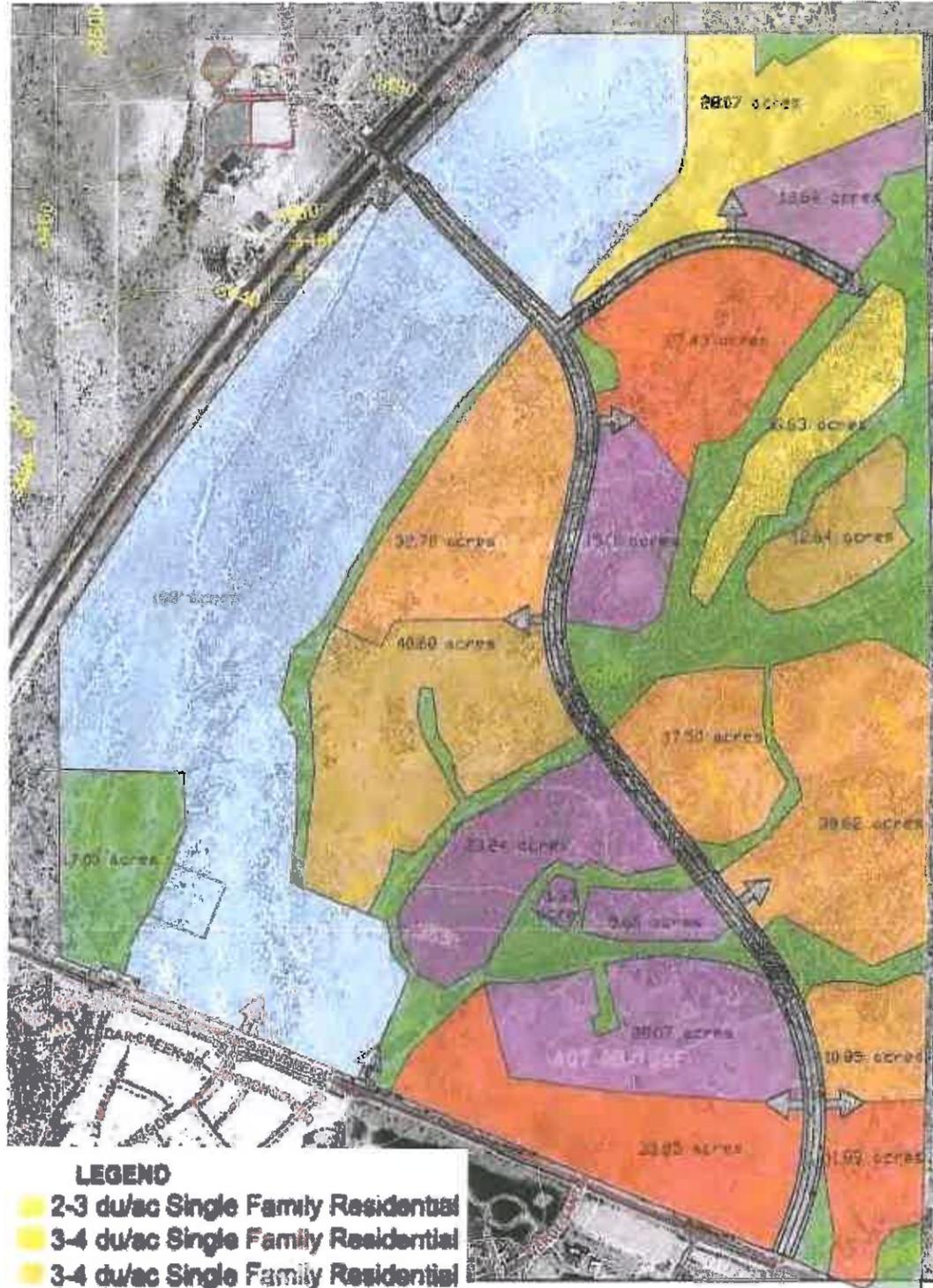
condition of the site is vacant desert land with sparse vegetation. The approved zoning is PAD and the site has never been developed so there are no existing land uses.

Brookfield is proposing to implement the approved Land Use Plan with 386.4 acres of residential development, 117.6 acres of commercial development, 2 acres for a wastewater treatment plant and 176 acres of open space. The approved number of 2050 dwelling units remains the same, with an overall density of 3.95 DU/AC, slightly below the 4.1 DU/AC approved in 2007. A broad variety of 1450 single-family and duplex dwelling units are planned on 367.3 acres, and 600 future multi-family units will occur on 54.1 acres. Residential densities will range from 2-3 to 2-6 on the single-family/duplex parcels and multi-family densities will be proposed as the Mixed Use areas are being developed in future phases. The Mixed Use areas are not being planned at this time but are proposed as future phases of development. A 2015 89 & VINE Land Use Comparison Exhibit with parcel data tables and residential parcel densities follows this section.

Streetscape, open space, property development standards, architectural theme, colors, building materials, landscape treatment, plant materials and wall treatment are described in subsequent narrative sections, along with street systems, drainage

and park areas. Master circulation, water, wastewater, traffic and drainage reports are also included in the MDP submittal.

**APPROVED 2007 PAD**



- LEGEND**
- 2-3 du/ac Single Family Residential
  - 3-4 du/ac Single Family Residential
  - 3-4 du/ac Single Family Residential
  - 4-5 du/ac Single Family Residential
  - 5-5 du/ac Single Family Residential
  - Mixed Use
  - Open Space

Approved 2007 PAD	Acres	Units	Du/AC
Residential	358	1476	4.1
Single Family	358	1476	4.1
Mixed Use	188	574	-
<b>Commercial:</b>			
Retail/ Office / Resort/ Light Industrial/ Employment	118	-	-
Residential; Apartments/ Multifamily	68	574	8.4
Wastewater Treatment Plant	2	-	-
Open Space*	176	-	-
Open Space Tracts	136	-	-
Estimated Required Open Space	40	-	-
<b>Assuming 426 Residential Acres</b>	<b>682</b>	<b>2050</b>	<b>3.0</b>
<b>20% Range for Minor Amendment</b>			
306 - 460 Acres Residential		426	
78 - 118 Acres Commercial		118	
159 - 239 Acres Open Space		176	

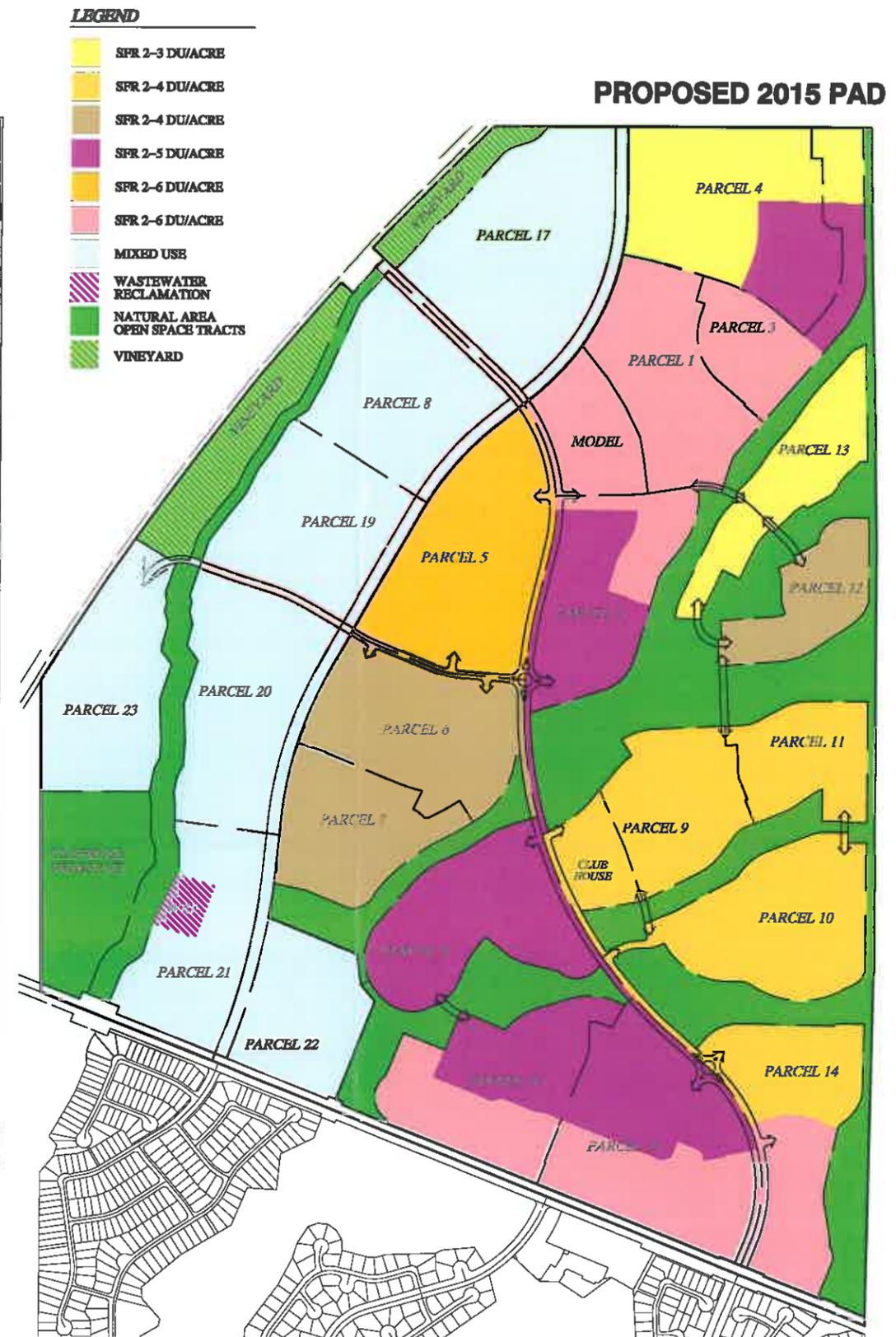
\* based on Section 424.D.5 of the Zoning Ordinance (PAD Zoning, Required Open Space) front yards, portions of commercial parking areas, and other similar open spaces may be included in the calculation of total PAD open space and have been estimated to be a minimum of 40 acres within the amended PAD.

Proposed 2015 PAD	Acres	Units	Du/AC
Residential	367.3	1450	3.95
Single Family \ Duplex	367.3	1450	3.95
Mixed Use	173.7	600	-
<b>Commercial:</b>			
Retail/ Office / Resort/ Light Industrial/ Employment	117.6	-	-
Residential; Apartments/ Multifamily	54.1	600	11.09
Wastewater Treatment Plant	2.0	-	-
*Open Space	176.0	-	-
Open Space Tracts	141.0	-	-
*Estimated Required Open Space	35	-	-
<b>Totals</b>	<b>682.3</b>	<b>2050</b>	<b>3.0</b>
<b>20% Range for Minor Amendment</b>			
306 - 460 Acres Residential**		386.4	
78 - 118 Acres Commercial		117.6	
159 - 239 Acres Open Space		176.0	

\*Estimated Open Space is Open Space internal to the parcels and is accounted for in the residential acreage above. The estimated open space is being shown in order to match the Approved 2007 Methodology.

\*\* Residential Acreage of 386.4 = 367.3acres + 54.1 Acres (MU) - 35acres (Open Space)

**PROPOSED 2015 PAD**



- LEGEND**
- SFR 2-3 DU/ACRE
  - SFR 2-4 DU/ACRE
  - SFR 2-4 DU/ACRE
  - SFR 2-5 DU/ACRE
  - SFR 2-6 DU/ACRE
  - SFR 2-6 DU/ACRE
  - MIXED USE
  - WASTEWATER RECLAMATION
  - NATURAL AREA OPEN SPACE TRACTS
  - VINEYARD

## **PAD ZONING APPROVAL HISTORY**

The existing PAD zoning on the site, which allows both the proposed residential community, as well as mixed-use areas that will be developed subsequently, was initially adopted by Yavapai County in 1987 for the project known as Verde Santa Fe. The original Yavapai County zoning for the entire Verde Santa Fe project, comprising approximately 1110 acres both north and south of Cornville Road, included 2 golf courses, a 30 acre resort site, 5,112 residential units, 111 acres of commercial, a 30 acre resort site, a fire station site and a water reclamation facility. The Verde Santa Fe project was amended by the County in 1995, which reduced the overall residential density to 3,004 units.

The 89 & VINE property was originally called Verde Santa Fe North, as the portion of the development north of Cornville Road. In 2000 a minor amendment was approved by Yavapai County for the Verde Santa Fe North property. The 2000 County approved PAD zoning was adopted by the City upon annexation of the property in 2002. The southern portion of Verde Santa Fe south of Cornville Road has already been developed in accordance with its County approvals.

Prior to annexation the City executed the Verde Santa Fe PreAnnexation Agreement on December 13, 2001. The City subsequently annexed the property and adopted the approved County PAD zoning in 2002, which was affirmed by the citizens in a subsequent referendum vote. The City wanted the property to be part of Cottonwood to enable Cottonwood both to control the project to better serve City goals and to benefit from tax revenue generated from the regional commercial uses to be developed along SH 89A.

The Preannexation Agreement established a set of Planning and Development Principles to guide plan implementation and granted rights for the development for up to 50 years. The property owner agreed to the more restrictive Planning and Development Principles desired by the City to meet its goals, including potential elimination of the golf course and the provision of a balanced mix of residential, commercial and open space uses, large tracts of commercial land along 89A to provide for regional retail uses, a mix of housing types, costs and densities, a village center, environmentally sensitive architectural design and building materials, connected open spaces, appropriate streetscape design and transitions to surrounding state and national forest land, all of which are incorporated into the proposal for 89 & VINE as detailed in subsequent sections of the narrative.

*(Appendix Tab C Verde Santa Fe Pre-annexation Development Agreement.)*

In 2007 the City processed and approved administratively a minor PAD Amendment of the annexed north portion. City staff approved a Land Use Map for the renamed Bella Montana development as an administrative minor amendment of the PAD zoning that had been legislatively approved by the City Council and affirmed in the referendum in 2002. That approved Land Use Plan is contained in Cottonwood's General Plan 2025. The 2007 Land Use Plan allows 2050 residential units on approximately 386 acres, 117.6 acres of commercial development within 188 acres designated mixed use, 2 acres for the wastewater treatment plant and 176 acres of open space. Those land use area acreages and the unit count are not being changed.

The 2007 minor amendment was intended primarily to achieve mutual City and developer goals as set forth in the Preannexation Development Agreement, including replacing the golf course with open space, removing commercial uses from Cornville Road and providing large tracts of land along 89A for large retailers serving regional needs. (*Appendix Tab D 2007 Minor PAD Amendment.*)

The 2007 Land Use Plan therefore depicted the areas and acreages designated for residential, commercial and open space uses that achieved these goals. The developer was stipulated to provide the detailed engineering and other information required for implementation of the approved uses in a Master Development Plan

(MDP) for staff approval. That implementation effort was underway in 2007-2008, after the staff approval of the minor amendment, but was delayed by the economic downturn.

Brookfield intends to implement the approved 2007 Bella Montana plan with the new name 89 & VINE, substantially unchanged with only those minor adjustments resulting from more refined engineering of the site. The 2007 Bella Montana land use map was not based upon the same detailed level of engineering of the site as has currently been undertaken. These minor adjustments do not constitute an amendment of the approved plan because, unlike the 2007 minor amendment in which land uses were relocated on the site, land use boundaries were changed and the golf course use eliminated, no such changes to land use areas are proposed. Nor are any other changes are proposed that meet the City's PAD Ordinance major/minor amendment criteria. *(Appendix Tab E 2015 89 & VINE LAND USE PLAN COMPARISON NARRATIVE AND EXHIBIT.)*

Brookfield is implementing the residential portion of the approved 2007 in phases as dictated by market demand. Subsequently it is anticipated that the mixed-use designated areas will be developed with wine-related uses and the commercial uses desired by the City to be located along 89A. Construction of the models for the

first residential subdivision is scheduled to begin after the City's preliminary and final plat approval process.

## 89 & VINE OVERVIEW

As stated earlier, 89 & VINE is a 682 acre residential/mixed use Master Planned Community. This MDP submittal only provides detailed planning for the residential acreage. (*Appendix Tab F – Conceptual 89 & VINE Master Plan.*) The remaining Mixed Use acreage is controlled by a separate entity and an updated MDP for that phase of the development will be processed as market conditions warrant.

In accordance with the 2007 approved PAD minor amendment that eliminated the golf course, 89 & VINE will utilize the numerous natural wash features for open space linkage, trails and view corridors. The residential component will be primarily single family detached homes with some duplexes and potential for future multi-family within the Mixed Use parcels as well. The intent is to provide a residential community with a wide variety of housing choices with a total of six lot sizes providing a diversity of product and maximum range of housing alternatives.

Again, 89 & VINE is being designed to reflect a vineyard/wine theme to give the community a unique identity and is using vineyards as both open space and the primary landscaping entry feature. A Wine Tasting Center/Community Facility is envisioned to be implemented in a future phase of development. (*Appendix Tab G Conceptual Vineyards and Wine Center.*) Future plans also envision a very unique Village Center in association with the wine tasting facilities that will provide a themed community gathering place with commercial opportunities. (*Appendix Tab H–Village Center Conceptual images.*)

Project amenities are planned to include a centrally located residential community center and associated park, an extensive trail system, the Cliffrose Preservation Area, numerous open space corridors with future linkage to the Coconino National forest and many smaller pocket parks providing community gathering spots within each neighborhood. Neighborhoods will be linked through the trail system.

To address the potential cut-through traffic between 89A and Cornville Road on Vine Boulevard, two traffic circles are being proposed for traffic calming purposes. Based on staff requests, a future collector street corridor is being set aside to connect from Vine Boulevard to the Arizona State Trust Land (ASTL) property on the north. Construction of this collector will be the responsibility of the developer

of the ASTL property unless 89 & VINE decides to construct all or a portion of it for its use. A second collector is proposed to connect to Cornville Road and separate the residential and mixed-use areas, which have been strategically located adjacent to SH 89A.

It should be noted that the community is providing an extremely high level of inter-connectivity, both vehicular and pedestrian, particularly in the trails and open space systems. Vine Boulevard runs basically north and south, and residents from throughout the community can walk or bike from their neighborhood to any of the other neighborhoods easily and safely. Each neighborhood is being provided substantial areas of open space and park land. A total of approximately 176 acres of open space are contained in the development under consideration, totaling 25%, in accordance with prior zoning approvals and the Pre-annexation Agreement. This includes the dedication of 19 acres for the Cliffrose Preservation Area.

89 & VINE has been planned in accordance with the design guidelines established in this MDP to provide the City with an exciting new master planned community with enduring neighborhoods. The vineyard theme, attractive entry features including vineyard landscaping and future inviting "Village Center" will provide

the community with a sense of identity and appeal that will attract homebuyers from throughout the state and country.

## **COTTONWOOD GENERAL PLAN 2025 REVIEW**

The 89 & VINE site is designated PLD (Planned Development) in Cottonwood's General Plan 2025. The PLD designation is intended to provide a higher quality of development with a mix of residential types as well as integration of commercial uses, which is proposed in the 89 & VINE development. The PLD designation also encourages the kind of pedestrian quality, attractive architecture and site development, open space networks and community values that have also been incorporated into the 89 & VINE development proposal. The existing land uses, or General Plan designations, around 89 & VINE are State Land Planning Area and Catholic Church/Public Institutional to the north and east, future commercial also to the north, State Land Planning Area/Coconino National Forest to the east and Verde Santa Fe to the south. All of the adjacent State and Forest land surrounding 89 & VINE is currently undeveloped and no plans for development of these lands have been able to be ascertained.

The project is within the East 89A Gateway Sub-area described as the major "gateway" entrance area to Cottonwood from Sedona and Cornville. Recommendations for this Sub-area include maintaining its views, ensuring a

human scale and attractive environment, integrating with the natural environment, emphasizing pedestrian orientation, neighborhood scale and village centers, all of which are addressed by the 89 & VINE proposal as set forth in the preceding 89 & VINE Overview and subsequent sections of the Project Narrative. **The project is also within the Growth Area East in the General Plan and the proposed land use plan is in conformance with the Verde Santa Fe Phase II Approved Land Use Plan shown in the Growth Area Element.**

The General Plan Land Use Element encourages the broad mix and diversity of land uses as well as walkable neighborhoods with access to parks, trails and places of social interaction that are being provided in the 89 & VINE proposal. The proposed preservation of the Cliffrose Conservation Area as well as major washes throughout the project is also consistent with the Land Use Element's encouragement of preservation of natural resources. The proposed mixed-use commercial area along 89A supports promoting Cottonwood as the commercial center for the region and providing opportunities for quality commercial uses, both of which are Land Use Element goals.

The 89 & VINE development proposal also meets the intent of General Plan goals through implementation of its circulation and open space plans. The circulation

plan provides for a hierarchy of streets designed to address both regional and neighborhood traffic safety and efficiency along with attractive streetscape design and multi-modal circulation systems including trails and bike paths. The open space plan incorporates a network of preserved open space, trails and neighborhood parks.

The proposed Water Master Plan incorporates water supply evaluation and the development of additional water resources. 89 & VINE is also proposing water conservation practices and the opportunity for the use of reclaimed water, all of which are in accordance with the Water Resources Element of the General Plan. The drainage plan with major wash protection and the sustainable development features of the proposed 89 & VINE development all further the Environmental Planning Element goals as well. 89 & VINE will be providing the public infrastructure needed to serve the development in accordance with the Cost of Development Element of the General Plan and providing for diverse housing needs, including specifically executive housing, in accordance with both the Land Use and Housing Elements.

The 89 & VINE master plan proposal also furthers the Economic Development element goals of maintaining Cottonwood as the commercial hub of the region

with its 89A regional retail uses, supporting diversification of economic opportunities with its wine industry focus and fostering tourism with its envisioned wine related and tourist-oriented facilities along with a potential hotel use. The City's current Economic Development Strategic Plan also calls for a wine industry focus, including creating more tasting room locations and an expanded tourist wineries experience as well as implementing the new "Heart of Arizona Wine Country" branding for Cottonwood, all of which are supported in the vineyard theming of 89 & VINE and its envisioned wine-related uses, which are being evaluated for inclusion in future phases of the development.

## **89 & VINE RESIDENTIAL PHASE I**

Phase I of the 89 & VINE project consists of the model home park and approximately 89 single family residential lots. The initial phase will include two lot sizes with a total of approximately 10 house styles. The intent is to start the project with as much diversity as possible to create a synergy for the community. Access is provided from 89A at the current location of Bill Gray Road. The intersection will be modified as required by the City of Cottonwood and Arizona Department of Transportation (ADOT.) Initial water and sewer service will be provided set forth in the Water and Wastewater Master Plan Reports as agreed upon by the City of Cottonwood. Final water and sewer service will be provided by permanent facilities constructed within the 89 & VINE development.

### **Model Home Park**

As an indicator of the commitment to the 89 & VINE community Brookfield Communities is creating a model home park that will serve the entire build-out of the project. The model home park has a total of approximately 21 lots and will allow for models of all of the product types to be constructed. Initial plans are for

approximately six models to be built. The model park will be a buyer friendly environment with a park like setting and pedestrian friendly layout to encourage walking tours of all of our models.

## **Initial Residential Community**

The initial residential community consists of 89 lots of 55' and 75' width. *(Appendix Tab I – Projected Development Phasing Plan and Phase I.)* Significant open space and a pocket park are provided within this first residential neighborhood. The lot layout provides all lots with a spectacular view of the nearby Black Hills range and particularly Mingus Mountain to the southwest. Due to the unique terrain and the fact that Brookfield Communities is committed to a single story development, these views will be unimpeded for all. In addition, Phase I allows for an open space corridor that will tie into the significant community wide open space amenities and trail system that will be maintained by the 89 & VINE Community Association (CA).

Generous entry-statement landscaping featuring the regional grape/wine theme and other local plantings will greet the prospective homebuyer from the entry off of 89A and be continuous through to the entry *(Appendix Tab J – 89 & VINE Entry*

*Overhead View*) into the model home park. Phase I will include a landscaped median on Vine Boulevard and provide sophisticated entry monumentation and landscaping that will establish the landscaping and wall theme throughout the community. The overall appeal of the layout, topography, open space and landscaping will set the tone for the entire development.

## **SITE DEVELOPMENT DESIGN AND GUIDELINES**

89 & VINE is bringing a new and unique residential community to Cottonwood. The community is being designed around a vineyard theme, which will include vineyards as both open space and as thematic landscaping along 89A and at the entry to the community. In addition, an active, vibrant “Village Center” and a spacious wine tasting and activities center, conceptually imaged as “The Barn,” are being evaluated as future development components. With its vineyards theme, 89 & VINE is already attracting the attention of prospective homebuyers.

The vineyards will comprise twenty-five to thirty acres of project open space. The potential for the harvesting of the vineyards by local vintners and for Yavapai College to have a role in its management as part of its vintner training program are both being explored. In addition to the vineyards, a Main Street and Village Center are envisioned in future phases. The Barn would be intended to showcase local vintners’ wine products and to serve as the hub of a great new entertainment venue which would be explored for future development.

## Design Theme Implementation

The entry to 89 & VINE will be very attractive and with an understated sophistication. (*Appendix Tab K – Entry Designs for 89 & VINE.*) The vineyards will frame the highway entry off of 89A, with nearly a half mile of vineyard open space lining the north and south approaches to Vine Boulevard. A two-lane landscaped Vine Boulevard, with median, proceeds through the commercial area and into the residential entry and neighborhoods. The residential community offers an extensive open space system, woven throughout, which links the individual neighborhoods. (*Appendix Tab L – Overhead Vine Blvd.*) The collector street pattern, with landscape tracts and sidewalks, provides direct vehicular, bicycle and pedestrian access to the individual neighborhoods and open space areas along with a connecting trail system. The trail system will provide miles of walking trails along with access to the common amenities, the Village Center and surrounding open space.

The vineyards theme, Village Center and major and minor entry monumentation, together with open space areas and the trail system, create community identity and establish its character. The entry features will be constructed of stucco, wood and

stone veneer. The perimeter walls will be constructed of masonry block, accented with a split-face pattern and stone veneer columns.

Arterial streets will be constructed to City of Cottonwood standards. The collector street pattern has been designed to manage community traffic safely and efficiently. Attached sidewalks, striped bike lanes on the collector streets, and landscape tracts encourage bicycle and pedestrian traffic. The local street patterns will provide diversity and cul-de-sacs with oversized lots.

Project signage will be controlled, and constructed in accordance with the accompanying exhibits and Master Sign Program.

The 89 & VINE Community Association, established by the CC&R's, will be responsible for the maintenance of all the private streets located behind the gates, amenities, open space areas and common area landscape tracts. In conjunction with the 89 & VINE Community Association, a Residential Design Review Committee (RDRC) will be formed to enforce the community design standards, which will also be established in the CC&R's.

## Landscaping

A variety of trees, mainly xeriscape plant materials and decomposed granite will be used for the arterial and collector streetscapes (*Appendix Tab M – Overall Landscape Plan.*) The arterial and collector streets and the major entries will be landscaped with drought tolerant trees and various plant materials. (*Appendix Tab N – Overall Streetscape and Neighborhood Landscape Concept.*) To maintain continuity throughout the community, a recommended plant palette will be provided for the residents (*Appendix Tab O – Master Plant List.*) Specific decomposed granite colors and size will also be specified. Rocks, boulders and other compatible materials may be used to supplement the landscaping design and enhance the traditional character of the development and xeriscape theme. All front yard landscaping in the single-family areas will favor xeriscape and will be installed by the homebuilder. Limited amounts of turf will be permitted in the front and rear yards of the single-family areas.

Landscaped common areas will incorporate low water use irrigation systems, and will be properly maintained by the Community Association.

## Site Development Landscaping Guidelines

- Xeriscape plant material and decomposed granite shall be used for the arterial and collector streetscapes.
- The arterial and collector streets shall be landscaped with drought tolerant trees and various plant materials.
- A recommended material and plant palette has been approved, and is shown in Appendix Tab P. A conceptual “urban furniture” palette has been designed and shown in (*Appendix Tab P – Materials and Plant Palette – Urban Furniture Palette*).
- A specific decomposed granite color and size shall be specified for the arterial and collector streets to create uniformity. All common area decomposed granite colors should be consistent throughout the community.
- All landscaped common areas shall be provided with a low water use irrigation system, and shall be properly maintained.
- Landscaping plans shall be subject to approval by the CA.
- Landscaping for individual residents shall follow the requirements for single-family developments as outlined in the City of Cottonwood Zoning Code.

## Open Space/Common Areas

As depicted on the Conceptual 89 & VINE Master Plan at Appendix Tab E, the 89 & VINE Community Association will provide for the maintenance of the significant single-family open space, common areas and project trail system provided under the MDP. The entire community will collectively provide a minimum of 25% open space. A Land Use and Open Space Table follows this section. At the time the single-family portions of the property have all been platted, all of the drainage ways and other major open space items in the project will have been dedicated to the Community Association.

Landscaping shall follow the requirements in this PAD. Sidewalks and bike lanes along the collector right-of-ways will provide pedestrian and bicycle access to the open space areas and trail system.

The trail system will have over 3.3 miles of trails. Active Trailheads will feature maps with mileage distances, trash receptacles and benches. Passive Trailheads will have trail maps only. (*Appendix Tab Q – Conceptual Open Space Landscape*

*Plan, Conceptual Parks and Trails Plan, and Tab R – Conceptual Open Space/Trail Section and Open Space/Trail Plans.)*

Examples of active and passive amenities that will be available in the 89 & VINE open space areas include:

- *Amphitheatre*
- *Vineyards*
- *Community Center*
- *Turfed Active Recreational Areas*
- *Horse Shoes*
- *Ramadas*
- *BBQ Grills*
- *Picnic Tables*
- *Benches*
- *Bike Rack Units*
- *Trash Receptacles*
- *Drinking Fountains*

The amenities listed above provide activities for all ages. Amenities will be strategically located to provide convenient access to the residential portions of the project.

The 89 & VINE Community Association shall maintain the open space and common areas, monumentation and perimeter fencing and all private roadways.

*(Appendix Tab S – Conceptual A and B Park Plans and Tab T – Conceptual Community Center Plan.)*

## **Entry Monumentation/Wall Images**

Primary entry monumentation will be constructed as needed at the intersection of 89A and Vine Boulevard as well as the northern entry to the residential section of 89 & VINE. Secondary entry monumentation will be constructed at the southern end of Vine Boulevard at the entry into the single-family area and at the intersection of Cliffrose Trail and Sunset Vista *(Appendix Tab K and U – Conceptual Entry Monumentation and Signage Design.)*

Perimeter theme walls will be constructed as needed along Cornville Road and collector streets. The perimeter theme walls will be constructed to a 6-foot height, and will include stone veneer columns at approximate 200 foot intervals to relieve the linear character of these walls. Due to the topography of 89 & VINE, the perimeter walls will have significant vertical relief as its 6-foot height follows that topography. View walls will be constructed in specified locations adjacent to the

open space areas, with exact locations to be determined at the time the landscaping plans are prepared and submitted at the time each new area is platted. (*Appendix Tab V – Conceptual Theme and Subdivision Walls, Conceptual View Wall Options*) Existing barbed wire fencing will be maintained in some areas along the north and east state and federal lands boundaries. The proposed entry monumentation and perimeter walls create a high quality residential development with specified design standards, and identifiable residential neighborhoods that have a sense of “place”.

The vineyards along 89A will be visible from the highway and will cover nearly a half mile of frontage open space at the north and south approaches to the main entry.

### **Entry Monumentation/Perimeter Walls/Fencing Guidelines**

- Formal entry monumentation shall be constructed at the locations shown at (*Appendix Tab W – Overall Conceptual Entry Feature and Wall Plan.*)
- The monumentation shall be constructed as depicted at (*Appendix Tab U.*)
- Perimeter theme walls shall be constructed of masonry block with decorative patterns and stone veneer columns. Along arterial and collector streets, stone veneer columns will be placed approximately every 200’. (*Appendix Tab V.*)

- Theme walls will be constructed of 6" x 8" x 16" masonry block.
- View fence may be constructed adjacent to same open space areas. Actual view fence locations will be shown on the landscaping plans as each new area is platted.
- Permanent chain link and wooden fencing will not be permitted. Temporary chain link construction fencing will be permitted for safety and security reasons. Wrought iron gates or wrought iron gates with wood slats will be permitted.
- Residential fences shall be built according to the City of Cottonwood Zoning Code.

## **Circulation Pattern and Street Standards**

The circulation pattern has been designed and engineered to safely and efficiently convey traffic with the community. The main collector streets will be non-gated, but will be speed controlled by round-a-bouts and changes in road patterns. Selected single-family residential areas will be gated for vehicular access only by the community residents. Pedestrians, hikers and bicyclists from the public at large are welcome to use most 89 & VINE trails, sidewalks and streets. All streets will be constructed of City of Cottonwood standards. The collector street pattern

has been designed with straight, attached sidewalks, bicycle lanes and landscape tracts to encourage bicycle and pedestrian traffic. All of the streets within the single-family area that are located within gated entry neighborhoods will be private streets and will be maintained by the Community Association, even though they are being constructed to full City standards.

The Vine Boulevard proposed private street right-of-ways shall be 130 feet wide, which includes 25 foot wide landscape tracts on each side. Six-foot wide straight, attached sidewalks will be constructed along Vine Boulevard, as well as four-foot wide bike lanes on each side of the road.

The local street proposed private right-of-ways shall be 40 feet wide. The local street entries shall be 70 feet wide with a landscape median. Each individual neighborhood within 89 & VINE will have an identifying name located on an entry monument to be built within the medians, which will provide more sense of “place” for the residents. (*Appendix Tab X – Conceptual Street Sections (3).*)

## 89 & VINE HOME PRODUCT OVERVIEW

The homes within our new 89 & VINE Master Planned Community will integrate the latest neo-traditional designs featuring contemporary architecture that borrows from the past. The emphasis will be upon socialization, walkability, wellness, and sustainability, as outlined by the work of Andres Duany, Elizabeth Moule, and Elizabeth Plater-Zyberk among others.

Specifically, over the lifetime of the project, likely our product offering will consist of five series of homes (two duplex products, and three series of detached homes built upon 55', 65', 75', 80', and 90' wide home sites. To provide variety in external appearance, each home will offer approximately eight different contemporary elevations and either a front entry or side entry garage. These five series of homes will offer 19 different floorplans and when combined with the possible elevations and garages a total offering of about **220 different combinations of floorplans and elevations.** (*Appendix Tabs Y and Z.*) This rich offering will provide a streetscape of homes with significantly different appearances that will eliminate the sea of "cookie cutter" elevations consisting of identical stucco walls and red tile roofs so present in the past.

Currently, plans for the 89 & VINE product offering over the multi-year build-out of the project consist of the following<sup>1</sup>:

1. An efficient “Home Town” Series will feature five homes consisting of 1,100, 1,250, 1410, 1683, and 1818 Square Feet. These most affordable single family detached homes will provide flowing floor plans, abundant glass walls, private retreats, and highly efficient affordable living.
2. A “Destination” series of homes will consist of six homes ranging in size from 1350 to 2100 square feet. These homes will feature open floorplans that use extensive glass walls that will serve to bring the outdoors into the home. This generation of homes will celebrate the indoor / outdoor concept and may be built on either 75’, or 80’ wide lots.
3. An upscale “Statesman” series of three homes will consist of a 2200 Square Foot, 2500 Square Foot and a 2800 Square Foot offerings. These homes will feature 8’ interior and entry doors, 10’ ceilings, and upscale

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<sup>1</sup> The “Statesman”, “Destination,” and “Home Town” series names may well be changed to fit the uniqueness of the 89 & VINE community.

appliances and fixtures. These homes will be built on 75', 80', and 100' wide lots.

4. A gate-guarded custom home community consisting of our largest lots (well over a quarter acre) on view lots bordering the national forest. This area will allow the homebuyer the opportunity to build their own custom home or choose from our selection of Brookfield's largest "Statesman" series homes.

In addition to the detached homes outlined above, 89 & VINE expects to offer two series of attached homes. These offerings are as follows:

5. A uniquely designed duplex product that features a rear facing garage and an alleyway for automobile entrance. This series will consist of four homes ranging in size from 1,100, 1252, 1312, and 1570 Square Feet. Each of these homes will indoor/outdoor living and extremely attractive exterior elevations (without garage doors facing the street).
6. The most affordable residential product offered within 89 & VINE is a series of four duplex homes of 1,100, 1255, 1430, and 1562 Square Feet in size. These homes will offer an efficient front entry garage (with two-

car tandem garage option) and highly efficient floorplans that will serve the owners with an extremely affordable home in a great community.

All of the homes within 89 & Vine will be contemporary in design. All elevations will integrate the neo-traditional model exemplified by the homes of Middle America built during the first five decades of the 20<sup>th</sup> Century. During this period every home exterior was different and served as a symbol of the uniqueness of every family residing within. No longer will residents be faced with a sea of stucco walls and tile roofs that all look the same. This concept of stylistic variety is characteristic of today's 21<sup>st</sup> Century community. Because of the variety in exterior designs offered, no two similar elevations will be permitted to be built in proximity to each other.

## **Development Standards**

The applicable City of Cottonwood sub-division ordinance standards shall be applied unless minor adjustments are necessary and approved by staff.

## **Proposed Phased Platting of Residential Neighborhoods**

The magnitude and complexity of the 89 & Vine project make it impractical to process project wide entitlements (Preliminary Plat or Final Plat) for the entire development at one time. As previously explained, the prudent development approach requires phasing of the platting process resulting ultimately in the platting of the entire project at completion. The master land plan for the development maintains 120 foot lot depths for most sections. The design philosophy is to mix 55', 65', 75' and 80' lot widths within each development. Total lot count will be monitored and will stay at or below the totals allowed by the MDP zoning. The final lot mix in each phase will be guided by buyer input.

Therefore the property will be Preliminary Platted in Phases to be determined by demand. Each Preliminary Plat will be accompanied by all supporting documentation required by City Ordinance. The Preliminary Plat will be heard by Planning and Zoning Commission and City Council. Preliminary Plats shall be valid for a period of two years from the date of approval. Final Plats shall be prepared in conformance with the approved Preliminary Plat and be accompanied by all supporting documentation as required by City Ordinance. Under the express

provisions of the Preannexation Development Agreement, the Hillside Ordinance, adopted subsequent to the Agreement, is not applicable to the project.

## **Perimeter Setback**

There is no required perimeter setback adjacent to the project. The property is bounded on the west by SR 89A and on the south by Cornville Road. These will be addressed by standard zoning setbacks and open space buffer areas. The property to the north is undeveloped Arizona State Land Department (ASLD) property and on the east is Bureau of Land Management property. The setbacks in these areas will be variable and will be related to any drainage interception features necessary as provided in the drainage studies to accompany each Preliminary Plat for the project.

## **Grey Water Disposal**

As alternative to dual drainage systems (wastewater and grey water), 89 & VINE will prepare a superior water conservation and re-use system. After the initial vault and haul operation all site generated effluent will be treated to a Class A+

level. Effluent lines will be constructed as necessary to provide irrigation for the proposed vineyards, open space and landscaping project wide. A detailed effluent budget will be prepared and provided to the City, resulting in 100% re-use of effluent. The option of selling some effluent to the Verde Santa Fe golf course is also included as a possible re-use component.

### **Corner Lots**

City standards require that corner lots be 10% wider than typical lots to accommodate the greater setback requirements. Because the project does not have a standard lot width due to the desire for product diversity, there will be a 10' landscape tract placed adjacent to all corner lots to meet the intent of this requirement. The landscape tract will be owned and maintained by the 89 & VINE CA.

## Sustainability Overview

89 & VINE will be designed to incorporate many of the most desirable features of sustainable construction practices as embodied in the “Low Impact Development” (LID) concept. One of the most critical components of LID is water conservation, and the program of conserving water begins in the earliest design stages of the project. To begin, we have revised the previously approved plan by eliminating 27 holes of water intensive golf and replaced with large tracts of natural open space and areas of environmentally sensitive plant materials. With the elimination of the previously approved 27-hole golf course, open spaces will be developed featuring a system of walking/jogging trails, nature trails, and parks using low water use indigenous plant materials. The principles outlined in the LID design approach is endorsed by U.S. Environmental Protection Agency as a method of meeting the goals of the Clean Water Act<sup>2</sup>.

One aspect of this concept is the establishment of bio-retention cells which are also called “rain gardens.” Among the most prominent features of this concept is a process employing a system of curb cuts and drains that permit rain water to flow into (indigenous) grassed swales that provide both greenscape and water retention.

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<sup>2</sup> Low Impact Development, <http://water.epa.gov/polwaste/green/index.cfm>

Advantages include protecting animal habitats, management of water runoff, and community aesthetics<sup>3</sup>. For those residents who desire it, a grey water recycling system (which captures, stores, and distributes grey water on their property) will be available for every homeowner.

Another critical aspect of environmentally sensitive, low impact development involves the practices of conservation in construction implementation. During the initial construction phases of the project it is important to plan and grade the project with least possible impact and disturbance to the land. As the construction process continues into new home construction, the utilization of as many local subcontractors, local workers, and local suppliers will support environmental efficiencies. More specifically, local workers will use less fuel coming to work and local subcontractors will use local resources to build the community. The system of “buying locally” has the distinct advantage of supporting local business and local firms that will keep employment growing and local businesses viable. Local resources will be used to the greatest extent possible.

The homes constructed within the community will include a number of energy and resource efficient features. Energy efficient design elements will include: recycled building materials, availability of photovoltaic solar panels, high efficiency water

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<sup>3</sup> Low Impact Development, Natural Resources Defense Council, <http://nrdc.org/water/pollution/storm.asp>

heating systems, jump ductworks, Low-E windows, digital thermostats, Energy Star® appliances, low VOC paint, and water management fixtures. Perhaps most importantly, we will provide our industry leading Customer Care® program whereby a new homeowner has the opportunity to meet with our construction team a total of five times from time of sale through the first year of occupancy to assure quality of construction and the desired maximum energy efficiency of the home.

The development of this type of master planned community will provide Cottonwood with new households which constitute an environmentally “clean industry” for the community.

## **Signage**

A Master Sign Plan for 89 & VINE residential subdivisions will be submitted separately for a Conditional Use Permit approval. A Master Sign Plan for 89 & VINE Mixed Use areas will be submitted separately for a Conditional Use Permit approval at the time of development of those areas. All signage will be appropriate to the character of the development, provide adequate identification and information, provide a pleasing visual environment and foster traffic safety. All signs shall comply with the Master Sign Plan.

## **Other Site Development Design Guidelines**

- All stored items, including boats and recreational vehicles, must be screened behind a 6' wall and cannot be visible from the street or neighborhood property.
- All waste containers must be screened from the street and neighboring property or stored in garages.
- Permanent on-street parking shall not be permitted.

## **Model Homes, Temporary Sales Offices and Construction Trailers**

Upon a request from the developer/builders to the City of Cottonwood, and once approved by the City, the model homes, temporary sales offices, temporary builder signs and construction trailers may be constructed and placed throughout the community. Model homes, temporary sales offices, temporary builder signs and temporary construction trailers shall be submitted for administrative review and approval by the City Manager and the Community Development Director.

# 89 & VINE

## Wastewater Treatment

### 1. Vault and Haul

- a. State Allows 24,000 gpd
- b. Developer requires 10,000 gpd (55-100 home closings depending on actual flows)
- c. Disposal site to be coordinated with City

### 2. Temporary Wastewater Treatment Plant (WWTP) - 40,000 gpd

- a. "208" permit application needs to be filed as soon as possible (covers "vault and haul", Temporary WWTP and Permanent WWTP)
- b. Capacity of 222 – 400 home closings depending on actual flows
- c. Designed and constructed prior to 1st home closing

### 3. Permanent WWTP - 100,000 gpd initial phase

- a. "At risk" design to start shortly after "208" permit submitted
- b. Depending on entitlement, permit and design progress, developer will have option to "fast track" construction and eliminate Temporary WWTP phase
- c. Capacity of 555 – 1,000 home closings/equivalent dwelling units (EDU's) depending on actual flows

## **Wastewater Treatment Continued**

- 4. Permanent WWTP – 100,000 gpd 1st expansion**
  - a. Cumulative capacity increases to 200,000 gpd**
  - b. Cumulative number of home closings/EDU capacity increases to 1,110 – 2,000**
- 5. Permanent WWTP – 120,000 gpd 2nd expansion**
  - a. Cumulative capacity increases to 320,000 gpd**
  - b. Cumulative number of home closings/EDU capacity increases to 1,778 – 3,000**
  - c. Permanent WWTP with expansions sufficient to service the entire 89&Vine Residential component and initial Mixed Use components**
- 6. Effluent to be**
  - a. Class A+ effluent**
  - b. Disposed of onsite to satisfy irrigation demands**
- 7. Financial Assurances**

**Master Wastewater Report**  
**89 & Vine**  
**City of Cottonwood, Arizona**

**1. INTRODUCTION**

**1.1 Project Description**

**1.1.1 Project Name & Developer**

89 & Vine is a 682 acre master planned development consisting of Residential and Mixed Use Commercial components. The developer of the project is 89 & Vine Arizona Partners, LLC, and is being managed by Brookfield Communities.

**1.1.2 Project Location & Topography**

The development is located within Section 31 Township 16 North, Range 4 and Section 6 Township 15 North, Range 4 East of the Gila and Salt River Base and Meridian, City of Cottonwood, Yavapai County, Arizona. The property is bound on the south by Cornville Road, to the northwest by State Highway 89A, to the north by Arizona State Land and Coconino National Forest to the east. The project location can be found on Figure 1 and project Aerial Overlay can be found on Figure 2.

The site is currently un-developed and is currently used for agricultural purposes. Generally, the site slopes from the northeast to southwest at an approximate 3.00% slope. The topographic information utilized for the purposes of this wastewater analysis has been obtained from a site aerial topographic survey, which was flown by Dallas Aerial, Inc. in May 2015. The topographic data utilizes NAVD 1988 datum.

The benchmark utilized for this project is:

*NGS Data Point located ±1850' south of US 89A & Cornville Road, ±150' east of the centerline of US 89A.*

*NGS point Designation = R 18*

*NGS point P.I.D. = ES0478*

*NGS point Elevation = 3,367.392 feet (NAVD-88 Datum)*

## **1.2 Purpose of Report**

The purpose of this report and wastewater analysis is to define the rules and regulations for governing wastewater design and model the associated phased master wastewater solution for the 89 & Vine development. The analysis has been performed to ensure that the criteria set forth by the City of Cottonwood and Arizona Department of Environmental Quality Title 18 and Bulletin No. 11 will be met for the development of the 89 and Vine wastewater system.

The City of Cottonwood (COC) does not currently provide sewer service to the project site; therefore, this plan contemplates the construction of a phased Wastewater Reclamation Facility (WRF) to be constructed on-site.

## **1.3 Content Summary**

The report is comprised of four major sections.

- existing area sewer facilities
- planning parameters and unit flow rates
- proposed sewer collection system
- proposed wastewater treatment facility
- proposed reclaimed water uses

## **2. EXISTING AREA WASTEWATER INFRASTRUCTURE**

The existing area sewer systems include various use specific septic systems and the larger Verde Santa Fe Wastewater Reclamation Facility (VSF WRF). The septic systems include the Catholic Church and Tao Fellowship located along Bill Grey Road northwest of 89A while the VSF WRF is located approximately ½ mile south of Cornville Road in the Verde Santa Fe development.

The VSF WRF was permitted for 264,000 gpd, however, is currently only equipped to treat 100,000 gpd. Based on discussions with the plant operators, the plant is currently at full capacity and cannot accommodate any additional offsite flows without an expansion.

### 3. DESIGN CRITERIA

The design criteria utilized for the wastewater analysis has been based on the criteria coordinated with City of Cottonwood. The projected residential sanitary sewer flows have been established based on historical potable water demands for the Verde Santa Fe development. The historical data obtained for the VSF water campus, indicates an average monthly potable water demand of approximately 200,000 gpd for the 940 service connections in Verde Santa Fe (See Appendix B). Based on the above referenced discussions with the operator of the VSF WRF the 940 service connections are yielding approximately 100,000 gpd of effluent or (106 gpd per dwelling unit). The difference in potable production and sewer effluent being treated can be attributed to domestic irrigation demands and miscellaneous uses that do not enter the sewer system. For the purposes of the 89 & Vine sewer analysis a more conservative assumption of 10% was applied to the 200 gpd potable demand to account for irrigation and miscellaneous uses not contributing to sewer flows. This results in an effluent value of 180 gpd / residential unit for the 89 & Vine project. This effluent value has previously been coordinated with Cottonwood staff. The wine center and mixed use areas were applied based on comparable land use categories identified similar Arizona cities' Integrated Water Master Plans.

The sanitary unit flow rates and design criteria utilized for the 89&Vine project is summarized below:

- Flow Criteria
  - Single Family Residential (SFR)
    - Unit Flow Factor = 180 gall/acre/day/Dwelling Unit
  - Multifamily Residential (MF = 80% SFR)
    - Unit Flow Factor = 144 gall/acre/day/Dwelling Unit
  - Mixed Use (MU) - Commercial/Retail/Multifamily
    - Per Acre Flow Factor = 1,200 gall/acre/day

- Peaking Factors per 2005 ARIZONA A.A.S. Title 18 Chapter 9

Upstream Population	Peaking Factor
100	3.62
200	3.14
<b>300</b>	2.90
400	2.74
500	2.64
600	2.56
700	2.50
800	2.46
900	2.42
1000	2.38
1,001 to 10,000	$PF = (6.330 \times p^{-0.231}) + 1.094$
10,001 to 100,000	$PF = (6.117 \times p^{-0.233}) + 1.128$
PF = Peaking Factor	p = Upstream Population

- Manning's Roughness Coefficient  $n = 0.013$
- Velocities
  - Minimum = 2.0 ft/s
  - Maximum = 10.0 ft/s
- Minimum Slopes
  - 8" = 0.0033 ft/ft; 10" = 0.0024 ft/ft; 12" = 0.0019 ft/ft; 15" = 0.0014 ft/ft
- d/D Ratios
  - d/D = 0.75
- Manhole Sizes
  - 4' diameter for manholes less than 10' deep
  - 5' diameter for manholes 10' or deeper
- Minimum Cover Depth = 5.0' from finished grade to top of pipe

- Drop through Manholes
  - 0.10' typical
  - 0.20' when pipe deflections are between 45-90 degrees
  - Deflections greater than 90 degrees will not be allowed
- Match crowns of pipe at size changes
- Line Separations
  - Horizontal and vertical separations of water and sanitary sewer lines must be in accordance to *Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems"*, the *Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control"*, and the *MAG Specification Section 610.5*
- Force Main
  - Velocities
    - Minimum = 3.0 ft/s; Maximum = 7.0 ft/s
  - Pipe material must have established ASTM, ANSI, AWWA, and NSF standards of manufacture, or seals of approval, and shall be designated as pressure sanitary sewer pipe
  - Force mains are to be constructed of restrained ductile iron pipe or approved equivalent
  - Air Release Valves are required at all peaks in elevation
  - Line separations must be in accordance to *Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems"*, the *Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control"*, and the *MAG Specification Section 610.5*
- Lift Station
  - Accessibility, drainage patterns, visual impacts, functions, design constraints, and ultimate street sections shall be considered when selecting the site location
  - The site shall be large enough to contain all the equipment and service equipment

- The lift station is to be designed per the minimum requirements set forth by the *Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control"*
- The need for telemetry, dual pumps, backup power supply, three-phase power, odor control, and perimeter walls will be addressed during site design.

#### **4. PROPOSED WASTEWATER SYSTEM**

This section of this report will provide an evaluation of the proposed sewer design for 89 & Vine. For the purpose of this preliminary analysis, only the critical alignments have been shown and modeled. The preferred sewer solution for the project is to convey flow by means of gravity sewer, note due to the topography of the site there are some areas that require deep sewers to prevent the need for multiple lift stations. The preliminary layout and profiles of the critical sewer alignments in can be viewed on Plates 1-9. Additional coordination will take place with the project geotechnical engineer and utility contractors to ensure constructability of the deep sewer sections. It is important to note, that further refinement of the sewer alignments and profiles will continue through final design. In cases where lines have been routed through open space or outside of proposed public right-of-way, a sewer easement with a minimum width of 20' shall be provided.

##### **4.1 Wastewater Generation**

The number of single family residential dwelling units being served by on a parcel by parcel basis has been determined based on the proposed land use plan seen in Figure 4. The PAD zoning document projects a maximum of 1,450 SFR units within the 367.3 residential zoning categories, resulting in a population density of 4.10 du/acre inclusive of the clubhouse area (9.2 acres) and 4.05 du/acre net of the clubhouse. The number of equivalent residential dwelling units (ERDUs) can also be determined for the non-residential parcels by dividing the projected average daily flow by 180gal.

The actual density projections will vary as the project develops based on the final land plan and associated lot sizes. Per the PAD, density may be transferred from parcel to

parcel so long as the overall residential density does not exceed the maximum allowable lot count of 2,050. The wastewater calculations contained herein will be updated as preliminary and final plats are brought forward for review. The updated wastewater calculations will track actual densities achieved on a parcel by parcel basis will track the anticipated density transfer for future infrastructure planning purposes.

No accommodations have been made for offsite flows as the surrounding property is Catholic Church, TAO fellowship, ASLD or national forest. Based on discussions with the owners of the Catholic Church property they intend on being on self-contained in as it relates to their water and sewer solutions. The TAO fellowship is currently on well water and utilizes a septic sewer system. The TAO fellowship property representatives are unsure how the property will develop long term and are not currently prepared to participate in the 89 & Vine water and sewer solution. The development schedule for the ASLD property is unknown and the state will not participate in oversizing infrastructure to accommodate their property, therefore, it is anticipated that the ASLD property will provide its own sewer solution at the time the property is developed.

#### **4.2 Proposed Collection System**

The proposed gravity sewer system will follow the natural terrain of the project and flow north to south to the proposed WRF. The collection system analyzed as part of this report serves the residential parcels and wine center (Parcels 1-17). The collection system required to serve the mixed use parcels (Parcel 18-23) will be evaluated under separate report at the time those parcels develop.

A total of (8) eight critical sewer alignments were identified as part of this master sewer analysis.

- Sewer Main "A" serves Parcels 14, 15 & 16 and could potentially serve the mixed use Parcels 21 and 22 should MU parcel owner wish to participate in the cost to oversizing of the line.
- Sewer Main "B" is the primary collector sewer for the residential parcels and serves as the outfall for Sewer Mains "C" & "D" and Parcels 8 & 10.
- Sewer Main "C" serves Parcels 8, 9, 11 and the project Club House.

- Sewer Main “D” serves Parcels 1,2,3,4 5, 6 & 7 and is the outfall sewer for Mains “E”, “F”, “G” & H.
- Sewer Main “E” serves Parcel 2 and the Model Complex
- Sewer Main “F” serves Parcels 12 & 13
- Sewer Main “G” serves Parcels 1, 3 & 4
- Sewer Main “H” serves Parcels 17 (Wine Center)

#### **4.3 Wastewater Line Sizing**

A *Microsoft Excel* spreadsheet has been developed to evaluate the proposed sewer lines and ensure that the required criteria is met based on the sewer line characteristics that are input, such as pipe size, slope, and dwelling units served. Tables 3 - 5 contain the proposed sewer line design variables, i.e. pipe size, slope, and invert elevation, pipe cover, and pipe capacity for the various sewer lines. The overall conceptual sewer layout with line sizing maybe viewed on Figure 6.

The proposed sewer lines for each alternative have been sized to ensure that the City criteria have been met while conveying the 89 & Vine peak flows. The peak flows have been determined based on the following equation:

$$Q = PF \times DU \times P \times U$$

Where:

Q = Peak Flow, gpd

PF = Peaking Factor

DU = # of Dwelling Units

P = Population per Dwelling Unit = 2.5

U = Unit Flow Factor = 180 gpd/ERDU

The pipe capacity for each line is then determined using Manning's equation and given the pipe size and the minimum allowable pipe slope. Using the peak flow and the pipe capacity, the spreadsheet calculates the d/D ratio within each pipe segment to ensure that the City of Cottonwood criteria are met regarding sewer pipe capacities.

## 5. 89&VINE WASTEWATER RECLAMATION FACILITY

The purpose of this section is to identify the proposed phasing of the 89&Vine Wastewater Reclamation Facility (89WRF) to serve 89&Vine and to identify the benchmark flows and associated equivalent residential dwelling units that could be served by each phase. The 89WRF Design Concept Report shall be submitted to the City of Cottonwood under separate cover in conjunction with the 208 Amendment and ADEQ Aquifer Protection (APP) permit. Water Works Engineers is currently under contract to prepare the 208 Amendment, APP permit and associated support documentation. Note that the total effluent listed below is cross referenced as ERDUs (Equivalent Residential Dwelling Units) however the phase limitations or need for expansion will actually be based on measured flow.

The proposed phasing for the 89WRF is as follows:

- Phase 1 – Vault and Haul
  - The vault and haul is proposed to be utilized during the design and construction of the first Phase of the temporary WRF. The vault and haul phase is intended to be an interim solution and will be utilized while the sewer treatment plant is being constructed and to allow the development to grow until such time there is sufficient daily effluent to support the treatment plant (typically 10% of the plant capacity). Current state regulations allow up to 24,000 gpd to utilize a vault and haul engineered system (upon ADEQ review and approval). The 89&Vine vault and haul system will be sized to accommodate 10,000 gpd (a smaller vault and haul system may be utilized if a temporary WRF is utilized). The developer will contract with a minimum of two wastewater hauler pump truck companies and will install a high water alarm with cellular/paging capabilities to ensure the sanitary sewer vault is emptied on an appropriate schedule. The effluent will be hauled to an acceptable location as identified by the City of Cottonwood (See Figure 5 for the City of Cottonwood proposed effluent disposal location).

- Phase 2 – Phase 1 of the Permanent Wastewater Reclamation Facility – 100,000 gpd
  - This phase of the WRF will begin the permanent facility construction. Similar to the previous phases, this treatment plant will be designed and planned to be in-service in advance of the development flows (100,000gpd or 555 ERDUs). This facility will produce Class A+ effluent also but will be equipped with full noise and odor control to allow the setback to be reduced to 350ft.
- Phase 2 (Alternate) - 40,000 gpd Temporary WRF
  - Phase 2 is a Class A+ interim wastewater treatment plant sized 40,000 gpd or 222 ERDUs. AUC Group, L.P. is currently under contract for the design and construction of the interim treatment plant. Note that the developer may elect to bypass this phase if the design, permitting, and construction schedule work with the proposed development timeline.
  - This temporary plant option will only be utilized should the permanent plant design and construction not be able to be completed in time for the 101 home closing.
- Phase 3 – Phase 2 of the Permanent Wastewater Reclamation Facility - 100,000 gpd expansion
  - This phase of the WRF is planned to accommodate further residential growth. Cumulative capacity with this phase in-service will be 200,000gpd or 1,111 ERDUs. This expanded facility will continue to produce Class A+ effluent and be equipped with full noise and odor control.
- Phase 4 – Phase 3 of the Permanent Wastewater Reclamation Facility - 120,000 gpd expansion
  - This phase of the WRF is planned to accommodate all phases of the single family residential parcels and wine center (Parcels 1-17). Cumulative capacity with this phase in-service will be 320,000gpd or

1,778 ERDUs. This expanded facility will continue to produce Class A+ effluent and be equipped with full noise and odor control.

- Future WRF Phases

- Future phases will be planned and constructed by others as mixed use development requires increased wastewater treatment capacity. The maximum buildout capacity to serve 89&Vine mixed use area is currently estimated to be +/-480,000 gpd.
- The total permitted capacity via the 208 Area Water Quality Plan is 800,000gpd. Any expansions to the plant to accommodate regional growth will be performed by others.

A graphical representation of the proposed Wastewater Reclamation Phasing may be seen below.

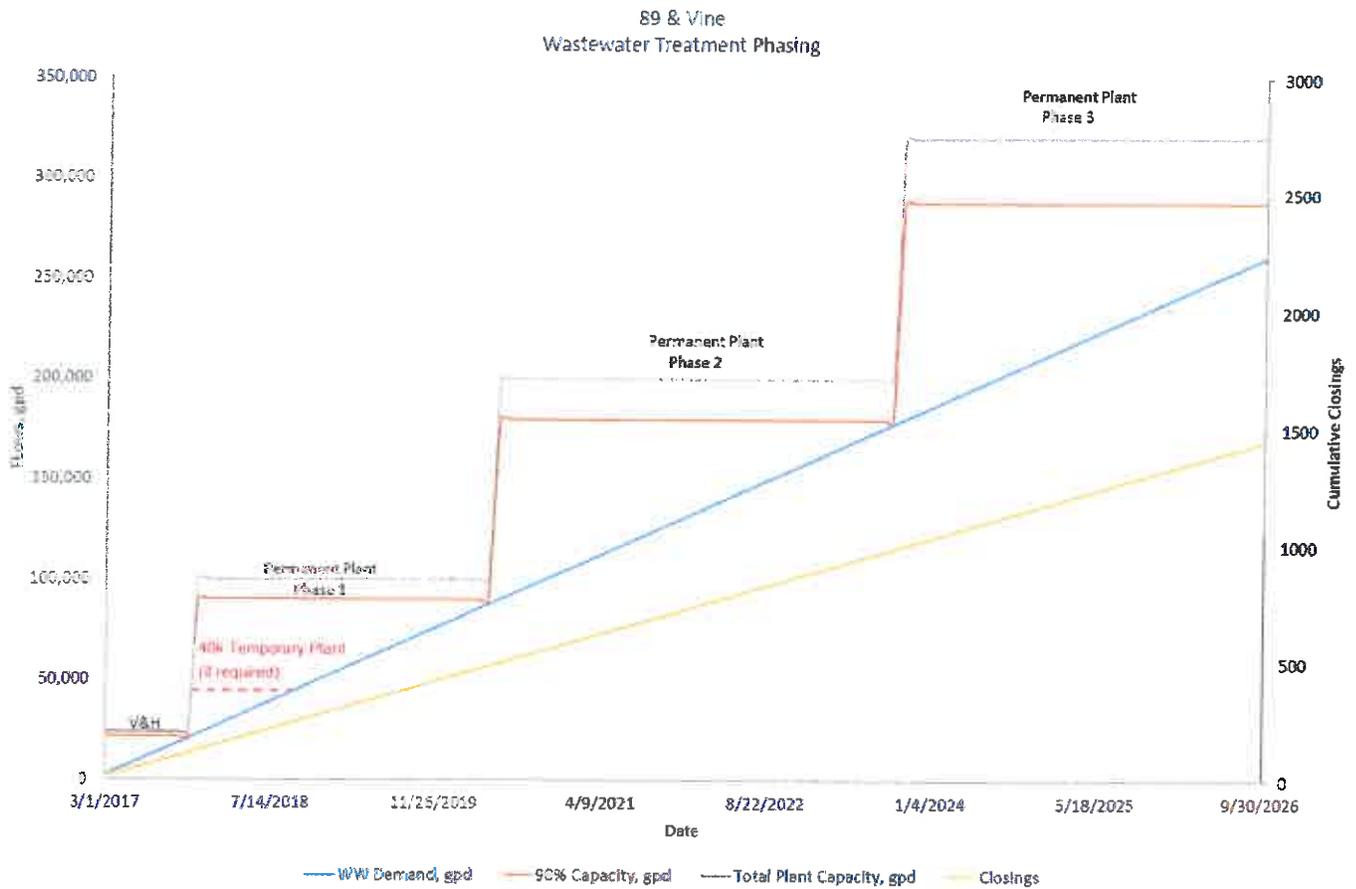


Figure 8 - Wastewater Reclamation Phasing

## **6. RECLAIMED WATER / EFFLUENT DISPOSAL**

The treated effluent (reclaimed water) from the 89WRF will be disposed of primarily through the use of irrigation. A water budget is being prepared in conjunction with the above referenced APP permit that will identify the irrigation demands for the project open space and may potentially include the irrigation demands for the Verde Santa Fe golf course located south of Cornville Road.

## **7. OPERATION AND MAINTENANCE**

The proposed sanitary sewer system and water reclamation facility will be owned and operated by the City of Cottonwood. The developer is currently coordinating with the City of Cottonwood on any required agreements between the city and the developer to address operation and maintenance of the proposed interim vault & haul, as well as, ownership/operation & maintenance of the phased temporary treatment plant serving the site. The sewer infrastructure agreement between the City and the developer will be coordinated under separate cover and is not intended to be discussed in this master sewer report.

## **8. CONCLUSION**

In summary, this report has defined the waste water discharges generated from the proposed 89&Vine development and identified the wastewater infrastructure necessary to serve the project. The proposed wastewater solution is based on gravity sewer to an onsite wastewater reclamation facility. Key points from this analysis may be viewed below:

- This report has been prepared in support of the 89&Vine MDP case as well as basis for design on the subsequent preliminary plat submittals.
- The wastewater collection system has been designed in accordance with criteria set forth by City of Cottonwood and Arizona Department of Environmental Quality Title 18 and Bulletin No. 11
- The site does not currently have sewer service and the existing area sewer facilities do not have capacity to accept the 89&Vine project without expansion.

- The preferred sewer collection system is via gravity sewer. Additional design / construction coordination is ongoing to ensure the proposed deep sewer is a viable solution to negate the need for onsite lift stations.
- A phased onsite Waste Water Reclamation Facility is proposed. The phasing will consist of: vault & haul (0-100 homes), permanent plant phase 1 (101+ homes) and subsequent permanent plant phases based on development progress and flows. A temporary WRF may be required should the permanent plant phase 1 not be complete in time for home 101. Permanent plant phasing is provided through 320,000gpd.
- Future Phases for the mixed use portions of 89&Vine and regional growth will be by others.
- The 89WRF will be permitted and constructed to produce Class A+ Effluent.
- The 89WRF effluent will be disposed of via onsite irrigation and potentially irrigation of the Verde Santa Fe golf course to the south.

## 9. REFERENCES

1. City of Cottonwood, Arizona  
*Subdivision Ordinance, 2005*
2. Arizona Department of Environmental Quality  
*Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control", 2005*
3. Arizona Department of Environmental Quality  
*Engineering Bulletin No. 11, "Minimum Requirements for Design, Submission of Plans and Specifications of Sewage Works", 1978*

# 89 & VINE

## Water

1. Initial Use of Verde Santa Fe (VSF) Water Facilities
  - a. Current excess capacity at VSF sufficient for 555 additional home closings/connections
  - b. 89& Vine is requesting connections for up to 400 home closings
  - c. 89 & VINE will help City insure VSF golf course well connection to VSF water campus
  - d. 89 & VINE will construct onsite booster station for potable/fire demands
  
2. 89 & VINE Onsite Wells
  - a. Well Siting Report has been completed
  - b. Permit application for 1st of two wells to be submitted as initial entitlements progress; design to commence shortly thereafter
  - c. Construction of 1st well to be completed prior to 400th home closing
  - d. 2nd well (backup well) site permitting, design and construction to be completed later as needed for project

## **Water Continued**

### **3. 89 & VINE Onsite Water Campus**

- a. Permitting, design and construction of the campus to be completed in advance of the 400th home closings**
- b. Campus to include 325,000 gallon ground storage tank, equipped with onsite Arsenic Treatment System with a capacity up to 435 gpm.**
- c. Campus size sufficient to service the entire 89 & VINE Residential component and the initial project Mixed Use components**

### **4. Financial Assurances**



December 11, 2015

Mr. Philip Peterson  
89 & Vine Arizona Partners  
3550 North Central Avenue, Suite 1001  
Phoenix, Arizona 85012

**SUBJECT: FRACTURE TRACE ANALYSIS – 89 & VINE – COTTONWOOD, AZ**

Dear Mr. Peterson:

Southwest Ground-water Consultants (SGC) has prepared the following well siting analysis for the proposed 89 & Vine Development located in the City of Cottonwood, Yavapai County, Arizona. The proposed development is located near the intersection of Highway 89A and Cornville Road, in Cottonwood, Arizona (Figure 1). SGC understands that there may be a need for several water production wells to supply the newly proposed development. By using the Fracture Trace Analysis method described in this report, SGC has identified five (5) potential sites for new water production wells on the 89 & Vine property.

**Geologic Setting**

The land surface elevation across the property is approximately 3,400 to 3,500 feet above mean sea level with relief from several moderately deep cut drainages passing through. The geologic unit at the surface and extending to a depth of approximately 1,000 feet is the Verde Formation that consists of sedimentary layers of limestone, sandstone, and mudstone (Figure 2). The Verde Formation is the shallowest water bearing formation in the area.

**Lineaments**

The sedimentary rock units beneath the surface store and transmit groundwater through pore spaces, faults, and fractures. Some of these faults and fractures extend up from the subsurface to the surface and may be visible at the surface in the form of washes, lines of vegetation, changes in rock units, or other linear forms (Figure 3). These surface structures are called lineaments and can be mapped using topographic maps, aerial photographs, and/or geologic maps. Completing a well at the intersection of multiple lineaments or near major lineaments may result in better producing wells as a result of the well coming in contact with a denser array of fractures and subsequent flow of water.

**Well Sites**

SGC completed a fracture trace analysis, which identifies the major lineaments in the vicinity of the 89 & Vine property. Based on the lineaments plotted by SGC, five (5) potential well sites across the 89 & Vine property (Figure 4) have been identified. The proposed locations are numbered in order of likelihood of encountering subsurface fractures, with well location number 1 expected to have the highest likelihood of production capacity.

Well location number one (1) was selected because it is near the intersection of a major and several minor lineaments. The major and minor lineaments are depicted at the surface as drainages through the property. The approximate coordinates of well location number 1 are N 34° 44' 11.957" and W 111° 57' 44.292".

Well location number two (2) was selected because it is near the intersection of a major lineament and a minor lineament. The major lineament is formed by a drainage that is up to approximately 25 feet deep near the northern portion of the project. The approximate coordinates of the second well location are N 34° 44' 5.948" and W 111° 58' 17.369".

Well location number three (3) was selected because it is located near the intersection of a major and minor lineament. It is also located directly adjacent to the Cornville Road, which may provide easier access. The lineaments near location 3 are all formed from surface drainage features. The approximate coordinates of the third well location are N 34° 43' 34.763" and W 111° 57' 26.873".

Well location number four (4) is located along the same major lineament as well location 1, but further to the north. Well location 4 is also located near a major and several minor lineaments and may be as favorable or more than well location 1. However, with its proximity to well location 1 and our knowledge of the well impacts in the area, we have designated it to number 4 purely to provide separation between pumping wells. The approximate coordinates of well location 4 are N 34° 44' 21.306' and W 111° 57' 38.599'.

Well location number five (5) is located along a major lineament on the north portion of the site. The major lineament is a significant drainage that has inscribed approximately 25 feet into the surface. The well 5 location is also located near the City of Cottonwood well that was tested as a precursor to this study. Based on the testing results from the City of Cottonwood well, the aquifer in the area of location 5 is promising for water production. However, with the water that was pumped from the City of Cottonwood well also came a high volume of very fine quartz sand. This sand can be very destructive to pumps and water systems. SGC also determined that the zone of influence of the pumping wells in the vicinity is moderately large due to the confined conditions of the shallow aquifer. Therefore, a well at location 5 may impact nearby wells that are located off site.

The estimated depth of the proposed production wells at the 89 & Vine site is approximately 1,000 to 1,200 feet deep. At these depths the wells should penetrate the Verde Formation and encounter an underlying volcanic sequence. No wells in this immediate vicinity have penetrated the volcanic sequence to determine its thickness. However, approximately 3 miles to the east a well penetrated about 200 feet of volcanics and an additional 100 feet of cemented alluvium before encountering a limestone unit (Redwall) that yielded thousands of gallons per minute. As a result, SGC proposes that an initial pilot borehole be drilled to approximately 1,500 feet to determine if the deep aquifer exists beneath the property. If it does, the number of required



Mr. Philip Peterson  
90 & Vine Well Siting  
December 11, 2015  
Page 3 of 3

production wells may be reduced. Otherwise, the probable depth of the Verde Formation production wells would be in the 800 to 1,000 feet.

Following the drilling and testing of the first well, SGC will refine the preliminary design for subsequent wells. In addition to well depth and design, SGC will conduct a well spacing optimization plan to better site the project wells with respect to distances between each well, land use plan, and well production.

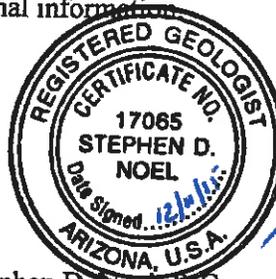
Please call if you have any questions or require additional information.

Sincerely,

**Southwest Ground-water Consultants**

  
Chris Catalano, R. G.,  
Project Manager

  
Stephen D. Noel, R.G.  
Director Expires: 9/30/15



Attachments: Figure 1. Vicinity Map  
Figure 2. Geologic Map  
Figure 3. Aerial Photograph  
Figure 4. Topographic Map with proposed well locations

c: Matt Goodwin, P.E.  
Warren Russel, P.E.  
Rob Bryant, P.E.



# ATTACHMENTS

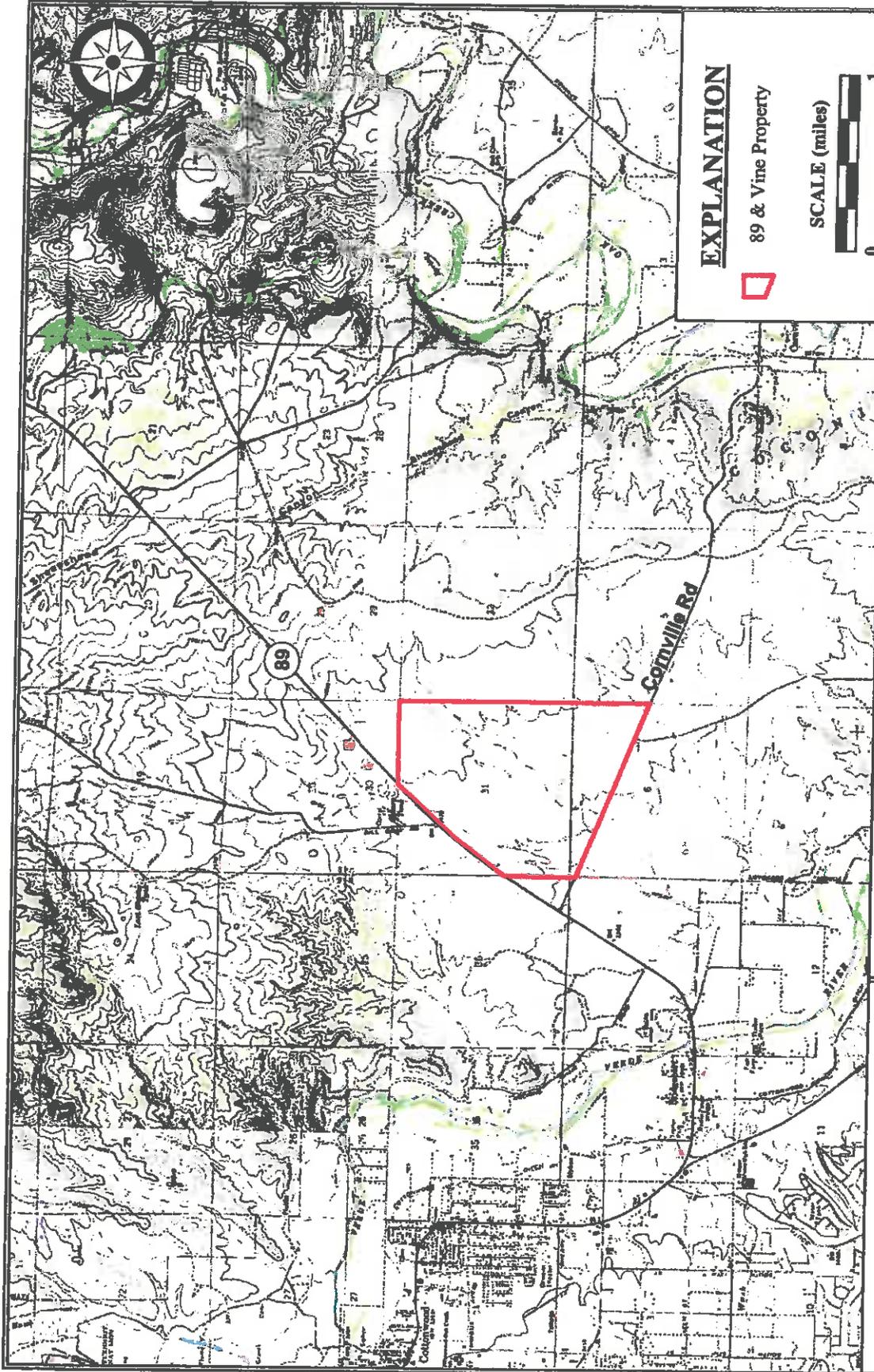
**Figure 1. Vicinity Map**

**Figure 2. Geologic Map**

**Figure 3. Aerial Photograph**

**Figure 4. Topographic Map with proposed well locations**





**EXPLANATION**

 89 & Vine Property

SCALE (miles)



**Southwest Ground-water  
Consultants**

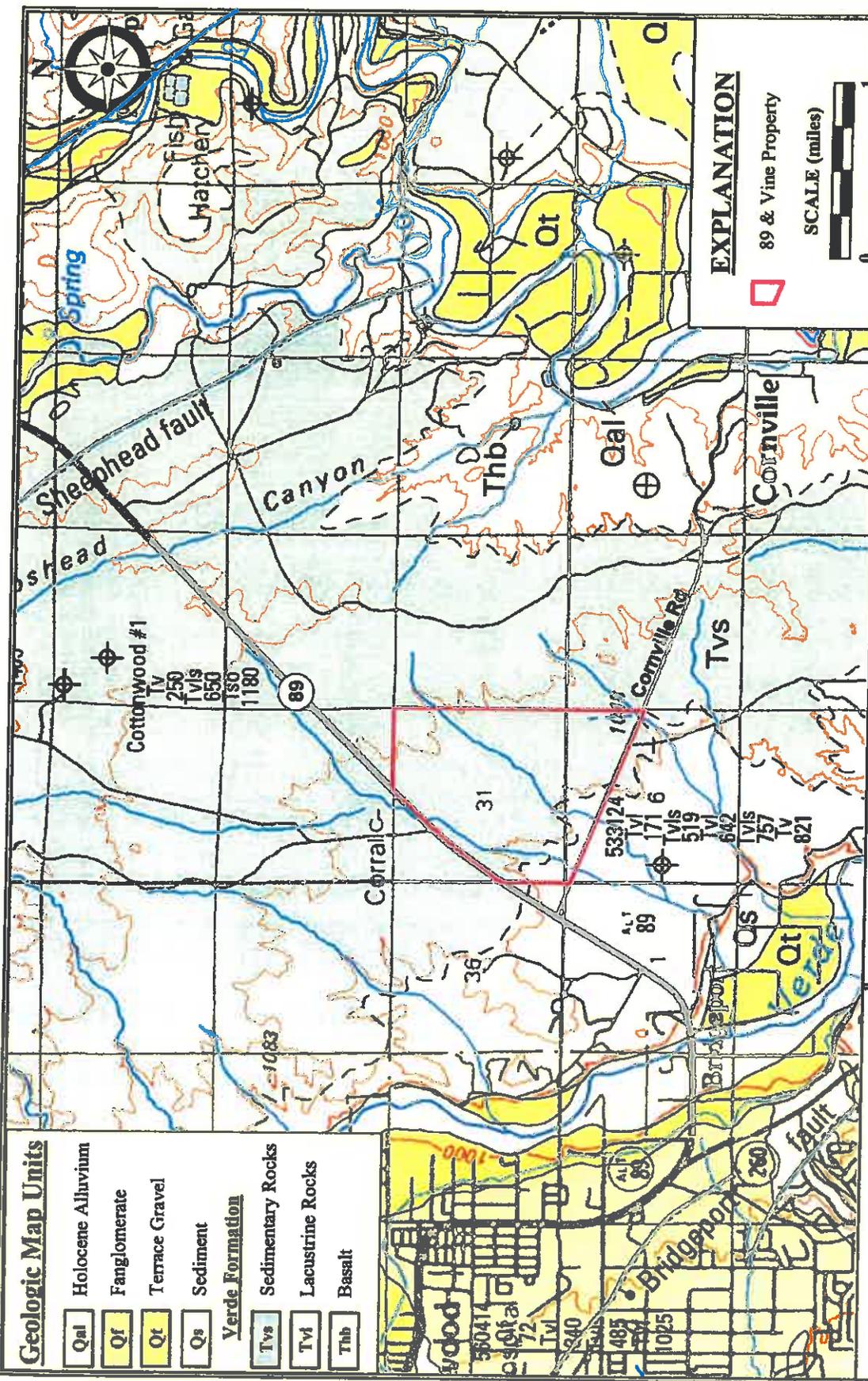
**VICINITY MAP**

**Figure**

**1**

December 10, 2015 Project B.2199

89 & Vine, Cottonwood, Yavapai County, Arizona



**Geologic Map Units**

Qal	Holocene Alluvium
Qf	Fanglomerate
Qt	Terrace Gravel
Qs	Sediment
<b>Verde Formation</b>	
Tvs	Sedimentary Rocks
Tvl	Lacustrine Rocks
Thb	Basalt

**EXPLANATION**

89 & Vine Property



**Southwest Ground-water  
Consultants**

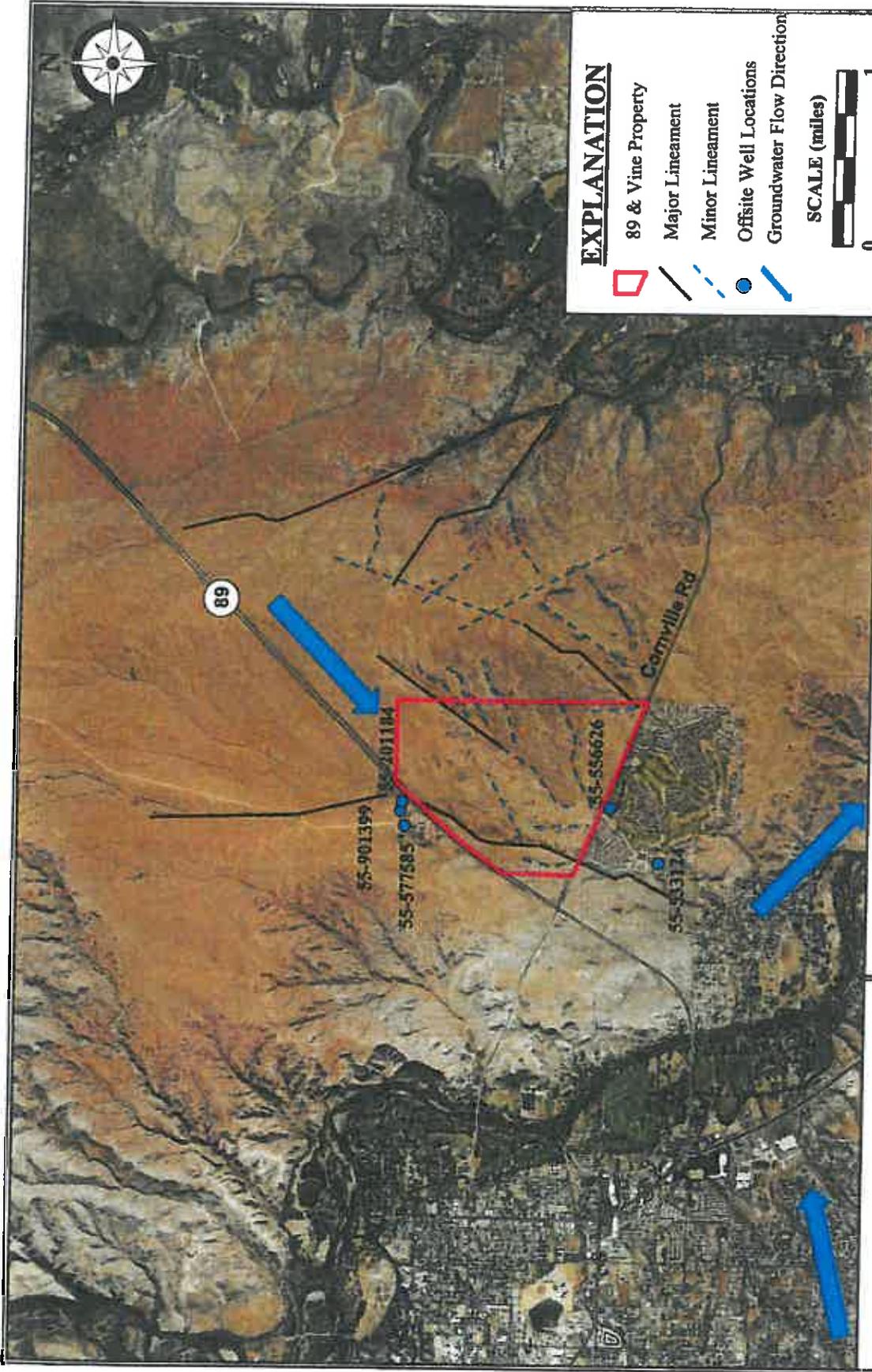
**GEOLOGIC MAP**

**Figure**

**2**

December 10, 2015 Project B.2199

89 & Vine, Cottonwood, Yavapai County, Arizona



**EXPLANATION**

-  89 & Vine Property
-  Major Lineament
-  Minor Lineament
-  Offsite Well Locations
-  Groundwater Flow Direction



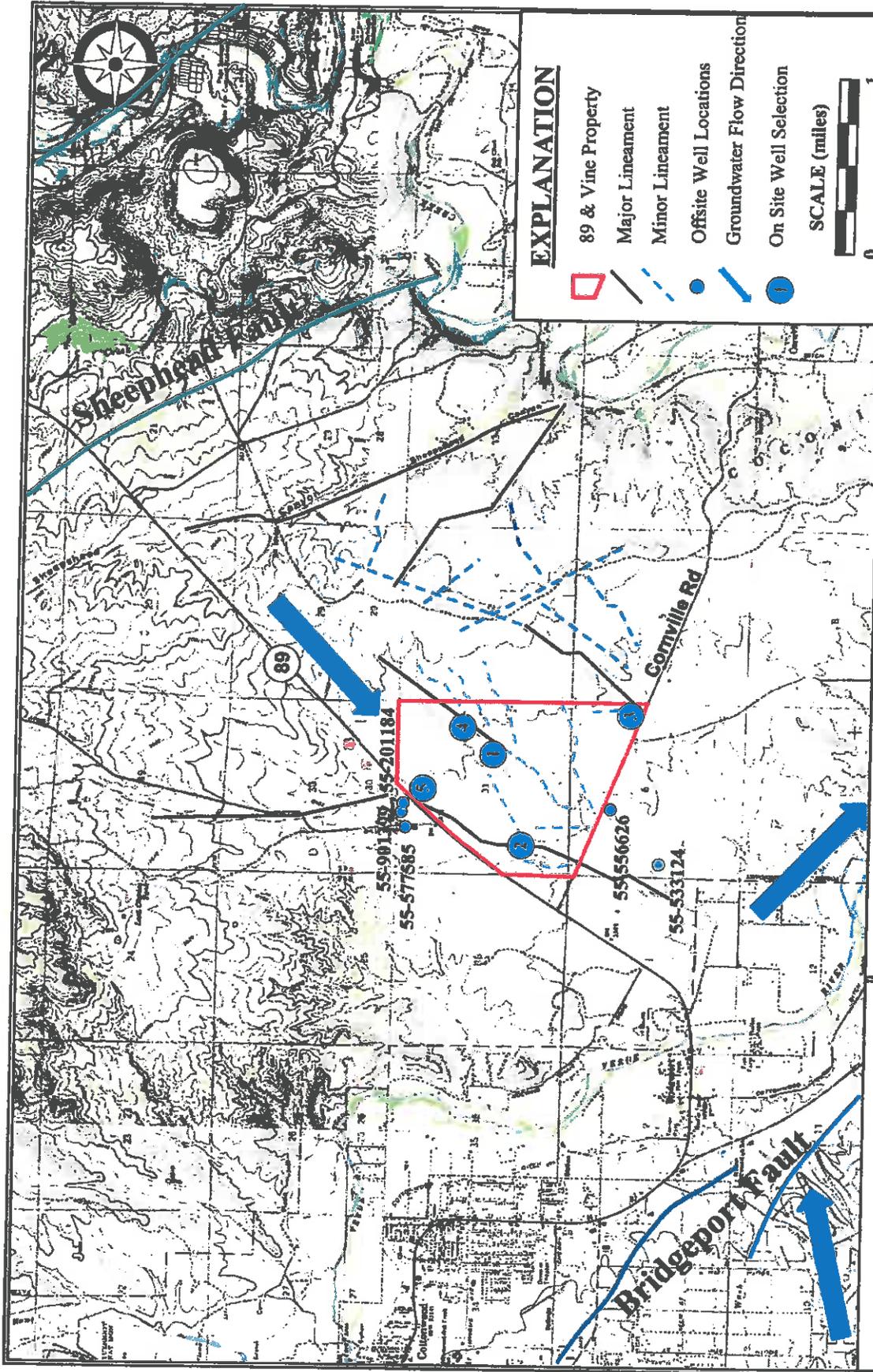
**Southwest Ground-water  
Consultants**

December 10, 2015 Project B.2199

**AERIAL PHOTOGRAPH**  
(with Inferred Lineaments, Offsite Well Locations, and Groundwater Flow Direction)

89 & Vine, Cottonwood, Yavapai County, Arizona

**Figure  
3**



Southwest Ground-water  
**Consultants**  
 December 10, 2015 Project B.2199

**TOPOGRAPHIC MAP**  
 (with Inferred Lineaments, Offsite Well Locations, Groundwater Flow Direction, and Recommended Well Locations)  
 89 & Vine, Cottonwood, Yavapai County, Arizona

**Figure**  
 4

**Master Water Report**  
**89 & Vine**  
**City of Cottonwood, Arizona**

**1. INTRODUCTION**

**1.1 Project Description**

**1.1.1 Project Name & Developer**

89 & Vine is a 682 acre master planned development consisting of Residential and Mixed Use Commercial components. The developer of the project is 89 & Vine Arizona Partners, LLC. The project is being managed by Brookfield Communities. The proposed development at build-out will consist of approximately 1,450 single family residential dwelling units 171.6 acres of Mixed-Use development, and a 9.2 acre Club House site.

**1.1.2 Project Location & Topography**

The development is located within Section 31 Township 16 North, Range 4 and Section 6 Township 15 North, Range 4 East of the Gila and Salt River Base and Meridian, City of Cottonwood, Yavapai County, Arizona. The property is bound on the south by Cornville Road, to the northwest by State Highway 89A, to the north by Arizona State Land and Coconino National Forest to the east. The project location can be found on **Figure 1** and project aerial overlay can be found on **Figure 2**. The proposed development can be found on **Figure 3**.

The site is currently un-developed and is currently used for agricultural purposes. Generally, the site slopes from the northeast to southwest at an approximate 3.00% slope, from an elevation of 3,590 feet above MSL to 3,370 feet above MSL. The topographic information utilized for the purposes of this water analysis has been obtained from a site aerial topographic survey, which was flown by Dallas Aerial, Inc. in May 2015. The topographic data utilizes NAVD 1988 datum.

The benchmark utilized for this project is:

*NGS Data Point located ±1850' south of US 89A & Cornville Road, ±150' east of the centerline of US 89A.*

*NGS point Designation = R 18*

*NGS point P.I.D. = ES0478*

*NGS point Elevation = 3,367.392 feet (NAVD-88 Datum)*

## **1.2 Purpose of Report**

This water report has been prepared in support of the Planned Area Development (PAD) for the 89 & Vine development. In support of the development, this report and analysis has four primary objectives.

- Define the rules and regulations for governing water design and water infrastructure sizing.
- Determine the maximum number of dwelling units that can be served from the existing Verde Santa Fe (VSF) Water distribution system.
- Determine the water infrastructure necessary to serve the 89 & Vine development at build-out.

The analysis has been performed to ensure that the criteria set forth by the City of Cottonwood and Arizona Department of Environmental Quality, Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems" will be met for the development of the 89 & Vine water system.

## **1.3 Content Summary**

The report is comprised of four major sections.

- existing area water facilities
- planning parameters and unit flow rates
- proposed interim water distribution system
- proposed ultimate water distribution system

## 2. WATER SYSTEM DESIGN CRITERIA

The water system demand and design analysis criteria defined below is based on the criteria coordinated with City of Cottonwood and set forth by the Arizona Department of Environmental Quality, *Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems"*.

### 2.1 Water System Demand Criteria

The projected residential potable water demands have been established based on historical potable water demands for the VSF development provided by the City. A copy of the historical demands can be found in **Table 1.1** and **Table 1.2** in **Appendix A**. The potable water demands for the wine center and mixed use areas were applied based on similar land use categories identified in similar Arizona cities' Integrated Water Master Plans. **Table 2-1** presents the water system demands that have been utilized to model the projected demands from the various 89 & Vine land uses.

<b>Parameter</b>	<b>Value</b>
Single Family Residential (gpd/du)	200
Multi-Family Residential (gpd/du)	160
Mixed Use (Wine Center/Commercial/Retail/Clubhouse) (gpd/ac)	1,200
Maximum Day Demand Peaking Factor	1.8
Peak Hour Demand Peaking Factor	3.0

These demands were utilized to develop the potable water requirements for 89 & Vine based on the land uses and lot projections presented in the 89 & Vine PAD. **Tables 2, 3, & 4** in **Appendix B** contain the detailed calculations determining the water requirements for each land use and parcel throughout the development.

### 2.2 Water System Analysis Criteria

Water system design guidelines and criteria were not available from the City of Cottonwood during the preparation of this report. **Table 2-2** presents the water

system design criteria that have been utilized to evaluate the existing and proposed water infrastructure that was modeled as part of this analysis. The criteria utilized are per ADEQ Bulletin 10, and common infrastructure sizing criteria used at several municipalities in Arizona.

<b>Table 2-2 89 &amp; Vine Water System Design Criteria</b>	
<b>Item</b>	<b>Sizing Criteria</b>
Storage	Sum of: 25% Max Day Demand (Equalizing) + Fire Flow Demand x Fire Flow Duration (Fire)
Booster Pumps	Pumps must supply larger of Peak Hour or Max Day Plus Fire Flow with largest pump out of service
Treatment Facilities	Max Day Demand
Well Production Facilities	Max Day Demand
Pipelines	<u>Peak Hour</u> Maximum Velocity is less than 7 ft/s Max Head Loss is less than 10 ft/ 1,000 ft Minimum System Pressure of 40 psi
	<u>Max Day Plus Fire Flow</u> Minimum System Pressure of 20 psi
Fire Flows	<u>Single Family Residential (1)</u> 1,000 gpm for 1 hour
	<u>Wine Center/Commercial/Retail/Clubhouse (2)</u> Per 2012 International Fire Code Table B105.1 Minimum Required Fire Flow and Flow Duration for Buildings

(1) Residential Fire Flow is 1,000 gpm for 1 hour for one- and two- family dwelling units that do not exceed 3,600 square feet. At this time it is not anticipated that any of the homes within the proposed development will exceed 3,300 square feet.

(2) A reduction in required fire-flow of up to 75 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute for the prescribed duration as specified in Table B105.1.

### 3. EXISTING AREA WATER INFRASTRUCTURE

The existing area water systems include the VSF water campus and distribution system and several private wells. The VSF water campus and distribution system are located directly south of the 89 & Vine development. This existing infrastructure serves 940 existing dwelling units within the VSF development. The existing wells include the Catholic Church Well (55-577585), the Bill Gray Well (55-201184), and Tao Fellowship Well all located along Bill Grey Road northwest of the proposed development and 89A.

The existing wells in the area can be seen on **Figure 4**. **Table 3-1** presents the VSF water system infrastructure that has been analyzed in terms of available capacity as part of this report.

<b>Table 3-1 VSF Water Infrastructure</b>	
<b>Item</b>	<b>Sizing Criteria</b>
Storage	1 – 750,000 gallon ground storage tank
Booster Pumps	2 – 15 Hp Pumps (Average & Max Day Demands) 1 – 40 Hp Pump (Peak Hour Demands) 2 – 75 Hp Pump (Max Day Plus Fire Flow Demand) Pumps deliver head throughout the entire system which is on a single pressure plane where elevations range from 3,334 feet above MSL to 3,461 feet above MSL
Treatment Facilities	350 gpm Capacity Arsenic Treatment System
Well Production Facilities	VSF Well (55-533124): Rated at 500 gpm VSF (Backup) Well (55-556626) Rated at 500 gpm
Pipelines	12-inch and 8-inch water lines throughout the development

The information pertaining to the existing VSF water campus (storage tank, on-site wells, treatment facilities and booster pumps) has been obtained thus far through coordination with Mike Traynor at the City of Cottonwood, Chris Catalano at Southwest Ground Water Consultants, and K.P. Ventures Well Drilling & Pump Co. LLC. The pipe line sizes and locations throughout the VSF distribution system have been obtained from the VSF As-Built plans.

In order to determine the available additional water supply within the VSF system, each component of infrastructure has been analyzed to determine the maximum number of 89 & Vine lots that could be served. As a factor of safety and based on ADEQ Criteria to begin planning, design and construction of a facility prior to exceeding capacity, this analysis has assumed that only 80% of the VSF well production, treatment capacity, and storage volume are available in calculating the number of additional lots that can be supplied with potable water. As discussed in **Section 2.2**, the demands that have been modeled as part of this analysis are based off of the existing 940 connections within the VSF water distribution system. In determining the available supply within the VSF system, a lot count of 1,000 lots has been used to account for any potential future connections that may come from within the VSF development.

### **3.1 Verde Santa Fe Well Production Facilities**

The VSF potable water demands are met through the water supplied by two on-site wells. The primary well is rated at 500 gpm, while the secondary well is in place as a redundancy measure, and is rated at 500 gpm. In analyzing the available well production, this analysis has assumed that only 80% of the 500 gpm of well capacity is available to serve the potable demands of VSF and 89 & Vine. Based on 400 gpm of available supply and the well production criteria presented in **Table 2-2**, and a max day demand from VSF of 250 gpm, there is approximately 150 gpm of available supply which represents a demand equivalent to approximately 600 single family dwelling units.

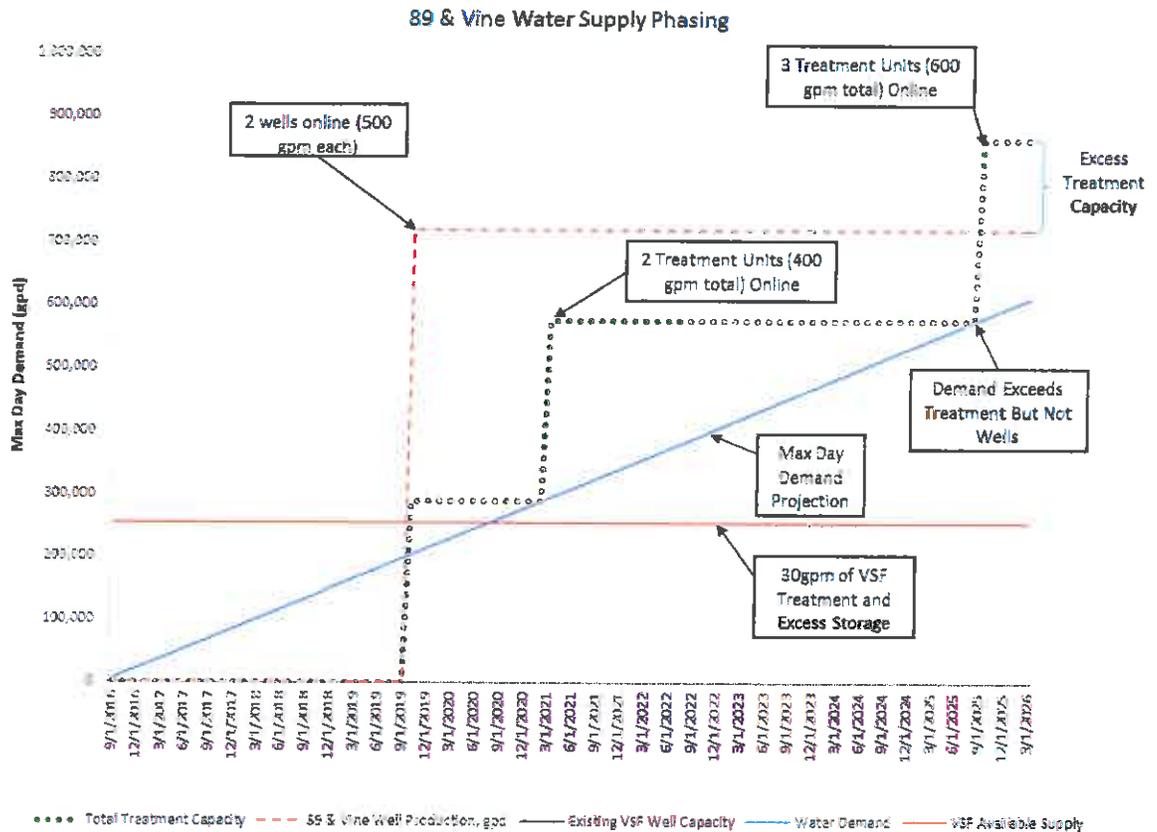
### **3.2 Verde Santa Fe Water Storage Tank**

The VSF water campus contains a 750,000 gallon ground storage tank. As with the well capacity, we have assumed that only 80% of the 750,000 gallons of storage volume is available to meet the potable demands of VSF and 89 & Vine. Based on 600,000 gallons of available storage and the storage criteria presented in **Table 2-2**, **Table 5** in **Appendix B** illustrates that there is approximately 312,900 gallons of available storage which represents approximately 3,477 single family dwelling units.

### **3.3 Verde Santa Fe Treatment Facilities**

The VSF water campus is equipped with an on-site Arsenic Treatment System. The treatment system has a capacity of 350 gpm. In analyzing the available treatment capacity, this analysis has assumed that only 80% of the 350 gpm treatment capacity is available to serve the potable demands of VSF and 89 & Vine. Based on 280 gpm of available supply and the well production criteria presented in **Table 2-2**, and a max day demand from VSF of 250 gpm, there is approximately 30 gpm of available treatment capacity available which represents a demand equivalent to approximately 120 single family dwelling units.

For the additional maximum day demand the proposal is to utilize the additional storage volume within the VSF existing tank. This unused portion of the tank is approximately 210,000 gallons after accounting for the daily max day storage volume. This volume will be utilized to satisfy max day demands that are in excess of the 30 gpm limitation of the existing arsenic treatment system. The following graph illustrates how the max day demand will be met throughout various phases of the project.



### 3.4 Verde Santa Fe Booster Pump Station and Distribution System

The VSF water booster pump station consists of the five pumps of varying power to supply the necessary flow and pressure for the different demand scenarios. The 2 – 15 Hp pumps provide the necessary flow and head to meet the average and maximum day demands. The 40 Hp pump provides the required flow and head to meet the peak hour demands, and the 2 – 75 Hp pumps meet the demands required during the maximum day plus fire flow scenario. The lots within the VSF development are served by a looped system of primarily 8-inch and 12-inch water lines. A water model of the VSF system does not exist, so in order to determine the available pumping and distribution capacity within the existing system, a model of the VSF system was created utilizing the information found in **Appendix C** and **Appendix D** which includes fire hydrant flow tests taken within VSF and As-Built Plans for the VSF development. The methodology used to create the model, model parameters, and model results will all be discussed in detail in a later section of this report.

## **4. DESIGN METHODOLOGY**

In order to determine the maximum number of lots that can be supplied with potable water by the VSF distribution system, several different models have been created. The first model that was constructed analyzed only the existing VSF system. The second model scenario analyzed the VSF system along with an interim number of 89 & Vine lots that could be served on a temporary basis. The final model analyzed the 89 & Vine residential demands at build-out. Based on this report analyzing three separate scenarios, some of the following sections of this report may be divided to present each scenario separately from the others.

### **4.1 H<sub>2</sub>OMap Water Model Software**

The computer program H<sub>2</sub>OMap was used to simulate both the existing VSF and the proposed 89 & Vine water distribution systems that were analyzed. The program was developed by *MWH Soft, Inc.* to perform geospatial hydraulic analysis for pipe networks. The program uses a network of links, nodes, pumps, tanks and reservoirs to represent the geometry of the proposed water system and calculate steady-state simulations of flows for a pressurized water distribution system.

### **4.2 Water Model Input Variables**

The existing VSF distribution system was established using the As-Built plans to determine water line sizes and locations. The proposed distribution system was created based on the proposed parcel layout for the 89 & Vine development. Water lines will be constructed within public right-of-way and utility easements to ensure that each lot has a water connection and that the system is looped. Input variables for the proposed water system model include:

- Node Elevations (feet)
- Water system average daily unit demands (gpd)
- Pipe diameters (inches)
- Hazen-Williams Friction Loss Factor, C=130

The node elevations were determined from the existing topography for the area.

Elevations across the VS development range from 3,334 feet to 3,461 feet above MSL, while the elevations across the 89 & Vine site range from 3,370 feet to 3,590 feet above MSL. The daily unit demand assigned to each node is calculated based number of lots served off each node. Pipe diameters for the 89 & Vine distribution system are assigned per the relative number of units served and adjusted based on an iterative process, and the Hazen-Williams coefficient is dependent upon pipe material.

### **4.3 Water Supply and Pressure Baseline**

#### **4.3.1 Verde Santa Fe & 89 & Vine Interim Model**

The water supply and pressure baseline for the VSF distribution system was established using the series of existing VSF pumps. A combination of pump data for the various sizes of pumps along with hydrant flow tests within the VSF development was used to create the pump curves that were used in the model to represent the pressure baseline provided at the VSF water campus. In addition to the five pumps that were modeled, the existing storage tank was modeled as a reservoir with a constant supply and elevation.

#### **4.3.2 89 & Vine Model**

The water supply and pressure baseline for the 89 & Vine development will be provided by a water campus consisting of a series of pumps of varying size, and a storage tank. The water campus has been located at the northern end of the property based on the elevation across the property falling from north to south. Based on the elevations across the project varying by as much as 220 feet, two pressure planes will be required in order to provide the development with an acceptable range of pressures. Pressure reducing valves will be modeled based on the required drop in pressure from the upper pressure plane. Once the pressure baseline is established for each model all input variables are assigned throughout the model, the water distribution network is evaluated for the average day, maximum day, peak hour and maximum day plus fire flow demand conditions based on the specific water system analysis criteria previously outlined.

## **5. PROPOSED WATER DISTRIBUTION SYSTEM**

### **5.1 89 & Vine Interim Condition**

#### **5.1.1 Distribution Lines and Temporary Booster Pump Station**

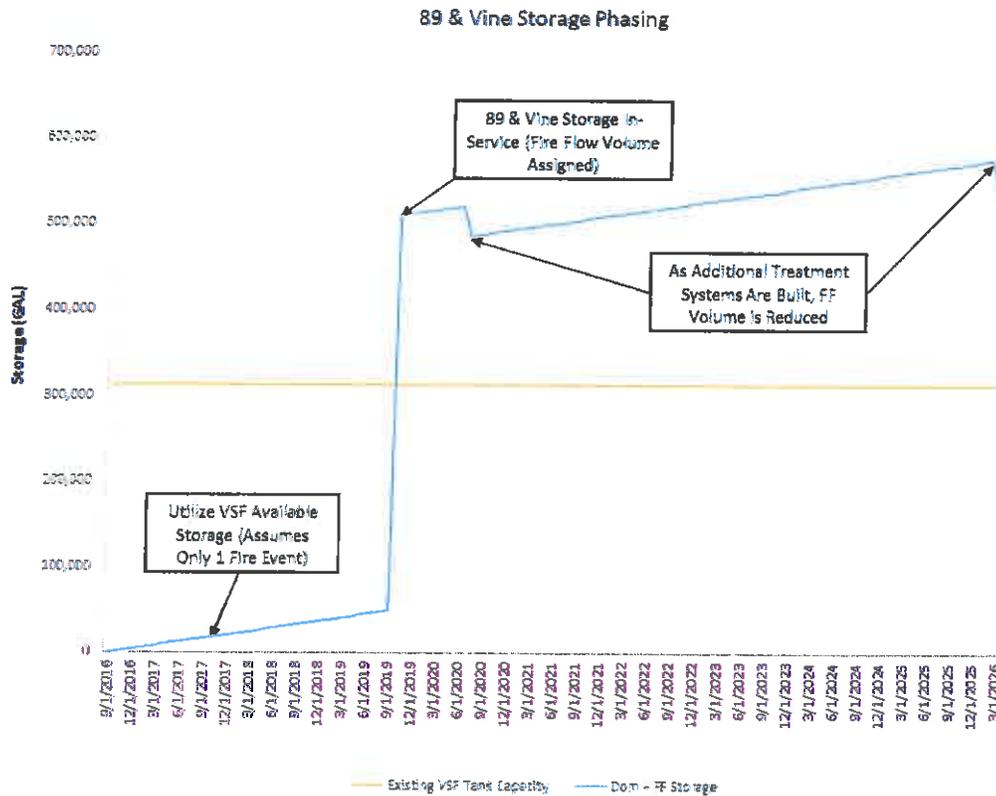
As part of this analysis, it is proposed that the first several residential parcels of the 89 & Vine development will be supplied with potable water from the existing VSF water campus and distribution system. In order to achieve this, a connection will be made to the existing 12" water line in Verde Santa Fe Parkway just south of its intersection with Cornville Road. The 12" water line will be extended to the west along the north side of Cornville Road over to the location of the future 89 & Vine Water Reclamation Facility. Because the first residential phases of the 89 & Vine development are located at an elevation that is located outside the limits of the VSF booster pumps, a temporary booster pump station will be required at this location. The temporary booster pump station will provide the head necessary to achieve acceptable pressures for the lots within the first phases of development. The temporary booster pump station pump sizes will be sized based on future design reports for this infrastructure, but for the purpose of this report and analysis a 2, 5, 10 and 50 Hp pump were modeled for the average day, maximum day, peak hour, and maximum day plus fire flow demand scenarios respectively. From the temporary booster pump station, a 12" water line will be extended north along the alignment of a future collector roadway. In addition to the 12" water line a series of additional 8-inch and 12-inch water lines will be constructed to serve this interim number of 89 & Vine lots. All of the lots served under this interim scenario will do so within one pressure zone. The existing VSF water distribution system and the proposed 89 & Vine Interim water distribution system can be seen on **Plate 1** and **Plate 2**.

### **5.2 89 & Vine Build-Out Condition**

#### **5.2.1 Water Supply and Treatment Facilities**

As previously illustrated, the existing VSF Treatment and Storage facilities can satisfy the initial demands for the 89 & Vine Development. The following graph illustrates how the storage will be phased during the proposed development. A temporary booster

pump station will boost flows from the VSF system to the initial phases of the proposed development.



Initially, the available storage within the VSF system will be utilized until enough demand is generated by the proposed development. This ensures not only will there be enough demand within the 89 & Vine Development to warrant wells, treatment, storage and booster pump station facilities, but there will also be enough of a population to turn-over the tank and fully utilize the newly built facilities. Operations challenges exist when large facilities are built with not enough demand.

### 5.2.2 Water Storage Facilities

The water supply for the 89 & Vine development will be provided by an on-site ground storage tank located at the proposed water campus at the north end of the development. The location for the proposed water campus and storage tank has been shown on **Plate 3**. Based on the storage criteria presented in **Table 2-2**, **Table 6** in

**Appendix B** illustrates that 321,901 gallons of storage is required to serve the proposed development. In order to serve the remaining mixed-use parcels an additional 72,728 gallons of storage will be required, assuming the fire flow requirements are consistent with those assumed.

### **5.2.3 Booster Pump Station and Pressure Zone**

The 89 & Vine development at build out will be served by a booster pump station consisting of a series of pumps of varying size. The booster pump station pump sizes will be sized based on future more detailed design reports for this infrastructure, but for the purpose of this report and analysis constant power pumps of the following powers, 10, 20, 35, and 50 Hp were modeled for the average day, maximum day, peak hour, and maximum day plus fire flow demand scenarios respectively. Based on the amount of elevation fall across the 89 & Vine development, as much as 220 feet, two pressure planes will be required in order to provide the development with an acceptable range of pressures. The upper pressure plane will include portions of the development from approximately 3,585 feet to 3,495 feet above MSL. The lower pressure plane will include portions of the development from approximately 3,495 feet to 3,410 feet above MSL. The locations for the proposed pressure reducing valves have been shown on **Plate 3**.

### **5.2.4 Distribution Lines**

The distribution lines proposed within this study are the minimum size necessary to serve the 89 & Vine Development. The analysis of the 89 & Vine water distribution system illustrates the required water main sizes to supply the adequate demands and maintain acceptable pressures throughout the system during extreme flow conditions. Ultimately, water distribution lines shall be proposed in all residential streets in which lots front on to them, however due to the fact that this report has been prepared in support of Zoning case and associated "bubble" plan, only the main distribution lines have been analyzed. These lines include mains that are necessary to ensure a "looped system". For the purpose of this preliminary analysis, not all pipe links have been shown and modeled. In cases where water lines are proposed to be routed

through open space areas or outside of proposed public right-of-way, a water line easement with a minimum width of 20' shall be provided that will allow for the required access and maintenance of the facilities. The proposed water distribution system can be seen on **Plate 3**.

## **6. WATER MODEL AND RESULTS**

This analysis has modeled three different water distribution systems: the existing VSF water distribution system, the existing VSF and interim 89 & Vine distribution systems, and the 89 & Vine water distribution system at build out. Each model and development scenario was analyzed under four separate conditions: Average Day Demands, Max Day Demands, Peak Hour Demands and Max Day plus Fire Flow.

### **6.1 Verde Santa Fe Water Distribution System**

Based on the demands for 1,000 connections within VSF and the previously mentioned design criteria, the average daily demand for Verde Santa Fe is 138.89 gpm. The maximum day demand is 250.00 gpm, and the peak hour demand was 416.67 gpm. A fire flow of 1,375 gpm for three (3) hours is the controlling fire flow situation, per the City's allowance of a 50% reduction in required fire flow for buildings that are equipped with an approved automatic sprinkler system. Per the output data produced from each fixed-rate model, each scenario analyzed meets the water system design criteria presented in **Table 2-2** pertaining to system pressures, pipe velocities and head losses, required demands, and fire flows. The minimum and maximum pressure nodes and maximum pipe velocity and head loss location for each scenario can be seen in **Table 6-1**.

<b>Table 6-1 Verde Santa Fe Water Distribution System Results</b>								
<b>Critical Constraint</b>	<b>Average Day Demand</b>		<b>Maximum Day Demand</b>		<b>Peak Hour Demand</b>		<b>MDD Plus Fire Flow</b>	
	<b>Value</b>	<b>Location</b>	<b>Value</b>	<b>Location</b>	<b>Value</b>	<b>Location</b>	<b>Value</b>	<b>Location</b>
Min. Pressure (psi)	47.15	VSF-104	51.92	VSF-104	54.48	VSF-104	27.18	VSF-104
Max. Pressure (psi)	102.18	VSF-92	106.96	VSF-92	109.55	VSF-92	89.71	VSF-92
Max. Velocity (ft/s)	0.39	VSF-389	0.71	VSF-389	1.18	VSF-389	6.40	VSF-101
Max. Head Loss (ft/1,000 ft)	0.10	VSF-389	0.20	VSF-389	0.54	VSF-389	18.38	VSF-101

As seen in the table above, all design constraints have been satisfied. Detailed node, pipe and reservoir output data for each scenario can be found in **Appendix E**. As seen in the tables below, all design constraints have been satisfied.

## **6.2 Verde Santa Fe & 89 & Vine Interim Water Distribution System**

Based on the demands for 1,000 connections within VSF, 555 equivalent dwelling units within the 89 & Vine development (531 single family residential lots and 4.0 acre Wine Center), and the previously mentioned design criteria, the average daily demand under this interim scenario is 216.00 gpm. The maximum day demand is 388.80 gpm, and the peak hour demand was 648.00 gpm. A fire flow of 1,375 gpm for three (3) hours is the controlling fire flow situation, per the City's allowance of a 50% reduction in required fire flow for buildings that are equipped with an approved automatic sprinkler system. Per the output data produced from each fixed-rate model, each scenario analyzed meets the water system design criteria presented in **Table 2-2** pertaining to system pressures, pipe velocities and head losses, required demands, and fire flows. The minimum and maximum pressure nodes and maximum pipe velocity and head loss location within the VSF distribution system for each scenario can be seen in **Table 6-2**.

Critical Constraint	Average Day Demand		Maximum Day Demand		Peak Hour Demand		MDD Plus Fire Flow	
	Value	Location	Value	Location	Value	Location	Value	Location
Min. Pressure (psi)	57.32	VSF-104	55.6	VSF-104	40.06	VSF-104	34.67	VSF-104
Max. Pressure (psi)	112.36	VSF-92	110.66	VSF-92	95.17	VSF-92	90.15	VSF-92
Max. Velocity (ft/s)	0.61	VSF-391	1.10	VSF-391	1.84	VSF-391	3.94	VSF-387
Max. Head Loss (ft/1,000 ft)	0.15	VSF-391	0.44	VSF-391	1.17	VSF-391	4.69	VSF-387

The minimum and maximum pressure nodes and maximum pipe velocity and head loss location within the 89 & Vine interim distribution system for each scenario can be seen in **Table 6-3**.

Critical Constraint	Average Day Demand		Maximum Day Demand		Peak Hour Demand		MDD Plus Fire Flow	
	Value	Location	Value	Location	Value	Location	Value	Location
Min. Pressure (psi)	48.4	89V-264	63.83	89V-264	60.28	89V-264	35.1	89V-264
Max. Pressure (psi)	130.34	89V-340	145.85	89V-340	142.5	89V-340	132.6 8	89V-340
Max. Velocity (ft/s)	0.39	89V-409	0.39	89V-409	0.66	89V-409	6.76	89V-349
Max. Head Loss (ft/1,000 ft)	0.10	89V-349	0.10	89V-349	0.25	89V-349	20.32	89V-349

As seen in the tables above, all design constraints have been satisfied. Detailed node, pipe and reservoir output data for each scenario can be found in **Appendix F**. As seen in the tables below, all design constraints have been satisfied.

### 6.3 89 & Vine Build Out Water Distribution System

Based on the demands for 1,450 single family dwelling units, a 36.9 acres Wine Center, and a 9.2 acre Club House and the previously mentioned design criteria, the average daily demand for 89 & Vine at build-out is 239.82 gpm. The maximum day demand is 431.67 gpm, and the peak hour demand was 719.45 gpm. A fire flow of 1,375 gpm for three (3) hours is the controlling fire flow situation, per the City's allowance of a 50% reduction in required fire flow for buildings that are equipped with an approved automatic sprinkler system. Per the output data produced from each fixed-rate model, each scenario analyzed meets the water system design criteria presented in **Table 2-2** pertaining to system pressures, pipe velocities and head losses, required demands, and fire flows. The minimum and maximum pressure nodes and maximum pipe velocity and head loss location for each scenario can be seen in **Table 6-4**.

Table 6-4 89 & Vine Build Out Water Distribution System Results								
Critical Constraint	Average Day Demand		Maximum Day Demand		Peak Hour Demand		MDD Plus Fire Flow	
	Value	Location	Value	Location	Value	Location	Value	Location
Min. Pressure (psi)	42.21	89V-250	42.15	89V-250	41.97	89V-250	27.94	89V-264
Max. Pressure (psi)	96.81	89V-224	96.76	89V-224	96.59	89V-224	96.76	89V-224
Max. Velocity (ft/s)	0.68	89V-399	1.22	89V-399	2.31	89V-399	4.36	89V-381
Max. Head Loss (ft/1,000 ft)	0.18	89V-399	0.54	89V-399	1.74	89V-399	9.02	89V-381

As seen in the table above, all design constraints have been satisfied. Detailed node, pipe and reservoir output data for each scenario can be found in **Appendix G**.

## 7. CONCLUSION

In summary, this Master Water Report has defined the water demands associated with the proposed 89 & Vine Planned Area Development Zoning Case. The report has also identified the water system design criteria that are to be utilized in the analysis and design of the existing and proposed water distribution infrastructure. Based on the analysis of the existing VSF and proposed 89 & Vine water infrastructure, the following conclusions can be made:

- The VSF water distribution system has the additional capacity available to supply potable water to 555 equivalent dwelling units within the 89 & Vine development.
- In order to provide potable water from the VSF distribution system to the 555 equivalent units identified above, a temporary booster pump station will be required to meet the potable water demands.
- Under the 89 & Vine Interim Water System scenario, the water distribution results during the Average Day Demand Scenario, Maximum Day Demand Scenario, Peak Hour Demand Scenario, and Maximum Day plus Fire Flow for the VSF & 89 & Vine Interim Water Distribution System Model are in accordance with the design guidelines established within this report.
- Once the VSF water distribution system reaches its capacity as identified in this Master Report, the 89 & Vine development will be required to construct and meet its potable water demands through an on-site water campus, consisting of wells, water treatment, water storage, and booster pump facilities.
- The proposed water distribution system will operate as a looped water system under two pressure zones. Pressure reducing valves are proposed along the three main lines serving the 89 & Vine development.
- Under the 89 & Vine Build Out Water System scenario, the water distribution results during the Average Day Demand Scenario, Maximum Day Demand Scenario, Peak Hour Demand Scenario, and Maximum Day plus Fire Flow for the 89 & Vine Build Out Water Distribution System Model are in accordance with the design guidelines established within this report.

## **8. REFERENCES**

1. Arizona Department of Environmental Quality  
*Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control"*
  
2. Arizona Department of Environmental Quality  
*Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems"*

**Traffic Impact Analysis  
For  
89 & VINE  
City of Cottonwood, Yavapai County, Arizona**

**1. INTRODUCTION & SUMMARY**

*A. Purpose of Report & Study Objectives*

This traffic impact analysis (TIA) has been prepared in support of the 89 & Vine project located in Cottonwood, Arizona. The objective of this report is to provide a comprehensive identification of the traffic impacts that the proposed development may impose on the surrounding roadways in order to maintain a safe and efficient roadway system. The TIA has been prepared in conformance with the Arizona Department of Transportation (ADOT) Traffic Engineering Guidelines and Processes (TGO 240) as a Category IIc Study. The TIA is also intended to satisfy the regulations of Yavapai County and the City of Cottonwood.

*B. Executive Summary*

The 89 & Vine development consists of approximately 500 acres located within the City of Cottonwood, Arizona and can be described as a portion Section 31, Township 16 North, Range 4 East and a portion of Section 6, Township 15 North, Range 4 East of the Gila and Salt River Base and Meridian, Yavapai County, Arizona. The physical location can be described as the northeast corner of State Route 89A (SR89A) and Cornville Road. The study area intersections for the TIA include the site access points and the SR89A/Cornville Road intersection. A roadway segment analysis is included for SR89A from SR260 to Bill Gray Road.

The proposed land uses include a mixture of single family residential lots that range from a high density attached dwellings to ¼ acre estate lots. There are projected to be approximately 1,650 residential lots at overall density of approximately 3.0 units per acre. The project will be constructed in several phases, but for the purposes of the TIA it will be assumed to develop in three phases with build out years of 2018, 2020, and 2025. The 2018 build out is anticipated to have approximately 400 lots, the 2020 build out is expected to add another 400 lots, and the remaining 650 lots are anticipated by

2025. A future adjacent development which will be completed by a separate developer will include 600 multi-family units and approximately 150 acres of mixed use development.

The 89 & Vine development is expected to generate 35,942 daily trips, 1,768, trips in the morning peak hour, and 1,543 trips in the evening peak hour. The proposed access points are at the existing intersections of SR89A/Bill Gray Road, Cornville Road/Amante Drive, and Cornville Road/Tissaw Road. Internally, the development will construct two divided collector roads to provide access to SR89A and Cornville Road.

The intersection of SR89A/Bill Gray is predicted to fail as a stop controlled intersection with the expansion of the church/school/assisted living being constructed west of SR89A. A signal or roundabout will likely be needed at this intersection for the existing traffic even without the 89 & Vine development. All the other study area intersections are expected to operate at acceptable levels of service with only minor turn lane improvements to mitigate traffic increases related to the 89 & Vine development.

The following infrastructure improvements are recommended to mitigate the traffic conditions that are predicted within the study area:

2015 – Existing

- Installation of a traffic signal or roundabout at SR89A/Bill Gray

2018 – Phase 1

- Construction of initial phase of Collector 1 and emergency access road
- Installation of right turn lane at SR89A/Collector 1 for northbound left turns
- Installation of right turn lane at SR89A/Collector 1 for westbound right turns
- Through lane of Collector 1 can serve as left turn lane as well as through lane since through movement is expected to have a very low volume.

2020 – Phase 2

- No additional mitigation needed

2025 – Phase 3

- Construction of remainder of Collector 1 to Cornville Road
- Installation of southbound left turn at Cornville Road/Collector 1

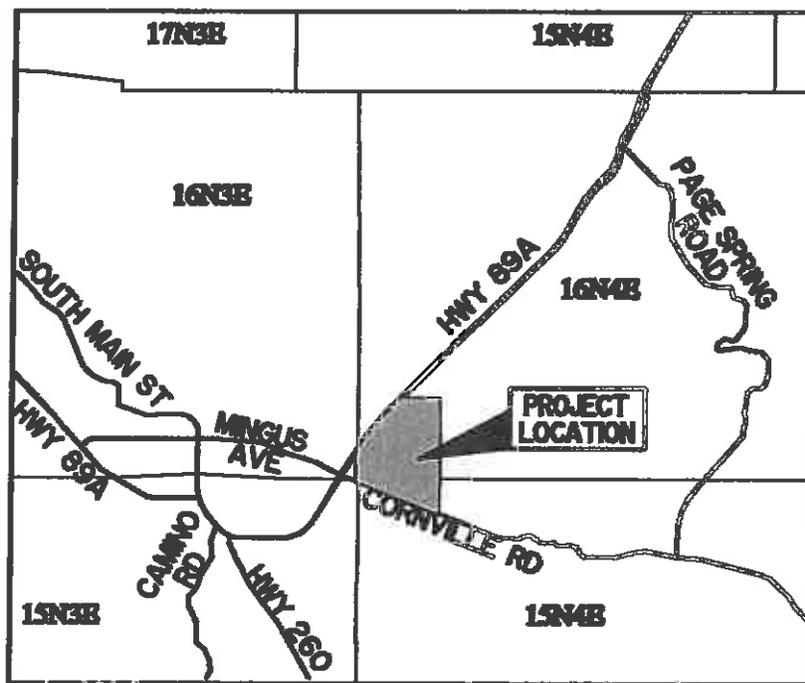
- Installation of eastbound left turn at Cornville Road/Collector 1
- 2035 – Horizon (Build out of mixed use by others)
- Construction Collector 2 throughout project
  - Installation of southbound left turn at Cornville Road/Collector 2
  - Installation of eastbound left turn at Cornville Road/Collector 2
  - Installation of left turn lanes on each approach at Collector 1/Collector 2
- Expansion of Cornville Road to four lane roadway

## 2. PROPOSED DEVELOPMENT

### A. Site Location

89 & Vine is located within the City of Cottonwood, Arizona and can be described as approximately 500 acres located in a portion Section 31, Township 16 North, Range 4 East and a portion of Section 6, Township 15 North, Range 4 East of the Gila and Salt River Base and Meridian, Yavapai County, Arizona. The physical location can be described as the northeast corner of SR89A and Cornville Road. The project location can be found on Figure 1.

Figure 1: Location Map



### *B. Land Use & Intensity*

The proposed land uses include a mixture of single family residential lots that range from high density attached dwellings to ¼ acre estate lots. There will be approximately 1,450 residential lots at an overall density of approximately 4.0 units per acre.

It should be noted that approximately 150 acres of future multi-family residential/commercial/office/mixed use development is planned between the 89 & Vine project and SR89A. That project, which will be developed independently by others, is included in this TIA for reference purposes as a future development, but a separate TIA will be submitted to address the impacts and improvements necessary to support that development.

### *C. Site Plan & Access*

The proposed 89 & Vine site plan is included in **Appendix A** of the report. Access to the development is planned at the following intersections as shown on the site plan.

- SR89A & Bill Gray Road
- Cornville Road & Amante Drive
- Cornville Road & Tissaw Road

### *D. Development Phasing & Timing*

The project will be constructed in several phases, but for the purposes of the traffic impact analysis it will be assumed to develop in three phases with build out years of 2018, 2020, and 2025. The 2018 build out is anticipated to have approximately 400 lots, the 2020 build out is expected to add another 400 lots, and the remaining 650 lots are anticipated by 2025. The progression of the development is anticipated to occur from north to south.

## **3. STUDY AREA CONDITIONS**

### *A. Study Area*

The study area for this report includes the proposed 89 & Vine development and the following roadway segments and intersections:

### Roadway Segments

- SR89A from SR260 to Bill Gray Road
- Cornville Road from SR89A to Tissaw Road
- Internal Collector #1 and #2

### Intersections

- SR89A & Cornville Road
- SR89A & Bill Gray Road
- Cornville Road & Tissaw Road (Collector #1)
- Cornville Road & Amante Drive (Collector #2)
- Collector #1 & Collector #2

### *B. Land Use*

The existing land uses within the study area include Verde Santa Fe, a master planned residential community with golf course located south of Cornville Road, a small church and school and a planned senior living/congregate care facility located west of SR89A at Bill Gray Road, and vacant land. For the purpose of this study, the school is assumed to have 1,000 students and the congregate care facility is assumed to have 180 units with a care staff of 75 people. Both facilities are assumed to be constructed prior to the opening year of 89 & Vine and the projected traffic from the facilities is included in the existing background conditions.

The City of Cottonwood is located approximately 2 miles west of the development and can be accessed by SR89A or Mingus Avenue which shares the same alignment with Cornville Road. The Town of Cornville is located approximately 3 miles to the east of the project along Cornville Road.

### *C. Site Accessibility*

Access to the site is planned for the three intersections shown in the development plan provided in **Appendix A**. Each of these intersections represents a major traffic node in the vicinity of the 89 & Vine project. These locations have been intentionally chosen in order to minimize the disruption along the major thoroughfares.

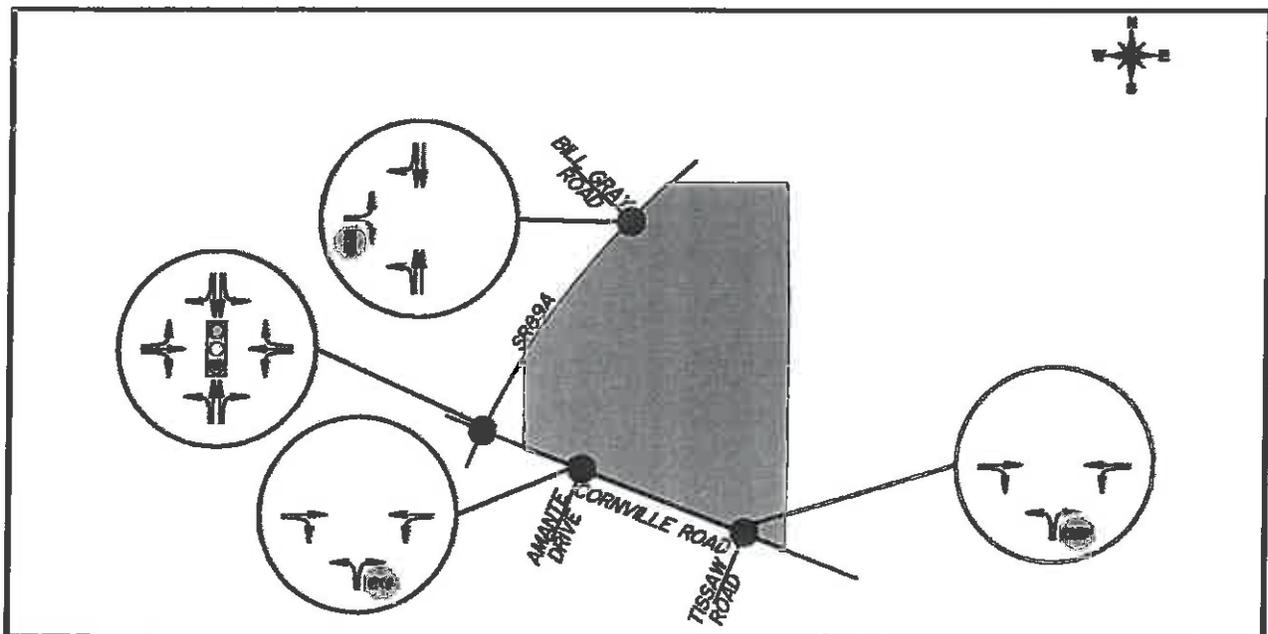
From a construction phasing perspective, the initial phase of the project will utilize the access point at SR89A & Bill Gray Road (Collector #1) and a secondary emergency access road that will extend out to SR89A near the northern limits of the development. According to ADOT, the Bill Gray Road alignment is currently the only point of access currently permitted for this development, so the emergency access will have to be permitted through the appropriate ADOT process. The second phase of the project will extend Collector #1 to Cornville Road and the final phase will complete the extension of Collector #2 to Cornville Road.

#### 4. ANALYSIS OF EXISTING CONDITIONS

##### A. Physical Characteristics

Existing lane configuration and intersection control for the study area intersections are shown in **Figure 2**. Aerial images of the existing intersections are included in **Appendix A**. Due to the relatively rural location of this development there is no transit, pedestrian, or bicycle facilities on the existing area roadways.

**Figure 2: Existing Lane Configuration and Intersection Control**



SR89A is an existing four-lane divided state highway with paved shoulders. The posted speed limit adjacent to the project is 55 MPH. The intersection of SR89A and Cornville

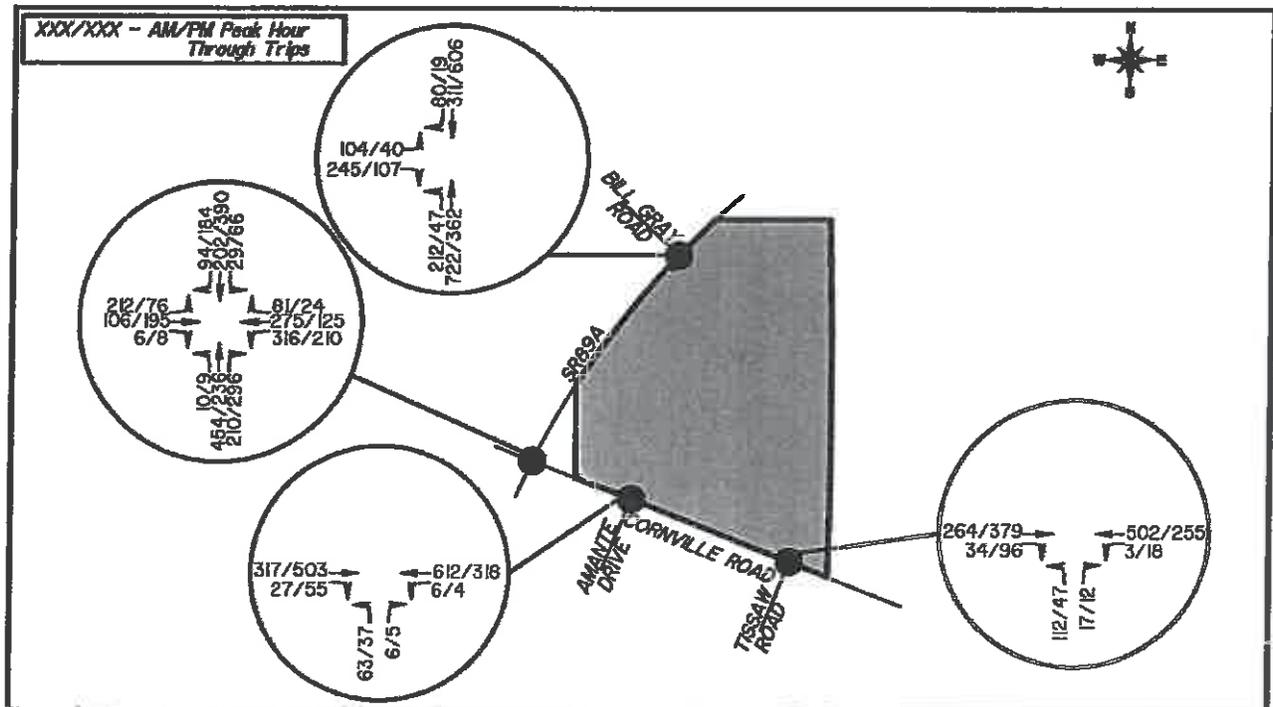
Road is signalized.

**Cornville Road** is an existing two lane asphalt road with gravel shoulders. The posted speed limit adjacent to the project is 50 MPH. The SR89A intersection is signalized, but the other Cornville Road intersections within the study area are stop controlled on the minor street approach.

### B. Traffic Volumes

Existing traffic volume data was obtained by Traffic Research & Analysis, Inc. in August 2015 and has been included in **Appendix B** of this study. The 24-hour traffic counts and the morning and evening peak hour traffic counts were collected at the existing study area intersections during a normal weekday. The morning and evening peak hour counts were tabulated between 7-9 AM and 4-6 PM respectively. Existing traffic volumes are shown on **Figure 3**. The existing average daily traffic (ADT) on SR89A is approximately 19,500 VPD between SR260 and Cornville Road and approximately 13,000 VPD between Cornville Road and Bill Gray Road. The existing ADT on Cornville Road is approximately 12,000 VPD.

**Figure 3: Existing Traffic Volumes (2015)**



### C. Level of Service

The existing Level of Service (LOS) was determined for the four existing intersections within the study area for the morning and evening peak hour conditions. The criteria and software for the analysis is described in Section 6 of this report. **Table 1** shows the existing LOS for the applicable intersections.

**Table 1: Existing Level of Service Intersection Analysis (2015)**

Intersection	Movement/ Approach	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
SR89A & Bill Gray Road	Eastbound	33.5	D	12.2	B
	Westbound	-	-	-	-
	Northbound	2.0	A	1.1	A
	Southbound	-	-	-	-
	<b>Overall</b>	<b>17.8</b>	<b>C</b>	<b>6.7</b>	<b>A</b>
SR89A & Cornville Road	Eastbound	52.8	D	55.6	E
	Westbound	49.7	D	47.8	D
	Northbound	18.5	B	17.0	B
	Southbound	18.9	B	17.9	B
	<b>Overall</b>	<b>34.6</b>	<b>C</b>	<b>29.3</b>	<b>C</b>
Cornville Road & Amante Drive (Collector 2)	Eastbound	-	-	-	-
	Westbound	0.1	A	0.1	A
	Northbound	22.6	C	17.8	C
	Southbound	-	-	-	-
	<b>Overall</b>	<b>11.4</b>	<b>B</b>	<b>9.0</b>	<b>A</b>
Cornville Road & Tissaw Road (Collector 1)	Eastbound	-	-	-	-
	Westbound	0.0	A	0.6	A
	Northbound	20.3	C	14.9	B
	Southbound	-	-	-	-
	<b>Overall</b>	<b>10.2</b>	<b>B</b>	<b>7.8</b>	<b>A</b>

### D. Safety

Traffic accident data was obtained from ADOT and Yavapai County for the roadways and intersections within the study area. The ADOT data includes incidents between

2012 and 2015. The Yavapai County data includes incidents between 2010 and 2012. According to the ADOT Data, there have been six (6) traffic incidents reported at the SR89A & Cornville Road intersection. One of the incidents reported included a fatality however it appears a pedestrian was involved as well as drugs and alcohol. Yavapai County data included 19 traffic incidents located along Cornville Road between SR89A and Tissaw Road. Of those 19 accidents, seven involved injuries and no fatalities were reported. The crash data is included in **Appendix B**. No sight distance issues have been identified on any of the study area intersections. Appropriate sight distance is provided.

## 5. PROJECTED TRAFFIC

### A. Site Traffic

Projected traffic volumes are established according to land use utilizing the Institute of Transportation Engineers (ITE) publication entitled *Trip Generation, 9<sup>th</sup> Edition* (2012). The data provided in this document has been obtained from actual traffic count surveys of similar developments and is recognized as the standard manual for trip generation.

The 89 & Vine development plan includes 1,450 single-family residential lots located east of Collector 2 as shown on the site plan in **Appendix A**. Within the future mixed use tracts located west of Collector 2, a separate developer will complete 600 units of multi-family residential and approximately 115 acres of mixed use development which may include a mix of retail, office, resort, light industrial, and employment uses. The applicable ITE land uses for this development are land use code 210 (Single Family Residential), 220 (Apartments), and 820 (Shopping Center). Based on the ITE trip generation data for these uses, it is estimated that 89 & Vine will generate 35,942 daily trips, 1,768, trips in the morning peak hour, and 1,543 trips in the evening peak hour. **Table 2** summarizes the trip generation for 89 & Vine according to the ITE Trip Generation rates and the full trip generation matrix is included in **Appendix B**. In accordance with standard ITE procedures, pass-by and internal capture trips are accounted for in the build-out year where there is a mixture of uses. No pass-by or internal capture is computed in the early phases of the project with single-family residential as the only use. The totals in Table 2 reflect the build-out traffic volumes

including the appropriate reductions due to pass-by and internal capture trips.

**Table 2: Trip Generation for 89 & Vine**

Land Use/ITE Code		Units	Daily	Weekday AM Peak			Weekday PM Peak		
			Trips	Hourly Trips	Enter	Exit	Hourly Trips	Enter	Exit
Ph. 1	210	400	3,808	300	75	225	400	252	148
Ph. 2	210	400	3,808	300	75	225	400	252	148
Ph. 3	210	650	6,188	488	122	366	650	410	240
Apt.	220	600	3,990	306	61	245	372	242	130
MU	820	425	18,148	408	253	155	1,577	757	820
Total	-	2,050	35,942	1,768	569	1,199	1,543	975	1,543

Note: Peak hour trip totals are reduced for pass-by and internal capture trips

The calculated number of trips from the ITE Trip Generation was used to represent the assumed vehicle trips generated from 89 & Vine that would access the local roadway network. The distribution of these trips was estimated using the configuration of the site and the expected route selections of drivers based on existing local traffic patterns. The basic logical assumption in both cases is that drivers will tend to choose the quickest and most convenient point of ingress and egress to reach their destination. Based on the configuration of the site and the surrounding roadway network, all traffic generated by 89 & Vine will be required to utilize the two roadways that form the west and south perimeter of the site for access however each phase of the project will have different primary traffic distributions due to roadway configuration.

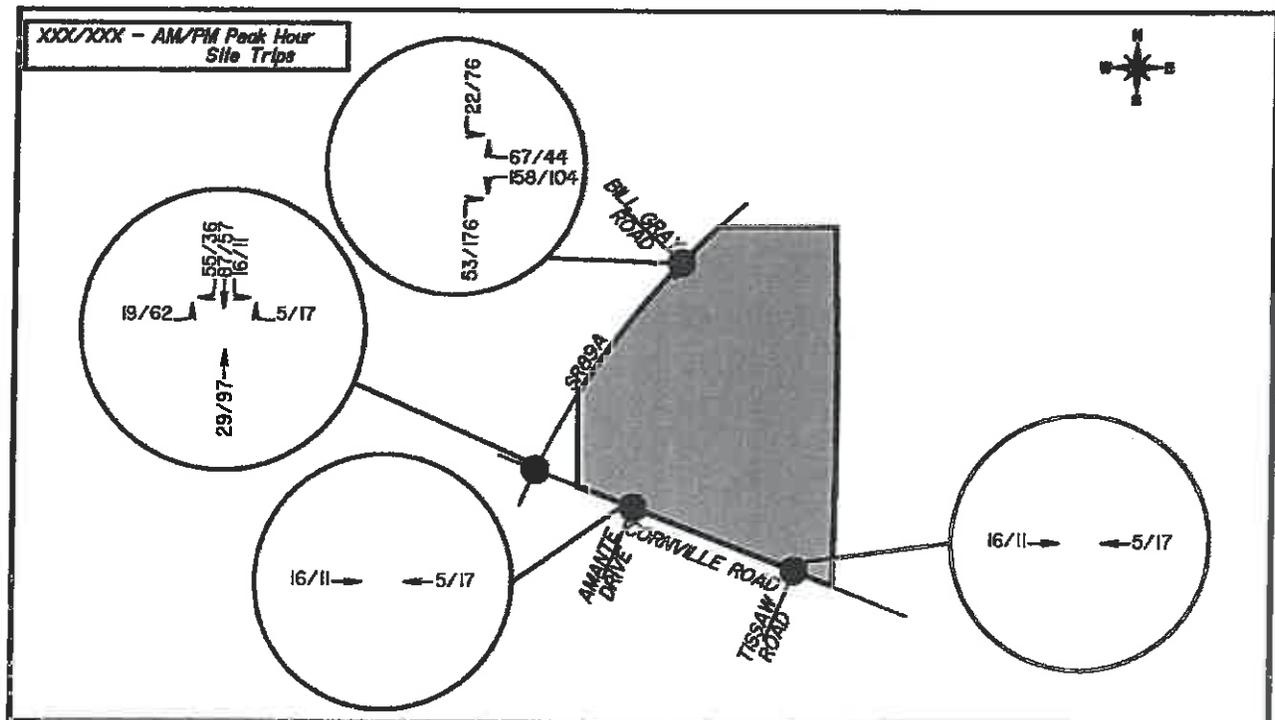
In Phase 1 (2018) and Phase 2 (2020), all of the traffic will be required to utilize SR89A for access. A secondary emergency access road will be constructed if required. In Phase 3 (2025), Collector 1 will be constructed out to Cornville Road to provide a second point of primary access. For Phase 3 it is assumed that 70% of the development traffic will access the development from SR89A & Collector 1 and the remaining 30% will access from Cornville Road & Collector 1. The ultimate developed scenario which includes the mixed use development is represented on the site plan

exhibit in Appendix A. The exhibit shows that at full build out, 50% of the development traffic ingress/egress from SR89A & Collector 1, 30% from Cornville Road & Collector 2, and the remaining 20% from Cornville Road & Collector 1.

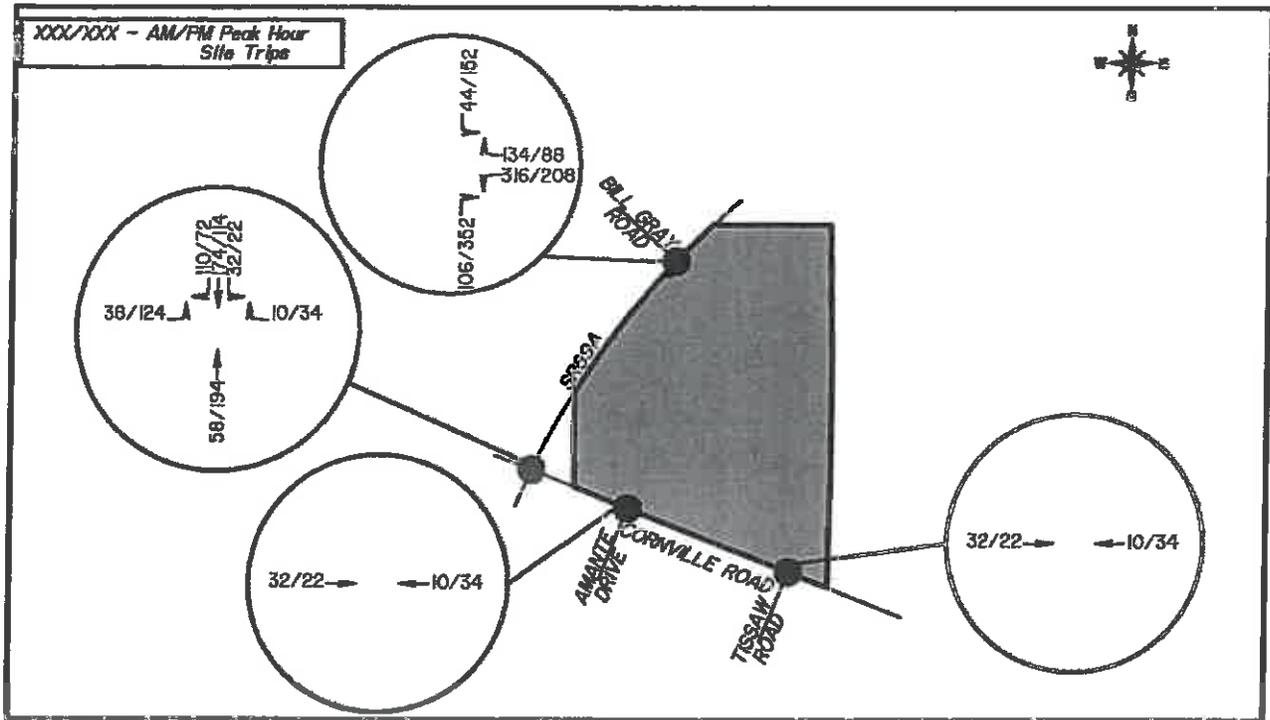
The secondary trip distribution is the direction that each of the site generated trips will travel to/from the site on the study area roadways. The basic assumption is that a majority of the traffic is expected to travel to and from the site toward the south and west. Therefore a secondary distribution of 70/30 is applied to site generated trips at SR89A as well as Cornville Road. A tertiary trip distribution is used for all the trips heading south and west through the SR89A & Cornville intersection. For these trips a 55/35/10 distribution is assumed as shown on the site plan in **Appendix A**.

Using the trip distribution assumptions described above, the 89 & Vine traffic was assigned to the study area intersections for each of the study years. The Phase 1 (2018) site generated trips are shown in **Figure 4**, the Phase 2 trips are shown in **Figure 5**, the Phase 3 (2025) trips are shown in **Figure 6**, and the horizon year (2035) trips are shown in **Figure 7**.

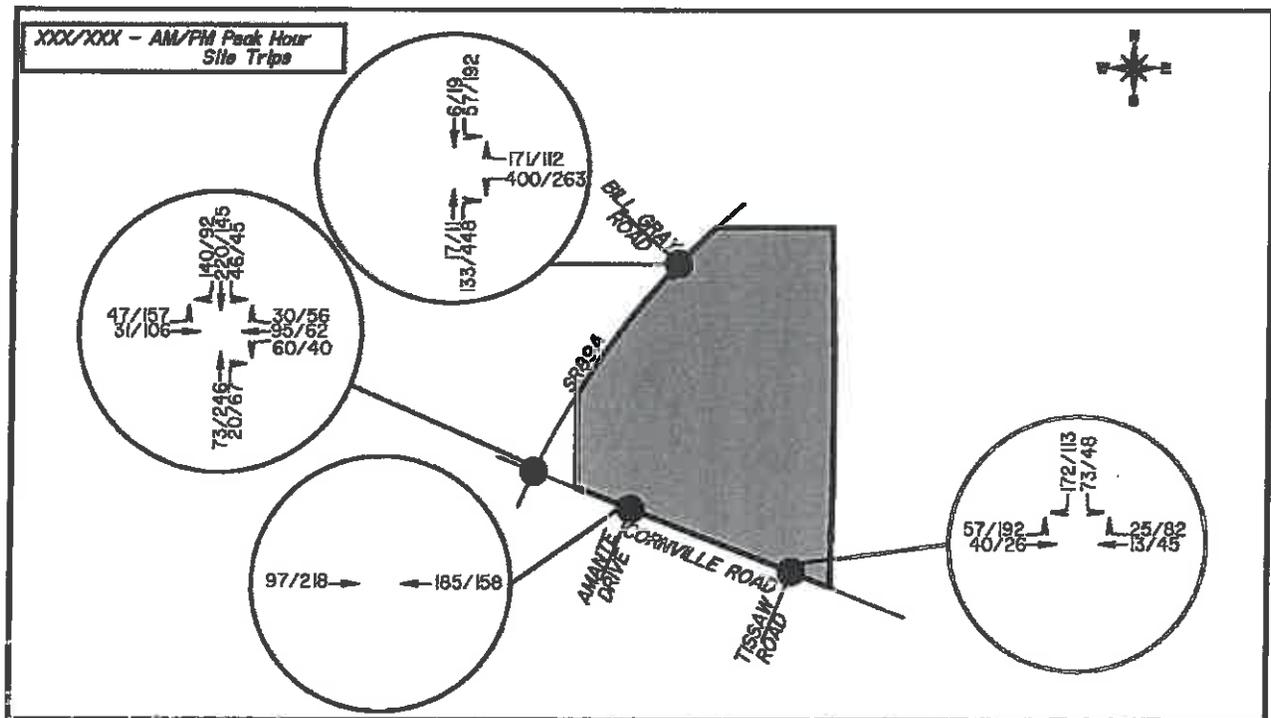
**Figure 4: Site Trip Distribution and Assignment (2018)**



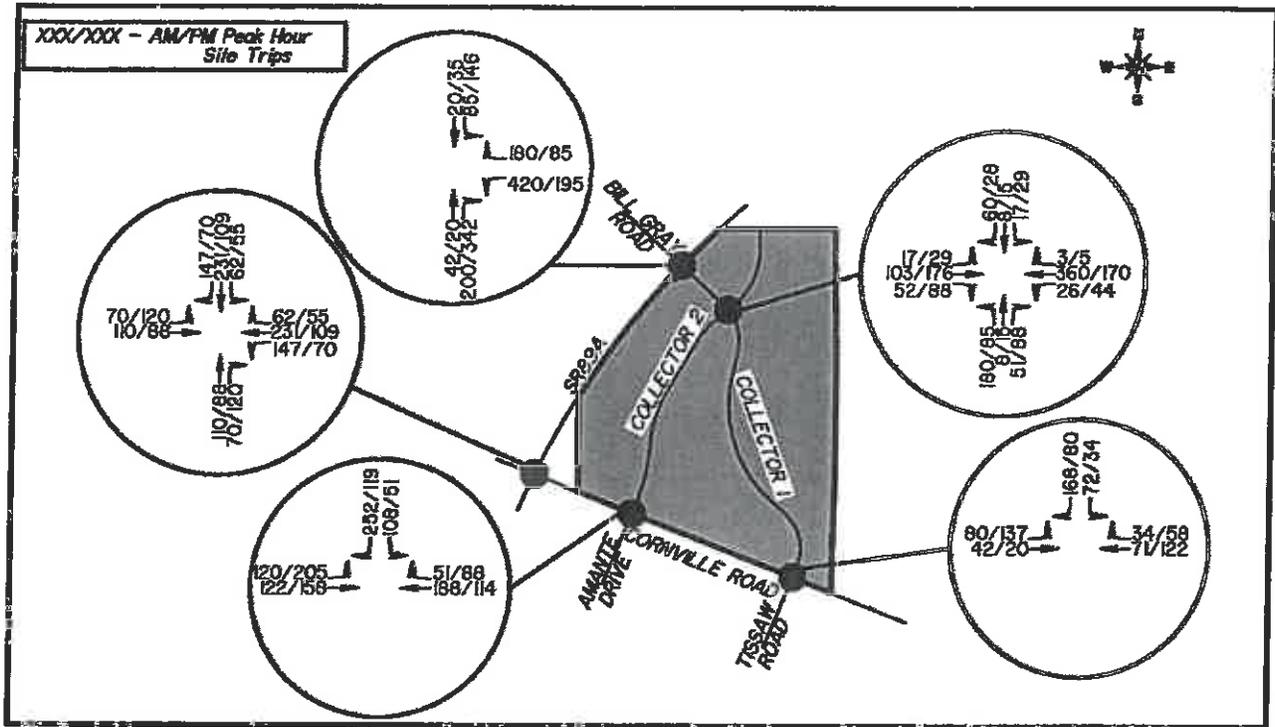
**Figure 5: Site Trip Distribution and Assignment (2020)**



**Figure 6: Site Trip Distribution and Assignment (2025)**



**Figure 7: Site Trip Distribution and Assignment (2035)**



**B. Background Traffic**

The non-site traffic or background traffic is the traffic volumes unrelated to the 89 & Vine project. The existing background traffic is the traffic volumes surveyed on the study area roadways and presented in **Figure 3** in the discussion of existing conditions within this report. The future background traffic estimated based on an assumed growth rate that is applied to the existing traffic volumes.

Historical traffic counts were obtained from Yavapai County in order to calculate the growth rate. Based on the counts that were obtained in this study area between 2005 and 2015 the annual growth rate cannot be calculated as there not a consistent increase in traffic volumes. However in an effort to project the potential for growth in the area an annual growth rate of 1% is assumed for the purpose of this study. **Table 3** shows the historical traffic counts on Cornville Road at SR89A over the last decade as well as the projected volume in the year 2035.

**Table 3: Historical Traffic Volumes on Cornville Road at SR89A**

Year	Traffic Volume (ADT) Cornville Road & SR89A
2005	12,128
2006	12,999
2007	13,028
2008	12,215
2009	11,969
2010	11,490
2011	10,707
2012	11,079
2013	10,969
2014	11,942
2015	11,419
2035 (Projected)	13,933

The assumed growth rate was applied to the existing peak hour traffic volumes in order to estimate the background traffic for the study years. **Figure 8** shows the background traffic in 2018, **Figure 9** is the background traffic in 2020, **Figure 10** is the background traffic in 2025, and **Figure 11** is the background traffic in 2035.

**Figure 8: Background Traffic Volumes (2018)**

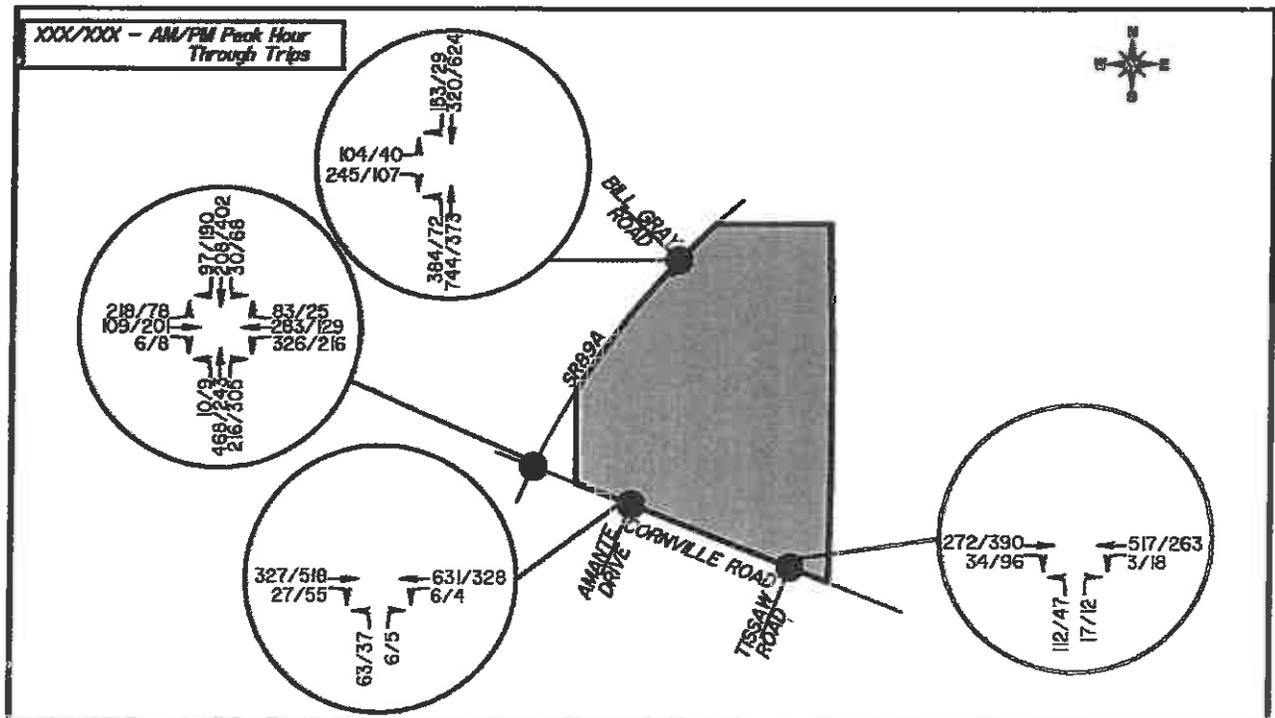


Figure 9: Background Traffic Volumes (2020)

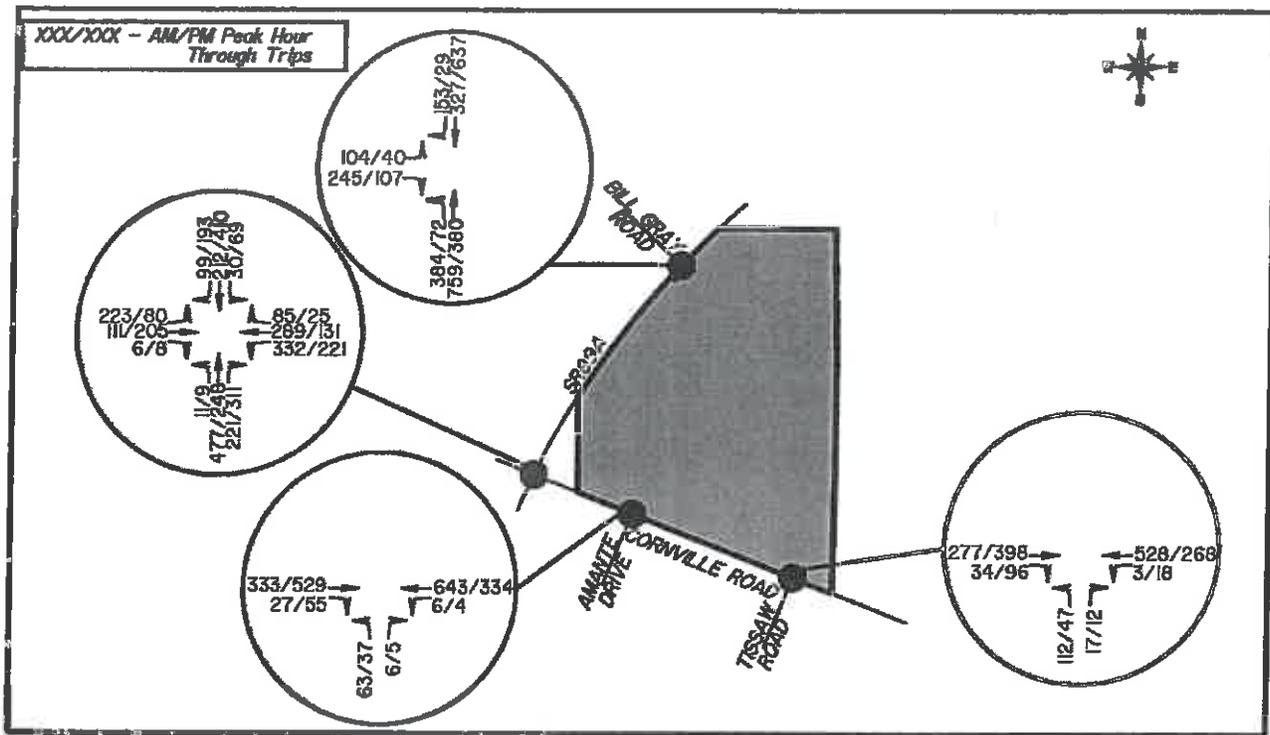


Figure 10: Background Traffic Volumes (2025)

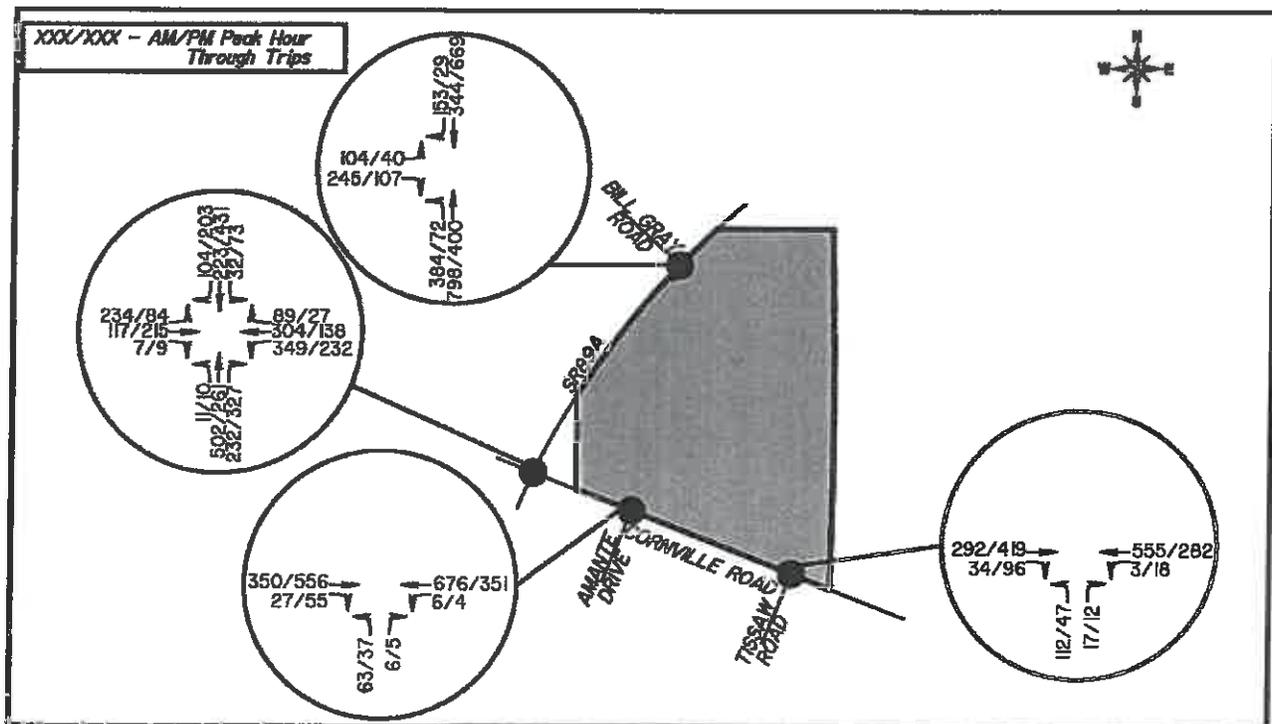
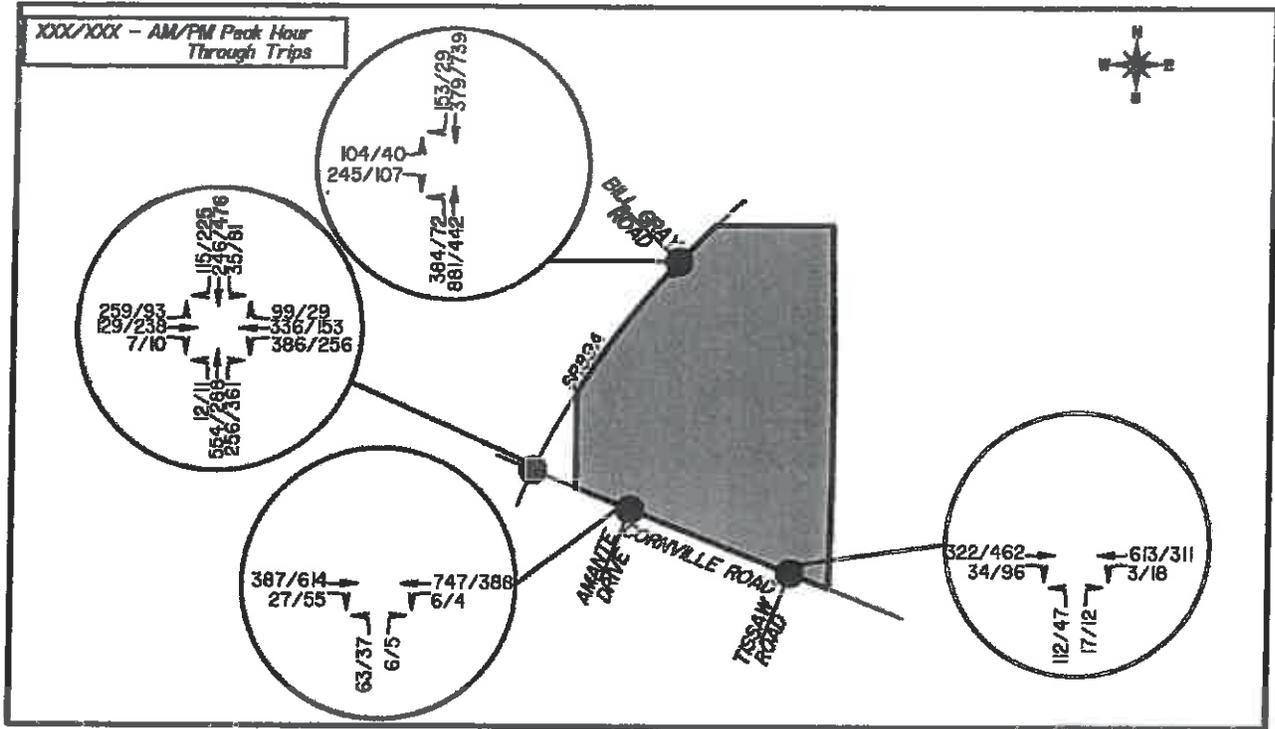


Figure 11: Background Traffic Volumes (2035)



C. Total Traffic

The total traffic for each study area intersection is the sum of the site traffic and the background traffic. Figure 12 shows the total traffic in 2018, Figure 13 is the total traffic in 2020, Figure 14 is the total traffic in 2025, and Figure 15 is the total traffic in 2035.

Figure 12: Total Traffic Volumes (2018)

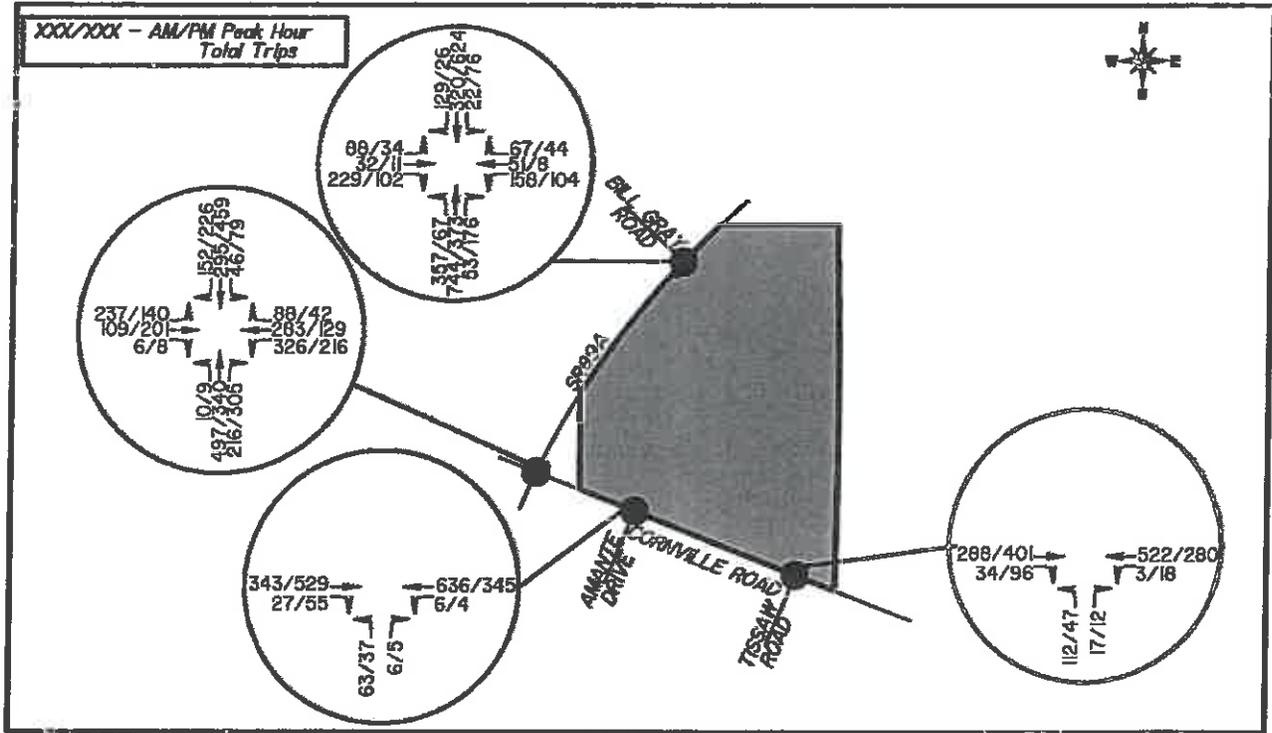


Figure 13: Total Traffic Volumes (2020)

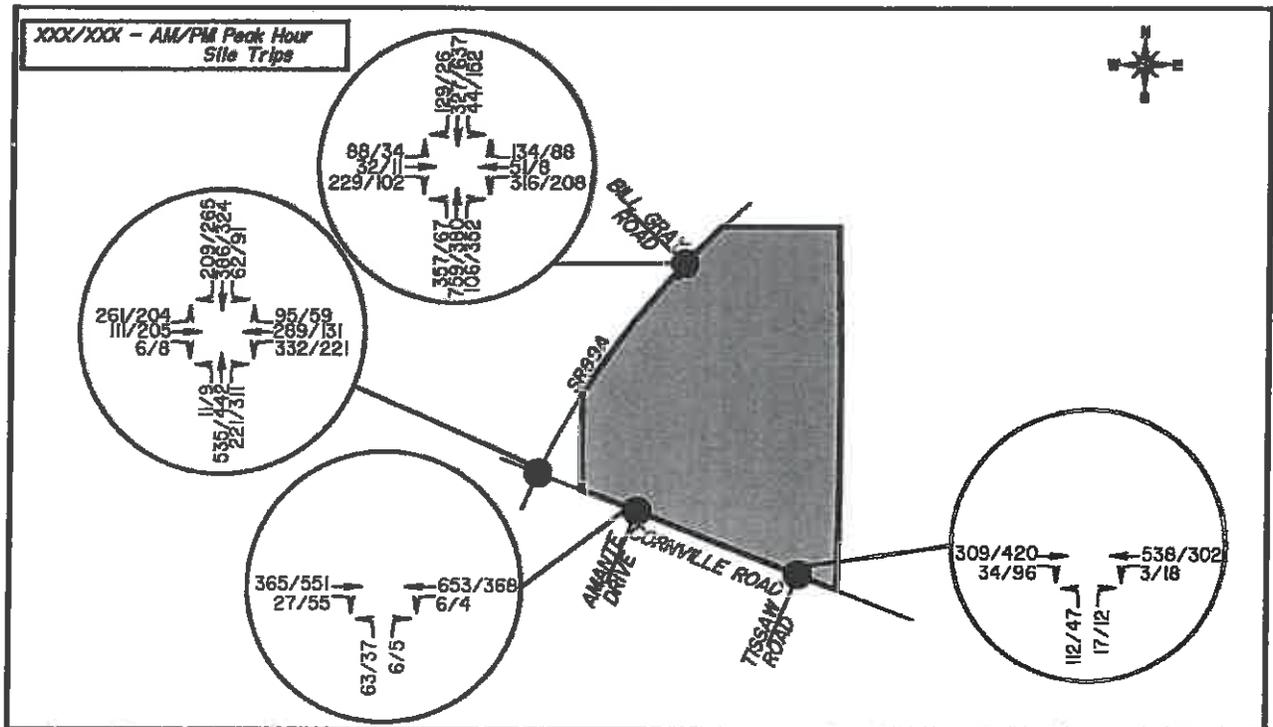


Figure 14: Total Traffic Volumes (2025)

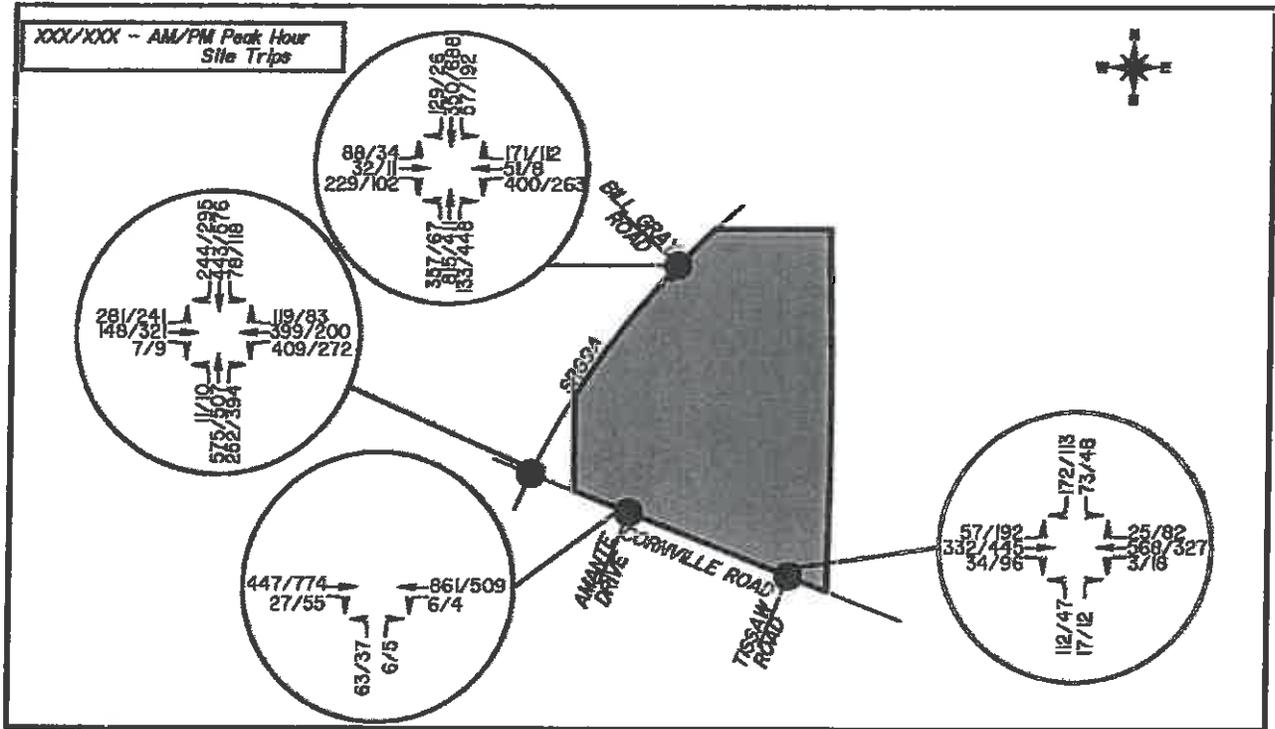
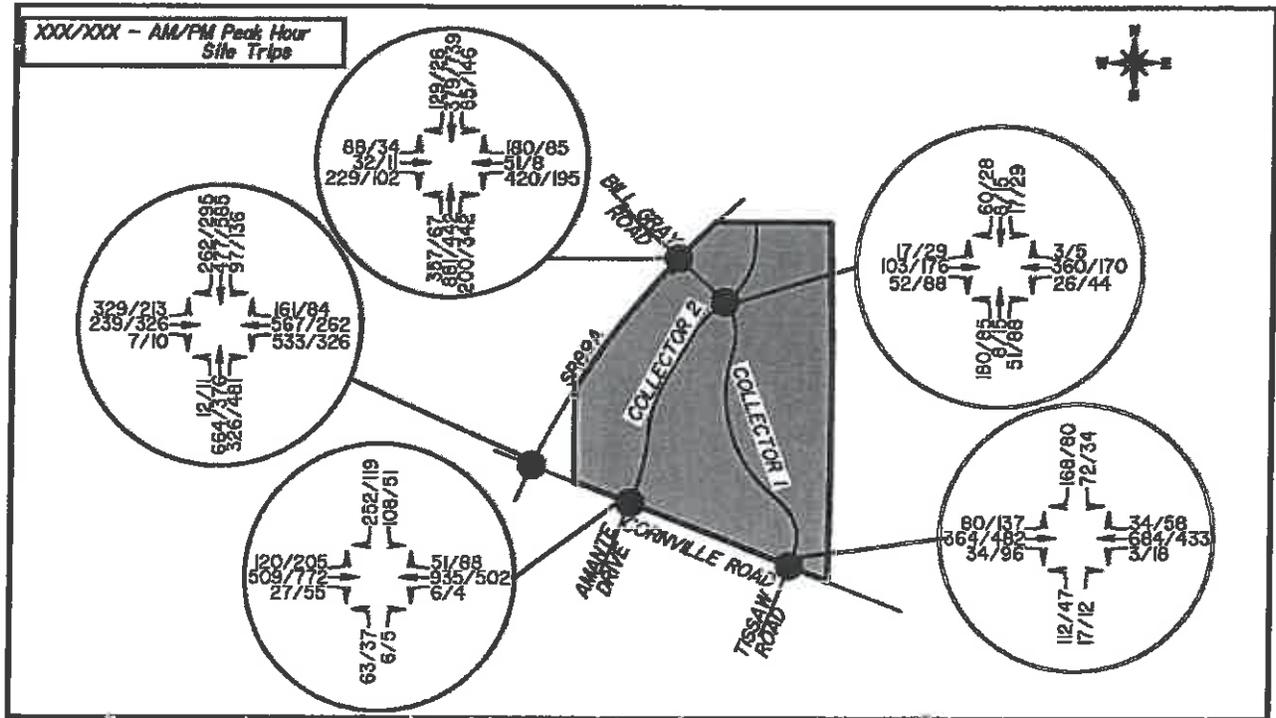


Figure 15: Total Traffic Volumes (2035)



## 6. TRAFFIC & IMPROVEMENT ANALYSIS

### A. Level of Service Analysis

Intersection capacity analyses were performed using *Highway Capacity Software 2010 (HCS2010)* which is a software package that implements the techniques described in the Transportation Research Board's *2010 Highway Capacity Manual (HCM)*. The study area intersections were evaluated at existing conditions (2015), Phase 1 (2018), Phase 2 (2020), Phase 3 (2025), and the 2035 horizon year.

The computed Level of Service (LOS) is used to determine the effectiveness of the operating conditions of an intersection. The LOS is a measure of intersection performance in terms of how much delay is experienced by drivers. There are six LOS categories ranging from "A" to "F". Each level is used to describe traffic flow in terms of the projected delay experienced by motorists. A LOS of "A" represents the lowest amount of delay and congestion and a LOS of "F" represents the highest amount of delay and congestion. A LOS of "E" is considered a representation of an intersection operating at capacity. **Table 4** shows the criteria for establishing the LOS for stop-controlled intersections. **Table 5** shows the criteria for establishing the LOS for signalized intersections.

**Table 4: Stop-Controlled Intersection Level of Service Criteria**

LOS	Control Delay per Vehicle (sec/veh)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

**Table 5: Signalized Intersection Level of Service Criteria**

LOS	Control Delay per Vehicle (sec/veh)
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

Phase 1 (2018)

The initial phase of the 89 & Vine development was evaluated on the applicable study area intersections using the total traffic volumes shown in **Figure 12**. The intersection control and lane geometry used for the analysis was based on the existing configuration shown in **Figure 2**. The LOS results are provided in **Table 6**. The results show that In Phase 1 the study area intersections are shown to operate at a LOS of “C” or better for Phase 1 of the project. The SR89A/Bill Gray Road intersection was evaluated as a signalized intersection because it failed as a two-way stop controlled. The detailed HCS2010 intersection analysis summary reports are included in **Appendix C**.

**Table 6: Phase 1 Level of Service Intersection Analysis (2018)**

Intersection	Movement/ Approach	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
SR89A & Bill Gray Road	Eastbound	49.4	D	56.3	E
	Westbound	52.0	D	56.2	E
	Northbound	18.8	B	9.5	A
	Southbound	26.3	C	14.8	B
	<b>Overall</b>	<b>29.2</b>	<b>C</b>	<b>20.9</b>	<b>C</b>
SR89A & Cornville Road	Eastbound	51.6	D	54.8	D
	Westbound	49.3	D	48.9	D
	Northbound	20.8	C	18.2	B
	Southbound	21.1	C	18.6	B
	<b>Overall</b>	<b>34.4</b>	<b>C</b>	<b>29.8</b>	<b>C</b>

Cornville Road & Amante Drive (Collector 2)	Eastbound	-	-	-	-
	Westbound	0.1	A	0.2	A
	Northbound	13.5	B	12.4	B
	Southbound	-	-	-	-
	<b>Overall</b>	<b>6.8</b>	<b>A</b>	<b>6.3</b>	<b>A</b>
Cornville Road & Tissaw Road (Collector 1)	Eastbound	-	-	-	-
	Westbound	0.0	A	0.5	A
	Northbound	21.9	C	15.6	C
	Southbound	-	-	-	-
	<b>Overall</b>	<b>11.0</b>	<b>B</b>	<b>8.1</b>	<b>A</b>

### Phase 2 (2020)

For the second analysis, the Phase 2 projected 89 & Vine traffic was added to the 2020 background traffic and evaluated on the same intersections as Phase 1. The traffic volumes used in the analysis are shown in **Figure 13**. The LOS results are provided in **Table 7**. The detailed HCS2010 intersection analysis summary reports are included in **Appendix C**. In both the morning and evening peak hours there are some small increases in approach and intersection delay compared to Phase 1 conditions. However the overall LOS for all study area intersections remains at a "C" or better.

**Table 7: Phase 2 Level of Service Intersection Analysis (2020)**

Intersection	Movement/ Approach	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
SR89A & Bill Gray Road	Eastbound	46.2	D	56.3	E
	Westbound	42.4	D	51.3	D
	Northbound	23.9	C	19.3	B
	Southbound	33.5	C	21.4	C
	<b>Overall</b>	<b>32.4</b>	<b>C</b>	<b>27.5</b>	<b>C</b>
SR89A & Cornville Road	Eastbound	50.6	D	53.8	D
	Westbound	49.0	D	50.4	D
	Northbound	23.3	C	19.5	B
	Southbound	23.2	C	20.2	C
	<b>Overall</b>	<b>34.7</b>	<b>C</b>	<b>31.6</b>	<b>C</b>

Cornville Road & Amante Drive (Collector 2)	Eastbound	-	-	-	-
	Westbound	0.1	A	0.1	A
	Northbound	13.7	B	12.2	B
	Southbound	-	-	-	-
	<b>Overall</b>	<b>6.9</b>	<b>A</b>	<b>6.2</b>	<b>A</b>
Cornville Road & Tissaw Road (Collector 1)	Eastbound	-	-	-	-
	Westbound	0.0	A	0.5	A
	Northbound	23.5	C	16.4	C
	Southbound	-	-	-	-
	<b>Overall</b>	<b>11.8</b>	<b>B</b>	<b>8.5</b>	<b>A</b>

### Phase 3 (2025)

For the Phase 3 analysis, it was assumed that Collector 1 would be constructed to Cornville Road. The Phase 3 projected 89 & Vine traffic was added to the 2025 background traffic to create the total traffic volumes shown in **Figure 14**. The Phase 3 traffic represents the full build out of the 89 & Vine residential development. The LOS results are provided in **Table 8**. The detailed HCS2010 intersection analysis summary reports are included in **Appendix C**. In both the morning and evening peak hours there are increases in approach and intersection delay compared to the previous phase. Once again, the overall LOS for all study area intersections remains at a “C” or better. The northbound approach on the Cornville/Tissaw intersection shows a LOS of “F”, however this is somewhat misleading since the northbound queue length is only 4 vehicles. This means that while there is a delay of almost a minute on this approach, the impact is relatively minor.

**Table 8: Phase 3 Level of Service Intersection Analysis (2025)**

Intersection	Movement/ Approach	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
SR89A & Bill Gray Road	Eastbound	39.8	D	55.9	E
	Westbound	32.3	D	49.0	D
	Northbound	29.2	C	27.6	C
	Southbound	40.4	D	24.4	C
	<b>Overall</b>	<b>33.3</b>	<b>C</b>	<b>31.6</b>	<b>C</b>

SR89A & Cornville Road	Eastbound	45.8	D	47.2	D
	Westbound	40.7	D	42.2	D
	Northbound	25.9	C	26.1	C
	Southbound	25.8	C	20.8	C
	<b>Overall</b>	<b>33.4</b>	<b>C</b>	<b>31.3</b>	<b>C</b>
Cornville Road & Amante Drive (Collector 2)	Eastbound	-	-	-	-
	Westbound	0.1	A	0.1	A
	Northbound	16.6	C	14.7	B
	Southbound	-	-	-	-
	<b>Overall</b>	<b>8.4</b>	<b>A</b>	<b>7.4</b>	<b>A</b>
Cornville Road & Tissaw Road (Collector 1)	Eastbound	1.8	A	3.9	A
	Westbound	0.0	A	0.4	A
	Northbound	53.4	F	49.4	E
	Southbound	16.0	C	20.4	C
	<b>Overall</b>	<b>17.8</b>	<b>C</b>	<b>18.5</b>	<b>C</b>

### Horizon (2035)

For this analysis, the horizon year which is defined as 10 years beyond the opening year of the last phase of the 89 & Vine residential development or the year 2035 was evaluated. The 89 & Vine traffic at full build out was added to the background traffic as well as the projected traffic from the adjacent mixed use development. The resulting traffic volumes are shown in **Figure 15** and the LOS results are provided in **Table 9**. The detailed HCS2010 intersection analysis summary reports are included in **Appendix C**. At all the intersections there are some minor increases predicted in the delay on the approaches, but the overall LOS remains at an acceptable level of "C" or better in the morning and evening peak hours for all intersections except the morning peak hour at SR89A/Bill Gray Road. This is mainly due to the large increase in traffic resulting from the mixed use development and no additional access points being permitted along SR89A. It was assumed for the 2035 analysis that Cornville Road is expanded to a four lane roadway.

**Table 9: Horizon Year Level of Service Intersection Analysis (2035)**

Intersection	Movement/ Approach	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
SR89A & Bill Gray Road	Eastbound	49.4	D	56.3	E
	Westbound	40.7	D	51.9	D
	Northbound	42.7	D	16.9	B
	Southbound	50.1	D	20.4	C
	<b>Overall</b>	<b>44.5</b>	<b>D</b>	<b>25.6</b>	<b>C</b>
SR89A & Cornville Road	Eastbound	47.7	D	50.2	D
	Westbound	37.3	D	42.1	D
	Northbound	30.8	C	25.6	C
	Southbound	25.2	C	17.9	B
	<b>Overall</b>	<b>34.4</b>	<b>C</b>	<b>31.0</b>	<b>C</b>
Cornville Road & Amante Drive (Collector 2)	Eastbound	3.2	A	3.2	A
	Westbound	0.1	A	0.1	A
	Northbound	57.6	F	54.6	F
	Southbound	22.5	D	18.3	C
	<b>Overall</b>	<b>20.9</b>	<b>C</b>	<b>19.1</b>	<b>C</b>
Cornville Road & Tissaw Road (Collector 1)	Eastbound	2.0	A	2.2	A
	Westbound	0.0	A	0.3	A
	Northbound	18.5	C	18.4	C
	Southbound	13.8	B	12.0	B
	<b>Overall</b>	<b>8.6</b>	<b>A</b>	<b>8.2</b>	<b>A</b>
Collector 1 & Collector 2	Eastbound	0.8	A	0.8	A
	Westbound	0.7	A	1.9	A
	Northbound	31.9	D	15.7	C
	Southbound	13.4	B	14.5	B
	<b>Overall</b>	<b>11.7</b>	<b>B</b>	<b>8.2</b>	<b>A</b>

Roadway Segment Analysis

A roadway capacity analysis was performed on each of the study area roadways using the volume to capacity (v/c) ratio method. A v/c ratio is a commonly used measure to

describe the level of congestion on a street segment. It compares the maximum capacity of a street segment to the anticipated Average Daily Traffic (ADT) volume. ADT is defined as the total number of vehicles traveling in both directions on a given roadway segment in a 24 hour period. Street capacities were estimated based on the roadway cross sections and design speeds and are shown in **Table 10**.

**Table 10: Average Daily Roadway Capacities**

Functional Classification & (Street Name)	Through Lanes	Maximum Capacity (Vehicles per Day)
State Highway (SR89A)	4-Lane	70,000
State Highway Arterial (SR89A)	4-Lane	35,000
County Road/Arterial (Cornville Road)	2-Lane	16,000
	4-Lane	32,000
Collector (89 & Vine Collectors 1 & 2)	2-Lane	14,000

The v/c ratios were calculated for the study area roadways based on the ADT volumes shown in **Table 10** for the years 2015, 2025, and 2035. The results of the v/c ratio analysis are shown in **Table 11**. It appears the roadway designations are generally adequate to accommodate the proposed traffic flows. Cornville Road is assumed to be expanded to a four lane roadway by 2035 to maintain an acceptable LOS.

**Table 10: Roadway Capacity (v/c Ratio) Analysis**

Roadway Segment	Existing Volume	Existing Capacity	Existing v/c Ratio	2025 Volume	2025 Capacity	2025 v/c Ratio	2035 Volume	2035 Capacity	2035 v/c Ratio
SR89A Between SR260 & Cornville Road	19,500	35,000	0.56	26,500	35,000	0.76	33,000	35,000	0.94
SR89A Between Cornville Road & Bill Gray Rd.	13,000	70,000	0.19	27,000	70,000	0.39	37,000	70,000	0.53
Cornville Road Between SR89A & Tissaw Road	12,000	16,000	0.75	16,000	16,000	1.00	27,500	32,000	0.86
Collector 1	-	-	-	9,700	14,000	0.69	18,000	14,000	1.29
Collector 2	-	-	-	-	-	-	11,000	14,000	0.79

	=	$v/c \geq 1.3$ (Over Capacity)
	=	$1.0 \leq v/c < 1.3$ (Slightly Over Capacity)
	=	$0.8 \leq v/c < 1.0$ (Near Capacity)
	=	$v/c < 0.8$ (Below Capacity)

## B. Roadway Improvements

### Turn Lanes

The need for turn lanes was evaluated on each of the study area intersections for the 2035 horizon year. The criteria and guidance for turn lane warrants was taken from ADOT TGP Section 245, "Turn Lane Warrants". The primary determining factors to warrant turn lanes are the combination of through traffic volume and turning traffic volume, the posted roadway speed, and the number of through lanes on the roadway. In addition to posted speed limit, 95<sup>th</sup> percentile queue lengths from the intersections analyses were used to compute storage length needs. The 95<sup>th</sup> percentile queue lengths for the intersections are included in the detailed HCS2010 reports within **Appendix C**.

- SR89A/Cornville – No changes to existing turn lanes
- SR89A/Bill Gray (Collector 1)
  - Westbound Left - With a very minor amount of westbound through traffic anticipated, the primary lane of Collector 1 can be utilized for left and through movements. If an independent left turn lane is constructed, the minimum storage should be 450 feet or a dual left turn with 200 feet of storage.
  - Westbound Right – 125' of storage
  - Northbound Right – 500' of storage (primary function is for deceleration as the right turns will be a free movement).
  - Southbound Right – Existing
  - Southbound Left - Existing
- Collector 1/Collector 2
  - Eastbound Left – 75' of storage
  - Westbound Left – Not warranted by volumes however a left turn lane with 75' of storage is recommended as a higher than expected percentage of

trips may utilize this turn to access the commercial tract in the future.

- Northbound Left – 100' of storage
- Southbound Left – 75' of storage
- Cornville Road/Collector 1
  - Southbound Left – 75' of storage
  - Eastbound Left – Not warranted by volumes, but a left turn lane with 200' of storage is recommended to provide a safer left turn into the development.
- Cornville Road/Collector 2
  - Southbound Left – 75' of storage
  - Eastbound Left – Not warranted by volumes, but a left turn lane with 200' of storage is recommended to provide a safer left turn into the development.

#### Preliminary Signal Warrant Analysis

A preliminary traffic signal warrant analysis was performed on the study area intersections with full turning movements using the basis of estimated average daily traffic (ADT). The purpose of the preliminary analysis is to identify intersections that may require additional study in the future to determine if signalization is needed. The analysis utilized the procedures outlined by the Manual on Uniform Traffic Control Devices (MUTCD). This document establishes eight separate, related sets of criteria termed "warrants". If none of the eight warrants are satisfied, then a signal should not be installed. If one or more of the warrants are satisfied, then the installation of a signal might be appropriate.

For the purpose of this analysis and due to lack of additional information, only the four primary signal warrant indicators were analyzed. The four primary signal warrants are:

- 1a Minimum Vehicular Volume (Eight Hour)
- 1b Interruption of Continuous Traffic (Eight Hour)
- 2 Four hour Vehicular Volume
- 3b Peak Hour Volume

Hourly adjustment factors were applied to the total ADT for each roadway to derive the peak hour, fourth highest hour, and eighth highest hour traffic volumes. The adjustment factors were obtained from Section 611 (Traffic Signals) of the ADOT TGP manual and are listed below.

<u>High Hour</u>	<u>Hourly Adjustment Factor</u>
1	0.0771
4	0.0656
8	0.0572

The MUTCD evaluation of traffic signal needs requirements are summarized in **Table 10**. The full signal warrant analysis tables are included in **Appendix C**. The SR89A/Bill Gray intersection is shown to meet signal warrants in existing conditions. For this study the existing conditions include the church, school, and assisted living that are currently expanding. It should also be noted that although the Cornville/Collector 1 and Cornville/Collector 2 intersections met a signal warrant, both intersections were shown to operate as two-way stop controlled intersections with a LOS of “C” or better through the horizon year.

**Table 10: Signal Warrant Evaluation Summary**

Intersection			Signal Warrant(s) Met?	Year
SR89A	&	Bill Gray Road (Collector 1)	YES	2015
Cornville Road	&	Amante Drive (Collector 2)	YES	2025
Cornville Road	&	Tissaw Road (Collector 1)	YES	2035
Collector 1	&	Collector 2	NO	N/A

Roadway Improvements

SR89A – Based on conversations with ADOT through the early planning stages of the 89 & Vine project, it may be necessary to reconfigure the SR89A/Bill Gray intersection to provide a more efficient geometry for vehicles turning through the existing median.

Cornville Road – Per the City of Cottonwood and Yavapai County thoroughfare plans for this roadway, Cornville Road will require expansion to a 4-lane roadway between the year 2025 and 2035 in order to provide capacity for the projected traffic. Expansion of this road will also allow the SR89A/Cornville intersection to continue to operate at a

LOS of “C”. It is not anticipated that this expansion will be necessary until the adjacent mixed use development is constructed.

Collector 1 & 2 – The proposed cross section for Collector 1 and Collector 2 which includes one lane in each direction with bike lanes and a divided median will be sufficient for the build out of the 89 & Vine development.

### Traffic Control

Based on the analysis of each study area intersection, the following represents the recommended traffic control.

- SR89A/Bill Gray (Collector 1) – Two Way Stop Controlled (TWSC)
  - Signal or Roundabout may be warranted once church/school/assisted living are complete
- SR89A/Cornville - Signalized
- Cornville/Collector 1 – TWSC
- Cornville/Collector 2 – TWSC
- Collector 1/Collector 2 - TWSC

## **7. CONCLUSIONS**

The 89 & Vine development is expected to generate 35,942 daily trips, 1,768, trips in the morning peak hour, and 1,543 trips in the evening peak hour. The proposed access points are at the existing intersections of SR89A/Bill Gray Road, Cornville Road/Amante Drive, and Cornville Road/Tissaw Road. Internally, the development will construct two divided collector roads to provide access to SR89A and Cornville Road.

The intersection of SR89A/Bill Gray is predicted to fail as a stop controlled intersection with the expansion of the church/school/assisted living being constructed west of SR89A. A signal or roundabout will likely be needed at this intersection for the existing traffic even without the 89 & Vine development. All the other study area intersections are expected to operate at acceptable levels of service with only minor turn lane improvements to mitigate traffic increases related to the 89 & Vine development.

The roadway analysis of Cornville Road indicates that even without the 89 & Vine development, the roadway is approaching capacity and may need to be expanded to a four lane roadway between 2025 and 2030.

## **8. RECOMMENDATIONS**

The following infrastructure improvements are recommended to mitigate the traffic conditions that are predicted within the study area:

### 2015 – Existing

- Installation of a traffic signal or roundabout at SR89A/Bill Gray

### 2018 – Phase 1

- Construction of initial phase of Collector 1 and emergency access road
- Installation of right turn lane at SR89A/Collector 1 for northbound left turns
- Installation of right turn lane at SR89A/Collector 1 for westbound right turns
- Through lane of Collector 1 can serve as left turn lane as well as through lane since through movement is expected to have a very low volume.

### 2020 – Phase 2

- No additional mitigation needed

### 2025 – Phase 3

- Construction of remainder of Collector 1 to Cornville Road
- Installation of southbound left turn at Cornville Road/Collector 1
- Installation of eastbound left turn at Cornville Road/Collector 1

### 2035 – Horizon (Build out of mixed use by others)

- Construction Collector 2 throughout project
- Installation of southbound left turn at Cornville Road/Collector 2
- Installation of eastbound left turn at Cornville Road/Collector 2
- Installation of left turn lanes on each approach at Collector 1/Collector 2
- Expansion of Cornville Road to four lane roadway

**Master Drainage Report  
for  
89 & Vine  
City of Cottonwood, Arizona**

**1. Introduction**

**1.1 Project Location & General Description**

89 & Vine is a 680 acre mixed-use master planned community in the City of Cottonwood, Arizona that is being developed by 89 & Vine Arizona Partners, LLC. The 89 & Vine development is proposed on Yavapai County parcel numbers 407-23-004G and 407-09-166B located in the City of Cottonwood, Yavapai County, Arizona. Parcels 407-23-004G and 407-09-166B are located in Section 31, Township 16 North, Range 4 East and Section 6, Township 15 North, Range 4 East of the Gila and Salt River Base and Meridian, Yavapai County, Arizona, respectively. The property is bounded on the west by the 308' right-of-way (ROW) of U.S. Highway 89-A and on the south by the 100' ROW of Cornville Road. A vicinity map of the project can be found on Figure 1. A project location map with aerial image can be found on Figure 2. The surrounding land is mostly undeveloped desert with the exception of the Verde Santa Fe residential development immediately south of Cornville Road and the Immaculate Conception Catholic Church immediately west of U.S. 89-A.

The 89 & Vine development consists of undeveloped desert rangeland with moderate vegetative cover that is comprised of small to medium sized bushes with minimal trees. The project site generally slopes from north and northeast to the south and southwest with a maximum elevation of 3,589 and minimum elevation of 3,353. Off-site drainage is intercepted at the west, north, and eastern boundaries and is conveyed through the site by several well-incised washes. Flows from the four main washes leave the property via existing culvert systems beneath Cornville Road located approximately 1,585 feet, 3,146 feet, 5,412 feet, and 6,550 feet east of U.S. 89-A.

The proposed development consists of approximately 370 residential acres, 35 mixed-use acres, and 140 acres of open space. Approximately 135 mixed-use

acres adjacent to U.S. 89-A are considered to be undeveloped for the purposes of this report until such time as detailed development plans are brought forward under separate cover.

## **1.2 Purpose of Report**

This drainage report has been prepared in support of the 89 & Vine PAD zoning and MDP. The objective of this report is to provide a regional hydrologic analysis to determine existing and proposed conditions discharges for the project, determine the location of required detention facilities, demonstrate that the proposed development results in no adverse impacts downstream, and provide an outline for future reports as phases of the project are developed.

## **1.3 Design Requirements**

This master report and future phases shall be designed in accordance with the following guidelines:

- *City of Cottonwood Municipal Code, Title 15 Buildings and Construction, Chapter 15.40 Stormwater Detention, Cottonwood Arizona, May 2015*
- *Highway Drainage Design Manual - Volume 2 Hydrology, Arizona Department of Transportation, 2014*

## **1.4 Site Location relative to known FEMA Flood Hazard Zone**

There currently is no effective FEMA floodplain located on the property, which is entirely within Zone X per Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) 04025C1780G, dated September 3, 2010. The project location overlaid on the FEMA map can be found on Figure 4.

## **1.5 Long-Term Maintenance Responsibility**

A maintenance program for the project's drainage systems is required to preserve design integrity and purpose of the drainage systems. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose and can result in reduced performance. It is the responsibility of private developers, homeowner associations, etc. for facilities on private property, private streets and private right-of-ways, unless accepted by the

City Cottonwood for regular maintenance. The City of Cottonwood will be responsible for maintenance of facilities within public right-of-ways or within drainage easements. A regular maintenance program is required to have drainage systems perform to the level of protection or service as presented in this report and the project's plans and specifications.

Drainage facilities to be maintained by the Master Home Owners Association versus the city of Cottonwood will be identified in the final drainage report or construction plans for each phase.

### **1.6 Required permits**

- A Section 404 jurisdictional delineation analysis is currently being performed. Some of the project may be subject to a 404 permit based on findings of the JDA and final landplan.
- NPDES Storm Water Permit

### **1.7 Project Benchmark & Datum**

*NGS Data Point located  $\pm 1850'$  south of US 89A & Cornville Road,  $\pm 150'$  east of the centerline of US 89A.*

*NGS point Designation = R 18*

*NGS point P.I.D. = ES0478*

*NGS point Elevation = 3,367.392 feet (NAVD-88 Datum)*

## **2. Hydrologic Analysis**

The off-site and on-site hydrologic conditions have been identified in order to evaluate the required drainage infrastructure to serve 89 & Vine. Off-site flows are those existing flows that originate outside the parcel boundary and would need to be conveyed through or around the subdivision via channels, storm drain pipe or box culverts. On-site flows consist of storm water run-off generated within the parcel and are conveyed to first flush, retention, or detention basins before discharging to adjoining wash corridors.

## **2.1 Off-Site Hydrology**

The off-site hydrology can be categorized into two scenarios; regional off-site flows and local off-site flows. For the purposes of this report, the regional off-site flows can be considered as the contributing areas to the four main washes that exit the site. Local off-site flows are those that are generated outside the limits of project area but have a basin size that is not large enough to warrant a regional analysis.

### **2.1.1 Regional Off-Site Hydrology**

The watershed in which the proposed project lies does not appear to have been included in any previous drainage way planning studies, flood hazard delineation reports, or other any other type of hydrologic or hydraulic analysis. As previously mentioned, the project site is located in FEMA Zone X as shown on FIRM Panel 04025C1780G, dated September 3, 2010. The watershed consists mainly of undeveloped desert land with very minor portions of commercial and transportation land uses under existing conditions. Under proposed conditions both residential and mixed use areas have been included as part of this report. Future commercial and mixed use areas adjacent to U.S. 89-A are assumed to be undeveloped. Based in inspection of aerial photography, there do not appear to be any irrigation facilities located within the project site. The soils within the watershed consist mainly of gravely and sandy loams.

### **2.1.2 Sub-basin Description**

The on-site drainage for the project site consists of multiple existing wash corridors that convey flows from north to south. The flows are conveyed beneath Cornville Road via four storm drain systems as previously mentioned. Off-site flow intersects the project boundary on the east side with three major, well-incised washes along with multiple smaller washes. A small area of off-site runoff will impact the northern boundary while the remaining area farther north of the site is conveyed west under U.S. 89-A via a box culvert system.

The drainage sub-basin delineations were prepared in a manner that would provide a concentration point at most of the major wash confluences to allow a

discharge computation for hydraulic modeling at a later time. Sub-basins were delineated to coincide with the project boundary at major wash locations in order to determine a discharge that would have to be captured and conveyed through the proposed development. The existing and proposed conditions hydrology schematics can be found on Plates 1 and 2, respectively.

### **2.1.3 Development Criteria and Constraints**

The culvert systems beneath Cornville road act as a site constraint for the 89 & Vine project. A previous drainage study has been performed for the Cornville Road culvert systems located approximately 3,146 feet (Wash "B"), 5,412 feet (Wash "C"), and 6,550 feet (Wash "D") east of U.S. 89-A by the Yavapai County Flood Control District in July, 1991 and amended in May, 1992. The three culvert systems for Washes "B", "C" and "D" were designed for 1,639 cfs, 67 cfs and 845 cfs, respectively. Excerpts from this report can be found in Appendix A. No design information was available on the existing culvert located on Zalesky Wash located approximately 1,585 feet east of U.S. 89-A.

Pending hydraulic analysis, the proposed improvements as part of the 89 & Vine project are intended to have no adverse impacts at these culvert crossings. The post-project conditions discharges are to be less than or equal to the design discharge per the *City of Cottonwood Ordinance No. 172* or that the 100-year water surface elevations do not negatively impact existing infrastructure or cause overtopping of Cornville Road where overtopping did not previously occur.

### **2.1.4 Rainfall**

Rainfall depths utilized in this analysis were taken from latest National Oceanic and Atmospheric Association (NOAA) precipitation data. The point precipitation rainfall values were established from NOAA Atlas 14, Volume 1, Version 5.0 which was last updated in 2011. The depth duration data used for this analysis can be found in Appendix B.

### **2.1.5 Methods Utilized to Quantify Run-off**

The methods utilized to quantify storm run-off were performed in conformance with the City of Cottonwood and Yavapai County requirements as stated in the

Drainage Design Manual for Yavapai County. Flows were calculated in conformance with the HEC-HMS methodology per the procedure within the County's Hydrology Manual.

The hydrologic analysis was performed using the U.S. Army Corps of Engineers HEC-HMS v4.0 computer program. The Green and Ampt equation was used to calculate rainfall losses. Synthetic unit hydrographs were developed using the Clark unit hydrograph method. The 100-year, 24-hour general storm event was modeled for both existing and proposed conditions. The existing and proposed conditions HEC-HMS output can be found in Appendix H and Appendix I respectively.

#### **2.1.6 Soils Data**

Soil data for this analysis was downloaded from the United States Department of Agriculture / National Resources Conservation Service Web Soil Survey (WSS). Recommended Green and Ampt Parameter values were not listed in Appendix B of the 2014 ADOT Hydrology Manual for the soil map units located in the area of interest. Since recommended Green and Ampt parameter values were not listed in the tables, the parameter values were calculated using the guidance and equations provided in the ADOT 2014 Hydrology Manual, Appendix B, Section B.3. Soils data for percent sand, percent clay, percent organic matter, and percent gravels was downloaded for the top 6 inches of the soil horizon in the area of interest using WSS. Green and Ampt soil parameter calculations as well as input data downloaded from WSS can be found in Appendix C. Soils maps for the existing and proposed conditions watersheds can be found in Appendix C.

#### **2.1.7 Land Use Data & Green and Ampt Loss Parameters**

Existing conditions land uses were delineated based on current aerial photography with guidance from the land uses provided in Table 7.7 of the Yavapai County Drainage Design Manual. Existing land uses consisted primarily of undeveloped desert rangeland with moderate vegetative cover, pavement, and a church. The desert rangeland category was split into three land use categories based on the average land slopes per guidance presented in the 2013 Drainage

Design Manual for Maricopa County, Hydrology. Flat slopes were areas where the land slope was generally less than five percent. Hill slopes consisted of slopes of five to ten percent and mountain terrain were areas where slopes were generally greater than ten percent. Proposed conditions land uses were assigned based on the 2015 PAD for 89 & Vine prepared by G&M.

Existing and proposed conditions land use maps can be found in Appendix D. Land use calculations and Green and Ampt Loss input variable calculations for existing and proposed conditions basins can be found in Appendix D.

#### **2.1.8 Clark Unit Hydrograph Parameters**

The time of concentration and storage coefficient used in the Clark Unit Hydrograph method were calculated according to the equations and guidance presented in Section 7.5.2 of the Yavapai County Drainage Design Manual. Watershed types were assigned as either desert/mountain or urban based upon the type of watershed that contained the largest portion of the time of concentration length. In basins where the watercourse profile contained vertical drops, the downstream elevation was adjusted so that the calculated slope correctly represented the average slope of the watershed. The Clark Unit Hydrograph parameter calculations for both the existing and proposed conditions models can be found in Appendix E.

#### **2.1.9 Reach Routing**

The routing of flows within the HEC-HMS model was accomplished utilizing the Muskingum-Cunge methodology presented in Section 7.6.2.3 of the Yavapai County Drainage Design Manual. Eight point cross sections were developed that were representative of the reaches using aerial topography and Manning's Roughness Coefficients were assigned based on aerial imagery of the site. Reach routing data for the existing and proposed conditions models can be found in Appendix F.

#### **2.1.10 Detention**

Detention facilities have been designed per the City of Cottonwood Municipal Code, Title 15 Buildings and Construction, Chapter 15.40 Stormwater Detention,

so that the peak 100-year discharge where runoff leaves the site is less than or equal to the calculated existing conditions discharge or the design capacity of the Cornville Road culverts, whichever is lower. Detention facilities have been designed using a combination of culvert outlets and earthen spillways to regulate discharge using the HEC-HMS outflow structures method. Elevation - storage data, outlet design, and HEC-HMS computed hydrographs can be found in Appendix G.

### 2.1.11 Results

Table 1 below consists of a comparison of the existing conditions and proposed conditions discharges for the 100-year storm event quantified in this hydrologic analysis. Table 2 summarizes the detention requirements for the development based on this analysis. Detention requirements may change based on the final design of the parcels and future updates to this model.

**Table 1: 100-Year, 24-hour Discharge Comparison**

Concentration Point	Existing Conditions Discharge (cfs)	Proposed Conditions Discharge (cfs)
CP-A	1,271	1,231
CP-B	966	955
CP-C	70	67
CP-D	353	348

**Table 2: Detention Requirements Summary**

Drainage Basin Name	Parcels (Or portion of)	Required Volume (Ac-ft)	Outlet Structure
B101B	1 & 3	1.97	18" Culvert
B101D	2	2.78	Overflow Weir
B102B	6	2.10	Overflow Weir
B121B	12	1.45	Overflow Weir
B121C	13	0.89	Overflow Weir
201B	9 & 11	2.68	Overflow Weir
203A	15 & 16	4.38	18" Culvert
C100	14 & 15	2.37	Overflow Weir

#### **2.1.12 Local Off-Site Hydrology**

For local off-site drainage areas flows shall be calculated using the iterative rational method or unit hydrograph procedures as applicable. Flows from any local off-site areas that intersect the project boundary will be captured by small interceptor channels that will convey flows to the major washes. Local off-site drainage areas will be delineated and discharges calculated in conjunction with the preliminary plat for each phase.

#### **2.2 On-Site Hydrology**

The project will be designed in accordance with the *Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology*.

During the preliminary plat process, the site will be delineated into drainage areas based on preliminary grading assumptions. Gutters will convey the storm water runoff from the streets within the subdivision to scuppers or inlets and storm drain pipes into retention basins within the phase.

Peak flow rates for onsite watersheds shall be computed using the FCDMC iterative Rational Method.

$$Q = C * I * A$$

Where:

Q = Peak runoff

C = Weighted runoff coefficient

i = Rainfall intensity in inches per hour corresponding to the time of concentration

A = Drainage area in acres

In order to determine the weighted runoff coefficient used in the rational method, coefficients for each land use are taken from midrange data points in Table 3.2 of the *Flood Control District's Drainage Design Manual for Maricopa County, Arizona, Volume 1, Hydrology*. The anticipated types of land uses and their calculated C-values are as follows:

<u>Land Use</u>	<b>2-10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
LDR	0.45	0.51	0.57	0.62
MDR	0.57	0.63	0.68	0.71
MFR	0.70	0.78	0.84	0.88
C1	0.60	0.67	0.72	0.75
DL2	0.35	0.39	0.42	0.44
NDR	0.35	0.39	0.42	0.44
NHS	0.48	0.53	0.57	0.60
LPC	0.18	0.20	0.21	0.22
P	0.80	0.89	0.93	0.95

### 3. Floodplain & Hydraulic Analysis

As was previously stated, there currently is no effective FEMA floodplain on the property, which is located on FIRM Map Panel 04025C1780G, dated September 3, 2010. Regional flows are expected to generally be contained within the channel banks of the 4 major washes on the site due to all of the washes being deeply incised and as a result are not expected to affect the land plan of the site.

In conjunction with the first preliminary plat submittal a hydraulic analysis will be performed in order to size culverts at the major wash crossings and to determine

the limits of the 100-year floodplain within the site. The hydraulic analysis will be performed using the USACE backwater computation program HEC-RAS with technical guidance from the *Drainage Design Manual for Yavapai County*.

#### 4. Proposed Drainage Infrastructure

##### 4.1 Off-Site Runoff Conveyance

As previously discussed, flows from any local off-site areas that intersect the project boundary will be captured by small interceptor channels that will convey flows to the major washes. If necessary, minor interceptor channels will be sized during the preliminary plat process for each phase. Manning's equation will be used to compute the channel capacity and a minimum of one-foot of freeboard to adjacent lots will be provided for the 100-year storm event.

##### 4.2 On-Site Runoff Conveyance

###### 4.2.1 Street Conveyance

Per Yavapai County storm drain design guidelines residential and collector streets shall be designed to carry 10-year flow between the curbs and carry the 100-year flow within the right-of-way with a maximum depth of 6-inches over the crown of the street. In addition, the 100-year discharge within the right-of-way shall not exceed 100 cfs. Street Capacity was determined using Manning's Equation as follows:

$$Q = 1.486/n * A * R^{2/3} * S^{1/2}$$

Where:

Q = Capacity in cfs

n = Manning's roughness coefficient = .015 (streets sections); = .030 (ROW outside pavement)

A = Flow Area in (sq. ft)

S = Street longitudinal slope (ft/ft)

R = Hydraulic Radius (ft)

As indicated, the composite "n" value will change with increasing storm flow event. A value of 0.015 is utilized for conveyance in the street section, and a value of 0.030 is utilized in the right of way behind the back of curb (this value is

used when higher frequency storm water events are anticipated to overtop the top of curb).

The simplified full street capacity equation for a residential roadway with either 6" wedge or 6" vertical curb is:

$$Q_{10}(\text{cap}) = 514 * S^{1/2} \quad Q_{100}(\text{cap}) = 518 * S^{1/2}$$

The simplified half street capacity equation for a local street with median is:

$$Q_{10}(\text{cap}) = 261 * S^{1/2} \quad Q_{100}(\text{cap}) = 283 * S^{1/2}$$

The simplified half street capacity equation for Vine Boulevard without a median is:

$$Q_{10}(\text{cap}) = 245 * S^{1/2} \quad Q_{100}(\text{cap}) = 472 * S^{1/2}$$

See Figures 5, 6 and 7 for detailed street capacity calculations.

#### 4.2.2 Storm Drain Inlets

The 6" curb and gutters will convey the storm runoff from the roadway corridor to inlets (catch basins) positioned at every sump location along the alignment. The required wing length necessary to capture the 10-year storm event for the standard City of Phoenix type "M" catch basin shall be calculated for each sub-basin design point based on the following equation.

Curb Inlets – City of Phoenix Standard Detail P-1569-1 and P-1569-2

**Capacity for Catch Basin in Sump Drainage Design Manual - Hydraulics,**  
Maricopa County Flood Control District, 2013:

$$Q_i = C_w(L + 1.8W)d^{1.5}C_c \text{ (Eqn. 3.11) = cfs}$$

$C_w$  = Weir Coefficient for Curb Inlet = 2.3

$L$  = Length of Curb Opening (ft)

$W$  = Width of Depressed Gutter (ft) = 1.5

$d$  = Depth at inlet (ft) = 0.67

$C_c$  = Clogging Factor = 0.80

**Capacity for Catch Basin On-Grade Drainage Design Manual - Hydraulics,  
Maricopa County Flood Control District, 2013:**

$$L_t = 0.6Q^{0.42}S^{0.3}\left(\frac{1}{nS_e}\right)^{0.6}\left(\frac{1}{C_c}\right) \text{ (Eqn. 3.10) = ft}$$

Q = Total gutter flow rate (cfs)

S = Longitudinal slope (ft/ft)

S<sub>e</sub> = Equivalent pavement cross-slope (ft/ft)

n = Manning's roughness coefficient = 0.015

C<sub>c</sub> = Clogging Factor = 0.80

$$S_e = S_x + S'_w E_0 \text{ (Eqn. 3.9) = ft/ft}$$

S<sub>x</sub> = Pavement cross-slope (ft/ft)

S'<sub>w</sub> = Cross slope of the gutter at the inlet (ft/ft)

E<sub>0</sub> = Ratio of flow in the depressed section to total gutter flow

$$Q_s = \left(\frac{0.56}{n}\right)S_x^{1.67}S^{0.5}T_s^{2.67} \text{ (Eqn. 3.3) = cfs}$$

Q<sub>s</sub> = Flow rate in paved area (cfs)

T<sub>s</sub> = Spread of flow on pavement for a composite section (ft)

S = Longitudinal slope (ft/ft)

S<sub>x</sub> = Pavement cross-slope (ft/ft)

$$Q = \frac{Q_s}{(1-E_0)} \text{ (Eqn. 3.5) } \quad Q_w = Q - Q_s \text{ (Eqn. 3.6)}$$

Q<sub>w</sub> = Flow rate in depressed section of gutter (cfs)

Q<sub>s</sub> = Flow rate in paved area (cfs)

Q = Total gutter flow rate (cfs)

E<sub>0</sub> = Ratio of flow in the depressed section to total gutter flow

$$E_0 = 1 / \left( 1 + \frac{S_w/S_x}{\left[ \frac{1 + S_w/S_x}{W^{-1}} \right]^{2.67} - 1} \right) \text{ (Eqn. 3.4)}$$

S<sub>x</sub> = Pavement cross-slope (ft/ft)

W = Width of gutter (ft)

T = Width of flow, spread (ft)

$S_w = \text{Cross-slope of a depressed gutter } (S_x + \frac{\text{gutter depression}}{W}) \text{ (ft/ft)}$

Catch basins shall be located and sized as part of the final construction plan design.

#### **4.2.3 Storm Drain Pipe**

Storm drain is designed where inlets are necessary intercept street flow. Each storm drain pipe shall be sized to ensure that the 10-year storm hydraulic grade line (HGL) is at a minimum of 1 foot below the proposed ground elevation at manholes and inlets. Hydraulic grade calculations shall be performed to establish the hydraulic grade line (HGL) of the system. The HGL shall begin at an elevation no lower than the water surface elevation for the 10-year storm of the receiving box culvert, storm drain pipe or pond. The general equation for analyzing the HGL is the following:

$$\text{End HGL} = \text{Begin HGL} + \text{Friction Loss} + \text{Minor Losses} + \text{Elevation Delta}$$

Minor losses such as bends, junctions, manholes, transitions, and entrance losses are accounted for where applicable. Storm drain calculations shall be provided at the time of final construction plan submittal.

#### **4.3 On-Site Detention**

Detention facilities will be designed so that they will drain within 36-hours from the end of the rainfall event via bleeder pipes to an adjacent wash or by the use of dry well(s). Side slopes will vary from 2:1 to 6:1 or flatter based on geotechnical recommendations, landscape design, and site topography to achieve an aesthetically pleasing appearance. The regional hydrologic model will be updated based on proposed detention facilities in conjunction with the preliminary plat submittal for each phase. Detailed design of outlet structures as well as disposal of stored runoff will be provided in conjunction with construction plan submittals.

#### **4.4 Erosion Control**

Rock rip-rap will be utilized to provide erosion protection in channels storm drain and box culvert and outlets and other areas where concentrated flows may cause erosion due to the velocity of the flows. Erosion control measures will be designed during the final construction plan submittal utilizing the methods outlined below.

##### **Channel Bank Lining**

The rock rip-rap that lines the channels will be designed appropriately and sized per the Flood Control District of Maricopa County *Drainage Design Manual - Hydraulics, Chapter 6*. Per Table 6.2 of the FCD manual a maximum allowable velocity without rip-rap protection may be assumed as 2.5 ft/sec. Additional geotechnical sampling will be performed prior to construction in order to perform tractive stress calculations for channels containing design velocities over 2.5 fps. The results of the tractive stress calculations will be used to determine if rip-rap is warranted. If the use of riprap is warranted, it will be designed per the guidance in section 6.6.3 of the FCD manual in the final drainage report for each phase.

#### **5. Future Reports**

- A floodplain & hydraulic analysis of major washes will be submitted with the preliminary plat for parcels adjacent to the washes as necessary. The report will include:
  - Culvert sizing for major wash roadway crossings
  - Floodplain delineation in wash corridors
- A preliminary drainage report will be submitted concurrently with the preliminary plat for each phase. The preliminary drainage report will include:
  - Delineation of drainage areas for the phase based on preliminary grading assumptions and computation of peak flow rates
  - Conceptual storm drain layout
  - Preliminary detention basin grading and outfall structure design if required

- Update of regional hydrologic analysis based on preliminary drainage areas for the phase and land use to verify there is no increase in 100-year discharges where flows leave the project compared to the existing conditions discharges shown in this report
- Delineation of any local off-site drainage areas that affect the phase and sizing of minor interceptor channels
- A final drainage report will be prepared with the construction plan submittal for each phase. The final drainage report will include:
  - Delineation of drainage areas within the phase based on the final drainage design and computation of peak flow rates
  - Verification of street capacity for the 10-year and 100-year storm events
  - Storm drain inlet sizing calculations
  - Storm drain pipe sizing and supporting HGL calculations
  - Detailed design of detention basin outlet structures and design for the method of disposal of retained water in order for the basin to drain within thirty-six hours after a storm event
  - Permanent erosion control design for channels and pipe/culvert outlets

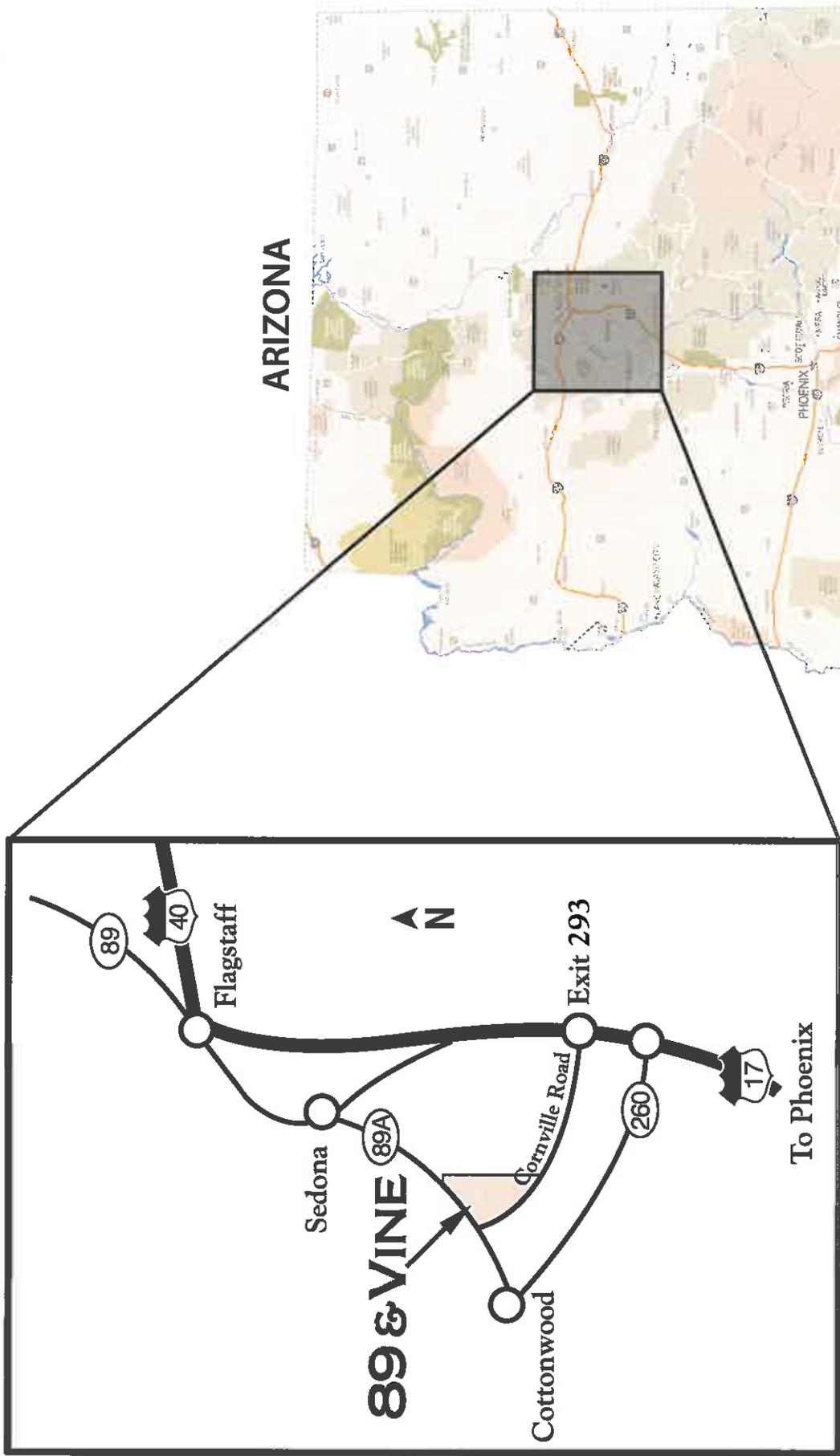
## **6. Conclusions**

1. This report is intended to serve as the Master Drainage Report for the 89 & Vine development.
2. This analysis was prepared according to City of Cottonwood drainage design regulations.
3. The project site is not located within effective FEMA floodplain.
4. Proposed conditions hydrology assumes that existing drainage patterns are generally maintained.
5. Proposed conditions discharges are equal to or less than existing conditions.

6. Existing drainage structures, specifically those constructed beneath Cornville Road, do not experience any adverse impacts under proposed conditions.
7. Proposed drainage structures will be designed for the proposed conditions 100-year discharges quantified as part of this analysis.
8. Detention has been designed for the 100-year storm event.
9. Detention basins will be designed per City of Cottonwood Municipal Code, Chapter 15.40 Stormwater Detention and The City of Cottonwood Ordinance No. 172, as phases of the project are developed.
10. The regional hydrologic model will be updated with the preliminary plat for each phase based on preliminary grading assumptions and land uses.
11. A hydraulic analysis will be performed using HEC-RAS to size culverts at wash crossings.
12. Detailed outlet structure design for detention facilities will be provided in conjunction with construction plan submittals.
13. Detention facilities will be required to drain within 36 hours after the end of a rainfall event either by bleeder pipes or drtwell(s).
14. Streets will be designed to adequately convey the 10-year peak flow without overtopping the curb and the 100-year flow inside the right-of-way.
15. Proposed inlets and storm drains shall be appropriately sized to accommodate the 10-year peak flow for street flows and 100 year event for off-site flows.
16. Interceptor channels will be sized to convey local off-site flows to the major washes as part of the preliminary plat process.
17. Permanent erosion control design will be provided as part of construction plan submittals.

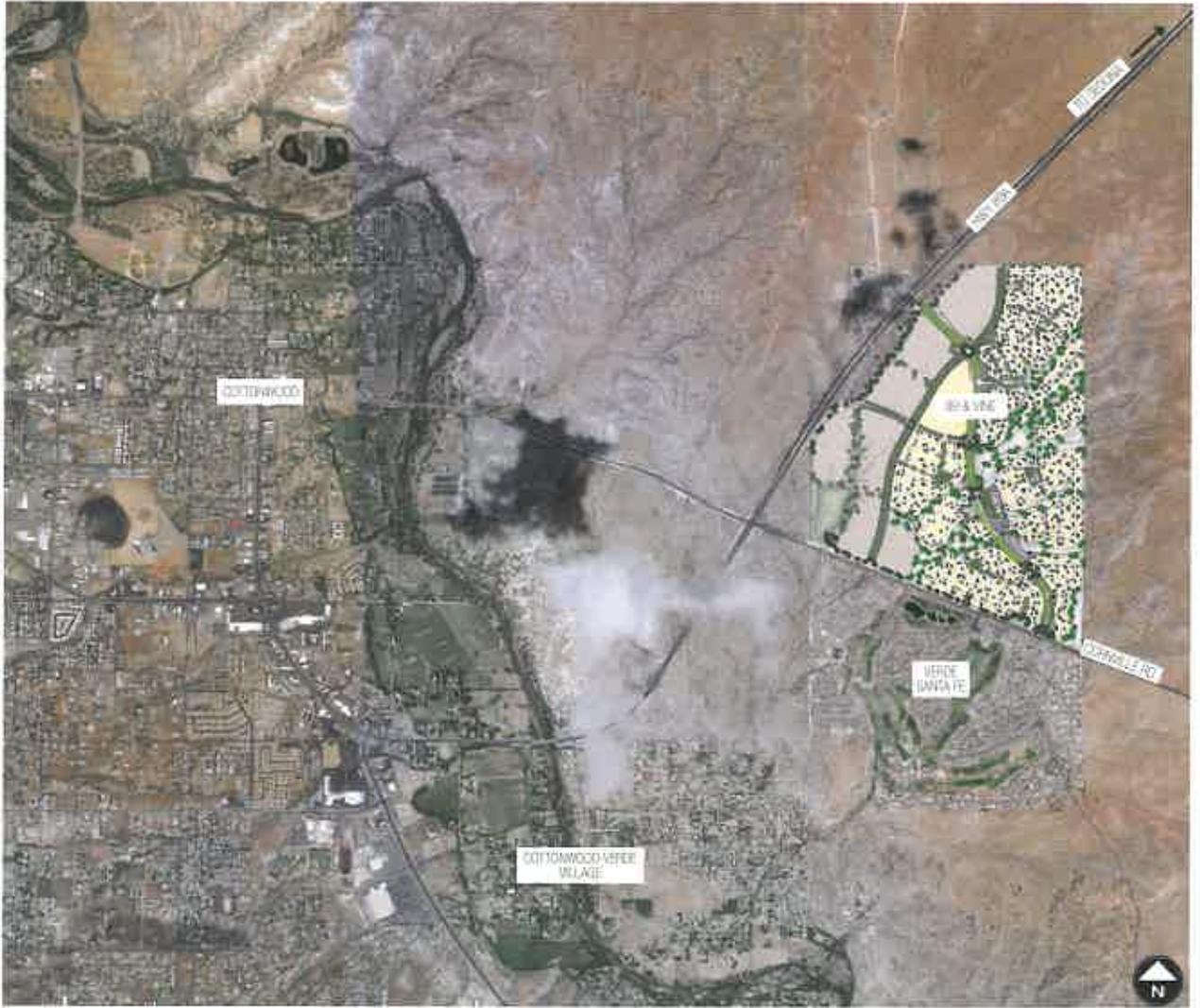
## 7. References

1. Yavapai County Flood Control District, *Drainage Design Manual for Yavapai County*, July, 2015.
2. City of Cottonwood, Arizona, *Cottonwood Municipal Code, Title 15 – Buildings and Construction, Chapter 15.40 – Stormwater Detention*, 1985.
3. National Oceanic and Atmospheric Association, *NOAA Atlas 14 Precipitation-Frequency Atlas of the United States, Volume 1, Version 5.0: Semiarid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah)*, 2011.
4. Federal Emergency Management Agency, *Flood Insurance Rate Maps for Yavapai County – Map Number 04025C1780G*, September 3, 2010.
5. Arizona Department of Transportation, *Highway Drainage Design Manual, Volume 2 Hydrology*, 2014.
6. Flood Control District of Maricopa County, *Drainage Design Manual, Hydrology, 4<sup>th</sup> Addition August 2013*



**VERDE VALLEY AREA**

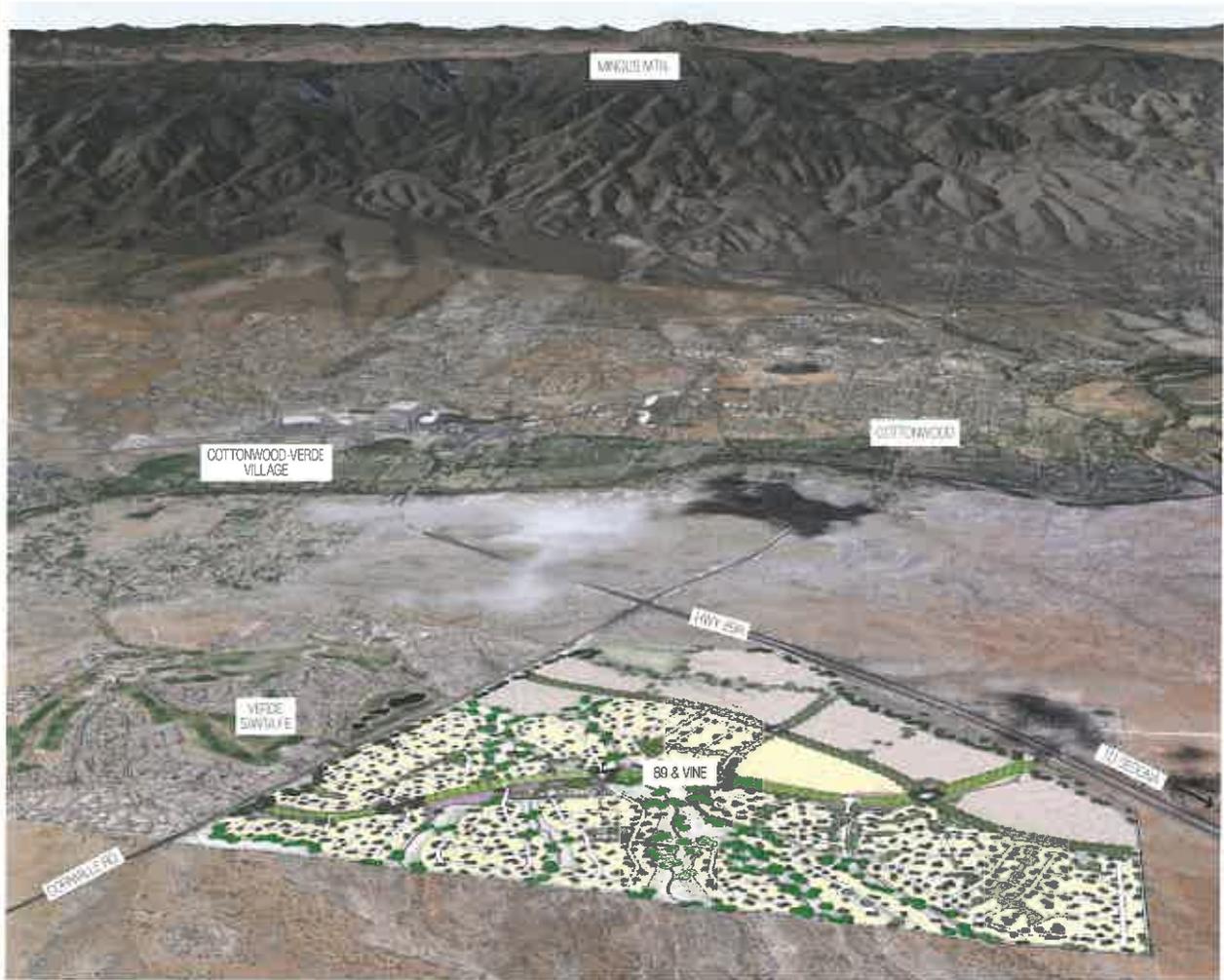
**89 & VINE REGIONAL LOCATION MAP**

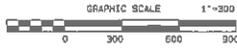


SCALE: NTS

89 & VINE  
PAD EXHIBITS

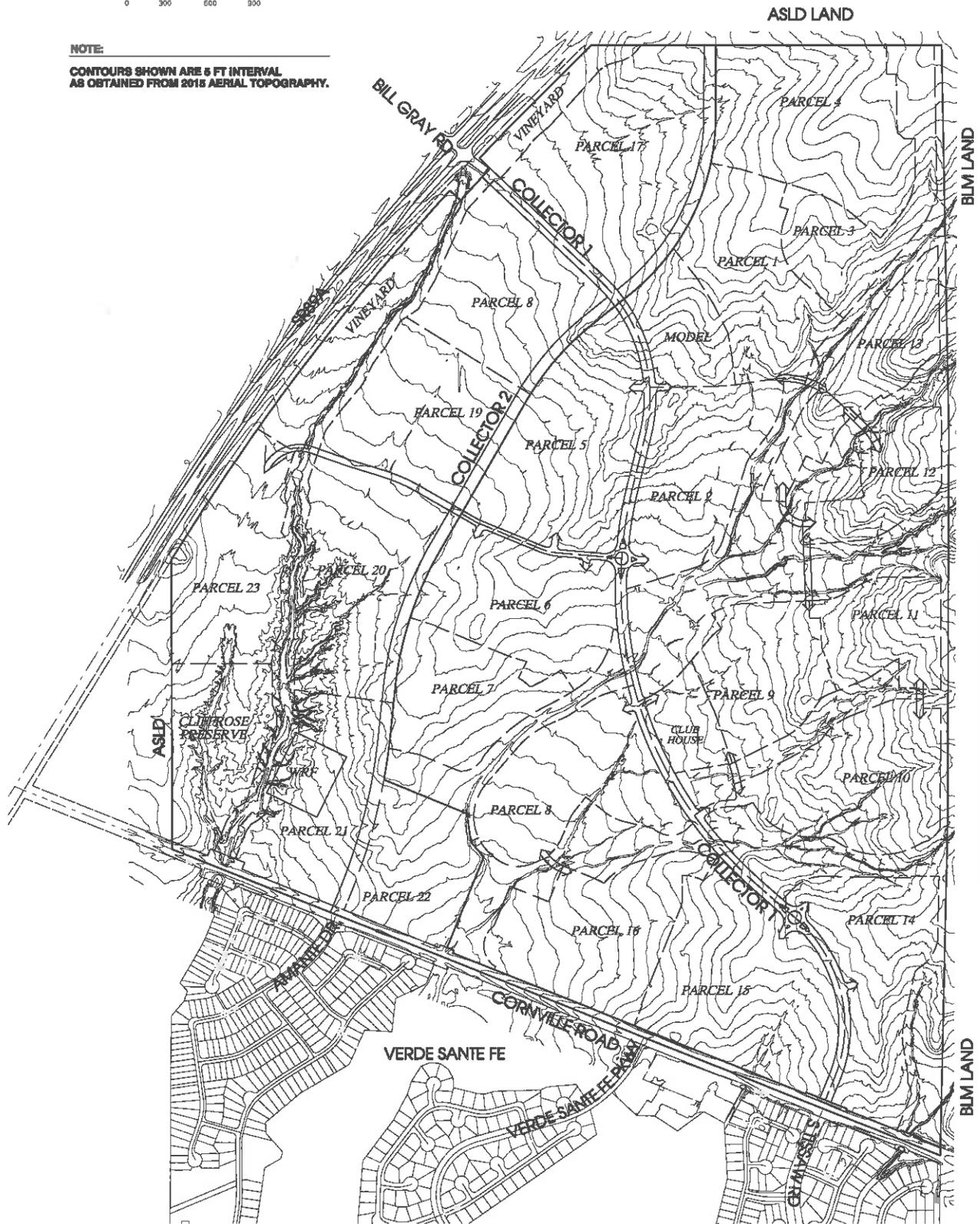
VICINITY MAP





**NOTE:**

CONTOURS SHOWN ARE 5 FT INTERVAL  
AS OBTAINED FROM 2015 AERIAL TOPOGRAPHY.



ENGINEER/PLANNER:

**GOODWIN &  
MARSHALL &**

CIVIL ENGINEERS -- PLANNERS -- SURVEYORS

4808 E Thistle Landing Dr, Ste. 100, Phoenix, Arizona 85044  
Metro (602) 216-7285



DESIGN GROUP

EXISTING TOPOGRAPHY  
FOR

**89TH & VINE**

LOCATED IN

**CITY OF COTTONWOOD  
YAVAPAI COUNTY, ARIZONA**

NOVEMBER 2015

WATER SYSTEM DESIGN REPORT FOR 89TH & VINE, COTTONWOOD, ARIZONA

11/13/2015 11:30 AM

WHEN RECORDED RETURN TO:  
Jay Stuckey  
Republic Companies  
11811 North Tatum Boulevard  
Suite 1005  
Phoenix, AZ 85028

11.00  
\$5  
\$1  
\$12.00

3429526 SK 3900 PG 470  
Yavapai County  
Patsy Jenney-Dolan, Recorder  
02/11/2002 02:17P PAGE 1 OF 11  
CITY OF COTTONWOOD  
RECORDING FEE 11.00  
SURCHARGE 0.00  
POSTAGE 1.00

### VERDE SANTA FE PREANNEXATION DEVELOPMENT AGREEMENT

This Agreement is entered into this 13th day of December, 2001, by and between Verde Santa Fe Limited Partnership, an Arizona Limited Partnership (Owner) and the City of Cottonwood, an Arizona municipal corporation (City).

#### RECITALS

A. Arizona Revised Statutes §9-500.05 authorizes the City to enter into a Preannexation Development Agreement relating to property located outside the incorporated area of the municipality.

B. Owner owns the real property consisting of approximately 688 acres proposed to be annexed into the City and legally described on Exhibit A attached hereto (Property).

C. The Property is the northern phase of the Verde Santa Fe Masterplanned Community, the southern phase of which is currently under development in Yavapai County (County) in accordance with the original Verde Santa Fe Conceptual Master Plan and Planned Area Development for the Property approved in August, 1987, by the Yavapai County Board of Supervisors, subsequently amended by the County in 2000 (County Plan/PAD), and in accordance with Final Site Plans also approved by the County for the initial phase of the Verde Santa Fe Masterplanned Community south of Cornville Road, and in accordance with the Verde Santa Fe Development Agreement recorded at 3036916 BK 3568 PG554 in the records of Yavapai County (County Agreement). The County Plan/PAD and the County Agreement shall remain in effect, on the property under development south of Cornville Road, unchanged by this Agreement.

D. Under the County Plan/PAD the Property is entitled to develop with a broad range of employment, general commercial, retail, office, single and multi-family residential uses and an eighteen hole golf course.

E. Annexation of the Property is consistent with the City's Strategic Plan For Economic Development and with the City's General Plan in the vicinity of the Property.

F. City and Owner desire to enter into this Agreement 1) to set forth the planning direction, development principles and concepts that will result in the mutually desired sustainable development of the Property; 2) to provide the process for refinement and amendment of the County Plan/PAD as necessary to achieve such development; 3) to encourage elimination of the golf course if economically feasible alternative land uses can be developed; 4) to facilitate consolidation and concentration of employment/industrial and commercial retail/office uses along Highway 89A in order to locate uses along this regional transportation corridor that will be required to meet increasing regional demand for jobs, services and housing; and 5) to allow the community to take advantage of the new regional road connections being provided to the area, including the Cornville-Mingus and Big Park connections. The Agreement also provides for (i) Owner's assurances to City that the Property will be developed in accordance with the provisions of this Agreement and the Planning and Development Principles herein, and (ii) City's assurances to Owner that it will be permitted to develop the Property in accordance with this Agreement and the Planning and Development Principles herein.

G. City and Owner acknowledge and agree that the development of the Property pursuant to this Agreement will result in planning and economic benefits to City and its residents by (i) requiring the development of the Property to be consistent with the Planning and Development Principles set forth in this Agreement, (ii) increasing tax and other revenues to City based upon, among other things, the construction of improvements on the Property and the use of the Property for residential and business purposes, and (iii) creating jobs with the development of the Property and through the operation of new businesses on portions of the Property. City and Owner further acknowledge and agree that the development of the Property pursuant to this Agreement will benefit Owner by assuring (i) its ability to develop the Property in accordance with the Planning and Development Principles herein and (ii) City's cooperation in the development of the Property in accordance with the Planning and Development Principles herein.

H. City and Owner acknowledge and agree that the nature and extent of the proposed development of the Property as a masterplanned community with compatible residential commercial and recreational components are such that substantial tax revenues may be generated and inure to the direct economic benefit of the City, which tax revenue may be in excess of the cost incurred by the City pursuant to this Agreement or by virtue of the City rendering future services to the Property.

I. The City confirms that prior to the execution of this Agreement, the City has met all legal requirements for its approval under state and local law.

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth in this Agreement, City and Owner state, confirm and agree as follows:

AGREEMENT

1. Incorporation of Recitals. The foregoing recitals and all exhibits are incorporated into this Agreement by this reference.

2. Vested Rights. The City agrees that because development under the County Plan/PAD for the entire 1130.35 acre project has commenced in the southern phase of the development with substantial investment by the Owner in road dedications, off-site improvements, infrastructure and golf course installation, together with the issuance of building permits for houses and other structures currently occupied, and because annexation should not result in the loss of any vested entitlements, vested rights have been established allowing the continued development of the Property under the approved County Plan/PAD, and shall be established for development in general accordance with this Agreement, and any amendments to the County/PAD in accordance with this Agreement, upon adoption by the City of General Plan and zoning classifications consistent therewith after the full Planning Commission and City Council notice and public hearing process as required by state statutes.

3. Agreement to Annex. By approving this Agreement, the City is agreeing to process annexation of the Property subject to the requirements of A.R.S. §9-471 relating to annexation of territory and conditioned only upon those provisions and conditions contained in this Agreement, the requirements of the laws of the State of Arizona and the currently existing Ordinances of the City. The City shall process annexation of the Property expeditiously and in good faith in order to achieve annexation at the earliest feasible date under state law following approval of this Agreement.

4. Effective Date. This Agreement does not become operative unless annexation proceedings to annex the Property to the City are completed by June 11, 2003, unless the parties mutually agree in writing to a later date. The parties understand that such completion includes the 30-day waiting period from the adoption of the Ordinance annexing the Property by the City, as provided by A.R.S. §971.D. The "Effective Date" shall mean the date annexation proceedings to annex the Property into the City are final.

5. Duration of Agreement. If not sooner terminated in accordance with the provisions hereof, this Agreement shall continue in full force and effect from the effective date for a period of fifty (50) years.

6. Zoning Upon Annexation. In accordance with the provisions of both A.R.S. §9-462.04.D. and Section 402.3 of the City of Cottonwood Zoning Ordinance (Ordinance), the City shall at the time of its approval of annexation enact an ordinance establishing Planned Unit Development (P.U.D.) zoning on the Property, which is the City equivalent of existing County zoning, based upon the approved County Plan/PAD shown on the attached Exhibit B and under the same amendment process affirmed by the County in its letter of September 12, 2000, attached Exhibit C, which P.U.D. zoning shall continue in effect until amended as necessary to implement this Agreement in accordance with state statute and City Ordinance provisions after required public hearings.

7. Intended Development and Permitted Uses. The Owner intends to develop the Property in general accordance with the anticipated course of development as reflected in this Agreement and in the Planning and Development Principles set forth in Paragraph 8 below. The City agrees to and encourages the Owner's implementation of the mix of land uses with sufficient density and intensity to be sustainable and economically viable, as set forth in the Planning and Development Principles, provided that the Owner pays applicable fees and complies with all applicable rules, regulations and review processes required by law, including but not limited to all statutorily required processes for General Plan adoption and rezoning. Owner shall make separate applications for additional rezoning requests or other approvals necessary to implement the Planning and Development Principles. The City shall, in good faith, conduct the General Plan and rezoning procedures necessary for the implementation of the uses described in the Planning and Development Principles in accordance with applicable state statutes and City ordinances. Thereafter, the City shall in good faith conduct procedures necessary for adoption of final site plans implementing the P.U.D. and any amendments thereof, for each phase of the development, upon application by Owner. Prior to actual construction upon individual development parcels, all plans, permits, inspections and approvals required by City (or by other applicable federal, state or local statutes and regulations) shall first be provided or obtained by Owner. Permits and approvals to be provided by the City shall not be unreasonably withheld. Owner shall promptly pay all applicable fees related to such plans, permits, inspections and approvals.

8. Planning and Development Principles. Implementation of the planning direction reflected in this Agreement shall be guided by the following Planning and Development Principles to achieve sustainable, well-balanced and viable development:

- a. The development of the proposed community should reflect its regionally significant location at the major transportation crossroads hub of Verde Valley, and should include a balanced mix of commercial, business/employment, residential, and open space uses. The north golf course is an integral part of the development plan for the Property that has been approved by Yavapai County, and the Owner has the vested right to develop the golf course; the City encourages the Owner to evaluate and possibly replace the golf course with economically feasible alternative uses.
- b. In recognition of this crossroads location, large tracts of commercial land should be available along the 89A corridor to provide for large retailers serving regional needs and for a mix of industrial/employment uses, while maintaining a relationship to the masterplanned community's core and overall identity.
- c. A mix of housing styles, types, densities, and costs should be available within the community.

- d. A resort site may be included to take advantage of the visitor market in the region and provide a unique destination, which offers incredible views, access to trail systems and a village center, golf, and shopping within walking distance.
- e. The potential creation of a village center within the community should be studied and evaluated. If economically feasible and developed, the village center would be intended to relate to all aspects of the project providing a pedestrian-oriented central street system offering a variety of businesses, restaurants, entertainment, housing, and public spaces integrating the social fabric of the community.
- f. Land use, architectural design and building materials should be sensitive to the natural environment and reflect the historical/cultural context of the area. Energy conserving building strategies and an efficient water use strategy should be incorporated.
- g. A connective open space system should be developed throughout the community, preserving major washes or view corridors, incorporating a trail system, and connecting the mix of uses within the community, while providing access to the public lands adjacent to the community, as allowed by the public agencies with jurisdiction.
- h. Special planning and design consideration should be given to the boundaries of the site adjacent to State Trust land and National Forest on the north and east. The interface between the developed community and these public lands should be sensitive to the management strategies of each agency.
- i. Streetscape plans should be designed for Cornville Road and the major arterial/collectors which reflect the character of the area and the community itself while accommodating necessary signage and visibility of uses serving regional and area needs. Each streetscape design should relate to the nature of the road and help to create the unique identity of the community.
- j. Special consideration should be given to the aesthetics and character of the Cornville Road corridor, while accommodating commercial/employment uses at the intersection with Highway 89A and transitional commercial and residential uses east of the intersection.

9. Extension of City Services. In accordance with A.R.S. §9-471.0 the City shall implement the necessary procedures to provide the Property with appropriate levels of infrastructure and services comparable to those that the City would provide similar properties in the City, in accordance with applicable City ordinances and statutory requirements in effect as of the date of the execution of this agreement, provided that the Owner installs the necessary improvements and infrastructure required by the City pursuant to applicable codes. The City shall

ensure that water and wastewater services are provided to the Property on the same terms and conditions as provided to other users for as long as the Property remains within the incorporated area of the City. These services may be provided by an existing private utility area, or by the City, such determination to be made by the City. The City intends, however, and shall use best efforts to establish a municipal water company to provide water service to the Property and to acquire the existing Verde Santa Fe private water utility company for the provision of water service to the Property so as to be able to serve the Property upon installation by Owner of the necessary water system facilities. The City intends and shall use best efforts to, either through its existing or expanded wastewater facilities or by the acquisition of the existing Verde Santa Fe Sewer Company, provide sewer service to the Property upon installation by Owner of the wastewater facilities necessary to connect to the City's system. City and Owner shall cooperate to coordinate the timing of infrastructure installation and the potential establishment of City water and sewer service to the Property, including private utility company acquisitions, to assure availability of water and sewer when needed. Until and unless other arrangements are in place, the Property shall have the right to connect its water and/or sewer system(s) with any other municipal or private water or sewer company or to develop its own water or sewer companies as necessary to serve the Property.

10. Fire Service. The City shall ensure that regular fire service is provided to the property by either providing such service directly or by entering into an inter-governmental agreement to provide regular fire service to the Property. Any such fire service shall meet or exceed all performance and other standards generally applicable to the City, including ISO rating and equipment, and station construction and renovation standards.

11. Expedited Approvals.

- a. The City hereby acknowledges and agrees that development of the Property will, as a result of the size of the Property and other economic factors, occur over a span of a number of years and will require the City's ongoing participation in the review and approval of preliminary and final site plans, infrastructure plans, drainage plans, design plans, building plans, use permits, grading permits, building permits and other plans, permit applications and inspections which are part of the City's current building and development requirements (Approval Requests). Because the City will receive extensive data relative to the entire Property, including but not limited to topography, drainage, elevations, infrastructure and circulation, and because design criteria are intended to be established that will apply to all development on the Property, the City and the Owner hereby agree that, in connection with all such Approval Requests relating to the development of the Property or any portion thereof, and the construction of any improvements thereon, they shall cooperate with each other in good faith to expedite the processing and approval of any such Approval Requests and otherwise accelerate the review and response to all such Approval Requests to the greatest extent possible, including but not limited to the Development Review requirements of the Ordinance. The City and the Owner shall use best efforts to provide for

Planning and Zoning Administrator approval of all required Development Review applications in accordance with Section 304 of the Ordinance.

- b. City and Owner shall each designate a representative to act as liaison with the other party in the administration of this Agreement and the resolution of disputes hereunder. City and Owner agree that Owner must be able to proceed rapidly with the development of the Property and that, accordingly, the above-described expedited City review and construction inspection process is necessary. Accordingly, the parties agree that if at any time the Owner believes that an impasse has been reached with City Staff on any issue affecting the Property, the Owner shall have the right to immediately appeal to the City Manager for an expedited decision pursuant to this Paragraph. If the issue on which an impasse has been reached is an issue where a final decision can be reached by City Staff, the City Manager shall give the Owner a final decision within fifteen (15) days after Owner's request for an expedited decision. If the issue on which an impasse has been reached is one where a final decision requires action by the City Council, the City Manager shall be responsible for scheduling a City Council hearing on the issue within four (4) weeks after Owner's request for an expedited decision. Both parties agree to continue to use reasonable good faith efforts to resolve an impasse pending any such expedited decision.

12. Developability of Property. The City hereby acknowledges and agrees that at the time of annexation there is no growth boundary limitation applicable to the Property and that the City in proceeding with annexation has determined that the Property is in an area that is suitable for development as described herein to serve the needs of both the community and the entire region as well as for the extension of public infrastructure and is unsuitable for placement into an urban reserve or other growth restricted area. The City further agrees to undertake any action necessary to confirm the inclusion of the Property within the primary growth area of the community if required by the City or by other governmental entities to the extent possible under applicable law.

13. Right to Permits and No Moratorium. City agrees that upon compliance with the provisions of this Agreement and the adoption of General Plan designations and zoning to permit the uses set forth in this Agreement and the Planning and Development Principles, the Owner shall have the vested right to develop the Property in accordance therewith and that until the Property is fully developed, the City shall take no action which would result in restricting the availability of building permits or other applicable permits or approvals necessary to allow construction of the type of improvements and uses that are, as of the date of this Agreement, permitted under City ordinances, including the Zoning Ordinance, which permit the maximum intensity of development and range of uses consistent with this Agreement and the Planning and Development Principles so long as the requirements of applicable codes are met. Nor shall the City impose a moratorium upon zoning, subdividing, platting, building permits, utility connections or any other actions which would have the effect of imposing a prohibition or substantial impediment upon continued development within the Property in accordance with the

adopted zoning. Further, the City agrees that it will not refuse to expand necessary infrastructure to allow for the continued development of the Property in accordance with the adopted zoning provided that the Owner provides the necessary funding for such infrastructure, installs the infrastructure or arranges for such funding. Any such moratorium, restriction, or limitation on the availability of building permits or other applicable permits or approvals shall be of no effect against the Property, the Owner, or any other person having any interest in the Property. This provision shall not apply to a moratorium affecting the Property imposed by state, federal or County government.

14. Phasing of Development. Development of the Property shall be according to any final site plans required to be approved by the City, and neither residential nor commercial development shall be subject to any particular phasing schedule.

15. City Regulation of Development. The rules, regulations, development fees and official policies of the City applicable to and governing the development of the Property shall be those rules, regulations, development fees and official policies which are existing and in force for the City as of the recording of this Agreement, and City shall not impose or enact any additional conditions, zoning exactions, dedications, development fees, rules or regulations applicable to or governing the development of the Property except only as follows: (i) future land use rules, regulations and official policies of the City that are consistent with the express provisions of this Agreement and not contrary to the existing land use regulations applicable to and governing the development of the Property, provided that such land use rules, regulations and official policies shall not in any manner, whether directly or indirectly, adversely impact the development of the Property as contemplated under this Agreement and provided that such future land use rules, regulations and official policy shall be applied in the most minimal and the least intrusive manner possible; (ii) future land use rules, regulations and official policies of the City that are not consistent with the express provisions of this Agreement or contrary to the existing land use regulations applicable to and governing the development of the Property that the Owner may agree in writing apply to the development of the Property; (iii) future land use rules, regulations and official policies of the City enacted as necessary to comply with future state and federal laws and regulations, provided that in the event of any such state or federal laws or regulations prevent or preclude compliance with this Agreement, such affected provisions of this Agreement shall be modified as may be necessary to meet the minimum requirements of such state and federal laws and regulations, (iv) future generally applicable land use rules, regulations and official policies of the City, including updates of amendments to existing building, plumbing, mechanical, electrical, dangerous buildings, drainage and similar construction and safety related codes, such as the Uniform Building Code, which updates and amendments are generated by a nationally recognized construction/safety organization, or by the state or federal governments, reasonably necessary to alleviate legitimate and bona fide harmful and noxious uses in which event any rule, regulation, or policy imposed in an effort to contain or alleviate such harmful and noxious use shall be the most minimal and the least intrusive alternative possible and may be imposed only after public hearing and comment and shall not, in any event, be imposed arbitrarily; and (v) future imposition of taxes or of development, filing, review or other applicable fees, or modifications thereto, so long as such taxes or fees are imposed or charged uniformly by the City to all persons and entities; and (vi) any other zoning provision, development provision, street

development standard, or other similar standard or provision that is applied uniformly to all similarly situated Property within the City, upon written agreement the City and the Owner.

16. Public Improvements and Infrastructure. Public improvements and infrastructure required for development of the Property shall be provided by the Owner as set forth herein in accordance with all applicable City codes. Owner shall have no such obligation to construct or caused to be constructed or installed any of the public improvements and infrastructure if Owner decides not to commence development of the Property. Owner shall install public infrastructure, including streets and on-site water and wastewater systems necessary to serve the Property which, together with any public improvements and infrastructure to be constructed by Owner within public easements or rights-of-way, shall be constructed in compliance with applicable City codes, related regulations and policies and rights-of-way permits not inconsistent with the Planning and Development Principles. City intends to enter into required procedures to implement City-owned water and sewer services as set forth in Section 9 of this Agreement. Upon approval by City of the completed improvements including the water and sewer systems and streets located in public rights-of-way, such improvements shall be dedicated to and accepted by City for maintenance. Owner shall comply with the requirements of the City in providing the City with financial or other assurances acceptable to the City which assure that required public improvements and infrastructure shall be constructed. No oversizing shall be required to serve other off-site projects unless paid for at the time of infrastructure installation and oversizing. If any development fees applied Citywide are adopted by the City subsequent to the Effective Date of this Agreement, or subsequent to annexation, any such fees shall apply to the Property, but Owner shall receive credits to offset such development fees equal to the actual cost of public infrastructure that would be subject to such development fees that is installed by the Owner under this Agreement.

17. Elementary School District Obligations. Pursuant to the County Agreement, Owner shall reserve for a period of ten (10) years from the commencement of development of the Verde Santa Fe Masterplanned Community, which commencement of development of the southern phase of the Verde Santa Fe project occurred in 1996, for the use of the Cottonwood-Oak Creek School District No. 6, (District) a 15-acre school site within the 1130.35 AC development originally approved by the County at a location to be determined and based upon actual student demand from the 1130.35 AC development. If the need for a school cannot be determined by the end of the ten-year period from the commencement of the development, then this reservation commitment will be released. This obligation remains applicable to the entire 1130.35 acres.

18. Bill Gray Road Realignment Agreement. The City shall take all necessary actions to implement the Bill Gray Road Realignment Agreement with the Arizona Department of Transportation (ADOT), including those provisions setting forth ADOT obligations to install specified roadway improvements. (Attached as Exhibit D.) The provisions of this Section and of this Agreement shall in no way constitute an agreement by the City to undertake or otherwise accept responsibility for any obligations of ADOT with respect to the Property or the Bill Gray Road Realignment.

19. General Provisions.

- a. Notices and Filings. Unless otherwise specifically provided herein, all notices, filings, demands or other communications relating to this Agreement shall be in writing and either delivered personally or by certified mail, return receipt requested. Such notice shall be deemed to have been duly delivered upon date of delivery, addressed as follows:

City: Brian Mickelsen  
City Manager  
City of Cottonwood  
827 North Main Street  
Cottonwood, Arizona 86326

With a copy to: Melinda Garrahan  
City Attorney  
City of Cottonwood  
Mangum Wall Stoops & Warden PLLC  
100 N. Elden  
P. O. Box 10  
Flagstaff, Arizona 86002-0010

Owner: Verde Santa Fe Limited Partnership  
C/o Republic Companies  
11811 North Tatum Boulevard  
Suite 1005  
Phoenix, Arizona 85028  
Attn: Jay Stuckey

With a copy to: Earl, Curley & Lagarde  
3101 N. Central Avenue, Suite 1000  
Phoenix, Arizona 85012  
Attn: Lynne A. Lagarde

These addresses may be changed by either party by written notice.

- b. Default. Failure or unreasonable delay of either party to act in accord with any provision of this Agreement for thirty (30) calendar days (the "cure period") following receipt of a written notice from the other party, shall constitute an "incident of default." The notice shall specify the nature of the alleged default and the manner in which said default may be satisfactorily cured. However, if an action to cure under this Development Agreement would reasonably require more than thirty (30) calendar days to complete, the

responsible party shall have such reasonable additional time beyond thirty (30) days in which to comply.

In the event of an uncured default by either party, the non-defaulting party shall have the right to terminate this Agreement by written notice to the defaulting party, which termination shall be effective thirty (30) calendar days following the mailing of the notice, if the defaulting party has not cured such default within such time period. In addition, if any default is not cured within the cure period, the non-defaulting party may exercise all rights and remedies available to it at law or in equity, including without limitation the right to specifically enforce any term or provision hereof and/or the right to institute an action for damages.

Any dispute arising under this Agreement may be subject to arbitration in accordance with A.R.S. §12-1501 *et seq.*, but only if mutually agreed to by the parties. All disputes shall be governed by Arizona law.

- c. Amendments. This Agreement may be amended only by a written agreement fully executed by City and Owner. Any amendment shall be adopted by ordinance or resolution and recorded in the Office of the Yavapai County Recorder within ten (10) calendar days of its execution.
- d. Time of Essence and Successors. Time is of the essence of this Agreement. All of the provisions hereto shall inure to the benefit of and be binding upon the successors and assigns of the parties hereto, except as provided in Paragraph e below; provided, however, that Owner's rights and obligations hereunder may only be assigned by a written instrument, recorded in the Official Records of Yavapai County, Arizona, expressly assigning all or any portion of such rights and obligations. In the event of a complete assignment by Owner of all rights and obligations of Owner hereunder, Owner's liability hereunder shall terminate effective upon the assumption of the same by Owner's assignee, provided that the City has been provided notice of the name, address and phone number of the assignee within three (3) days of the effective date of the assignment.
- e. Termination Upon Sale to Public. City and the Owner hereby acknowledge and agree that this Agreement is not intended to and shall not create conditions or exceptions to title or covenants running with the Property. Therefore, in order to alleviate any concern as to the effect of this Agreement on the status of title to any of the Property, notwithstanding anything contained herein to the contrary, and so long as not prohibited by law, this Agreement shall terminate without the execution or recordation of any further document or instrument as to any lot which has been finally subdivided and individually (and not in "bulk") leased (for a period of longer than one year) or sold to the end purchaser or user thereof (Public Lot) and thereupon such

Public Lot shall be released from and no longer be subject to or burdened by the provisions of this Agreement.

- f. Waiver. No waiver by any part of a breach of any of the terms, covenants or conditions of this Agreement shall be construed or held to be a waiver of any succeeding or preceding breach of the same or any other term, covenant or condition. No delay in exercising any right or remedy shall constitute a waiver thereof.
- g. Costs and Attorneys' Fees. In the event any action shall be instituted between any of the parties in connection with this Agreement, the party prevailing in such action shall be entitled to recover from the other party or parties all of its costs, including reasonable attorneys' fees, to be determined by the court and not by a jury.
- h. Severability. In the event any provision, phrase or clause of this Agreement shall become legally invalid, the remaining portions shall not be affected thereby and shall remain in force and effect.
- i. Merger Clause. This Agreement constitutes the entire agreement between the parties hereto pertaining to the subject matter hereof, and all prior and contemporaneous agreements, representations, negotiations and understandings of the parties hereto, oral or written, are hereby superseded and merged herein.
- j. Recordation. This Agreement shall be recorded in the Office of the County Recorder of Yavapai County within ten (10) calendar days of execution.
- k. Governing Law. This Agreement shall be governed by and construed under the laws of the State of Arizona.
- l. Headings. The descriptive headings of the paragraphs of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions hereof.
- m. Exhibits. If any exhibit is attached hereto it shall be incorporated herein by this reference.
- n. Further Acts. Each of the parties hereto shall execute and deliver all such documents and perform all such acts as are reasonably necessary, from time to time, to carry out the matters contemplated by this Agreement.
- o. No Partnership/Third Party Rights. Nothing contained in this Agreement shall, create any partnership, joint venture or other arrangement between Owner and the City. No term or provision of this Agreement is intended to,

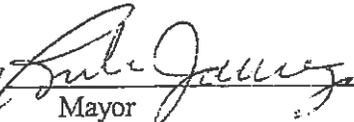
or shall, be for the benefit of any person, firm, organization or corporation not a party hereto, and no such other person, firm, organization or corporation shall have any right or cause of action hereunder.

- p. Titles to Names, Plans, Etc. Except with regard to improvements and infrastructure constructed pursuant to public bidding processes, Owner shall be the owner of all names, titles, plans, drawings, specifications, ideas, programs, designs and work products of every nature developed, formulated or prepared by or at the instance of Owner in connection with the Property. However, in connection with any conveyance of portions of the Property to any public entity, such rights pertaining to the portions of the Property so conveyed shall be deemed assigned to such public entity. Owner shall be entitled to utilize all such materials described herein to the extent required for Owner to construct, operate or maintain improvements and infrastructure relating to the Property.

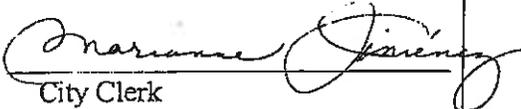
20. Conflict Of Interest. The parties agree that this Agreement may be cancelled for conflict of interest in accordance with A.R.S. §38.511.

IN WITNESS WHEREOF, the parties hereto have executed this Preannexation Development Agreement by and through their authorized representatives.

CITY OF COTTONWOOD,  
an Arizona municipal corporation

By:   
Mayor

ATTEST:

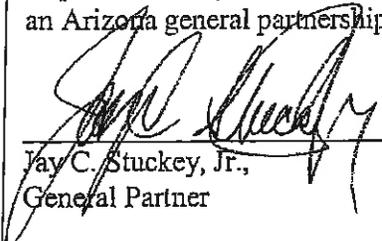
By:   
City Clerk

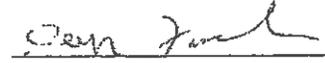
APPROVED AS TO FORM:

By:   
City Attorney

VERDE SANTA FE LIMITED PARTNERSHIP,  
an Arizona limited partnership  
by its General Partner:

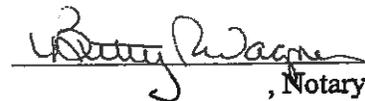
Republic & Turpin-Fisher Partners,  
an Arizona general partnership

  
\_\_\_\_\_  
Jay C. Stuckey, Jr.,  
General Partner

  
\_\_\_\_\_  
George Fisher, FINANCIAL SY  
General Partner

STATE OF ARIZONA        )  
  ) ss.  
County of Maricopa        )

The foregoing instrument was acknowledged before me this 18th day of December, 2001, by Jay C. Stuckey, Jr. and George Fisher, the General Partners of Republic & Turpin-Fisher Partners, an Arizona general partnership, the General Partner of Verde Santa Fe Limited Partnership, an Arizona limited partnership.

  
\_\_\_\_\_  
, Notary Public

My Commission Expires:

March 20, 2003

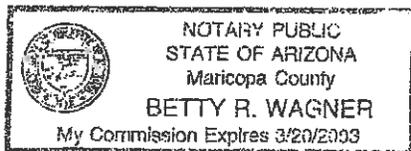


EXHIBIT A

North Parcel

That part of Section 31, T. 16 N., R. 4 E., G. & S.R.M., Yavapai County, Arizona, lying Southeast of U.S. Highway 89-A together with that part of Section 6, T. 15 N., R. 4 E., G. & S.R.M., Yavapai County, Arizona, lying North of the Cornville Road (Yavapai County Route No. 30), more particularly described as follows:

BEGINNING at the Northeast corner of said Section 31, marked by a 1938 G.L.O. brass cap;

THENCE S. 01 15' 53" E. along the East line of said Section 31 a distance of 2615.63 feet to the East 1/4 corner of said Section 31, marked by a 1938 G.L.O. brass cap;

THENCE S. 00 00' 18" W. along said East line a distance of 2675.89 feet to the southeast corner of said Section 31, and also being the Northeast corner of said Section 6, marked by a 1938 G.L.O. brass cap;

THENCE S. 01 05' 22" W. along the East line of said Section 6 a distance of 2301.97 feet to the centerline of the said Cornville Road (Yavapai County Route No. 30);

THENCE N. 68 12' 18" W. along said centerline a distance of 5657.58 feet to the intersection with the West line of said Section 6;

THENCE N. 00 10' 23" E. along said West line a distance of 177.85 feet to the Northwest corner of said Section 6, and also being the Southwest corner of said Section 31, marked by a 1938 G.L.O. brass cap;

THENCE N. 00 22' 08" W. along the West line of said Section 31, a distance of 1990.09 feet to a point on curve of the centerline of U.S. Highway 89-A, the center of which bears N. 57 52' 39" E;

THENCE North and East along said curve, having a radius of 17,188.73 feet through a central angle of 13 22' 38" for an arc length of 4013.17 feet to the P.T. of said curve (ENG. STA. 295 + 09.00 P.T.);

THENCE N. 45 29' 59" E. along said centerline a distance of 291.78 feet to the intersection with the North line of said Section 31;

THENCE S. 89 59' 10" E. along said North line a distance of 2533.98 feet to the TRUE POINT OF BEGINNING.

CONTAINING 693.31 acres, more or less;

SUBJECT TO any easements and rights-of-way of record.



**EXHIBIT C**  
**YAVAPAI COUNTY**  
**PLANNING AND BUILDING DEPARTMENT**

ANNEX  
500 E. MARINA ST.  
PRESCOTT, AZ 86303

(520) 771-3193

ADMINISTRATIVE CENTER  
255 E. GURLEY  
PRESCOTT, ARIZONA 86301

COTTONWOOD ANNEX  
10 S. 8<sup>TH</sup> STREET  
COTTONWOOD, AZ 86326

(520) 639-8151

**RECEIVED**

SEP 13 2000

September 12, 2000

Jay Stuckey  
Republic Companies  
11811 N. Tatum Blvd. Suite 1005  
Phoenix, Arizona 85028

RE: Proposed Administrative Amendment  
Verde Santa Fe PAD Master Plan

Dear Mr. Stuckey:

Your submittal for amendment to the approved Planned Area Development Master Plan, for the above referenced project, was referred out to various reviewing agencies for comment.

Under Section 109.N.9 of the Yavapai County Zoning Ordinance, if an amendment falls into any one or all of the following categories, it would be deemed a major amendment. Major amendments require review and approval by the Planning and Zoning Commission and the Board of Supervisors.

- (a) an increase in the approved totals of dwelling units or gross leasable area for the PAD (Planned Area Development) District.
- (b) a significant change in zoning boundaries as determined by the Planning and Building Director from those approved for the PAD District.
- (c) any change which could have significant impact on areas adjoining the PAD as determined by the Planning and Building Director.
- (d) any change which could have a significant traffic impact on roadways adjacent or external to the PAD as determined by the Planning and Building Director.

If an amendment can demonstrate not being within any of the foregoing items, and be seen as minor in nature after referral and approval by various reviewing agencies, it can be administratively approved.

Responses received are as follows:

*The Flood Control District* advises that they have no problem with the proposed reconfiguration of land use. However, the changes will need to be considered as the drainage reports for the affected parcels are submitted.

*County Engineer/Public Works* advises they have no problem with the modifications. They do note that there will be requirements for additional dedication of land for right-of-way on Highway 89A to accommodate future turn lanes.

*The Zoning Division* had no comments on the proposed changes.

## EXHIBIT C

*The Cornville/ Page Springs Fire District* did not respond to this review. They will have future opportunities to review the project in relation to their requirements when subdivision plats are submitted for review.

*The Arizona Department of Transportation* did not respond on this issue, but will have the opportunity to review future plat submittals. The proposed amendment is in response to ADOT changes to access along Highway 89A reducing access to one point at the Bill Gray Road intersection.

*The City of Cottonwood* did not respond on the referral sent out July 28, 2000.

The proposed changes illustrate a reduction in the potential number of dwelling units for Verde Santa Fe North. The 1995 Master Plan illustrated there would be possibly 2,056 dwelling units, while this submittal illustrates 1,892 dwelling units or a reduction of 164 dwelling units.

The amended plan also indicates that there will be approximately one (1) additional acre over the approved Master Plan. This would constitute a major amendment rather than a minor amendment. However, there is also a disclaimer on the submittal attachments that states "The total commercial acreage within Verde Santa Fe North and South remains the same." Based on that note, any administrative approval will require adherence to same.

Arrangement of land uses still affords the same or lesser impact on adjacent lands as was approved under the 1995 Master Plan. Commercial frontage along Highway 89A has been reduced by nearly ¼ mile. Residential uses still abut properties along the northerly and easterly boundaries of the PAD as was done under the original plan. The golf course has been redesigned to accommodate relocation of other land uses. The applicant indicates that the PAD open space requirement will still be met or exceeded. The developer should note that since the approval of the master plan, Yavapai County has adopted new standards for golf course improvements. This golf course, when brought forward for actual development will be required to meet the current standards.

Please note that under the approved Development Agreement, 15 acres of land were to be set aside should the School District exercise its option to acquire a parcel and develop a school facility within the overall Verde Santa Fe project. The Agreement was approved in 1996 granting the school a ten (10) year window to exercise their option. There are still roughly 6 years left for this option to be acted upon.

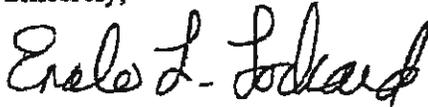
Based on the foregoing responses and findings, the proposed amendment will be considered minor in nature and is approved administratively by this Department in accordance with Ordinance requirements and in the cooperative effort to work with ADOT in their access management of Highway 89A. This administrative approval is with the understanding that there will be no increase in commercial acreage and that a minimum 25% open space will be provided as defined by the Zoning Ordinance. Please provide a revised copy of the plan illustrating the following additional or corrected information; 1.) the correct total of commercial acreage; 2.) the name and addresses of the developer and the firm preparing the plan; 3.) Add to the plan title "Amendment to Verde Santa Fe"; 4.) Include in the site data table the range of actual dwelling units within each category and a summary range of total dwelling units for the Verde Santa Fe North project similar to that done with the original master plan.

## EXHIBIT C

The revised copy should be submitted in a 24" x 36" format along with an 8 1/2 by 11" photo reduction of the plan for the permanent file. This administrative approval will not be in force and effect until such time as the revised plan is submitted.

Should you have any questions, please contact me.

Sincerely,



Enalo L. Lockard, AICP  
Assistant Planning Director

e-mail: Mike Rozycki  
Susan Branson  
xc: Jim Binick  
Jerry Owen, City of Cottonwood  
Victoria Bever, ADOT

## EXHIBIT D

### BILL GRAY ROAD REALIGNMENT AGREEMENT

#### A. REQUIRED EASEMENTS

- The anticipated necessary right-of-way has been acquired. If any future additional right-of-way is necessary, it will be negotiated between Yavapai County and land owners.

#### B. VERDE SANTA FE DEVELOPMENT (see attached amendment)

- Republic Companies will submit a revised master plan with supporting documentation for administrative changes.
- Yavapai County Planning Department will conduct a final confirmation and administrative review for approval by all regulatory departments.
- Any changes to the master plan will be of an administrative nature and will not affect the integrity of the plan already approved.
- Republic Companies will prepare administrative revisions reflecting an alternative land use for the proposed hotel/resort/conference center that will not require separate access to SR 89A.
- Republic Companies will consent to annexation of the Verde Santa Fe Development by the City of Cottonwood and agree to pay the applicable taxes.

#### C. REALIGNMENT OF BILL GRAY ROAD

- ADOT will abandon a portion of the old Bill Gray Road alignment
- Yavapai County will assist with the acquisition of any required right-of-way for the new alignment
- ADOT will design and construct Bill Gray Road in accordance with Yavapai County Standards
- Yavapai County will assume ownership of Bill Gray Road outside the state ROW for SR 89A.
- ADOT will provide A/C overlay from SR89A to the intersection with the church as per Shepard-Wesnitzer, Inc. plan and construct the 4-way intersection within Church/G.M. Fratelli lands
- Yavapai County will surface existing Bill Gray Road from the point where the new tie-in will be to the forest boundary.
- Yavapai County will surface with A/C millings and asphalt spray the existing Bill Gray Road to a 32 ft width from the point where the new intersection will tie in to the state land boundary to the north.
- City of Cottonwood, at city expense, shall be responsible for the curb, gutter and sidewalk for where needed for Bill Gray Road as it extends through the Church and G.M. Fratelli properties, when the City feels the curb, gutter and sidewalks are needed
- Yavapai County will construct a standard two-lane road to the State Trust Land boundary.

## **EXHIBIT D**

### **D. INTERSECTION OF BILL GRAY ROAD AND SR 89A**

- When the surrounding development generates enough traffic to warrant auxiliary lanes, ADOT will pay for design and construction providing sufficient ROW is granted to ADOT by Yavapai County for the additional features.
- Yavapai County will secure the anticipated ROW needed from adjacent property owners/developers.
- ADOT will signalize the intersection of SR 89A and Bill Gray Road when traffic signal warrants are met as outlined by the Manual of Uniform Traffic Control Devices in a formal Traffic Signal Warrant Analysis.
- When warranted, developers will pay for the initial cost of the traffic signal at this intersection. Monthly utility costs associated with the signal operation will be paid by Yavapai County.
- ADOT will provide two 24" sleeves on either side of the intersection for future utility access and provide conduit to accommodate a future traffic signal.

### **E. T-INTERSECTION**

- ADOT will design and construct the T-Intersection where Bill Gray Road intersects the Church property in a manner that accommodates master plan traffic needs of the Church to include a 2000 seat church, grammar school, high school and cemetery; and the commercial-retail development of the adjacent 10 acre parcel. The road shall be four lanes from SR89A into the G.M. Fratelli parcel to the Church site and a four (4) way intersection, the other three (3) way being roads 32 feet wide.

### **F. ZALESKI WASH**

- ADOT will construct an energy dissipater on the outlet of the drainage structure where Zaleski Wash crosses under SR 89A.

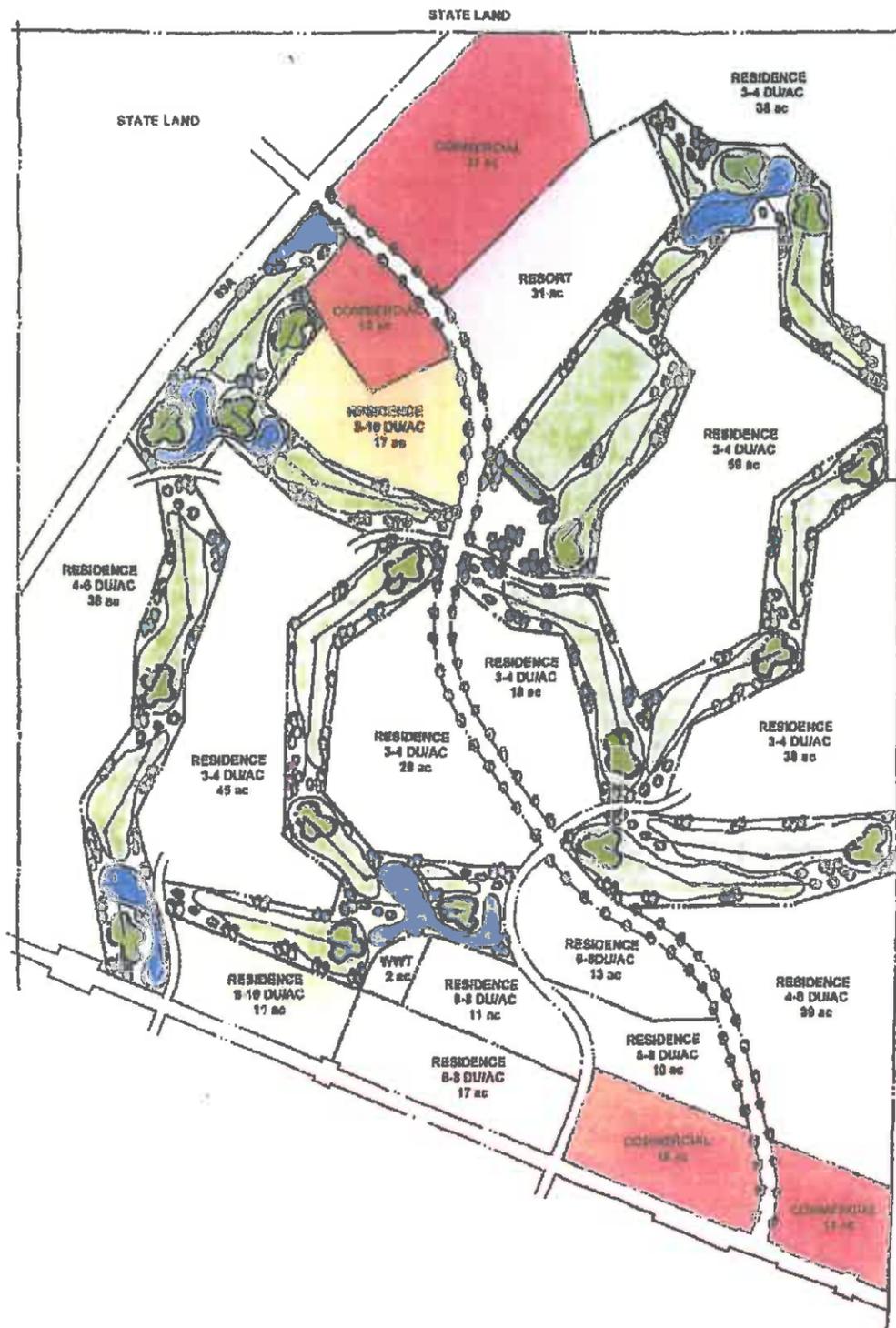
### **G. ACCESS PERMIT**

- ADOT will issue a "locked gate access permit" without improved driveway to the engineer to include agricultural and land maintenance.
- Yavapai County will allow temporary access to the engineer.
- Verde Santa Fe to be granted permanent access permit for the entire project as per the attached plan without further traffic studies.

### **H. ANNEXATION BY CITY OF COTTONWOOD**

- The City of Cottonwood will seek to annex the Verde Santa Fe Development, Catholic Church and G.M Fratelli properties.

APPROVED PAD



Approved PAD Plan

	Acres	Units	DU / AC
<b>Residential</b>	<b>383</b>	<b>2056</b>	<b>5.4</b>
3-4 du/ac	227	908	4.0
4-6 du/ac	77	462	6.0
6-8 du/ac	51	408	8.0
8-10 du/ac	28	280	10.0
<b>Commercial</b>	<b>67</b>	-	-
<b>Resort</b>	<b>31</b>	-	-
<b>Golf Course</b>	<b>199</b>	-	-
<b>Wastewater Treatment Plant</b>	<b>2</b>	-	-
	<b>682</b>	<b>2,056</b>	<b>5.4</b>

2006 Plans for 2006-2010	Proposed
306 - 460 Acres Residential	426
76 - 118 Acres Commercial	118
159 - 239 Acres Open Space	176

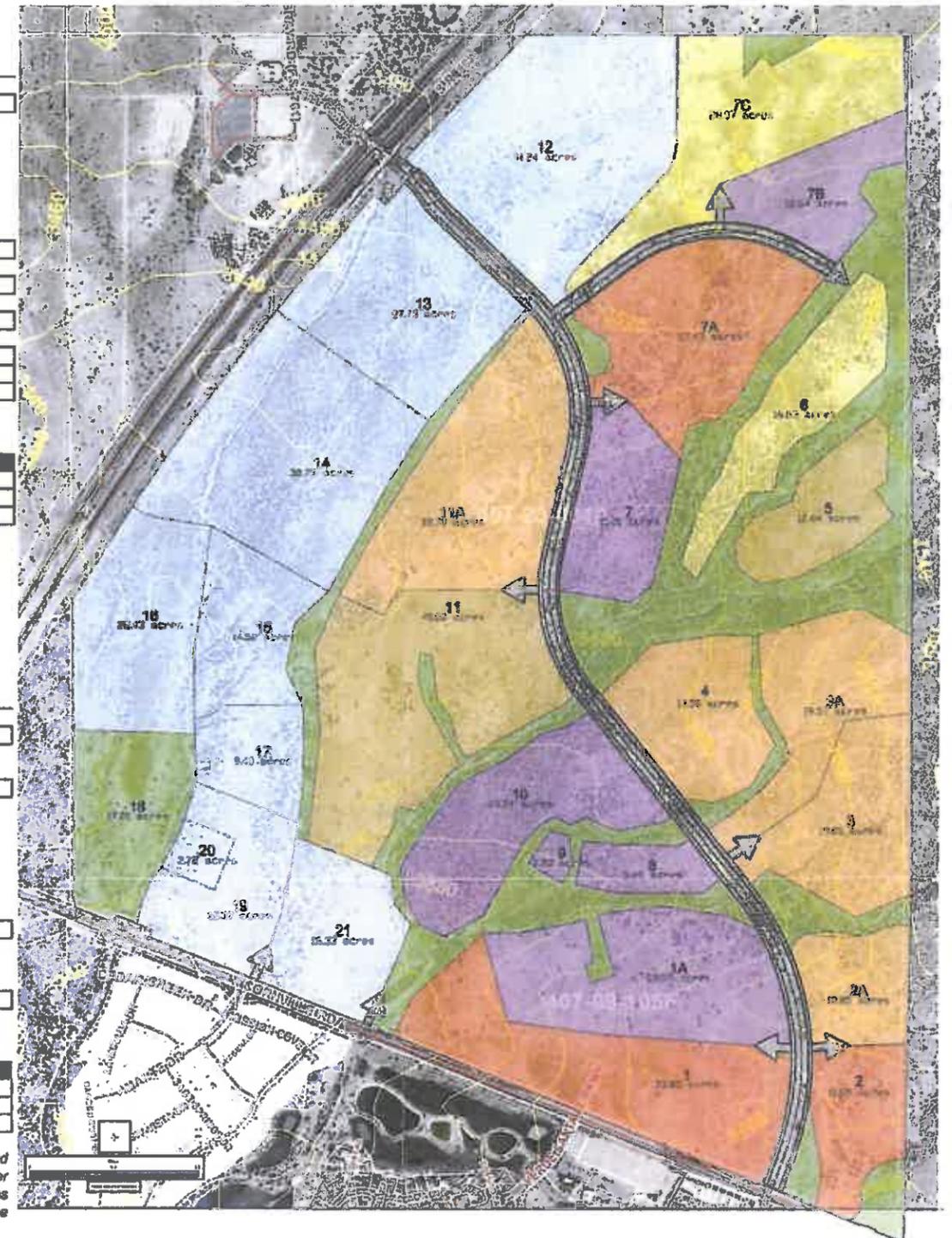
Proposed PAD Amendment Plan

	Acres	Units	DU / AC
<b>Residential</b>	<b>358</b>	<b>1,476</b>	<b>4.1</b>
Single Family	358	1,476	4.1
<b>Mixed Use</b>	<b>118</b>	<b>650</b>	-
Commercial:	118	-	-
Retail/Office/Resort/Light Industrial/Employment	-	-	-
Residential: Apartments / Multifamily	68	650	9.6
Wastewater Treatment Plant	2	-	-
<b>Open Space*</b>	<b>176</b>	-	-
Open Space Tracts	136	-	-
Estimated Required Open Space	40	-	-
<b>Assuming 426 Residential Acres</b>	<b>682</b>	<b>2,126</b>	<b>5.0</b>

2006 Plans for 2006-2010	Proposed
306 - 460 Acres Residential	426
76 - 118 Acres Commercial	118
159 - 239 Acres Open Space	176

\* Based on Section 424.D.5 of the Zoning Ordinance (PAD Zoning, Required Open Space) front yards, portions of commercial parking areas, and other similar open spaces may be included in the calculation of total PAD open space and have been estimated to be a minimum of 40 acres within the proposed amended PAD.

AMMENDED PAD



## **2015 89 & VINE LAND USE PLAN COMPARISON NARRATIVE**

Brookfield Communities is proposing the development of the residential portion of the approximately 682 acre parcel at Highway 89A and Cornville Road, formerly known as the North Portion of Verde Santa Fe. In 2001 the City of Cottonwood annexed the property and adopted the approved Yavapai County PAD zoning on the site. **In 2007 City staff administratively approved a land use map for the renamed Bella Montana development as an administratively approved minor amendment of the PAD zoning that had been legislatively approved by the City Council and affirmed in a referendum in 2001-2002. Brookfield intends to implement the 2007 Bella Montana plan, with the new name 89 & VINE, substantially unchanged with only those minor adjustments that are needed based upon more detailed engineering of the site. Unlike the 2007 minor amendment in which uses were relocated on the site, land use boundaries were changed and the Golf Course use eliminated, these minor adjustments do not constitute an amendment of the approved plan.**

The Bella Montana land use map was not based upon the same detailed level of engineering of the site as has currently been undertaken. The 2007 minor amendment was intended primarily to achieve mutual City and developer goals as set forth in the Verde Santa Fe Preannexation Development Agreement, including replacing the golf course and providing large tracts of land along 89A for large retailers serving regional needs. The land use map therefore depicted the areas and acreages designated for residential, commercial and open space uses on the amended plan that achieved these goals. The developer was stipulated to provide the detailed engineering and other information required for the implementation of the plan and the development of the approved uses in a Master Development Plan (MDP) for staff approval. That implementation effort was underway in 2007-2008, after the staff approval of the minor amendment, but was delayed by the economic downturn.

The City of Cottonwood Zoning Ordinance specifies four criteria for a major amendment to a PAD approval as follows:

**SECTION 424. K. AMENDMENTS TO PAD APPROVAL.**

1. A request for an amendment to an approved PAD shall be processed as either a minor amendment or major amendment.

2. An application for a PAD amendment will be routed for review by all affected City departments or agencies and upon receipt of review comments, the Zoning Administrator will determine whether the requested change meets any one of the following criteria for a major amendment:
  - a. An increase in the total number of dwelling units of more than 5 percent above the original approval;
  - b. An increase in the gross leasable square feet within a PAD of more than 10 percent above the original approval;
  - c. A reconfiguration in land use designation boundaries and/or parcel sizes that increases or decreases the size of any land use designation boundaries and/or parcel sizes by more than 20 percent; and
  - d. Any other change which could have a significant impact on areas adjoining the PAD, including a significant traffic impact on roadways adjacent or external to the PAD.

3. All major amendments to a PAD shall be reviewed and approved by the Planning and Zoning Commission, Development Review Board and City Council following the same procedure as prescribed for the original approval.
  
4. Any PAD Amendment application, including a rearrangement of parcels, Circulation systems and/or open space areas within a PAD that does not meet any of the above criteria shall be processed as a minor amendment. A minor amendment shall be reviewed by all affected City departments and agencies and may be administratively approved by the Zoning Administrator.

The more refined 2015 89 & VINE land use plan proposes no changes that meet any of the above criteria.

As previously explained, in 2001 the City of Cottonwood annexed the portion of the Verde Santa Fe Development north of Cornville Road with its Yavapai County approved PAD Master Plan, adopted City PUD zoning based upon the approved PAD and entered into a Preannexation Development Agreement with the developer. In 2007 Cottonwood approved the minor amendment to the PAD,

which Brookfield Communities is now implementing. The 2015 89 & VINE Land Use Summary and Map exhibit is being submitted for initial review by the City and its land use counsel to verify consistency with the approved 2007 Plan. A copy of the 2007 Plan included in the City's General Plan is also being submitted for comparison purposes. The 2007 PAD minor amendment is the only amendment of the PAD since the property's annexation by Cottonwood and thus is the only relevant amendment for purposes of this analysis. Additional prior approval background is being provided for informational purposes.

The original Verde Santa Fe PAD was approved by Yavapai County in 1987. A copy of the Land Use Table for the North Portion of the property north of Cornville Road that was annexed by Cottonwood is attached. The 1987 PAD approval allowed 2844 DU's at approximately 4.4 DU/AC on the North Portion of the property according to the Yavapai County Staff analysis of the 1987 PAD. In 1996 a Master Development Plan revision was approved by Yavapai County, and a total of 688 acres of property was shown on the North Portion comprised of 418 acres of Residential, 81 acres of Commercial/Resort, 2 acres of Waste Water Treatment Plant, 163 acres of Golf Course and 24 acres of ROW, according to the Land Use North Table of the 1996 plan (previously reviewed in meeting at Gammage & Burnham). The number of dwelling units was reduced to 2056. In

2000 Yavapai County approved a minor amendment to the North Portion of the PAD that proposed a total of 1982 dwelling units on 383 acres of Residential with 97 acres of Commercial/Resort, 2 acres of Waste Water Treatment Plant, 182 acres of Golf Course and 24 acres of ROW with the same 688 acre total. This is the approved PAD zoning that was adopted upon annexation by Cottonwood in 2001.

The PAD approval process, under the applicable Zoning Ordinances in Yavapai County at the time of the initial PAD zoning adoption and subsequent minor amendment by the County and at the time of the annexation, adoption of zoning and minor amendment by Cottonwood, did not require the level of detailed engineering and technical information required by the PAD ordinances of Maricopa County, Phoenix and other Valley cities. That level of detail was left to the implementation stage of the development. Cottonwood did not have a PAD ordinance at the time of annexation and zoning adoption of County PAD zoning. Its PUD ordinance was amended and replaced by the PAD ordinance adopted by the City in 2004, and subsequently amended in 2008. **Brookfield is not requesting either new PAD zoning or an amendment of the existing PAD zoning requiring further legislative action by the City Council. Its PAD zoning has already been legislatively approved and affirmed in a referendum. Brookfield is simply requesting the administrative staff approval of the**

**technical MDP submittal, including all required infrastructure master plan reports, that was contemplated in the stipulations of the staff approval of the minor amendment to the PAD in 2007, set forth in the attached City approval letter that has been previously provided.**

The PAD zoning as adopted by Cottonwood upon annexation of the property was amended as noted above in 2007, and the 2007 Land Use Table and Map exhibit as approved in that minor amendment is attached for comparison purposes. An exhibit with both the 2007 and 2015 Land Use Tables is also attached for easier verification that no reconfigurations in land use designation boundaries/parcel sizes (acreages) or no changes in the residential dwelling unit total are being proposed. The 2007 PAD Residential acreage is shown as 426, which unfortunately reflects 40 acres counted as interior Open Space that should have been deducted from this total leaving 386 acres of Residential. The Commercial acreage is 117.6 and the Open Space is 176 on the 2007 Plan. The residential dwelling unit total is 2050.

The attached 2015 Land Use Summary and Map exhibit demonstrates that the 2007 Plan is being implemented essentially unchanged and that no amendment of the 2007 Plan is being proposed. The 2015 Plan is based on more refined engineering analysis and information, and only minor adjustments of internal

parcel configurations and acreages reflect that more detailed information now available. The Residential, Commercial and Open Space land use designation boundaries/parcel sizes remain the same at 386.4, 117.6 and 176 acres respectively. The 2015 Plan, however as noted above, corrects the Residential acreage error on the 2007 Plan in which approximately 40 acres allocated to Open Space within residential parcels was not subtracted from the Residential acreage amount. This error appears in the lower section of the 2007 table that shows 426 Residential acres, which if added to the 118 and 176 Commercial and Open Space acreages, plus the 2 acres of Waste Water Treatment Plant, results in a total property size of 722 acres rather than the actual 682 acres. The residential dwelling unit total remains the same 2050.

**Therefore no major amendment to the approved PAD is required because no changes are proposed that meet the major amendment criteria under the PAD Ordinance cited above. (a) The total of residential units remains the same at 2050. (b) No increase in gross lease-able floor area is proposed. (No site plans or gross lease-able floor area were previously approved by either the County or Cottonwood.) (c) The Residential, Commercial and Open Space land use designation boundaries/parcel sizes remain the same at 386, 117.6 and 176 acres. (d) Because the 2015 Plan does not make any changes that would**

**intensify development, such as increasing the number of dwelling units or adding more commercial acreage, no significant impacts are caused to adjacent lands or roadways.**

## LAND USE NORTH

### RESIDENTIAL

**3-6 UNITS PER ACRE                      320 ACRES**

Tract 1	180 ACRES
Tract 2	40 ACRES
Tract 3	27 ACRES
Tract 4	60 ACRES
Tract 5	13 ACRES

**7-12 UNITS PER ACRE                      56 ACRES**

Tract 6	12 ACRES
Tract 7	20 ACRES
Tract 8	24 ACRES

**13-18 UNITS PER ACRE                      14 ACRES**

Tract 9	14 ACRES
---------	----------

**RESORT    30 ACRES**

Tract 10	30 ACRES.
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**COMMERCIAL                                      75 ACRES**

Tract 11	10 ACRES
Tract 12	10 ACRES
Tract 13	15 ACRES
Tract 14	14 ACRES
Tract 15	10 ACRES
Tract 16	16 ACRES

**GOLF COURSE                                      150 ACRES**

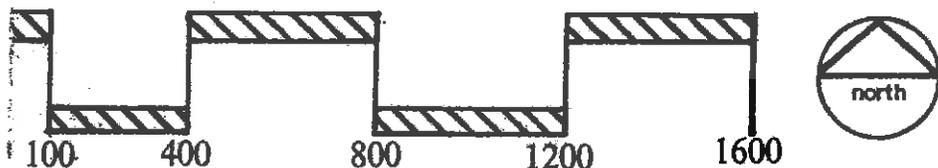
Tract 17	80 ACRES
Tract 18	<u>70 ACRES</u>

**TOTAL ACRES                                      645 ACRES**

# LENDRUM DESIGN GROUP

10317.00

March 1987



**LAND USE SUMMARY**

Proposed 2015 PAD	Acres	Units	Du/AC
<b>Residential</b>	<b>367.3</b>	<b>1450</b>	<b>3.95</b>
Single Family \ Duplex	367.3	1450	3.95
<b>Mixed Use</b>	<b>173.7</b>	<b>600</b>	<b>-</b>
<b>Commercial:</b>			
Retail/ Office / Resort/ Light Industrial/ Employment	117.6	-	-
<b>Residential: Apartments/ Multifamily</b>	<b>54.1</b>	<b>600</b>	<b>11.09</b>
Wastewater Treatment Plant	2.0	-	-
<b>*Open Space</b>	<b>176.0</b>	<b>-</b>	<b>-</b>
Open Space Tracts	141.0	-	-
*Estimated Required Open Space	35	-	-
<b>Totals</b>	<b>682.3</b>	<b>2050</b>	<b>3.0</b>

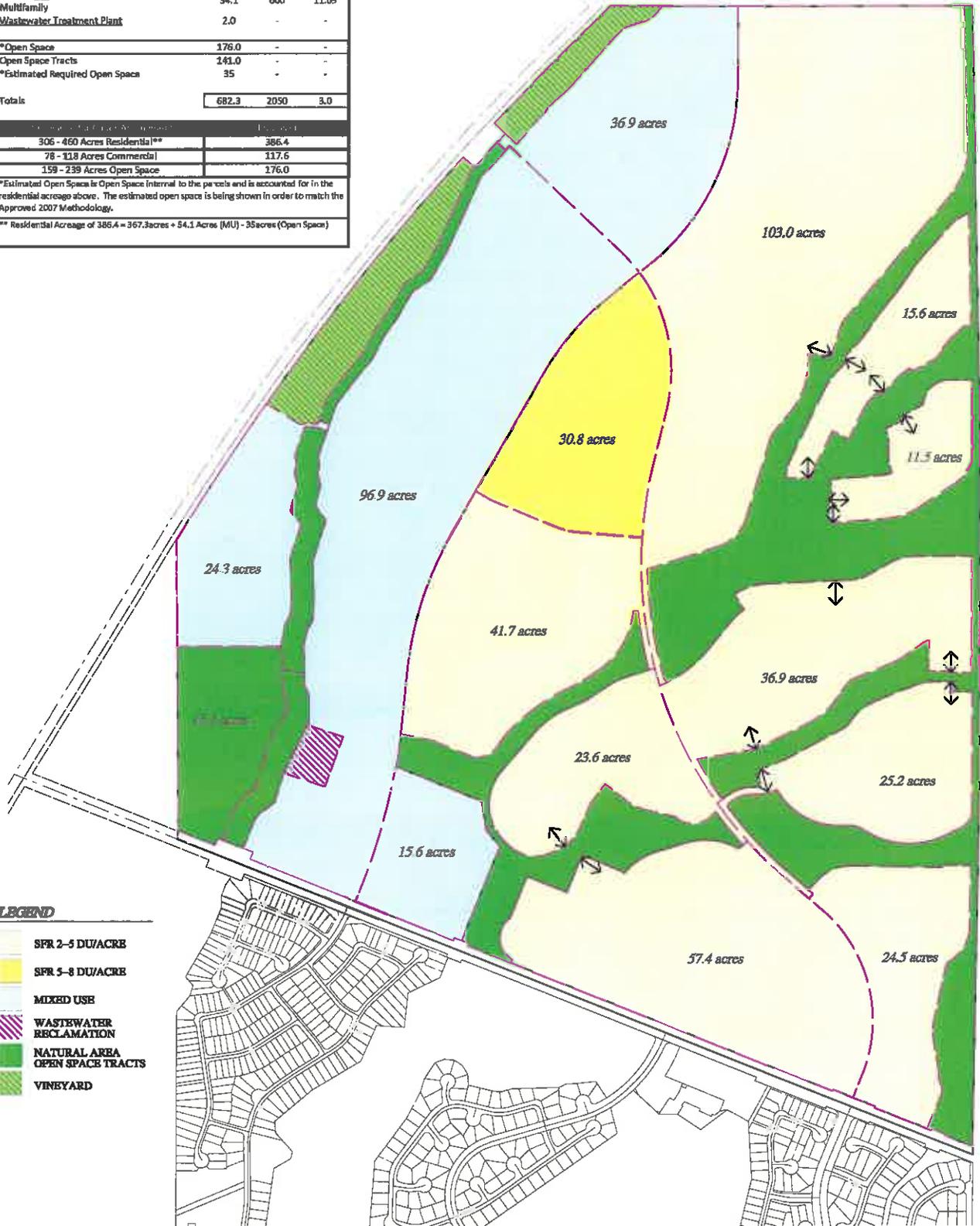
Proposed 2015 PAD	Acres
306 - 460 Acres Residential**	386.4
78 - 118 Acres Commercial	117.6
159 - 239 Acres Open Space	176.0

\*Estimated Open Space is Open Space internal to the parcels and is accounted for in the residential acreage above. The estimated open space is being shown in order to match the Approved 2007 Methodology.

\*\* Residential Acreage of 386.4 = 367.3 acres + 54.1 Acres (MU) - 35 acres (Open Space)



SCALE: 1" = 300'



**LEGEND**

- SFR 2-5 DU/ACRE
- SFR 5-8 DU/ACRE
- MIXED USE
- WASTEWATER RECLAMATION
- NATURAL AREA
- OPEN SPACE TRACTS
- VINEYARD

ENGINEER/PLANNER:

**GOODWIN & MARSHALL**

CIVIL ENGINEERS ~ PLANNERS ~ SURVEYORS

4809 E Thistle Landing Dr, Ste. 100, Phoenix, Arizona 85044  
Metro (602) 218-7285



DESIGN GROUP

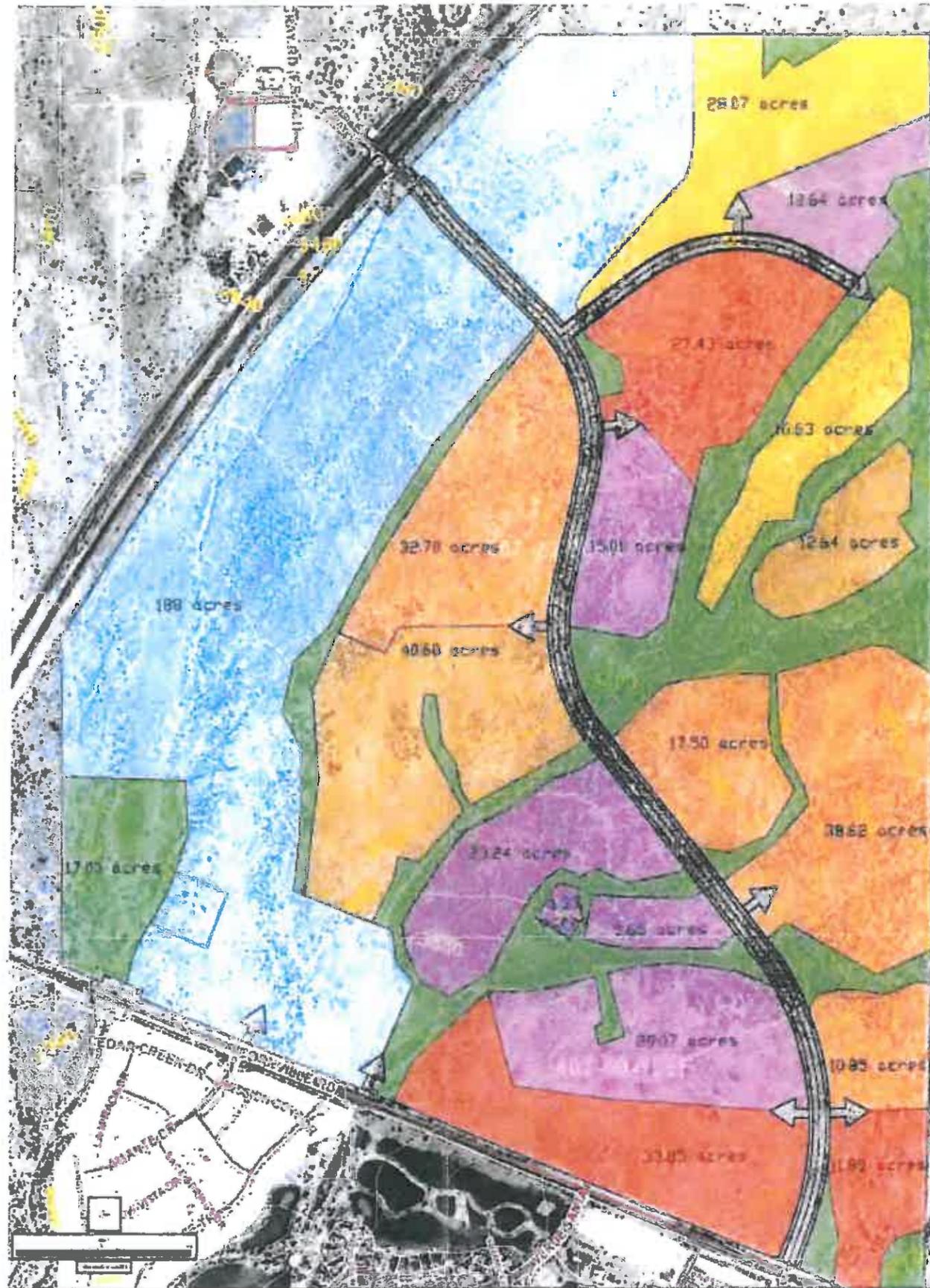
PROPOSED 2015 PAD

for  
**89 & VINE**  
CITY OF COTTONWOOD,  
YAVAPAI COUNTY, ARIZONA  
SEPTEMBER, 2015

# EXHIBIT A

## LEGEND

- 2-3 du/ac Single Family Residential
- 3-4 du/ac Single Family Residential
- 3-4 du/ac Single Family Residential
- 4-5 du/ac Single Family Residential
- 5-6 du/ac Single Family Residential
- Mixed Use
- Open Space



Data Table for Bella Montana

Proposed PAD Amendment Plan	Acres	Units	DU/AC
<b>Residential</b>	<b>350</b>	<b>1,478</b>	<b>4.1</b>
Single Family	350	1,478	4.1
<b>Mixed Use</b>	<b>183</b>	<b>574</b>	<b>-</b>
Commercial	118	-	-
Retail/Office/Research/Light Industrial/Employment	-	-	-
Residential Apartments / Multifamily	68	574	8.4
Wastewater Treatment Plant	2	-	-
<b>Open Space*</b>	<b>178</b>	<b>-</b>	<b>-</b>
Open Space Tracts	138	-	-
Estimated Required Open Space	40	-	-
<b>Assuming 428 Residential Acres</b>	<b>882</b>	<b>2,050</b>	<b>4.3</b>

Open Space for Minor Amendment	Proposed
308 - 460 Acres Residential	428
78 - 118 Acres Commercial	118
159 - 238 Acres Open Space	178

\* Based on Section 42.1 D 5 of the Zoning Ordinance (PAD Zoning, Required Open Space) front yards portions of commercial parking areas and other similar open spaces may be included in the calculation of total PAD acres applied and have been estimated to be a minimum of 40 acres under the proposed amended PAD.

Bella Montana

A Brookfield Communities Development

03-05-07



Proposed Minor Amendment to PAD

Approved 2007 PAD	Acres	Units	Du/AC
Residential	358	1476	4.1
Single Family	358	1476	4.1
Mixed Use	188	574	-
<b>Commercial:</b>			
Retail/ Office / Resort/ Light Industrial/ Employment	118	-	-
<del>Residential:</del> Apartments/ Multifamily	68	574	8.4
Wastewater Treatment Plant	2	-	-
Open Space*	176	-	-
Open Space Tracts	136	-	-
Estimated Required Open Space	40	-	-
Assuming 426 Residential Acres	682	2050	3.0
<b>20% Range for Minor Amendment</b>		<b>Proposed</b>	
306 - 460 Acres Residential		426	
78 - 118 Acres Commercial		118	
159 - 239 Acres Open Space		176	
* based on Section 424.D.5 of the Zoning Ordinance (PAD Zoning, Required Open Space) front yards, portions of commercial parking areas, and other similar open spaces may be included in the calculation of total PAD open space and have been estimated to be a minimum of 40 acres within the amended PAD.			

Proposed 2015 PAD	Acres	Units	Du/AC
Residential	367.3	1450	3.95
Single Family \ Duplex	367.3	1450	3.95
Mixed Use	173.7	600	-
<b>Commercial:</b>			
Retail/ Office / Resort/ Light Industrial/ Employment	117.6	-	-
<del>Residential:</del> Apartments/ Multifamily	54.1	600	11.09
Wastewater Treatment Plant	2.0	-	-
*Open Space	176.0	-	-
Open Space Tracts	141.0	-	-
*Estimated Required Open Space	35	-	-
Totals	682.3	2050	3.0
<b>20% Range for Minor Amendment</b>		<b>Proposed</b>	
306 - 460 Acres Residential**		386.4	
78 - 118 Acres Commercial		117.6	
159 - 239 Acres Open Space		176.0	
*Estimated Open Space is Open Space internal to the parcels and is accounted for in the residential acreage above. The estimated open space is being shown in order to match the Approved 2007 Methodology.			
** Residential Acreage of 386.4 = 367.3acres + 54.1 Acres (MU) - 35acres (Open Space)			



April 11, 2007

Philip V. Petersen  
Brookfield Communities, Inc.  
3101 N. Central Ave., Ste. 290  
Phoenix, AZ 85012  
FAX (602)263-8078

Lynne A. Lagarde  
Earl, Curley & Lagarde  
3101 N. Central Ave., Ste 1000  
Phoenix, AZ 85012  
FAX (602)265-2195

**RE: Clarification of PAD Amendment** *06-050*

As a clarification to my letter of 3-22-07, please be advised that your proposal is approved as a minor amendment to the Planned Area Development for Verde Santa Fe North, subject to the following stipulations:

1. Adjusting the total commercial acreage to 117.6 acres.
2. Reclassification of "industrial uses" to those which fit under the City's commercial zoning districts.
3. Submittal of a Preliminary Plat, Master Development Plan and traffic impact study for the entire Verde Santa Fe North project, which demonstrates all traffic impacts and provides for their mitigation with suitable improvements. The MDP should also identify the necessary on-site and off-site improvements, and establish a sequence and timeline for their implementation.

If you have any questions, please give me a call at 928-634-5505.

Sincerely,

George V. Gehlert  
Community Development Director

C: Brian Mickelsen, City Manager



FAXED: 3 PGS  
March 22, 2007

Philip V. Petersen  
Brookfield Communities, Inc.  
3101 N. Central Ave., Ste. 290  
Phoenix, AZ 85012  
FAX (602)263-8078

Lynne A. Lagarde  
Earl, Curley & Lagarde  
3101 N. Central Ave., Ste 1000  
Phoenix, AZ 85012  
FAX (602)265-2195

**RE: PAD Amendment for Verde Santa Fe North / Bella Montana**

I am writing to follow up our most recent conversations concerning your proposed amendment to the adopted Planned Area Development for Verde Santa Fe North (also known as Bella Montana), dated 12-18-06. As you are aware, the proposal was submitted as a "minor" amendment to the PAD, as addressed under Section 424 of the Cottonwood Zoning Ordinance (Planned Area Development). Staff offers the following with regard to the major amendment triggers identified in the PAD code:

- **424.L.2.a (Increase in Residential units by more than 5%):** I have located the revised site plan referenced in the minor amendment approved by Yavapai County, as referenced in Enalo Lockard's letter of 9-12-00. It does in fact establish a cap of 1,982 residential units. A 5% increase would enable the addition of 99 units for a total of 2081. The proposal for 2,050 units (an addition of 68 units) meets the threshold for minor amendment.
- **424.L.2.b (Increase of gross lease-able floor area >10%):** Because there is no site planning which accompanies the "bubble plan" for the adopted PAD, we feel this category is not applicable.
- **424.L.2.c (An increase of land use areas of more than 20%):** As mentioned previously, the land use categories identified in your proposal do not completely match those referenced in the existing PAD. We have therefore had to assume three land use categories (commercial, residential and open space); that "Resort" is the same as "commercial;" and "golf course" is the same as "open space." Under this premise, the residential acreage increase from 383 acres to 426 acres equates to 11.2%. The open space change from 199 acres to 176

acres equates to an 11.6% change. Both of these changes fall within the minor amendment threshold. The proposal also meets the open space requirement associated with the Master Plan approved by Yavapai County in 1995 (25% or 172 acres). Additionally, the adopted PAD proposal supports 98 acres of commercial uses. A 20% increase would accommodate no more than 117.6 acres (as opposed to 118 acres suggested in the proposal). **Please adjust the commercial acreage.**

• **424.L.2.d (“Significant impact” to adjacent lands or roadways):**

The following is a summary of my primary concerns regarding potential impacts of the proposed changes:

1. Additional water use: The addition of 68 residences would suggest increased water use. However, this seems to have been more than offset by the elimination of the golf course.
2. The establishment of a “mixed use” area across from the existing Amante neighborhood within Verde Santa Fe. Staff has received written comment from the HOA President supporting the replacement of the residential uses with commercial uses.
3. Increased traffic from added residences and commercial areas. Although the traffic impact associated with the approved PAD is quite substantial, the change to that impact that would result from the addition of 68 residences and 20 acres of commercial development is questionable. Particularly in light of the fact that the “commercial use” areas include a variety of potential end users, including retail, resort and “industry.” The addition of commercial area actually supports the General Plan’s objective of a regional commercial facility; also acknowledged by the pre-annexation agreement. The resulting impact will depend on the variety of commercial development which is ultimately approved for this site. **Staff will ask you to address the traffic issue in depth with the submittal of a traffic study for the project in its entirety, which demonstrates a traffic impact similar to the approved PAD.**
4. “Industrial use” suggested by the amendment is not referenced by the existing PAD. Although both the General Plan and the pre-annexation agreement envision businesses and employment” uses, **those uses must be identified under the Commercial classifications of the Cottonwood Zoning Ordinance.**

### Conclusions and Response to Request

The proposal appears to accomplish many of the objectives set out by the City's General Plan for this area and for its "Planned Development" land use classification; as well as by the tenets of the pre-annexation agreement. In view of the above analysis, Staff will approve the request as a minor amendment, provided you can adequately address the highlighted issues in the submittal of a Preliminary Plat, Master Development Plan and traffic study. The MDP should also identify the necessary on-site and off-site improvements, and establish a sequence and timeline for their implementation.

We will schedule the proposal for code review within 3 weeks of receiving the submittal. I would anticipate that review of the MDP and pre-plat by the Planning and Zoning Commission would follow within 2-3 months of submittal. The MDP will also be evaluated by the Design Review Board, prior to review by the City Council. Again, final plat applications are only reviewed by the Council.

I would like to schedule a meeting to address the traffic issue and the specific requirements associated with the content of the Master Development Plan, plat, traffic and drainage studies. Please acquaint yourself with the MDP requirements set out in the PAD Code of the Cottonwood Zoning Ordinance (Section 424); and with the City of Cottonwood Subdivision code (both are available online at [www.ci.cottonwood.az.us](http://www.ci.cottonwood.az.us) under "projects").

If you have any questions, please give me a call at 928-634-5505.

Sincerely,

George V. Gehlert  
Community Development Director

C: Brian Mickelsen, City Manager  
Ruben Jauregui, Mayor  
Jim Gillsepie, P&Z Commission Chairman  
Tim Costello, Public Works Director  
Dan Lueder, Utilities Director



**CONCEPTUAL  
89 & VINE  
VINEYARDS & WINE  
TASTING CENTER**



# CONCEPTUAL WINE TASTING INTERIOR

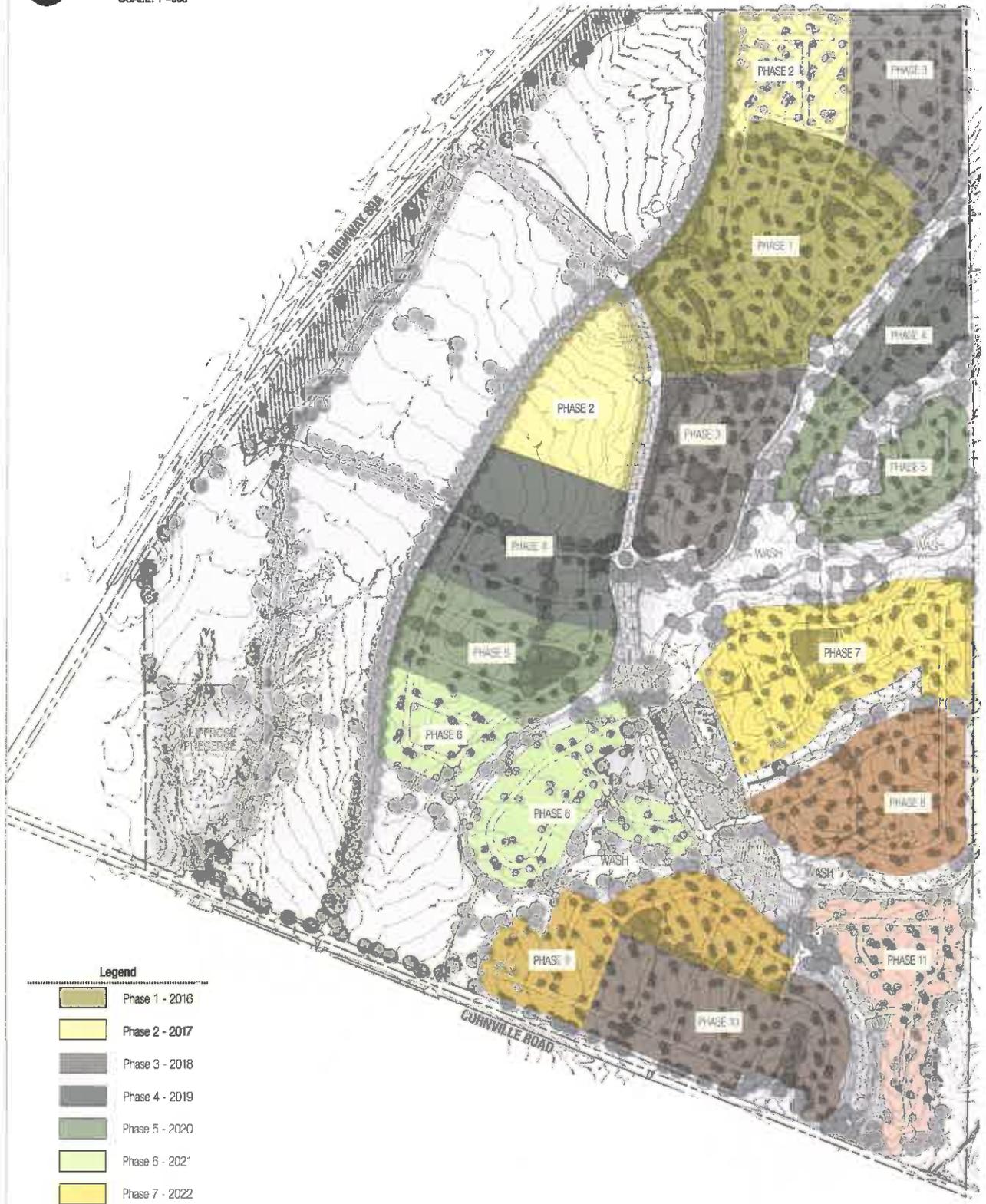
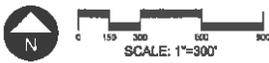


# CONCEPTUAL 89 & VINE VILLAGE CENTER



# CONCEPTUAL 89 & VINE VILLAGE CENTER





**Legend**

	Phase 1 - 2016
	Phase 2 - 2017
	Phase 3 - 2018
	Phase 4 - 2019
	Phase 5 - 2020
	Phase 6 - 2021
	Phase 7 - 2022
	Phase 8 - 2023
	Phase 9 - 2024
	Phase 10 - 2025
	Phase 11 - 2026



0 100 200 300 400  
SCALE: 1"=300'



89 & VINE  
PAD EXHIBITS

CONCEPTUAL PHASE 1 VICINITY MAP



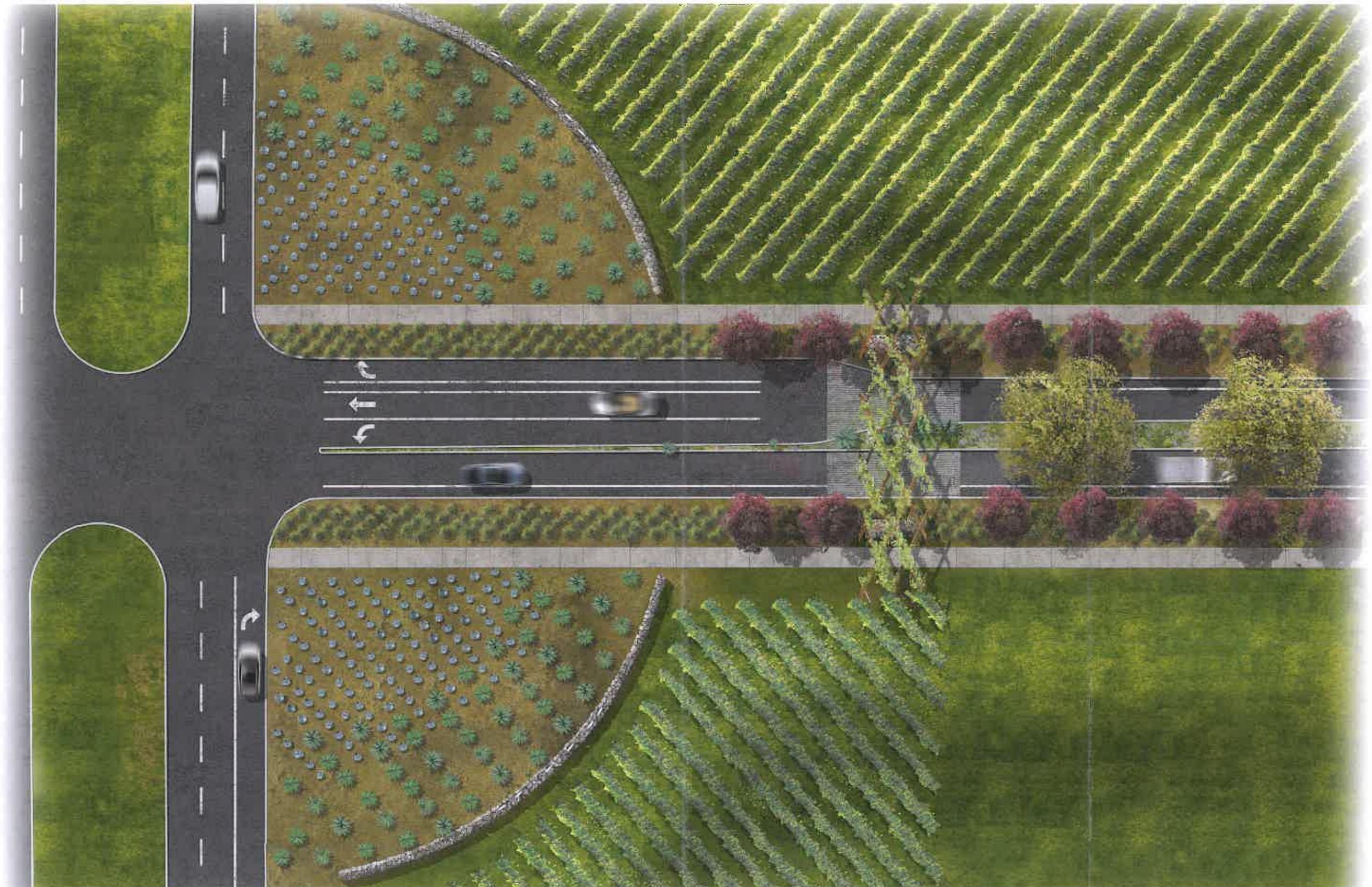
Scale: NTS



**Legend**

-  Lot 1
-  Lot 2

**CONCEPTUAL  
89 & VINE  
ENTRY OVERHEAD  
VIEW**



**CONCEPTUAL  
MAIN ENTRY  
MONUMENTATION  
AT INTERSECTION  
OF HWY 89A AND  
VINE BOULEVARD**



**CONCEPTUAL  
OVERHEAD OF  
ENTRY TO  
89 & VINE  
RESIDENTIAL AREA**





STREET TREES



PARKS



WASHES



VINEYARDS

**89 & VINE**  
PAD EXHIBITS

OVERALL CONCEPTUAL LANDSCAPE PLAN



**Legend**

-  Street Trees: Theme #1 - Green Ash
-  Street Trees: Theme #2 - Indian Rosewood
-  Street Trees: Theme #3 - Chinese Pistache
-  Vineyards



THEME TREE #1  
FRAXINUS PENNSYLVANICA - GREEN ASH



THEME TREE #2  
DALBERGIA SISSOO - INDIAN ROSEWOOD



THEME TREE #3  
PISTACHIA CHINENSIS - CHINESE PISTACHIO



VINEYARDS

**89 & VINE**  
PAD EXHIBITS

OVERALL CONCEPTUAL STREETSCAPE  
LANDSCAPE PLAN



**Legend**

 Neighborhood Trees



FRAXINUS CHINENSIS - CHINESE PISTACHE



WICKSTROMIA ANILINOSA - TEXAS HONEY MESQUITE



ACACIA SALICINA - SWEET ACACIA



CELTIS OCCIDENTALIS - COMMON HACKBERRY



CHLOPSIS LINEARIS - DESERT WILLOW

**NOTE:**

1. ADDITIONAL TREE SPECIES MAY BE PLACED WITHIN THE NEIGHBORHOOD LANDSCAPES, BUT THE TREES IDENTIFIED SHOULD BE ESTABLISHED AS THE VISUALLY DOMINANT SPECIES WITHIN THE NEIGHBORHOOD.
2. NEIGHBORHOOD TREES SHOULD TRANSITION TO ADJACENT STREETSCAPES, WASH AND OPEN SPACE TRACTS TO PROVIDE SEAMLESS TRANSITIONS THROUGHOUT THE PROJECT.

**89 & VINE**  
PAD EXHIBITS

OVERALL CONCEPTUAL NEIGHBORHOOD  
LANDSCAPE PLAN

#### TREES:

- ACACIA ANEURA - MULGA ACACIA
- ACACIA SMALLII - SWEET ACACIA
- ALNUS OBLONGIFOLIA - ARIZONA ALDER
- CEDRUS DEODARA - DEODAR CEDAR
- CELTIS OCCIDENTALIS - COMMON HACKBERRY
- CELTIS RETICULATA - NEATLEAF HACKBERRY
- CERCEIS OCCIDENTALIS - WESTERN REDBUD
- CHILOPSIS LINEARIS - DESERT WILLOW
- CUPRESSUS ARIZONICA - ARIZONA CYPRESS
- DALBERGIA SISSOO - INDIAN ROSEWOOD
- FRAXINUS PENNSYLVANICA - GREEN ASH
- FRAXINUS VELUTINA - MODESTO ASH
- GLEDITSIA TRIACANTHOS - HONEYLOCUST
- JUGLANS MAJOR - ARIZONA WALNUT
- JUNIPERUS MONOSPERMA - ONE-SEED JUNIPER
- JUNIPERUS OSTEOSPERMA - UTAH JUNIPER
- LASERSTROEMIA INDICA - GRAPE MYRTLE
- MALLUS VARIETIES - FLOWERING CRABAPPLE
- MELIA AZEDARACH - CHINABERRY
- PINUS HALEPENSIS - ALEPPO PINE
- PISTACIA CHINENSIS - CHINESE PISTACHE
- PITHECELOBIUM FLEXICAILLE - TEXAS EBONY
- PLATANUS WRIGHTII - ARIZONA SYCAMORE
- PROSOPIS GLANDULOSA - TEXAS HONEY MESQUITE
- PROSOPIS VELUTINA - VELVET MESQUITE
- PRUNUS VARIETIES - FLOWERING PLUM
- QUERCUS EMORYI - EMORY OAK (LIVE OAK)
- QUERCUS GAMBELI - GAMBEL OAK
- RHUS LANCEOLATA - FLAME LEAF SUMAC
- ROBINIA AMBIGUA - LOCUST
- SALIX MATSUJIANA - GLOBE WILLOW
- SAMBUCCUS MEXICANA - ARIZONA ELDER
- SAPINDUS SAPONARIA - WESTERN SOAPBERRY
- SOPHORA SECLINDIFLORA - TEXAS MOUNTAIN LAUREL
- ULMUS PARVIFOLIA - CHINESE ELM
- VALUQUILINA CALIFORNICA - ARIZONA ROSEWOOD
- VITEX AGNUS-CASTUS - MONK'S PEPPER TREE

#### SHRUBS:

- ACACIA GREGGII - CATCLAW ACACIA
- ARCTOSTAPHYLLUS PUNGENS - MANZANITA (POINTLEAF)
- ARTEMISIA STELLERIANA - DUSTY MILLER
- ARTEMISIA TRIDENTATA - BIG SAGE
- ATRIPLEX CANESCENS - FOUR-WING SALTBUCH
- BAILEYA MULTIRADIATA - DESERT MARIGOLD
- BUDDLEIA ALTERNIFOLIA - FOUNTAIN BUTTERFLY BUSH
- CALLIANDRA CALIFORNICA - RED FAIRY DUSTER
- CAESALPINIA GILLIESII - YELLOW BIRD OF PARADISE
- CAESALPINIA PULCHERRIMA - BIRD OF PARADISE
- CERCOCARPUS MONTANUS - MOUNTAIN MAHOGANY
- COTONEASTER DIMORPHICA - SPREADING COTONEASTER
- COWANIA MEXICANA - CLIFFROSE
- DALEA FORMOSA - FEATHER DALEA
- DALEA FRUTESCENS - SIERRA NEGRA DALEA
- DASYLIRON WHEELERI - DESERT SPOON
- EUROTIA LANATA - WINTER FAT
- EPHEDRA VIRIDIS - MORMON TEA
- EREMOPHYA VALENTINE - VALENTINE
- FOUQUIERIA SPLENDENS - OCOTILLO
- GUTIERREZIA SAROTHRAE - SNAKEWEED
- JUNIPERUS CHINENSIS - JUNIPER
- JUNIPERUS SABINA - JUNIPER
- JUNIPERUS HORIZONTALIS - SPREADING JUNIPER
- JUSTICIA CALIFORNICA - RED CHUPAROSA
- LARREA TRIDENTATA - CREOSOTE BUSH
- LEUCOPHYLLUM FRUTESCENS - TEXAS SAGE
- MUHLENBERGIA RIGENS - DEER GRASS
- MUHLENBERGIA CAPILLARIS 'REGAL MIST' - REGAL MIST MUHLY
- NANDINA DOMESTICA - HEAVENLY BAMBOO
- PHOTINIA FRASERI - FRASER'S PHOTINIA
- PHOTINIA SEBRILLATA - CHINESE PHOTINIA
- PITTOSPORUM TOBRIA - PITTOSPORUM
- PYRACANTHA COCCINEA - PYRACANTHA FIRETHORN
- QUERCUS TURBINELLA - SCRUB OAK
- RUELLIA BRITTONIANA - COMMON RUELLIA
- RUELLIA PENINSULARIS - DESERT RUELLIA
- RHUS OVATA - SUGAR SUMAC
- ROSEMARY OFFICINALIS - ROSEMARY
- RUMEX CRISPUS - CURLY DOCK

#### SHRUBS CONT.

- SALVIA GREGGII - AUTUMN SAGE
- SALVIA COLLIMBARIAE - DESERT SAGE
- SANTOLINA CHAMAECYPARISSUS - GRAY SANTOLINA
- SANTOLINA VIRENS - GREEN SANTOLINA
- SIMMONDISIA CHINENSIS - JOJOBA
- SPHAERALCEA AMBIGUA - GLOBE MALLOW
- TECOMA STANS - YELLOW BELLS
- VALUQUILINA CALIFORNICA - ARIZONA REDWOOD
- VIBURNUM VAR. - VIBURNUM
- VITIS ARIZONICA - ARIZONA GRAPE
- XYLOSMA CONGESTUM - XYLOSMA
- ZIZIPHUS OBSTUSIFOLIA - GRAYTHORN

#### ACCENTS AND CACTI:

- AGAVE AMERICANA - CENTURY PLANT
- AGAVE GEMINIFLORA - TWIN PEAKS AGAVE
- AGAVE PARRYI - PARRY'S AGAVE
- AGAVE WEBERI - WEBER'S AGAVE
- DASYLIRON ACROTICHE - GREEN DESERT SPOON
- DASYLIRON WHEELERI - DESERT SPOON
- ECHINOPIUS CANDICANS - ARGENTINE GIANT
- ECHINOCEBUS FENDLERI - FENDLER HEDGEBHOG
- ECHINOCACTUS GRISONII - GOLDEN BARREL
- ECHINOCEBUS TRIGLOCHDIATUS - CLARET CUP HEDGEBHOG
- HESPERALOE PAVIFLORA - RED YUCCA
- NOLINA MICROCARPA - BEARGRASS
- OPUNTIA PHAEGANTHA - PRICKLY PEAR DESERT
- OPUNTIA WHIPPLEI - PLATEAU CHOLLA
- OPUNTIA VAR. - PRICKLY PEAR
- YUCCA ALBOFOLIA - SPANISH BAYONET YUCCA
- YUCCA BACCATA - BANANA YUCCA
- YUCCA ELATA - SOAPTREE YUCCA

#### GROUNDCOVERS:

- ACACIA BENDOLENS 'DESERT CARPET' - DESERT CARPET ACACIA
- BACCHARIS 'STARN THOMPSON' - STARN THOMPSON BACCHARIS
- CONVULVULUS ONEIFOLIUM - BUSH MORNING GLORY
- CHRYSACTINIA MEXICANA - DAMIANITA
- DALEA CAPITA 'SIERRA GOLD' - SIERRA GOLD DALEA
- HYMENOXYS ACALUIS - ANGELITA DAISY
- LANTANA X 'NEW GOLD' - NEW GOLD LANTANA
- LANTANA MONTEVENSIS - TRAILING PURPLE LANTANA
- MELAMPODIUM LEUCANTHUM - BLACK DAISY
- PENSTEMON PARRYI - PARRY'S PENSTEMON
- SPHAERALCEA AMBIGUE - DESERT MALLOW
- VERBENA TEMARI PURPLE - PURPLE VERBENA

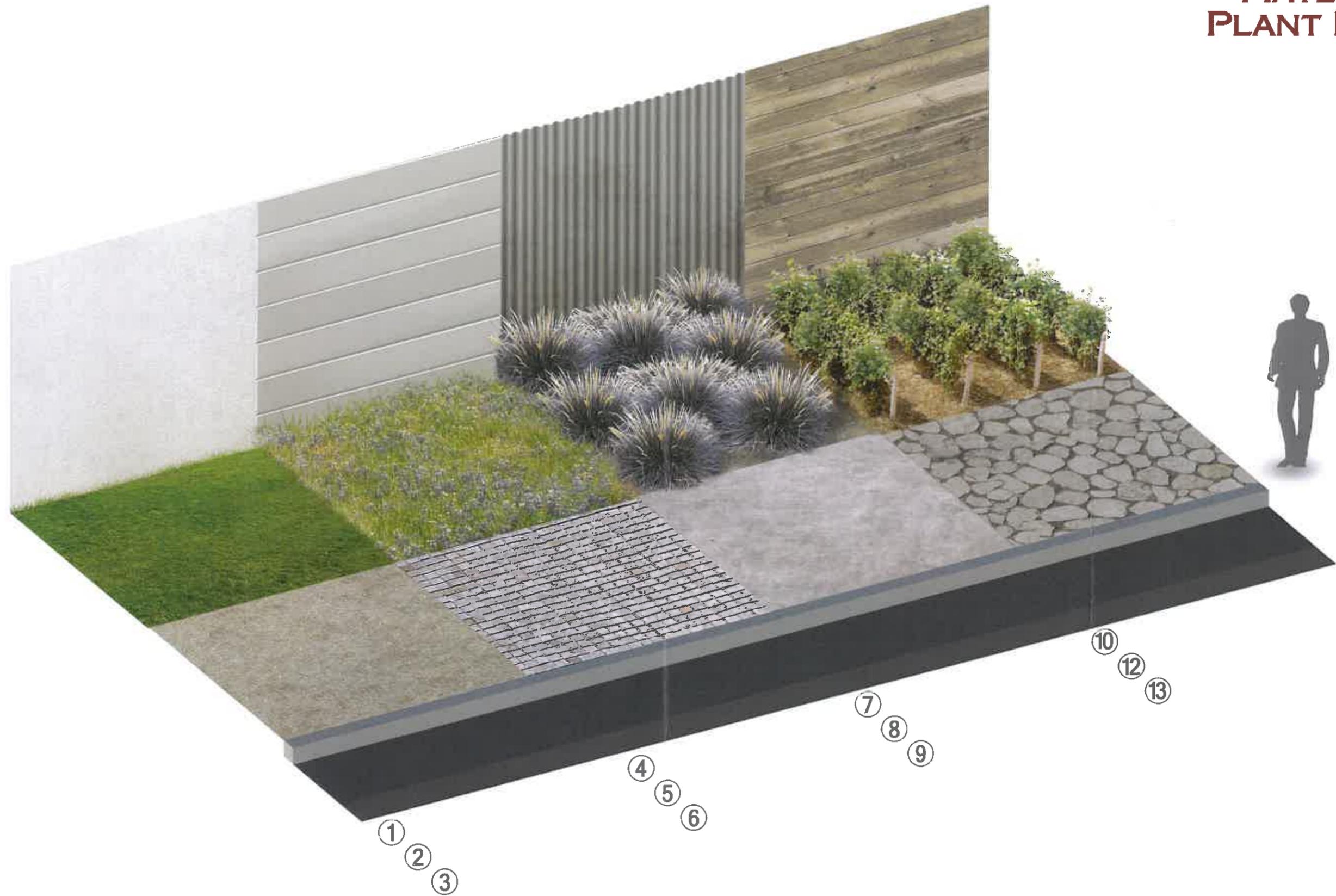
#### VINES:

- CLYTOSTOMA CALLISTEGODES - LAVENDER TRUMPET VINE
- PARTHENOCESSUS 'HACIENDA CREEPER' - RANCHO VIEJO CREEPER
- VITIS 'ROGER'S RED' - ROGER'S RED CALIFORNIA GRAPE
- VARIOUS VARIETIES OF PRODUCTION VINEYARD GRAPES\*

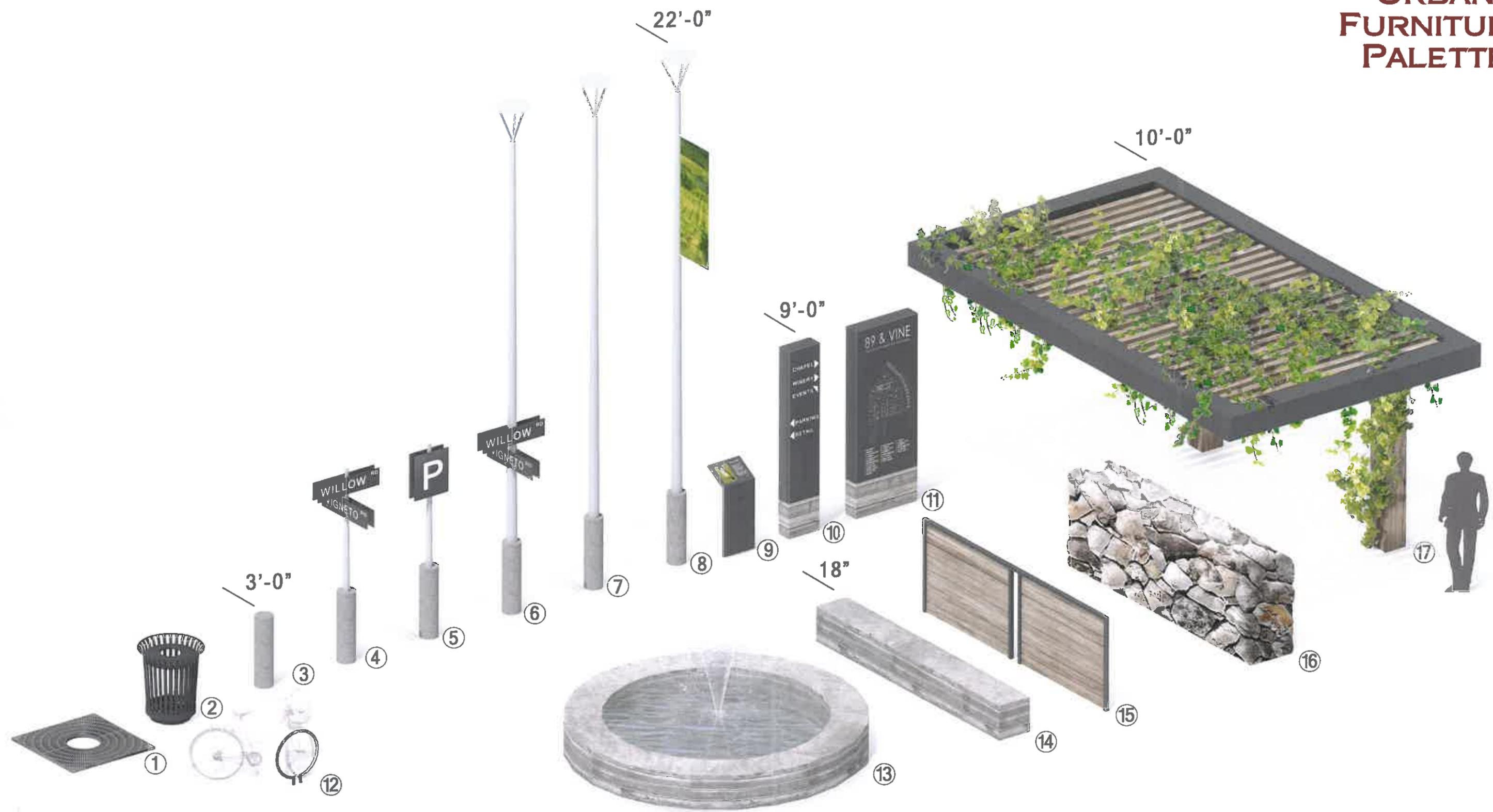
#### \*NOTE:

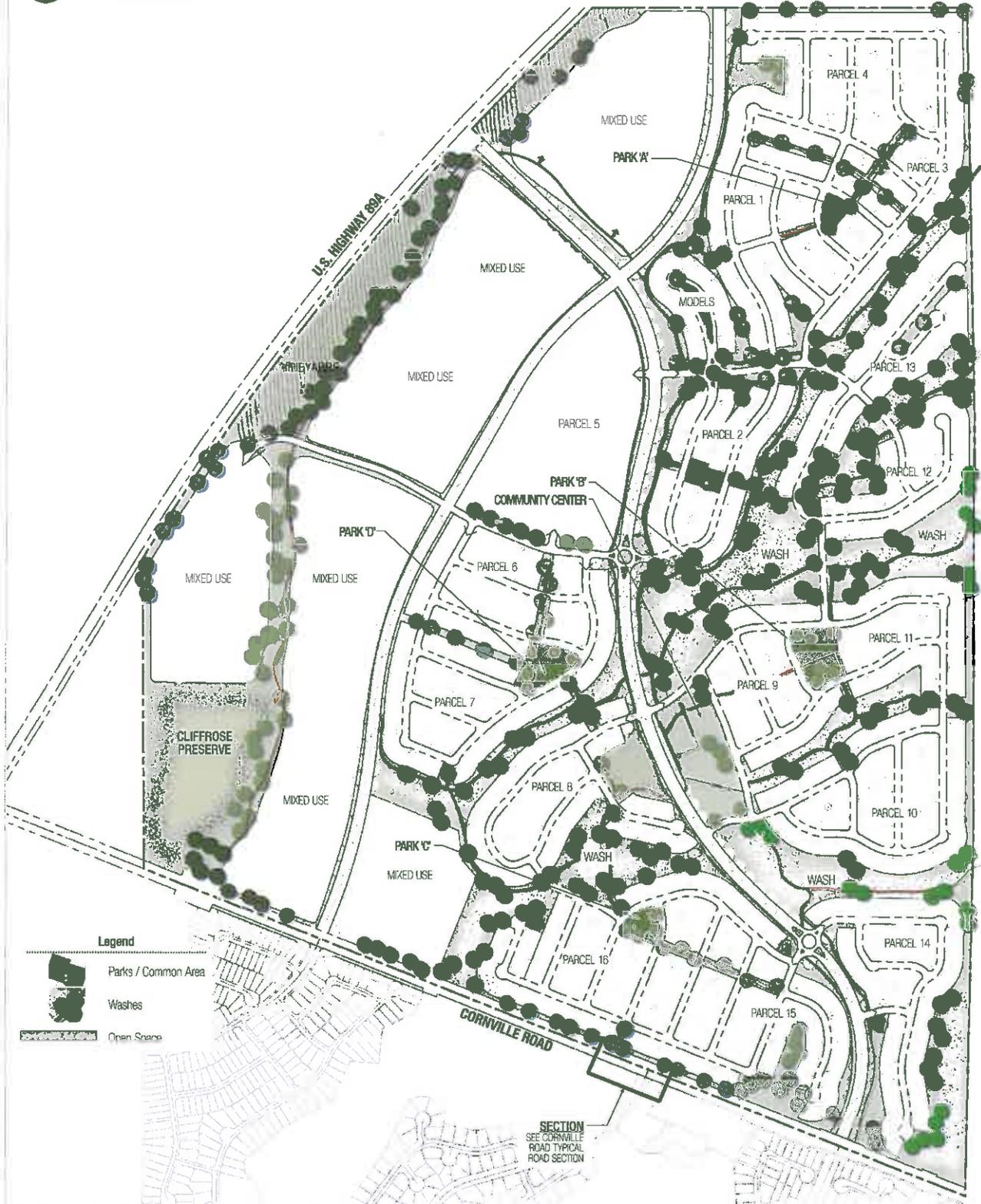
1. ADDITIONAL PLANT MATERIALS MAY BE INTRODUCED AS DIFFERENT VARIETIES BECOME AVAILABLE THROUGH LOCAL NURSERIES AND IF THEY ARE CONSISTENT WITH THE OVERALL THEME OF THE PROJECT.
2. VARIOUS VARIETIES OF PRODUCTION VINEYARD GRAPES ARE INTENDED TO BE LOCATED IN OPEN SPACE TRACTS DESIGNATED ON THE PLANS.

# CONCEPTUAL 89 & VINE MATERIAL & PLANT PALETTE



# 89 & VINE CONCEPTUAL URBAN FURNITURE PALETTE





**SECTION**  
SEE CORNVILLE  
ROAD TYPICAL  
ROAD SECTION

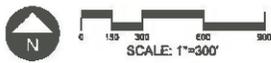


**PARKS / COMMON AREA TREE:**  
DALBERGIA SISOOD - INDIAN ROSEWOOD



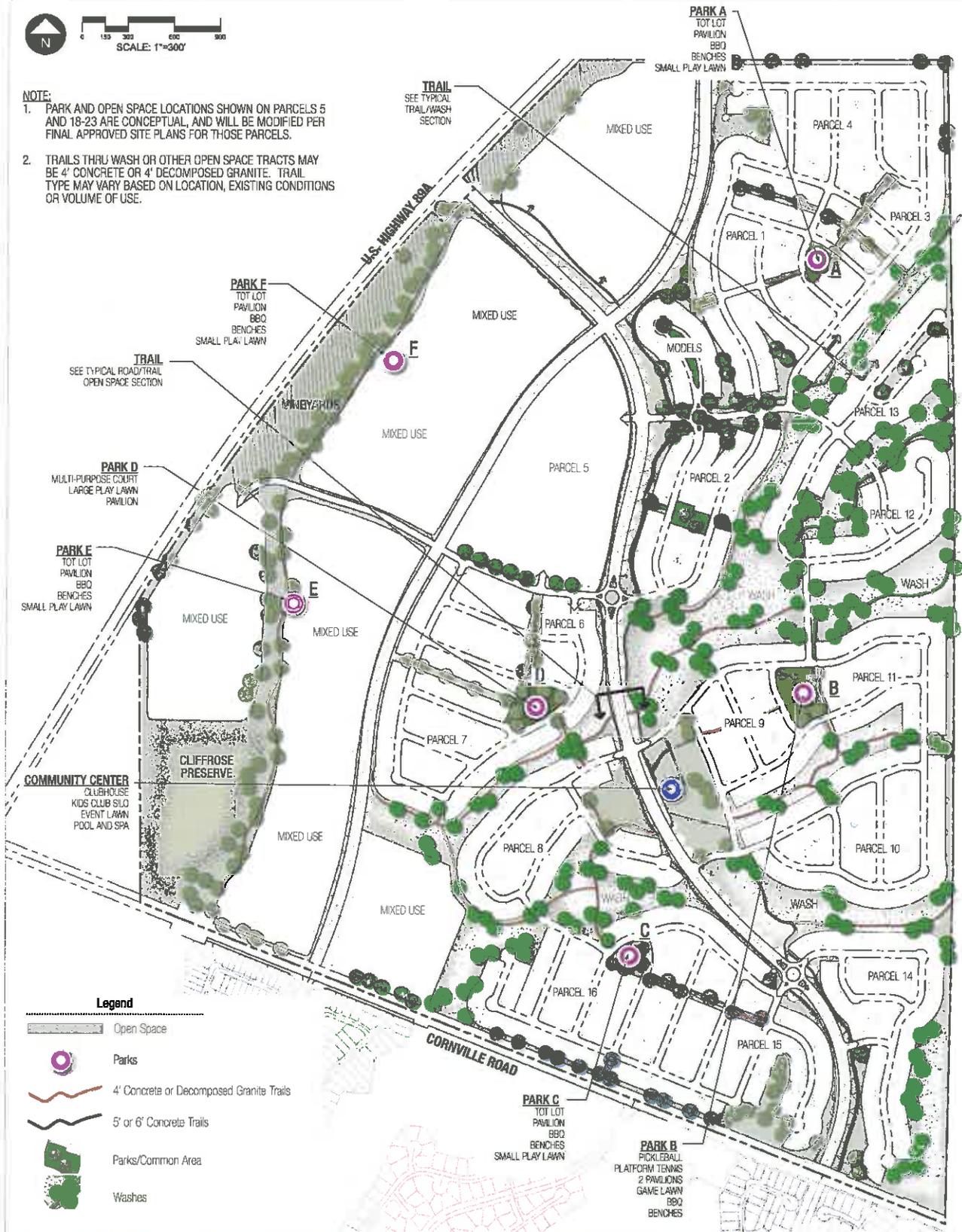
**WASH AREA TREE:**  
PROSOPIS VELUTINA - VELVET MESQUITE

- NOTE:**
1. ADDITIONAL TREE SPECIES MAY BE PLACED WITHIN COMMON AREA AND WASH LANDSCAPES, BUT THE TREES IDENTIFIED SHOULD BE ESTABLISHED AS THE VISUALLY DOMINANT SPECIES.
  2. OPEN SPACE LANDSCAPES SHOULD TRANSITION TO ADJACENT STREETSCAPE AND NEIGHBORHOOD LANDSCAPES TO PROVIDE SEAMLESS TRANSITIONS THROUGHOUT THE PROJECT.



**NOTE:**

1. PARK AND OPEN SPACE LOCATIONS SHOWN ON PARCELS 5 AND 18-23 ARE CONCEPTUAL, AND WILL BE MODIFIED PER FINAL APPROVED SITE PLANS FOR THOSE PARCELS.
2. TRAILS THRU WASH OR OTHER OPEN SPACE TRACTS MAY BE 4" CONCRETE OR 4" DECOMPOSED GRANITE. TRAIL TYPE MAY VARY BASED ON LOCATION, EXISTING CONDITIONS OR VOLUME OF USE.



**Legend**

- Open Space
- Parks
- 4" Concrete or Decomposed Granite Trails
- 5" or 6" Concrete Trails
- Parks/Common Area
- Washes



PLAY EQUIPMENT



PLAY LAWNS

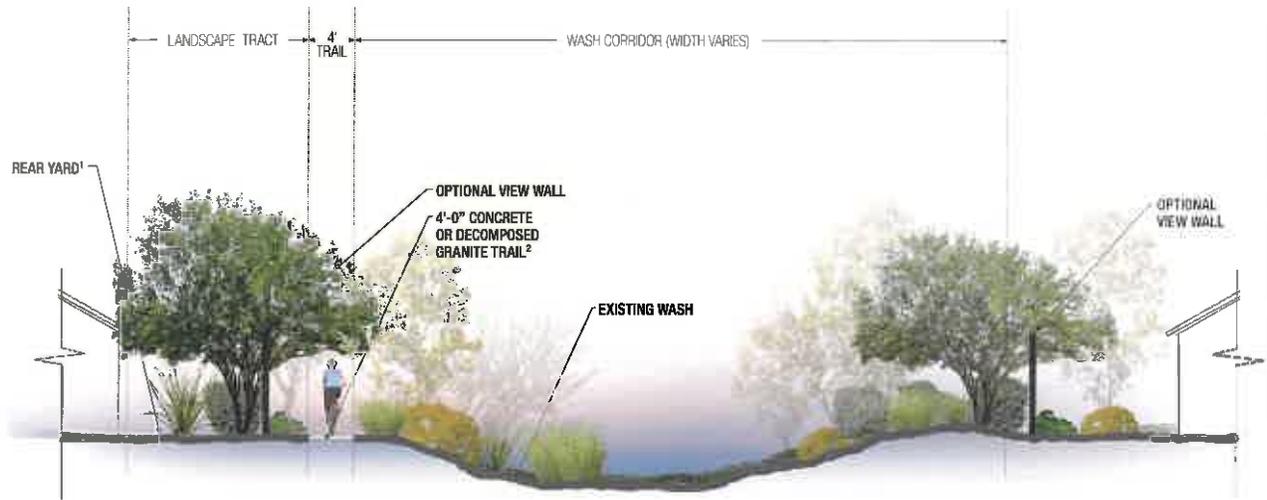


PICKLE BALL COURTS



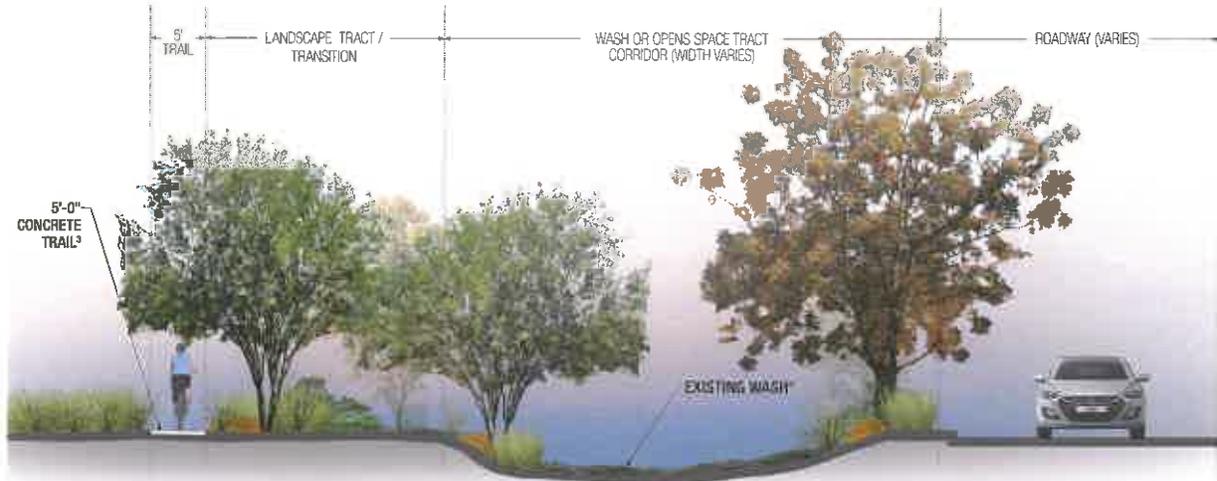
PICNIC PAVILIONS

**89 & VINE**  
PAD EXHIBITS  
CONCEPTUAL PARKS AND TRAILS PLAN



TYPICAL TRAIL/WASH SECTION

NTS



TYPICAL ROAD/OPEN SPACE SECTION

NTS

**NOTES:**

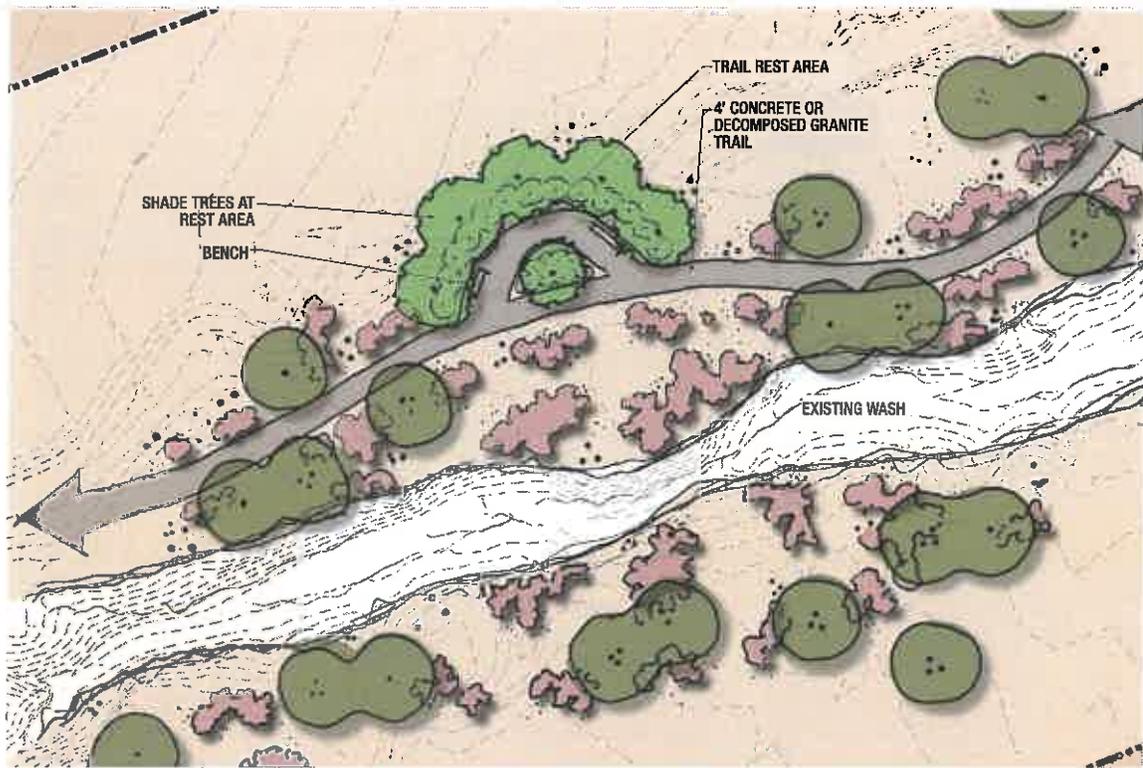
1. LANDSCAPING FROM REAR YARDS BACKING TO WASH OR OPEN SPACE TRACTS SHOULD BLEND TO NATIVE/WASH LANDSCAPES.
2. TRAILS SHOULD MEANDER ALONG WASH, AVOIDING EXISTING NATIVE VEGETATION, WHILE RESPONDING TO TERRAIN TO PROVIDE INTEREST FOR THE TRAIL USER, WHILE MAXIMIZING PRIVACY TO ADJACENT HOMES.
3. PROVIDE MEANDERING TRAIL ALONG ROADWAYS, WHERE ADJACENT OPEN SPACE TRACT ALLOWS, IN PLACE OF STANDARD TRAIL PARALLELING ROADWAYS.
4. UTILIZE DRAINAGEWAYS/OPEN SPACE TRACTS ALONG ROADWAY, WHERE FEASIBLE TO PROVIDE LANDSCAPE BUFFERS TO TRAIL USERS AND HOMES.
5. TRAILS THRU WASH OR OTHER OPEN SPACE TRACTS MAY BE 4' CONCRETE OR 4' DECOMPOSED GRANITE. TRAIL TYPE MAY VARY BASED ON LOCATION EXISTING CONDITIONS OR VOLUME OF USE.



CONCRETE TRAIL



DECOMPOSED GRANITE TRAIL



TYPICAL TRAIL/WASH PLAN



TYPICAL TRAIL CROSSING AT MAJOR ROADWAY

PROVIDE VINEYARD PLANTINGS ALONG MAJOR ROADWAYS WHERE SPACE AND TERRAIN ALLOWS

NOTE:

1. TRAILS THRU WASH OR OTHER OPEN SPACE TRACTS MAY BE 4" CONCRETE OR 4" DECOMPOSED GRANITE. TRAIL TYPE MAY VARY BASED ON LOCATION, EXISTING CONDITIONS OR VOLUME OF USE.



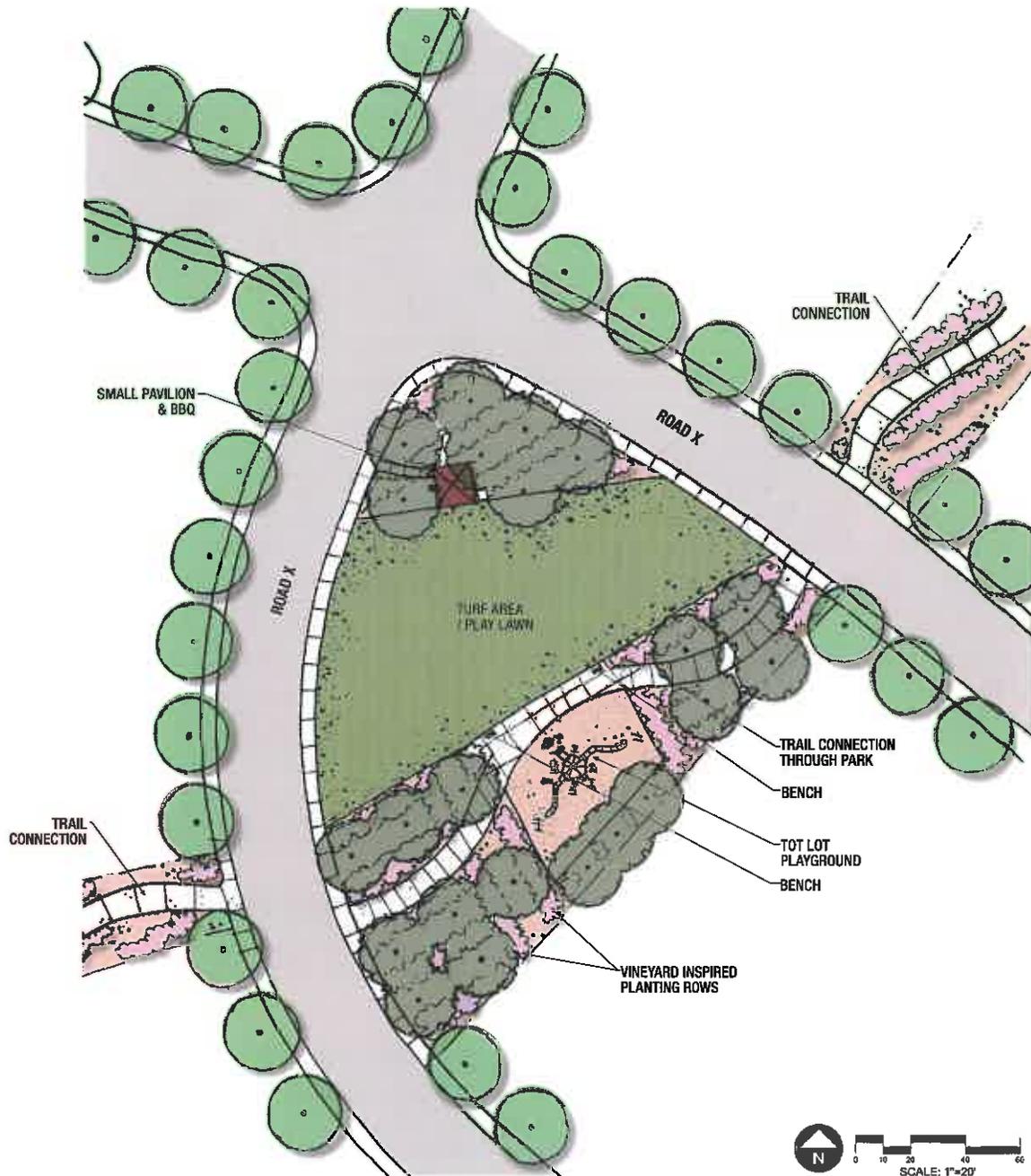
DECORATIVE PAVERS



DECOMPOSED GRANITE TRAIL

89 & VINE  
PAD EXHIBITS

CONCEPTUAL OPEN SPACE/  
TRAIL PLANS



Vicinity Map



**PARK 'A' CONCEPT:**

PARK 'A' PICKS UP DESIGN CUES FROM COUNTRY VINEYARDS BY UTILIZING ROWS OF PLANT MATERIAL THAT MIMIC THE VINEYARD LANDSCAPES. ON THE NORTHERN END OF THE PARK, A PARK PAVILION AND BBQ IS NESTLED WITHIN THE VINEYARD WITH VIEWS AND ACCESS TO THE PLAY LAWN WHILE ACTING AS AN ANCHOR FOR THE PARK CORNER.

THE GENEROUS PLAY LAWN PROVIDES SPACE FOR INFORMAL PLAY AND PASSIVE RAMBLING.

THE SOUTHERN END OF THE PARK PICKS BACK UP THE VINEYARD CONCEPT IN PLANTED ROWS OF PLANT MATERIALS. THE TRAIL CONNECTION THROUGH THE PARK OFFERS INTERACTION WITH THE TOT LOT, AND ALLOWS FOR AREAS OF RESPIRE WITH BENCHES THAT FRONT BOTH THE PLAYGROUND AND PLAY AREA.



**Vicinity Map**



**PARK 'B' CONCEPT**

PARK 'B' IS AN ACTIVE PARK THAT INCLUDES SEVERAL COURT SPORTS INCLUDING PICKLE BALL AND PLATFORM TENNIS COURTS. PARK 'B' CONTINUES DESIGN CUES FROM THE VINEYARD LANDSCAPES BY UTILIZING ROWS OF PLANT MATERIAL THAT MIMIC THE VINEYARDS AND ARE INTEGRATED THROUGH THE PARK FEATURES. ON THE NORTHERN END OF THE PARK, A PARK PAVILION AND BBQ IS NESTLED WITHIN THE VINEYARD WITH DISTANT VIEWS TO MINGUS MOUNTAIN AND ACCESS TO THE PLAY LAWN. A SECOND PAVILION LIES IN THE CENTER OF THE PARK PROVIDING ACCESS TO PARKING, TRAILS AND THE COURTS.

THE GENEROUS PLAY LAWN PROVIDES SPACE FOR INFORMAL PLAY.

THE SOUTHERN END OF THE PARK ALSO UTILIZES THE VINEYARD LANDSCAPE CONCEPT IN ROWS OF PLANT MATERIALS. SEVERAL TRAIL CONNECTIONS THROUGH THE PARK OFFER RESIDENTS A DIRECT LINK TO THE TRAIL SYSTEM AND THE COMMUNITY CENTER TO THE WEST.

**89 & VINE**  
PAD EXHIBITS

PARK 'B' CONCEPTUAL PLAN



Vicinity Map



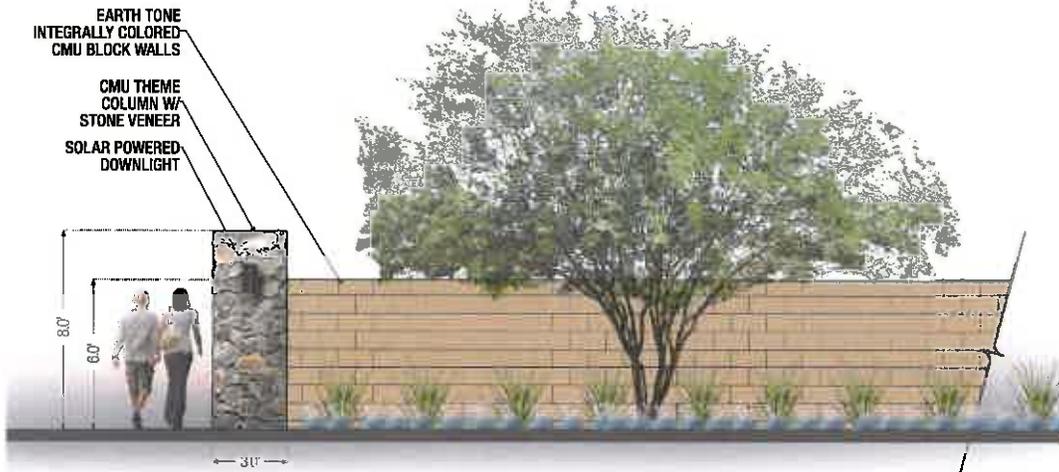
**COMMUNITY CENTER CONCEPT:**  
 DESIGN INSPIRATION FROM VINEYARD RESIDENCES, TUCKED AMONG THE VINES. SIMPLE AND FUNCTIONAL WITH QUALITY INDOOR AND OUTDOOR SPACES PROVIDING RESIDENTS WITHIN 69+VINE A UNIQUE GATHERING SPACE.

# 89 & VINE CONCEPTUAL PRIMARY ENTRY MONUMENT TO RESIDENTIAL



**89 & VINE  
CONCEPTUAL  
NEIGHBORHOOD  
ENTRY TO  
GATED AREAS**





**DETAIL 1** THEME WALL

ELEVATION  
N.T.S.



**DETAIL 2** SUBDIVISION WALL

ELEVATION  
N.T.S.

**NOTE:**

1. WALL LOCATIONS MAY BE ADJUSTED ON A CASE BY CASE BASIS, AS EXISTING CONDITIONS DICTATE.



**DETAIL 3 2'-0" VIEW WALL**

ELEVATION  
NT2



**DETAIL 4 4'-0" VIEW WALL**

ELEVATION  
NT3



**DETAIL 5 6'-0" VIEW WALL**

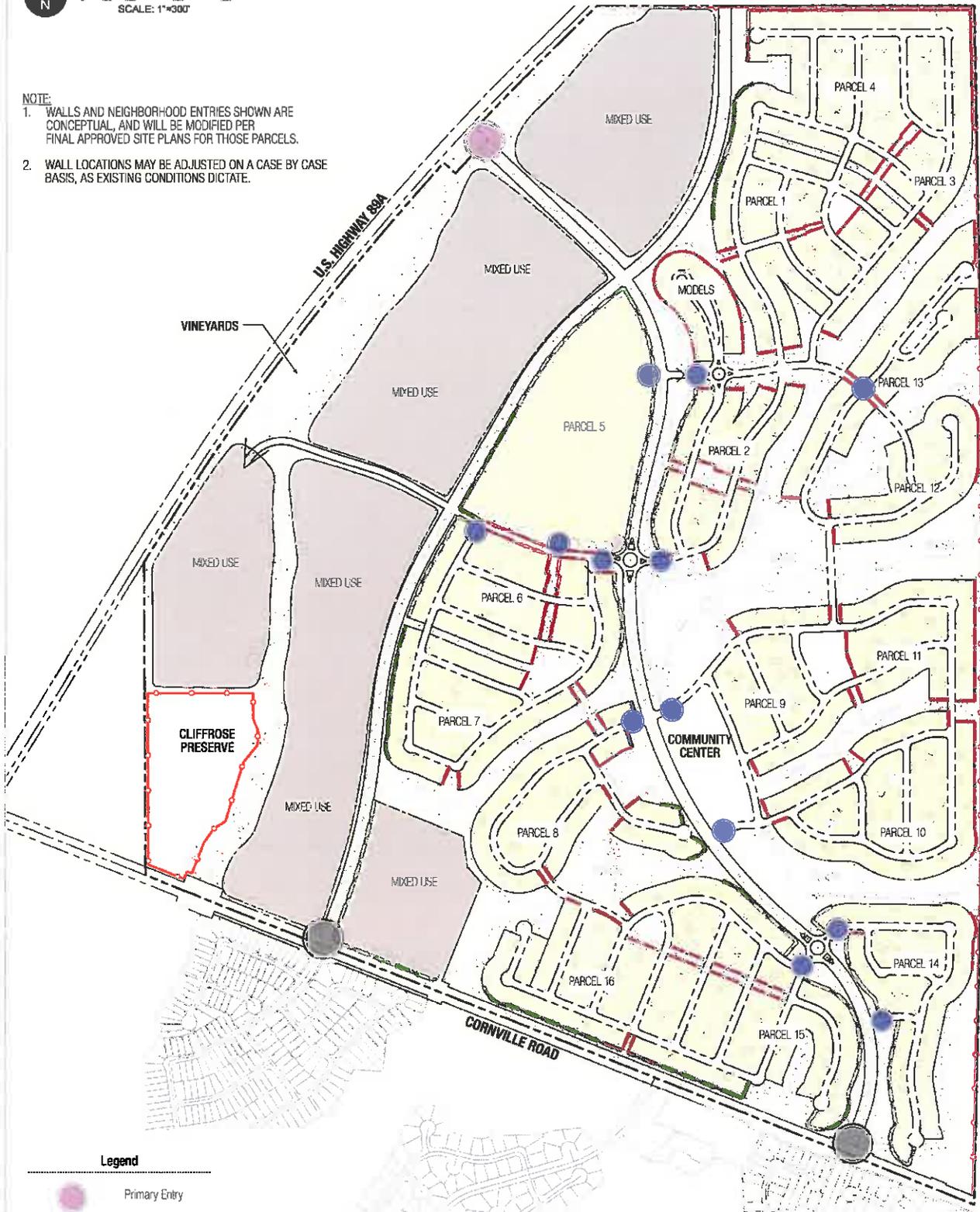
ELEVATION  
NT3

**NOTE:**  
1. VIEW WALLS AND VIEW WALL TYPES MAY BE PLACED ON A CASE BY CASE BASIS RESPONDING TO EXISTING CONDITIONS AND MAY VARY BY LOCATION AND DESIRED INTENT.



**NOTE:**

1. WALLS AND NEIGHBORHOOD ENTRIES SHOWN ARE CONCEPTUAL, AND WILL BE MODIFIED PER FINAL APPROVED SITE PLANS FOR THOSE PARCELS.
2. WALL LOCATIONS MAY BE ADJUSTED ON A CASE BY CASE BASIS, AS EXISTING CONDITIONS DICTATE.

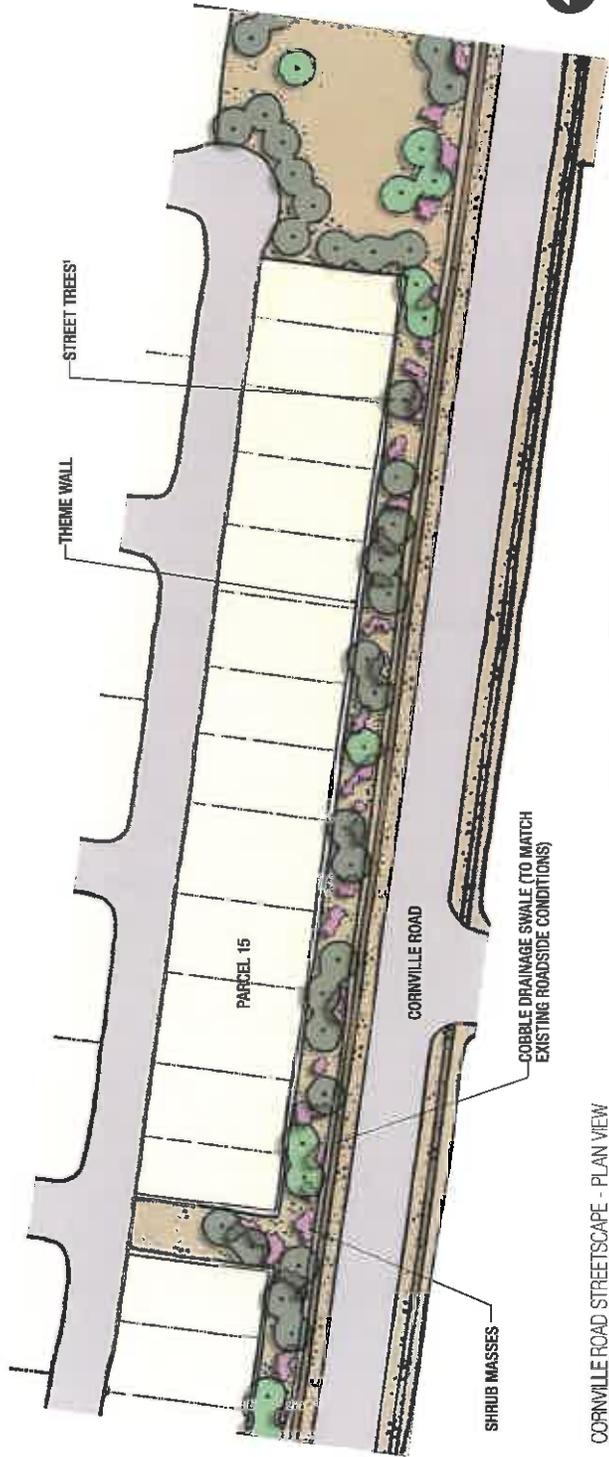


**Legend**

-  Primary Entry
-  Secondary Entry
-  Neighborhood Entry
-  Barbed Wire Fencing
-  Theme Wall
-  Subdivision/View Wall



- NOTE:
1. STREET TREES AND SHRUBS TO BE PLANTED IN A NATURAL PATTERN.
  2. ADDITIONAL TREE SPECIES MAY BE PLACED ALONG CORNVILLE ROAD, BUT INDIAN ROSEWOOD SHOULD BE ESTABLISHED AS THE VISUALLY DOMINANT SPECIES.



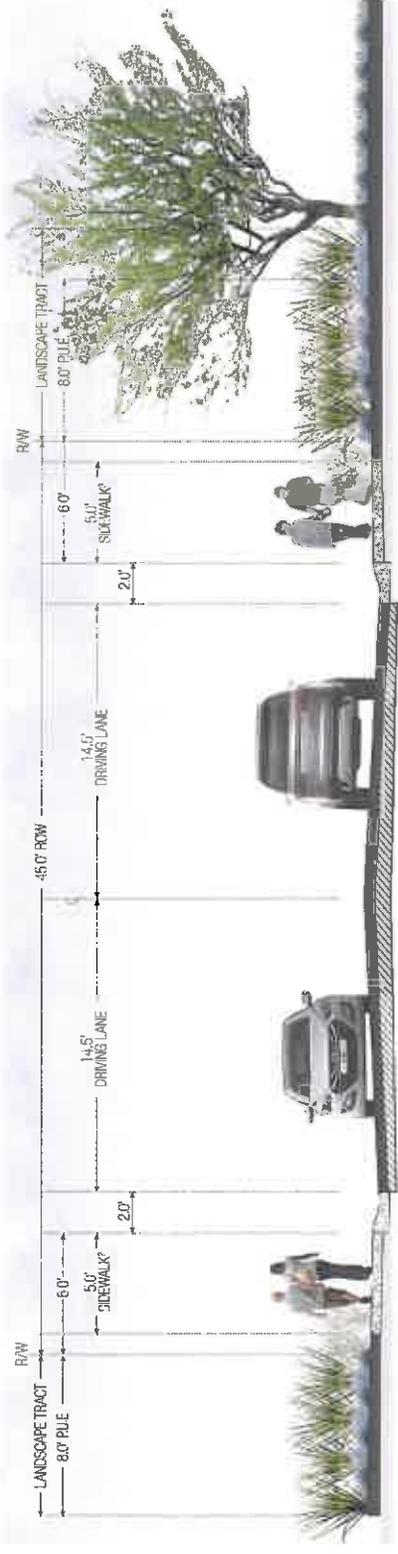
CORNVILLE ROAD STREETScape - PLAN VIEW

M/S



CORNVILLE ROAD STREETScape - SECTION

M/S



RESIDENTIAL ROADWAY



LOCAL ENTRY STREET WITH MEDIAN

NOTE:

1. STREET TREES PER STREETSCAPE LANDSCAPE PLAN.
2. 5' SIDEWALKS MAY MEANDER INTO ADJACENT LANDSCAPE TRACT, WHERE FEASIBLE (BOTH SIDES OF ROAD).
3. INTERGRATE LOW STONE WALLS AT MAJOR INTERSECTIONS AND ROUNDABOUTS TO MATCH THEME ENTRY AND COLUMN MATERIALS.

# 89 & VINE

## CONCEPTUAL HOME ELEVATIONS







1,720 Square Feet

# Yosemite Floorplan

with elevation choices

## Destination SERIES



*Hacienda Patch*



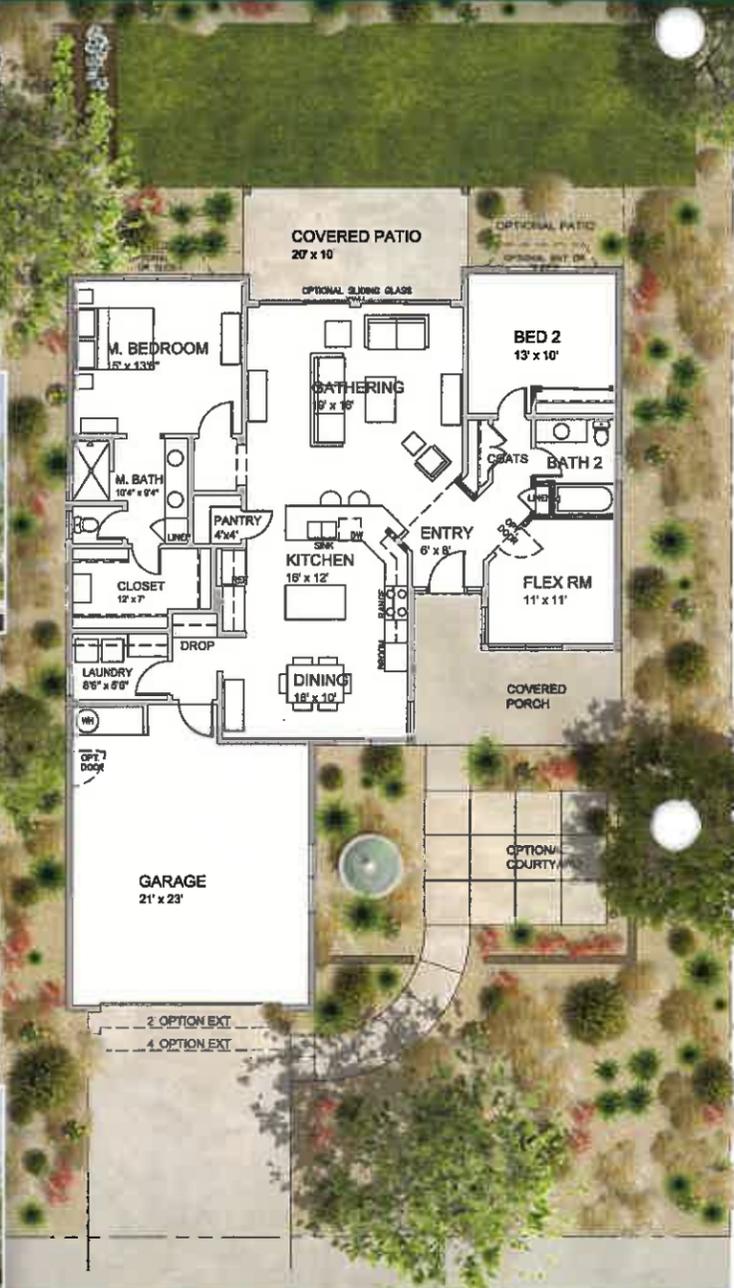
*Prairie*



*International*



*Mid-Century*



**Front Entry 2-Car Garage**



*Hacienda Flat*



*Newport*



*Santa Monica*



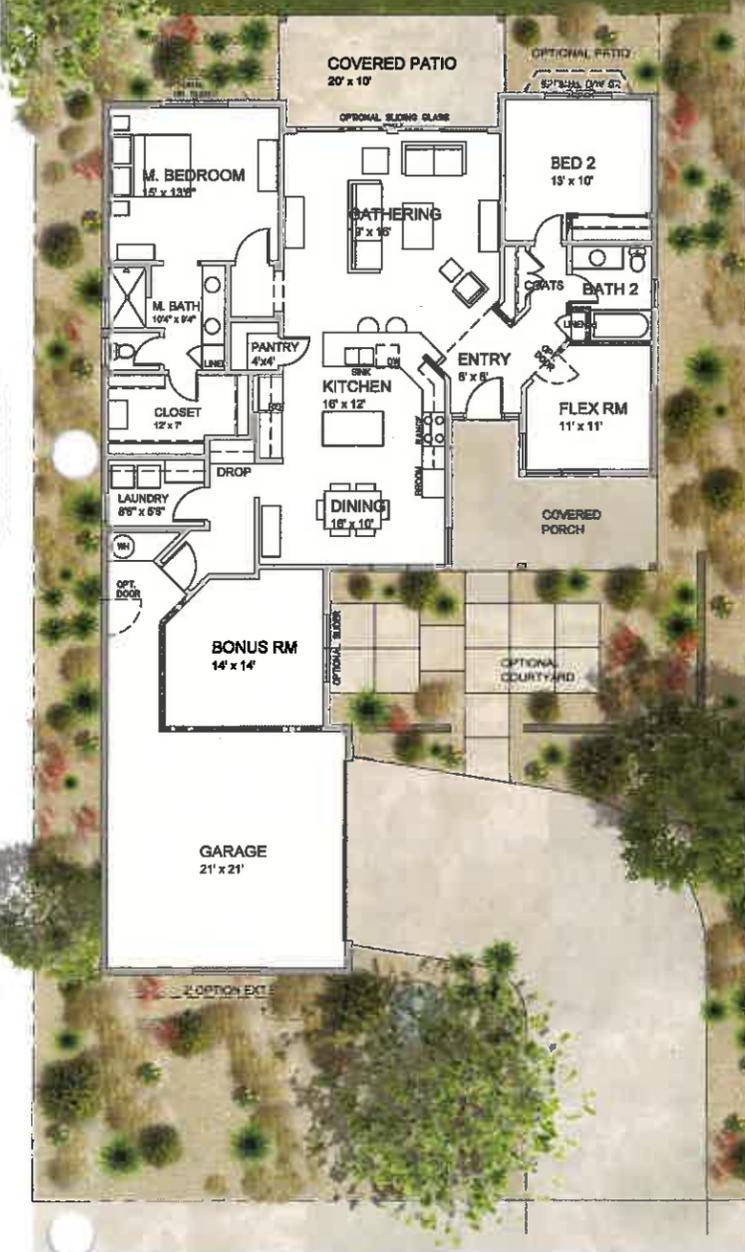
*Craftsman*



*Midwestern*



*Laguna*



**Side Entry 2-Car Garage w/Bonus Room Option**



*Georgian*

1,895 Square Feet

# Redwood Floorplan

with elevation choices

## Destination SERIES



Side Entry 2-Car Garage



Side Entry 2-Car Garage w/Split 3rd Car Garage

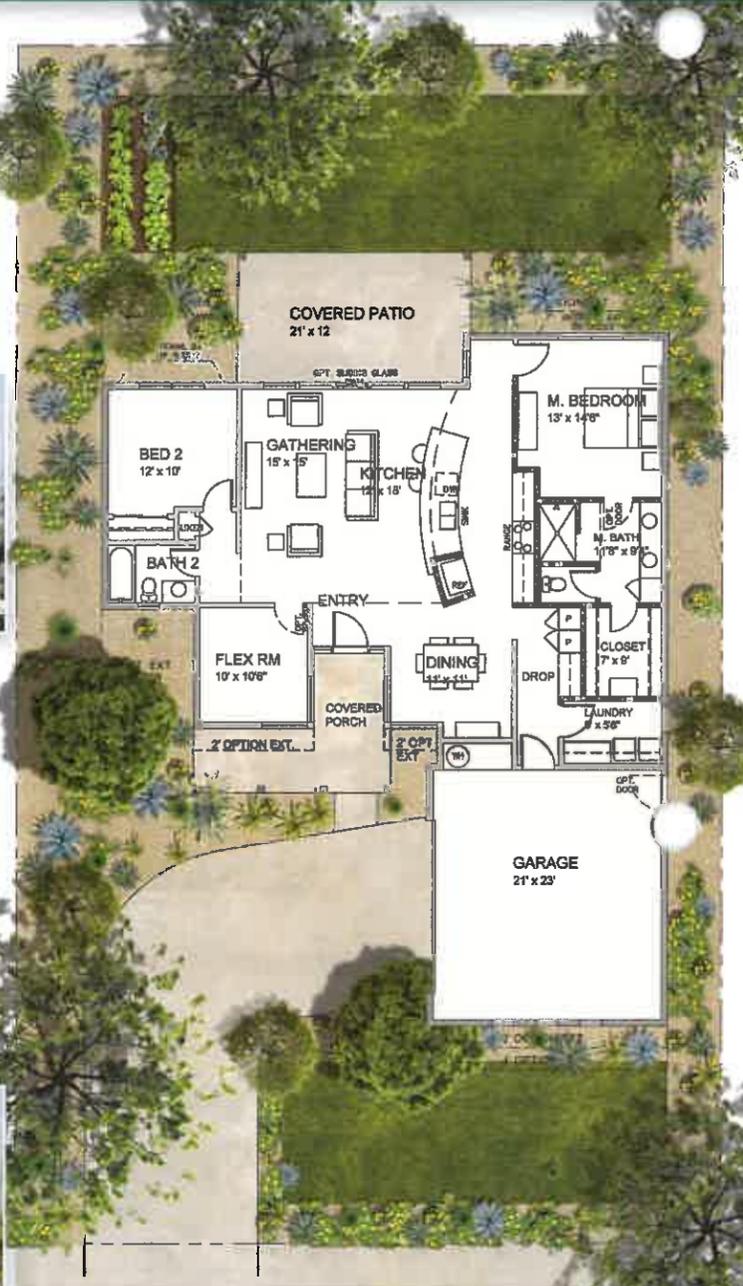


1,595 Square Feet

# Napa Floorplan

with elevation choices

## Destination SERIES



Side Entry 2-Car Garage



Side Entry 2-Car Garage w/Split 3rd Car Garage



1,970 Square Feet

# Denali Floorplan

with elevation choices

## Destination SERIES



*Santa Monica*



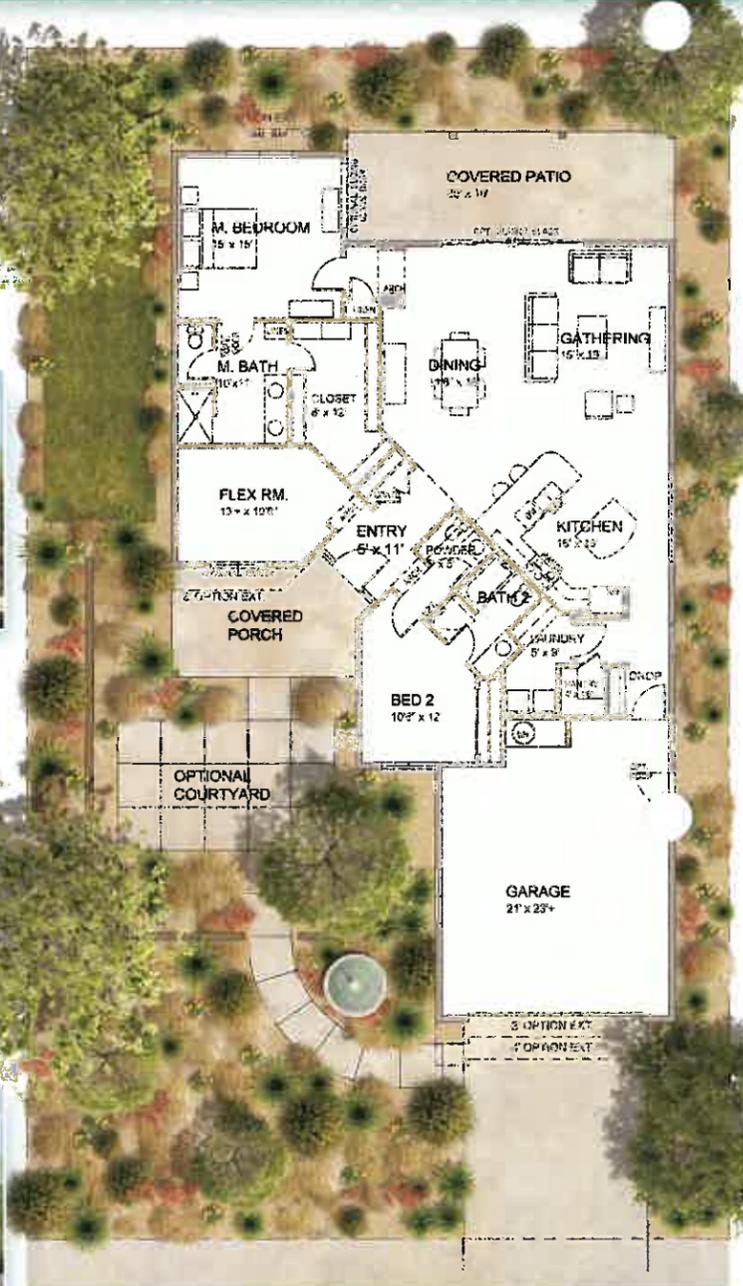
*Craftsman*



*Prairie*



*Midwestern*



Front Entry 2-Car Garage



*International*



Side Entry 2-Car Garage  
w/Bonus Room Option



*Craftsman*



*Prairie*



*Laguna*



*Georgian*



*Hacienda-Pitch*



*Midwestern*

1,350 Square Feet

# Rainier Floorplan

with elevation choices

## Destination SERIES



Front Entry 2-Car Garage



Side Entry 2-Car Garage w/Bonus Room Option



2,585 Square Feet

# Lincoln Floorplan

with elevation choices

## Statesman SERIES



*Prairie*



*International*



*Santa Monica*



*Hacienda Flat*



**Side Entry 2-Car Garage**



*Med Century*



*Hacienda Pitch*



*Santa Monica*



**Side Entry 2-Car Garage w/Split 3rd Car Garage**



*Georgian*



*Hacienda Flat*



*Laguna*



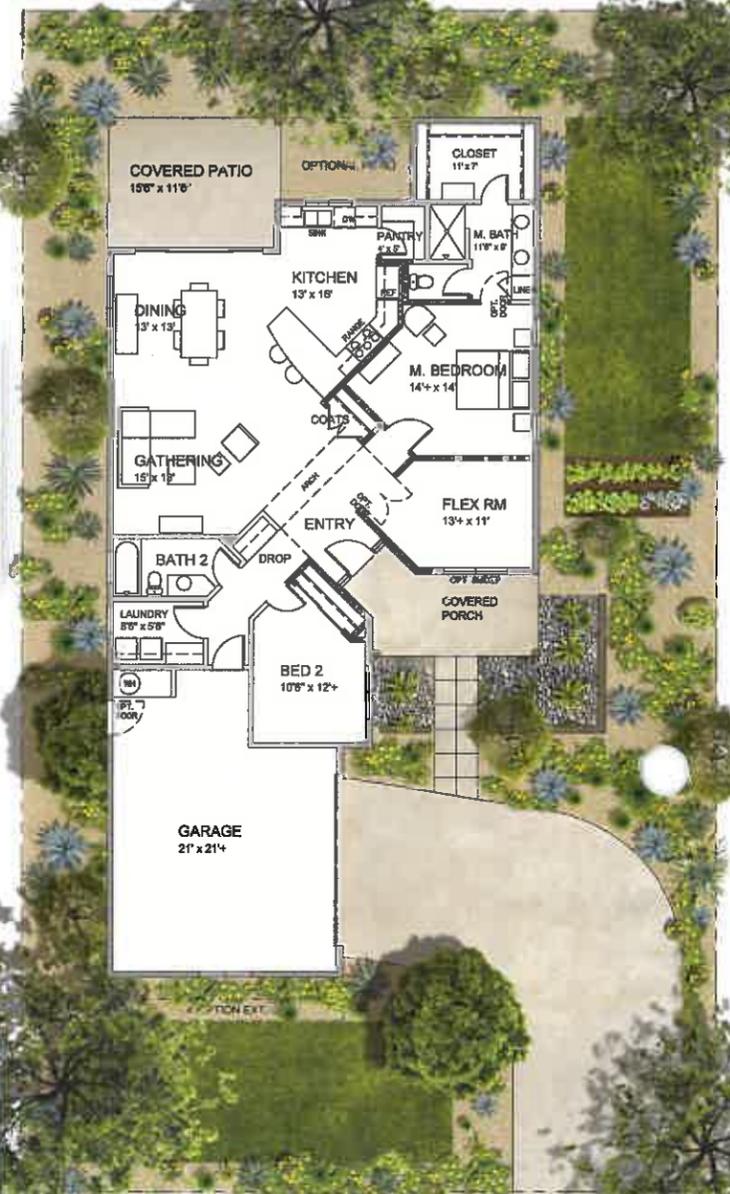
*Med Century*

1,642 Square Feet

# Highland Floorplan

with elevation choices

## Hometown SERIES



Side Entry 2-Car Garage



Side Entry 2-Car Garage  
w/Split 3rd Car Garage



2,850 Square Feet

# Madison Floorplan

with elevation choices

## Statesman SERIES



Front Entry 2-Car Garage



Side Entry 2-Car Garage  
w/Bonus Room Option





# 89 & VINE

By Brookfield Communities Inc.  
Cottonwood, Arizona



## 89 & VINE

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BrookfieldCommunities.com



## Home Concepts for Future 89 & VINE Phases