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Introduced by City Council

BILL NO. 2844

ORDINANCE NO. 2 6 6 2

**PCN21-0008 /PD25-0003 - FINAL
APPROVAL OF THE ANDELIN RANCH
PLANNED DEVELOPMENT HANDBOOK
FOR AN APPROXIMATELY 115.89-
ACRE SITE GENERALLY LOCATED
SOUTH OF ANDELIN RANCH ROAD,
EAST OF CALYPSO DRIVE, WEST OF
FALLEN GROVE LANE, AND NORTH
OF STONEBROOK PARKWAY.**

AN ORDINANCE ADOPTING THE FINAL PLAN FOR THE ANDELIN RANCH PLANNED DEVELOPMENT HANDBOOK FOR AN APPROXIMATELY 115.89-ACRE SITE GENERALLY LOCATED SOUTH OF ANDELIN RANCH ROAD, EAST OF CALYPSO DRIVE, WEST OF FALLEN GROVE LANE, AND NORTH OF STONEBROOK PARKWAY, SPARKS, NEVADA, IN THE PD (PLANNED DEVELOPMENT - ANDELIN RANCH) ZONING DISTRICT.

THE CITY COUNCIL OF THE CITY OF SPARKS DOES ORDAIN:

SECTION 1: The final plan (Andelin Ranch Planned Development Handbook) for the property described in Exhibit "A," situated in the City of Sparks, County of Washoe, State of Nevada, is hereby adopted as provided for in Exhibit "B."

SECTION 2: The City Clerk is instructed and authorized to publish the title to this ordinance as provided by law and to record the plan certified herein as provided by law.

SECTION 3: The ordinance shall become effective upon passage,

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approval, and publication.

SECTION 4: The provisions of this ordinance shall be liberally construed to effectively carry out its purposes in the interest of the public health, safety, welfare, and convenience.

SECTION 5: If any subsection, phrase, sentence, or portion of this section is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions.

SECTION 6: The City Council finds that this ordinance is not likely to impose a direct and significant economic burden upon a business or directly restrict the formation, operation, or expansion of a business, or is otherwise exempt from Nevada Revised Statutes Chapter 237.

PASSED AND ADOPTED this 10th day of November 2025 by the following vote of the City Council:

AYES:Abbott, VanderWell, Anderson, Bybee, Rodriguez

NAYS:N/A

ABSENT:N/A

ABSTAIN: N/A

APPROVED this 10th day of November 2025.

Ed Lawson

Ed Lawson, Mayor

ATTEST:

APPROVED AS TO FORM ONLY:

Lisa Hunderman

**Lisa Hunderman
City Clerk**



Jessica Cokerly

**Wes Duncan
City Attorney**

A.P.N.'s:

528-030-13

528-030-14

528-030-15

**CITY OF SPARKS PLANNED UNIT DEVELOPMENT
LEGAL DESCRIPTION**

All that certain real property situate within a portion of the Southwest One-Quarter (SW 1/4) of Section Two (2), Township Twenty (20) North, Range Twenty (20) East, Mount Diablo Base and Meridian, Washoe County, Nevada, being more particularly described as follows:

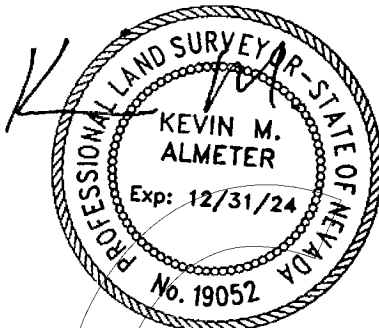
Parcel 1, Parcel 2, and Parcel 3 per Parcel Map No. 4545, recorded April 20, 2006 as File No. 3376788 in the Official Records of Washoe County, Nevada.

Prepared by:

Wood Rodgers, Inc.

1361 Corporate Blvd.

Reno, NV 89502



11-13-24

Kevin M. Almeter, P.L.S.

Nevada Certificate No. 19052

When recorded, mail to
City of Sparks
P.O. Box 857
Sparks, Nevada 89432-0857
ATTN: Community Development Dep't

(Space above for recorder's use only)

NOTICE OF ADOPTION OF DEVELOPMENT PLAN
(NRS Chapter 278A)

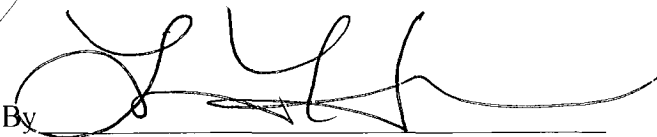
Name of Development: Andelin Ranch
Name of Plan: Planned Development Handbook for Andelin Ranch
City No. PCN21-0008
Date of Approval: November 10, 2025

NOTICE IS HEREBY GIVEN that on the above indicated date, the City Council of the City of Sparks, Nevada, gave final approval to the above described plan as the development plan for the above-named development, whose legal description is attached to Ordinance No. 2662 as Exhibit A.

Pursuant to NRS 278A.570 (2) after this plan is recorded, all zoning and subdivision regulations applicable to the property described in Exhibit A cease to apply and are replaced with the plan attached as Exhibit B to Ordinance No. 2662 hereto.

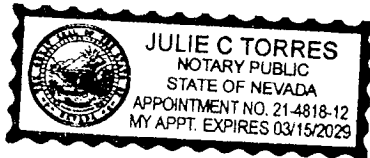
Dated this 9 day of December, 2025.

City of Sparks, Nevada

By 
Lisa Hunderman
City Clerk

State of Nevada) Acknowledgement in representative capacity
County of Washoe) (NRS 240.1665)

This instrument was acknowledged before me on 12-9-2025
By Lisa Hunderman as the City Clerk of Sparks, Nevada



Julie C Torres

Notary Public

Table of Approvals and Amendments

City File #	Item Approved	Approval Date	Recorded in Official Records of Washoe County
PD25-0003	Approval of Planned Development Standard Handbook	November 10, 2025	



ANDELIN RANCH

Planned Development Handbook

Approved November 10, 2025

Prepared For:
Andelin Family Trust

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Appendix 2 – Legal Description

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Appendix 4 – Andelin Farms Existing Uses, Site Plan, and Existing Structures/Building Inventory

Appendix 5 – Preliminary Sewer Report

Appendix 6 – Preliminary Hydrology Report

Andelin Ranch

Project Description

Introduction

Andelin Ranch began in 1917 with the Gaspari family transforming the upland sagebrush landscape into alfalfa fields which was harvested as feed for cattle and milk cows. In 1982 the Gaspari's sold the ranch, and it was acquired by the Andelin Family. In 2010, the next generation of Andelin's expanded the ranching legacy and opened the farm to the public featuring a pumpkin patch as a fun seasonal attraction for local families. As the popularity of the event grew over the years, the Andelin's began offering more attractions throughout the year embracing the changing of the seasons in the unique setting of a working farm. Over the last decade the Andelin Family Farm has grown in popularity as the City of Sparks has developed around it. Looking forward, the Andelin's look to preserve the history of agriculture in the Spanish Spring Valley that the Gaspari Family started over a century ago and expand upon the legacy by continuing the farm while providing the public with seasonal festivals and services that support the spirit of the Andelin Family Farm through the Andelin Ranch Planned Development (ARPD).



Figure 1: Andelin Farm

Project Location

The ARPD is located within the City of Sparks on ± 115.7 acres. The site is bound by the Stonebrook Planned Development to the west, north, and east, and future residential development to the south. Specifically, the site consists of Assessor Parcel Numbers (APN's) 528-030-15, 528-030-14, and 528-030-13. The site is currently accessed from Andelin Drive via Pyramid Highway and is planned to have additional access via the future extension of Stonebrook Parkway to the south (not a part).

Andelin Ranch

Exhibit 1: Vicinity Map



Applications

It should be noted that this request was submitted as part of a larger request on all the parcels owned by the Andelin Family. Some of the improvements are not included in the ARPD but shall be included in the analysis to ensure they can accommodate a full build-out scenario. The previous applications include an Annexation (PCN21-0008/AX21-0001), Master Plan Amendment (PCN21-0008/MPA21-0002), and Rezoning (PCN21-0008/RZ21-0002). These applications will be processed concurrently with this request. The traffic study, which includes all the offsite improvements associated with the applications above, is included in Appendix 3.

Andelin Ranch



Figure 2: Andelin Farm Pasture Looking South

Objective

Andelin Ranch is a legacy to the modern history of Spanish Springs. The objective of the ARPD is to preserve farming culture and to allow the public a chance to experience the changing of the seasons through the seasonal festivals and family attractions which were founded by the Andelin Family. The development plan builds upon the farming legacy while providing a mix of commercial and retail services that will serve the surrounding urban environment and preserve this tradition for future generations. Standards and allowed uses are established in the Development Standards section of this handbook. Any standard that is not addressed in this handbook should defer to the Sparks Municipal Code Title 20 (SMC), as amended.

The ARPD will address the following:

- Define Development Standards for each land use;
- Establish a use (Adventure Farm) which will allow a working farm to operate within the City, preserve a total aggregate minimum of 50 acres of agricultural land or open space and historical ranching structures and allow the community to experience the history of the Spanish Springs farming culture by hosting seasonal festivals that celebrate the changing of the seasons;
- Define the existing structures/main farmhouse, access points, and existing attractions;
- Establish landscape standards that maintain the farm aesthetic, including the open views of the agricultural fields, and where appropriate, incorporating use of

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environmentally sensitive development, low impact development (LID), and drainage facilities for future development;

- Guide architectural styles for new buildings complementary to the existing farm;
- Define commercial uses complementary to the farm which are consistent in density and intensity with commercial centers within the City of Sparks.

Exhibit 2: Existing Site Plan and Circulation



Site Conditions

The site is currently home to Andelin Family Farm, a working farm with year-round uses and seasonal festivals and events which are open to the general public. Current uses include agricultural fields, four single-family residences (including main farmhouse),

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multiple accessory buildings, and agricultural structures with site improvements allowing onsite circulation and access via Andelin Drive as identified in *Exhibit 2*. The site is surrounded by residential uses to the north, east, and west. Future residential is planned to the south and a future elementary school which is proposed to the northwest. The completion of Stonebrook Parkway is anticipated to be extended along the southern boundary of the ARPD with the future development of the residential (offsite). Utilities to serve future development of ARPD are available in the Stonebrook and Pioneer Meadows developments and will be extended into the site with the extension of Andelin Drive and/or the completion of Stonebrook Parkway.



Figure 3: Main Driveway to the Ranch House

Project Development Concept

The project concept looks to build upon the success of the Andelin Family Farm over the past decade by preserving the historical features and operations of the farm, while allowing the community to experience and celebrate the seasonal changes through the expansion of new attractions and uses that promote the agricultural experience. The addition of complementary uses, including commercial/retail shops, will provide a broader range of uses for the surrounding area while preserving the rich agricultural history of Spanish Springs.

Currently, the unique nature of Andelin Family Farm is not a defined use within the City of Sparks Development Code. Therefore, the intent of this handbook is to establish a use that allows the farm to continue operating as a “working farm” while also hosting seasonal festivals and events that are open to the public. The handbook also establishes

Andelin Ranch

development standards for each land use district, identifies permitted uses in each district, and includes use standards that are specific to Andelin Family Farm allowing this use to operate within the city, through compliance of the handbook.



Figure 4: Andelin Adventure Farm Activities

All existing structures and infrastructure identified in *Appendix 4*, including buildings, access roads, and secondary buildings shall be exempt from the Development Standards of this handbook. Upon adoption of the handbook, the existing uses including seasonal festivals and the attractions listed in *Appendix 4*, may be permitted through the approval of an Administrative Review. New construction including improvements associated with permitted uses, or the repurposing of an existing use, will need to be designed in accordance with the Development Standards of the underlying land use district as identified in this handbook. As development occurs, in line with the development standards of this handbook, a total aggregate minimum of 50 acres of agricultural land or open space (livestock fields, livestock pens/corals, and livestock shelters, agricultural fields, open space, landscaping, outdoor recreation areas, natural areas, etc.) must be retained within the ARPD to ensure preservation of the agricultural character of the site.

Administration

The ARPD shall be administered by the Administrator or their designee as defined in the City of Sparks Municipal Code. The Administrator shall have the authority to reasonably interpret and apply this handbook.

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Andelin Family Trust shall be the Primary Developer in place from the first phase of development. Should the Primary Developer be designated or assigned to another entity, the assignee shall notify the City of Sparks in writing and provide documentation of the change in entity. The Primary Developer shall continue throughout the development of the handbook until and unless a property owners association or other such entity is created to serve the role of the Primary Developer. Primary Developer rights may be assigned by land use categories, dependent on the underlying property ownership and previous assignment of declarant rights, which shall be disclosed to the City of Sparks upon application for development permits. The role of the Primary Developer, for the purposes of this handbook, shall be:

- To prescribe and administer methods and procedures to ensure and control the quality of development that occurs within ARPD;
- To maintain all common area improvements, storm drain and/or irrigation channels, detention and/or other flood control facilities;
- To establish Covenants, Conditions and Restrictions (CC&R's), which may allow for the creation of: an Architectural Review Committee to maintain consistent project architecture; and a property owners association to provide maintenance and operations of the common elements of the ARPD and enforcement of the CC&R's.
- To review all development plans and applications to ensure that a minimum of 50.0 acres of agricultural land or open space land is retained in aggregate across all development within the PUD. An accounting of acreage shall be provided with each entitlement application.

Review Process

Prior to the submittal of a development application to the City of Sparks, the proposed development shall be reviewed by the Primary Developer at their sole discretion. Each development application submitted to the city shall include written documentation of approval from the Primary Developer. The Primary Developer shall inform the Administrator of any changes of contact information or delegation of authority to its review process. Written approval by the Primary Developer does not constitute city approval of a development application. The construction of individual projects, including accessory structures, shall follow the City of Sparks building permit process. For some uses where a tentative map, conditional use permit, or administrative review is required, these processes shall precede the building permit process, as applicable.

Appeals:

The applicant or developer may appeal any decision, comments, or recommendations of the Administrator in accordance with SMC, as amended.

Development Schedule:

The build-out of the project will be dependent on market conditions. It is anticipated that the initial entitlements will include an administrative review for *Adventure Farm* use, as hereinafter defined, and construction of the required improvements detailed in the phasing section of this handbook. Development of the individual building sites will depend on market conditions and the requirements of future users. This PD shall be valid and enforceable for a minimum of 5 years. The 5-year timeframe shall commence upon

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final approval of this PD (as evidenced by the initial recording date of the certified handbook). Commencement includes approval of any entitlement, administrative review, or building permit located within the PD. Upon commencement of the project, the PD shall expire at the written request of the primary developer, or 30 years from the date of initial recording. If the project has not commenced within 5 years, or if the project has commenced but is not built out within 30 years, then the PD shall require an application to the City Council to determine if it is appropriate to extend the development schedule prior to further development.

Conflicts

In the event of a conflict between these design standards and the City of Sparks Municipal Code, these standards shall govern development of ARPD. When a specific standard is not addressed by the handbook, then refer to the applicable section of the Sparks Municipal Code Title 20, as amended, at the time of review.

Flexibility

The Land Use Plan and Development Standards contained herein are intended to depict the general development vision for ARPD. Sufficient flexibility shall be allowed to permit detailed planning and design at the time of actual development. The acreage of each land use category may be increased by up to 10% if it is demonstrated that additional acreage is necessary due to constraints and/or design considerations to accommodate the project, to the satisfaction of the Administrator. The total acreage for the commercial land use is 16 acres. The total acreage for the agrotourism land use is 100 acres. This provision shall not exceed a cumulative total of 10% for each of these land use categories. Changes in excess of 10% shall require an amendment to the Development Standards Handbook.

Modifications:

The Administrator shall have the ability to grant Minor Deviations as outlined in Sparks Municipal Code. Minor deviations shall be subject to written approval from the primary developer. Deviations of ten percent or more (Major Deviation), shall conform to the City of Sparks Variance process as outlined in SMC, as amended.

Hours of Construction

Construction activities at the Development may commence no earlier than 6:00 a.m. and must cease no later than 7:00 p.m. Monday through Friday, 9:00 a.m. to 5:00 p.m. on Saturday and no construction on Sunday. For purposes of this handbook, construction activities include any start-up of machinery back up beepers, cutting wood, pounding, nails, earth moving, etc. which involves material noise to any adjoining residence or business. Construction hours will only apply to any construction-related activities and will not apply to any seasonal festivals or special events, daily business operations, ranching, or farming related activities. The foregoing limitations shall not be applicable to any activities involving dust control procedures pursuant to the Dust Control Plan, as hereinafter defined, vehicle or equipment fill or dirt, or in the event of any activity in response to an emergency situation at the Development. Notwithstanding the foregoing, the parties acknowledge that the ARPD may submit a temporary use permit to the City

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for approval by the administrator for temporary periods of construction activities beyond the hours of construction listed above, in the event it becomes necessary to complete water production wells, concrete placement, and paving or other similar construction activities. Such plans must include a statement of need and issue and may include temporary construction lighting, but shall provide for reasonable mitigation from such lighting and noise for surrounding residents and/or businesses.

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Infrastructure

Major infrastructure improvements including utilities (water and sewer), site access, police, and fire service are anticipated to be brought into the site through the extension of Stonebrook Parkway (offsite) and Andelin Drive to the northwest to serve new development. These connections will provide the project site with major ingress and egress points as well as provide the project site with the major utility points of connection required to serve future development. The timing of the infrastructure is based on use and is outlined in the *Phasing* section below.



Figure 5: Paved Road into Andelin Farm

Site Access, Circulation, and Traffic

A Traffic Impact Study was completed as part of the ARPD. Although the traffic in this handbook is specific to ARPD, the entire development, including the future planned residential to the south (offsite), was assessed to demonstrate the anticipated traffic generated at full buildout of the entire Andelin properties. The Traffic Impact Study anticipates the completion of Stonebrook Parkway along the southern boundary of ARPD with a connection from Schiedbar Road to be constructed with the future residential. Although these improvements are offsite, they were evaluated as part of this ARPD as they are anticipated to be complete prior to full buildout.

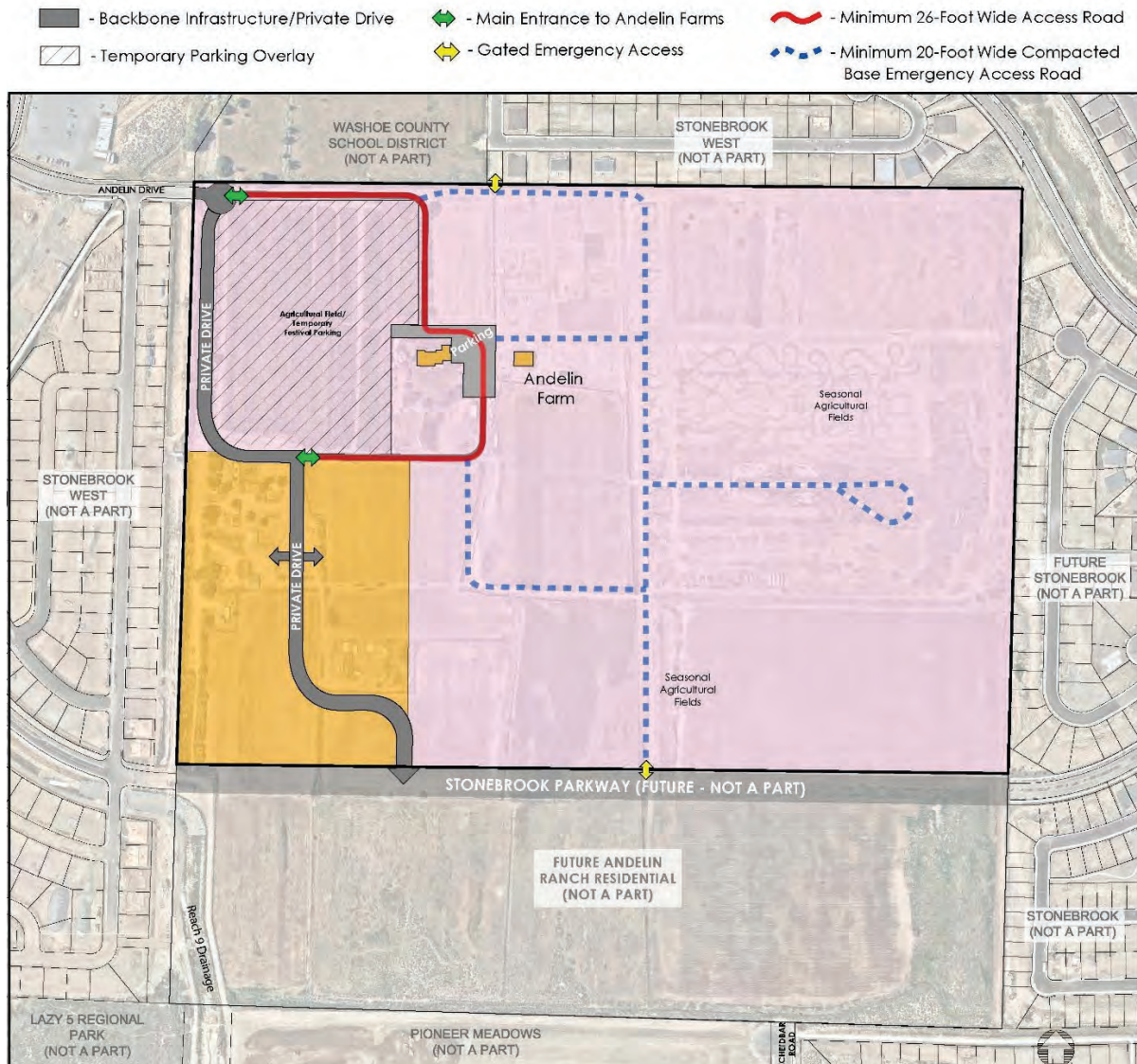
Site Access:

Currently Andelin Drive serves as the main access to the site via Pyramid Highway through the Stonebrook Development. Offsite improvements as part of the Stonebrook Development include a 40-foot right-of-way with two travel lanes. As Andelin Drive enters the site in the northwest, it connects to a private driveway which provides onsite

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circulation. As ARPD develops, and once the completion of Stonebrook Parkway along the southern boundary is complete (by others), the primary access to ARPD will come from the south via a private drive connecting to Stonebrook Parkway. Andelin Drive will then provide secondary access.

Exhibit 3: Full Buildout Circulation and Emergency Access Plan



Circulation:

At full buildout, onsite circulation will include a north/south running private drive from Stonebrook Parkway to Andelin Drive (see Exhibit 3). The private drive will provide a connection to future uses including a network of emergency access roads that will allow for further vehicular access into the site for emergency vehicles. Offsite, the primary and secondary access will help to distribute the traffic generated by the future buildout of ARPD. The southern connection to Stonebrook Parkway will provide regional connectivity

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to Pyramid Highway to the west, La Posada Drive to the northeast, and Wingfield Hills Road via Schiedbar Road to the south. While the secondary access from Andelin Drive will provide additional access to Pyramid Highway.

Traffic:

The anticipated traffic at full buildout of ARPD, is anticipated to generate 2,022 daily, 95 AM peak hour, and 192 PM peak hour trips. During the seasonal events and festivals an additional 334 daily trips and 266 peak hour trips are anticipated. Anticipating the future site access points at Stonebrook Parkway and Andelin Drive, the study concludes that offsite intersections are anticipated to have some impacts on the existing street network, but these have already been mitigated through the recommended improvements to the existing intersections. Including the southbound right-turn pocket at the Stonebrook Parkway/Tierra Del Sol Parkway roundabout to accommodate the proposed traffic level. With this improvement complete, the study has concluded that the surrounding roads and intersections will be able to accommodate the projected traffic generated from this request and the proposed residential to the south at full buildout, including traffic generated from the seasonal festivals. However, the traffic study also recommends that temporary monitoring should occur every 3 to 5 years after full buildout during seasonal festivals to ensure additional mitigation is not required, (refer to the Traffic Impact Study for Andelin Ranch included in Appendix 3).

Sanitary Sewer Service

Sewer service is available via the City of Sparks within the proposed Stonebrook Parkway connection (to be completed by others) and Andelin Drive. Sewer from Andelin Drive and through the future completion of Stonebrook Parkway will be extended into Andelin Ranch to serve future development. The connection of Stonebrook Parkway will improve the efficiency of the sewer for the surrounding community and provide necessary services to future development in the southern portion of the project site. Any future sewer lines needed to develop the site can be extended within public/private roads to serve the subject property. A Preliminary Sewer Report has been included in Appendix 5.

Water Service

The project site is within the Truckee Meadows Water Authority (TMWA) Service Boundary and services can be extended to serve the property.

Hydrology

The site generally slopes from north to south. The Reach 9 Channel located to the southwest (offsite) will carry onsite flows including those generated at full buildout. A Conceptual Drainage Report, included in Appendix 6, has determined that future projects on this site can be designed to collect and convey 100-year storm flows through the future development and into Reach 9. It has also been concluded that the project can be developed without adversely affecting downstream properties.

Police and Fire

Police and fire protection will be provided by the City of Sparks, which is already providing services to the adjacent surrounding properties. New developments will be further

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evaluated during future entitlement processes, or during the building permit to ensure adequate services are available.

Phasing

Prior to, or in coordination with, any new development, an Administrative Review shall require the following improvements based on the total number of acres of development. The required site improvements will be contingent upon the infrastructure phasing plan below. A total number of acres shall be submitted with each Administrative Review which includes a running total of any previously approved developments to show conformance with this requirement. Additionally, an accounting of the minimum 50.0 acres of agricultural or open space land shall be provided with each entitlement application. This is required for any use, however, the *Adventure Farm* use is exempt from this request and should not be calculated towards the total number of developed acres. Infrastructure specific to the *Adventure Farm* use is specified in the *Adventure Farm Use Standards* section of this handbook.

These phases may occur independently, all at once, or not in consecutive order. Once the improvements in a phase are complete, any other Administrative Review shall be exempt from the required infrastructure improvements.

Less than five (5.0) acres:

- Paved improvements designed to the City of Sparks street standards connecting to either Andelin Drive or Stonebrook Parkway and the subject site (no north/south through connection is required).
- Utilities to serve the proposed commercial development in accordance with Sparks Municipal Code shall be located within the private driveway or located in a public utility easement.

More than five (5.0) acres:

- Paved improvements designed to the City of Sparks street standards for the completion of the north and south access road (identified as 'Private Drive' in *Exhibit 3*) connecting Andelin Drive to Stonebrook Parkway.
- Utilities to serve the proposed development in accordance with Sparks Municipal Code shall be located within the private drive or located in a public utility easement.

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Land Uses

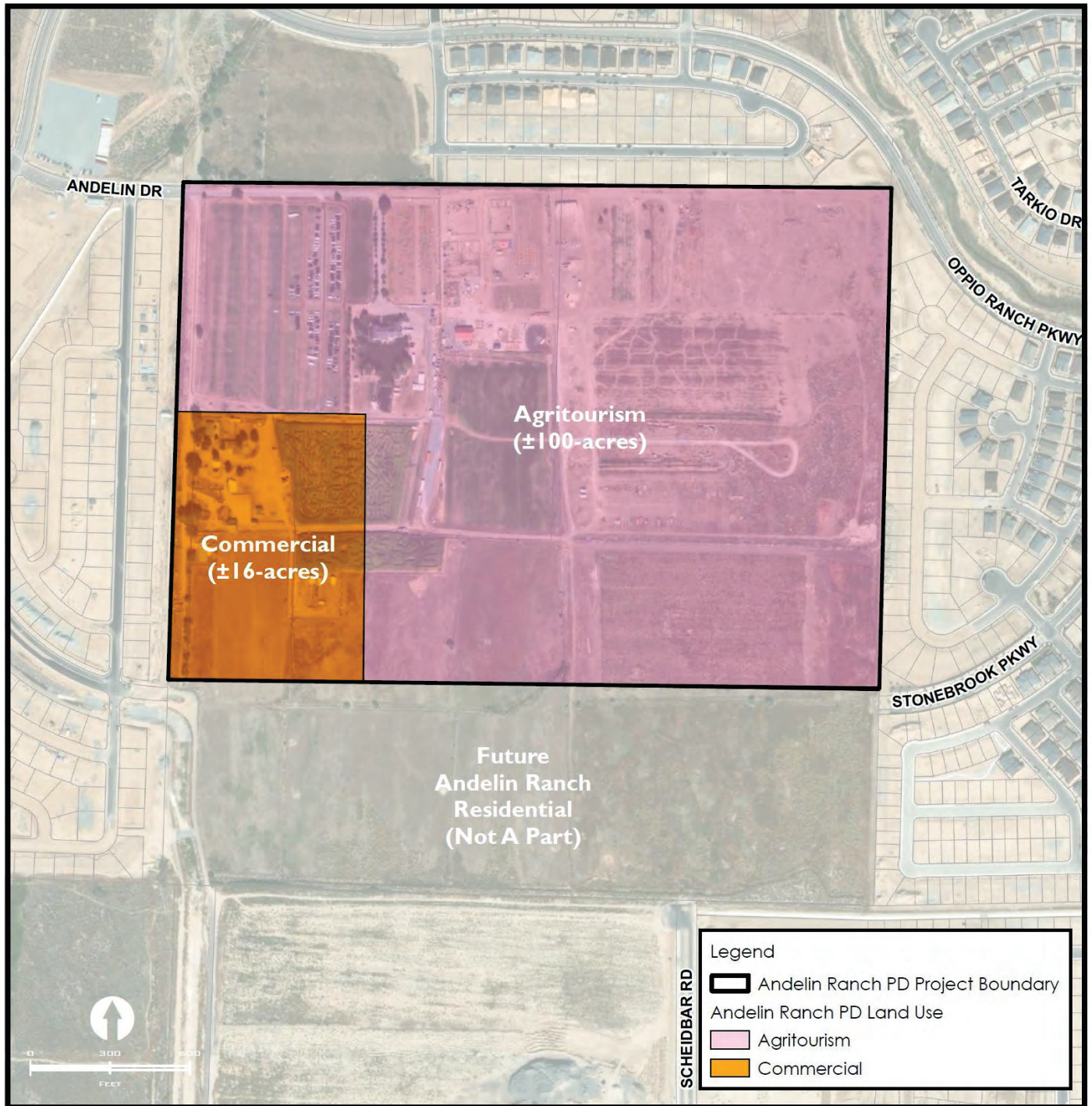


Exhibit 4: Land Use Plan

Andelin Ranch

Introduction

The intent of this chapter is to establish the two land use districts that will make up Andelin Ranch with different intensities and uses appropriate for each district. The land use districts are intended to complement one another and provide a unique sense of place that is specific to Andelin Ranch. Uses are established for each of the land use districts in *Table 1*. Protective covenants may be addressed by a separate CC&R document for commercial areas. Any items not listed specifically within this section will utilize Sparks Municipal Code (SMC) Title 20, as amended.

Agritourism Land Use

The agritourism land use district (Agritourism district) applies to ±100-acres identified in the Land Use Plan (Exhibit 4) and will allow for uses intended to preserve the farming history of the Spanish Spring Valley, allowing the farm to operate in much the same way as it is today. In addition, new uses will support the spirit of the seasonal festivals and ensure the rural feel of the farm is reflected in the expanded services. Generally, uses that support farming or outdoor event/activities such as seasonal festivals, weddings, private parties, or event venues (which includes amplified music and speech), are encouraged in the Agritourism district. A total aggregate minimum of 50 acres of agricultural land or open space (livestock fields, livestock pens/corals, and livestock shelters, agricultural fields, open space, landscaping, outdoor recreation areas, natural areas, etc.) must be retained within the ARPD to ensure preservation of the agricultural character of the site.

Permitted uses shall encourage the preservation of the main farmhouse, entryway, and agricultural fields. The main farmhouse may be used as a private residence or may also be reconfigured and repurposed for public use in the future, subject to building and fire codes at the time.

Commercial Land Use

The commercial land use district (Commercial district) includes ±16-acres to the northwest of the future Stonebrook Parkway extension. The Commercial district will allow density and development standards that are more traditionally found in commercial and retail centers while providing a greater mix of uses than the Agritourism district allows. This district looks to allow uses that will serve the surrounding neighbors and community with office space, restaurants/bars, retail, or similar uses that are complementary to the agricultural component of Andelin Ranch. A development within the commercial land use shall not exceed 16 acres.

The Commercial district is intended to serve primarily indoor uses. Any outdoor events occurring outside of a primary structure within the Commercial district that is not within the *Adventure Farm use* and includes amplified music and speech including bars, restaurants, or retail shops are intended to occur during normal business hours.

Temporary Uses:

Temporary uses which include temporary structures such as tented ballroom enclosures to accommodate temporary indoor/outdoor event activities such as weddings, private

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parties (which includes amplified music and speech), and open areas for farmers markets, or other private parties and events may be subject to additional temporary use permits if the event is not established in the administrative review or other permitting process. Any outdoor events that operate outside of the normal business hours or are not associated with the *Adventure Farm use* shall obtain a Temporary Use Permit from the City of Sparks prior to the event in accordance with SMC, as amended.

Allowed Uses

Upon approval of the handbook, the uses identified in Table 1 below shall be allowed in the Agritourism and Commercial districts accordingly. Non-residential uses permitted by right shall be subject to approval of an Administrative Review (AR), in accordance with the City of Sparks Municipal Code. Any use not listed in Table 1 is not permitted unless it is considered accessory to a listed permitted use or is similar and/or compatible with a listed permitted use, to the satisfaction of the Zoning Administrator, per SMC, as amended. All uses identified shall be in accordance with the definitions established in Sparks Municipal Code unless otherwise specified in this handbook.

TABLE 1: Andelin Ranch Permitted Uses		
P = Permitted by Right (may require Administrative Review) C = Conditional Use Permit Required		
Use Category/Specific Use Type	Land Use District	
	Agritourism	Commercial
Residential		
Dwelling, Single Family Detached	P	
Live/Work Dwelling	P	
Home Occupation	P	
Lodging/Short-Term Rental		
Bed and Breakfast	P	
Hotel/Motel (Less Than 20 Units)	C	C
Resort, Dude/Guest Ranch	C	
Commercial/Mixed Use		
Adventure Farm ^{1,2}	P	P
Animal Services, Indoor	P	C
Animal Services, Overnight	P	C
Brewery/Craft Distillery/Urban Winery		P
Grocer/Food Market (Less than 10,000 sq. ft.)	P	P
Farmers Market	P	P
Food Preparation	P	P
Restaurant	P	P
Restaurant with Drive Through		P
Office		P
Maintenance & Repair Services		P
Wedding Chapel	P	P
Convenience Store		P
Nursery (Commercial, Retail and Wholesale)	P	
Retail, general		P

Andelin Ranch

TABLE 1: Andelin Ranch Permitted Uses

P = Permitted by Right (may require Administrative Review)

C = Conditional Use Permit Required

Use Category/Specific Use Type	Land Use District	
	Agritourism	Commercial
Public/Civic/Institutional		
Adult Daycare		P
Child Care Facility	P	P
Child Care, In Home (1-6 Children)		P
Church or Worship Center		C
School (Private)		C
Event Center/Banquet Hall	P	P
Fraternal Club/Lodge/Community Service Facility		P
Personal Instruction Services		P
Medical Office, Clinic, or Laboratory (less than 50,000 sf gfa)		P
Cultural Institution		P
Entertainment Facility/Theater		P
Health/Fitness Club		P
Recreational Facility, Minor		P
Park/Open Space		P
Industrial		
Production, Craftwork		P
Outdoor Storage	P	
Infrastructure		
Bike Share Kiosk	P	P
Communications Facility	C	C
Renewable Energy Production	C	C
Utility, Minor	C	C
Wireless Communication Tower or Antenna	C	C
Weather or Environmental Monitoring Station	P	P
Agriculture		
Farm or Ranch	P	
Urban Agriculture	P	

Notes:

1. See 'Adventure Farm' definition in the *Use Definition* Section of this Handbook.
2. See additional development standards outlined in the *Adventure Farm Use Standards* Section of this Handbook.

Andelin Ranch

Use Definitions

Adventure Farm:

The Adventure Farm use incorporates all activities incidental to the operation of the farm including agricultural fields, crop production, raising of livestock, the main farmhouse, and all secondary buildings, outdoor storage, storage sheds, barns, or support structures that allow for operations of the farm.

In addition to the farming activities, this use also includes bringing members of the public to the farm for recreational, educational, or retail purposes including all outdoor activities related to games, attractions, rides, exotic animals, and petting zoos that support the tourism portion of the farm. These events may include but are not limited to, seasonal festivals, day camps, educational classes, field trips, weddings, private parties, pumpkin patch, Christmas tree sales, and farmer's markets. The size, scope, and frequency of these events shall be established through the Administrative Review process and are subject to the development standards outlined in the *Adventure Farm Use Standards* section of this Handbook.

Andelin Ranch

Development Standards

Site and Building Design Standards

Any new structure which does not meet the exemptions criteria and is constructed after the approval of this handbook shall be subject to the standards listed below. Any standard not addressed below shall be subject to the building standards outlined in SMC Title 20, as amended.

Exemptions:

All existing buildings constructed prior to the date of approval of the ARPD are exempt from these standards. A complete list of existing buildings/structures and their location can be reviewed in Appendix 4. Furthermore, new structures associated with the *Adventure Farm* use which are generally intended for agriculture or farming and are not intended for human habitation or will not allow members of the public access including hoop houses, chicken coops, lean-to/shade structures, or similar buildings which are less than 500 square feet may not be subject to the standards here in, (see *Adventure Farm Use Standards* section of this Handbook for a list of exempt buildings).

Table 2: Andelin Ranch Building Design Standards		
Land Use District	Agritourism	Commercial
Site Size (min)	1 acre	None
Site Coverage (max)	70%	None
Site Width (min)	60'	None
Setbacks ¹		
Front/Exterior Side	10'	10'
Side	10'	10'
Rear	10'	10'
Exterior to Project Boundary ^{2,3}	60'	60'
Separation Between Buildings	20'	20'
Height		
Height (max)	45'	35'
Density		
Maximum Residential Density	0.25 du/ac	N/A

Notes:

1. Existing uses and buildings shall be exempt from the above setback and building height standards. Additions to existing buildings shall meet the above setback and building height standards.
2. The project boundary refers to the limits of the Andelin Ranch PD shown in Exhibit 1.
3. The setback for any new 24-hour use (hotel, bed and breakfast, etc.) shall be a minimum of 100 feet from the project boundary when adjacent to an existing residential use.

Agricultural Preservation

Upon the adoption of this Handbook, the 116-acre site contains an approximate total of 1.04 acres of developed land, which includes existing residences, garages, permanent outbuildings, and paved driveway/roadway. The remaining approximately 114.96 acres of the site is dedicated to agriculture or open space. This includes livestock fields

Andelin Ranch

(including all livestock fields, pens/corals, and shelters for livestock), agricultural fields, open space, landscaping, parks, natural vegetation areas, and other outdoor recreation facilities. As development proceeds in accordance with the standards outlined herein, a minimum aggregate of 50.0 acres of land must be retained as agricultural land or open space for the entire ARPD. Each development application submitted to the Primary Developer and Zoning Administrator shall include an accounting of the existing and proposed acreage of both developed and undeveloped land within the entire ARPD. Areas where the primary use of the land is for agricultural purposes may be included in the minimum although a portion or portions of those areas are used for another non-agricultural use seasonally or for a portion of the year, including the temporary parking/alfalfa field which may be used for seasonal parking as described in the Adventure Farm Use Standards section of the Handbook.

Off-Street Parking

Parking shall be provided based on individual use. Paved parking shall be provided for each use at the rate listed below in the minimum parking table. For any use not listed, parking shall be provided based on Sparks Municipal Code, as amended. Parking shall be identified on a site plan and is subject to review during the Administrative Review process. Parking dimensions shall be provided in accordance with Sparks Municipal Code, as amended. Shared parking is allowed between uses and may be established during the administrative review period.

Parking Lot Design:

Where possible, shared parking facilities are strongly encouraged to mitigate the impacts of large, paved surfaces to reduce heat island effect, and to minimize the use of resources and preserve the authenticity of the farm. Paved parking areas are encouraged to use curb sparingly to promote storm water discharge into bio-retention swales. Parking lots may be located in the front, side or rear of buildings and shall utilize low-impact-design (LID) elements where feasible. Alternative surface materials may be allowed and approved through the Administrative Review process or through the approval of the administrator.

ADA Parking shall be provided at a rate established in SMC, as amended.

Andelin Ranch

Table 3: Minimum Parking Ratios:

Use:	Parking Spaces Required:
Adventure Farm	0.60 per employee during peak shift ³
Urban Agriculture	0.75 per employee during largest shift
Farm or Ranch	
Nursery (retail)	1 per 500 sf
Single-Family Detached	1 per 1,250 sq. ft. per unit (not to exceed 3 per unit)
Lodging	1 per guest room plus 1 per 800 sf of restaurant or public meeting space; or 1 per recreational vehicle/camping space
Animal Services (indoor/overnight)	1 per 1,500 sf
Baking/Food Preparation	0.75 per employee during largest shift
Event Center/Banquet Hall	1 per 200 sf of principal use area
Renewable Energy Production	N/A

Note:

1. The Administrator may approve the use of alternative parking space requirements based on Urban Land Institute, American Planning Association, Institute of Transportation Engineers or other analytical studies approved by the Administrator, that take into account monthly, hourly and weekly variation; peaking characteristics, ride share programs, proximity to transit stops and shared uses. The applicant shall justify the use of and appropriateness of alternative parking number calculations.
2. All uses not listed in the table above shall meet the standards outlined in SMC, as amended.
3. Minimum parking spaces required for temporary parking days are outlined in the *Adventure Farm Use Standards, Parking Standards, Item 8*.

Temporary Parking:

Temporary parking may only be allowed in the agritourism district and shall only be associated with the *Adventure Farm* use. Temporary parking for the *Adventure Farm* is subject to the standards outlined in the *Adventure Farm Use Standards* included in this handbook.

Alternative Pavement Materials

Alternative materials for private driveways, off-street parking lots, or pedestrian paths that are required to be paved in accordance with SMC may incorporate low-impact-design (LID) materials including porous asphalt, permeable pavers, open concrete grids, engineered soil stabilizers/glues, recycled asphalt/concrete, or an alternative equivalent. This material shall demonstrate compliance with load requirements for fire/emergency vehicles and shall be approved by the City Engineer during the Administrative Review or similar process.

Landscape and Screening Standards:

The landscape standards in the Agritourism district are intended to preserve and maintain the authentic rural character of the farm, by embracing the open views and preserving the agricultural history of the area, while the landscape standards associated with the Commercial district should incorporate elements of the farm but be reflective of those traditionally associated with commercial developments. In addition, landscaping should

Andelin Ranch

be incorporated to provide adequate buffering and screening between residential uses and enhancing the primary entry ways leading into the site. The two districts will blend to create a unique sense of place specific to Andelin Ranch.



Figure 6: Agricultural Field Corn Field During the Spring

Agritourism District Landscape Standards:

The following standards apply to the uses allowed within the Agritourism district identified in the Land Use Plan (Exhibit 4). The goal of the landscape standards is to preserve the historic look and feel of a rural farm and to allow for the daily operations of the working farm. The landscape within the Agritourism district will be similar in appearance to that of an authentic rural farm. Therefore, the following standards will apply to all permitted uses within the Agritourism land use:

- Uses within the Agritourism district shall be exempt from the landscape standards identified of SMC, as amended. Agricultural fields and crop production shall provide most of the vegetation and ground cover which are anticipated to fluctuate throughout the year with the growing seasons. Hayfields, pasture, and land under production will have crops during the growing seasons (spring/summer) with sufficient irrigation water and will lie dormant with bare ground during the fall/winter until the irrigation season begins again. Dryland areas of the farm, including pollinator habitats which are not irrigated, will have native plants, grasses, and flowers. Ground cover in these areas will vary seasonally based on animals grazing and natural precipitation.

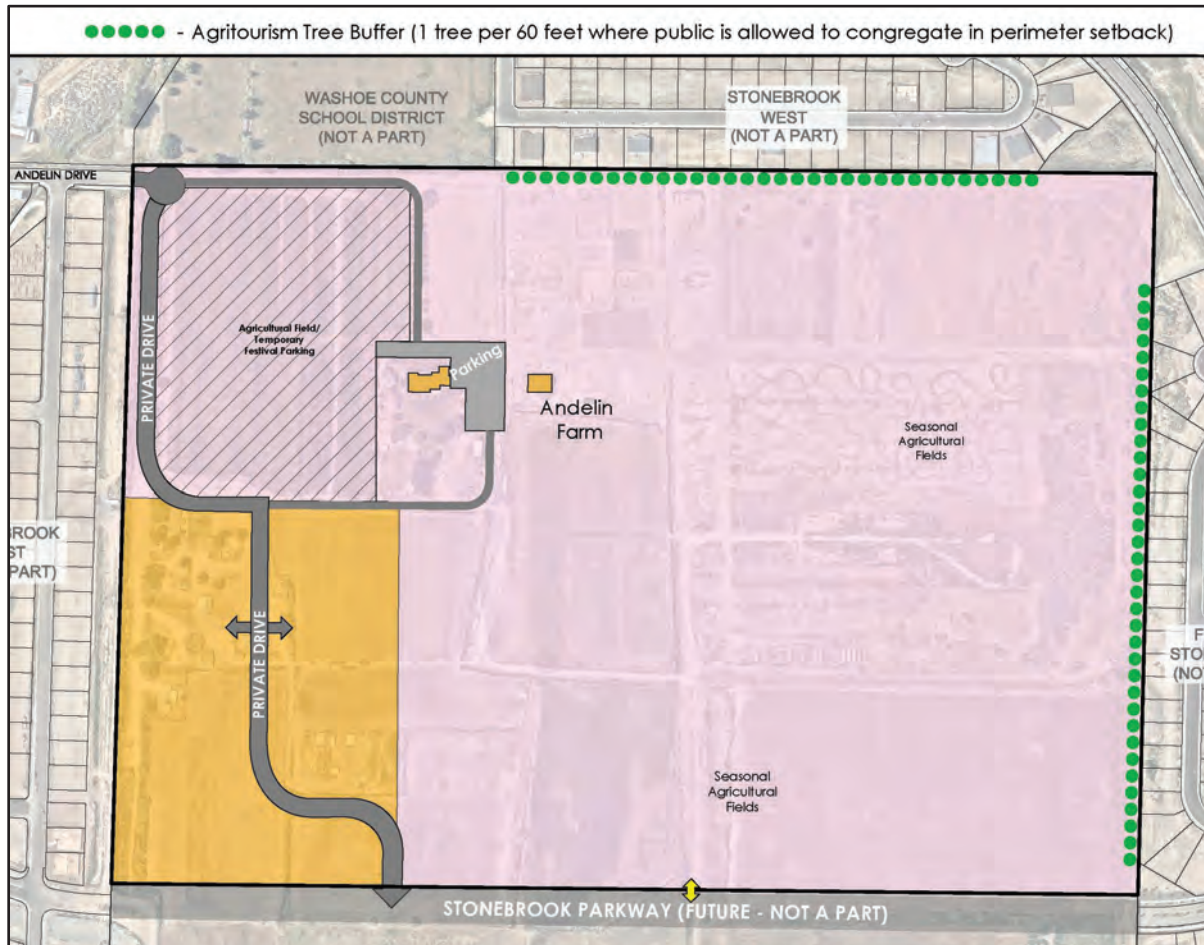
Andelin Ranch

- These areas will not require drip irrigation and shall be exempt from any ground surface treatments, as well as the minimum number of trees and shrubs required.
- Street trees are encouraged along the private driveways but not required.
- Parking areas shall be exempt from parking lot screening and landscape standards including additional trees per parking space.
- Existing trees are encouraged to be preserved and incorporated into the landscaped area if they are healthy and in good condition.

Agritourism Screening and Tree Buffer:

Where the public is permitted to walk, gather, or congregate outside of a vehicle in the Agritourism district, and which is within sixty feet of the northern or eastern project boundary and directly adjacent to a residential parcel, a tree buffer shall be provided. The buffer shall include a minimum of one tree every sixty-feet (60 ft) as demonstrated in Exhibit 6.

Exhibit 5: Agritourism Tree Buffer



Andelin Ranch

Commercial District Landscape Standards:

The following standards apply to the uses allowed within the Commercial district identified in the Land Use Plan (Exhibit 4). The goal of the landscape standards is to enhance the entrance and commercial development as well as provide adequate buffer and screening from the residential to the west.

The following standards will apply to all permitted uses within the Commercial district:

- The minimum landscape shall be provided in accordance with the Neighborhood Commercial standards of SMC, as amended.
- Up to fifty percent (50%) of the required minimum landscape area can use agricultural fields and crop production as an equivalent alternative to formal landscape. These areas shall be identified during the Administrative Review or entitlement process and shall not require drip irrigation or ground surface treatments. The minimum number of trees and shrubs required shall not apply to these areas.
- Open view fencing, including split rail or similar types may be used as an alternative equivalent to a solid wall between residential and non-residential uses.
- Landscape and screening standards within the Commercial district associated with the *Adventure Farm* use are exempt from the landscape standard here in and shall comply with the standards outlined in the Agritourism District Landscape Standards listed above. This area will be established during the Administrative Review process.

Buildings and Architecture:

The architectural style should reflect the historic nature of the farm and be able to incorporate the existing style of the buildings found throughout Andelin Ranch. In the Agritourism district, colors should complement the barn red and white color theme that many of the existing buildings within the farm reflect. However, it is certainly appropriate for buildings to incorporate more modern representations, especially in the Commercial district, but all buildings should be complementary to the historic past.

- New buildings within the Agritourism district shall comply with the Architectural Standards outlined in SMC for Agricultural districts and shall generally incorporate the style and theme of the imagery provided in the architectural character (Figure 8). Imagery shall be provided to demonstrate various architectural elements that may be appropriate.
- New buildings within the Commercial district shall comply with the architectural standards outlined in SMC for Commercial districts.

Signs:

Signs shall be provided in accordance with SMC, as amended. Uses within the Agritourism district shall follow the standards applicable to the sign standards in the A-5 zoning and uses in the Commercial district will comply with the sign standards applicable to the C1 Commercial zoning and use.

Andelin Ranch



Figure 7: Architectural Character Options

ADVENTURE FARM USE STANDARDS

General

This section establishes standards that ensure the daily operations of a farm, which are supplemented with the options to diversify farm income by allowing members of the public to visit and participate in recreational activities, seasonal festivals, private parties, and retail sales, are compatible with the surrounding residential neighborhoods.

Applicability

- This section applies to the *Adventure Farm* use defined in the *Use Definition* section of this handbook.
- This section shall exempt an Adventure Farm use from complying with the *Animal* ordinance within SMC , as amended.
- These standards shall apply to the Adventure Farm use in either the Agritourism or Commercial land use districts.

Standards

When operating Adventure Farm as a Principal Use the following standards apply:

1. The applicant must receive an Administrative Review approval for this use prior to the issuance of a business license.
2. Landscape and screening standards shall apply as outlined in the Agritourism district established in this handbook.
3. Outdoor storage is allowed but shall be consolidated throughout the property as much as possible. Screening of outdoor storage areas interior to the site is not required but shall be kept in an area that is relatively difficult to view from public streets and, where appropriate, from neighboring properties. Storage areas that are located within 60 feet of the property line or a public road shall be screened using a combination open view fencing and landscape/vegetation.
4. Storage of inoperable vehicles, such as historical farming equipment or operable heavy equipment or machinery used for farming or that are related to daily operations of the use such as fleet vehicles, or farming equipment/machinery, are not considered outdoor storage.
5. Shipping containers (Conex Box) may be permitted through the Administrative Review process as long as the following apply:
 - a) Shipping containers shall not be stacked vertically and no more than five (5) may be stored in the same area,
 - b) Shipping containers shall solely be utilized for the storage of materials and goods in association with the permitted business,

Andelin Ranch

- c) No more than a total of thirty (30) shall be allowed within the Adventure Farm use at a time.
- 6. During the Administrative Review process, a maximum event capacity based on infrastructure and public safety shall be set. This capacity limit shall be based on infrastructure provided for Phase 1 or Phase 2 outlined in the *Required Site Improvements* section below.
- 7. Events and festival operations to comply with NRS 450B.690-695.
- 8. Amplified music and speech shall be limited to the hours of 8:00am and 10:30 p.m. Thursday, 8:00 a.m. and 11:30 p.m. Friday and Saturday, and 8:00 a.m. to 9:00 p.m. Sunday through Wednesday.
- 9. Set-up and removal of events may occur outside of operational hours, provided no music or other amplified sound during outdoor set up and/or removal of event occurs.
- 10. Seasonal Festivals are part of the Adventure Farm use and is a general term that includes all the existing uses established in Appendix 4 of this handbook. Upon approval of the Administrative Review, new attractions may be added and expanded in the future without the approval/amendment of the Administrative Review if they are similar in type and size as those outlined in Appendix 4. The Administrator may determine if a new attraction impacts the general operations of the use which will require an amendment to the administrative review.
- 11. All newly constructed structures shall be in compliance with standards outlined in *Table 2* for the respective land use district identified in the handbook.
- 12. A residential use may be permitted as accessory to the adventure farm; the residential structure shall comply with the setbacks for a primary structure.
- 13. Any artificial lighting associated with the entertainment portion of the adventure farm use shall be shielded and directed downward to avoid spilling onto adjacent property and designed to promote dark skies.
- 14. Manure generated from the petting zoo, pony rides, horse rides, and camel ride areas shall be removed, at minimum, every seven (7) days during operations.
- 15. Fugitive dust for the areas where the public is present or may be present during hours of operation shall be controlled in accordance with all state and local regulations. This shall only be enforced during days when festivals are active or are planned to be active. Areas for farming operations shall be exempt from this requirement.
- 16. Construction of a chicken coop, lean-to, hay storage, or hoop house that is intended for animal habitation or storage of food/materials in which no members

Andelin Ranch

of the public are allowed access and is less than 500 square feet, are exempt from the Administrative Review process.

17. Chickens, livestock, and other animals may be kept if the following standards are complied with:
 - a) The animal will be kept within appropriate fencing or a secure enclosure with regular access to food and water.
 - b) All livestock are defined under Nevada Revised Statutes (NRS 569.0085), and all other animals shall be permitted in accordance with all county and state regulations as amended, including Washoe County Exotic Animal Ordinance 1610.
18. To ensure compliance of this handbook, a site plan and documents shall be submitted and approved through the Administrative Review process. The plan and documents shall include:
 - a) Emergency Services Plan for seasonal festivals to the approval of the Administrator.
 - b) Site circulation plan and access plan showing compliance with the handbook to the approval of the City Engineer.
 - c) Action operational report after one year to the city to determine compliance with infrastructure and operational requirements. Allow for review of changes to development standards.
 - d) Business license review process for compliance with handbook and special event permits.

Parking Standards

Permanent parking stalls shall be provided for all daily operations and meet the standards outlined in the *Table 3: Minimum Parking Ratios* for the Adventure Farm use or based on the minimum parking standards outlined in the *Required Site Improvements* section of this below, whichever is greater.

Temporary Parking:

Temporary parking is intended to be used for events that are larger in attendance than the normal day-to-day operations and is only allowed, due to the temporary nature of the events, with the Adventure Farm use. When not used for temporary parking, it is the intent of this handbook that this area contributes to the farming operations and maintains an overall pleasing farm feel outside of the temporary parking days. Temporary parking shall be approved through the Administration Review process if the following apply:

1. Temporary parking must occur within the *Temporary Parking Overlay* as identified in *Exhibit 8*.

Andelin Ranch

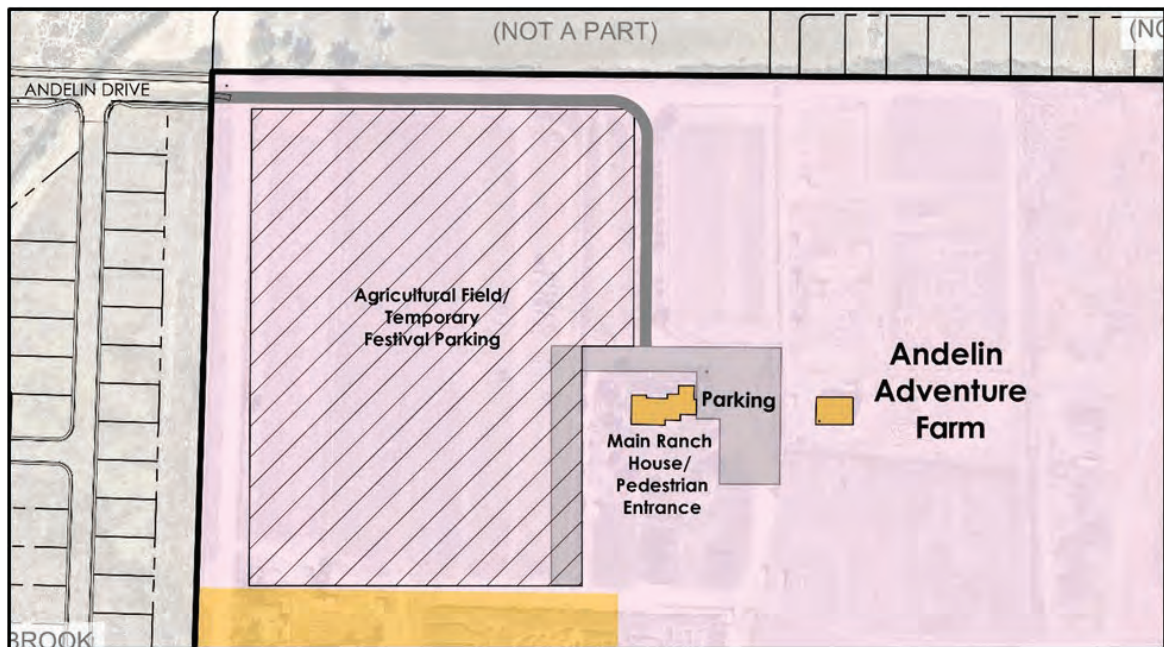


Exhibit 6: Temporary Parking Overlay

2. Parking within the Temporary Parking Overlay shall not exceed more than a maximum of eighty (80) days per calendar year and is intended to be used for events that attract a larger attendance which cannot be accommodated through the number of paved parking stalls. The number of days the temporary parking may occur shall be established through the Administrative Review process.
3. When not used for temporary parking, the overlay area shall be used for a use that is intended to sustain the operations of the farm. This may include hay production, animal grazing, crop production, or similar use associated with the farm. It is the intent of this handbook that this area contributes to the farming operations and maintains an overall pleasing farm feel outside of the temporary parking days.
4. The ground cover within the temporary parking overlay shall be allowed to recover and grow so that the long-term use shall be able to persist year-round. During the growing season, when not used for temporary parking, the overlay area must be maintained with regular watering. When the area is used for temporary parking, the area must keep the underlying vegetation alive with regular watering and mowing to minimize the length of the vegetation and help reduce risk of fire hazard.
5. Provide a parking plan to be approved with the Administrative Review process. The plan shall identify all paved parking spaces based on the rates provide in the *Table 3: Minimum Parking Ratios* and shall show areas to be considered for temporary parking. The total number of paved parking spaces and temporary

Andelin Ranch

parking spaces shall also be identified on the parking plan and match those required in the *Required Site Improvements* section of this handbook.

6. During days with temporary parking, drive isles and parking lanes must be clearly marked and identified. These may be marked with temporary stripping, flagging, or a similar method. Drive aisles shall be a minimum of twenty-six feet wide (26 ft) and parking stalls shall be a minimum of nineteen feet deep (19 ft) by nine feet wide (9 ft). Parking lanes may be marked/identified individually or in pairs of twenty (markings every 180 feet). All drive aisles and site circulation shall have access to a minimum of two points of ingress and egress.
7. During days of temporary parking, the existing paved parking may be used to provide ADA parking stalls at a rate that is in accordance with SMC , as amended. The number of ADA spaces shall reflect the number of parking spaces provided in the temporary parking area.
8. During days of temporary parking, the minimum number of temporary parking spaces provided shall be at a rate of one space per every 5 attendees. Or a minimum of 400 parking spaces for Phase 1 (max 2,000 attendees) and 800 parking spaces or Phase 2 (max 4,000 attendees).
9. The operator of the Adventure Farm shall record the number of days in which the temporary parking areas are used per calendar year.
10. If additional paved parking is deemed necessary year-round, the operator of the adventure farm may provide paved parking within the temporary parking overlay, however, any paved parking shall be removed from the temporary parking overlay.
11. Larger private parties or day camps/fields trips may be allowed outside of the 80 calendar days provided permanent parking is not required (i.e. Bus/van drop off and pickup).
12. All events which require the use of temporary parking outside of the days established in the Administrative Review process shall obtain a Temporary Use Permit from the City of Sparks prior to the event in accordance with SMC, as amended.
13. To ensure compliance of this handbook, a temporary parking mitigation plan shall be submitted and approved through the Administrative Review process. The plan shall include measures to insure property and environmental safety but not be limited to:
 - a) Dust control plan: A plan for dust control shall be submitted to the administrator for review prior to the approval of an Administrative Review. The plan shall only be enforced during days that temporary parking is being used or planned and shall be in conformance with all local and federal air quality standards;

Andelin Ranch

- b) Fire mitigation plan: A plan for fire suppression shall be submitted for review prior to the approval of an administrative review. The grass/alfalfa must be maintained in a way that will limit the length through regular mowing. The vegetation must be kept in a living state and any areas with excessive dry or dead vegetation shall not allow parking;
- c) Trash/oil release plan: during times when the field is used for temporary parking, the entire area shall be inspected daily for any trash or oil/fuel release. All trash will be collected and any areas that have been identified to require fuel/oil clean up shall be mitigated accordingly.
- d) Inclement weather plan: A plan to address instances where conditions may not be suitable for vehicles to use the temporary parking area during periods of inclement weather and days following inclement weather where the ground may not support vehicle traffic shall be established.



Figure 8: Temporary Parking Area

Required Site Improvements

During the Administrative Review for the Adventure Farm use, the maximum number of people allowed for a seasonal event shall be established with either Phase 1, which will allow a maximum of 2,000 people at any given time, or Phase 2 which will allow up to 4,000 people at any given time. Based on the approved phase, the required site improvements will be contingent upon the timing associated with each phase. The timing for the improvements will begin upon the date of approval of the Administrative Review. These phases may not occur in consecutive order and can be applied for at any time during the Administrative Review process.

Andelin Ranch

Phase 1:

Allows for a maximum of **2,000 people** at any time to be allowed in the Adventure Farm use. Although the maximum number of people per day may exceed 2,000 people during the seasonal festivals, the seasonal festivals shall only operate for up to an 18-week period per calendar year. Upon approval of an Administrative Review for Phase 1, the following improvements shall be provided within the specific timeline:

Within one (1) year:

- A minimum of fifty (50) paved parking spaces shall be provided. Required additional parking shall be provided in accordance with the rates outlined in the *Adventure Farm* use established in *Table 3: Minimum Parking Ratios* of this handbook. Temporary parking shall only be allowed within the 'temporary parking overlay' outlined in *Exhibit 8* of this handbook when temporary parking days can meet the conditions outline in the *Adventure Farm Use Standards*. A minimum of 400 parking spaces shall be provided in the Temporary parking overlay in accordance with the *Adventure Farm Use Standards, Parking Standards, Item 8* when the temporary parking area is in use for the seasonal festivals and special events.
- Vehicle access and site circulation for daily operations (days outside of the seasonal festivals) including loading/unloading areas shall be paved or covered with an alternative equivalent approved by the fire administrator. All site circulation shall comply with the minimum width standards and turnaround requirements for fire access standards established in the Administrative Review.

Within three (3) years:

- Pedestrian ADA pathways/access loop connecting parking areas to the entrance and providing suitable access throughout the Adventure Farm (paved and gravel surfaces).
- A permanent restroom shall be constructed to serve the Adventure Farm use. Portable restrooms may be allowed during seasonal events or during peak attendance events.

Phase 2:

Allows for a maximum of **4,000 people** at any time to be allowed in the Adventure Farm use. Although the maximum number of people per day may exceed 4,000 people during the seasonal festivals, the seasonal festivals shall only operate for up to an 18-week period per calendar year. Upon approval of an Administrative Review for Phase 2, the following improvements shall be provided within the specific timeline:

Year one:

Andelin Ranch

- A minimum of fifty (50) paved parking spaces shall be provided. Required additional parking shall be provided in accordance with the rates as outlined in the *Adventure Farm* use established in *Table 3: Minimum Parking Ratios* of this handbook. Temporary parking is allowed within the 'temporary parking overlay' outlined in *Exhibit 8* of this handbook when temporary parking days can meet the conditions outline in the *Adventure Farm Use Standards*. A minimum of 800 parking spaces shall be provided in the Temporary parking overlay in accordance with the *Adventure Farm Use Standards, Parking Standards, Item 8* when the temporary parking area is in use for the seasonal festivals and special events.
- Vehicle access and site circulation for daily operations including loading/unloading areas shall be paved or covered with an alternative equivalent approved by the fire administrator. All site circulation shall comply with the minimum width standards and turnaround requirements for fire access standards.
- Paved improvements to the minimum twenty-six (26) foot wide north and south access road (identified as 'Private Drive' in *Exhibit 3*) connecting Andelin Drive to Stonebrook Parkway for Emergency Medical Service Access.
- Pedestrian ADA pathways/access loop connecting parking areas to the entrance and providing suitable access throughout the Adventure Farm (paved and gravel surfaces).
- A permanent restroom shall be constructed to serve the Adventure Farm use. Portable restrooms may be allowed during seasonal events or during peak attendance events.

Within three (3) years:

- Paved improvements designed to the City of Sparks street standards for the north and south access road (identified as 'Private Drive' in *Exhibit 3*) connecting Andelin Drive to Stonebrook Parkway.
- Utilities to serve the proposed development in accordance with Sparks Municipal Code shall be located within the private drive or located in a public utility easement.

Appendix 1:

Council Decision & Certification Letter and Zoning Ordinance



FILED

JUN 24 2025

Sparks City Clerk
By *[Signature]*

Office of the
CITY CLERK

NOTICE OF FINAL ACTION

On Monday, June 23, 2025, the Sparks City Council took final action on the following agenda item:

Consideration, discussion and possible approval of the of the Tentative Andelin Ranch Planned Development handbook on a 115.89-acre site located at 8100 Pyramid Way.

City Council approved this agenda item.

Filed in compliance with NRS 278.0235, Actions against agency: Commencement.

[Signature]
Julie Torres (For)
Chief Deputy City Clerk



FILED

JUN 24 2025

Sparks City Clerk
By *[Signature]*
Office of the
CITY CLERK

NOTICE OF FINAL ACTION

On Monday, June 23, 2025, the Sparks City Council took final action on the following agenda item:

Second Reading, Public Hearing, discussion and possible adoption of Bill No. 2838 to rezone a 164.9-acre site from A-40 (Agriculture – 40 acres) zoning to 115.89 acres to Planned Development (PD) and 49.03 acres to Single-Family Residential 6,000 square foot lots (SF-6) located at 8100 Pyramid Way.

City Council approved this agenda item.

Filed in compliance with NRS 278.0235, Actions against agency: Commencement.

[Signature]
Julie Torres (For)
Chief Deputy City Clerk

Appendix 2:

Legal Description

A.P.N.'s:

528-030-13

528-030-14

528-030-15

**CITY OF SPARKS PLANNED UNIT DEVELOPMENT
LEGAL DESCRIPTION**

All that certain real property situate within a portion of the Southwest One-Quarter (SW 1/4) of Section Two (2), Township Twenty (20) North, Range Twenty (20) East, Mount Diablo Base and Meridian, Washoe County, Nevada, being more particularly described as follows:

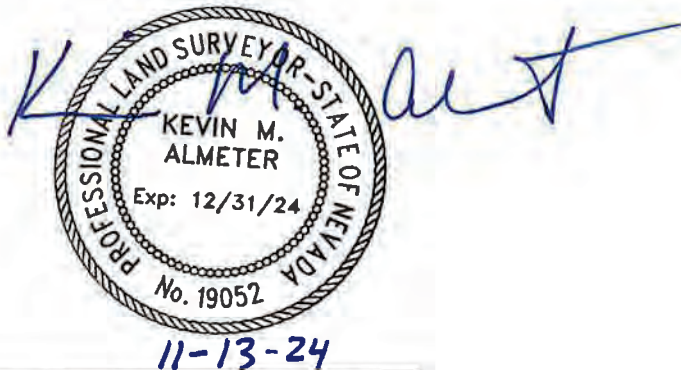
Parcel 1, Parcel 2, and Parcel 3 per Parcel Map No. 4545, recorded April 20, 2006 as File No. 3376788 in the Official Records of Washoe County, Nevada.

Prepared by:

Wood Rodgers, Inc.

1361 Corporate Blvd.

Reno, NV 89502



Kevin M. Almeter, P.L.S.

Nevada Certificate No. 19052

Appendix 3:

Traffic Impact Analysis

TRAFFIC IMPACT STUDY

FOR

ANDELIN FAMILY FARM

December 8, 2021

PREPARED FOR:
Wood Rodgers, Inc.

PREPARED BY:



Headway Transportation, LLC
5482 Longley Lane, Suite B, Reno, Nevada 89511
775.322.4300
www.HeadwayTransportation.com

YOUR QUESTIONS ANSWERED QUICKLY

Why did you perform this study?

This Traffic Impact Study evaluates the potential traffic impacts associated with the proposed Andelin Family Farm project in Sparks, Nevada. This study of potential transportation impacts was undertaken for planning purposes and to assist in determining what traffic controls or mitigations may be needed to reduce potential impacts, if any are found.

What does the project consist of?

The project consists of up to 350 single family residential units and approximately 42,800 square feet of boutique style commercial space including retail space, two restaurants, a beer garden, and an education building where the Andelin family can host small educational events to teach visitors about farming and local history. Additionally, the Andelin Family Farm will provide seasonal activities such as a pumpkin patch, hay rides, corn mazes, and a petting zoo, consistent with the current activities on the farm.

How much traffic will the project generate?

The residential and commercial uses of the project are anticipated to generate approximately 4,508 Daily, 328 AM peak hour, and 419 PM peak hour trips to the external roadway network on a mid-week day, and approximately 4,331 Daily and 419 Midday peak hour trips on a Saturday.

Trip generation estimates for special events at Andelin Farm were determined based on traffic count data collected during the 2021 Fall Festival and a schedule of events provided by the project applicant. The estimated peak hour trip generation during an event such as the Fall Festival is approximately 668 Saturday peak hour trips and 266 weekday PM peak hour trips. Events at Andelin Farm generate a wide range of trip levels. The peak trip generation estimates evaluated in this analysis are expected to occur less than 10 days of the year.

Are there any traffic impacts or proposed mitigation measures?

All studied intersections are expected to operate within policy level of service thresholds during the weekday AM and PM peak hours under Future Year Plus Project conditions when Andelin Farm is not hosting a seasonal event. The planned/proposed roadway network will accommodate normal weekday and weekend traffic flows. The project area build-out intersection lane configurations and controls are shown on **Figure 9**.

Tierra Del Sol Parkway/Andelin Drive Intersection Event Conditions

During the weekday PM peak hour under Future Year Plus Project Plus Event conditions (when Andelin Farm is hosting a large seasonal event) the Tierra Del Sol Parkway/Andelin Drive intersection is expected



to operate at overall LOS E. The LOS E condition is expected to occur as Stonebrook West and the Andelin Family Farm projects approach build-out (20-year horizon). Additionally, this condition is expected only during peak weekday evening events at Andelin Farm on the busiest days of the year (expected less than 10 days of the year). The future year traffic volume forecasts are based on land uses that are not yet built and have the potential to not materialize as expected.

The following management strategy is recommended:

- ▶ Implement temporary traffic control for peak weekday evening events exceeding 700 persons on site at one time. Level of service D is expected at this intersection during all evening events with less than 700 guests on site at one time and traffic control will be utilized to manage conditions on peak evenings with more than 700 guests on site at one time.

Stonebrook Parkway/Tierra Del Sol Parkway Intersection

The southbound approach to the Stonebrook Parkway/Tierra Del Sol Parkway roundabout intersection is expected to operate at a volume-to-capacity ratio of 0.84 during the weekday PM peak hour during an event, which is essentially at design capacity. A southbound right-turn pocket is recommended at the Stonebrook Parkway/Tierra Del Sol Parkway roundabout with the Andelin Family Farm project and will improve the southbound approach to a v/c ratio of 0.45 which is an acceptable condition. The ultimate roundabout configuration is shown in **Exhibit 4** (page 17).



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INTRODUCTION

This report presents the findings of a Traffic Impact Study completed to assess the potential traffic impacts to the local roadway network associated with the Andelin Family Farm project in Sparks, Nevada. This traffic impact study has been prepared to document future traffic conditions, quantify traffic volumes generated by the proposed project, and provide recommendations for planned/future intersections. The location of the project is shown on **Figure 1** and the project site plan is shown on **Figure 2**.

Study Area and Evaluated Scenarios

The project consists of up to 350 single family residential units and approximately 42,800 square feet of boutique style commercial space including retail space, two restaurants, a beer garden, and an education building where the Andelin family can host small educational events to teach visitors about farming and local history. Additionally, the Andelin Family Farm will provide seasonal activities such as a pumpkin patch, hay-rides, corn mazes, and a petting zoo, consistent with the current activities on the farm.

The project is generally located east of Pyramid Highway and south of La Posada Drive. The surrounding area is currently in various stages of development. The study intersections (shown on **Figure 1**) are planned or under construction and were selected based on their future locations in relation to the project and are most likely to be impacted by project traffic. The following intersections are included in this study:

1. Pyramid Highway/Stonebrook Parkway/Dolores Drive
2. Tierra Del Sol Parkway/Andelin Drive
3. Stonebrook Parkway/Tierra Del Sol Parkway
4. Stonebrook Parkway/Project Access 1
5. Stonebrook Parkway/Scheidbar Drive/Project Access
6. Stonebrook Parkway/Project Access 2
7. Pyramid Highway/Andelin Drive

The Pyramid Highway/Dolores Drive intersection is the only existing, operational intersection. Stonebrook Parkway is currently under construction and will create the east leg of the intersection. The Tierra Del Sol Parkway/Andelin Drive intersection is built, but not open to traffic. The Stonebrook Drive/Tierra Del Sol Parkway roundabout is in the final planning stages and will be constructed within the next few months. Intersections 4 through 7 are planned/future intersections.

Existing and Existing Plus Project conditions analyses were not performed as the project area and study roadways are currently under construction. Multiple projects within the overall Stonebrook and Kiley Ranch Master Plan areas are under construction. Additionally, only one study intersection is currently operational (Pyramid Highway/Dolores Drive) and does not currently connect to the project area. Therefore, the following development scenarios were evaluated:

- Future Year Conditions (20 year horizon)



► Future Year Plus Project Conditions

Based on the anticipated activities and periods of peak traffic generation, the following peak hours were evaluated:

- Weekday AM peak hour – without Andelin Farm event traffic
- Weekday PM peak hour – without Andelin Farm event traffic
- Weekday PM peak hour – with Andelin Farm event traffic
- Saturday Midday peak hour – with Andelin Farm event traffic

ANALYSIS METHODOLOGY

Level of service (LOS) is a term commonly used by transportation practitioners to measure and describe the operational characteristics of intersections, roadway segments, and other facilities. This term equates seconds of delay per vehicle at intersections to letter grades “A” through “F” with “A” representing optimum conditions and “F” representing breakdown or over capacity flows.

Intersections

Intersection level of service methodology is established in the *Highway Capacity Manual (HCM)*, 6th Edition, published by the Transportation Research Board. The methodology for signalized intersections determines the level of service by comparing the average control delay for the overall intersection to the delay thresholds in **Table 1**. Level of service at unsignalized (side-street stop controlled, all-way stop controlled, and roundabout) intersections is determined by comparing the average control delay for the worst movement/approach to the delay thresholds in **Table 1**.

Table 1: Level of Service Definition for Intersections

Level of Service	Brief Description	Average Delay (seconds per vehicle)	
		Signalized Intersections	Unsignalized Intersections
A	Free flow conditions.	< 10	< 10
B	Stable conditions with some affect from other vehicles.	10 to 20	10 to 15
C	Stable conditions with significant affect from other vehicles.	20 to 35	15 to 25
D	High density traffic conditions still with stable flow.	35 to 55	25 to 35
E	At or near capacity flows.	55 to 80	35 to 50
F	Over capacity conditions.	> 80	> 50

Source: *Highway Capacity Manual*, 6th Edition

Level of service calculations were performed for the signalized and side street stop controlled study intersections using the Synchro/SimTraffic 11 software package with analysis and results reported in accordance with *HCM* methodology. Roundabout intersections were analyzed using SIDRA software with results also reported in accordance with *HCM* methodology. For roundabouts, the volume-to-capacity



(v/c) ratio is a better indicator of roundabout performance than LOS. Roundabouts should operate with a v/c of less than 0.85 on all approaches. Therefore, average delay, level of service, and v/c are presented.

Level of Service Policy

The 2050 Regional Transportation Plan (RTP) establishes level of service criteria for regional roadway facilities in the City of Reno, City of Sparks, and Washoe County. The current level of service policy is:

“All regional roadway facilities projected to carry less than 27,000 ADT at the latest RTP horizon – LOS D or better.”

“All regional roadway facilities projected to carry 27,000 or more ADT at the latest RTP horizon – LOS E or better.”

“All intersections shall be designed to provide a level of service consistent with maintaining the policy level of service of the intersecting corridors”.

Pyramid Highway south of La Posada Drive is projected to carry more than 27,000 ADT at the latest RTP horizon. Stonebrook Parkway and Tierra Del Sol Parkway are projected to carry less than 27,000 ADT. The following level of service thresholds were used for the study intersections:

LOS E

- ▶ Pyramid Highway/Dolores Drive/Stonebrook Parkway
- ▶ Pyramid Highway/Andelin Drive

LOS D

- ▶ Tierra Del Sol Parkway/Andelin Drive
- ▶ Stonebrook Parkway/Tierra Del Sol Parkway
- ▶ Stonebrook Parkway/Project Access 1
- ▶ Stonebrook Parkway/Scheidbar Drive/Project Access
- ▶ Stonebrook Parkway/Project Access 2

EXISTING CONDITIONS

Roadway Facilities

A brief description of the key roadways in the study area is provided below.

Pyramid Highway (State Route 445) is a north-south state highway that connects Interstate 80 (I-80) in the south to State Route 446 at Pyramid Lake in the north. The segment of Pyramid Highway near the project site is classified in the 2050 RTP as a High Access Control (HAC) Arterial. The Nevada Department of Transportation (NDOT) classifies the segment of Pyramid Highway near the project site as an “Other

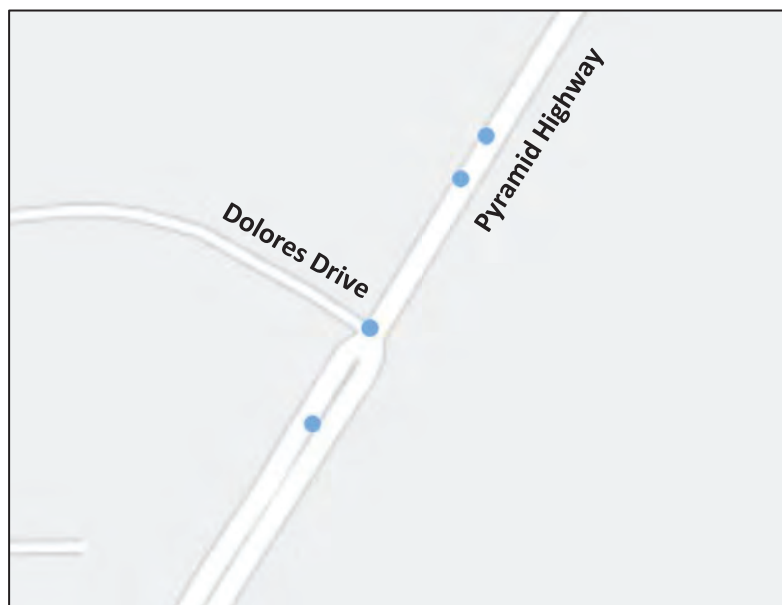


Principal Arterial.” Pyramid Highway is currently a four-lane roadway with a two-way left-turn lane and/or left-turn pockets at intersections. The posted speed limit in the project area is 55 mph.

Stonebrook Parkway is a two-lane roadway that is currently under construction. The roadway currently connects at La Posada Drive and will extend to Pyramid Highway at Dolores Drive. The 2050 RTP classifies Stonebrook Parkway as a Moderate Access Control (MAC) Arterial.

Crash History

Vehicle collision data is available on the NDOT Traffic Safety App website (ndot.maps.arcgis.com) and includes information from 2015 to 2017 (the most current online data available). As shown in **Exhibit 1**, there were five collisions on Pyramid Highway at or near Dolores Drive, the only existing study intersection, during the three-year period (some collisions occurred at the same location and overlap in the Exhibit). All five collisions were property damage only (PDO) collisions. Two of the incidences were single vehicle run-off-the-road collisions, two were rear-end collisions, and one was an angle collision. The crash data does not appear to indicate any significant safety issue at the intersection.



Source: ndot.maps.arcgis.com

Exhibit 1: Collision Data (2015 to 2017)

FUTURE YEAR (20 YEAR HORIZON) CONDITIONS

The Future Year analysis estimates operating conditions for expected build out of the project area (approximately the 20 year horizon).

Planned Roadway Improvements

The RTC's 2050 RTP outlines programmed roadway projects of regional significance. The project list is split into three time periods: 2021 - 2025 (first five years of the plan), 2026 – 2030 (second five years of the plan), and 2031 – 2050 (remaining years of the plan). The following roadway improvements are programmed within the project area:

RTP Regional Road Improvements (2021 - 2025)

- ▶ Stonebrook Parkway – Pyramid Highway to N/S Connector Road (identified as Scheidbar Drive in this analysis): New roadway
- ▶ N/S Connector Road (Scheidbar Drive) – Stonebrook Parkway to Wingfield Hill Road: New roadway

RTP Regional Road Improvements (2031-2050)

- ▶ Pyramid Highway/Sun Valley/US 395 Connector
 - » Pyramid Highway – Lazy 5 Parkway to La Posada Drive: Widen 4 lanes to 6 lanes
- ▶ Eagle Canyon Drive – Pyramid Highway to W Calle de la Plata: Widen 2 lanes to 4 lanes

Planned Intersection Improvements

The Future Year intersection lane configurations and controls for some of the study intersections were determined based on analysis performed for the *Traffic Impact Study for Stonebrook West* (Traffic Works, 2018) and the *Stonebrook Traffic Study* (Solaegui Engineers, Ltd., February 2017). Additionally, the Pyramid Highway/Dolores Drive intersection has been analyzed in multiple studies, most recently the *Addendum to the Pyramid Highway/US 395 Connector Traffic Report (December 2011), for Arterial Alternatives For Pyramid Highway and US 395 Connector* (Jacobs, June 2017) and the *Traffic Impact Study for Stonebrook West* (Traffic Works, 2018). Six lanes on Pyramid Highway and a traffic signal at the Pyramid Highway/Dolores Drive intersection are programmed in the Pyramid Highway improvements (in the Jacobs study) and needed based on Stonebrook West Future Year traffic volumes. Headway Transportation also performed a traffic signal warrant study for the Pyramid Highway/Dolores Drive intersection in October 2019 and concluded that a traffic signal will be needed at the intersection. A traffic signal at Pyramid Highway/Dolores Drive will be constructed with the Stonebrook West project.

The Stonebrook Parkway/Tierra Del Sol Parkway intersection was analyzed as part of the Stonebrook West project and is currently in the final design phases. The lane configurations and roundabout control are shown in **Exhibit 2**.



The Tierra Del Sol Parkway/Andelin Drive intersection is currently constructed (but not operational) as an all way stop controlled intersection with shared left/through/right-turn lanes on the northbound and southbound approaches and a left-turn lane and shared through/right-turn lane on the eastbound and westbound approaches.

Traffic Volume Forecasts

The weekday Future Year Plus Project traffic volumes from the *Traffic Impact Study for Stonebrook West* (Traffic Works, 2018) were developed based on anticipated build out of the entire Stonebrook/Kiley Ranch area and include all anticipated traffic generated by these projects as well as regional growth through the area. The Stonebrook West traffic volume forecasts were used as the weekday Future Year background traffic volumes in this study and were developed based on the following:

- ▶ 2040 background traffic volumes forecasts were developed using information from two sources: the *Stonebrook Traffic Study* (Solaegui Engineers, Ltd., February 2017) and the *Addendum to the Pyramid Highway/US 395 Connector Traffic Report (December 2011), for Arterial Alternatives For Pyramid Highway and US 395 Connector* (Jacobs, June 2017)
- ▶ Traffic volumes were compared and adjusted to use highest forecasts for the area roadways
- ▶ Traffic Analysis Zones (TAZ's) from the regional travel demand model were evaluated and adjusted where necessary to include all planned projects in the area.
- ▶ The *Stonebrook Traffic Study* and the Jacobs report analyze future year conditions for the year 2035. In order to develop 2040 traffic volume forecasts (the most current available forecast data at the time this study was initiated), growth rates for Pyramid Highway and La Posada Drive were developed and applied to the 2035 traffic volumes for an additional five years.

The weekday Future Year (no project) traffic volumes for this study are shown on **Figure 4**.

Saturday peak hour traffic volume forecasts were developed by comparing weekday PM peak hour traffic count data and Saturday Midday peak hour count data (12:00 PM to 2:00 PM) collected by NDOT. Additionally, Saturday peak hour traffic counts were collected at the Pyramid Highway/La Posada Drive and Pyramid Highway/Dolores Drive intersections in July 2021 and compared previous traffic count data collected in 2018. Weekday PM peak hour traffic volumes on Pyramid Highway south of La Posada Drive were compared to Saturday Midday peak hour traffic volumes. The Saturday peak hour traffic volumes were approximately 78 percent of the weekday PM peak hour traffic volumes. Therefore, the weekday

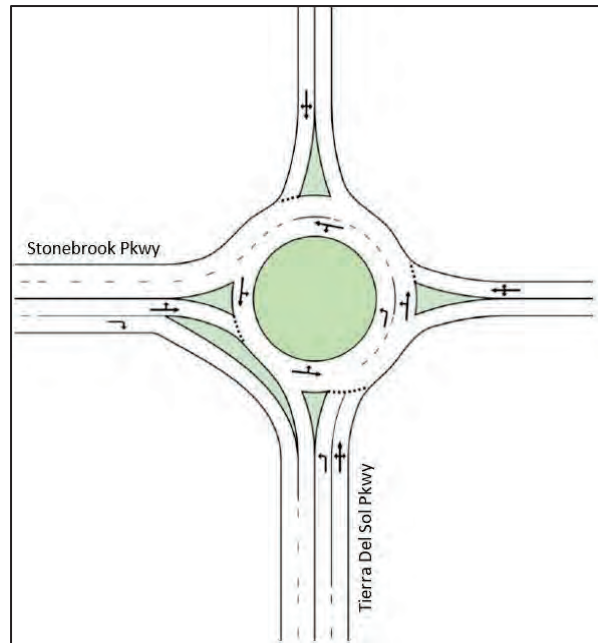


Exhibit 2: Stonebrook Pkwy/Tierra Del Sol Pkwy Roundabout Configuration

PM peak hour traffic volumes at the study intersections were factored by 78 percent to develop the Saturday peak hour volumes (shown on **Figure 5**).

Intersection Level of Service

Future Year (no project) intersection level of service analysis was performed for the signalized and stop controlled intersections using SimTraffic microsimulation analysis software. The roundabout intersections were analyzed using SIDRA analysis software. **Table 2** shows the Future Year conditions level of service results and the technical calculations are provided in **Appendix A**.

Table 2: Future Year Conditions Intersection Level of Service

Intersection	Control ¹	Weekday						Saturday		
		AM			PM			Midday		
		Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³
Pyramid Hwy/Dolores Dr/ Stonebrook Pkwy	Signal									
Overall		58.7	E	NA	56.5	E	NA	26.2	D	NA
Tierra Del Sol/Andelin Drive	All Way Stop									
Overall		6.7	A	NA	13.0	B	NA	8.8	A	NA
Stonebrook Pkwy/Tierra Del Sol Pkwy	RAB									
Northbound Approach		5.9	A	0.03	7.8	A	0.04	6.2	A	0.03
Southbound Approach		7.8	A	0.33	14.8	B	0.69	9.6	A	0.50
Eastbound Approach		8.2	A	0.38	13.0	B	0.55	8.7	A	0.37
Westbound Approach		9.3	A	0.49	8.1	A	0.40	6.5	A	0.29
Pyramid Highway/Andelin Drive	Side Street Stop									
Westbound Right		14.0	B	NA	34.6	D	NA	18.0	C	NA
Southbound Left		28.0	D		37.2	E		26.4	D	

Notes: 1. RAB = roundabout

2. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for RAB and side street stop controlled intersections.

3. v/c Ratio = volume-to-capacity ratio; reported for RAB intersections.

Source: Headway Transportation, 2021

As shown in the table, the study intersections are expected to operate within level of service thresholds during the weekday AM and PM and Saturday Midday peak hours.

PROJECT CONDITIONS

The project consists of three trip generating components – 1) residential units, 2) boutique style commercial space, and 3) Andelin Family Farm that hosts seasonal special events such as a pumpkin patch, corn maze, and train rides. Trip generation and trip distribution estimates were developed for each component.



Residential/Commercial Uses (Components 1 & 2)

Trip Generation

Trip generation rates from the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) were used to develop trip generation estimates for the residential and commercial components (components 1 and 2) of the project. The commercial uses have been designed to be neighborhood-serving, boutique style uses that are primarily intended for the residents of nearby neighborhoods. Therefore, it is expected that some internalization (i.e. people who live in the residential units will shop at the retail within the project site) and alternative modes of travel (i.e. walking and biking) will occur within the project boundaries. Internal capture and alternative mode reductions were calculated and included in the trip generation estimates. **Table 3** shows the trip generation calculations for a typical weekday during the AM and PM peak hours, as well as the Saturday Midday peak hour. Detailed trip generation calculations are provided in **Appendix B**.

Table 3: Trip Generation Estimates – Residential & Commercial Uses

Land Use (ITE Code)	Size ¹	Trips ²							
		Weekday					Saturday		
		Daily	AM	AM In/Out	PM	PM In/Out	Daily	Midday	Midday In/Out
Single Family Housing (210)	350 du	3,304	259	65/194	347	219/128	3,339	326	176/150
Shopping Center (820)	30.3 ksf	1,144	28	17/11	115	55/60	1,397	136	71/65
Drinking Place (925)	1.1 ksf	125	0	0/0	12	8/4	125	12	8/4
High Turnover Sit Down Restaurant (932)	6.6 ksf	740	66	36/30	64	40/24	808	74	38/36
Museum (580)	4.8 ksf	13	1	1/0	1	0/1	32	3	2/1
Total Trips		5,326	354	119/235	539	322/217	5,701	551	295/256
<i>Internal Capture/Alternative Modes</i>		<i>818</i>	<i>26</i>	<i>13/13</i>	<i>120</i>	<i>60/60</i>	<i>1,370</i>	<i>132</i>	<i>66/66</i>
Net New Trips		4,508	328	106/222	419	262/157	4,331	419	229/190

Notes: 1. du = dwelling units; ksf = 1,000 square feet

2. Trips were calculated based on standard trip rates in the Institute of Transportation Engineers' *Trip Generation Manual, 10th Edition*. Detailed trip generation calculations are provided in **Appendix B**.

Source: Headway Transportation, 2021

As shown in the table, the residential and commercial components of the project are expected to generate approximately 4,508 Daily, 328 AM peak hour, and 419 PM peak hour trips to the external roadway network on a mid-week day, and approximately 4,331 Daily and 419 Midday peak hour trips on a Saturday.

Trip Distribution

Project trips were distributed to the adjacent roadway network based on the locations of complimentary land uses and anticipated travel patterns. Project trips are anticipated to be distributed as follows and are shown on **Figure 6** (weekday) and **Figure 7** (Saturday):

- ▶ 15% to/from the north via Pyramid Highway



- ▶ 55% to/from the south via Pyramid Highway
- ▶ 5% to/from the east via La Posada Drive
- ▶ 15% to/from the south via Scheidbar Drive & Wingfield Hills Drive
- ▶ 10% to/from the Stonebrook West project site

Special Events (Component 3)

Trip Generation

Trip generation estimates for special events at Andelin Farm (component 3) were determined based on traffic count data collected during the 2021 Fall Festival and a schedule of events provided by the project applicant. Andelin Farm hosts special events throughout the year including:

- ▶ Spring Festival (Wednesday through Saturday in April)
- ▶ Private Tours (Tuesday through Saturday in May and June)
- ▶ Farm Camp (Monday through Friday in June and July)
- ▶ Summer Festival (Thursday through Saturday in August)
- ▶ Fall Field Trip (Tuesday through Friday in September – 1 Week Only)
- ▶ Fall Festival (Wednesday through Saturday in October)
- ▶ Live Nativity (December – 1 Night Only)

The Fall Festival generates the highest levels of traffic, with Saturdays typically generating the most and the last two weeks being the peak generators. The Spring and Summer Festivals also generate high levels of traffic, but typically less than the Fall Festival. The other events do not currently, and are not expected to, generate a significant amount of traffic during peak hours. The Private Tours generate up to 100 guests per day; the Farm Camp generates 10 to 30 guests per day and occurs from 9:00 AM to 1:00 PM (outside of the peak hours); and the Fall Field Trip generates up to 100 guests per day and occurs from 10:00 AM to 12:00 PM (outside of the peak hours).

Two analysis periods were evaluated for special events – weekday PM peak hour (4:00 PM to 6:00 PM) and Saturday Midday peak hour (12:00 PM to 2:00 PM). Existing traffic volumes on Pyramid Highway were used to determine the hourly fluctuation of traffic on a Saturday. It was determined that the 12:00 PM to 2:00 PM period has the highest background traffic volumes of the day. The 1:00 PM to 2:00 PM hour was found to have the highest combination of event trips plus background traffic, and was therefore used as the Saturday peak hour. Graphical models of the hourly traffic volumes on a Saturday are provided in **Appendix B**.

Existing traffic volume data was collected during the last two weeks of the 2021 Fall Festival and was used to determine existing trip generation. **Exhibit 3** shows the peak hour trip generation (vehicles in and out) during the weekday PM peak hour and Saturday Midday peak hour.



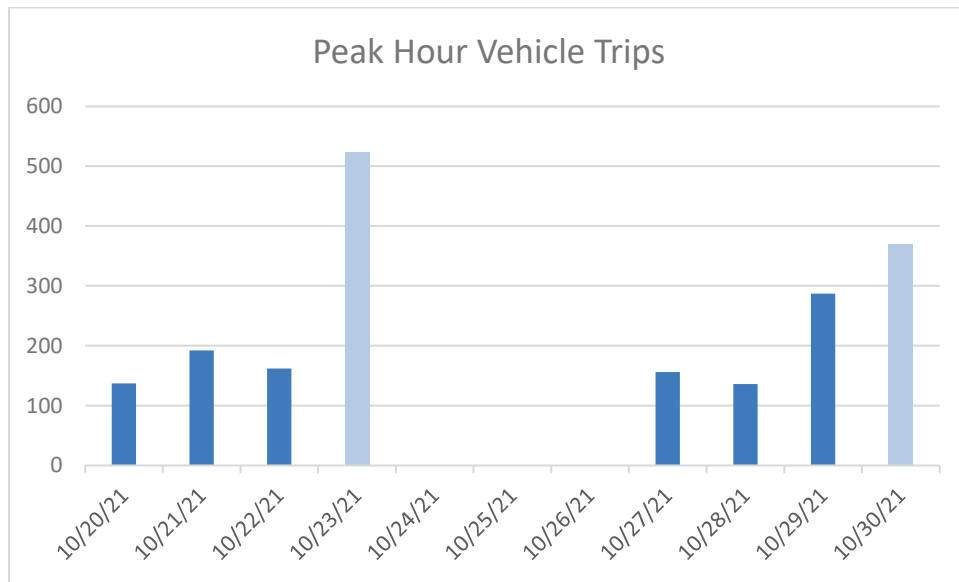


Exhibit 3: Fall Festival Trips

As shown in the chart, the last Friday of October (10/29/21) generated the highest number of weekday PM peak hour trips, with less than 70 percent of that traffic on the second highest weekday (10/21/21). Saturdays generate the most traffic, with a current estimated maximum of approximately 500 to 600 trips during the Midday peak hour.

For future planning and analysis purposes, a vehicle occupancy rate of 3 people per vehicle was assumed. Based on 3 people per vehicle, it was assumed that Andelin Farm could accommodate up to 2,000 guests (or approximately 668 vehicles) at one time on a peak Saturday. Inbound and outbound vehicle trips were estimated based on existing arrival/departure trends and are shown in **Appendix B**. The weekday PM peak hour trip generation was calculated based on 800 guests on-site at one time (or approximately 266 vehicle trips in the weekday PM peak hour).

Table 4 shows the trip generation calculations for the Saturday Midday peak hour and the weekday PM peak hour. Detailed trip generation calculations are provided in **Appendix B**.

Table 4: Trip Generation Estimates – Special Events

	Saturday Midday ¹			Weekday PM ²		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Guests	1,000	1,000	2,000	400	400	800
Vehicles (based on 3 people per vehicle)	334	334	668	133	133	266
Total Trips	334	334	668	133	133	266

Notes: 1. 1:00 PM to 2:00 PM

2. Based on 80 percent of Saturday guests.

Source: Headway Transportation, 2021

As shown in the table, the proposed project was evaluated based on approximately 668 Saturday event peak hour trips and 266 weekday PM event peak hour trips.



Trip Distribution

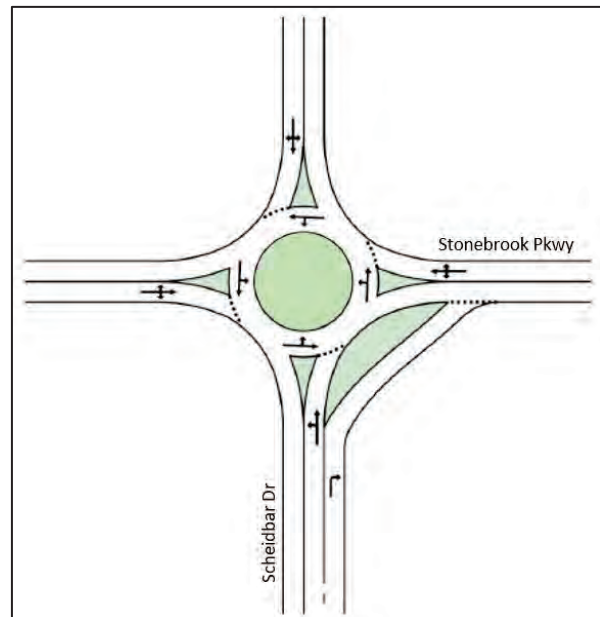
Event trips were distributed to the adjacent roadway network based on anticipated travel patterns and regional population density. It was assumed that visitors would use all possible routes to arrive/depart from Andelin Farm, however it was also assumed that the majority of visitors would use Andelin Drive for arrival and Andelin Drive and Stonebrook Parkway for departure. Andelin Drive is currently constructed, the address of the farm is on Andelin Drive, and all marketing and website materials will provide directions via Andelin Drive. Event trips are anticipated to be distributed as follows and are shown on **Figure 8**:

- ▶ 10% to/from the north via Pyramid Highway
- ▶ 65% to/from the south via Pyramid Highway
- ▶ 5% to/from the east via La Posada Drive
- ▶ 20% to/from the south via Scheidbar Drive & Wingfield Hills Drive

FUTURE YEAR PLUS PROJECT CONDITIONS

Intersection Configurations

The intersection lane configurations and controls have been determined based on previous analyses and through this analysis to accommodate anticipated future traffic volumes generated by this project and other surrounding projects (Stonebrook, Stonebrook West, etc.). The Stonebrook Parkway/Scheidbar Drive intersection has not been previously analyzed, therefore the recommended lane configurations and controls were determined as part of this analysis. The intersection was initially analyzed as a side street stop controlled intersection with stop control on the northbound (Scheidbar Drive) and southbound approaches. The intersection would not function within policy level of service during the AM or PM peak hours; therefore, a roundabout was analyzed at the intersection. **Exhibit 3** shows the configuration needed to operate within policy level of service thresholds.



**Exhibit 3: Stonebrook Pkwy/Scheidbar Dr
Roundabout Configuration**

The intersection lane configurations and controls used in the analysis are shown on **Figure 9**.



Future Year Plus Project Analysis – Residential & Commercial Uses

Traffic Volumes

Future Year Plus Project conditions traffic volumes for the weekday AM and PM peak hours (shown on **Figure 10**) were developed by adding the project trips from the residential and commercial components of the project at the study intersections (**Figure 6**) to the Future Year background traffic volumes (**Figure 4**).

Intersection Level of Service

Table 5 shows the weekday AM and PM peak hour Future Year Plus Project conditions intersection level of service results at the study intersections based on the lane configurations and controls shown on **Figure 9** and the traffic volumes shown on **Figure 10**. The level of service results represent an average weekday when Andelin Farm is not hosting an event. The technical calculations are provided in **Appendix C**.

As shown in the table, the study intersections are expected to operate within level of service thresholds during the AM and PM peak hours with the lane configurations shown on **Figure 9** and assuming the six lanes planned on Pyramid Highway are constructed.



Table 5: Future Year Plus Project Intersection Level of Service – No Event

Intersection	Control ¹	Future Year (No Project)						Future Year Plus Project					
		Weekday						Weekday					
		AM			PM			AM			PM		
		Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³
Pyramid Hwy/Dolores Dr/ Stonebrook Pkwy	Signal												
Overall		58.7	E	NA	56.5	E	NA	61.9	E	NA	58.7	E	NA
Tierra Del Sol/Andelin Dr	All Way Stop												
Overall		6.7	A	NA	13.0	B	NA	6.8	A	NA	16.9	C	NA
Stonebrook Pkwy/Tierra Del Sol Pkwy ⁴	RAB												
Northbound Approach		5.9	A	0.03	7.8	A	0.04	6.2	A	0.03	9.4	A	0.07
Southbound Approach		7.8	A	0.33	14.8	B	0.69	9.0	A	0.38	18.4	C	0.75
Eastbound Approach		8.2	A	0.38	13.0	B	0.55	8.9	A	0.43	20.7	C	0.74
Westbound Approach		9.3	A	0.49	8.1	A	0.40	12.5	B	0.63	9.5	B	0.48
Stonebrook Pkwy/Project Access 1	RAB												
Northbound Approach		NA						6.1	A	0.08	7.6	A	0.05
Southbound Approach								6.8	A	0.07	5.7	A	0.06
Eastbound Approach								8.0	A	0.44	14.9	B	0.72
Westbound Approach								10.6	B	0.56	8.1	A	0.42
Stonebrook Pkwy/ Scheidbar Dr	RAB												
Northbound Approach		NA						5.8	A	0.23	11.7	B	0.52
Southbound Approach								8.9	A	0.06	6.1	A	0.02
Eastbound Approach								13.9	B	0.59	17.7	C	0.75
Westbound Approach								20.5	C	0.78	9.1	A	0.40
Stonebrook Pkwy/Project Access 2	Side Street Stop												
Northbound Approach		NA						13.2	B	NA	13.1	B	NA
Southbound Approach								6.2	A		3.0	A	
Eastbound Left								5.3	A		3.9	A	
Westbound Left								1.8	A		0.5	A	
Pyramid Hwy/Andelin Dr	Side Street Stop												
Westbound Right		14.0	B	NA	34.6	D	NA	18.5	C	NA	36.8	E	NA
Southbound Left		28.0	D		37.2	E		34.2	D		44.4	E	

Notes: 1. RAB = roundabout

2. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop controlled and RAB intersections.

3. v/c Ratio = volume-to-capacity ratio; reported for RAB intersections.

4. The Stonebrook Parkway/Tierra Del Sol Parkway roundabout results assume a single lane on the southbound approach.

Source: Headway Transportation, 2021



Future Year Plus Project Analysis – Special Events

Traffic Volumes

Weekday PM peak hour and Saturday Midday peak hour Future Year Plus Project Plus Event conditions traffic volumes (shown on **Figure 11**) were developed by adding the residential and commercial project trips at the study intersections (**Figures 6 and 7**) and the event project trips (**Figure 8**) to the Future Year background traffic volumes (**Figure 4**).

Intersection Level of Service

Table 6 shows the Future Year Plus Project Plus Event conditions intersection level of service results at the study intersections based on the lane configurations and controls shown on **Figure 9** and the traffic volumes shown on **Figure 11**. The technical calculations are provided in **Appendix D**.

As shown in the table, the Tierra Del Sol Parkway/Andelin Drive intersection is expected to operate at LOS E with the addition of approximately 266 vehicle trips during the weekday PM peak hour for a special event with approximately 800 people on site. The southbound approach of the Stonebrook Parkway/Tierra Del Sol Parkway intersection is also expected to operate with a volume-to-capacity ratio of 0.84 with one southbound approach lane. As noted previously, the volume-to-capacity (v/c) ratio is a better indicator of roundabout performance than LOS and roundabouts should operate with a v/c of less than 0.85 on all approaches. The southbound approach is at design capacity and adding a southbound right-turn lane is therefore recommended. The other study intersections are expected to operate within level of service thresholds during the weekday PM and Saturday Midday peak hours with a special event and the lane configurations shown on **Figure 9**.

Table 6: Future Year Plus Project Intersection Level of Service – With Event

Intersection	Control ¹	Future Year (No Project)						Future Year Plus Project Plus Event					
		Weekday PM			Saturday Midday			Weekday PM			Saturday Midday		
		Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³
Pyramid Hwy/Dolores Dr/ Stonebrook Pkwy	Signal												
Overall		56.5	E	NA	26.2	D	NA	70.1	E	NA	39.5	D	NA
Tierra Del Sol Pkwy/ Andelin Dr	All Way Stop												
Overall		3.0	A	NA	8.8	A	NA	48.6	E	NA	30.2	D	NA
Stonebrook Pkwy/Tierra Del Sol Pkwy ⁴	RAB												
Northbound Approach		7.8	A	0.04	6.2	A	0.03	10.1	B	0.09	8.9	A	0.10
Southbound Approach		14.8	B	0.69	9.6	A	0.50	25.7	D	0.84	23.9	C	0.82
Eastbound Approach		13.0	B	0.55	8.7	A	0.37	23.6	C	0.78	15.0	C	0.62
Westbound Approach		8.1	A	0.40	6.5	A	0.29	11.0	B	0.55	11.7	B	0.58
Stonebrook Pkwy/Project Access 1	RAB												
Northbound Approach		NA						7.9	A	0.05	7.3	A	0.06
Southbound Approach								6.8	A	0.15	8.3	A	0.28
Eastbound Approach								16.7	C	0.76	13.1	B	0.66
Westbound Approach								8.8	A	0.46	8.7	A	0.45
Stonebrook Pkwy/ Scheidbar Dr	RAB												
Northbound Approach		NA						12.0	B	0.52	9.2	A	0.37
Southbound Approach								6.3	A	0.02	6.0	A	0.03
Eastbound Approach								19.7	C	0.78	13.4	B	0.65
Westbound Approach								9.6	A	0.42	8.3	A	0.34
Stonebrook Pkwy/Project Access 2	Side Street Stop												
Northbound Approach		NA						18.6	C	NA	11.6	B	NA
Southbound Approach								3.1	A		3.5	A	
Eastbound Approach								4.2	A		4.5	A	
Westbound Approach								5.8	A		0.4	A	
Pyramid Hwy/Andelin Dr	Side Street Stop												
Westbound Right		34.6	D	NA	18.0	C	NA	38.0	E	NA	21.4	C	NA
Southbound Left		37.2	E		26.4	D		48.2	E		28.7	D	

Notes: 1. RAB = roundabout

2. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop controlled and RAB intersections.

3. v/c Ratio = volume-to-capacity ratio; reported for RAB intersections.

4. The Stonebrook Parkway/Tierra Del Sol Parkway roundabout results assume a single lane on the southbound approach.

Bold Text indicates level of service beyond the policy threshold.

Source: Headway Transportation, 2021



Recommended Improvements – Tierra Del Sol Parkway/Andelin Drive

The LOS E condition at the Tierra Del Sol Parkway/Andelin Drive intersection is expected to occur in the 20 year horizon and during a peak event at Andelin Farm that is not a regular occurrence. While traffic volume projections are based on planned/approved projects and the best available modelling information, a large portion of the background traffic volumes are from projects that are not currently built (i.e. the Stonebrook West PUD) and have the potential to not materialize as expected. Traffic volume projections in the master traffic study for Stonebrook West assume land uses with the highest trip generation potential.

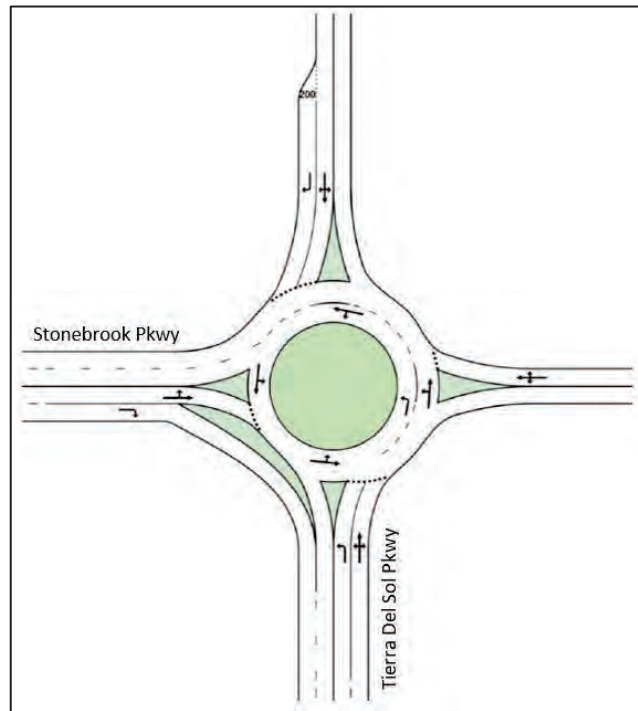
Additional analysis was performed to determine the estimated number of trips that could be accommodated at the Tierra Del Sol Parkway/Andelin Drive intersection during the weekday PM peak hour. Analysis results show that the Tierra Del Sol Parkway/Andelin Drive intersection would operate within policy level of service thresholds with the addition of up to 240 vehicle trips during the weekday PM peak hour. As shown in **Exhibit 3**, only one night during the Fall Festival currently exceeds 240 trips during the PM peak hour. 240 vehicle trips equates to approximately 700 visitors (based on a vehicle occupancy rate of 3 people per vehicle).

The following management strategy is recommended:

- ▶ Implement temporary traffic control for peak weekday evening events exceeding 700 persons on site at one time. Level of service D is expected at this intersection during all evening events with less than 700 guests on site at one time and traffic control will be utilized to manage conditions on peak evenings with more than 700 guests on site at one time.

Recommended Improvements – Stonebrook Parkway/Tierra Del Sol Parkway

The southbound approach of the Stonebrook Parkway/Tierra Del Sol Parkway intersection is expected to operate with a volume-to-capacity (v/c) ratio of 0.84. As noted previously, roundabouts should operate with a v/c ratio of less than 0.85 on all approaches. The southbound approach is at design capacity, therefore a southbound right-turn pocket is recommended at the intersection (shown in **Exhibit 4**). **Table 7** shows the Future Year Plus Project Plus Event conditions level of service results at the intersection with the recommended improvement.



**Exhibit 4: Stonebrook Pkwy/Tierra Del Sol Pkwy
Recommended Roundabout Configuration**

Table 7: Future Year Plus Project Intersection Level of Service – With Event (with Mitigation)

Intersection	Control ¹	Future Year Plus Project Plus Event (with Mitigation)					
		Weekday PM			Saturday Midday		
		Delay ²	LOS	v/c Ratio ³	Delay ²	LOS	v/c Ratio ³
Stonebrook Pkwy/Tierra Del Sol Pkwy	RAB						
Northbound Approach		10.1	B	0.09	8.9	A	0.10
Southbound Approach		9.2	A	0.45	9.2	A	0.41
Eastbound Approach		23.6	C	0.78	15.0	C	0.62
Westbound Approach		11.0	B	0.55	11.7	B	0.58

Notes: 1. RAB = roundabout

2. Delay is reported in seconds per vehicle for the worst approach/movement for RAB intersections.

3. v/c Ratio = volume-to-capacity ratio; reported for RAB intersections.

Source: Headway Transportation, 2021

As shown in the table, all approaches of the Stonebrook Parkway/Tierra Del Sol Parkway intersection are expected to operate at acceptable v/c ratios with the proposed configurations.

CONCLUSIONS

The following is a list of our key findings and recommendations:

- ▶ The proposed project includes up to 350 single family residential units and approximately 42,800 square feet of boutique style commercial space including retail space, two restaurants, a beer garden, and an education building where the Andelin family can host small educational events to teach visitors about farming and local history. Additionally, the Andelin Family Farm will provide seasonal activities such as a pumpkin patch, hay-rides, corn mazes, and a petting zoo, similar to the current activities on the farm. This analysis evaluates weekday PM peak hour and Saturday Midday peak hour conditions that are expected to occur less than 10 days of the year.
- ▶ The residential and commercial uses of the project are anticipated to generate approximately 4,508 Daily, 328 AM peak hour, and 419 PM peak hour trips to the external roadway network on a mid-week day, and approximately 4,331 Daily and 419 Midday peak hour trips on a Saturday.
- ▶ Events at Andelin Farm generate a wide range of trip levels. The trip generation estimates in this analysis represent peak days with highest trip generation levels anticipated. The proposed project was evaluated based on approximately 668 Saturday peak hour trips and 266 weekday PM peak hour trips.
- ▶ The study intersections are expected to operate within policy level of service thresholds during the weekday AM and PM peak hours under Future Year Plus Project conditions when Andelin Farm is not hosting a seasonal event with the lane configurations and controls shown on **Figure 9**.
- ▶ During the weekday PM peak hour under Future Year Plus Project Plus Event conditions (when Andelin Farm is hosting a large seasonal event) the Tierra Del Sol Parkway/Andelin Drive intersection is expected to operate at overall LOS E. The LOS E condition is expected to occur as Stonebrook West and the Andelin Family Farm projects approach build-out (20-year horizon). Additionally, this condition is expected only during peak weekday evening events at Andelin Farm on the busiest days of the year (expected less than 10 days of the year). The future year traffic volume forecasts are based on land uses that are not yet built and have the potential to not materialize as expected.
- ▶ The following management strategy is recommended:
 - » Implement temporary traffic control for peak weekday evening events exceeding 700 persons on site at one time. Level of service D is expected at this intersection during all evening events with less than 700 guests on site at one time and traffic control will be utilized to manage conditions on peak evenings with more than 700 guests on site at one time.
- ▶ The southbound approach of the Stonebrook Parkway/Tierra Del Sol Parkway intersection is expected to operate with a volume-to-capacity ratio of 0.84 during the weekday PM peak

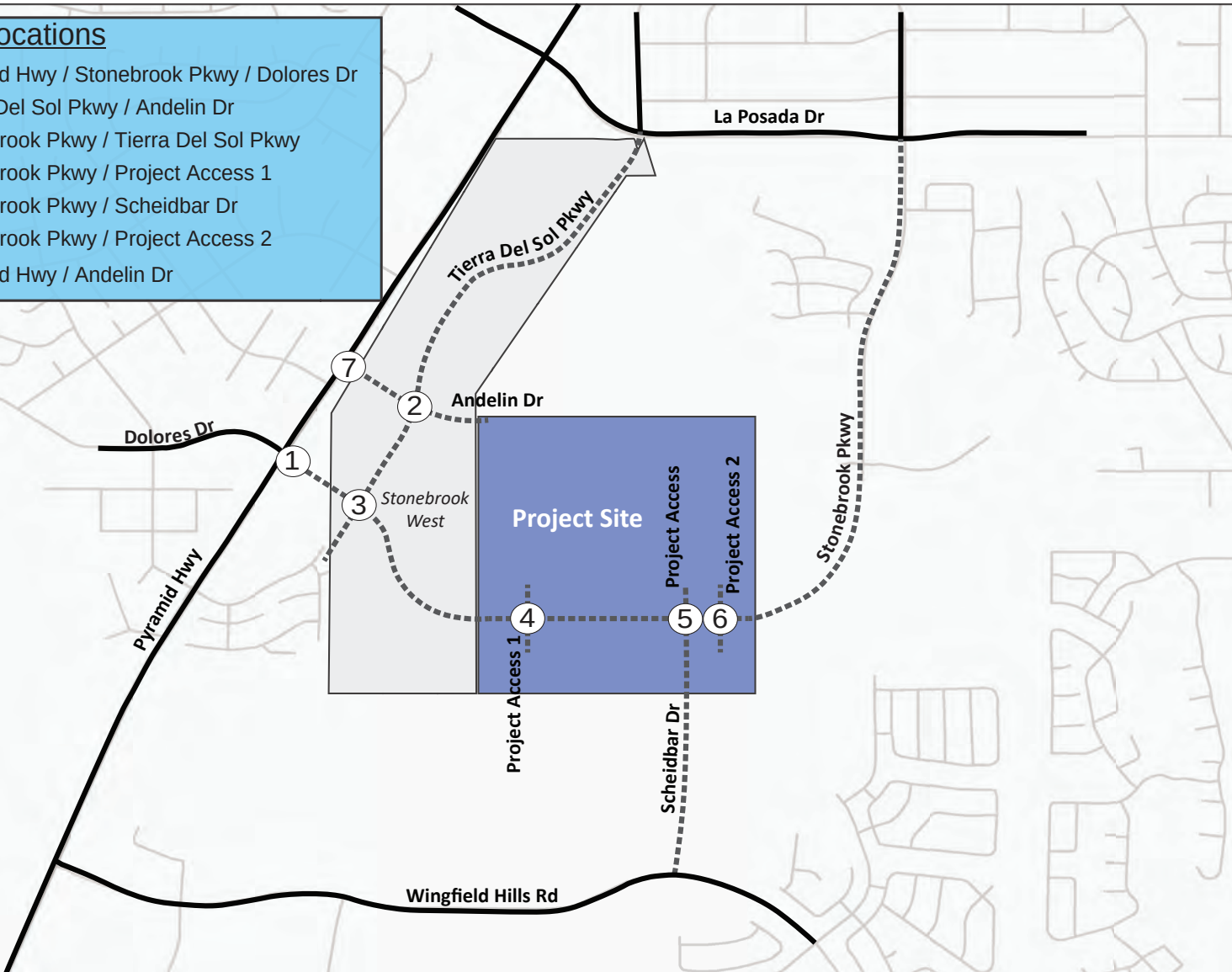


hour during an event, which is essentially at design capacity. A southbound right-turn pocket is recommended at the Stonebrook Parkway/Tierra Del Sol Parkway roundabout with the Andelin Family Farm project and will improve the southbound approach to a v/c ratio of 0.45 which is an acceptable condition. The ultimate roundabout configuration is shown in **Exhibit 4** (page 17).



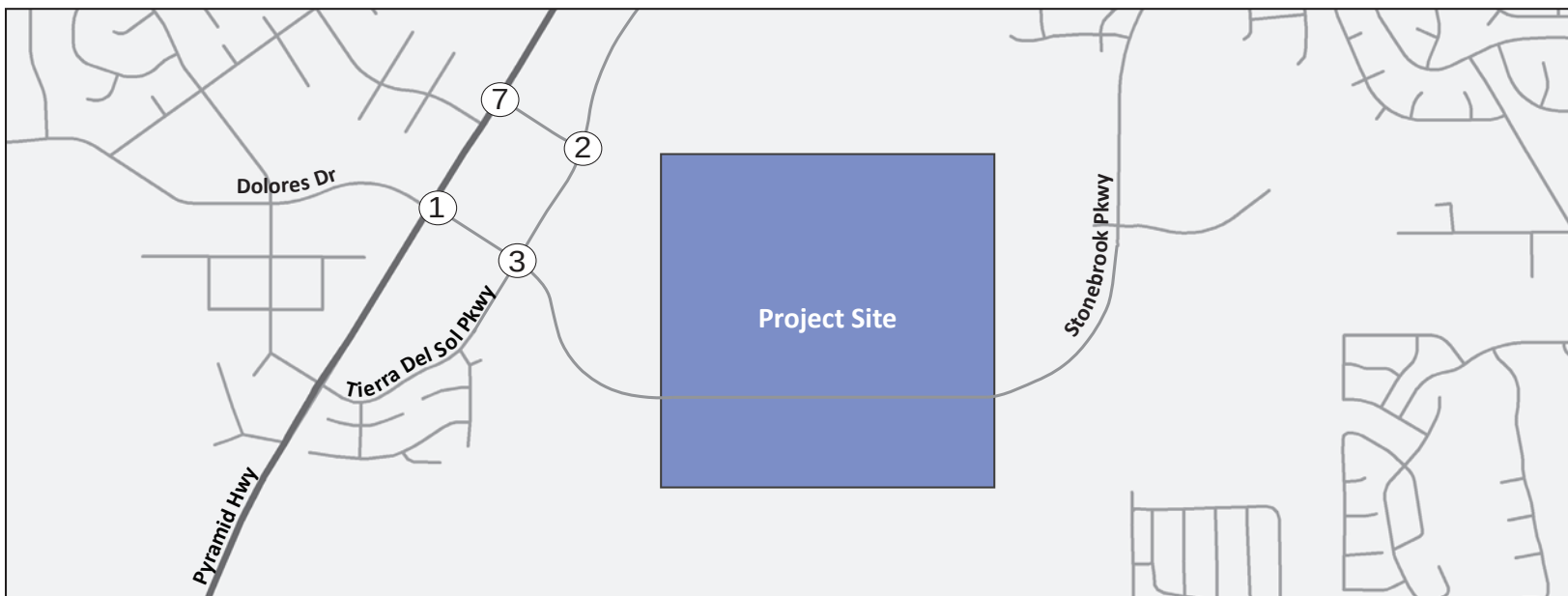
Study Locations

- ① Pyramid Hwy / Stonebrook Pkwy / Dolores Dr
- ② Tierra Del Sol Pkwy / Andelin Dr
- ③ Stonebrook Pkwy / Tierra Del Sol Pkwy
- ④ Stonebrook Pkwy / Project Access 1
- ⑤ Stonebrook Pkwy / Scheidbar Dr
- ⑥ Stonebrook Pkwy / Project Access 2
- ⑦ Pyramid Hwy / Andelin Dr

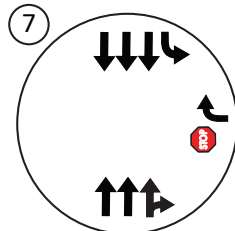


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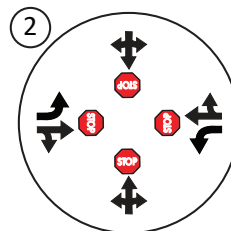
Figure 2
Andelin Family Farm
Traffic Impact Study
Site Plan



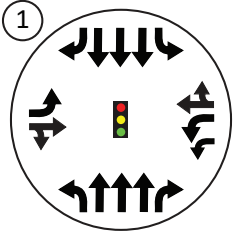
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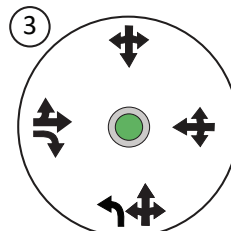
Tierra Del Sol Pkwy / Andelin Dr

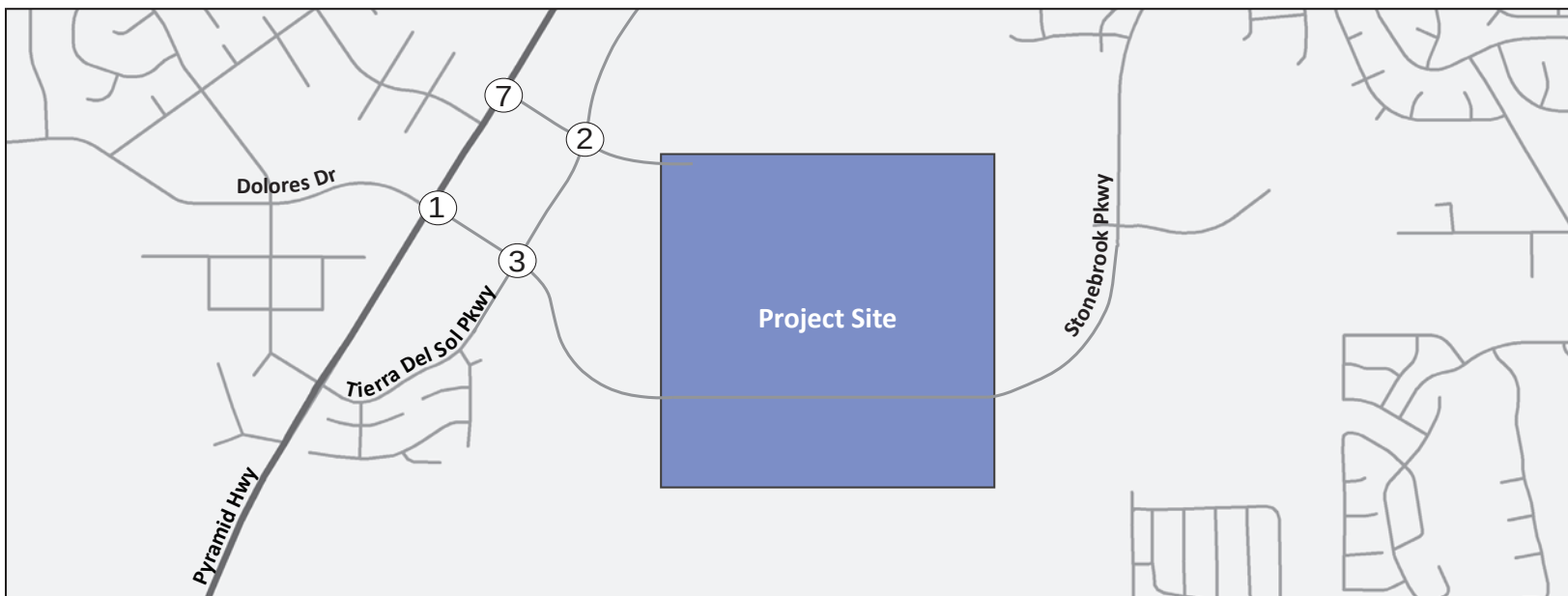


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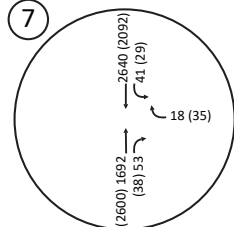


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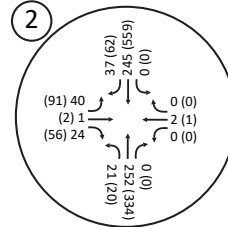




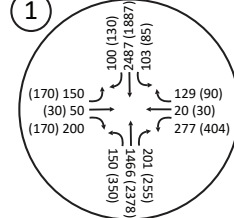
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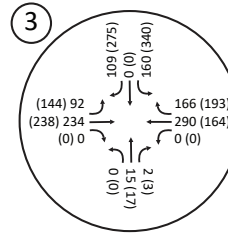
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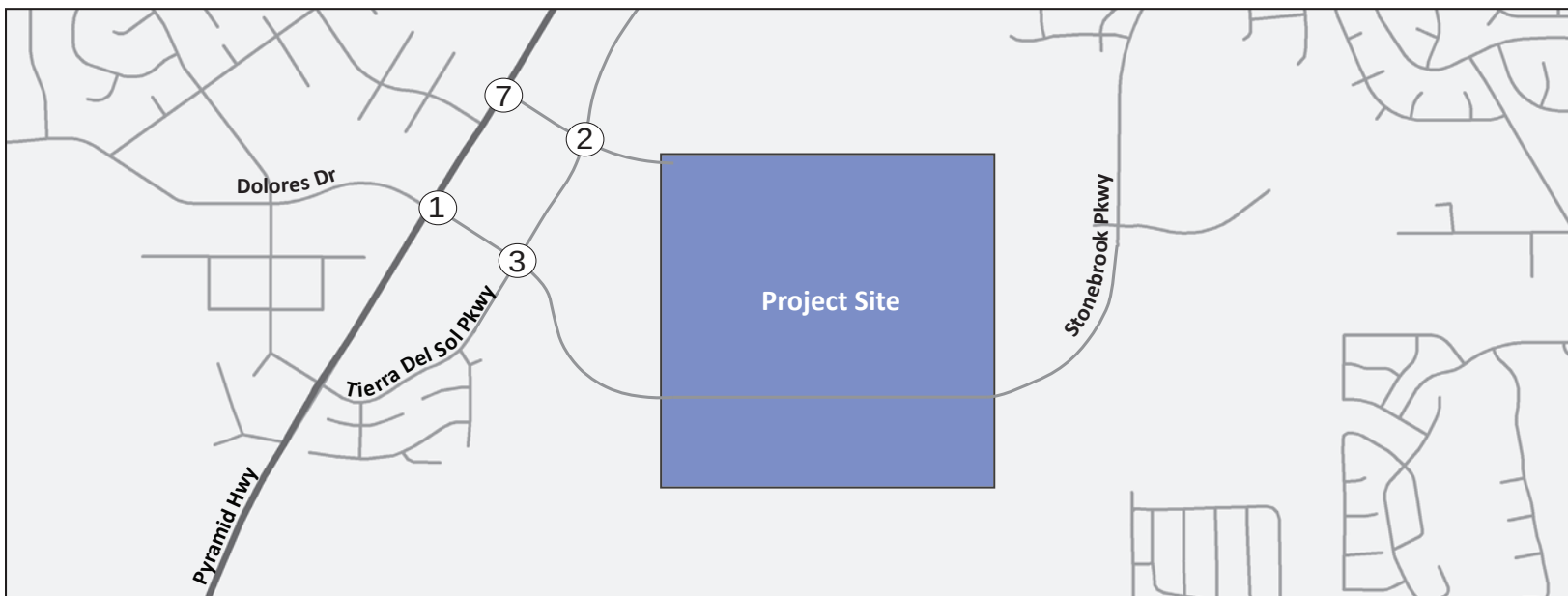


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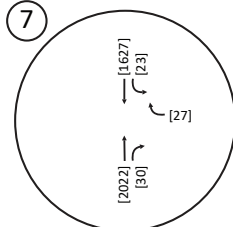


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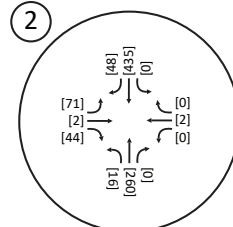




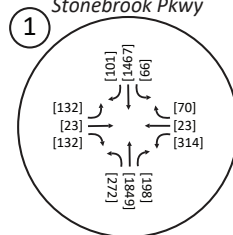
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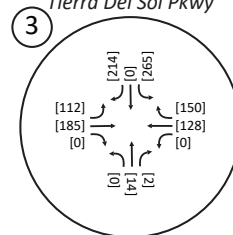
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Pyramid Hwy / Dolores Dr / Stonebrook Pkwy

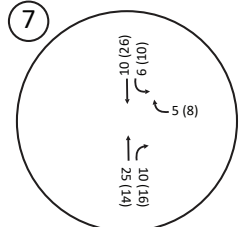


Stonebrook Pkwy / Tierra Del Sol Pkwy

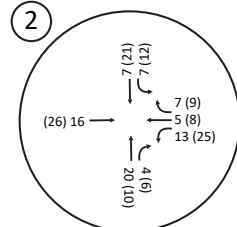




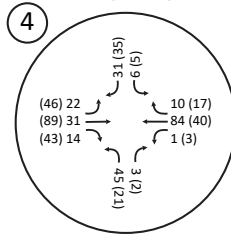
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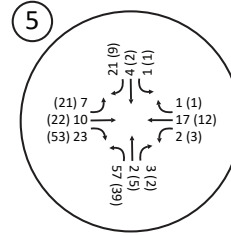
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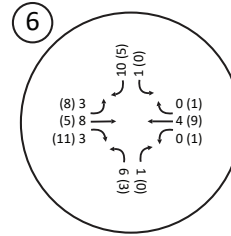
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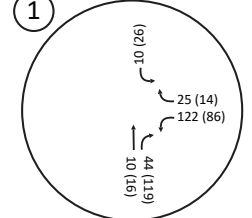
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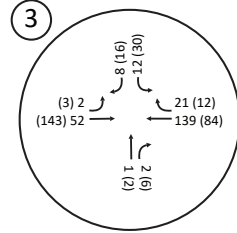
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Pyramid Hwy / Dolores Dr / Stonebrook Pkwy

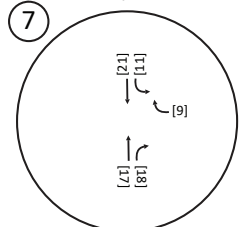


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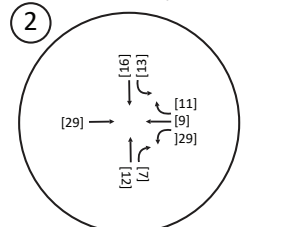




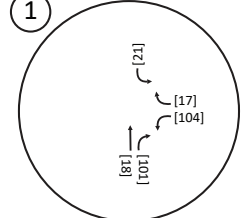
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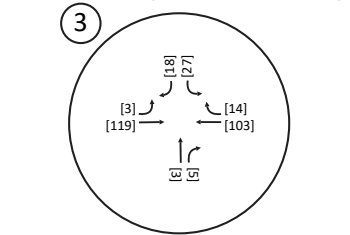
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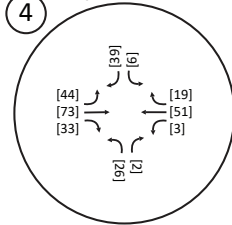
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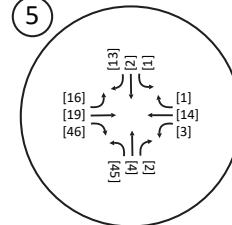
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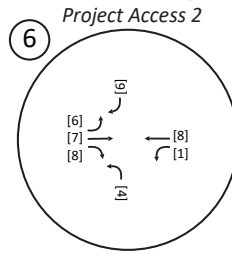
Stonebrook Pkwy / Project Access 1



Stonebrook Pkwy / Scheidbar Dr

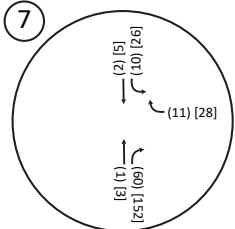


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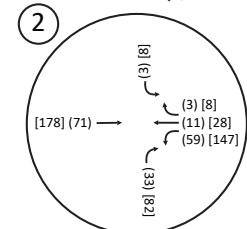




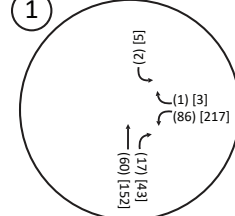
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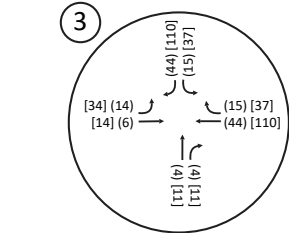
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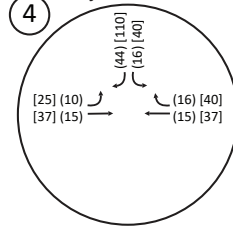
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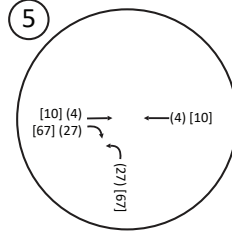
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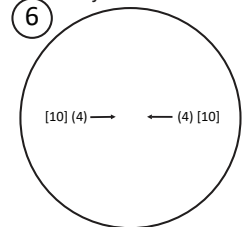
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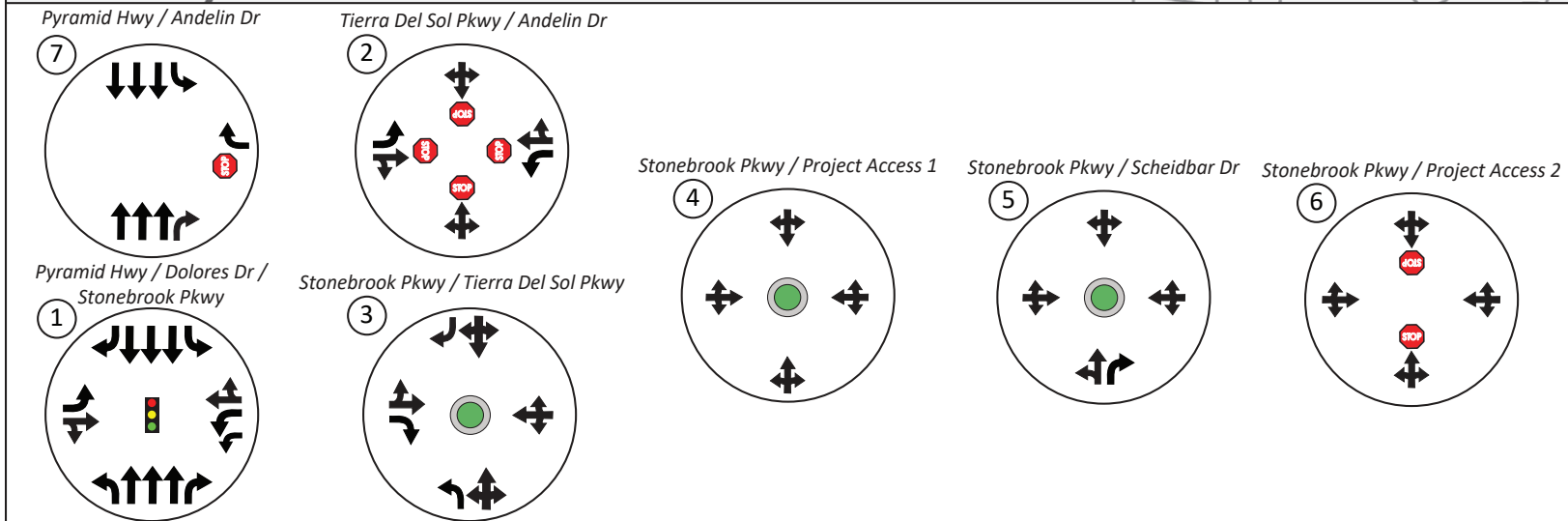
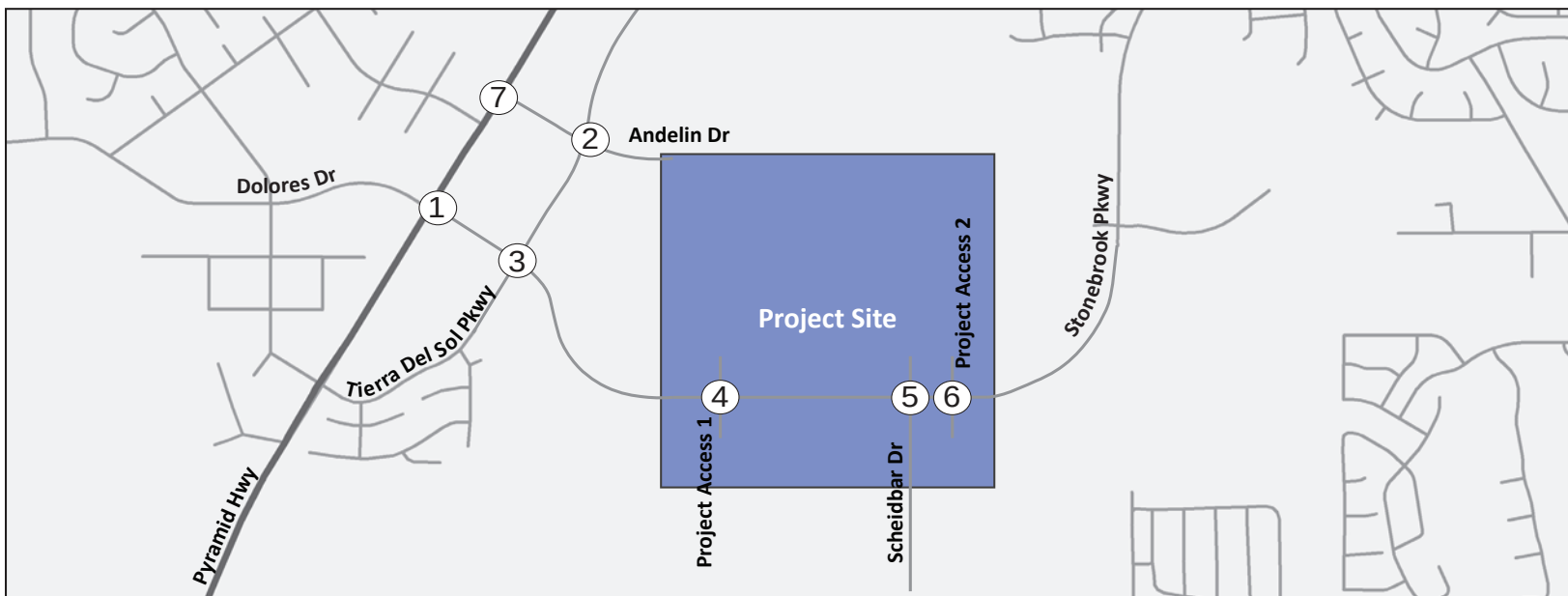


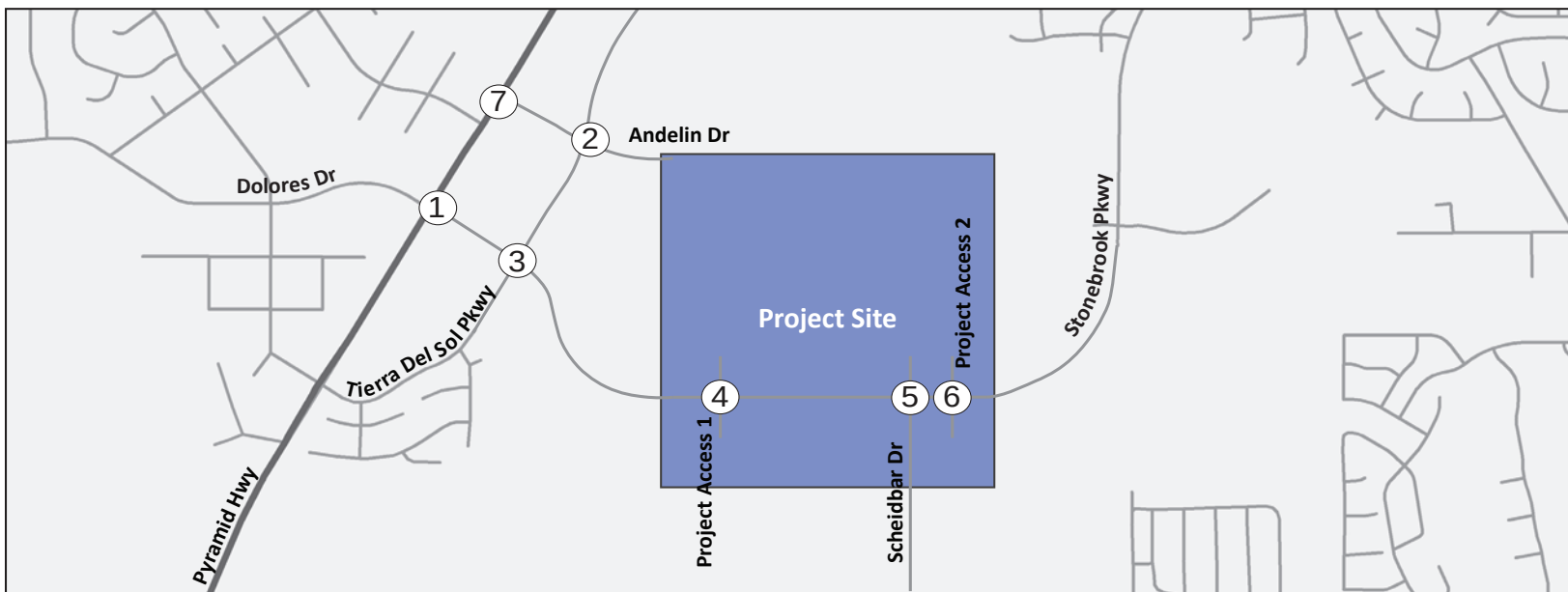
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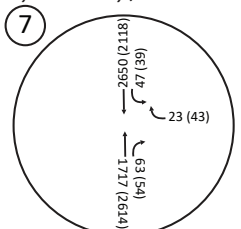
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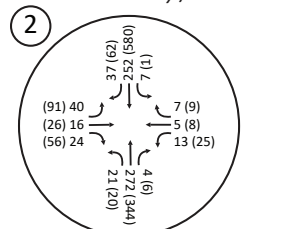




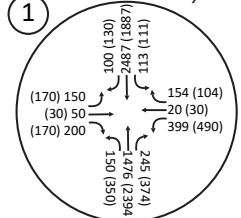
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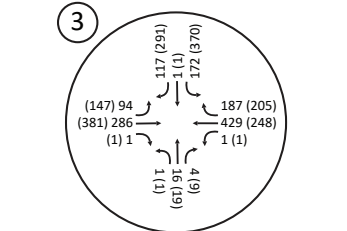
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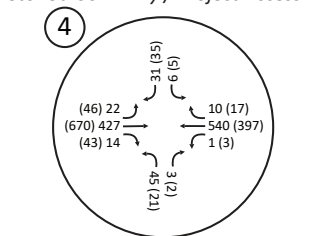
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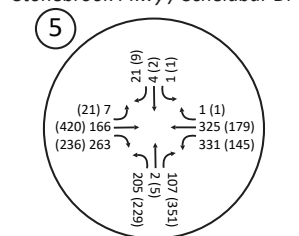
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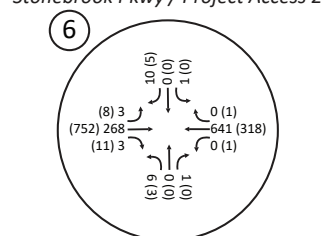
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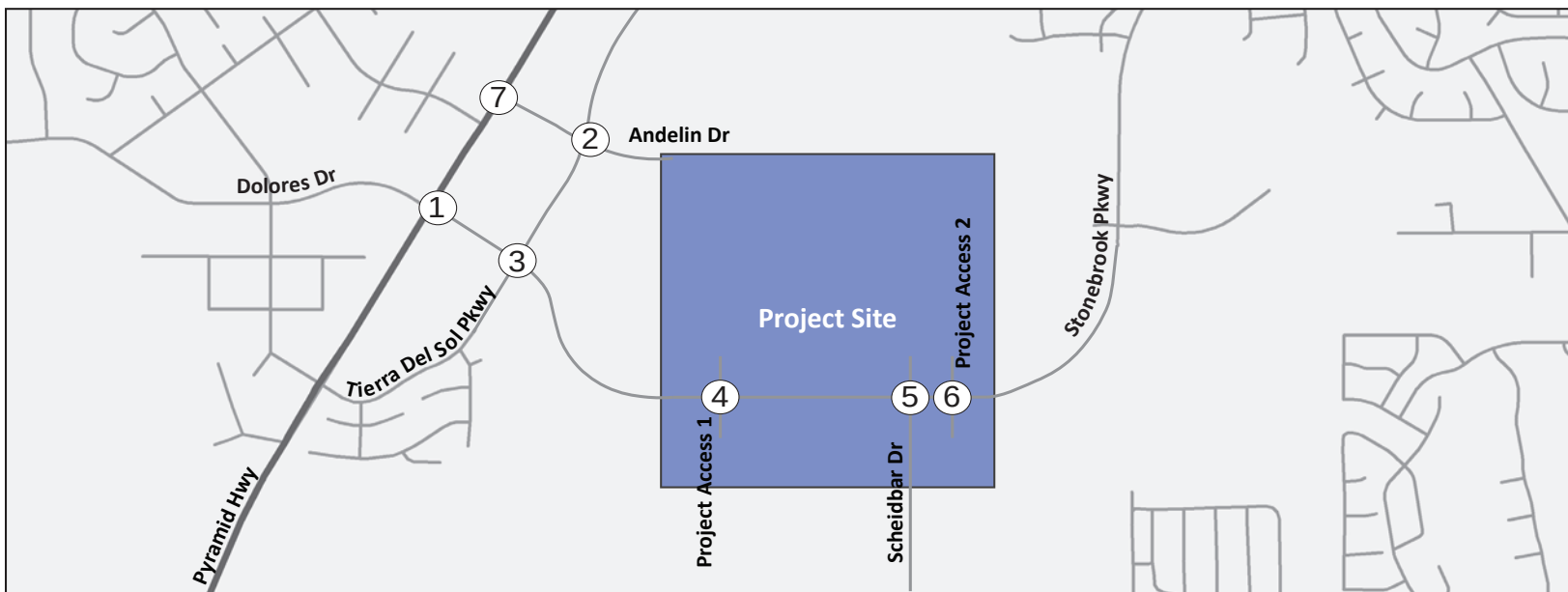


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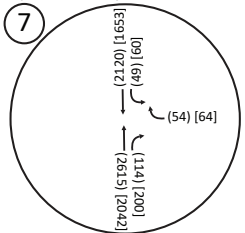


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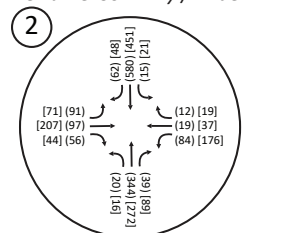




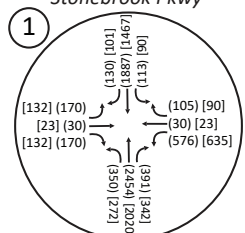
Pyramid Hwy / Andelin Dr



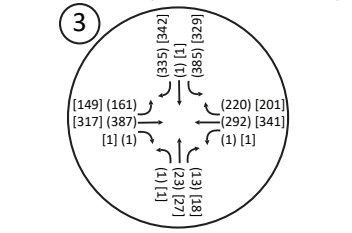
Tierra Del Sol Pkwy / Andelin Dr



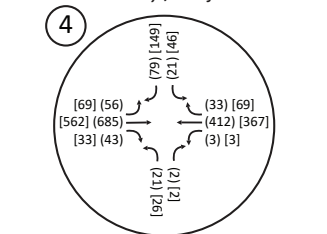
Pyramid Hwy / Dolores Dr / Stonebrook Pkwy



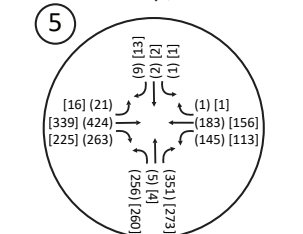
Stonebrook Pkwy / Tierra Del Sol Pkwy



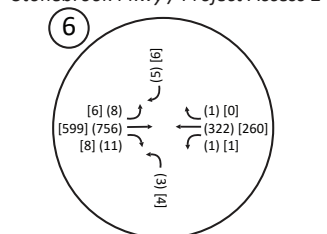
Stonebrook Pkwy / Project Access 1



Stonebrook Pkwy / Scheidbar Dr



Stonebrook Pkwy / Project Access 2



(PM Peak Hour Volume) [Saturday Midday Peak Hour Volume]

Figure 11
Andelin Family Farm
Traffic Impact Study
Future Year Plus Project Traffic Volumes - Plus Event

Appendix A

Future Year LOS Calculations



SimTraffic Performance Report

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.6	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	56.7	69.9	47.8	80.4	53.3	22.4	108.4	24.2	18.5	93.1	79.4	65.5
Vehicles Entered	152	51	208	286	21	133	164	1581	205	103	2461	91
Vehicles Exited	152	50	205	281	21	132	162	1584	205	103	2442	90
Hourly Exit Rate	152	50	205	281	21	132	162	1584	205	103	2442	90
Input Volume	156	52	208	289	21	134	156	1589	209	107	2592	104
% of Volume	97	96	99	97	100	99	104	100	98	96	94	87

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	58.7
Vehicles Entered	5456
Vehicles Exited	5427
Hourly Exit Rate	5427
Input Volume	5617
% of Volume	97

2: Tierra Del Sol & Andelin Dr Performance by movement

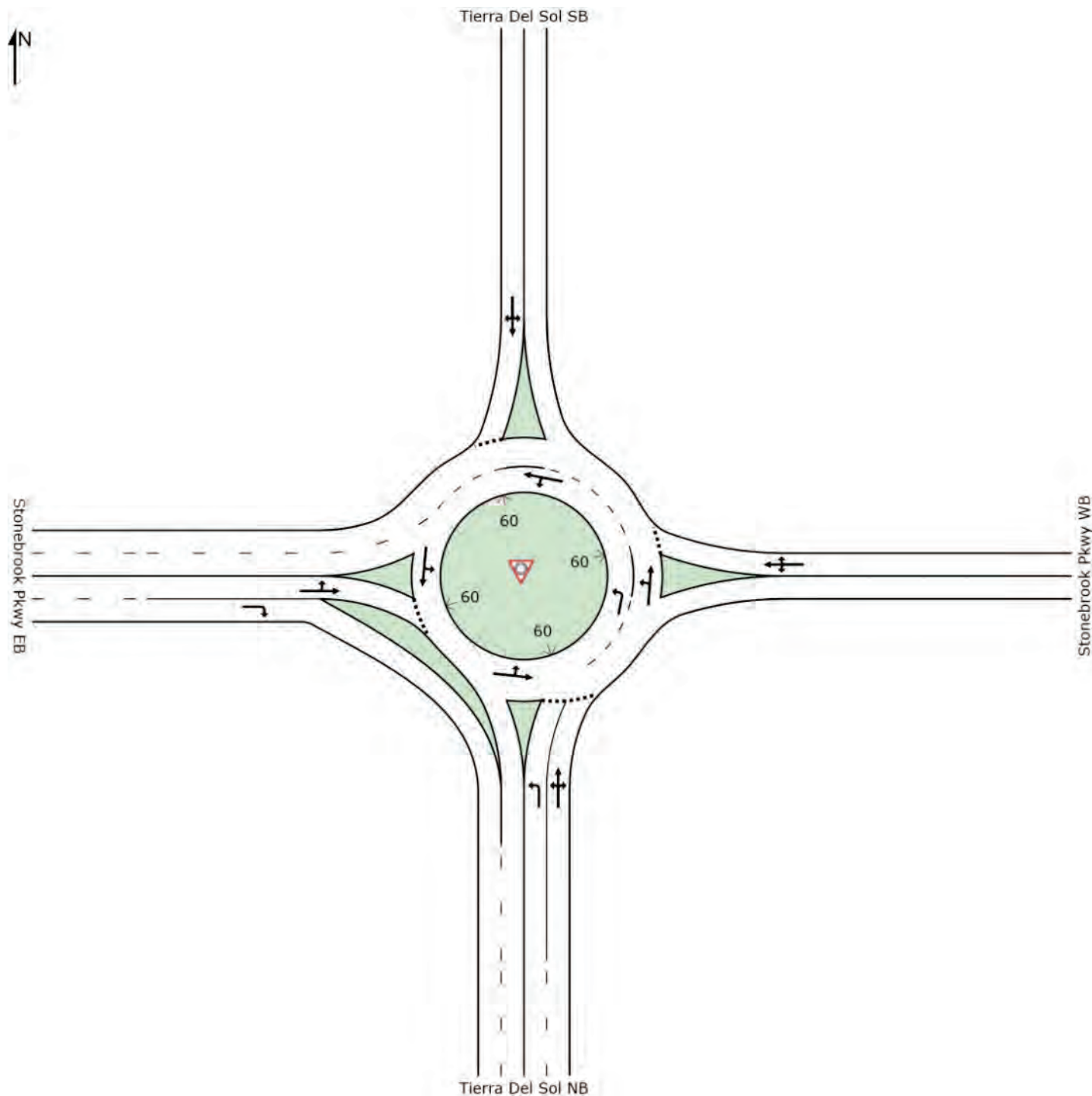
Movement	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.1
Total Del/Veh (s)	5.6	0.6	3.5	6.8	6.6	7.4	7.5	4.2	6.7
Vehicles Entered	42	28	25	2	23	247	242	35	644
Vehicles Exited	42	28	25	2	23	248	242	35	645
Hourly Exit Rate	42	28	25	2	23	248	242	35	645
Input Volume	40	30	24	2	21	252	245	37	651
% of Volume	106	95	103	100	108	98	99	95	99

SITE LAYOUT



Site: Stonebrook Pkwy/Tierra Del Sol

Roundabout



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MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Tierra Del Sol

Future Year Conditions
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Tierra Del Sol NB											
3	L2	1	2.0	0.002	5.6	LOS A	0.0	0.1	0.48	0.30	31.7
8	T1	16	2.0	0.029	5.9	LOS A	0.1	2.3	0.48	0.40	33.7
18	R2	2	2.0	0.029	5.9	LOS A	0.1	2.3	0.48	0.40	32.9
Approach		20	2.0	0.029	5.9	LOS A	0.1	2.3	0.48	0.39	33.5
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.488	9.3	LOS A	2.0	51.6	0.28	0.18	31.9
6	T1	315	2.0	0.488	9.3	LOS A	2.0	51.6	0.28	0.18	32.1
16	R2	180	2.0	0.488	9.3	LOS A	2.0	51.6	0.28	0.18	31.4
Approach		497	2.0	0.488	9.3	LOS A	2.0	51.6	0.28	0.18	31.8
North: Tierra Del Sol SB											
7	L2	174	2.0	0.332	7.8	LOS A	1.1	27.0	0.37	0.33	31.5
4	T1	1	2.0	0.332	7.8	LOS A	1.1	27.0	0.37	0.33	31.6
14	R2	118	2.0	0.332	7.8	LOS A	1.1	27.0	0.37	0.33	31.0
Approach		293	2.0	0.332	7.8	LOS A	1.1	27.0	0.37	0.33	31.3
West: Stonebrook Pkwy EB											
5	L2	100	2.0	0.383	8.2	LOS A	1.8	46.2	0.40	0.29	31.9
2	T1	254	2.0	0.383	8.2	LOS A	1.8	46.2	0.40	0.29	32.0
12	R2	1	2.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.5
Approach		355	2.0	0.383	8.2	LOS A	1.8	46.2	0.40	0.29	32.0
All Vehicles		1165	2.0	0.488	8.5	LOS A	2.0	51.6	0.34	0.25	31.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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7: Pyramid Hwy & Andelin Dr Performance by movement

Movement	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.7	0.3	0.2
Total Del/Veh (s)	0.2	14.0	2.7	0.5	28.0	1.6	2.3
Vehicles Entered	39	18	1704	54	42	2612	4469
Vehicles Exited	39	17	1701	54	42	2615	4468
Hourly Exit Rate	39	17	1701	54	42	2615	4468
Input Volume	40	18	1692	53	41	2640	4484
% of Volume	98	93	101	102	103	99	100

SimTraffic Performance Report

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	0.6	0.7	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	65.0	61.8	35.2	72.2	56.1	32.3	101.8	29.7	26.0	110.3	80.5	59.3
Vehicles Entered	169	30	177	418	34	92	329	2313	232	83	1948	128
Vehicles Exited	168	30	175	417	33	92	330	2319	233	84	1916	126
Hourly Exit Rate	168	30	175	417	33	92	330	2319	233	84	1916	126
Input Volume	177	31	177	421	31	94	365	2670	266	89	1966	135
% of Volume	95	97	99	99	106	98	90	87	88	94	97	93

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	56.5
Vehicles Entered	5953
Vehicles Exited	5923
Hourly Exit Rate	5923
Input Volume	6422
% of Volume	92

2: Tierra Del Sol & Andelin Dr Performance by movement

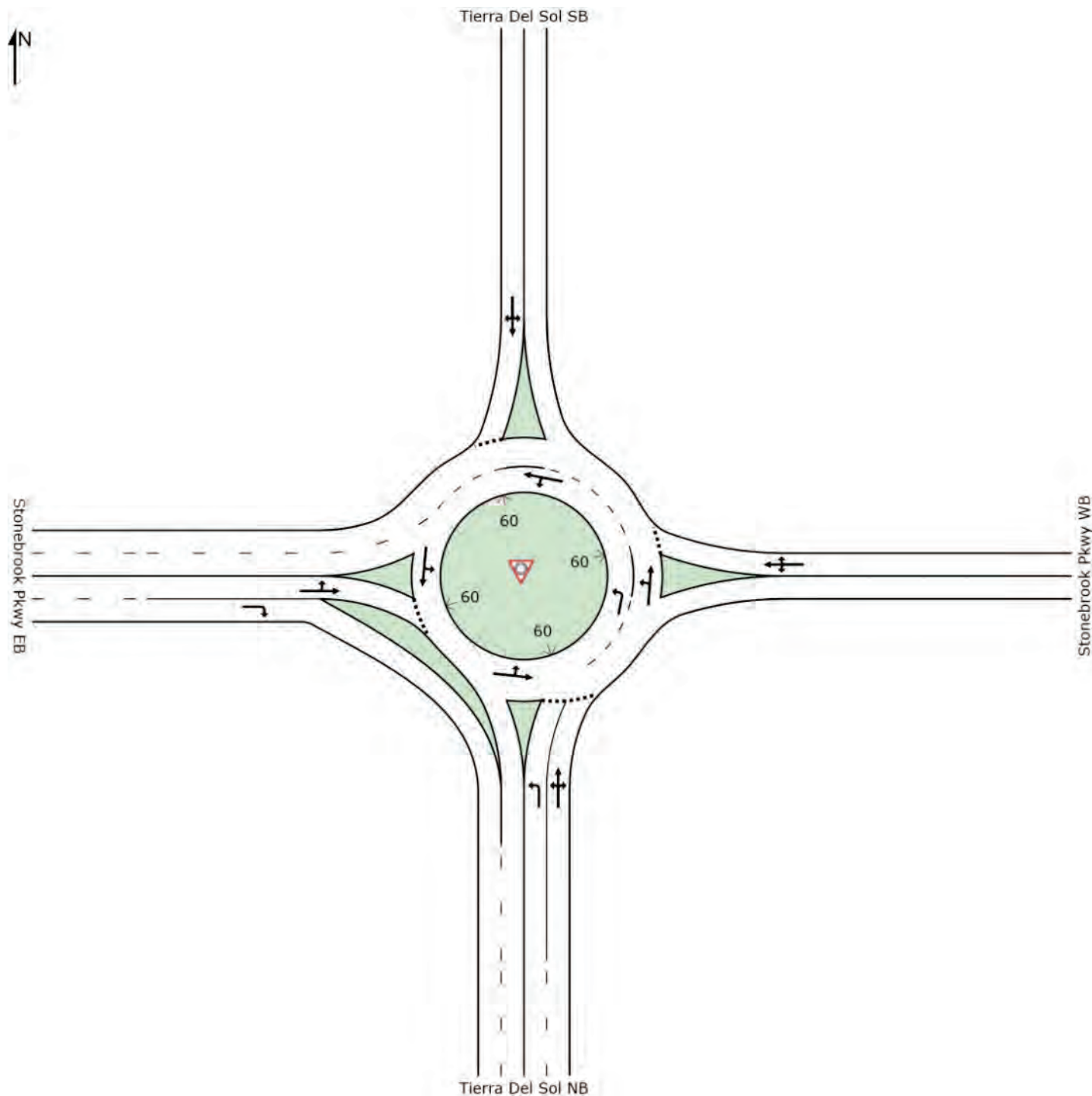
Movement	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	2.2	0.3	0.2		0.0	0.0	0.9	0.8	0.7
Total Del/Veh (s)	6.8	6.4	4.9		8.8	9.0	17.2	14.1	13.0
Vehicles Entered	95	3	60	0	23	329	568	63	1141
Vehicles Exited	95	3	60	0	24	330	567	63	1142
Hourly Exit Rate	95	3	60	0	24	330	567	63	1142
Input Volume	91	3	56	1	20	334	559	62	1126
% of Volume	104	100	108	0	119	99	101	102	101

SITE LAYOUT



Site: Stonebrook Pkwy/Tierra Del Sol

Roundabout



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INTERSECTION 6

MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Tierra Del Sol

Future Year Conditions
PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Tierra Del Sol NB											
3	L2	1	2.0	0.002	7.3	LOS A	0.0	0.2	0.56	0.40	31.0
8	T1	18	2.0	0.044	7.8	LOS A	0.1	3.5	0.57	0.55	32.8
18	R2	3	2.0	0.044	7.8	LOS A	0.1	3.5	0.57	0.55	32.0
Approach		23	2.0	0.044	7.8	LOS A	0.1	3.5	0.57	0.54	32.6
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.398	8.1	LOS A	1.4	36.2	0.30	0.22	32.5
6	T1	178	2.0	0.398	8.1	LOS A	1.4	36.2	0.30	0.22	32.6
16	R2	210	2.0	0.398	8.1	LOS A	1.4	36.2	0.30	0.22	31.9
Approach		389	2.0	0.398	8.1	LOS A	1.4	36.2	0.30	0.22	32.2
North: Tierra Del Sol SB											
7	L2	370	2.0	0.687	14.8	LOS B	4.4	112.9	0.49	0.40	28.7
4	T1	1	2.0	0.687	14.8	LOS B	4.4	112.9	0.49	0.40	28.8
14	R2	299	2.0	0.687	14.8	LOS B	4.4	112.9	0.49	0.40	28.3
Approach		670	2.0	0.687	14.8	LOS B	4.4	112.9	0.49	0.40	28.5
West: Stonebrook Pkwy EB											
5	L2	157	2.0	0.548	13.1	LOS B	3.2	82.0	0.64	0.67	29.7
2	T1	259	2.0	0.548	13.1	LOS B	3.2	82.0	0.64	0.67	29.8
12	R2	1	2.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.5
Approach		416	2.0	0.548	13.0	LOS B	3.2	82.0	0.64	0.67	29.8
All Vehicles		1498	2.0	0.687	12.5	LOS B	4.4	112.9	0.49	0.43	29.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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7: Pyramid Hwy & Andelin Dr Performance by movement

Movement	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.4	0.2	0.1
Total Del/Veh (s)	0.2	34.6	3.1	0.7	37.2	1.7	2.9
Vehicles Entered	44	37	2428	34	29	2100	4672
Vehicles Exited	45	36	2426	34	29	2101	4671
Hourly Exit Rate	45	36	2426	34	29	2101	4671
Input Volume	47	35	2600	38	29	2092	4841
% of Volume	96	102	93	90	99	100	96

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	34.9	38.8	16.5	35.0	37.4	16.0	52.8	22.8	17.3	44.2	25.5	12.0
Vehicles Entered	133	27	133	307	23	70	273	1903	199	60	1472	107
Vehicles Exited	133	27	133	306	24	71	273	1893	199	59	1471	107
Hourly Exit Rate	133	27	133	306	24	71	273	1893	199	59	1471	107
Input Volume	132	23	132	314	23	70	272	1900	198	66	1467	101
% of Volume	101	116	101	97	103	101	100	100	101	89	100	106

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	26.2
Vehicles Entered	4707
Vehicles Exited	4696
Hourly Exit Rate	4696
Input Volume	4699
% of Volume	100

2: Tierra Del Sol & Andelin Dr Performance by movement

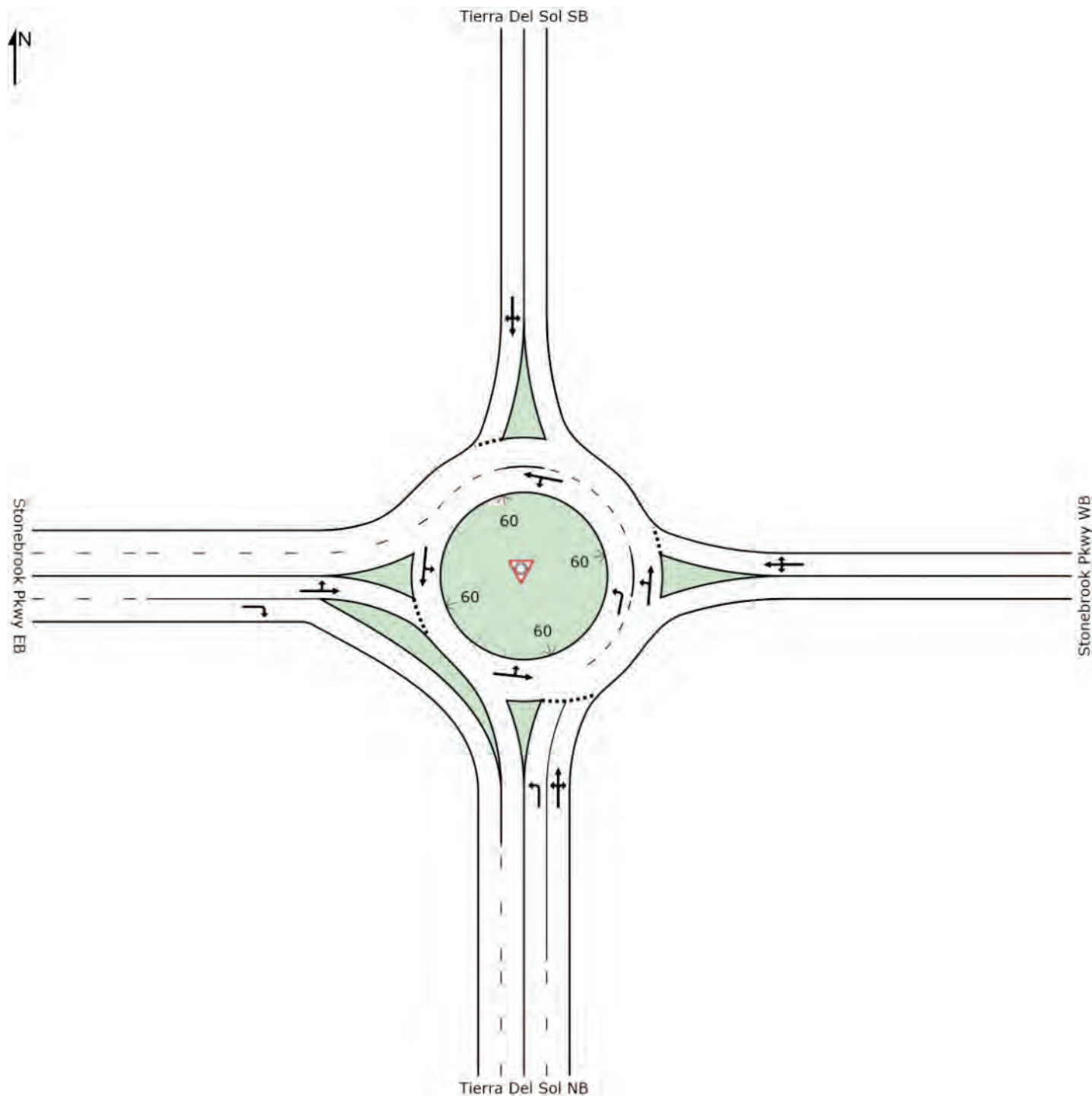
Movement	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	2.2	0.0	0.2	0.1	0.0	0.0	0.5	0.5	0.5
Total Del/Veh (s)	6.1	9.7	3.9	7.8	7.4	7.8	10.6	7.5	8.8
Vehicles Entered	74	1	47	2	17	266	442	44	893
Vehicles Exited	74	1	47	2	17	266	441	44	892
Hourly Exit Rate	74	1	47	2	17	266	441	44	892
Input Volume	71	2	44	2	16	260	435	48	878
% of Volume	104	50	107	100	105	102	101	92	102

SITE LAYOUT



Site: Stonebrook Pkwy/Tierra Del Sol

Roundabout



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INTERSECTION 6

MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Tierra Del Sol

Future Year Conditions
Saturday Midday Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Tierra Del Sol NB											
3	L2	1	2.0	0.002	5.9	LOS A	0.0	0.1	0.50	0.32	31.6
8	T1	15	2.0	0.027	6.2	LOS A	0.1	2.2	0.50	0.43	33.5
18	R2	2	2.0	0.027	6.2	LOS A	0.1	2.2	0.50	0.43	32.7
Approach		18	2.0	0.027	6.2	LOS A	0.1	2.2	0.50	0.42	33.3
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.288	6.5	LOS A	0.9	23.1	0.23	0.14	33.3
6	T1	133	2.0	0.288	6.5	LOS A	0.9	23.1	0.23	0.14	33.4
16	R2	156	2.0	0.288	6.5	LOS A	0.9	23.1	0.23	0.14	32.7
Approach		291	2.0	0.288	6.5	LOS A	0.9	23.1	0.23	0.14	33.0
North: Tierra Del Sol SB											
7	L2	276	2.0	0.497	9.6	LOS A	2.1	53.0	0.31	0.21	30.8
4	T1	1	2.0	0.497	9.6	LOS A	2.1	53.0	0.31	0.21	30.9
14	R2	223	2.0	0.497	9.6	LOS A	2.1	53.0	0.31	0.21	30.3
Approach		500	2.0	0.497	9.6	LOS A	2.1	53.0	0.31	0.21	30.6
West: Stonebrook Pkwy EB											
5	L2	117	2.0	0.371	8.7	LOS A	1.7	42.0	0.48	0.41	31.5
2	T1	193	2.0	0.371	8.7	LOS A	1.7	42.0	0.48	0.41	31.6
12	R2	1	2.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.5
Approach		310	2.0	0.371	8.7	LOS A	1.7	42.0	0.48	0.41	31.6
All Vehicles		1119	2.0	0.497	8.4	LOS A	2.1	53.0	0.34	0.25	31.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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INTERSECTION 6

7: Pyramid Hwy & Andelin Dr Performance by movement

Movement	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.7	0.2	0.1
Total Del/Veh (s)	0.2	18.0	2.8	0.4	26.4	1.3	2.4
Vehicles Entered	35	28	2014	32	23	1626	3758
Vehicles Exited	35	28	2017	31	23	1628	3762
Hourly Exit Rate	35	28	2017	31	23	1628	3762
Input Volume	37	27	2023	30	23	1627	3767
% of Volume	95	103	100	102	99	100	100

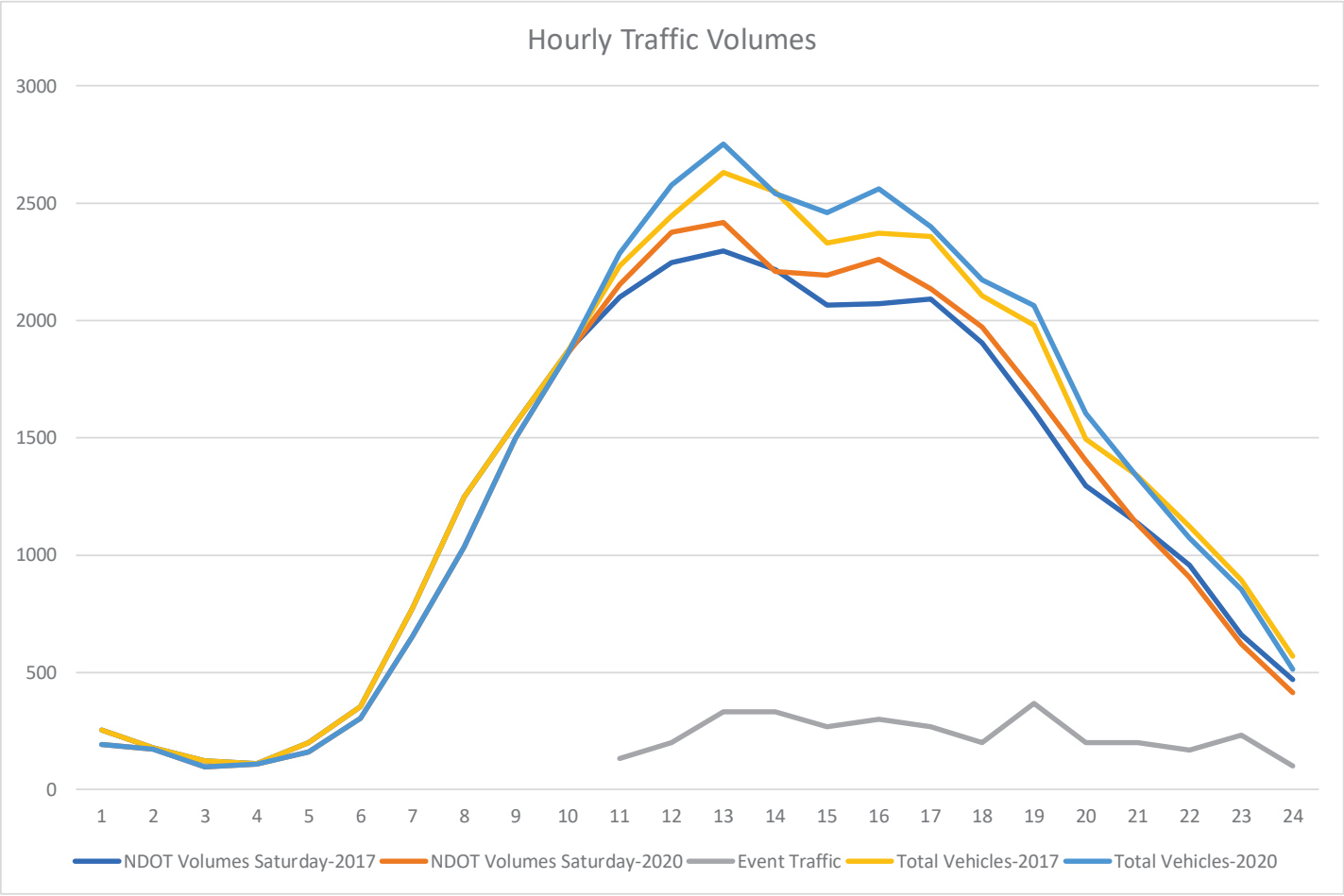
Appendix B

Trip Generation Calculations



	Land Use	Size	Units	Trip Rates							Trips						
				Daily	AM	AM In	AM Out	PM	PM In	PM Out	Daily	AM	AM In	AM Out	PM	PM In	PM Out
Residential	Single Family Homes (210)	350	du	9.44	0.74	0.19	0.56	0.99	0.62	0.37	3304	259	65	194	347	218	128
Retail	Shopping Center (820)	30.3	ksf	37.75	0.94	0.58	0.36	3.81	1.83	1.98	1144	28	18	11	115	55	60
Retail	Drinking Place (925)	1.1	ksf	113.6				11.36	7.50	3.86	125	0	0	0	12	8	4
Retail	High Turnover Sit Down Restaurant (932)	6.6	ksf	112.18	9.94	5.47	4.47	9.77	6.06	3.71	740	66	36	30	64	40	25
Retail	Museum (580)	4.8	ksf	2.8	0.28	0.24	0.04	0.18	0.03	0.15	13	1	1	0	1	0	1
Total Trips											5326	354	120	235	539	321	218
Internal Capture/Alternative Modes											818	26	13	13	120	60	60
Net New Trips											4508	328	107	222	419	261	158

	Land Use	Size	Units	Trip Rates				Trips			
				Saturday	Midday	Mid In	Mid Out	Saturday	Midday	Mid In	Mid Out
Residential	Single Family Homes (210)	350	du	9.54	0.93	0.50	0.43	3339	326	176	150
Retail	Shopping Center (820)	30.3	ksf	46.12	4.5	2.34	2.16	1397	136	71	65
Retail	Drinking Place (925)	1.1	ksf	113.6	11.36	7.50	3.86	125	12	8	4
Retail	High Turnover Sit Down Restaurant (932)	6.6	ksf	122.4	11.19	5.71	5.48	808	74	38	36
Retail	Museum (580)	4.8	ksf	6.6	0.66	0.47	0.19	32	3	2	1
Total Trips								5701	551	295	256
Internal Capture/Alternative Modes								1370	132	66	66
Net New Trips								4331	419	229	190



Special Events Trip Generation

Saturday

Hour	Arriving Guests	Exiting Guests	Total Guests at Farm
10	800		800
11	1000	200	1600
12	1200	800	2000
1	1000	1000	2000
2	600	1000	1600
3	1000	800	1800
4	600	1000	1400
5	600	600	1400
6	1200	1000	1600
7	800	400	2000
8	600	600	2000
9	200	800	1400
10	200	1200	400
11	100	500	0

Weeknight

1	400	400	800
---	-----	-----	-----

Persons per Vehicle = 3

Hour	Arriving Vehicles	Exiting Vehicles	Total Vehicles
10	267		267
11	333	67	400
12	400	267	667
1	333	333	667
2	200	333	533
3	333	267	600
4	200	333	533
5	200	200	400
6	400	333	733
7	267	133	400
8	200	200	400
9	67	267	333
10	67	400	467
11	33	167	200

1	133	133	267
---	-----	-----	-----

Appendix C

Future Year Plus Project LOS Calculations



SimTraffic Performance Report

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.6	0.8	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	63.2	91.0	68.1	87.3	54.1	22.0	163.7	27.0	18.7	93.4	77.2	63.6
Vehicles Entered	152	50	200	396	20	154	151	1495	252	109	2421	98
Vehicles Exited	150	50	198	397	20	154	146	1486	251	107	2391	96
Hourly Exit Rate	150	50	198	397	20	154	146	1486	251	107	2391	96
Input Volume	150	50	200	399	20	154	150	1487	245	113	2487	100
% of Volume	100	101	99	100	99	100	97	100	102	95	96	96

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	61.9
Vehicles Entered	5498
Vehicles Exited	5446
Hourly Exit Rate	5446
Input Volume	5554
% of Volume	98

SimTraffic Performance Report

2: Tierra Del Sol & Andelin Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	4.1	0.1	0.1	0.0	0.0	0.0	0.4	0.3	0.3
Total Del/Veh (s)	5.5	2.8	3.5	5.1	6.4	3.1	6.5	7.6	4.3	7.3	7.7	4.9
Vehicles Entered	36	48	24	11	6	6	21	262	5	7	254	37
Vehicles Exited	36	48	24	11	6	6	21	263	5	7	253	37
Hourly Exit Rate	36	48	24	11	6	6	21	263	5	7	253	37
Input Volume	40	46	24	13	5	7	21	273	4	7	252	37
% of Volume	91	105	99	83	120	86	99	96	125	100	100	101

2: Tierra Del Sol & Andelin Dr Performance by movement

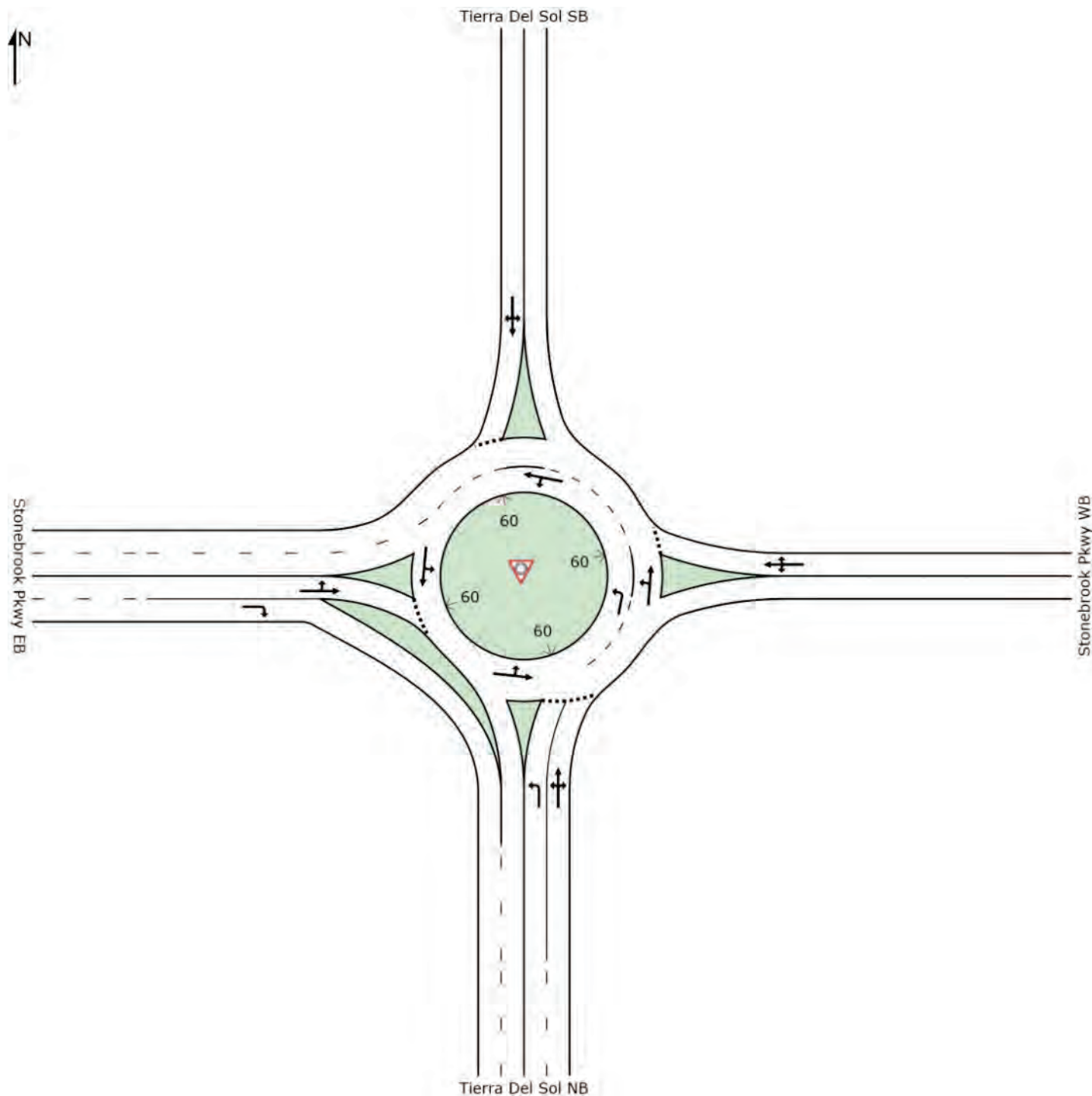
Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	6.8
Vehicles Entered	717
Vehicles Exited	717
Hourly Exit Rate	717
Input Volume	728
% of Volume	98

SITE LAYOUT



Site: Stonebrook Pkwy/Tierra Del Sol

Roundabout



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MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Tierra Del Sol

Future Year Plus Project Conditions
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Tierra Del Sol NB											
3	L2	1	2.0	0.002	5.9	LOS A	0.0	0.1	0.49	0.31	31.6
8	T1	17	2.0	0.034	6.2	LOS A	0.1	2.8	0.50	0.43	33.5
18	R2	4	2.0	0.034	6.2	LOS A	0.1	2.8	0.50	0.43	32.7
Approach		22	2.0	0.034	6.2	LOS A	0.1	2.8	0.50	0.43	33.3
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.630	12.5	LOS B	3.4	86.7	0.36	0.24	30.5
6	T1	447	2.0	0.630	12.5	LOS B	3.4	86.7	0.36	0.24	30.6
16	R2	195	2.0	0.630	12.5	LOS B	3.4	86.7	0.36	0.24	30.0
Approach		643	2.0	0.630	12.5	LOS B	3.4	86.7	0.36	0.24	30.5
North: Tierra Del Sol SB											
7	L2	179	2.0	0.376	9.0	LOS A	1.3	31.8	0.45	0.46	31.0
4	T1	1	2.0	0.376	9.0	LOS A	1.3	31.8	0.45	0.46	31.1
14	R2	122	2.0	0.376	9.0	LOS A	1.3	31.8	0.45	0.46	30.4
Approach		302	2.0	0.376	9.0	LOS A	1.3	31.8	0.45	0.46	30.8
West: Stonebrook Pkwy EB											
5	L2	98	2.0	0.430	9.0	LOS A	2.2	54.8	0.43	0.32	31.6
2	T1	298	2.0	0.430	9.0	LOS A	2.2	54.8	0.43	0.32	31.7
12	R2	1	2.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.5
Approach		397	2.0	0.430	8.9	LOS A	2.2	54.8	0.43	0.32	31.7
All Vehicles		1364	2.0	0.630	10.6	LOS B	3.4	86.7	0.40	0.31	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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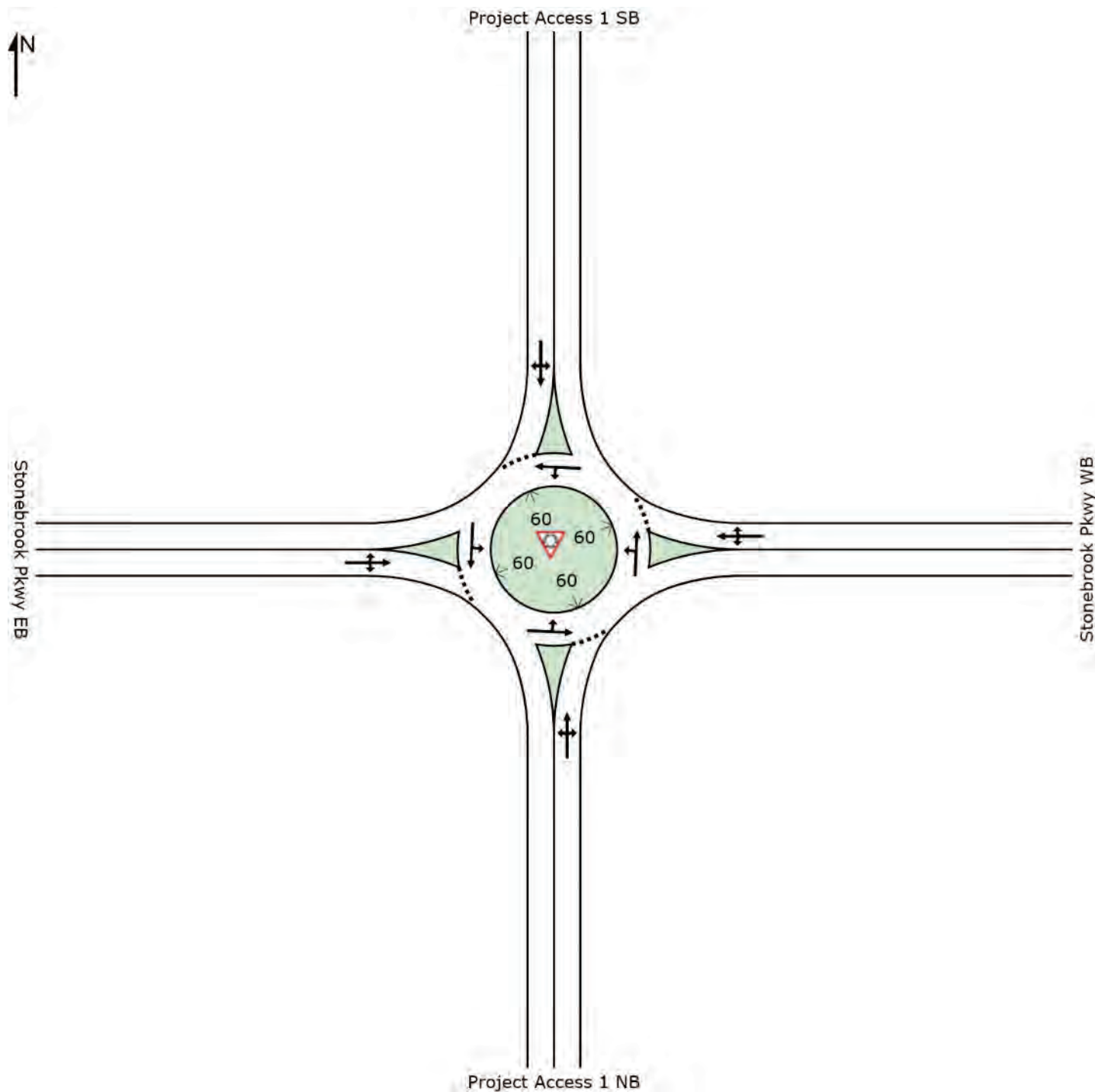
SITE LAYOUT

Site: Stonebrook Pkwy/Project Access 1

Future Year Plus Project Conditions

AM Peak

Roundabout



MOVEMENT SUMMARY

 **Site: Stonebrook Pkwy/Project Access 1**

Future Year Plus Project Conditions
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Project Access 1 NB											
3	L2	47	2.0	0.075	6.1	LOS A	0.2	6.3	0.48	0.42	31.6
8	T1	1	2.0	0.075	6.1	LOS A	0.2	6.3	0.48	0.42	31.8
18	R2	3	2.0	0.075	6.1	LOS A	0.2	6.3	0.48	0.42	31.1
Approach		51	2.0	0.075	6.1	LOS A	0.2	6.3	0.48	0.42	31.6
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.557	10.6	LOS B	3.7	94.6	0.34	0.18	31.3
6	T1	562	2.0	0.557	10.6	LOS B	3.7	94.6	0.34	0.18	31.5
16	R2	10	2.0	0.557	10.6	LOS B	3.7	94.6	0.34	0.18	30.8
Approach		574	2.0	0.557	10.6	LOS B	3.7	94.6	0.34	0.18	31.5
North: Project Access 1 SB											
7	L2	6	2.0	0.067	6.8	LOS A	0.2	5.5	0.52	0.49	32.8
4	T1	1	2.0	0.067	6.8	LOS A	0.2	5.5	0.52	0.49	32.9
14	R2	32	2.0	0.067	6.8	LOS A	0.2	5.5	0.52	0.49	32.2
Approach		40	2.0	0.067	6.8	LOS A	0.2	5.5	0.52	0.49	32.3
West: Stonebrook Pkwy EB											
5	L2	23	2.0	0.438	8.0	LOS A	2.5	64.0	0.08	0.02	32.4
2	T1	445	2.0	0.438	8.0	LOS A	2.5	64.0	0.08	0.02	32.5
12	R2	14	2.0	0.438	8.0	LOS A	2.5	64.0	0.08	0.02	31.8
Approach		481	2.0	0.438	8.0	LOS A	2.5	64.0	0.08	0.02	32.5
All Vehicles		1146	2.0	0.557	9.2	LOS A	3.7	94.6	0.24	0.13	31.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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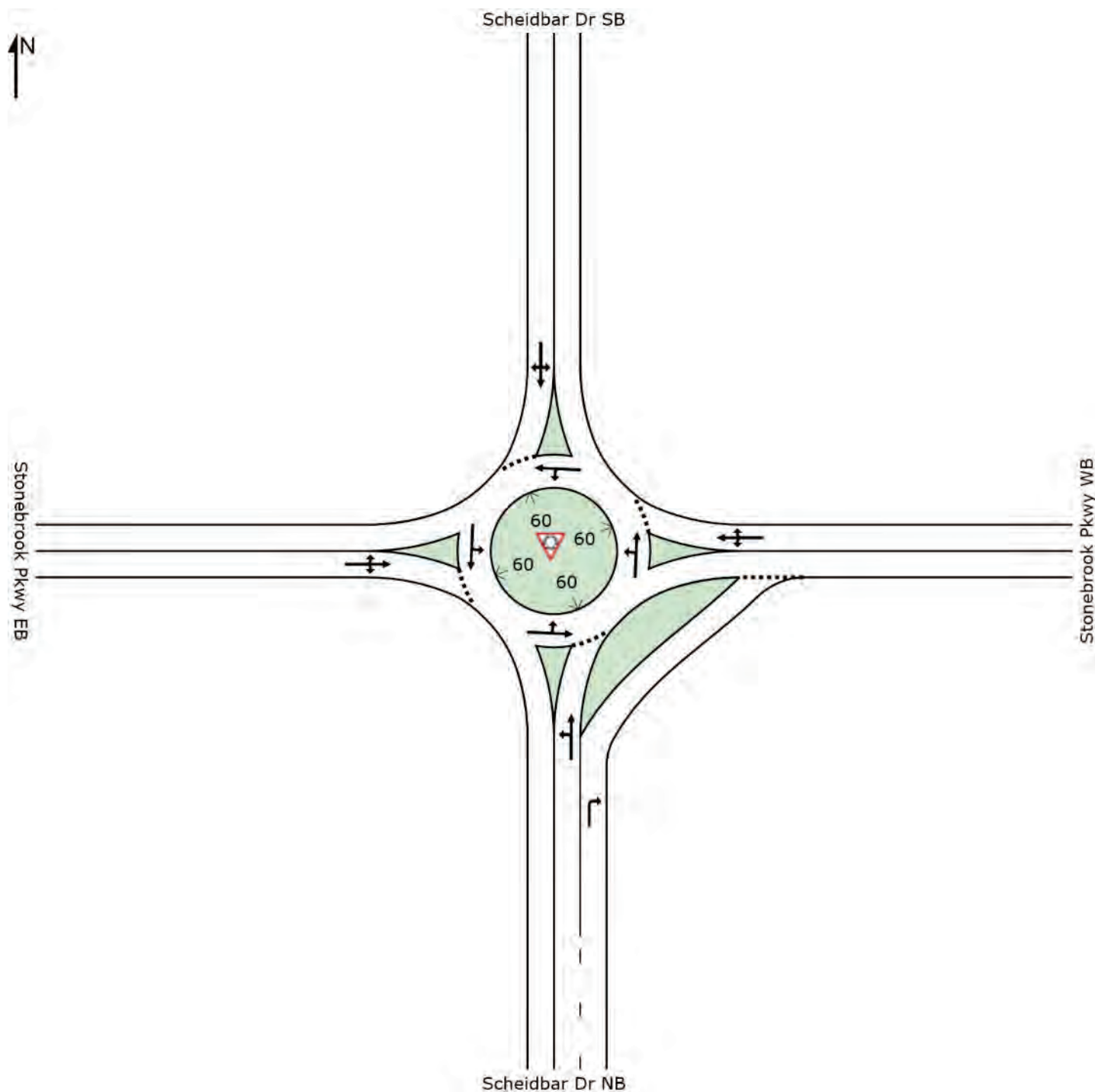
SITE LAYOUT

Site: Stonebrook Pkwy/Scheidbar Dr

Future Year Plus Project Conditions

AM Peak

Roundabout



MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Scheidbar Dr

Future Year Plus Project Conditions
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Scheidbar Dr NB											
3	L2	214	2.0	0.234	6.3	LOS A	0.9	24.0	0.35	0.24	31.4
8	T1	2	2.0	0.234	6.3	LOS A	0.9	24.0	0.35	0.24	31.5
18	R2	111	2.0	0.120	5.0	LOS A	0.4	11.1	0.30	0.20	33.5
Approach		327	2.0	0.234	5.8	LOS A	0.9	24.0	0.33	0.23	32.1
East: Stonebrook Pkwy WB											
1	L2	345	2.0	0.775	20.5	LOS C	8.6	217.7	0.79	0.75	26.9
6	T1	339	2.0	0.775	20.5	LOS C	8.6	217.7	0.79	0.75	27.0
16	R2	1	2.0	0.775	20.5	LOS C	8.6	217.7	0.79	0.75	26.5
Approach		684	2.0	0.775	20.5	LOS C	8.6	217.7	0.79	0.75	26.9
North: Scheidbar Dr SB											
7	L2	1	2.0	0.061	8.9	LOS A	0.2	4.8	0.61	0.61	32.0
4	T1	4	2.0	0.061	8.9	LOS A	0.2	4.8	0.61	0.61	32.2
14	R2	22	2.0	0.061	8.9	LOS A	0.2	4.8	0.61	0.61	31.5
Approach		27	2.0	0.061	8.9	LOS A	0.2	4.8	0.61	0.61	31.6
West: Stonebrook Pkwy EB											
5	L2	7	2.0	0.586	13.9	LOS B	3.8	95.3	0.66	0.69	29.9
2	T1	173	2.0	0.586	13.9	LOS B	3.8	95.3	0.66	0.69	30.0
12	R2	274	2.0	0.586	13.9	LOS B	3.8	95.3	0.66	0.69	29.4
Approach		454	2.0	0.586	13.9	LOS B	3.8	95.3	0.66	0.69	29.7
All Vehicles		1493	2.0	0.775	15.1	LOS C	8.6	217.7	0.65	0.61	28.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SimTraffic Performance Report

6: Stonebrook Pkwy & Project Access 2 Performance by movement

Movement	EBL	EBT	EBR	WBT	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.6	0.1	0.1		0.1	0.4
Total Del/Veh (s)	5.3	0.9	0.4	1.8	13.2	3.3		6.2	1.7
Vehicles Entered	3	271	3	651	6	2	0	9	945
Vehicles Exited	3	271	3	650	6	2	0	9	944
Hourly Exit Rate	3	271	3	650	6	2	0	9	944
Input Volume	3	269	3	641	6	1	1	10	934
% of Volume	100	101	100	101	100	200	0	90	101

SimTraffic Performance Report

7: Pyramid Hwy & Andelin Dr Performance by movement

Movement	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.3	0.3	0.2
Total Del/Veh (s)	0.3	18.5	2.7	0.6	34.2	13.6	9.4
Vehicles Entered	39	22	1713	63	47	2659	4543
Vehicles Exited	38	22	1712	63	46	2633	4514
Hourly Exit Rate	38	22	1712	63	46	2633	4514
Input Volume	40	23	1717	63	47	2650	4540
% of Volume	96	95	100	100	98	99	99

SimTraffic Performance Report

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.6	0.7	0.6	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	63.2	89.7	48.8	62.3	59.6	36.5	105.6	38.8	34.3	131.9	74.4	56.4
Vehicles Entered	168	31	171	479	29	106	321	2211	343	112	1878	127
Vehicles Exited	169	31	171	479	29	106	316	2211	343	107	1864	126
Hourly Exit Rate	169	31	171	479	29	106	316	2211	343	107	1864	126
Input Volume	170	30	170	490	30	104	350	2408	374	111	1888	130
% of Volume	99	102	100	98	96	102	90	92	92	97	99	97

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	58.7
Vehicles Entered	5976
Vehicles Exited	5952
Hourly Exit Rate	5952
Input Volume	6255
% of Volume	95

SimTraffic Performance Report

2: Tierra Del Sol & Andelin Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.8	0.1	0.1	4.2	0.3	0.2	0.0	0.0	0.0	1.6	1.5	1.8
Total Del/Veh (s)	7.2	8.6	5.3	6.5	8.4	3.8	10.3	10.0	6.1	23.8	24.4	21.9
Vehicles Entered	88	24	60	25	8	10	22	344	9	12	586	62
Vehicles Exited	88	24	59	25	8	10	22	344	9	12	586	62
Hourly Exit Rate	88	24	59	25	8	10	22	344	9	12	586	62
Input Volume	91	26	56	25	8	9	20	344	7	12	580	62
% of Volume	96	91	106	99	100	111	109	100	129	98	101	100

2: Tierra Del Sol & Andelin Dr Performance by movement

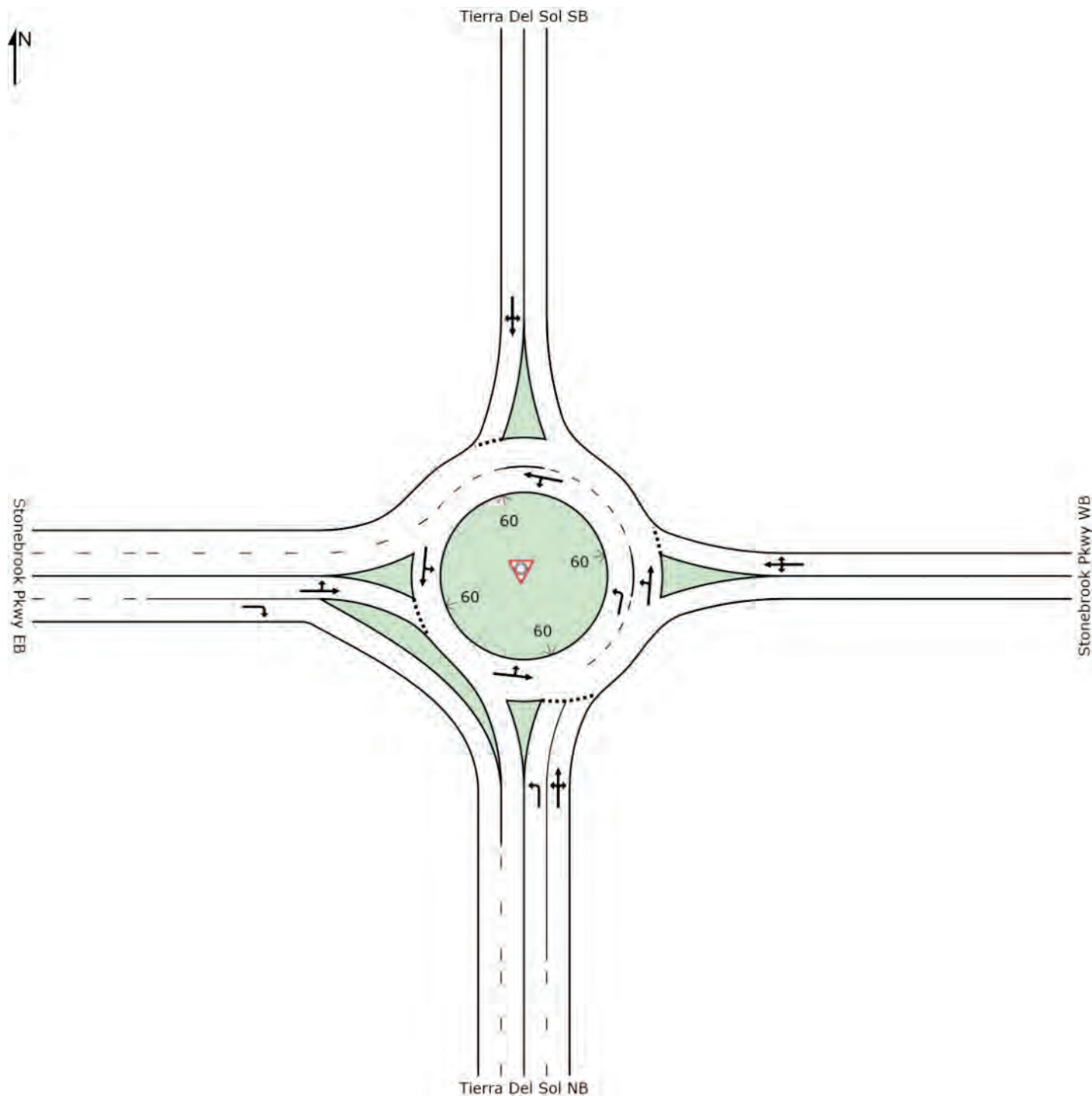
Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	16.9
Vehicles Entered	1250
Vehicles Exited	1249
Hourly Exit Rate	1249
Input Volume	1241
% of Volume	101

SITE LAYOUT



Site: Stonebrook Pkwy/Tierra Del Sol

Roundabout



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INTERSECTION 6

MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Tierra Del Sol

Future Year Plus Project Conditions
PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Tierra Del Sol NB											
3	L2	1	2.0	0.002	8.5	LOS A	0.0	0.2	0.62	0.47	30.5
8	T1	20	2.0	0.068	9.4	LOS A	0.2	5.4	0.63	0.63	32.0
18	R2	9	2.0	0.068	9.4	LOS A	0.2	5.4	0.63	0.63	31.2
Approach		30	2.0	0.068	9.4	LOS A	0.2	5.4	0.63	0.63	31.7
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.483	9.5	LOS A	1.9	49.5	0.34	0.25	31.8
6	T1	258	2.0	0.483	9.5	LOS A	1.9	49.5	0.34	0.25	32.0
16	R2	214	2.0	0.483	9.5	LOS A	1.9	49.5	0.34	0.25	31.3
Approach		473	2.0	0.483	9.5	LOS A	1.9	49.5	0.34	0.25	31.7
North: Tierra Del Sol SB											
7	L2	385	2.0	0.750	18.4	LOS C	5.8	146.1	0.63	0.62	27.5
4	T1	1	2.0	0.750	18.4	LOS C	5.8	146.1	0.63	0.62	27.6
14	R2	303	2.0	0.750	18.4	LOS C	5.8	146.1	0.63	0.62	27.1
Approach		690	2.0	0.750	18.4	LOS C	5.8	146.1	0.63	0.62	27.3
West: Stonebrook Pkwy EB											
5	L2	153	2.0	0.737	20.8	LOS C	6.4	162.7	0.81	0.92	27.1
2	T1	397	2.0	0.737	20.8	LOS C	6.4	162.7	0.81	0.92	27.2
12	R2	1	2.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.5
Approach		551	2.0	0.737	20.7	LOS C	6.4	162.7	0.80	0.92	27.2
All Vehicles		1744	2.0	0.750	16.5	LOS C	6.4	162.7	0.61	0.61	28.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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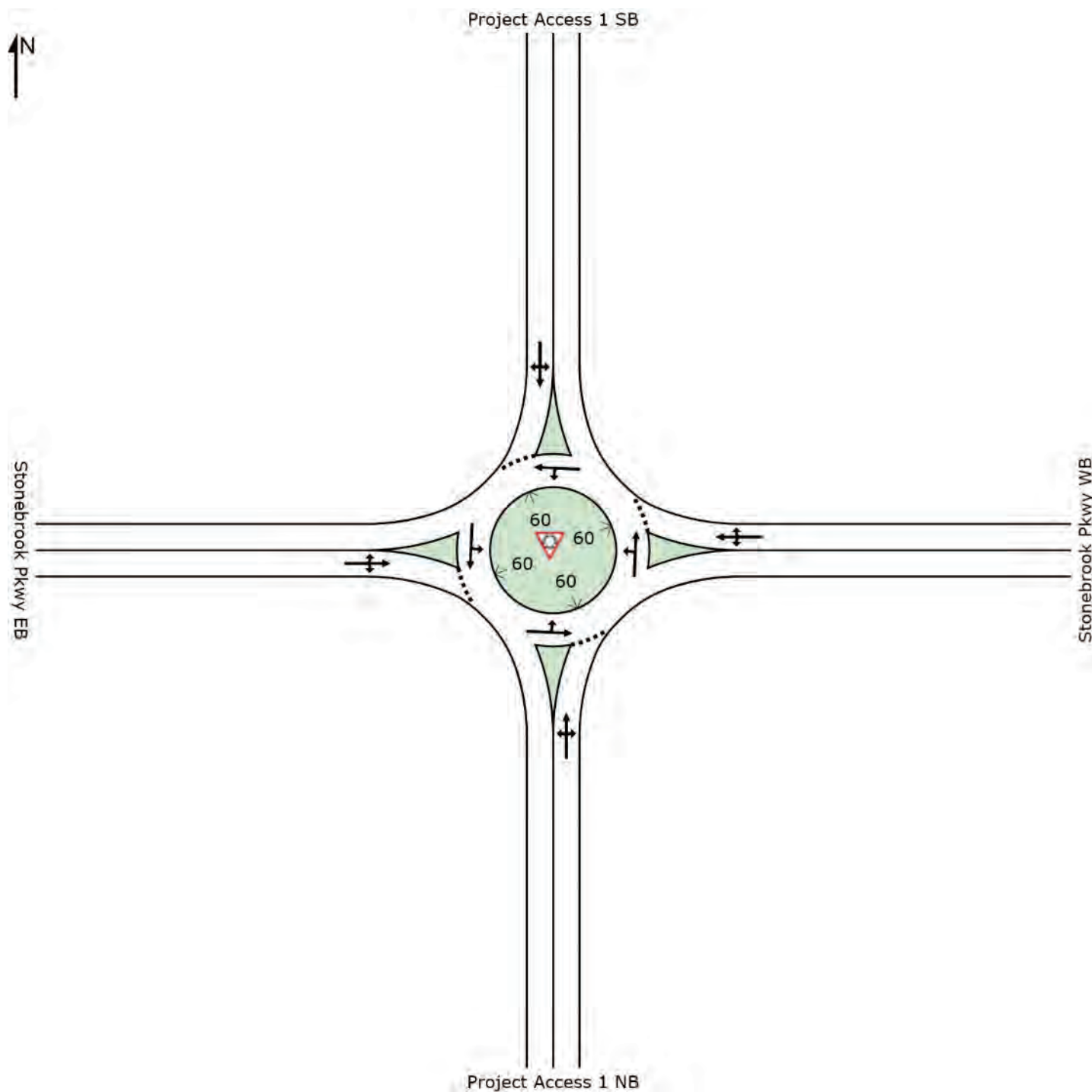
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**SIDRA
INTERSECTION 6**

SITE LAYOUT

Site: Stonebrook Pkwy/Project Access 1

Future Year Plus Project Conditions
PM Peak
Roundabout



MOVEMENT SUMMARY

 **Site: Stonebrook Pkwy/Project Access 1**

Future Year Plus Project Conditions
PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Project Access 1 NB											
3	L2	22	2.0	0.049	7.6	LOS A	0.2	3.9	0.56	0.54	31.1
8	T1	1	2.0	0.049	7.6	LOS A	0.2	3.9	0.56	0.54	31.2
18	R2	2	2.0	0.049	7.6	LOS A	0.2	3.9	0.56	0.54	30.5
Approach		25	2.0	0.049	7.6	LOS A	0.2	3.9	0.56	0.54	31.0
East: Stonebrook Pkwy WB											
1	L2	3	2.0	0.421	8.1	LOS A	2.3	57.2	0.27	0.14	32.4
6	T1	414	2.0	0.421	8.1	LOS A	2.3	57.2	0.27	0.14	32.6
16	R2	18	2.0	0.421	8.1	LOS A	2.3	57.2	0.27	0.14	31.9
Approach		434	2.0	0.421	8.1	LOS A	2.3	57.2	0.27	0.14	32.5
North: Project Access 1 SB											
7	L2	5	2.0	0.060	5.7	LOS A	0.2	5.1	0.46	0.38	33.4
4	T1	1	2.0	0.060	5.7	LOS A	0.2	5.1	0.46	0.38	33.6
14	R2	36	2.0	0.060	5.7	LOS A	0.2	5.1	0.46	0.38	32.8
Approach		43	2.0	0.060	5.7	LOS A	0.2	5.1	0.46	0.38	32.9
West: Stonebrook Pkwy EB											
5	L2	48	2.0	0.721	14.9	LOS B	8.0	202.1	0.17	0.04	29.5
2	T1	698	2.0	0.721	14.9	LOS B	8.0	202.1	0.17	0.04	29.6
12	R2	46	2.0	0.721	14.9	LOS B	8.0	202.1	0.17	0.04	29.0
Approach		792	2.0	0.721	14.9	LOS B	8.0	202.1	0.17	0.04	29.5
All Vehicles		1294	2.0	0.721	12.2	LOS B	8.0	202.1	0.22	0.10	30.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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INTERSECTION 6**

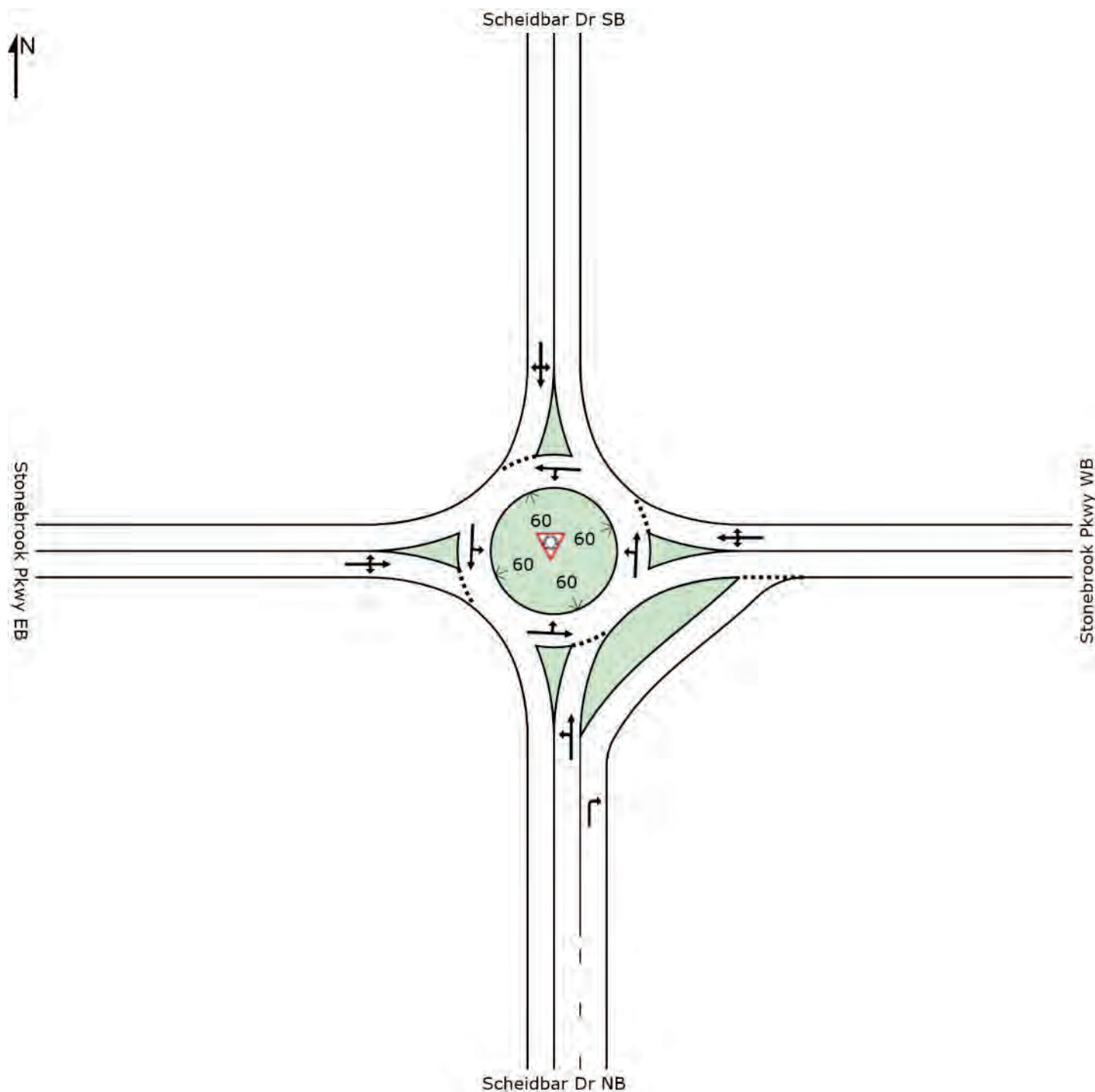
SITE LAYOUT

Site: Stonebrook Pkwy/Scheidbar Dr

Future Year Plus Project Conditions

PM Peak

Roundabout



MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Scheidbar Dr

Future Year Plus Project Conditions
PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Scheidbar Dr NB											
3	L2	239	2.0	0.352	9.8	LOS A	1.4	36.7	0.57	0.57	30.0
8	T1	5	2.0	0.352	9.8	LOS A	1.4	36.7	0.57	0.57	30.1
18	R2	366	2.0	0.516	13.0	LOS B	2.8	71.3	0.65	0.69	29.9
Approach		609	2.0	0.516	11.7	LOS B	2.8	71.3	0.62	0.64	29.9
East: Stonebrook Pkwy WB											
1	L2	151	2.0	0.402	9.1	LOS A	1.9	47.3	0.49	0.42	31.2
6	T1	186	2.0	0.402	9.1	LOS A	1.9	47.3	0.49	0.42	31.3
16	R2	2	2.0	0.402	9.1	LOS A	1.9	47.3	0.49	0.42	30.7
Approach		340	2.0	0.402	9.1	LOS A	1.9	47.3	0.49	0.42	31.2
North: Scheidbar Dr SB											
7	L2	1	2.0	0.020	6.1	LOS A	0.1	1.6	0.50	0.41	33.3
4	T1	2	2.0	0.020	6.1	LOS A	0.1	1.6	0.50	0.41	33.5
14	R2	9	2.0	0.020	6.1	LOS A	0.1	1.6	0.50	0.41	32.7
Approach		13	2.0	0.020	6.1	LOS A	0.1	1.6	0.50	0.41	32.9
West: Stonebrook Pkwy EB											
5	L2	22	2.0	0.745	17.7	LOS C	7.6	192.6	0.68	0.54	28.5
2	T1	438	2.0	0.745	17.7	LOS C	7.6	192.6	0.68	0.54	28.6
12	R2	246	2.0	0.745	17.7	LOS C	7.6	192.6	0.68	0.54	28.0
Approach		705	2.0	0.745	17.7	LOS C	7.6	192.6	0.68	0.54	28.4
All Vehicles		1667	2.0	0.745	13.7	LOS B	7.6	192.6	0.62	0.55	29.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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INTERSECTION 6

SimTraffic Performance Report

6: Stonebrook Pkwy & Project Access 2 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.3	0.1	0.1	0.1
Total Del/Veh (s)	3.9	1.7	1.5	0.5	0.1	13.1	3.0	1.4
Vehicles Entered	8	738	12	322	2	3	5	1090
Vehicles Exited	9	739	12	322	2	3	5	1092
Hourly Exit Rate	9	739	12	322	2	3	5	1092
Input Volume	8	752	12	318	1	3	5	1101
% of Volume	112	98	98	101	200	100	100	99

SimTraffic Performance Report

7: Pyramid Hwy & Andelin Dr Performance by movement

Movement	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.4	0.2	0.1
Total Del/Veh (s)	0.4	36.8	3.3	0.8	44.4	2.3	3.4
Vehicles Entered	50	42	2425	46	38	2114	4715
Vehicles Exited	50	41	2424	47	37	2113	4712
Hourly Exit Rate	50	41	2424	47	37	2113	4712
Input Volume	48	43	2614	54	39	2118	4916
% of Volume	105	96	93	87	95	100	96

Appendix D

Future Year Plus Project Plus Event LOS Calculations



SimTraffic Performance Report

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.6	0.8	0.7	1.0	0.4	0.4	0.2	0.0	0.2	0.0	0.0	0.0
Total Del/Veh (s)	58.7	80.3	44.1	88.9	69.8	39.1	139.8	47.9	42.7	157.4	83.7	66.7
Vehicles Entered	167	30	162	578	25	111	323	2247	363	111	1870	129
Vehicles Exited	168	30	161	579	25	113	319	2225	362	110	1846	128
Hourly Exit Rate	168	30	161	579	25	113	319	2225	362	110	1846	128
Input Volume	170	30	170	576	30	105	350	2454	391	113	1888	130
% of Volume	99	99	95	101	83	107	91	91	93	98	98	99

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	70.1
Vehicles Entered	6116
Vehicles Exited	6066
Hourly Exit Rate	6066
Input Volume	6408
% of Volume	95

SimTraffic Performance Report

2: Tierra Del Sol & Andelin Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.5	0.1	0.1	4.0	0.4	0.2	0.0	0.0	0.0	8.7	9.3	7.1
Total Del/Veh (s)	8.1	10.1	7.0	7.8	8.3	4.3	12.7	12.6	10.1	87.3	92.6	87.3
Vehicles Entered	95	96	55	83	19	12	20	336	43	15	582	65
Vehicles Exited	96	96	56	83	20	12	20	336	43	15	576	64
Hourly Exit Rate	96	96	56	83	20	12	20	336	43	15	576	64
Input Volume	91	97	56	84	19	12	20	345	40	15	580	62
% of Volume	105	99	100	99	104	98	99	97	108	98	99	103

2: Tierra Del Sol & Andelin Dr Performance by movement

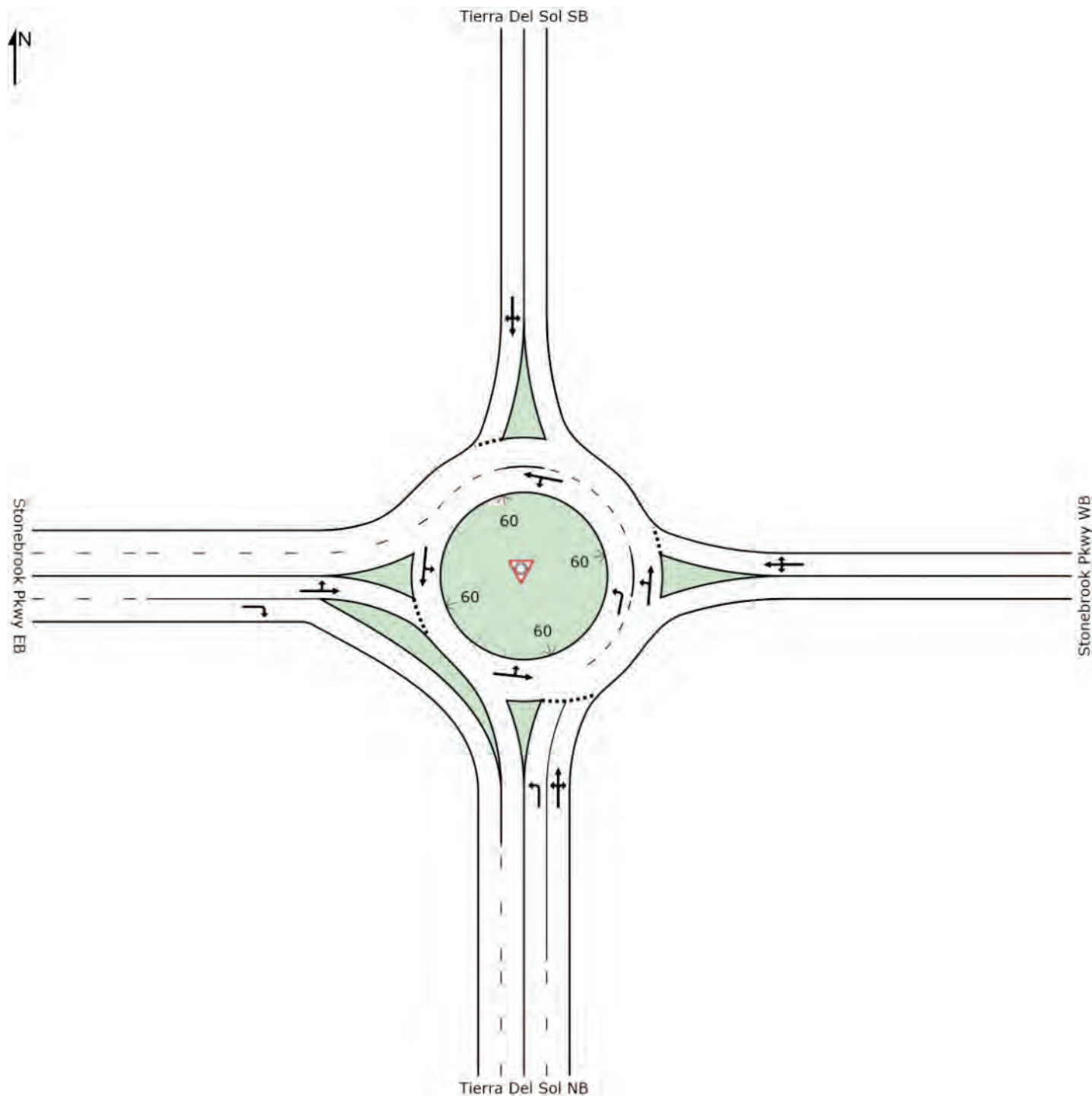
Movement	All
Denied Del/Veh (s)	4.6
Total Del/Veh (s)	48.6
Vehicles Entered	1421
Vehicles Exited	1417
Hourly Exit Rate	1417
Input Volume	1422
% of Volume	100

SITE LAYOUT



Site: Stonebrook Pkwy/Tierra Del Sol

Roundabout



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INTERSECTION 6

MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Tierra Del Sol

Future Year Plus Project Plus Event Conditions
PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Tierra Del Sol NB											
3	L2	1	2.0	0.003	8.8	LOS A	0.0	0.2	0.63	0.49	30.4
8	T1	24	2.0	0.091	10.1	LOS B	0.3	7.2	0.65	0.65	31.7
18	R2	14	2.0	0.091	10.1	LOS B	0.3	7.2	0.65	0.65	30.9
Approach		39	2.0	0.091	10.1	LOS B	0.3	7.2	0.65	0.65	31.4
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.554	11.0	LOS B	2.5	63.4	0.40	0.31	31.2
6	T1	304	2.0	0.554	11.0	LOS B	2.5	63.4	0.40	0.31	31.3
16	R2	229	2.0	0.554	11.0	LOS B	2.5	63.4	0.40	0.31	30.6
Approach		534	2.0	0.554	11.0	LOS B	2.5	63.4	0.40	0.31	31.0
North: Tierra Del Sol SB											
7	L2	401	2.0	0.844	25.7	LOS D	8.6	218.3	0.80	0.88	25.3
4	T1	1	2.0	0.844	25.7	LOS D	8.6	218.3	0.80	0.88	25.3
14	R2	349	2.0	0.844	25.7	LOS D	8.6	218.3	0.80	0.88	24.9
Approach		751	2.0	0.844	25.7	LOS D	8.6	218.3	0.80	0.88	25.1
West: Stonebrook Pkwy EB											
5	L2	168	2.0	0.777	23.7	LOS C	7.4	187.8	0.85	0.99	26.2
2	T1	403	2.0	0.777	23.7	LOS C	7.4	187.8	0.85	0.99	26.3
12	R2	1	2.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.5
Approach		572	2.0	0.777	23.6	LOS C	7.4	187.8	0.85	0.99	26.2
All Vehicles		1896	2.0	0.844	20.6	LOS C	8.6	218.3	0.70	0.75	27.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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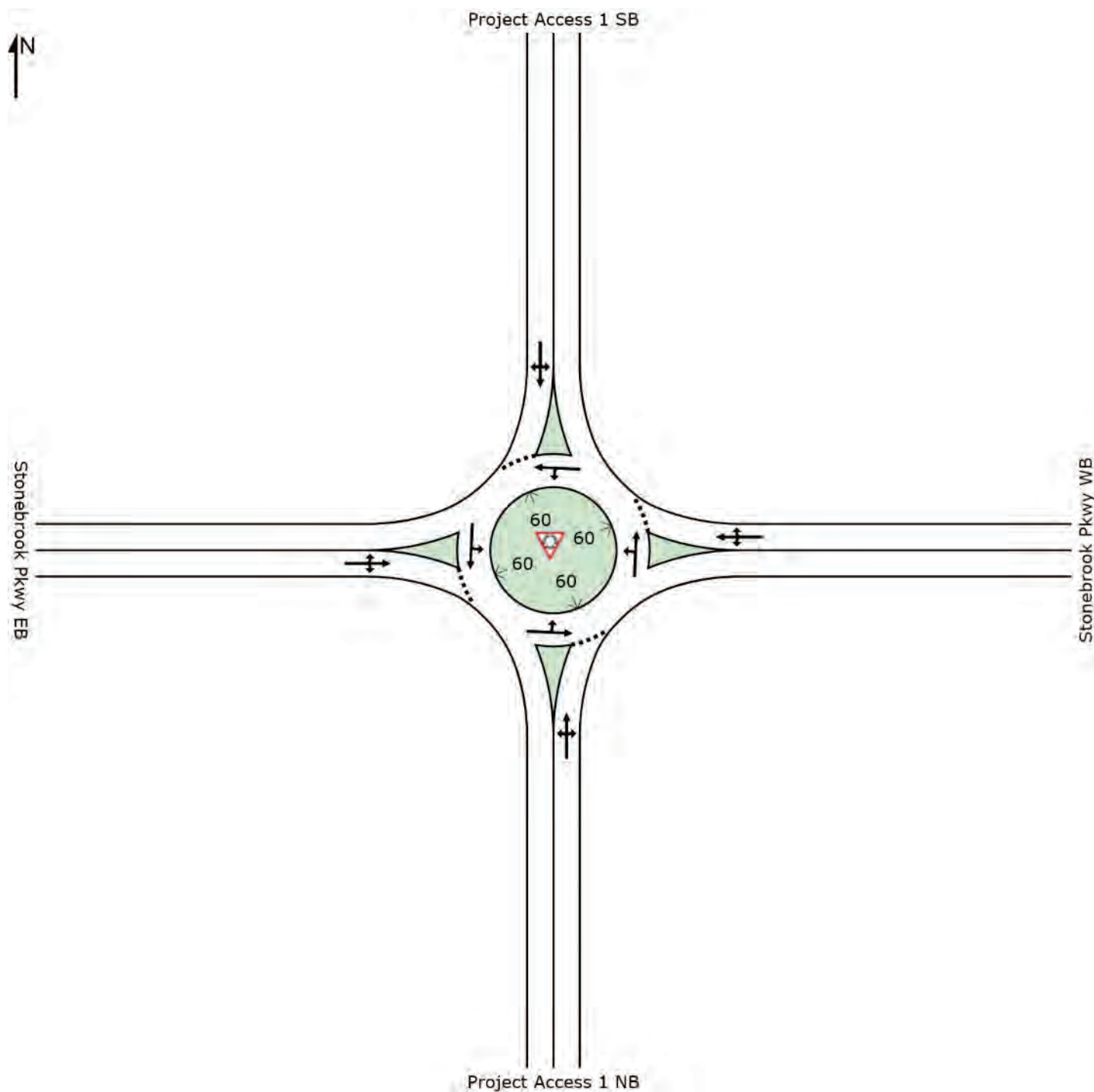
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**SIDRA
INTERSECTION 6**

SITE LAYOUT

Site: Stonebrook Pkwy/Project Access 1

Future Year Plus Project Plus Event Conditions
PM Peak
Roundabout



MOVEMENT SUMMARY

Site: Stonebrook Pkwy/Project Access 1

Future Year Plus Project Plus Event Conditions
PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Project Access 1 NB											
3	L2	22	2.0	0.051	7.9	LOS A	0.2	4.1	0.57	0.57	30.9
8	T1	1	2.0	0.051	7.9	LOS A	0.2	4.1	0.57	0.57	31.0
18	R2	2	2.0	0.051	7.9	LOS A	0.2	4.1	0.57	0.57	30.4
Approach		25	2.0	0.051	7.9	LOS A	0.2	4.1	0.57	0.57	30.9
East: Stonebrook Pkwy WB											
1	L2	3	2.0	0.458	8.8	LOS A	2.6	65.1	0.30	0.17	32.1
6	T1	429	2.0	0.458	8.8	LOS A	2.6	65.1	0.30	0.17	32.3
16	R2	34	2.0	0.458	8.8	LOS A	2.6	65.1	0.30	0.17	31.6
Approach		467	2.0	0.458	8.8	LOS A	2.6	65.1	0.30	0.17	32.2
North: Project Access 1 SB											
7	L2	22	2.0	0.151	6.8	LOS A	0.5	13.5	0.49	0.45	32.7
4	T1	1	2.0	0.151	6.8	LOS A	0.5	13.5	0.49	0.45	32.8
14	R2	82	2.0	0.151	6.8	LOS A	0.5	13.5	0.49	0.45	32.1
Approach		105	2.0	0.151	6.8	LOS A	0.5	13.5	0.49	0.45	32.2
West: Stonebrook Pkwy EB											
5	L2	58	2.0	0.758	16.7	LOS C	9.0	229.8	0.33	0.12	28.8
2	T1	714	2.0	0.758	16.7	LOS C	9.0	229.8	0.33	0.12	28.9
12	R2	46	2.0	0.758	16.7	LOS C	9.0	229.8	0.33	0.12	28.3
Approach		818	2.0	0.758	16.7	LOS C	9.0	229.8	0.33	0.12	28.8
All Vehicles		1415	2.0	0.758	13.2	LOS B	9.0	229.8	0.34	0.17	30.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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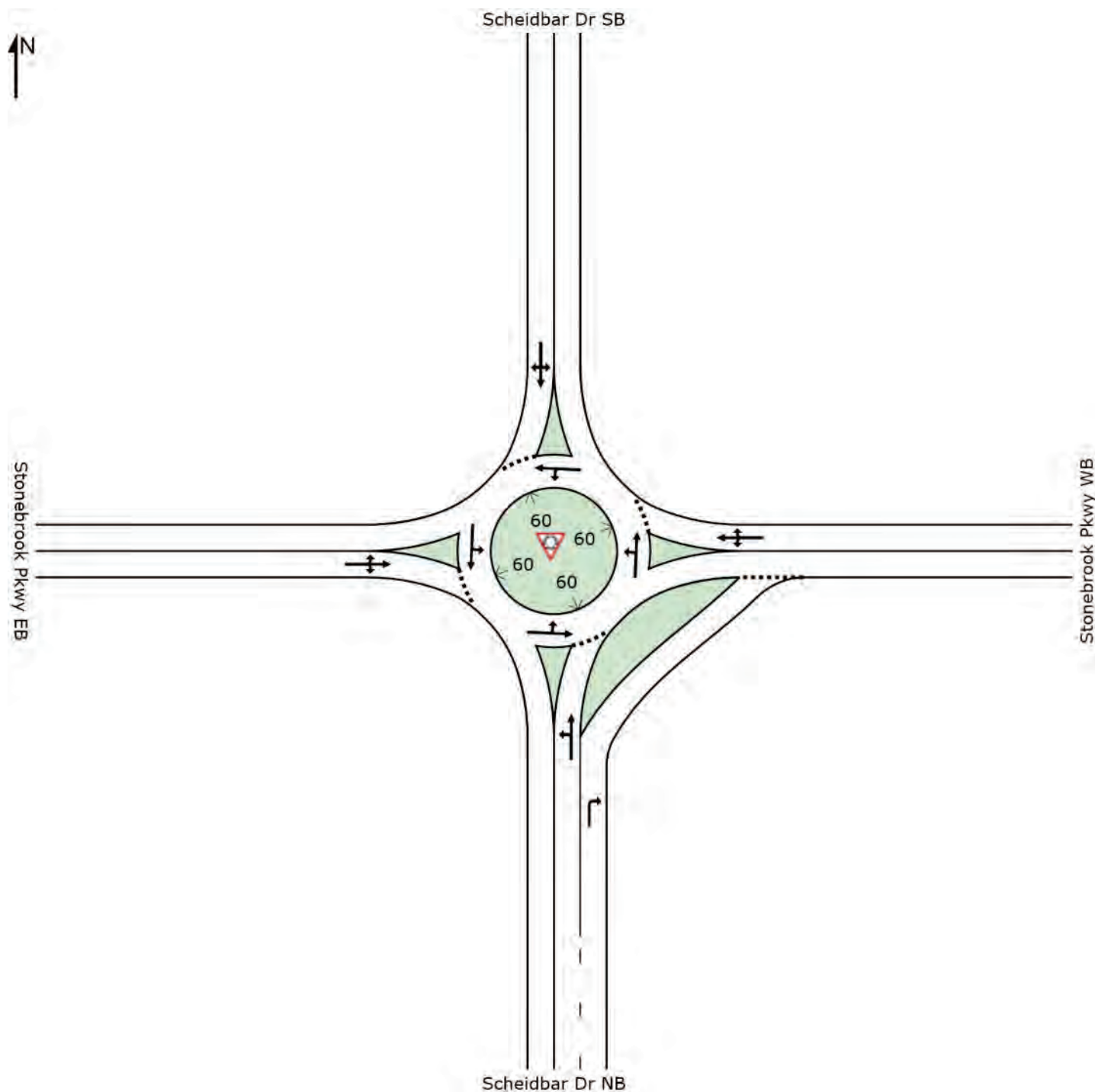
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INTERSECTION 6

SITE LAYOUT

Site: Stonebrook Pkwy/Scheidbar Dr

Future Year Plus Project Plus Event Conditions
PM Peak
Roundabout



MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Scheidbar Dr

Future Year Plus Project Plus Event Conditions
PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Scheidbar Dr NB											
3	L2	267	2.0	0.394	10.5	LOS B	1.7	44.1	0.59	0.61	29.7
8	T1	5	2.0	0.394	10.5	LOS B	1.7	44.1	0.59	0.61	29.8
18	R2	366	2.0	0.518	13.1	LOS B	2.8	71.7	0.65	0.69	29.8
Approach		638	2.0	0.518	12.0	LOS B	2.8	71.7	0.63	0.66	29.8
East: Stonebrook Pkwy WB											
1	L2	151	2.0	0.419	9.6	LOS A	1.9	49.4	0.52	0.46	31.0
6	T1	191	2.0	0.419	9.6	LOS A	1.9	49.4	0.52	0.46	31.1
16	R2	2	2.0	0.419	9.6	LOS A	1.9	49.4	0.52	0.46	30.5
Approach		344	2.0	0.419	9.6	LOS A	1.9	49.4	0.52	0.46	31.0
North: Scheidbar Dr SB											
7	L2	1	2.0	0.021	6.3	LOS A	0.1	1.7	0.51	0.43	33.2
4	T1	2	2.0	0.021	6.3	LOS A	0.1	1.7	0.51	0.43	33.3
14	R2	9	2.0	0.021	6.3	LOS A	0.1	1.7	0.51	0.43	32.6
Approach		13	2.0	0.021	6.3	LOS A	0.1	1.7	0.51	0.43	32.8
West: Stonebrook Pkwy EB											
5	L2	22	2.0	0.779	19.7	LOS C	8.9	227.2	0.74	0.59	27.8
2	T1	442	2.0	0.779	19.7	LOS C	8.9	227.2	0.74	0.59	27.9
12	R2	274	2.0	0.779	19.7	LOS C	8.9	227.2	0.74	0.59	27.3
Approach		737	2.0	0.779	19.7	LOS C	8.9	227.2	0.74	0.59	27.7
All Vehicles		1731	2.0	0.779	14.7	LOS B	8.9	227.2	0.65	0.59	29.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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INTERSECTION 6

SimTraffic Performance Report

6: Stonebrook Pkwy & Project Access 2 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.6	0.3	0.4	0.1	0.1	0.1
Total Del/Veh (s)	4.2	1.8	1.6	5.8	0.5	0.9	18.6	3.1	1.5
Vehicles Entered	7	746	9	1	330	1	2	5	1101
Vehicles Exited	7	746	9	1	329	1	2	5	1100
Hourly Exit Rate	7	746	9	1	329	1	2	5	1100
Input Volume	8	756	12	1	322	1	3	5	1109
% of Volume	88	99	73	100	102	100	67	100	99

7: Pyramid Hwy & Andelin Dr Performance by movement

Movement	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.4	0.2	0.1
Total Del/Veh (s)	0.7	38.0	3.3	1.1	48.2	2.5	3.8
Vehicles Entered	44	52	2403	104	57	2112	4772
Vehicles Exited	44	52	2406	104	57	2113	4776
Hourly Exit Rate	44	52	2406	104	57	2113	4776
Input Volume	48	54	2616	114	49	2120	5000
% of Volume	92	97	92	91	117	100	96

SimTraffic Performance Report

Midday Peak Hour

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	0.5	0.5	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	33.8	40.2	17.7	59.0	41.0	20.9	80.7	37.5	32.6	75.1	30.6	14.3
Vehicles Entered	133	22	129	633	22	95	280	2044	341	93	1467	103
Vehicles Exited	134	23	129	625	21	94	276	2036	339	93	1469	103
Hourly Exit Rate	134	23	129	625	21	94	276	2036	339	93	1469	103
Input Volume	132	23	132	635	23	90	272	2035	342	92	1468	101
% of Volume	102	99	98	98	90	104	102	100	99	101	100	102

1: Pyramid Hwy & Dolores Dr/Stonebrook Pkwy Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	39.5
Vehicles Entered	5362
Vehicles Exited	5342
Hourly Exit Rate	5342
Input Volume	5345
% of Volume	100

2: Tierra Del Sol & Andelin Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.9	0.1	0.1	3.8	0.5	0.5	0.1	0.0	0.0	3.5	0.5	0.5
Total Del/Veh (s)	9.1	15.9	12.1	11.4	9.7	5.3	11.9	17.0	13.4	34.6	60.7	54.5
Vehicles Entered	71	205	43	173	40	20	16	273	90	21	451	50
Vehicles Exited	71	205	43	173	40	20	16	272	89	22	448	50
Hourly Exit Rate	71	205	43	173	40	20	16	272	89	22	448	50
Input Volume	71	207	44	176	37	19	16	276	89	21	451	48
% of Volume	100	99	98	98	109	104	98	98	100	104	99	105

2: Tierra Del Sol & Andelin Dr Performance by movement

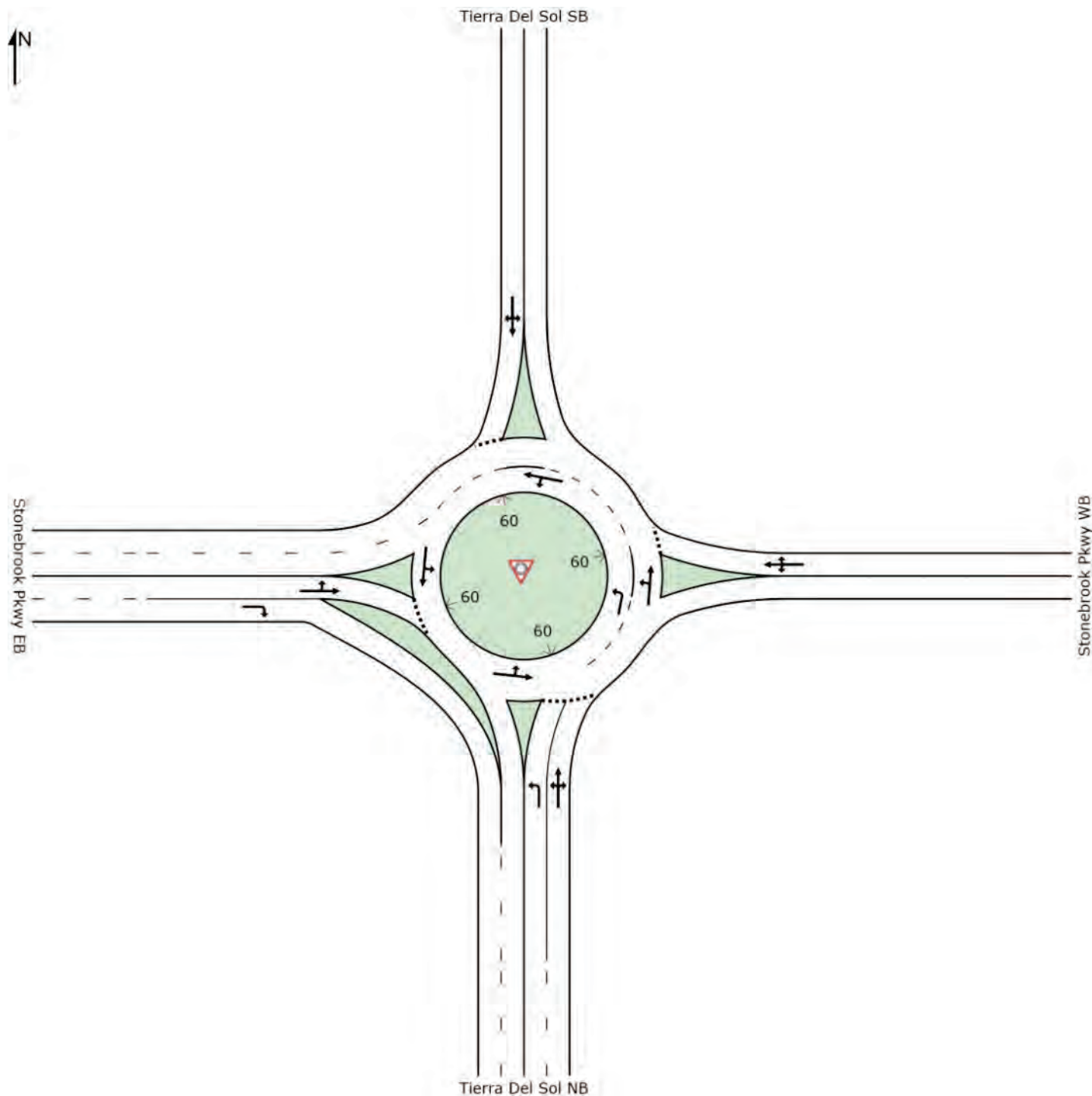
Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	30.2
Vehicles Entered	1453
Vehicles Exited	1449
Hourly Exit Rate	1449
Input Volume	1456
% of Volume	100

SITE LAYOUT



Site: Stonebrook Pkwy/Tierra Del Sol

Roundabout



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INTERSECTION 6

MOVEMENT SUMMARY



Site: Stonebrook Pkwy/Tierra Del Sol

Future Year Plus Project Plus Event Conditions
Saturday Midday Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Tierra Del Sol NB											
3	L2	1	2.0	0.002	7.6	LOS A	0.0	0.2	0.57	0.42	30.9
8	T1	28	2.0	0.098	8.9	LOS A	0.3	8.0	0.59	0.59	32.2
18	R2	19	2.0	0.098	8.9	LOS A	0.3	8.0	0.59	0.59	31.5
Approach		48	2.0	0.098	8.9	LOS A	0.3	8.0	0.59	0.59	31.9
East: Stonebrook Pkwy WB											
1	L2	1	2.0	0.582	11.7	LOS B	2.8	71.5	0.41	0.32	30.9
6	T1	355	2.0	0.582	11.7	LOS B	2.8	71.5	0.41	0.32	31.0
16	R2	209	2.0	0.582	11.7	LOS B	2.8	71.5	0.41	0.32	30.4
Approach		566	2.0	0.582	11.7	LOS B	2.8	71.5	0.41	0.32	30.8
North: Tierra Del Sol SB											
7	L2	343	2.0	0.815	23.9	LOS C	7.2	183.0	0.77	0.87	25.8
4	T1	1	2.0	0.815	23.9	LOS C	7.2	183.0	0.77	0.87	25.9
14	R2	356	2.0	0.815	23.9	LOS C	7.2	183.0	0.77	0.87	25.5
Approach		700	2.0	0.815	23.9	LOS C	7.2	183.0	0.77	0.87	25.7
West: Stonebrook Pkwy EB											
5	L2	155	2.0	0.623	15.0	LOS C	4.3	109.5	0.69	0.72	29.0
2	T1	330	2.0	0.623	15.0	LOS C	4.3	109.5	0.69	0.72	29.1
12	R2	1	2.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.5
Approach		486	2.0	0.623	15.0	LOS C	4.3	109.5	0.68	0.72	29.1
All Vehicles		1800	2.0	0.815	17.2	LOS C	7.2	183.0	0.63	0.65	28.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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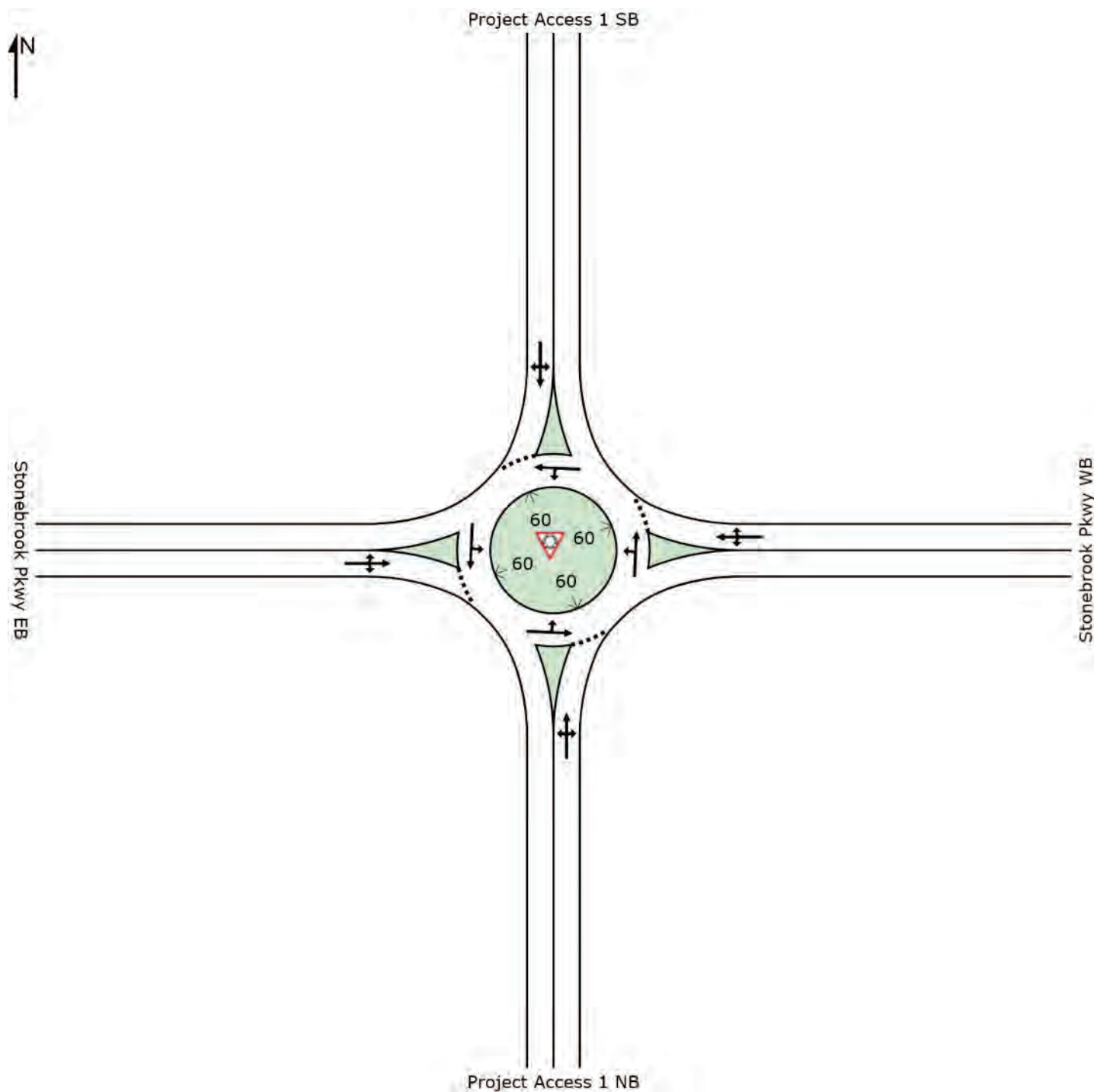
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**SIDRA
INTERSECTION 6**

SITE LAYOUT

Site: Stonebrook Pkwy/Project Access 1

Future Year Plus Project Plus Event Conditions
Saturday Middy Peak
Roundabout



MOVEMENT SUMMARY

Site: Stonebrook Pkwy/Project Access 1

Future Year Plus Project Plus Event Conditions
Saturday Midday Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Project Access 1 NB											
3	L2	27	2.0	0.056	7.3	LOS A	0.2	4.5	0.55	0.53	31.1
8	T1	1	2.0	0.056	7.3	LOS A	0.2	4.5	0.55	0.53	31.2
18	R2	2	2.0	0.056	7.3	LOS A	0.2	4.5	0.55	0.53	30.6
Approach		30	2.0	0.056	7.3	LOS A	0.2	4.5	0.55	0.53	31.1
East: Stonebrook Pkwy WB											
1	L2	3	2.0	0.447	8.7	LOS A	2.4	61.6	0.33	0.20	32.2
6	T1	382	2.0	0.447	8.7	LOS A	2.4	61.6	0.33	0.20	32.3
16	R2	61	2.0	0.447	8.7	LOS A	2.4	61.6	0.33	0.20	31.6
Approach		447	2.0	0.447	8.7	LOS A	2.4	61.6	0.33	0.20	32.2
North: Project Access 1 SB											
7	L2	48	2.0	0.281	8.3	LOS A	1.1	27.8	0.52	0.50	32.0
4	T1	1	2.0	0.281	8.3	LOS A	1.1	27.8	0.52	0.50	32.1
14	R2	155	2.0	0.281	8.3	LOS A	1.1	27.8	0.52	0.50	31.4
Approach		204	2.0	0.281	8.3	LOS A	1.1	27.8	0.52	0.50	31.5
West: Stonebrook Pkwy EB											
5	L2	72	2.0	0.658	13.1	LOS B	5.6	142.0	0.36	0.17	30.1
2	T1	585	2.0	0.658	13.1	LOS B	5.6	142.0	0.36	0.17	30.2
12	R2	34	2.0	0.658	13.1	LOS B	5.6	142.0	0.36	0.17	29.6
Approach		692	2.0	0.658	13.1	LOS B	5.6	142.0	0.36	0.17	30.2
All Vehicles		1373	2.0	0.658	10.8	LOS B	5.6	142.0	0.38	0.24	31.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

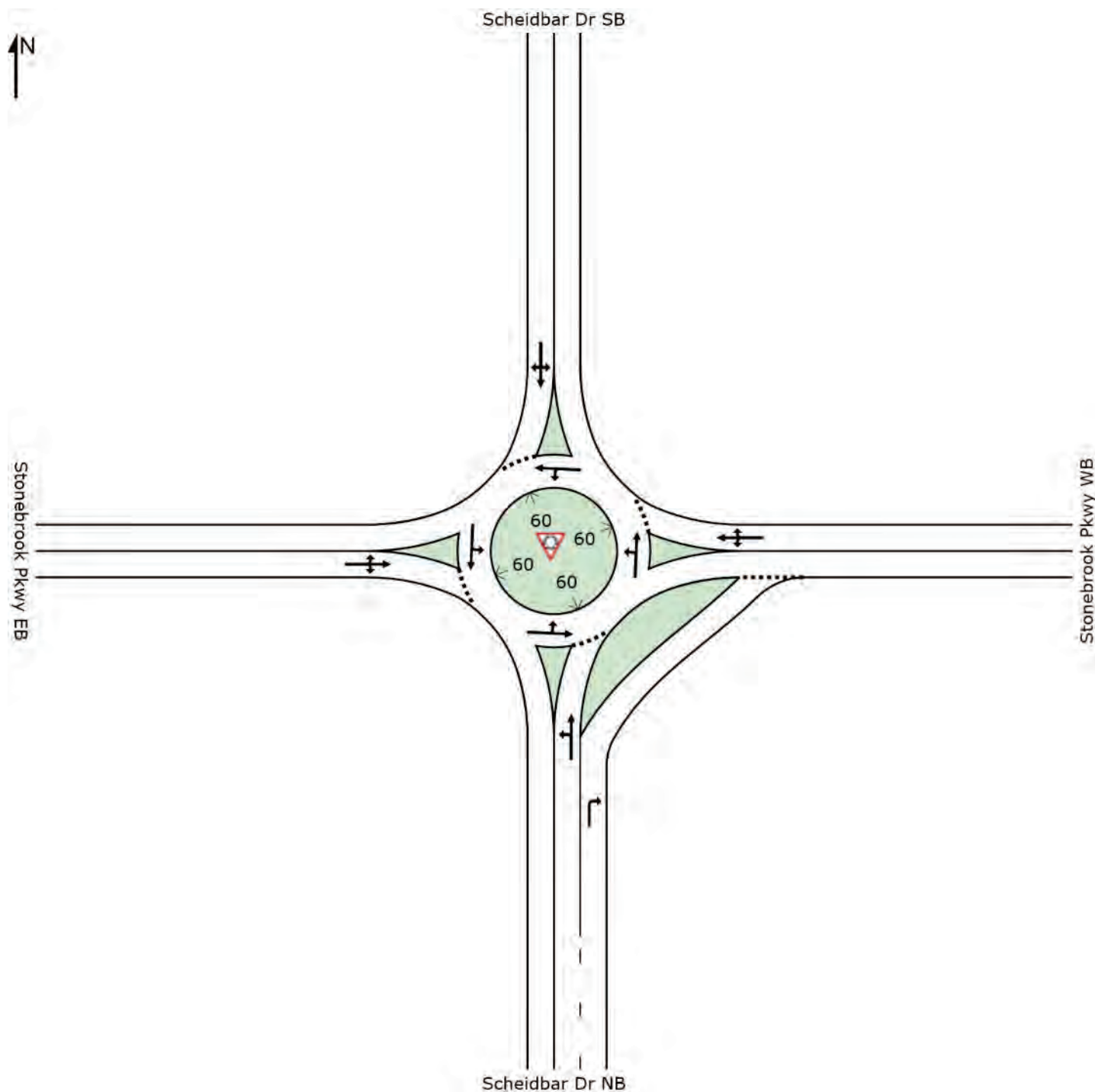
Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: Stonebrook Pkwy/Scheidbar Dr

Future Year Plus Project Plus Event Conditions
Saturday Middy Peak
Roundabout



MOVEMENT SUMMARY

 **Site: Stonebrook Pkwy/Scheidbar Dr**

Future Year Plus Project Plus Event Conditions
Saturday Midday Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Scheidbar Dr NB											
3	L2	271	2.0	0.362	9.2	LOS A	1.5	39.1	0.54	0.50	30.2
8	T1	4	2.0	0.362	9.2	LOS A	1.5	39.1	0.54	0.50	30.3
18	R2	284	2.0	0.368	9.2	LOS A	1.6	40.2	0.53	0.49	31.5
Approach		559	2.0	0.368	9.2	LOS A	1.6	40.2	0.53	0.50	30.8
East: Stonebrook Pkwy WB											
1	L2	118	2.0	0.342	8.3	LOS A	1.5	37.4	0.48	0.41	31.6
6	T1	163	2.0	0.342	8.3	LOS A	1.5	37.4	0.48	0.41	31.7
16	R2	1	2.0	0.342	8.3	LOS A	1.5	37.4	0.48	0.41	31.0
Approach		281	2.0	0.342	8.3	LOS A	1.5	37.4	0.48	0.41	31.6
North: Scheidbar Dr SB											
7	L2	1	2.0	0.026	6.0	LOS A	0.1	2.1	0.49	0.41	33.4
4	T1	2	2.0	0.026	6.0	LOS A	0.1	2.1	0.49	0.41	33.5
14	R2	14	2.0	0.026	6.0	LOS A	0.1	2.1	0.49	0.41	32.8
Approach		17	2.0	0.026	6.0	LOS A	0.1	2.1	0.49	0.41	32.9
West: Stonebrook Pkwy EB											
5	L2	17	2.0	0.649	13.4	LOS B	4.9	123.4	0.51	0.34	30.1
2	T1	353	2.0	0.649	13.4	LOS B	4.9	123.4	0.51	0.34	30.2
12	R2	266	2.0	0.649	13.4	LOS B	4.9	123.4	0.51	0.34	29.6
Approach		635	2.0	0.649	13.4	LOS B	4.9	123.4	0.51	0.34	30.0
All Vehicles		1493	2.0	0.649	10.8	LOS B	4.9	123.4	0.51	0.41	30.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6: Stonebrook Pkwy & Project Access 2 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0		0.2	0.1	0.1	0.1
Total Del/Veh (s)	4.5	1.3	1.3		0.4	11.6	3.5	1.1
Vehicles Entered	5	588	8	0	268	3	7	879
Vehicles Exited	5	588	8	0	268	3	7	879
Hourly Exit Rate	5	588	8	0	268	3	7	879
Input Volume	6	600	8	1	260	4	6	884
% of Volume	83	98	100	0	103	75	117	99

7: Pyramid Hwy & Andelin Dr Performance by movement

Movement	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.6	0.2	0.1
Total Del/Veh (s)	1.4	21.4	3.0	1.3	28.7	1.3	2.8
Vehicles Entered	42	64	2048	198	58	1656	4066
Vehicles Exited	42	63	2049	198	58	1656	4066
Hourly Exit Rate	42	63	2049	198	58	1656	4066
Input Volume	37	64	2042	200	60	1653	4056
% of Volume	114	98	100	99	97	100	100

Appendix 4:

Andelin Farms Existing Uses, Site Plan, and Existing Structure/Building Inventory

List of Existing Uses

Festivals (14-18 weeks per year):

- Spring Festival (April/May)
- Summer Festival (August)
- Fall Festival (September/October)
- Live Nativity/Winter Festival (December)

Events:

- Private Tours
- Farm Camp
- Educational Field Trips

Uses:

Agricultural Fields (±60.6 Acres)

- Seasonal Crops/Pasture

Livestock Fields (±19.7 Acres)

- Cattle, Pigs, Chickens, etc.

Residential Rentals (±4.6 Acres)

- Three Rental Homes/Dwellings
- Barns/storage sheds

Main Ranch House & Adventure Park Entrance (±4.0 Acres)

- Main Ranch House
- Concession Stands
- Daily/Year-Round Parking

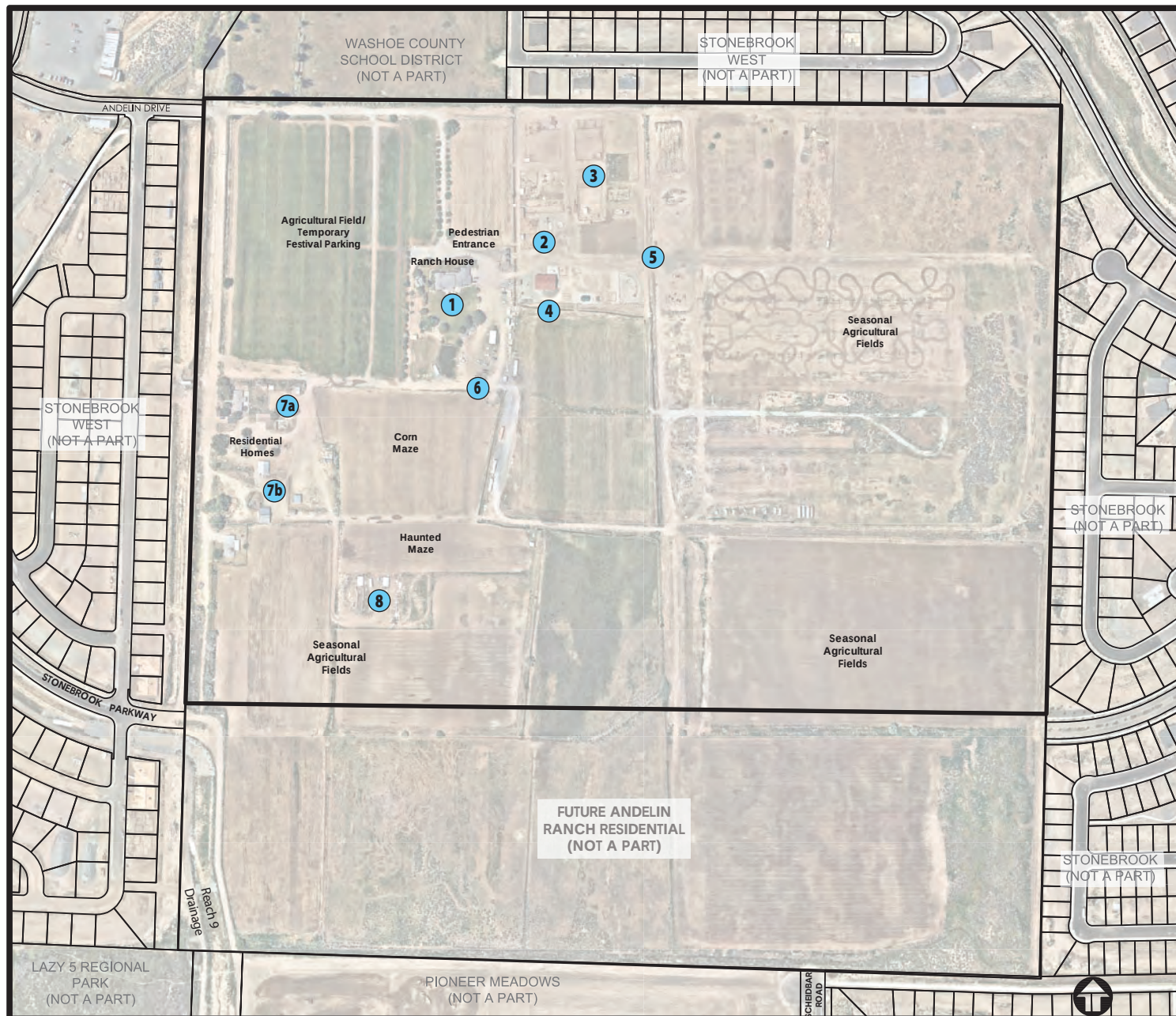
Pasture/Festival Parking (±13.9 Acres)

- Pasture/Alfalfa Fields
- Temporary Festival Parking (Approx. 50 days a year)

Andelin Adventure Park (±62.1 Acres)

- Farm Store
- Private Events/Birthday Parties
- Petting Zoo
- Haunted House/Maze
- Bus Ride/Paintball Shoot
- Animal/Horses/Ponies/Camel Rides
- Tractor Pull Hay Ride
- Train Ride
- Small Child Barrel Ride
- Mini-Ziplines
- Inflatable Jump Pad
- Slides
- Kids Corn Maze
- Kids Hay Bale Maze
- Seasonal "You Pick'Em Fields"
Tulips/Sunflowers/Pumpkins/etc.
- Hamster Wheels
- Bunny Hop
- Gem Mining/Sluice Box
- Duck Races
- "Fishing" Pond
- Sand Excavation Site
- Lasso Station
- Corn Box
- Play Garden

Inventory



Photos from Sites 1-8 found on attached pages.

Site I



Main Ranch House Frontage.



Main Ranch House Rear.



Main Ranch House looking west.

Site 2



Ticket kiosks



Ticket kiosks



Chicken Coop



Animal Shelter



Concession Stand



Animal Shelters



Mining Attraction



Animal Shelter

Site 3



Feed Storage Sheds



Shade Structure/Lean To



Shade Structure



Shade Structure/Lean To



Play Structure



Animal Shade Structure



Hoop House



Mini-Zip Lines

Site 4



Andelin Farm Store (North Elevation)



Andelin Farm Store (South/east Elevation)



Farm Store Interior



Temporary Shaded Picnic Area



Concession Stand



Storage Sheds



Andelin Farm Attraction



Andelin Farm Educational Attraction

Site 5



Baby Animal Petting House (west/south elevation)



Baby Animal Petting House (east/north elevation)



Shaded Structure



Mining Attraction



Concession Stand



Storage Shed

Site 6



Temporary Tent for Private Parties



Gazebo for Private Parties



Ticket Booth South of Ranch House



Animal Shelter



Concession Stand



Conex Boxes for Storage



Zombie Paint ball Buses



Storage Shed

Site 7a



Private Residence I



Storage Shed behind Private Residence I



Animal Shelter behind Private Residence I



Storage shed in front of Private Residence I



Private Residence II (west elevation)



Private Residence II (south elevation)



Private Residence II detached garage



Private Residence II (north elevation)

Site 7b



Old Barn for storage (west elevation)



Old Barn for storage (east elevation)



Old Barn for storage (north elevation)



Old storage structure



Hay storage structure



Old storage structure



Old storage structure



Private Residence III

Site 8



Structure for haunted theme event (looking west)



Structure for haunted theme event (looking south)



Enclosed cargo trailers for storage



Enclosed cargo trailers & hoop houses for storage



Temporary Haunted House I (east)



Temporary Haunted House II (west)



Temporary Haunted House wall panels



Entrance to Haunted Corn Maze (facade)

Appendix 5:

Preliminary Sewer Report

REVISED CONCEPTUAL DRAINAGE REPORT

FOR

**ANDELIN RANCH
PROJECT #3727
SPARKS, NEVADA**

Prepared for:

**Andelin Family Trust
8100 Pyramid Highway
Washoe County, NV 89436**

Revised August 2025

Prepared by:

**Wood Rodgers Inc.
1361 Corporate Boulevard
Reno, Nevada 89502**



09/10/2025

Shawnee Dunagan, P.E.



WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

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APPENDIX A

VICINITY MAP
FEMA FIRM EXHIBITS
RUNOFF COEFFICIENT TABLE
701
NOAA INTENSITY TABLE
NRCS SOIL MAP

APPENDIX B

EXISTING BASINS
PROPOSED BASINS

APPENDIX C

HOUSE MORAN REACH 9 STUDY

APPENDIX D

POND MANAGEMENT PLAN
OUTLINE



1 INTRODUCTION

This report serves as the conceptual drainage study for the Andelin Ranch Planned Unit Development (Plan Area). The purpose of this report is to provide the preliminary analysis to support the development of the proposed project in accordance with the Truckee Meadows Regional Drainage Manual (TMRDM) and City of Sparks development standards.

1.1 PROJECT LOCATION

The Andelin Ranch PUD is located within Section 2, T20N, R20E, MDM, Washoe County, Nevada, APNs 528-030-13, 528-030-14, and 528-030-15. The overall site consists of approximately 116 acres. The project is bounded by Stonebrook Village CC to the North, Stonebrook Villages F and G to the East, future Pioneer Meadows Business Park and Pioneer Meadows Village 6 to the South, and Stonebrook West Villages 1 & 2 to the West. A vicinity map is included in Appendix A.

1.2 PROJECT DESCRIPTION

The proposed project consists of an Annexation, Rezoning, Comprehensive Plan Amendment and Planned Unit Development. The project will establish a cultural institution that will host a mix of commercial uses, and agricultural amenities. Future development of the site was conceptualized and will consist of grading of the site for the various proposed uses, and necessary infrastructure to serve the site, such as sewer, storm drain, water and public roads.

The existing site is partially undeveloped, agricultural uses, and a single-family residence. The existing terrain generally slopes from North to South at less than .25 percent. There are various irrigation ditches on the project site, some actively used and other remnants of historic irrigation uses. The site is located partially within FEMA FIRM maps 32031C2865G unshaded Zone X, and 32031C3052G unshaded Zone X. The FEMA FIRM maps are in Appendix A. The soils of the project consist mainly of non-plastic to medium plasticity silty sandy loam and clayey sandy loam. The soil map from the USGS Natural Resources Conservation Service can be found in Appendix A for the soil classifications.

1.3 REGULATORY PERSPECTIVE

The project site is currently located within Washoe County jurisdiction. The submitted requests would bring the project into City of Sparks jurisdiction. Future drainage facilities would be managed by Andelin Ranch, future Homeowner Associations, and the City of Sparks. Andelin Ranch would be responsible for maintenance and ownership any infrastructure necessary to serve the Ranch. City of Sparks will be mostly responsible for the storm drain infrastructure in the public roadways.

2 PREVIOUS STUDIES

A geotechnical analysis was performed by Wood Rodgers, Inc. in November 2017 as a part of the tentative map application for Stonebrook West. This report analyzed the soil classification and mechanics of the proposed site.



Future improvements will drain into the extension of Reach 9 regional channel. A Proposed Storm Drain Layout Exhibit for the proposed infrastructure is located in Appendix A.

A regional drainage study was prepared for the City of Sparks by House Moran Consulting, Inc. in February 2018. This study is titled *Letter Report – Sparks Reach 9 Regional Flood Control Channel Hydrograph Development & North Truckee Watershed Study*. This report computed peak flow hydrographs at key locations along the Reach 9 regional drainage alignment and other flood control facilities and infrastructure in the City of Sparks. The runoff generated from the proposed development was incorporated into this report and HEC-RAS analysis.

A technical drainage report was prepared with the Stonebrook West Backbone Infrastructure. This report has been referenced because the tie in of the proposed storm drain infrastructure with connect into the extension of Reach 9.

3 HISTORIC DRAINAGE SYSTEM

The existing site is partially undeveloped, agricultural uses, and single-family residence. The existing terrain generally slopes from North to South at less than .25 percent. The historic drainage for the plan area consists of overland flow in a southeast direction. There are historic drainage and irrigation channels that carry the flow throughout the project site. Historically storm water flows would flow either southwest or southeast and flow into the La Posada Drainage Channel. The *La Posada Drainage Channel Improvements Design Report* (LPDCI-DR), dated March 2004, further discussed the historic drainage patterns for this area.

4 CONCEPTUAL DRAINAGE SYSTEM

The conceptual drainage system for the project site consists of a few different concepts. Andelin Farms has been analyzed as needing to continue to drain in the same manner that occurs today. The farm and uses to the north part of the project drains by sheet flow to the south. A pond could be dug at existing ground near the boundary of the farm/commercial uses and the future residential uses to the south to keep the site lower or divert into a storm drain system that would ultimately drain to Reach 9. This will allow the existing uses to the north to continue to drain to the south. A storm drain network will be required to drain Stonebrook Parkway that will also drain to Reach 9. The pond could be operated in such a manner that enough capacity remains to store all run off during a 100-year 10-day storm event. There will be an outlet from the pond that will divert any overflow storm water to an underground storm drain system. This underground network will drain into Reach 9. There is also the ability that the grading could be designed for an underground storm drain system. The area is all analyzed under the House Moran Report as well for a more detailed analysis of the area.

A future underground storm drain network may also collect all storm water from the southern parcel south of Future Stonebrook Parkway depending on the final configuration and layout of that parcel. For now this area remains as existing with this analysis. Any future underground network would ultimately outlet to Reach 9.



The drainage concept of having a pond allows the site to be graded in such a manner to reduce the import of fill to the project site. This will put less truck traffic and congestion on the recently paved roads, extending the life of the pavement and is safer for the public.

Detention has already been provided within the analysis of Reach 9, but is further discussed in Section 6.1 of this report.

The preliminary and/or final storm drain system will be designed with future entitlements to convey both the 5-year and 100-year system through the pipe network with minimal flow in the street. The 5-year storm allows for a 12' minimum travel lane for each local street at peak flow. The 100-year storm is allowed to pond and flood the local street at sag locations but is eventually picked up by inlets and carried through the pipe system. Stubs have been proposed with the Stonebrook West Backbone Infrastructure to accept the ultimate condition 100-year flows.

4.1 CONCEPTUAL DRAINAGE WATERSHEDS

With the conceptual drainage plan the project site was broken down into 2 proposed sheds based upon the type of use and initial location the storm water flows are directed. The conceptual storm drain shed are as follows:

- P-1: Commercial Uses
- P-2: Parking and paved roadways

The basin data for the proposed basins can be found on the *Proposed Basins and Storm Drain for Andelin Ranch* in Appendix B.

5 CONCEPTUAL HYDROLOGIC ANALYSIS

The hydrologic analysis in this report consists of preliminary peak runoff flow computations for the proposed conditions. The preliminary storm drain design consists of storm drain, curb/gutter, street and channelized flow. The 5-year and 100-year storm events were modeled per the TMRDM using the Rational method. 5-year and 100-year rainfall intensities from the National Oceanic and Atmospheric Administration Atlas 14 for the area, onsite basin areas, and rational runoff coefficients from the TMRDM were utilized to determine peak flows.

5.1 DESIGN RAINFALL INTENSITIES

Precipitation intensity estimates were taken from Atlas 14, Volume 1, Version 5 from NOAA, which analyzes precipitation data frequencies based upon historic data and area. Intensities were used appropriately for the 5-year and 100-year storm events. The time of concentration used for this analysis was 5 minutes. This corresponds to a precipitation intensity of 1.91 in/hr and 4.79 in/hr for the 5-year and the 100-year storm events respectively.

5.2 RATIONAL METHOD

The Rational Method Formula was used to compute peak runoff flow rates for the proposed site conditions for both the 5-year and 100-year storm events. The Rational Method Formula requires only the area of the basin, the rainfall intensity as discussed in Section 5.1 of this report



corresponding to the time of concentration as discussed in Section 5.1 of this report, and the Rational Runoff Coefficient as discussed in Section 5.3 of this report. Peak runoff flows are determined using the following equation:

$$Q = ciA$$

Where:

Q = peak runoff in cubic feet per second (cfs).

c = Rational runoff coefficient (unitless)

i = rainfall intensity in (inches/hr)

A = area of the basin (acres)

5.3 RATIONAL RUNOFF COEFFICIENTS

Rational Runoff Coefficients were determined using Table 701 of the TMRDM. This table gives values for “C” corresponding to land use of the area being analyzed. A copy of the table is included in Appendix A. The individual basins were assigned coefficients based upon the use and can be found in the table on the *Proposed Basins and Storm Drain for Andelin Ranch* in Appendix B.

5.4 RESULTS OF HYDRAULIC ANALYSIS FOR PROPOSED BASINS

The results of the rational method for the proposed storm drain flows for the 5-year and 100-year design are presented in Appendix B on the *Proposed Basins and Storm Drain for Andelin Ranch* in Appendix B. A conceptual storm drain system layout was designed based on the basin sizes, outlet locations and conceptual grading. The layout shows the preliminary location of the mains that will outlet to either Reach 9 or the pond. The preliminary/final design of any of the projects associated with this layout with identify locations of catch basins and smaller storm drain pipes. The total peak flows with the conceptual drainage plan are 42.0 cfs and 287.3 cfs in the 5-year and 100-year storm events, respectively. Detention is further addressed in Section 6.1.

5.5 RESULTS OF HYDRAULIC ANALYSIS FOR EXISTING BASINS

The rational runoff coefficient for the existing basins was used utilizing one existing basin, since the whole existing sites drains by sheet flow to the south one basin. Due to the sheet flow condition and the low slope on the site the time of concentration is estimated to be approximately 10 minutes. This corresponds to a rainfall intensity of 1.91 in/hr and 4.79 in/hr for the 5-year and the 100-year storm events respectively. The runoff coefficient assigned to the existing land use to be utilized is .05 and .30 for the 5-year and 100-year storm events. These are an average of the overall open space of a majority of the 185 acres and some residential buildings, barns, dirt roads, etc. The existing peak flows in the 5-year and 100-year storm events are 15.5 cfs and 205.5 cfs, respectively. With future entitlements and development, the existing condition will be analyzed in greater depth to ensure the site drains in a similar manner. Detention is further address in Section 6.1.

6 SPECIAL FLOOD HAZARDS

The entire site lies within FEMA flood hazard area “unshaded X”, which indicates that the project is outside the 0.2% probability per year flood zone. As the project area is outside the 0.2% annual



probability of flooding, there are no special flood hazard considerations proposed with this project. The FEMA Flood Insurance Rate Maps (FIRM) in for the project area have been included in Appendix A.

6.1 IMPACTS OF PROPOSED DEVELOPMENT ON FLOOD HAZARD AREA

Detention for the whole site of Andelin Ranch was accounted for in the House Moran study on some level. The Reach 9 design and Andelin Ranch development are compatible with the *Stonebrook Parkway Phase 1 Technical Drain Report* and *Sparks Reach 9 Regional Flood Control Channel Hydrograph Development & North Truckee Drain Watershed Study*, and as such are not anticipated to further impact flood hazard areas. The ponds will be able to provide additional detention to the site.

6.1.1 Detention Requirements

At the time of any future land use entitlement or building permit application a hydrology report will need to be completed to identify if any additional detention requirements need to be addressed. Any increased 100-year storm flow between existing and proposed conditions will be contained on site. A majority of the site at this time on the north side of Future Stonebrook Parkway will remain an agricultural use. If the development of the site increases the impervious area of the site in a manner different than the *Sparks Reach 9 Regional Flood Control Channel Hydrograph Development & North Truckee Drain Watershed Study* projected, additional detention may be required to ensure that peak flows do not exceed the Reach 9 Design. As different methods and peak flows are generated between the rational method and the Reach 9 study the difference will need to be based upon the overall C values for the build out of the site.

6.2 FLOODPROOFING MEASURES

Storm drain pipes will be designed in the future to convey the 100-year flow conditions without overland release of excess runoff. In the case of a catch basin or lateral clogging the street section will be sufficient to collect and convey runoff through the proposed project.

6.3 FEMA AND LOCAL CODE COMPLIANCE

The Andelin Ranch site will be compliant with all federal and local code requirements.

7 REACH 9 CHANNEL

The purpose of this section is to provide the references for the previous reports that completed analysis on Reach 9 that are relevant to the proposed villages. Reach 9 was analyzed using HEC RAS during the design process and a more detailed analysis of this design can be found in the *Stonebrook West Backbone Technical Drainage Report*. The design included the channel extension for which the proposed storm drain system will ultimately be draining to. The analysis was based on the peak flows from the model developed for the City of Sparks to include all watersheds that contribute to the Reach 9 channel. Please refer to the *Sparks Reach 9 Regional Flood Control Channel Hydrograph Development & North Truckee Drain Watershed Study* completed by House Moran for a more detailed analysis of the model. Ultimately with the conceptual drainage plan all storm water flows will be conveyed to Reach 9. The Reach 9 study



analyzed the area based upon the Sparks 2030 Comprehensive Plan. The plan identified the land use of the project area as Low Density Residential of 3-6 dwelling units per acre.

8 PROPOSED POND

A Pond Management Plan will be completed with the construction of the pond if that is incorporated into a future design. An outline for the content of what the plan will include is in Appendix D. This will help ensure that the constructed pond functions in the proper manner and remains healthy. Initial discussions with the Nevada Division of Environmental Protection (NDEP) have begun. During the design of the pond the owner will work with NDEP, Washoe County Health Department, Sparks Fire and any other permitting entities as required.

9 CONCLUSIONS

The proposed conceptual drainage system for Andelin Ranch provides the analysis that the future projects on this site can be designed to collect and convey 100-year storm flows through the future residential area to the south, Commercial and Agricultural areas into the Reach 9 Channel extension. The project can be developed without adversely affecting downstream properties and can be developed so that the project is protected from 100-year storm flows. No negative impacts are anticipated from the development of the Andelin Ranch Project.



10 REFERENCES

Truckee Meadows Regional Drainage Manual, April 30, 2009.

Stonebrook Conditional Letter of Map Revision Request, Wood Rodgers, Inc., January 2006

La Posada Drainage Channel Improvements Design Report, Wood Rodgers, Inc., March 2004

Sparks Reach 9 Regional Flood Control Channel Hydrograph Development & North Truckee Drain Watershed Study, House Moran Consulting, Inc., February, 26, 2018

Pioneer Meadows Reach 9 HEC-RAS Analysis, Wood Rodgers, Inc., December 2018

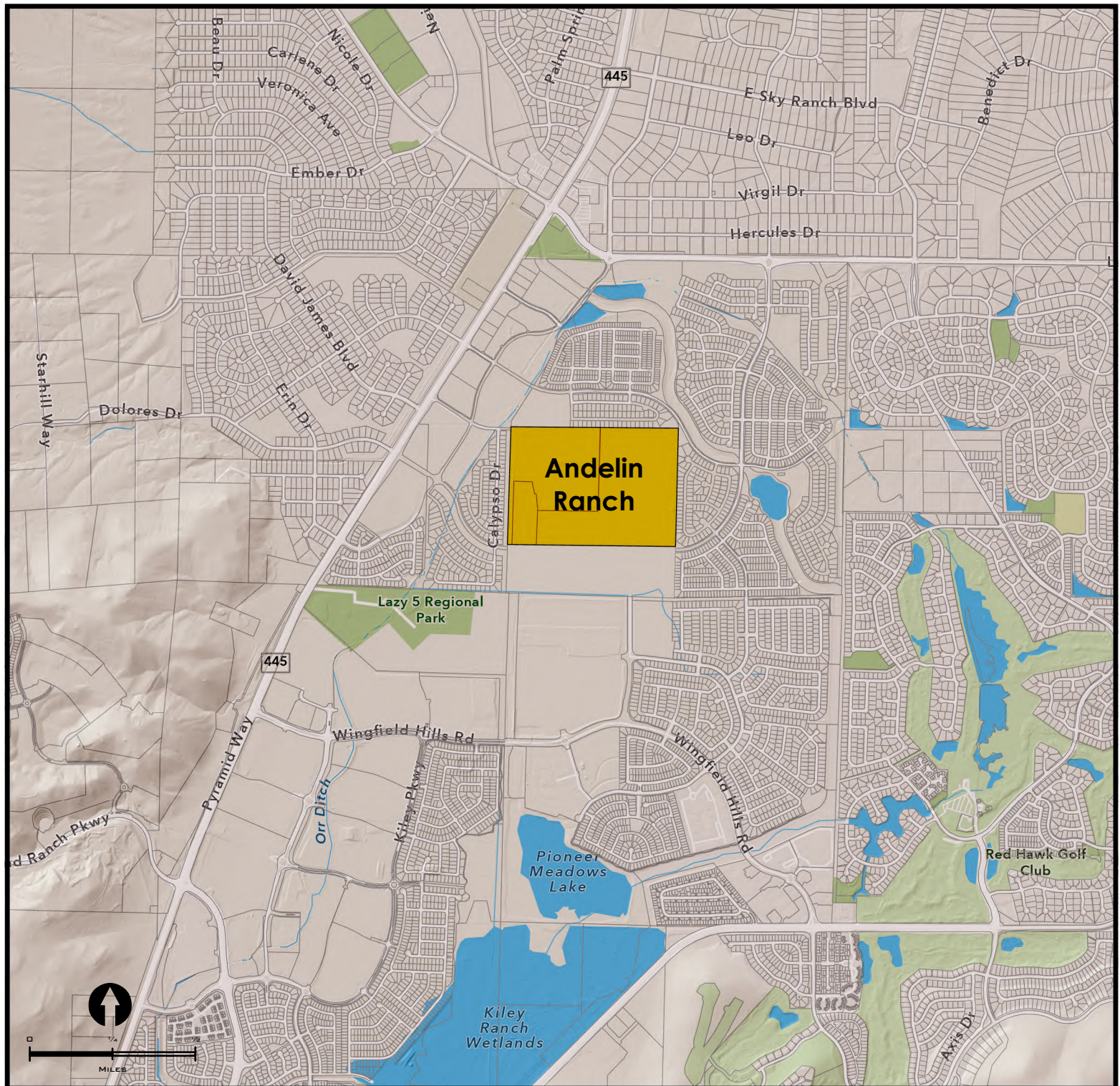
Bentley FlowMaster V8i, Haestad Methods, Inc.



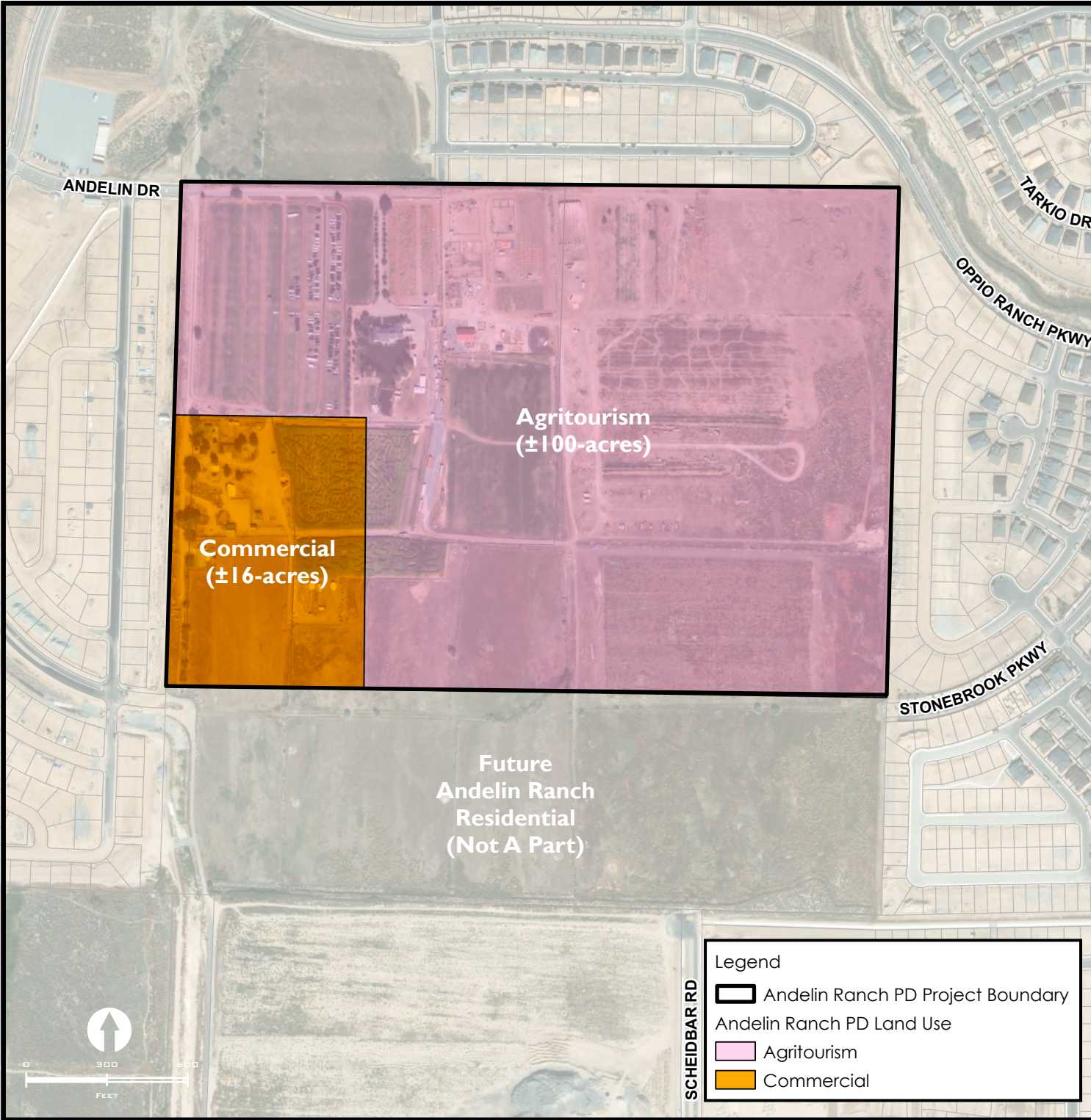
APPENDIX A

GENERAL FIGURES

Vicinity Map



Land Use



National Flood Hazard Layer FIRMette



119°42'55"W 39°37'42"N



119°42'18"W 39°37'15"N

0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS



0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X



OTHER AREAS OF FLOOD HAZARD



OTHER AREAS

GENERAL STRUCTURES



OTHER FEATURES



MAP PANELS



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **3/23/2021 at 5:14 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

RATIONAL FORMULA METHOD RUNOFF COEFFICIENTS

Land Use or Surface Characteristics	Aver. % Impervious Area	Runoff Coefficients	
		5-Year (C ₅)	100-Year (C ₁₀₀)
<u>Business/Commercial:</u>			
Downtown Areas	85	.82	.85
Neighborhood Areas	70	.65	.80
<u>Residential:</u>			
(Average Lot Size)			
1/8 Acre or Less (Multi-Unit)	65	.60	.78
1/4 Acre	38	.50	.65
1/8 Acre	30	.45	.60
1/2 Acre	25	.40	.55
1 Acre	20	.35	.50
<u>Industrial:</u>	72	.68	.82
<u>Open Space:</u>			
(Lawns, Parks, Golf Courses)	5	.05	.30
<u>Undeveloped Areas:</u>			
Range	0	.20	.50
Forest	0	.05	.30
<u>Streets/Roads:</u>			
Paved	100	.88	.93
Gravel	20	.25	.50
<u>Drives/Walks:</u>	95	.87	.90
<u>Roof:</u>	90	.85	.87
Notes:			
1. Composite runoff coefficients shown for Residential, Industrial, and Business/Commercial Areas assume irrigated grass landscaping for all pervious areas. For development with landscaping other than irrigated grass, the designer must develop project specific composite runoff coefficients from the surface characteristics presented in this table.			
VERSION: April 30, 2009	REFERENCE: USDCM, DROCOG, 1969 (with modifications)		TABLE 701
WRC ENGINEERING, INC.			



NOAA Atlas 14, Volume 1, Version 5
Location name: Sparks, Nevada, USA*
Latitude: 39.6284°, Longitude: -119.7047°
Elevation: 4484.51 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.13 (0.948-1.31)	1.42 (1.19-1.66)	1.91 (1.61-2.26)	2.38 (1.99-2.82)	3.17 (2.60-3.82)	3.91 (3.12-4.78)	4.79 (3.72-5.98)	5.88 (4.38-7.49)	7.64 (5.40-10.1)	9.28 (6.26-12.5)
10-min	0.864 (0.726-0.996)	1.08 (0.900-1.26)	1.45 (1.22-1.71)	1.81 (1.52-2.15)	2.41 (1.98-2.91)	2.98 (2.38-3.64)	3.65 (2.83-4.54)	4.47 (3.34-5.70)	5.81 (4.10-7.68)	7.06 (4.77-9.54)
15-min	0.712 (0.596-0.824)	0.892 (0.744-1.04)	1.20 (1.01-1.42)	1.50 (1.25-1.78)	1.99 (1.64-2.40)	2.46 (1.96-3.01)	3.02 (2.34-3.76)	3.70 (2.76-4.71)	4.81 (3.39-6.35)	5.83 (3.94-7.88)
30-min	0.480 (0.402-0.554)	0.600 (0.500-0.700)	0.808 (0.678-0.952)	1.01 (0.842-1.20)	1.34 (1.10-1.62)	1.65 (1.32-2.03)	2.03 (1.57-2.53)	2.49 (1.86-3.17)	3.24 (2.28-4.27)	3.93 (2.65-5.31)
60-min	0.297 (0.249-0.343)	0.371 (0.310-0.434)	0.500 (0.419-0.589)	0.622 (0.522-0.740)	0.829 (0.681-1.00)	1.02 (0.818-1.25)	1.26 (0.973-1.57)	1.54 (1.15-1.96)	2.00 (1.41-2.64)	2.43 (1.64-3.29)
2-hr	0.197 (0.173-0.228)	0.244 (0.216-0.284)	0.315 (0.275-0.366)	0.377 (0.325-0.438)	0.474 (0.398-0.554)	0.560 (0.459-0.664)	0.664 (0.529-0.796)	0.798 (0.616-0.991)	1.04 (0.766-1.34)	1.27 (0.900-1.66)
3-hr	0.157 (0.139-0.179)	0.195 (0.174-0.223)	0.245 (0.218-0.280)	0.287 (0.252-0.328)	0.346 (0.299-0.398)	0.397 (0.338-0.462)	0.461 (0.384-0.543)	0.549 (0.447-0.667)	0.705 (0.556-0.898)	0.851 (0.653-1.12)
6-hr	0.110 (0.098-0.124)	0.137 (0.123-0.155)	0.171 (0.151-0.193)	0.196 (0.174-0.223)	0.230 (0.201-0.263)	0.255 (0.220-0.293)	0.281 (0.239-0.327)	0.314 (0.262-0.370)	0.378 (0.309-0.453)	0.443 (0.356-0.565)
12-hr	0.071 (0.064-0.080)	0.090 (0.080-0.101)	0.113 (0.101-0.127)	0.132 (0.117-0.148)	0.156 (0.136-0.177)	0.174 (0.151-0.200)	0.193 (0.165-0.224)	0.213 (0.178-0.249)	0.238 (0.194-0.285)	0.261 (0.209-0.317)
24-hr	0.044 (0.039-0.049)	0.055 (0.050-0.062)	0.071 (0.063-0.079)	0.083 (0.074-0.093)	0.101 (0.089-0.113)	0.115 (0.101-0.129)	0.129 (0.112-0.147)	0.145 (0.124-0.166)	0.166 (0.140-0.192)	0.183 (0.152-0.214)
2-day	0.026 (0.023-0.029)	0.033 (0.029-0.037)	0.043 (0.038-0.048)	0.050 (0.044-0.057)	0.061 (0.053-0.070)	0.070 (0.061-0.080)	0.079 (0.068-0.091)	0.089 (0.075-0.104)	0.103 (0.085-0.122)	0.114 (0.093-0.137)
3-day	0.019 (0.017-0.021)	0.024 (0.021-0.027)	0.031 (0.028-0.035)	0.037 (0.033-0.042)	0.045 (0.040-0.052)	0.052 (0.045-0.060)	0.060 (0.051-0.068)	0.067 (0.057-0.078)	0.078 (0.064-0.092)	0.087 (0.070-0.104)
4-day	0.015 (0.014-0.017)	0.019 (0.017-0.022)	0.025 (0.023-0.029)	0.030 (0.027-0.034)	0.038 (0.033-0.043)	0.043 (0.037-0.049)	0.050 (0.042-0.057)	0.056 (0.047-0.065)	0.066 (0.054-0.077)	0.074 (0.059-0.088)
7-day	0.010 (0.009-0.012)	0.013 (0.011-0.015)	0.017 (0.015-0.020)	0.021 (0.018-0.024)	0.025 (0.022-0.029)	0.029 (0.025-0.034)	0.034 (0.029-0.039)	0.038 (0.032-0.045)	0.045 (0.036-0.053)	0.050 (0.040-0.060)
10-day	0.008 (0.007-0.009)	0.010 (0.009-0.012)	0.014 (0.012-0.016)	0.016 (0.014-0.019)	0.020 (0.017-0.023)	0.023 (0.020-0.027)	0.026 (0.022-0.030)	0.029 (0.025-0.035)	0.034 (0.028-0.040)	0.038 (0.030-0.045)
20-day	0.005 (0.004-0.006)	0.006 (0.005-0.007)	0.008 (0.007-0.009)	0.010 (0.009-0.011)	0.012 (0.010-0.014)	0.013 (0.012-0.015)	0.015 (0.013-0.017)	0.017 (0.014-0.020)	0.019 (0.016-0.023)	0.021 (0.017-0.025)
30-day	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.006 (0.006-0.007)	0.007 (0.007-0.008)	0.009 (0.008-0.010)	0.010 (0.009-0.012)	0.011 (0.010-0.013)	0.013 (0.011-0.015)	0.014 (0.012-0.017)	0.016 (0.013-0.019)
45-day	0.003 (0.003-0.003)	0.004 (0.003-0.004)	0.005 (0.004-0.006)	0.006 (0.005-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.008-0.011)	0.011 (0.009-0.012)	0.012 (0.010-0.014)
60-day	0.003 (0.002-0.003)	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.004-0.006)	0.006 (0.005-0.007)	0.007 (0.006-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.007-0.010)	0.009 (0.008-0.011)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

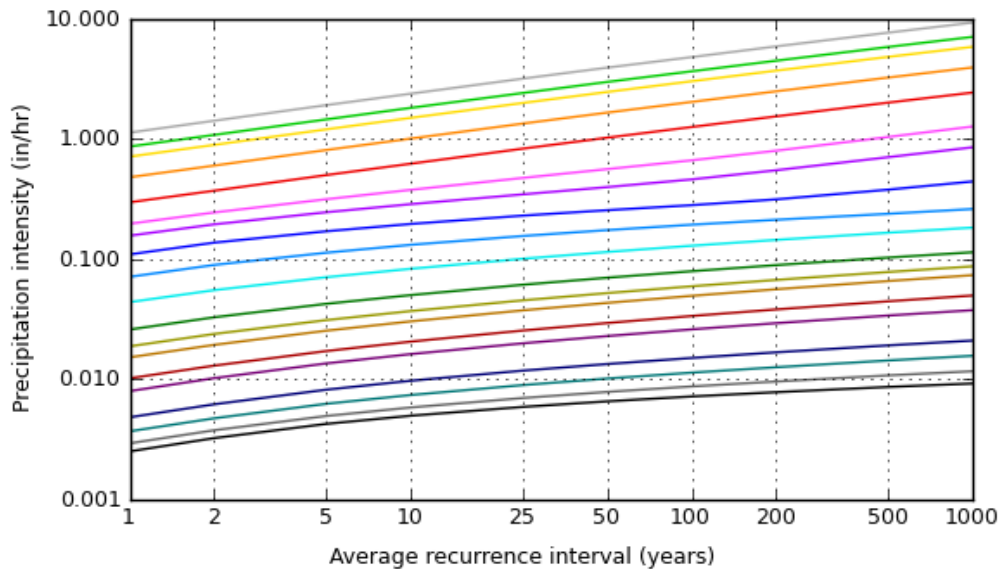
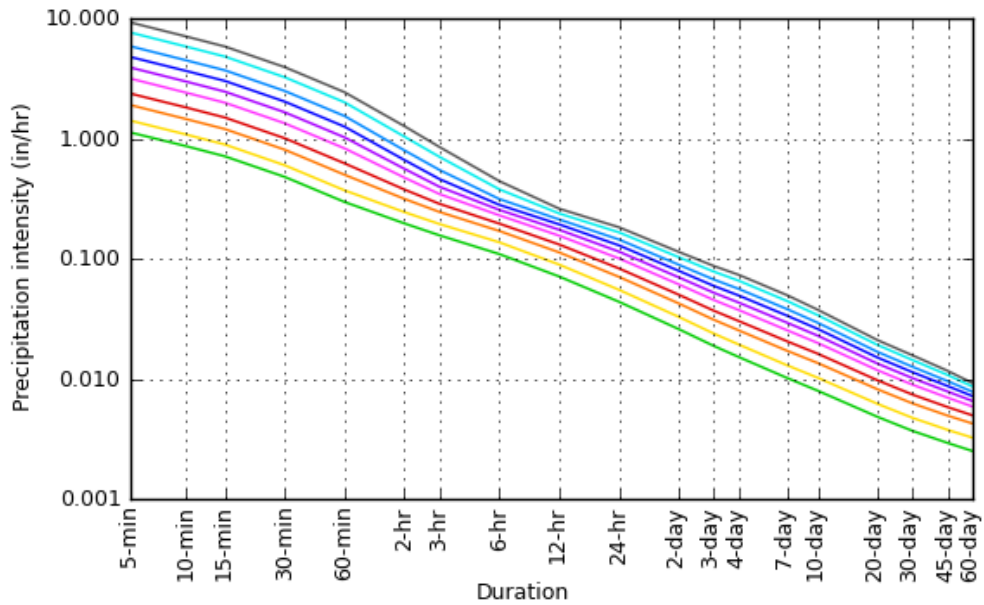
Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

PF graphical

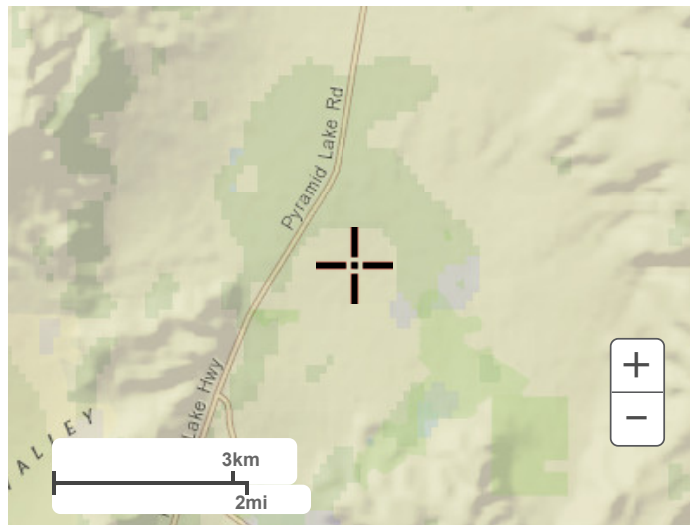
PDS-based intensity-duration-frequency (IDF) curves

Latitude: 39.6284°, Longitude: -119.7047°

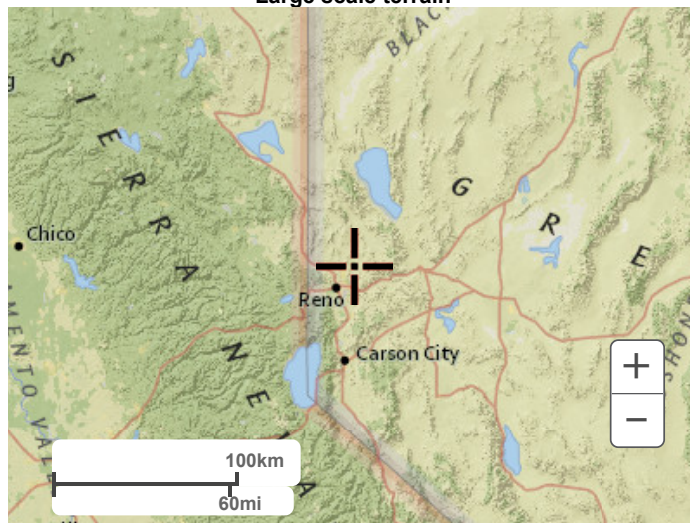


Maps & aerials

Small scale terrain



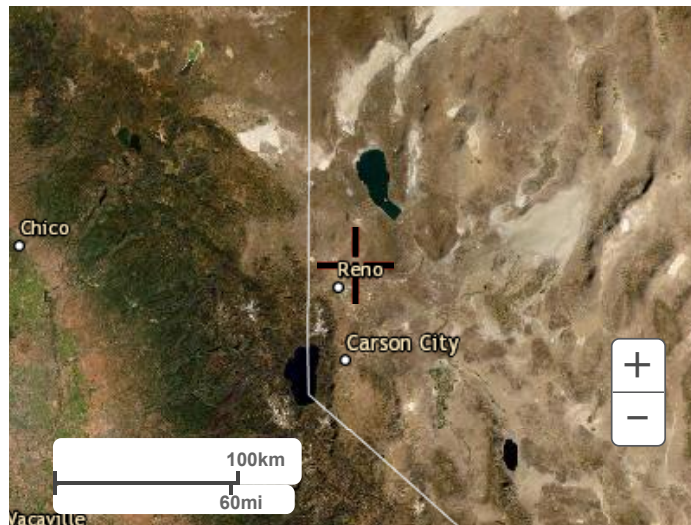
Large scale terrain



Large scale map



Large scale aerial

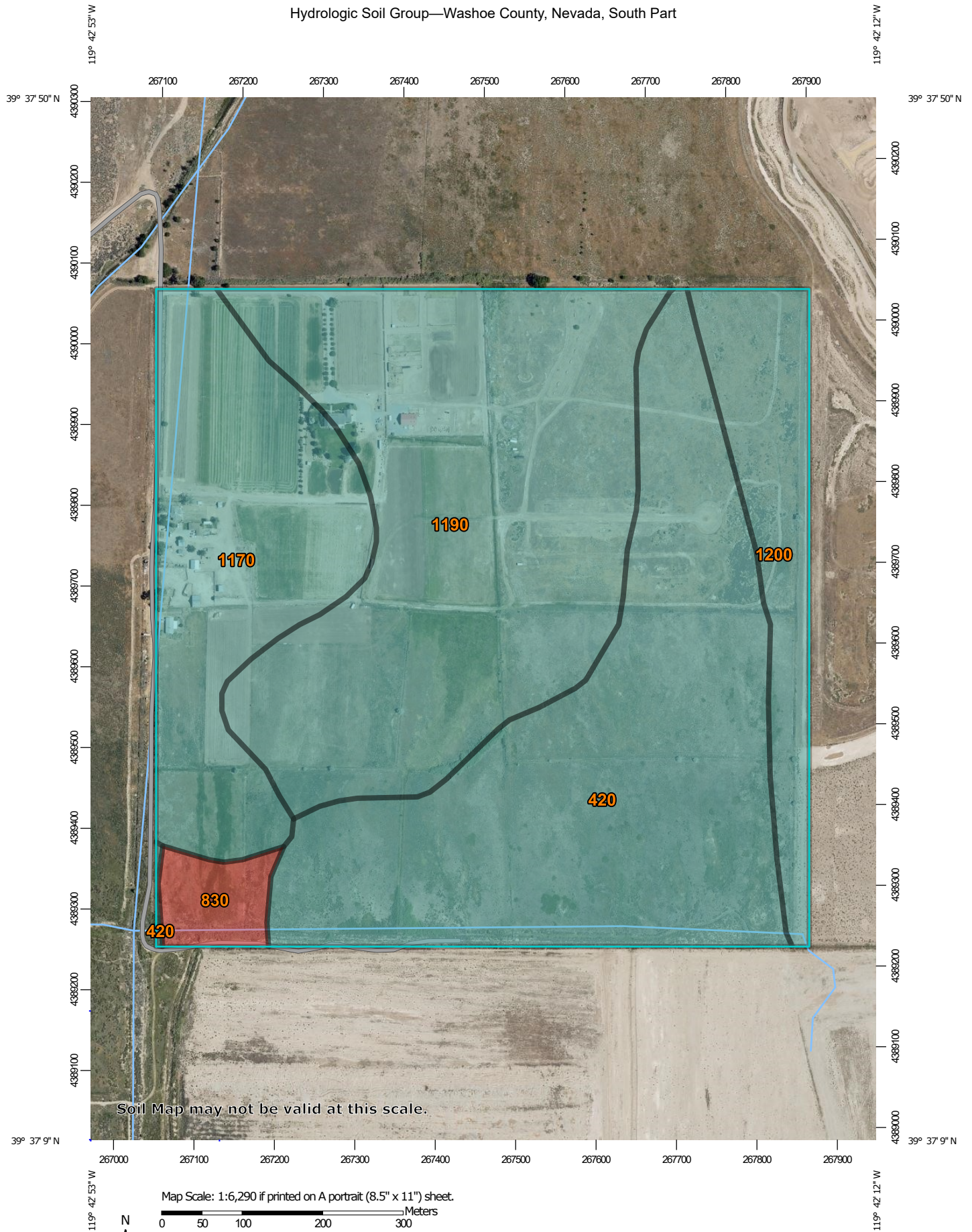


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[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

Hydrologic Soil Group—Washoe County, Nevada, South Part



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washoe County, Nevada, South Part
 Survey Area Data: Version 17, Aug 26, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Oct 1, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
420	Godecke loamy sand	C	56.3	34.3%
830	Fettic silty clay loam	D	3.8	2.3%
1170	Wedertz sandy loam, 2 to 4 percent slopes	C	30.4	18.5%
1190	Spasprey sandy loam, 0 to 2 percent slopes	C	59.0	36.0%
1200	Mellor silt loam	C	14.5	8.8%
Totals for Area of Interest			164.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX B

PROPOSED BASINS

EXISTING BASINS
FOR
ANDELIN RANCH

SPARKS, NEVADA
AUGUST 2025



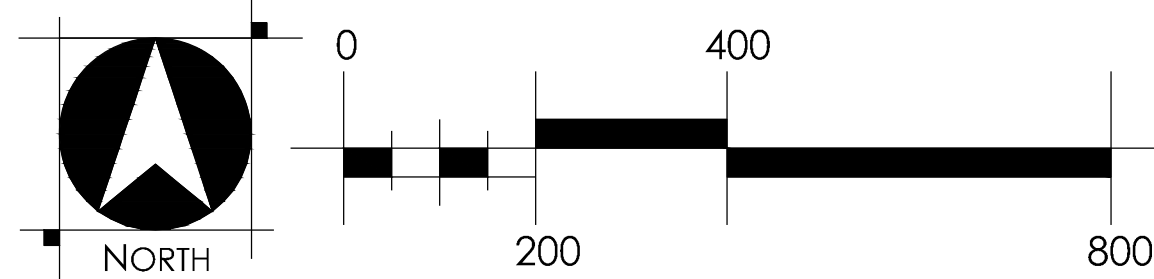
BASIN RATIONAL RUNOFF COEFFICIENTS

BASIN ID	LAND USE	C ₅	C ₁₀₀
E-1	OPEN SPACE	0.05	0.30
E-2	OPEN SPACE	0.05	0.30
E-3	OPEN SPACE	0.05	0.30
E-4	OPEN SPACE	0.05	0.30
E-5	OPEN SPACE	0.05	0.30
E-6	OPEN SPACE	0.05	0.30
E-7	OPEN SPACE	0.05	0.30

PRELIMINARY STORM
DRAIN BASIN FLOWS

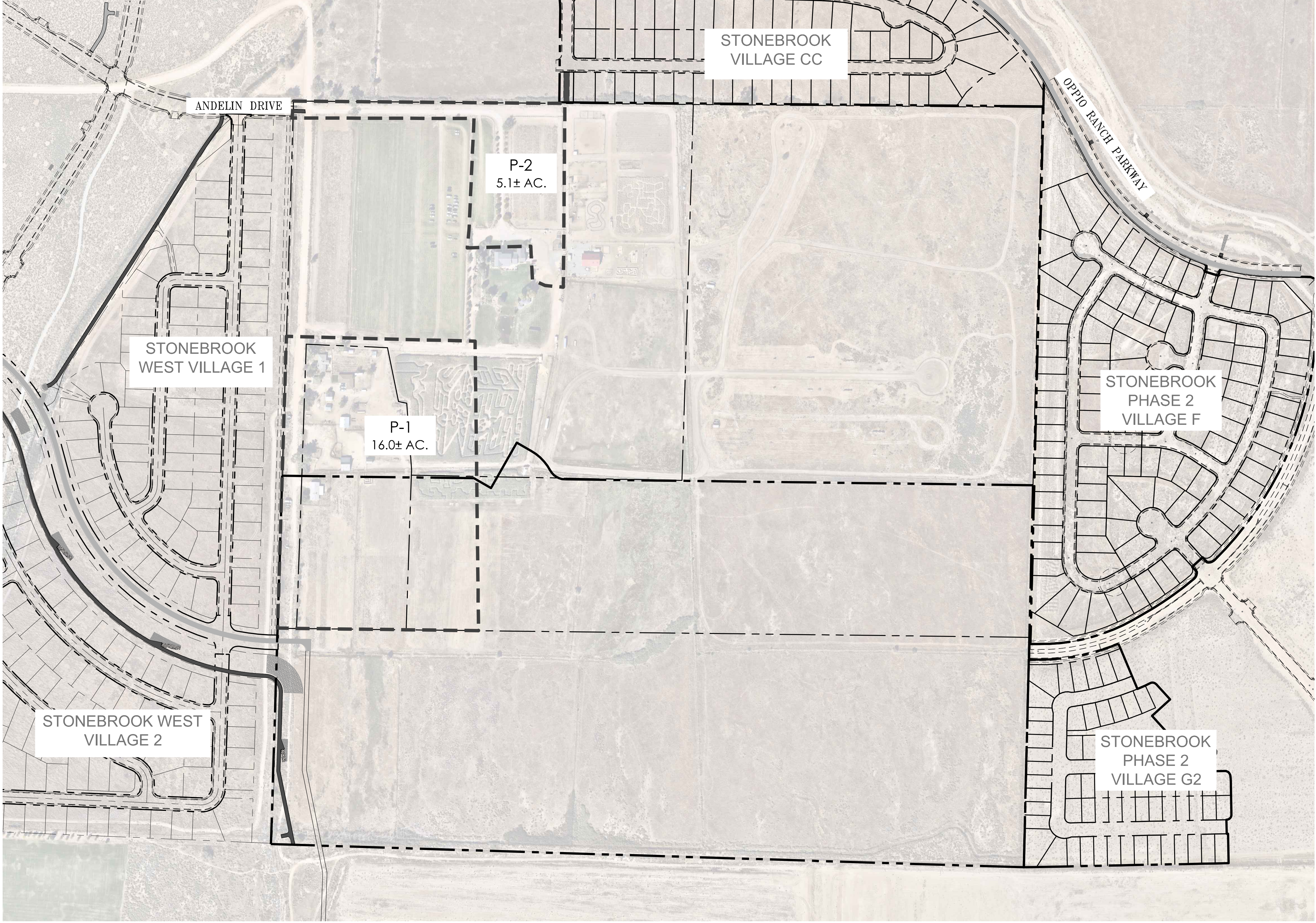
BASIN ID	Q ₅ (cfs)	Q ₁₀₀ (cfs)
E-1	2.2	33.5
E-2	1.3	19.8
E-3	3.7	56.0
E-4	2.1	31.5
E-5	1.6	24.7
E-6	4.0	31.5
E-7	0.6	8.5
TOTAL	15.5	205.5

THE WHOLE SITE ULTIMATELY DRAINS THROUGH EXISTING FLOOD IRRIGATION DITCHES, OTHER DITCHES AND OVERLAND FLOW THROUGHOUT THE WHOLE AREA DOWN TO THE SOUTH EAST CORNER OUT TO REACH 9.



PROPOSED BASINS
FOR
ANDELIN RANCH

SPARKS, NEVADA
AUGUST 2025



BASIN RATIONAL RUNOFF COEFFICIENTS

BASIN ID	LAND USE	C ₅	C ₁₀₀
P-1	COMMERCIAL (NEIGHBORHOOD)	0.65	0.80
P-2	PARKING AND ROADS	0.88	0.93

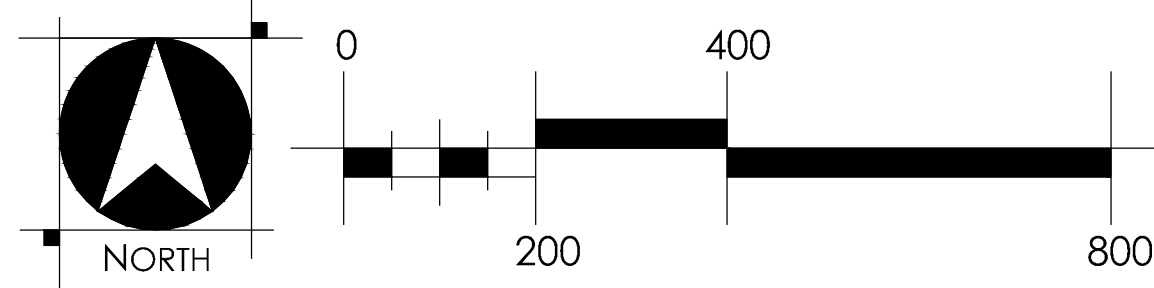
PRELIMINARY STORM
DRAIN BASIN FLOWS

BASIN ID	Q ₅ (cfs)	Q ₁₀₀ (cfs)
P-1	19.9	61.3
P-2	8.6	22.7

PEAK FLOW
INCREASE

Q ₅ (cfs)	Q ₁₀₀ (cfs)
26.5	81.8

THE SITE WILL NEED TO DRAIN IN A SIMILAR MANNER AS EXISTS TODAY. WITH FINAL DESIGN OF THE COMMERCIAL AND ANY PARKING/PAVED AREAS THE INCREASE IN FLOWS WILL NEED TO BE DETAINED BEFORE ULTIMATELY DRAINING INTO REACH 9. FINAL DESIGN WILL DRIVE THE AMOUNT AND THEREFORE THE TYPE OF DETENTION REQUIRED ON SITE. THIS COULD BE A SMALL POND OR UNDERGROUND SYSTEM. A SMALL STORM DRAIN SYSTEM MAY BE DESIGNED TO CONVEY THE FLOWS TO REACH 9 TO ACCOMMODATE THE FUTURE DEVELOPMENT OF STONEBROOK PARKWAY.



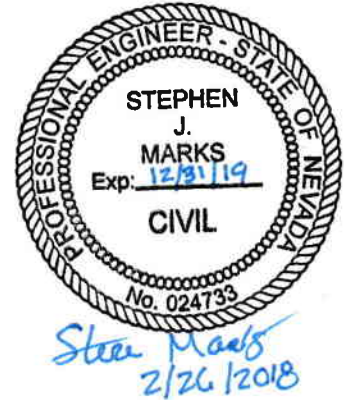
APPENDIX C

HOUSE MORAN REACH 9 STUDY



February 26, 2018

Jon Ericson, PE, PTOE
City Engineer
City of Sparks
Community Services Department
431 Prater Way
Sparks, NV 89431

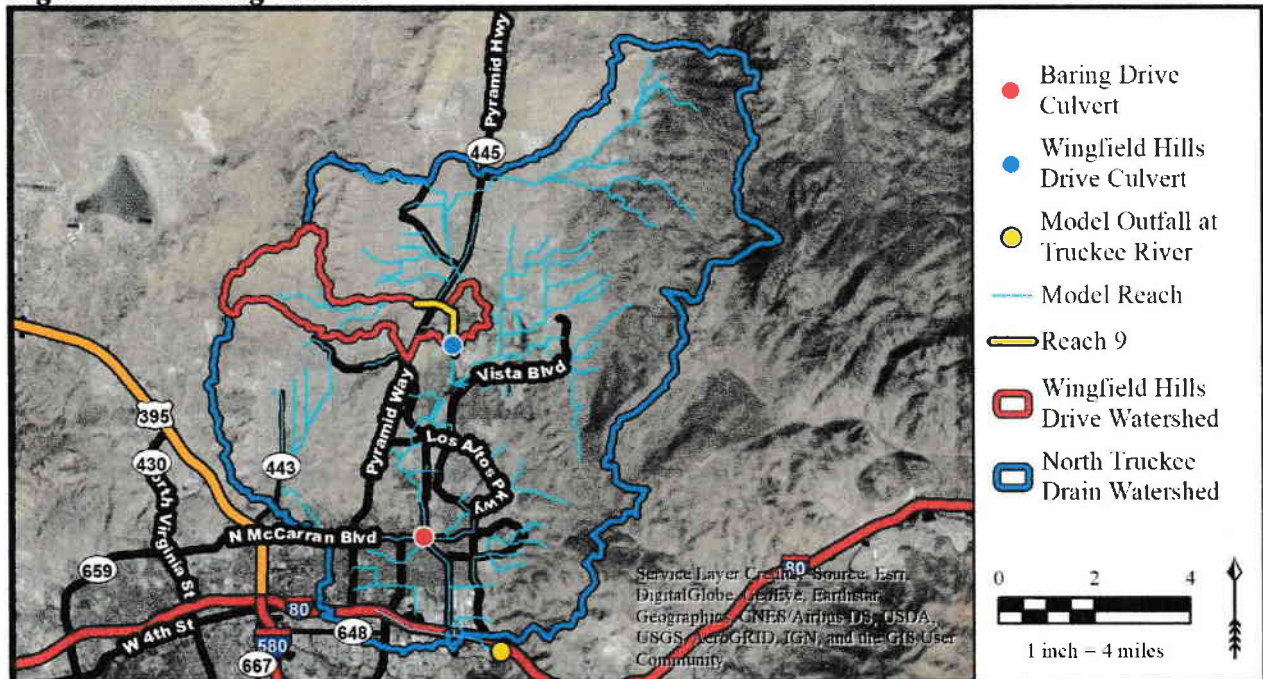


RE: Letter Report - Sparks Reach 9 Regional Flood Control Channel Hydrograph Development & North Truckee Drain Watershed Study

Dear Mr. Ericson:

The purpose of this study is to compute peak flow hydrographs at key locations along the Reach 9 and at other flood control facilities and infrastructure throughout the City of Sparks. Additionally, this study assesses the potential impacts to flow from connecting Reach 9 to the existing Pioneer Meadows Regional Detention Facility and analyzes anticipated future conditions flows through 2030. This analysis is carried downstream through the entire North Truckee Drain watershed to its confluence with the Truckee River. **Figure 1** below shows the location of Reach 9 and the North Truckee Drain watershed modeling extents.

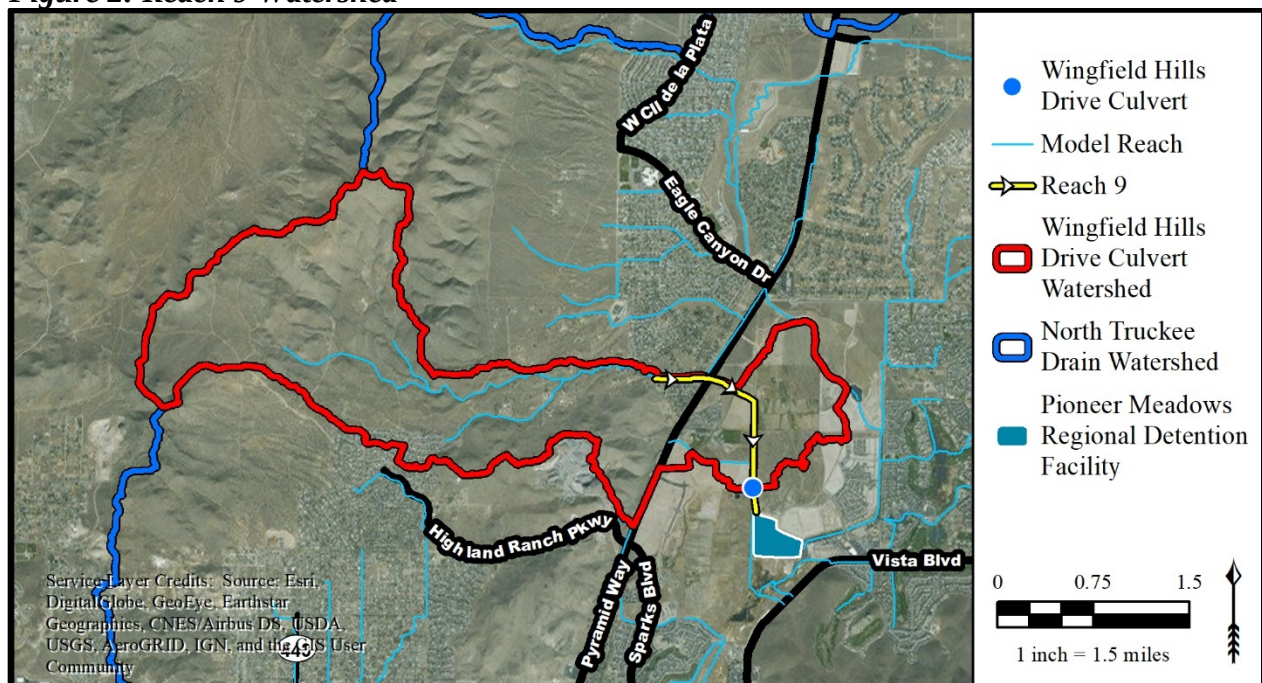
Figure 1: Modeling Extents



REACH 9 STUDY AREA

Reach 9 is a proposed flood control facility that aims to direct flow from approximately 5.2 sq. miles of watershed near the Desert Springs neighborhood northwest of Kiley Ranch by excavating a roughly 100 ft. wide channel under Pyramid Way and Orr Ditch to the Pioneer Meadows Regional Detention Facility. Currently drainage on the western side of Pyramid Way flows north along Pyramid Way in a roadside ditch before flowing through box culverts under Pyramid Way and connecting to Regional Flood Control Reach 4. Drainage on the eastern side of Pyramid Way flows south, bypassing Pioneer Meadows Regional Detention Facility and draining to the Spanish Springs Detention Basin.

Figure 2: Reach 9 Watershed



DATA COLLECTION

Data collection for the hydrologic models in this study was extensive and thorough. Wherever possible, Geographic Information System (GIS) software applications were utilized to obtain, organize, arrange, synthesize, and analyze the collected data. The following subsections outline the sources, nature, and extents of this data.

TOPOGRAPHIC DATA

Topographic data for a majority of the study area was provided to House Moran by the City of Sparks in three forms:

- 2 ft. contours
- Breaklines
- Spots

These datasets were provided as feature classes in a geodatabase. The vertical data is NAVD 88 and the horizontal datum is StatePlane Nevada West (US Feet). For areas of the watershed outside of the provided topographic data, USGS quad maps were utilized to delineate drainage areas and approximate basin lag times.

SOILS DATA

Soils data were obtained in digital formats from the NRCS Soil Survey Geographic (SSURGO) Database. Specifically, GIS shapefiles for soils were compiled from the soil surveys for Washoe County, NV. As Appendix Figure A-1 depicts, there are 143 Map Unit Symbols (MUSYM) within the defined North Truckee Drain watershed. Table B-2 in **Appendix B** lists these MUSYMs and provides a spatial breakdown for each unit within the watershed and/or HEC-HMS model subbasin. For each MUSYM, a breakdown of common soil textures that are used in the Green and Ampt (G&A) watershed abstraction parameter development for the hydrologic modeling of this study.

LAND USE DATA

Existing conditions land use was modeled in this study using 2010 Aerial Photography that was digitally processed using GIS to develop an impervious area coverage of the watershed. The impervious layer was then intersected with each subbasin to develop a percent impervious.

Future land use was modeled by approximating gross areas of development per the adopted 2030 Comprehensive Plan. These areas were assumed to contain 75% impervious area.

RAINFALL DATA

Design storms for the 100-year frequency events were generated using average rainfall values from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 values. ArcGIS was used to calculate the area weighted average of the NOAA Atlas 14 precipitation depth grids for the 5, 15, 60-minute and 2-, 3-, 6-, 12-, and 24-hour rainfall depths for the design storms. **Appendix B** includes table summaries of these data for each modeled subbasin. These data represent expected total rainfall depths (in inches) at the subbasin centroids for the given design storms.

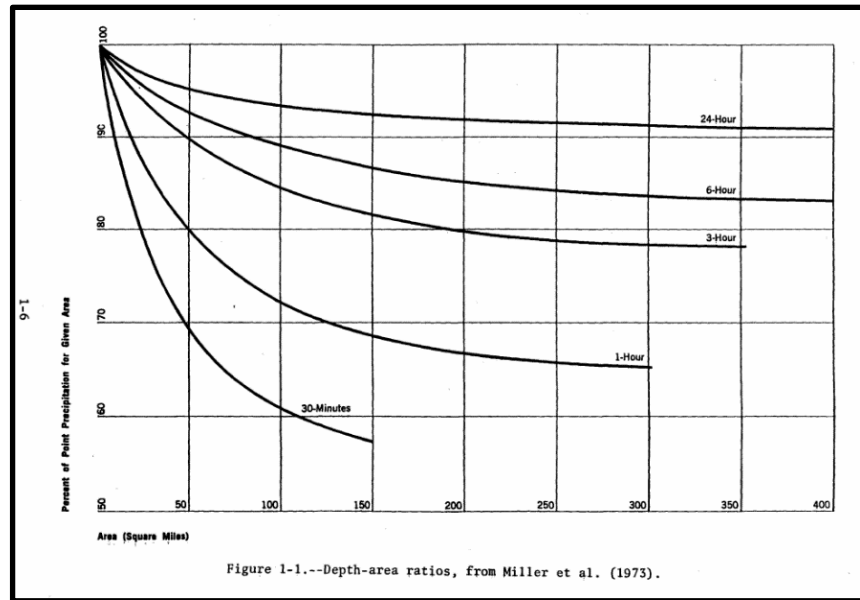
For hydrologic modeling purposes, these rainfall depths were used to develop balanced design storm hyetographs for each subbasin. The balanced storm method uses incremental rainfall depths arranged with the highest increment occurring in the middle of the storm and the second and third ranked incremental depths placed before and after the first. This procedure is continued until the entire storm duration is covered. This method was used because it provides a conservative, theoretical storm distribution with the highest rainfall intensities possible.

Appendix B includes an example of this procedure for developing a balanced storm hyetograph.

Prior to the development of the individual rainfall hyetographs, an Area Reduction Factor (ARF) is applied to reduce rainfall depths for each subbasin. ARFs are routinely utilized when large watersheds are modeled (drainage area > 10 sq. miles). The concept behind ARFs is the design storm does not uniformly and simultaneously impact each of the watershed subbasins, and can be

overly conservative and reductions to total rainfall depths may be warranted. When appropriate, the use of ARFs reduce total rainfall depths for the given storm durations, with larger reduction applied to shorter durations, as well as larger watersheds. NOAA Atlas 14 does not address ARFs, but its predecessor NOAA Atlas 2 includes curves for ARFs based on watershed area and storm durations (Miller, 1973). The Truckee Meadows Regional Drainage Manual (TMRDM) includes a figure to use when determining ARFs within the manual's jurisdictional area.

Figure 3: Area Reduction Factor Graph



The North Truckee Drain watershed area is approximately 88 sq. miles. For a 24-hour storm event this corresponds to an ARF of 94%. At the City's request, House Moran included model analyses that used an ARF of 94%, 95%, 96%, and 100% for a sensitivity analysis. During a presentation of modeling results with the City on November 20th, 2017, House Moran was instructed to use an ARF of 96% for design storms.

HYDROLOGIC MODELING METHODOLOGY

To achieve the objectives of this study, the hydrologic modeling software HEC-HMS v4.2.1 was utilized. Modeling methods used are standard hydrologic analysis practices. The USACE HEC-HMS (Hydrologic Modeling System) is the newer, Windows-based version of the older, DOS-based HEC-1 model software.

For this study, the Green and Ampt (G&A) watershed abstraction, the Snyder Unit Hydrograph (UH) rainfall transformation, and the Muskingum-Cunge hydrograph routing methods were paired for use in this HEC-HMS model. These methods are more appropriate and accurate for semi-arid regions with wide spatial variability in design storm depths in mountainside subbasins and catchments in the valley.

The Hydrologic Connectivity Map can be seen in **Appendix A slide 3**. This figure illustrates the extents of the North Truckee Drain HEC-HMS model. In total, the HEC-HMS model includes:

- 229 Subbasin
- 344 Junctions
- 344 Reaches

- 81 Reservoirs
- 1 Outfall

After subbasin delineation, subbasin parameters were calculated for the North Truckee Drain watershed HEC-HMS model using GIS software. Modeling input parameters from the GIS-based data collected for the study area. Specifically, GIS layers representing the subbasin boundaries, soil SSURGO data, and impervious area were used to develop weighted average values for each subbasin.

Appendix B provides details for all of the model parameters.

GREEN AND AMPT (G&A) METHOD PARAMETERS

The standard G&A method for estimating infiltration in the HEC-HMS model utilizes four primary parameters as defined below:

- Initial Content: Initial saturated soil content;
- Saturated Content: The effective porosity, calculated as total porosity minus initial soil content;
- Saturated Hydraulic Conductivity (KSAT): The infiltration rate of the soil once it is saturated, in inches per hour; and
- Wetting Front Capillary Suction (PSIF): The characteristic suction head of the soil, in inches.

SSURGO soils are intersected with each subbasin and weighted values are calculated based on each component dominant texture.

Figure 4: Green-Ampt Soil Parameters

Soil Texture Class	Initial Capacity θ_i	Saturated Content θ_r	Suction Head ψ in	Saturated Hydraulic Conductivity K_{sat} in/hr
Sand	0.071	0.417	2	4.64
Loamy sand	0.089	0.401	2.4	1.18
Sandy loam	0.166	0.412	4.3	0.43
Loam	0.241	0.434	3.5	0.26
Silt loam	0.315	0.486	6.6	0.13
Silt	0.251	0.408	7.5	0.1
Sandy clay loam	0.187	0.33	8.6	0.06
Clay loam	0.244	0.39	8.2	0.04
Silty clay loam	0.327	0.432	10.7	0.04
Sandy clay	0.23	0.321	9.4	0.02
Silty clay	0.331	0.423	11.5	0.02
Clay	0.306	0.385	12.5	0.01
Bedrock	0	0	0	0

MANNING'S N OVERLAND FLOW ROUGHNESS COEFFICIENT

The Manning's n overland flow parameter is used with the Snyder Unit Hydrograph (UH) rainfall transformation method in estimating the overland flow portion of lag time. Based on field observations of the typical thick vegetation and high desert scrub, an overland roughness value of 0.2 was used for lag time estimates.

LONGEST WATERCOURSE LENGTH

The concept of a longest watercourse length for a subbasin is familiar to most hydrologic modeling methods and is defined as the longest flow path through a subbasin from the divide to its outlet. These parameters are directly measured from horizontal projections of subbasins and are used in the rainfall transformation method in the HEC-HMS model.

LENGTH TO SUBBASIN CENTROID

The length to a subbasin centroid is defined as the length along the longest watercourse of the subbasins to a point nearest the area-based centroid of the subbasin. If the subbasin centroid is not located along the longest watercourse, this length is determined by creating a line from the centroid perpendicular to the longest watercourse. The length to the subbasin centroid is then defined by the length where this perpendicular line intersects the longest watercourse. The length to the subbasin centroid parameter is used solely in the Snyder Unit Hydrograph (UH) rainfall transformation method employed in the HEC-HMS model.

DEPRESSIONAL STORAGE (DSTORE) AND INITIAL LOSS

DSTORE, or initial loss, is a subbasin parameter by which precipitation is abstracted by retention in natural or artificial depressions on the land surface. Water either evaporates or eventually contributes to soil moisture by infiltration. The DSTORE or initial loss parameter, represented in inches of depth over the subbasin area, is subtracted from rainfall and reduces the available excess rainfall that becomes stormwater runoff. This value is a composite of impervious and pervious areas. Impervious cover = 0.05 in. and pervious cover = 0.4 in.

SUBBASIN AREA

The area of a subbasin is derived directly (measured) from the horizontal projection of the area within the boundaries of the subbasin, represented in square miles.

PERCENT IMPERVIOUS

Impervious areas are a critical component of the rainfall-runoff process because almost all rainfall landing on impervious areas is converted to runoff. HEC-HMS calculates a single combined hydrograph for each subbasin, but no infiltration is calculated for the impervious area. Impervious area can produce a majority of the runoff in areas with high rates of soil infiltration and the percent impervious area estimated for each land use is considered directly connected to the watershed collection system or outlet.

Typically, percent impervious is modeled as Directly Connected Impervious Area (DCIA). To estimate, several equations were applied to modify calculated percent impervious to DCIA. These equations were taken from EPA guidance on DCIA in technical support document: Estimating Change in Impervious Area (IA) and Directly Connected Impervious Areas (DCIA) for Massachusetts Small MS4 Permit (<https://www3.epa.gov/region1/npdes/stormwater/ma/MADCIA.pdf>).

Figure 5: DCIA Equations

Option 1: Assume connection between IC and DCIA	Description of Contributing Area	Equation to Apply
Default - No estimated area types of IC required	Mostly storm sewered with curb and gutter, residential rooftops connected to MS4	$DCIA\% = 0.1(\%IC)^{1.5}$
Option 2: Area types of IC for connections between IA and DCIA	Description of Contributing Area	Equation to Apply
Fully	100% storm sewered with all IC	None
Highly	Mostly storm sewered with curb and gutter, residential rooftops connected to MS4	$DCIA\% = 0.4(\%IC)^{1.2}$
Average	Mostly storm sewered with curb and gutter, residential rooftops connected to MS4	$DCIA\% = 0.1(\%IC)^{1.5}$
Partially	50% storm sewered with some infiltration and residential rooftops not connected to MS4	$DCIA\% = 0.04(\%IC)^{1.7}$
Slightly	Small % of urban area storm sewered or mostly infiltration	$DCIA\% = 0.01(\%IC)^2$

Area types were estimated based on impervious area for each subbasin. Categories were assigned based on the following ranges:

- Fully = 60-100% impervious
- Highly = 40-60% impervious
- Average = 20-40% impervious
- Partially = 10-20% impervious
- Slightly = 0-10% impervious

For future land use impervious calculations, a DCIA of “average” was assumed to account for storage and volume reduction likely required for future developments.

MANNING’S N CHANNEL FLOW ROUGHNESS COEFFICIENT

The Muskingum-Cunge hydrologic routing method in the HEC-HMS model utilizes Manning’s n channel flow roughness coefficients. In this method, average Manning’s n values are estimated for both channel and overbank flow areas for each defined routing reach. Based on field observations, manning’s n values were classified into 3 groups:

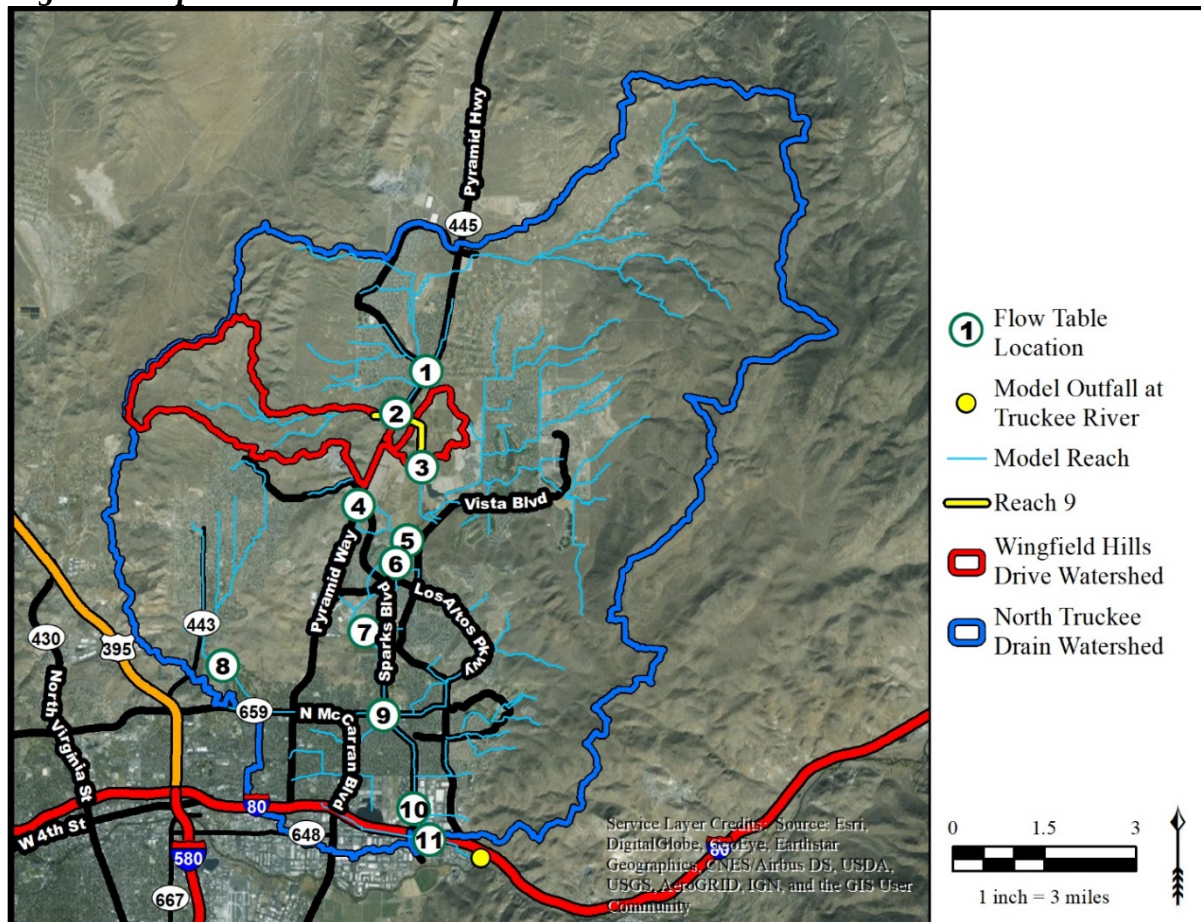
- Pipes and culverts = 0.02 – Typical pipe material is reinforced concrete. These values were increased to account for sedimentation and aging.
- Clean channels = 0.07 – These channels were observed to contain coarse aggregate and mostly clear of thick vegetation.
- Thickly vegetated channels = 0.15 – These channels were observed to be dominated by thick vegetation.

MODEL RESULTS

Reporting areas for results in peak flow for the following points of interest are shown in Figure 6 below. Also, refer to Appendix A slides 27-33 and 51-66 for detailed hydrographs and reservoir stage-storage curves. Note that this presentation occurred on Nov 20, 2017 and that after further quality review, some edits have occurred that had minor revisions to peak flow rates including expanding future development areas near Kiley Ranch. Refer to the following tables in this memo for final reported peak flow rates.

1. Reach 4 at Pyramid Way
2. Reach 9 at Pyramid Way
3. Reach 9 at Wingfield Hills Dr.
4. Kiley Parkway and Pyramid Way
5. Spanish Springs Dam
6. Kiley Ranch Dam
7. Disc Dr.
8. Sun Valley Dam
9. Baring Blvd
10. North Truckee Drain Gauge at Sparks Blvd
11. North Truckee Drain Culvert to Truckee River

Figure 6: Reported Flow Points of Interest



AREA REDUCTION FACTOR (ARF) SENSITIVITY ANALYSIS

Based on a 24-hr design storm duration and a watershed area of 88 sq. miles, the Truckee Meadows Regional Drainage Manual recommends using an ARF factor of 94%. The City requested that House Moran include additional model runs using ARF values of 95%, 96%, and 100% to see how much impact these adjustments in rainfall depth have on peak flow rates throughout the watershed. **Table 1** below summarizes the existing conditions basin model peak flow rates.

Table 1: Area Reduction Factor (ARF) Existing Conditions Basin Peak Flow Summary Table

Flow Table Identifier	94%	95%	95% vs. 94% increase	96%	96% vs. 94% increase	100%	100% vs. 94% increase
1	491	513	4.5%	535	9.0%	612	24.6%
2	305	318	4.3%	336	10.2%	388	27.2%
4 (In)	103	105	1.9%	110	6.8%	127	23.3%
4 (Out)	102	105	2.9%	109	6.9%	126	23.5%
5 (In)	424	434	2.4%	445	5.0%	483	13.9%
5 (Out)	372	377	1.3%	382	2.7%	403	8.3%
6 (In)	270	273	1.1%	279	3.3%	301	11.5%
6 (Out)	49	54	10.2%	60	22.4%	80	63.3%
7 (In)	449	456	1.6%	464	3.3%	489	8.9%
7 (Out)	444	451	1.6%	459	3.4%	485	9.2%
8 (In)	456	471	3.3%	485	6.6%	546	19.7%
8 (Out)	128	134	4.7%	140	9.4%	163	27.3%
9 (In)	460	468	1.7%	478	3.9%	507	10.2%
9 (Out)	726	739	1.8%	754	3.9%	815	12.3%
10	735	748	1.8%	764	3.9%	823	12.0%
11	971	988	1.8%	1008	3.8%	1083	11.5%

* Flow shown is peak flow, cfs

Some generalized observations from this sensitivity analysis are provided below:

- Percent increase in flow tends to have a larger impact further upstream in the watershed. Conversely, the increase in flows is lessened at points further downstream in the watershed.
- The increase in flows from 94% to 95% ARF generally range from 1-5%;
- The increase in flows from 94% to 96% ARF generally range from 3-10%;
- The increase in flows from 94% to 100% ARF generally range from 7-30%.

To add a moderate conservative increase to the estimated rates of flow, the City directed House Moran to use 96% ARF for design rainfall depths.

REACH 9 AND WINGFIELD HILLS DR

Table 2 below summarizes flow rates for the 24-hr 100-yr 96% ARF design storm under the following basin models:

- EX: existing conditions land use;
- EX-R9: Reach 9 connection with existing conditions land use;
- FC-R9: Reach 9 connection with future 2030 comprehensive plan land use.

Table 2: Reach 9 Peak Flow Rate Summary Table

Location	Flow Table Identifier	EX	EX-R9	EX-R9 vs. EX % Change	FC-R9	FC-R9 vs. EX-R9 % Change
Reach 4 at Pyramid Way	1	535	418	-21.9%	625	49.5%
Reach 9 at Pyramid Way	2	336	336	0.0%	336	0.0%
Reach 9 at Wingfield Hills Dr.	3	--	315	--	493	56.5%
Spanish Springs Dam (Upstream)	5 (in)	445	418	-6.1%	925	121.3%
Spanish Springs Dam (Downstream)	5 (out)	382	368	-3.7%	538	46.2%

* Flow shown is peak flow, cfs

Upstream of Pyramid Way, Reach 9 design flows are 336 cfs. Downstream of Pyramid Way, design flows use the future conditions land use peak rate of 493 cfs. The proposed design includes the following elements:

- Typical design cross section uses a 50 ft. wide trapezoidal channel excavated 5-7 ft. in depth.
- Under Orr Ditch, Reach 9 will be routed through a pair of reinforced concrete box culverts 6 ft. wide by 4 ft. high.

- Under Wingfield Hills Dr., Reach 9 will be routed through a pair of reinforced concrete box culverts 8 ft. wide by 4 ft. high.

NORTH TRUCKEE DRAIN

A summary of all the identified flow rates of interest is shown in **Table 3** for the 24-hr 100-yr 96% ARF design storm under the following basin models:

Table 3: North Truckee Drain Watershed Peak Flow Rate Summary Table

Location	Flow Table Identifier	EX	EX-R9	EX-R9 vs. EX % Change	FC-R9	FC-R9 vs. EX-R9 % Change
Reach 4 at Pyramid Way	1	535	418	-21.9%	625	49.5%
Reach 9 at Pyramid Way	2	336	336	0.0%	336	0.0%
Reach 9 at Wingfield Hills Dr.	3	--	315	--	493	56.5%
Kiley Parkway & Pyramid Way (Upstream)	4 (in)	110	110	0.0%	112	1.8%
Kiley Parkway & Pyramid Way (Downstream)	4 (out)	109	109	0.0%	112	2.8%
Spanish Springs Dam (Upstream)	5 (in)	445	418	-6.1%	925	121.38%
Spanish Springs Dam (Downstream)	5 (out)	382	368	-3.7%	538	46.2%
Kiley Ranch Dam (Upstream)	6 (in)	279	279	0.0%	279	0.0%
Kiley Ranch Dam (Downstream)	6 (out)	60	58	-3.3%	70	20.7%
Disc Dr. (Upstream)	7 (in)	464	446	-3.9%	603	35.2%
Disc Dr. (Downstream)	7 (out)	459	442	-3.7%	601	36.0%
Sun Valley Dam (Upstream)	8 (in)	485	485	0.0%	486	0.2%
Sun Valley Dam (Downstream)	8 (out)	140	140	0.0%	140	0.0%
Baring Culvert (Upstream)	9 (in)	478	461	-3.6%	610	32.3%
Baring Culvert (Downstream)	9 (out)	754	754	0.0%	772	2.4%
North Truckee Drain Gauge	10	764	764	0.0%	815	6.7%
North Truckee Drain Culvert	11	1008	1,008	0.0%	1,101	9.2%

* Flow shown is peak flow, cfs

CONCLUSION

In summary, House Moran developed a comprehensive hydrologic model of the Reach 9 and Wingfield Hills Dr. drainage area, as well as entire North Truckee Drain watershed. This analysis was performed using HEC-HMS v4.2.1 using Green and Ampt (G&A) watershed abstraction, the Snyder Unit Hydrograph (UH) rainfall transformation, and the Muskingum-Cunge hydrograph routing methods as these methods are more appropriate and accurate for semi-arid regions with wide spatial variability in design storm depths in mountainside subbasins and catchments in the valley.

This letter report details development of design flow rates for the proposed Reach 9 regional flood control facility and sizes the channel and associated culvert crossings for future land use in conjunction with the 2030 comprehensive plan. Additionally, the analysis shows that Reach 9 reduces peak flow rates from Reach 4 at Pyramid Way all the downstream to Baring Blvd.

Finally, this letter report summarizes peak flow rates at critical infrastructure throughout the North Truckee Drain watershed.

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APPENDIX D

POND MANAGEMENT PLAN EXAMPLE

Andelin Farms Pond Management Plan Outline

1. INTRODUCTION

- a. PROJECT DESCRIPTION
 - i. Location
 - ii. Ownership
 - iii. Intended Uses and Benefits / Restrictions
- b. POND MANAGEMENT GOALS
 - i. Design Components and Considerations
 - ii. Drainage and Hydrology
 - 1. Farm Operations and Residential Uses
 - iii. Sediment, Pollution and Erosion control
 - iv. Pond Water Quality
 - v. Make-up Water
 - vi. Permitting and Compliance

2. POND MANAGEMENT PLAN

- a. BEST MANAGEMENT PRACTICES
 - i. LANDSCAPE PRACTICES
 - 1. Farm Operation and Residential Uses
 - 2. Biodiverse Shorelines
 - ii. STORMWATER BMPs
 - 1. Farm Operations and Residential Uses
 - iii. WATER QUALITY MONITORING AND DATA COLLECTION
 - iv. ALGAE, AQUATIC VEGETATION, AND PEST CONTROL
 - 1. Aeration
 - 2. Mosquito Fish /
 - 3. Wildlife Friendly Algaecides and Insecticides
 - v. WILDLIFE
 - vi. TRASH AND LITTER
- b. ACCESS
 - i. Emergency Access
 - ii. Public Access Restrictions
- c. ROLES AND RESPONSIBILITIES
 - i. Andelin Farms HOA / Andelin Farms Commercial
 - ii. Stakeholder / Homeowner Education

Appendix 7:

Economic Impact Analysis

ANDELIN RANCH

Fiscal Impact Analysis

DECEMBER 2021

Prepared by:



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EXECUTIVE SUMMARY

Ekay Economic Consultants, Inc. (EEC) of Reno, Nevada was retained to conduct a fiscal impact analysis of a proposed mixed-use Andelin Ranch development for the City of Sparks. The analysis is based on the City of Sparks Fiscal Impact Analysis Guidelines recently adopted by the City. Project buildout information and fiscal impact findings for the General and Road Funds are summarized below:

- A portion of the property will continue to be used for existing agricultural/seasonal crops and livestock grazing.
- The remaining property is proposed to be developed to include 350 single family units and 42,800 square feet of commercial space.
- The commercial space, which includes retail and restaurant, educational camps, rental dwellings, and more, will support seasonal agricultural events and festivals planned for the property.

General Fund

- Project-related revenue for the General Fund over the 20-year analysis period is estimated at \$12.7 million.
- Project-related expenditures for the General Fund are estimated at \$4.1 million.
- The project is expected to generate a revenue surplus for the City of Sparks' General Fund in the amount of \$8.6 million over the 20-year analysis period.

Road Fund

- Project-related revenue for the Road Fund is estimated at \$0.4 million over the 20-year analysis period.
- Project-related expenditures for the Road Fund are estimated at \$7.3 million.
- The project is expected to generate a revenue deficit for the City of Sparks' Road Fund in the amount of \$6.9 million over the 20-year analysis period.

The analysis finds the proposed development will have a **positive** fiscal impact on the City of Sparks. Total cumulative surplus for the City of Sparks General and Road Funds is estimated at \$1.7 million over the 20-year analysis period.

INTRODUCTION

Ekay Economic Consultants, Inc. (EEC) of Reno, Nevada was retained to estimate the fiscal impact of the proposed Andelin Ranch development on the City of Sparks.

Project Overview

The project is expected to include three types of uses. First, existing agricultural uses, including seasonal crops and livestock grazing fields will continue on a portion of the property. No impacts associated with these uses are included in the analysis as they are not contemplated in the City's Fiscal Impact Guidelines and revenues and expenditures associated with agricultural uses are not expected to be significant.

Second, the project is expected to include a number of seasonal agricultural events and festivals. Festivals, including Fall Festival, Spring Festival, Summer Festival, and Live Nativity/Winter Festival, are expected to extend over 14 weeks every year. Events, including Private Tours, Farm Camp, and Fall Field Trip are expected to extend over nine weeks every year. To support these uses, the project proposes to include 42,800 square feet of commercial space. This space will include retail and restaurant space, administrative office, guest cottages and a bed and breakfast operation, an education building, and haunted house.

Some of the new commercial uses, such as food court concessions, and education and haunted buildings, will be seasonal operations, while other space will be used year round. The analysis conservatively assumes year-round revenue and expenditure impacts of these festival and commercial operations, as the exact operations timeline for these uses is unknown and it is difficult to differentiate between active and inactive operations.

Finally, the remaining portion of the property is proposed to be developed to include 350 single family homes. The impact of these units is also included in the analysis. Commercial and residential development is expected to take place between 2024 and 2029.

Housing Demand

The Andelin Ranch project is expected to add 350 single family homes to the City of Sparks over a four-year period between 2024 and 2027, an average of 88 units per year. The “Long-Term Fiscal Health Analysis” report prepared for the City of Sparks by Economic & Planning Systems, Inc. (EPS) in July 2019 provided an estimate of the demand for residential units for the City of Sparks between 2017 and 2038. The EPS report is now two years old and does not consider the significant increase in residential demand experienced in the region in the past year.

The EPS report estimated a housing demand of approximately 581 units per year for the City between 2017 and 2038. This included demand for 273 low to moderate density single family units (compared to 88 units estimated for the project), 145 high density single/low density multi-family, and 162 units of moderate to high density multi-family per year. This indicates the project’s residential absorption assumptions are within those estimated in the EPS report.

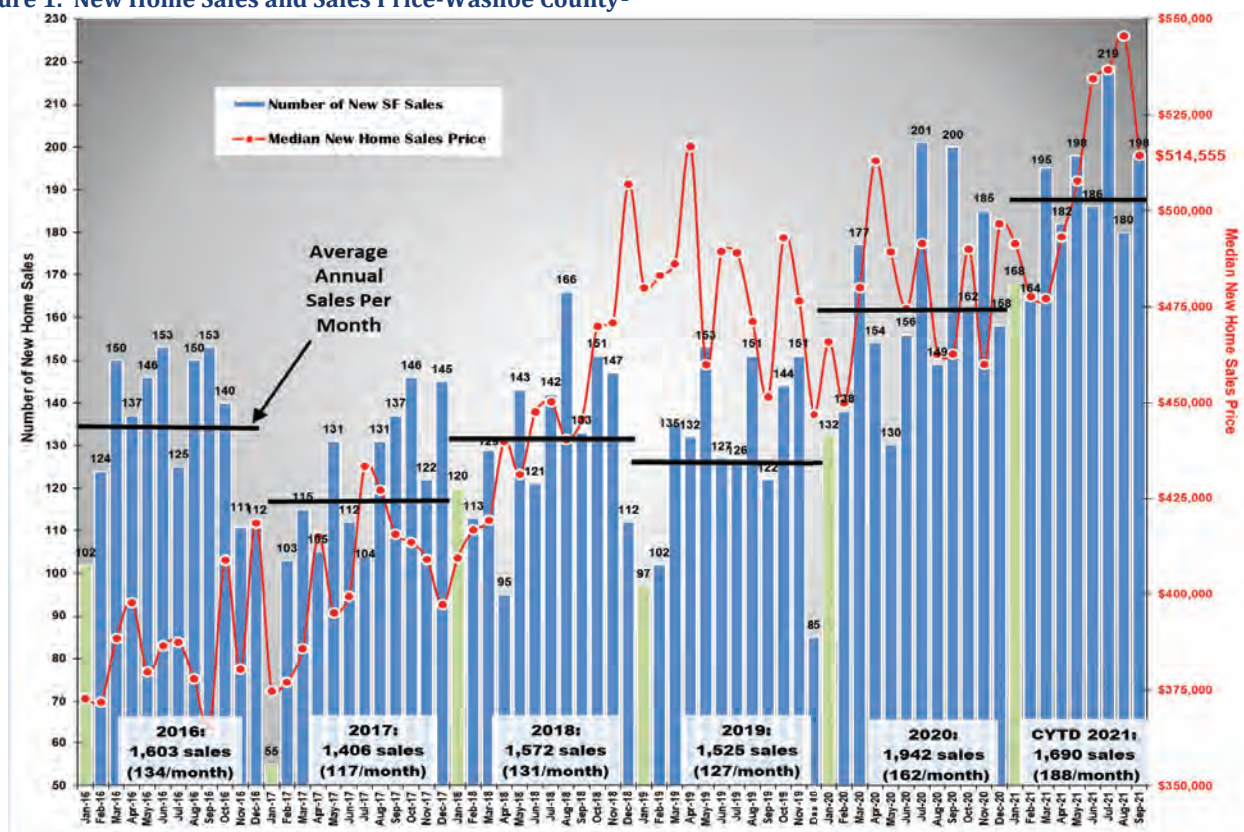
The project is surrounded by a number of other ongoing developments, including Kiley Ranch, Stonebrook, and Pioneer Meadows. There are a number of other projects in the City of Sparks adding residential uses to the City’s new home inventory. Compared to the numerous larger projects, the 350 units for the project make up a very small portion of the total units added by all Sparks developments.

Figure 1 shows the number of new homes sold in 2021 in Washoe County increased significantly over historical levels. On average, over the last five years (2016-2020), 134 new homes were sold in Washoe County per month, for 1,600 homes per year. In 2020, an average of 162 homes per month were sold in Washoe County, for almost 2,000 units for the year. In 2021, through September, 1,690 new homes have been sold, an average of 188 units per month. This is an increase driven by growth in wages of local population, and increased demand for housing from new residents moving to the area for quality of life and employment reasons.

Introduction

Andelin Ranch- Fiscal Impact Analysis

Figure 1. New Home Sales and Sales Price-Washoe County¹



¹ Center for Regional Studies, University of Nevada, Reno.

Introduction

Andelin Ranch- Fiscal Impact Analysis

The actual demand in the region is expected to be significantly higher than indicated by these new home sales, as sales are constrained by availability of new homes in the area. This is supported by a reported lack of standing inventory of new homes, as most new homes in the area are sold prior to or during construction.

This shortage of new homes is further supported by increasing homes prices (as also shown in Figure 1), which grew even during the pandemic. As a result, the expectation of the absorption of an average of 88 single family residential units over a four-year period is not unreasonable given the significant unmet housing demand in the region and historical absorption levels.

Methodology

Appendix 1 of the report provides a summary of the project's buildout, including number of residential units and non-residential square feet constructed each year, estimated taxable value of project's land and improvements, and project residents and employees. The remainder of the analysis is based on this information.

At this early stage in the planning process, no specific details for the project's buildout timeframe and development, including lot and building size, as well as construction and market costs are available. The fiscal impact analysis is based on the October 2019 City of Sparks Fiscal Impact Analysis Guidelines adopted by the City of Sparks, along with project-related information provided by project developers and existing market data. Revenues and costs included in this fiscal impact analysis are estimated for the 20-year analysis period as recommended in the Fiscal Impact Analysis Guidelines ("Guidelines") for the City of Sparks.

Appendices at the end of this report present revenue and cost projections on an annual basis over the analysis period. Assumptions used in developing these estimates are presented at the end of each appendix. Those appendices are:

Introduction

Andelin Ranch- Fiscal Impact Analysis

- Appendix 1: Buildout Assumptions
- Appendix 2: City of Sparks Estimated Real Property Tax Revenue
- Appendix 3: City of Sparks Estimated General and Road Fund Revenues
- Appendix 4: City of Sparks Estimated General and Road Fund Expenditures
- Appendix 5: City of Sparks Comparison of Estimated General and Road Fund Revenues and Expenditures

FINDINGS

Findings of the fiscal impact analysis are presented below for each fund.

General Fund

Table 1 summarizes the impact of the project on the City of Sparks General Fund over the 20-year analysis period. Detailed information for City of Sparks revenues and costs by line item, by year, as well as methodology for estimating these costs and revenues is found in Appendices 2-5. The table shows the project is estimated to result in a revenue surplus for the City of Sparks' General Fund in the amount of \$8.6 million over the 20-year analysis period.

Table 1. Summary of Estimated City of Sparks General Fund Impacts, 20-Year Total

Estimated Revenue	
Property Tax	\$ 11,135,806
Consolidated Tax	770,106
Business/Liquor Licenses	129,406
Fees, Permits, Charges	622,327
TOTAL	\$ 12,657,645
Estimated Costs	
General Government	\$ 1,110,981
Police	1,566,203
Fire	1,386,927
TOTAL	\$ 4,064,111
Revenue Surplus/(Deficit)	
Estimated Surplus/(Deficit)	\$ 8,593,534

Findings

Andelin Ranch- Fiscal Impact Analysis

Table 2 shows the estimated impact of the project on the City of Sparks General Fund, by year.

Table 2. Summary of Estimated City of Sparks General Fund Impacts, by Year

Year	Estimated Project Revenue	Estimated Project Costs	Annual Surplus	Cumul. Surplus
2024	\$ 64,444	\$ 22,392	\$ 42,052	\$ 42,052
2025	269,669	88,929	180,740	222,792
2026	469,450	152,971	316,479	539,272
2027	656,089	220,183	435,906	975,177
2028	667,565	221,815	445,750	1,420,928
2029	680,675	223,855	456,820	1,877,747
2030	683,659	223,855	459,805	2,337,552
2031	686,659	223,855	462,804	2,800,357
2032	689,674	223,855	465,819	3,266,176
2033	692,704	223,855	468,849	3,735,025
2034	695,749	223,855	471,894	4,206,919
2035	698,809	223,855	474,955	4,681,874
2036	701,885	223,855	478,030	5,159,904
2037	704,976	223,855	481,121	5,641,025
2038	708,082	223,855	484,228	6,125,253
2039	711,204	223,855	487,350	6,612,602
2040	714,342	223,855	490,487	7,103,090
2041	717,495	223,855	493,640	7,596,730
2042	720,664	223,855	496,809	8,093,539
2043	723,849	223,855	499,994	8,593,534
Total	\$ 12,657,645	\$ 4,064,111	\$ 8,593,534	

As the project is located in the “Potential Service Area for Station 6,” fire costs included in the fiscal impact analysis are estimated using a 1.16 multiplier over city-wide fire costs. Should the proposed Station 6 be constructed, fire costs associated with the project will be reduced and project-related surplus will be higher than estimated in this report.

Road Fund

Table 3 shows the 20-year estimated impact of the project on the Road Fund. The project is located north of Los Altos Parkway, in Road Fund Area #3 and is expected to add

Findings

Andelin Ranch- Fiscal Impact Analysis

633,680 square feet of roads to the City of Sparks inventory. The project's location results in road maintenance costs 1.41 times higher than city-wide costs.

Table 3. Summary of Estimated City of Sparks Road Fund Impacts, 20-Year Total

Estimated Revenue	
Fees & Licenses	\$ 443,008
Total Revenue	\$ 443,008
Estimated Costs	
Road Maintenance	\$ 7,314,596
Total Costs	\$ 7,314,596
Revenue Surplus/(Deficit)	
Estimated Surplus/(Deficit)	\$ (6,871,588)

Detailed information for these calculations can also be found in Appendix 3 and 4. The table shows the project is estimated to generate a revenue deficit for the City of Sparks Road Fund in the amount of \$6.9 million over the 20-year analysis period.

Conclusion

The analysis finds the proposed development will have a **positive** fiscal impact on the City of Sparks, as the surplus in the General Fund is expected to exceed the estimated deficit for the Road Fund.

Total cumulative surplus for the City of Sparks General and Road Funds is estimated at \$1.7 million over the 20-year analysis period.

LIMITING CONDITIONS & DISCLOSURES

In the preparation of this report, EEC asserts:

- The report is to be used in its entirety, and no part is to be used without the whole.
- In preparing this report, EEC relied on information provided by other individuals or found in previously existing records and/or documents. This information is assumed to be reliable. However, no warranty, either expressed or implied, is given by EEC for the accuracy of such information and EEC assumes no responsibility for information relied upon later found to have been inaccurate.
- EEC may amend this report in the event additional documents and/or other material discovered subsequent to the submission of this report and pertinent to the report and/or the conclusions contained herein are made available.
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- Possession of this report, or a copy of this report, does not carry with it the right of publication. Without the consent of EEC, this report may not be used for any purpose by any person other than the party for whom this report was prepared.

APPENDICES

**APPENDIX 1
BUILDOUT ASSUMPTIONS**

<u>YEAR</u>	<u>USE TYPE</u>	<u>COMMERCIAL SQUARE FEET BUILT</u>	<u># OF RESIDENTIAL UNITS BUILT</u>	<u>ADDED LAND VALUE</u>	<u>ADDED IMPROVEMENT VALUE</u>	<u>ESTIMATED PROJECT RESIDENTS</u>	<u>ESTIMATED PROJECT EMPLOYEES</u>
2024	Single Family	-	30	\$ 2,313,916	\$ 10,261,462	75	-
	Retail	3,000	-	1,047,528	436,968	-	5
	Office	-	-	-	-	-	-
	Entertainment	5,000	-	1,745,881	988,380	-	5
	Lodging	-	-	-	-	-	-
Subtotal		8,000	30	5,107,325	11,686,810	75	10
2025	Single Family	-	115	9,047,411	40,122,316	288	-
	Retail	3,600	-	1,282,175	534,849	-	6
	Office	1,200	-	427,392	254,690	-	3
	Entertainment	-	-	-	-	-	-
	Lodging	3,000	-	1,068,479	477,544	-	3
Subtotal		7,800	115	11,825,456	41,389,399	288	13
2026	Single Family	-	115	9,228,359	40,924,763	288	-
	Retail	3,000	-	1,089,849	454,622	-	5
	Office	-	-	-	-	-	-
	Entertainment	-	-	-	-	-	-
	Lodging	-	-	-	-	-	-
Subtotal		3,000	115	10,318,208	41,379,384	288	5
2027	Single Family	-	90	7,366,638	32,668,637	225	-
	Retail	12,000	-	4,446,582	1,854,856	-	22
	Office	-	-	-	-	-	-
	Entertainment	3,000	-	1,111,646	629,326	-	3
	Lodging	-	-	-	-	-	-
Subtotal		15,000	90	12,924,865	35,152,819	225	25
2028	Single Family	-	-	-	-	-	-
	Retail	-	-	-	-	-	-
	Office	-	-	-	-	-	-
	Entertainment	4,000	-	1,511,838	855,883	-	4
	Lodging	-	-	-	-	-	-
Subtotal		4,000	-	1,511,838	855,883	-	4
2029	Single Family	-	-	-	-	-	-
	Retail	-	-	-	-	-	-
	Office	-	-	-	-	-	-
	Entertainment	-	-	-	-	-	-
	Lodging	5,000	-	1,927,593	861,514	-	5
Subtotal		5,000	-	1,927,593	861,514	-	5
TOTAL		42,800	350	\$ 43,615,285	\$ 131,325,809	875	62

APPENDIX 1, ASSUMPTIONS:

1. The following buildout information represents the Developer's best estimate and market data in 2021.

a) Residential:

	<u># Of Acres</u>	<u># of Units</u>	<u>Land Value/Unit</u>	<u>Improv. Value/Unit</u>
Single Family	70.80	350	\$ 74,135	\$ 328,767

Source: Number of units built by year from Developer. Land and improvement values from nearby comparable developments in FY 2021-22. Washoe County Assessor website.

b) Commercial:

	<u># Of Acres</u>	<u>Square Feet</u>	<u>Land Value/Sq.Ft.</u>	<u>Improv. Value/Sq.Ft.</u>	
Retail		21,600	\$ 478,017	\$ 140.00	farm store, neighborhood retail, & food court
Office		1,200	\$ 312,430	\$ 200.00	admin office
Entertainment		12,000	\$ 304,919	\$ 190.00	event center, education & haunted buildings
Lodging		8,000	\$ 345,768	\$ 150.00	tiny house cottages and B&B
Total	35.90	42,800	\$ 400,123	\$ 157.57	

APPENDIX 1
BUILDOUT ASSUMPTIONS

Some of the above commercial uses are seasonal, including food court concessions and education and haunted budlings. The analysis conservatively assumes year-round uses.

Source: Acres and square footage from Developer. Land and improvement values from nearby comparable uses in FY 2021-22 from Washoe County Assessor website.

2. Project-related employees and residents are estimated as follows, using City of Sparks Fiscal Impact Analysis Guidelines, October 2019.

Land Use	Residents/Unit	Total Residents	Land Use	Empl/1,000 SqFt	Total Employees
Single Family	2.50	875	Retail	1.80	39
			Office	2.90	3
			Entertainment/Lodging	1.00	20
			Total		62

3. FY 2021-22 taxable values are inflated by 2% per year to arrive at the value in the year of construction.

**APPENDIX 2
CITY OF SPARKS
ESTIMATED REAL PROPERTY TAX REVENUE**

<u>YEAR</u>	<u>USE TYPE</u>	<u>TAXABLE LAND VALUE</u>	<u>TAXABLE IMPROVE. VALUE</u>	<u>CUMULATIVE ASSESSED</u>		<u>GENERAL FUND</u>
				<u>LAND VALUE</u>	<u>IMPROVE. VALUE</u>	
2024	Single Family	\$ 2,313,916	\$ 10,261,462	\$ 809,871	\$ 3,591,512	\$ 42,244
	Retail	1,047,528	436,968	366,635	152,939	4,987
	Office	-	-	-	-	-
	Entertainment	1,745,881	988,380	611,058	345,933	9,185
	Lodging	-	-	-	-	-
Subtotal		5,107,325	11,686,810	1,787,564	4,090,384	56,417
2025	Single Family	9,047,411	40,122,316	3,980,514	17,652,280	207,632
	Retail	1,282,175	534,849	817,229	340,901	11,116
	Office	427,392	254,690	149,587	89,141	2,291
	Entertainment	-	-	614,114	347,663	9,231
	Lodging	1,068,479	477,544	373,968	167,140	5,194
Subtotal		11,825,456	41,389,399	5,935,411	18,597,125	235,463
2026	Single Family	9,228,359	40,924,763	7,230,342	32,064,208	377,149
	Retail	1,089,849	454,622	1,202,762	501,723	16,360
	Office	-	-	150,335	89,587	2,303
	Entertainment	-	-	617,184	349,401	9,277
	Lodging	-	-	375,837	167,976	5,220
Subtotal		10,318,208	41,379,384	9,576,461	33,172,895	410,308
2027	Single Family	7,366,638	32,668,637	9,844,817	43,658,552	513,525
	Retail	4,446,582	1,854,856	2,765,080	1,153,431	37,610
	Office	-	-	151,087	90,035	2,314
	Entertainment	1,111,646	629,326	1,009,346	571,412	15,172
	Lodging	-	-	377,717	168,816	5,246
Subtotal		12,924,865	35,152,819	14,148,046	45,642,246	573,867
2028	Single Family	-	-	9,894,041	43,876,845	516,093
	Retail	-	-	2,778,905	1,159,198	37,798
	Office	-	-	151,842	90,485	2,326
	Entertainment	1,511,838	855,883	1,543,536	873,828	23,202
	Lodging	-	-	379,605	169,660	5,272
Subtotal		1,511,838	855,883	14,747,930	46,170,017	584,690
2029	Single Family	-	-	9,943,511	44,096,229	518,673
	Retail	-	-	2,792,800	1,164,994	37,987
	Office	-	-	152,601	90,938	2,337
	Entertainment	-	-	1,551,254	878,198	23,318
	Lodging	1,927,593	861,514	1,056,161	472,038	14,668
Subtotal		1,927,593	861,514	15,496,327	46,702,397	596,983
2030	Single Family	-	-	9,993,229	44,316,710	521,267
	Retail	-	-	2,806,764	1,170,819	38,177
	Office	-	-	153,364	91,392	2,349
	Entertainment	-	-	1,559,010	882,588	23,434
	Lodging	-	-	1,061,442	474,398	14,741
Subtotal		-	-	15,573,809	46,935,909	599,968
2031	Single Family	-	-	10,043,195	44,538,294	523,873
	Retail	-	-	2,820,798	1,176,673	38,368
	Office	-	-	154,131	91,849	2,361
	Entertainment	-	-	1,566,805	887,001	23,552
	Lodging	-	-	1,066,749	476,770	14,815
Subtotal		-	-	15,651,678	47,170,588	602,968

APPENDIX 2
CITY OF SPARKS
ESTIMATED REAL PROPERTY TAX REVENUE

<u>YEAR</u>	<u>USE TYPE</u>	<u>TAXABLE LAND VALUE</u>	<u>TAXABLE IMPROVE. VALUE</u>	<u>CUMULATIVE ASSESSED LAND VALUE</u>	<u>IMPROVE. VALUE</u>	<u>GENERAL FUND</u>
2032	Single Family	-	-	10,093,411	44,760,985	526,492
	Retail	-	-	2,834,902	1,182,556	38,560
	Office	-	-	154,902	92,309	2,373
	Entertainment	-	-	1,574,639	891,436	23,669
	Lodging	-	-	1,072,083	479,154	14,889
Subtotal		-	-	15,729,936	47,406,441	605,983
2033	Single Family	-	-	10,143,878	44,984,790	529,125
	Retail	-	-	2,849,076	1,188,469	38,752
	Office	-	-	155,676	92,770	2,385
	Entertainment	-	-	1,582,512	895,894	23,788
	Lodging	-	-	1,077,443	481,550	14,963
Subtotal		-	-	15,808,586	47,643,473	609,013
2034	Single Family	-	-	10,194,597	45,209,714	531,771
	Retail	-	-	2,863,322	1,194,411	38,946
	Office	-	-	156,455	93,234	2,397
	Entertainment	-	-	1,590,425	900,373	23,907
	Lodging	-	-	1,082,830	483,958	15,038
Subtotal		-	-	15,887,629	47,881,691	612,058
2035	Single Family	-	-	10,245,570	45,435,763	534,429
	Retail	-	-	2,877,638	1,200,383	39,141
	Office	-	-	157,237	93,700	2,408
	Entertainment	-	-	1,598,377	904,875	24,026
	Lodging	-	-	1,088,244	486,378	15,113
Subtotal		-	-	15,967,067	48,121,099	615,118
2036	Single Family	-	-	10,296,798	45,662,942	537,102
	Retail	-	-	2,892,026	1,206,385	39,337
	Office	-	-	158,023	94,169	2,421
	Entertainment	-	-	1,606,369	909,399	24,146
	Lodging	-	-	1,093,686	488,809	15,189
Subtotal		-	-	16,046,902	48,361,705	618,194
2037	Single Family	-	-	10,348,282	45,891,256	539,787
	Retail	-	-	2,906,486	1,212,417	39,533
	Office	-	-	158,813	94,640	2,433
	Entertainment	-	-	1,614,401	913,946	24,267
	Lodging	-	-	1,099,154	491,253	15,265
Subtotal		-	-	16,127,137	48,603,513	621,285
2038	Single Family	-	-	10,400,024	46,120,713	542,486
	Retail	-	-	2,921,019	1,218,479	39,731
	Office	-	-	159,607	95,113	2,445
	Entertainment	-	-	1,622,473	918,516	24,388
	Lodging	-	-	1,104,650	493,710	15,341
Subtotal		-	-	16,207,772	48,846,531	624,391
2039	Single Family	-	-	10,452,024	46,351,316	545,198
	Retail	-	-	2,935,624	1,224,572	39,930
	Office	-	-	160,405	95,588	2,457
	Entertainment	-	-	1,630,585	923,109	24,510
	Lodging	-	-	1,110,173	496,178	15,418
Subtotal		-	-	16,288,811	49,090,763	627,513

**APPENDIX 2
CITY OF SPARKS
ESTIMATED REAL PROPERTY TAX REVENUE**

<u>YEAR</u>	<u>USE TYPE</u>	<u>TAXABLE LAND VALUE</u>	<u>TAXABLE IMPROVE. VALUE</u>	<u>CUMULATIVE ASSESSED LAND VALUE</u>	<u>CUMULATIVE ASSESSED IMPROVE. VALUE</u>	<u>GENERAL FUND</u>
2040	Single Family	-	-	10,504,284	46,583,073	547,924
	Retail	-	-	2,950,302	1,230,695	40,129
	Office	-	-	161,207	96,066	2,469
	Entertainment	-	-	1,638,738	927,724	24,633
	Lodging	-	-	1,115,724	498,659	15,495
Subtotal		-	-	16,370,255	49,336,217	630,651
2041	Single Family	-	-	10,556,805	46,815,988	550,664
	Retail	-	-	2,965,054	1,236,848	40,330
	Office	-	-	162,013	96,547	2,482
	Entertainment	-	-	1,646,932	932,363	24,756
	Lodging	-	-	1,121,303	501,152	15,572
Subtotal		-	-	16,452,106	49,582,898	633,804
2042	Single Family	-	-	10,609,589	47,050,068	553,417
	Retail	-	-	2,979,879	1,243,032	40,532
	Office	-	-	162,823	97,029	2,494
	Entertainment	-	-	1,655,166	937,025	24,880
	Lodging	-	-	1,126,909	503,658	15,650
Subtotal		-	-	16,534,367	49,830,813	636,973
2043	Single Family	-	-	10,662,637	47,285,318	556,184
	Retail	-	-	2,994,778	1,249,248	40,734
	Office	-	-	163,638	97,514	2,507
	Entertainment	-	-	1,663,442	941,710	25,004
	Lodging	-	-	1,132,544	506,177	15,728
Subtotal		-	-	16,617,039	50,079,967	640,158
TOTAL		\$ 43,615,285	\$ 131,325,809			\$ 11,135,806

APPENDIX 2, ASSUMPTIONS:

1. Project taxable values are estimated in Appendix 1.
2. Assessed land and improvement values are estimating by adjusting taxable values to 35%.
3. Cumulative assessed values are increased by **0.5%** per year. Source: City of Sparks Fiscal Impact Analysis Guidelines, October 2019.
4. Operating tax rate is assumed to remain constant at FY 2019-20 amount per City of Sparks Fiscal Impact Analysis Guidelines, October 2019.

General Fund	
City of Sparks	\$ 0.9598

**APPENDIX 3
CITY OF SPARKS
ESTIMATED GENERAL AND ROAD FUND REVENUES**

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>					<u>ROAD FUND</u>
		<u>PROPERTY TAX</u>	<u>CTAX</u>	<u>LICENSES</u>	<u>FEES & PERMITS</u>	<u>TOTAL</u>	<u>FEES & PERMITS</u>
2024	Single Family	\$ 42,244	\$ 3,458	\$ 3	\$ 2,795	\$ 48,500	\$ 1,989
	Retail	4,987	167	654	135	5,942	96
	Office	-	-	-	-	-	-
	Entertainment	9,185	153	540	124	10,002	88
	Lodging	-	-	-	-	-	-
Subtotal		56,417	3,778	1,197	3,053	64,444	2,173
2025	Single Family	207,632	16,714	16	13,507	237,868	9,615
	Retail	11,116	367	1,438	297	13,218	211
	Office	2,291	105	370	85	2,851	60
	Entertainment	9,231	153	540	124	10,048	88
	Lodging	5,194	92	324	74	5,683	53
Subtotal		235,463	17,431	2,688	14,086	269,669	10,027
2026	Single Family	377,149	29,970	29	24,219	431,367	17,241
	Retail	16,360	534	2,092	432	19,417	307
	Office	2,303	105	370	85	2,863	60
	Entertainment	9,277	153	540	124	10,094	88
	Lodging	5,220	92	324	74	5,709	53
Subtotal		410,308	30,854	3,355	24,933	469,450	17,749
2027	Single Family	513,525	40,345	39	32,603	586,511	23,209
	Retail	37,610	1,202	4,707	971	44,490	691
	Office	2,314	105	370	85	2,874	60
	Entertainment	15,172	245	864	198	16,479	141
	Lodging	5,246	92	324	74	5,736	53
Subtotal		573,867	41,988	6,303	33,930	656,089	24,154
2028	Single Family	516,093	40,345	39	32,603	589,078	23,209
	Retail	37,798	1,202	4,707	971	44,678	691
	Office	2,326	105	370	85	2,886	60
	Entertainment	23,202	367	1,296	297	25,161	211
	Lodging	5,272	92	324	74	5,762	53
Subtotal		584,690	42,110	6,735	34,029	667,565	24,224
2029	Single Family	518,673	40,345	39	32,603	591,659	23,209
	Retail	37,987	1,202	4,707	971	44,867	691
	Office	2,337	105	370	85	2,897	60
	Entertainment	23,318	367	1,296	297	25,277	211
	Lodging	14,668	245	864	198	15,974	141
Subtotal		596,983	42,263	7,275	34,153	680,675	24,312
2030	Single Family	521,267	40,345	39	32,603	594,252	23,209
	Retail	38,177	1,202	4,707	971	45,057	691
	Office	2,349	105	370	85	2,909	60
	Entertainment	23,434	367	1,296	297	25,394	211
	Lodging	14,741	245	864	198	16,047	141
Subtotal		599,968	42,263	7,275	34,153	683,659	24,312
2031	Single Family	523,873	40,345	39	32,603	596,859	23,209
	Retail	38,368	1,202	4,707	971	45,248	691
	Office	2,361	105	370	85	2,921	60
	Entertainment	23,552	367	1,296	297	25,511	211
	Lodging	14,815	245	864	198	16,121	141
Subtotal		602,968	42,263	7,275	34,153	686,659	24,312

**APPENDIX 3
CITY OF SPARKS
ESTIMATED GENERAL AND ROAD FUND REVENUES**

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>					<u>ROAD FUND</u>
		<u>PROPERTY TAX</u>	<u>CTAX</u>	<u>LICENSES</u>	<u>FEES & PERMITS</u>	<u>TOTAL</u>	<u>FEES & PERMITS</u>
2032	Single Family	526,492	40,345	39	32,603	599,478	23,209
	Retail	38,560	1,202	4,707	971	45,439	691
	Office	2,373	105	370	85	2,933	60
	Entertainment	23,669	367	1,296	297	25,629	211
	Lodging	14,889	245	864	198	16,195	141
Subtotal		605,983	42,263	7,275	34,153	689,674	24,312
2033	Single Family	529,125	40,345	39	32,603	602,110	23,209
	Retail	38,752	1,202	4,707	971	45,632	691
	Office	2,385	105	370	85	2,944	60
	Entertainment	23,788	367	1,296	297	25,747	211
	Lodging	14,963	245	864	198	16,270	141
Subtotal		609,013	42,263	7,275	34,153	692,704	24,312
2034	Single Family	531,771	40,345	39	32,603	604,756	23,209
	Retail	38,946	1,202	4,707	971	45,826	691
	Office	2,397	105	370	85	2,956	60
	Entertainment	23,907	367	1,296	297	25,866	211
	Lodging	15,038	245	864	198	16,344	141
Subtotal		612,058	42,263	7,275	34,153	695,749	24,312
2035	Single Family	534,429	40,345	39	32,603	607,415	23,209
	Retail	39,141	1,202	4,707	971	46,021	691
	Office	2,408	105	370	85	2,968	60
	Entertainment	24,026	367	1,296	297	25,986	211
	Lodging	15,113	245	864	198	16,420	141
Subtotal		615,118	42,263	7,275	34,153	698,809	24,312
2036	Single Family	537,102	40,345	39	32,603	610,087	23,209
	Retail	39,337	1,202	4,707	971	46,216	691
	Office	2,421	105	370	85	2,980	60
	Entertainment	24,146	367	1,296	297	26,106	211
	Lodging	15,189	245	864	198	16,495	141
Subtotal		618,194	42,263	7,275	34,153	701,885	24,312
2037	Single Family	539,787	40,345	39	32,603	612,773	23,209
	Retail	39,533	1,202	4,707	971	46,413	691
	Office	2,433	105	370	85	2,992	60
	Entertainment	24,267	367	1,296	297	26,227	211
	Lodging	15,265	245	864	198	16,571	141
Subtotal		621,285	42,263	7,275	34,153	704,976	24,312
2038	Single Family	542,486	40,345	39	32,603	615,472	23,209
	Retail	39,731	1,202	4,707	971	46,611	691
	Office	2,445	105	370	85	3,005	60
	Entertainment	24,388	367	1,296	297	26,348	211
	Lodging	15,341	245	864	198	16,647	141
Subtotal		624,391	42,263	7,275	34,153	708,082	24,312
2039	Single Family	545,198	40,345	39	32,603	618,184	23,209
	Retail	39,930	1,202	4,707	971	46,809	691
	Office	2,457	105	370	85	3,017	60
	Entertainment	24,510	367	1,296	297	26,470	211
	Lodging	15,418	245	864	198	16,724	141
Subtotal		627,513	42,263	7,275	34,153	711,204	24,312

**APPENDIX 3
CITY OF SPARKS
ESTIMATED GENERAL AND ROAD FUND REVENUES**

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>					<u>ROAD FUND</u>
		<u>PROPERTY TAX</u>	<u>CTAX</u>	<u>LICENSES</u>	<u>FEES & PERMITS</u>	<u>TOTAL</u>	<u>FEES & PERMITS</u>
2040	Single Family	547,924	40,345	39	32,603	620,910	23,209
	Retail	40,129	1,202	4,707	971	47,009	691
	Office	2,469	105	370	85	3,029	60
	Entertainment	24,633	367	1,296	297	26,593	211
	Lodging	15,495	245	864	198	16,801	141
Subtotal		630,651	42,263	7,275	34,153	714,342	24,312
2041	Single Family	550,664	40,345	39	32,603	623,650	23,209
	Retail	40,330	1,202	4,707	971	47,210	691
	Office	2,482	105	370	85	3,042	60
	Entertainment	24,756	367	1,296	297	26,716	211
	Lodging	15,572	245	864	198	16,879	141
Subtotal		633,804	42,263	7,275	34,153	717,495	24,312
2042	Single Family	553,417	40,345	39	32,603	626,403	23,209
	Retail	40,532	1,202	4,707	971	47,411	691
	Office	2,494	105	370	85	3,054	60
	Entertainment	24,880	367	1,296	297	26,839	211
	Lodging	15,650	245	864	198	16,957	141
Subtotal		636,973	42,263	7,275	34,153	720,664	24,312
2043	Single Family	556,184	40,345	39	32,603	629,170	23,209
	Retail	40,734	1,202	4,707	971	47,614	691
	Office	2,507	105	370	85	3,066	60
	Entertainment	25,004	367	1,296	297	26,964	211
	Lodging	15,728	245	864	198	17,035	141
Subtotal		640,158	42,263	7,275	34,153	723,849	24,312
TOTAL		\$ 11,135,806	\$ 770,106	\$ 129,406	\$ 622,327	\$ 12,657,645	\$ 443,008

APPENDIX 3, ASSUMPTIONS:

1. For property tax revenue see Appendix 2.
2. Other General and Road Fund revenues are estimated using the following factors applied to the project's buildout measurements shown in Appendix 1.

	Per Unit		Per 1,000 Square Feet					
	General Fund	Single Family	Retail	Office	Lodging/ Entertainment			
Consolidated Tax (Ctax)	\$	115.27	\$	55.63	\$	87.42	\$	30.60
Business/Liquor Licenses		0.11		217.92		308.48		107.97
Fees, Permits, Charges		93.15		44.96		70.65		24.73
Road Fund								
Fees, Licenses, Permits	\$	66.31	\$	32.00	\$	50.29	\$	17.60

Source: City of Sparks Fiscal Impact Analysis Guidelines, October 2019.

**APPENDIX 4
CITY OF SPARKS
ESTIMATED GENERAL AND ROAD FUND EXPENDITURES**

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>				<u>ROAD FUND</u>	
		<u>GENERAL GOVERNMENT</u>	<u>POLICE</u>	<u>FIRE</u>	<u>TOTAL</u>	<u>SQUARE FEET ADDED</u>	<u>MAINTENANCE COST</u>
2024	Single Family	\$ 5,010	\$ 5,130	\$ 5,280	\$ 15,420		
	Retail	219	3,063	1,650	4,932		
	Office	-	-	-	-		
	Entertainment	200	1,125	715	2,040		
	Lodging	-	-	-	-		
Subtotal		5,429	9,318	7,645	22,392	124,180	\$ 77,240
2025	Single Family	\$ 24,215	\$ 24,795	\$ 25,520	74,530		
	Retail	482	6,739	3,630	10,850		
	Office	137	94	54	284		
	Entertainment	200	1,125	715	2,040		
	Lodging	120	675	429	1,224		
Subtotal		25,154	33,427	30,348	88,929	204,900	204,688
2026	Single Family	\$ 43,420	\$ 44,460	\$ 45,760	133,640		
	Retail	701	9,802	5,280	15,782		
	Office	137	94	54	284		
	Entertainment	200	1,125	715	2,040		
	Lodging	120	675	429	1,224		
Subtotal		44,578	56,155	52,238	152,971	204,900	332,136
2027	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	320	1,800	1,144	3,264		
	Lodging	120	675	429	1,224		
Subtotal		60,604	84,472	75,107	220,183	99,700	394,149
2028	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	120	675	429	1,224		
Subtotal		60,764	85,372	75,679	221,815	-	394,149
2029	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2030	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2031	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149

APPENDIX 4
CITY OF SPARKS
ESTIMATED GENERAL AND ROAD FUND EXPENDITURES

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>				<u>ROAD FUND</u>	
		<u>GENERAL GOVERNMENT</u>	<u>POLICE</u>	<u>FIRE</u>	<u>TOTAL</u>	<u>SQUARE FEET ADDED</u>	<u>MAINTENANCE COST</u>
2032	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2033	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2034	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2035	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2036	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2037	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2038	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2039	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149

**APPENDIX 4
CITY OF SPARKS
ESTIMATED GENERAL AND ROAD FUND EXPENDITURES**

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>				<u>ROAD FUND</u>	
		<u>GENERAL GOVERNMENT</u>	<u>POLICE</u>	<u>FIRE</u>	<u>TOTAL</u>	<u>SQUARE FEET ADDED</u>	<u>MAINTENANCE COST</u>
2040	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2041	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2042	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
2043	Single Family	\$ 58,450	\$ 59,850	\$ 61,600	179,900		
	Retail	1,577	22,054	11,880	35,510		
	Office	137	94	54	284		
	Entertainment	480	2,700	1,716	4,896		
	Lodging	320	1,800	1,144	3,264		
Subtotal		60,964	86,497	76,394	223,855	-	394,149
TOTAL		\$ 1,110,981	\$ 1,566,203	\$ 1,386,927	\$ 4,064,111	633,680	\$ 7,314,596

APPENDIX 4, ASSUMPTIONS:

1. General Fund revenues are estimated using the following factors applied to the project's buildout measurements shown in Appendix 1.

	<u>Per Unit</u>		<u>Per 1,000 Square Feet</u>		
	<u>General Fund</u>	<u>Single Family</u>	<u>Retail</u>	<u>Office</u>	<u>Lodging/Entertainment</u>
General Government	\$	167.00	\$ 73.00	\$ 114.00	\$ 40.00
Police		171.00	1,021.00	78.00	225.00
Fire (Outside Existing Service)		176.00	550.00	45.00	143.00

Source: City of Sparks Fiscal Impact Analysis Guidelines, October 2019.

2. Square feet of streets from Developer. Maintenance costs are estimated at **\$ 0.6220** per year, per square foot for roads North of Los Altos Parkway. Source: City of Sparks Fiscal Impact Analysis Guidelines, October 2019.

APPENDIX 5
CITY OF SPARKS
COMPARISON OF ESTIMATED GENERAL AND ROAD FUND REVENUES AND EXPENDITURES

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>			<u>ROAD FUND</u>		
		<u>EST. REVENUE</u>	<u>EST. COSTS</u>	<u>SURPLUS/ (DEFICIT)</u>	<u>EST. REVENUE</u>	<u>EST. COSTS</u>	<u>SURPLUS/ (DEFICIT)</u>
2024	Single Family	\$ 48,500	\$ 15,420	\$ 33,080	\$ 1,989		
	Retail	5,942	4,932	1,010	96		
	Office	-	-	-	-		
	Entertainment	10,002	2,040	7,962	88		
	Lodging	-	-	-	-		
Subtotal		64,444	22,392	42,052	2,173	\$ 77,240	\$ (75,067)
2025	Single Family	237,868	74,530	163,338	9,615		
	Retail	13,218	10,850	2,367	211		
	Office	2,851	284	2,567	60		
	Entertainment	10,048	2,040	8,008	88		
	Lodging	5,683	1,224	4,459	53		
Subtotal		269,669	88,929	180,740	10,027	204,688	(194,660)
2026	Single Family	431,367	133,640	297,727	17,241		
	Retail	19,417	15,782	3,635	307		
	Office	2,863	284	2,578	60		
	Entertainment	10,094	2,040	8,054	88		
	Lodging	5,709	1,224	4,485	53		
Subtotal		469,450	152,971	316,479	17,749	332,136	(314,387)
2027	Single Family	586,511	179,900	406,611	23,209		
	Retail	44,490	35,510	8,979	691		
	Office	2,874	284	2,590	60		
	Entertainment	16,479	3,264	13,215	141		
	Lodging	5,736	1,224	4,512	53		
Subtotal		656,089	220,183	435,906	24,154	394,149	(369,995)
2028	Single Family	589,078	179,900	409,178	23,209		
	Retail	44,678	35,510	9,167	691		
	Office	2,886	284	2,601	60		
	Entertainment	25,161	4,896	20,265	211		
	Lodging	5,762	1,224	4,538	53		
Subtotal		667,565	221,815	445,750	24,224	394,149	(369,925)
2029	Single Family	591,659	179,900	411,759	23,209		
	Retail	44,867	35,510	9,356	691		
	Office	2,897	284	2,613	60		
	Entertainment	25,277	4,896	20,381	211		
	Lodging	15,974	3,264	12,710	141		
Subtotal		680,675	223,855	456,820	24,312	394,149	(369,837)
2030	Single Family	594,252	179,900	414,352	23,209		
	Retail	45,057	35,510	9,546	691		
	Office	2,909	284	2,625	60		
	Entertainment	25,394	4,896	20,498	211		
	Lodging	16,047	3,264	12,783	141		
Subtotal		683,659	223,855	459,805	24,312	394,149	(369,837)
2031	Single Family	596,859	179,900	416,959	23,209		
	Retail	45,248	35,510	9,737	691		
	Office	2,921	284	2,636	60		
	Entertainment	25,511	4,896	20,615	211		
	Lodging	16,121	3,264	12,857	141		
Subtotal		686,659	223,855	462,804	24,312	394,149	(369,837)

APPENDIX 5
CITY OF SPARKS
COMPARISON OF ESTIMATED GENERAL AND ROAD FUND REVENUES AND EXPENDITURES

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>			<u>ROAD FUND</u>		
		<u>EST. REVENUE</u>	<u>EST. COSTS</u>	<u>SURPLUS/ (DEFICIT)</u>	<u>EST. REVENUE</u>	<u>EST. COSTS</u>	<u>SURPLUS/ (DEFICIT)</u>
2032	Single Family	599,478	179,900	419,578	23,209		
	Retail	45,439	35,510	9,929	691		
	Office	2,933	284	2,648	60		
	Entertainment	25,629	4,896	20,733	211		
	Lodging	16,195	3,264	12,931	141		
Subtotal		689,674	223,855	465,819	24,312	394,149	(369,837)
2033	Single Family	602,110	179,900	422,210	23,209		
	Retail	45,632	35,510	10,122	691		
	Office	2,944	284	2,660	60		
	Entertainment	25,747	4,896	20,851	211		
	Lodging	16,270	3,264	13,006	141		
Subtotal		692,704	223,855	468,849	24,312	394,149	(369,837)
2034	Single Family	604,756	179,900	424,856	23,209		
	Retail	45,826	35,510	10,316	691		
	Office	2,956	284	2,672	60		
	Entertainment	25,866	4,896	20,970	211		
	Lodging	16,344	3,264	13,080	141		
Subtotal		695,749	223,855	471,894	24,312	394,149	(369,837)
2035	Single Family	607,415	179,900	427,515	23,209		
	Retail	46,021	35,510	10,510	691		
	Office	2,968	284	2,684	60		
	Entertainment	25,986	4,896	21,090	211		
	Lodging	16,420	3,264	13,156	141		
Subtotal		698,809	223,855	474,955	24,312	394,149	(369,837)
2036	Single Family	610,087	179,900	430,187	23,209		
	Retail	46,216	35,510	10,706	691		
	Office	2,980	284	2,696	60		
	Entertainment	26,106	4,896	21,210	211		
	Lodging	16,495	3,264	13,231	141		
Subtotal		701,885	223,855	478,030	24,312	394,149	(369,837)
2037	Single Family	612,773	179,900	432,873	23,209		
	Retail	46,413	35,510	10,903	691		
	Office	2,992	284	2,708	60		
	Entertainment	26,227	4,896	21,331	211		
	Lodging	16,571	3,264	13,307	141		
Subtotal		704,976	223,855	481,121	24,312	394,149	(369,837)
2038	Single Family	615,472	179,900	435,572	23,209		
	Retail	46,611	35,510	11,100	691		
	Office	3,005	284	2,720	60		
	Entertainment	26,348	4,896	21,452	211		
	Lodging	16,647	3,264	13,383	141		
Subtotal		708,082	223,855	484,228	24,312	394,149	(369,837)
2039	Single Family	618,184	179,900	438,284	23,209		
	Retail	46,809	35,510	11,299	691		
	Office	3,017	284	2,732	60		
	Entertainment	26,470	4,896	21,574	211		
	Lodging	16,724	3,264	13,460	141		
Subtotal		711,204	223,855	487,350	24,312	394,149	(369,837)

**APPENDIX 5
CITY OF SPARKS
COMPARISON OF ESTIMATED GENERAL AND ROAD FUND REVENUES AND EXPENDITURES**

<u>YEAR</u>	<u>USE TYPE</u>	<u>GENERAL FUND</u>			<u>ROAD FUND</u>		
		<u>EST. REVENUE</u>	<u>EST. COSTS</u>	<u>SURPLUS/ (DEFICIT)</u>	<u>EST. REVENUE</u>	<u>EST. COSTS</u>	<u>SURPLUS/ (DEFICIT)</u>
2040	Single Family	620,910	179,900	441,010	23,209		
	Retail	47,009	35,510	11,499	691		
	Office	3,029	284	2,745	60		
	Entertainment	26,593	4,896	21,697	211		
	Lodging	16,801	3,264	13,537	141		
Subtotal		714,342	223,855	490,487	24,312	394,149	(369,837)
2041	Single Family	623,650	179,900	443,750	23,209		
	Retail	47,210	35,510	11,699	691		
	Office	3,042	284	2,757	60		
	Entertainment	26,716	4,896	21,820	211		
	Lodging	16,879	3,264	13,615	141		
Subtotal		717,495	223,855	493,640	24,312	394,149	(369,837)
2042	Single Family	626,403	179,900	446,503	23,209		
	Retail	47,411	35,510	11,901	691		
	Office	3,054	284	2,770	60		
	Entertainment	26,839	4,896	21,943	211		
	Lodging	16,957	3,264	13,693	141		
Subtotal		720,664	223,855	496,809	24,312	394,149	(369,837)
2043	Single Family	629,170	179,900	449,270	23,209		
	Retail	47,614	35,510	12,104	691		
	Office	3,066	284	2,782	60		
	Entertainment	26,964	4,896	22,068	211		
	Lodging	17,035	3,264	13,771	141		
Subtotal		723,849	223,855	499,994	24,312	394,149	(369,837)
TOTAL		\$ 12,657,645	\$ 4,064,111	\$ 8,593,534	\$ 443,008	\$ 7,314,596	\$ (6,871,588)

APPENDIX 5, ASSUMPTIONS:

1. See Appendices 2 and 3 for estimated revenues and Appendix 4 for estimated costs.