Nevada Northwest Specific Plan Amendment #3

Duane U. Deverill Charitable Trust

Executive Summary

The 3rd amendment to the Nevada Northwest Specific Plan is proposed as a condition precedent to provide consistency zoning from Mixed-Use Commercial (MUC) to Multifamily Residential (MFR) for two parcels of land (APN #'s 1320-30-611-006 & 007), where as part of the 20-year Master Plan Update in 2017 the land use designation on these two parcels were changed from Commercial to Multifamily. A concurrent request for a zoning map amendment was submitted along with application for the 3rd amendment to the specific plan.

Based on the approved land use, this specific plan update reflects changes to population, residential density, land use and zoning exhibits, building architecture, conceptual plans, utilities, and the like

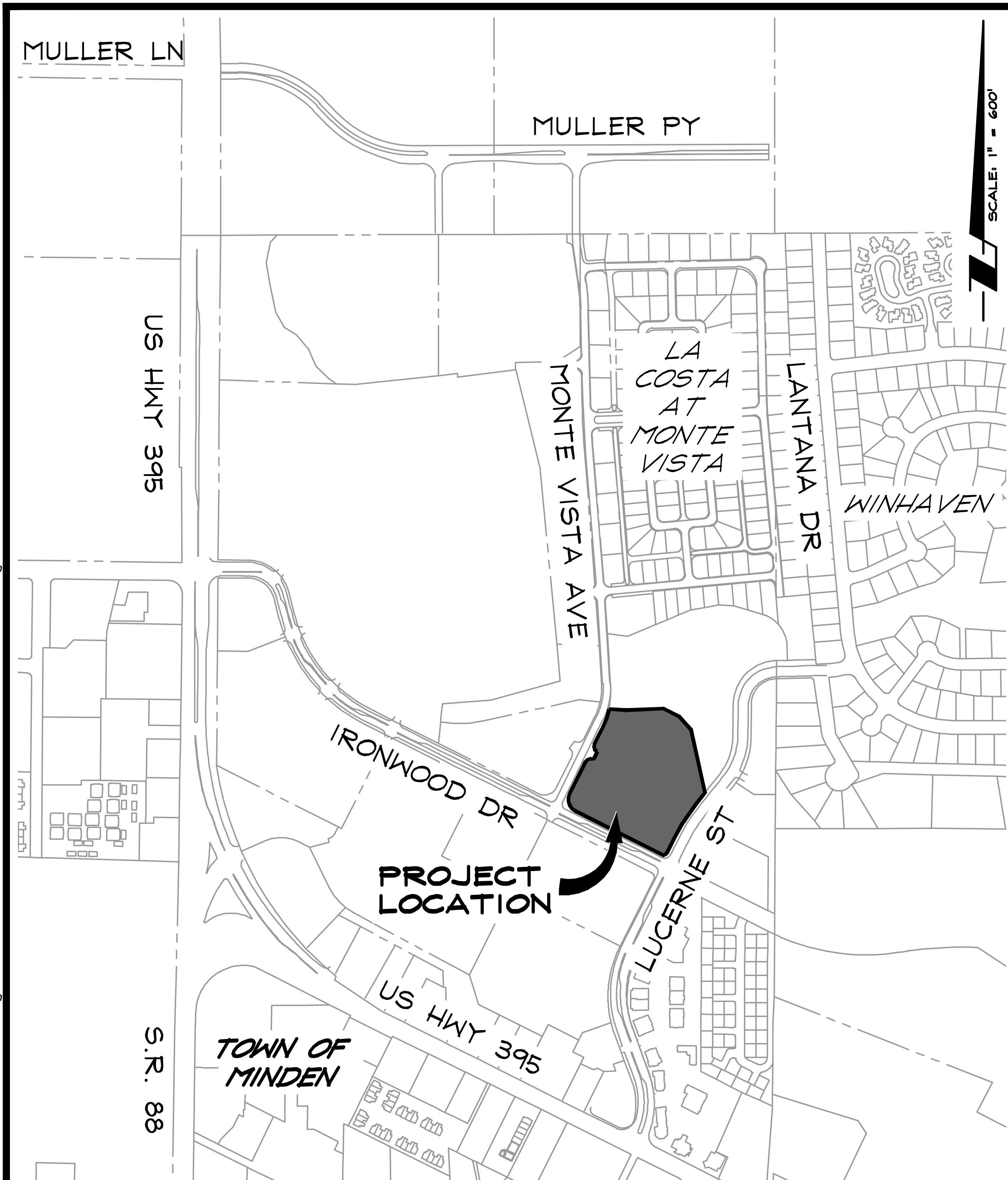
Douglas County
COMMUNITY DEVELOPMENT
PLANNING DIVISION
APPROVAL
Date 9-6-18
Signature

Table of Contents

LIST OF EXHIBITS (found in appendix)

DESCRIPTION	EXHIBIT NO.
Exhibit A	
See 2001 Specific Plan – Exhibits not included in Amendment #3	
Exhibit B	**Commercial Elevations (Amended)**
~~Mixed Use Commercial Elevations~~ **DELETED**	
Exhibit C	**Single Family Elevations (Amended)**
Exhibit D	**~~Town Home~~/Multifamily Elevations (Amended)**
Exhibit E	**Traffic Analysis (Amended)**
Exhibit F	**Drainage Report**

LIST OF FIGURES



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VICINITY MAP

NEVADA NW SPECIFIC PLAN AMENDMENT #3
DUANE DEVERILL CHARITABLE TRUST

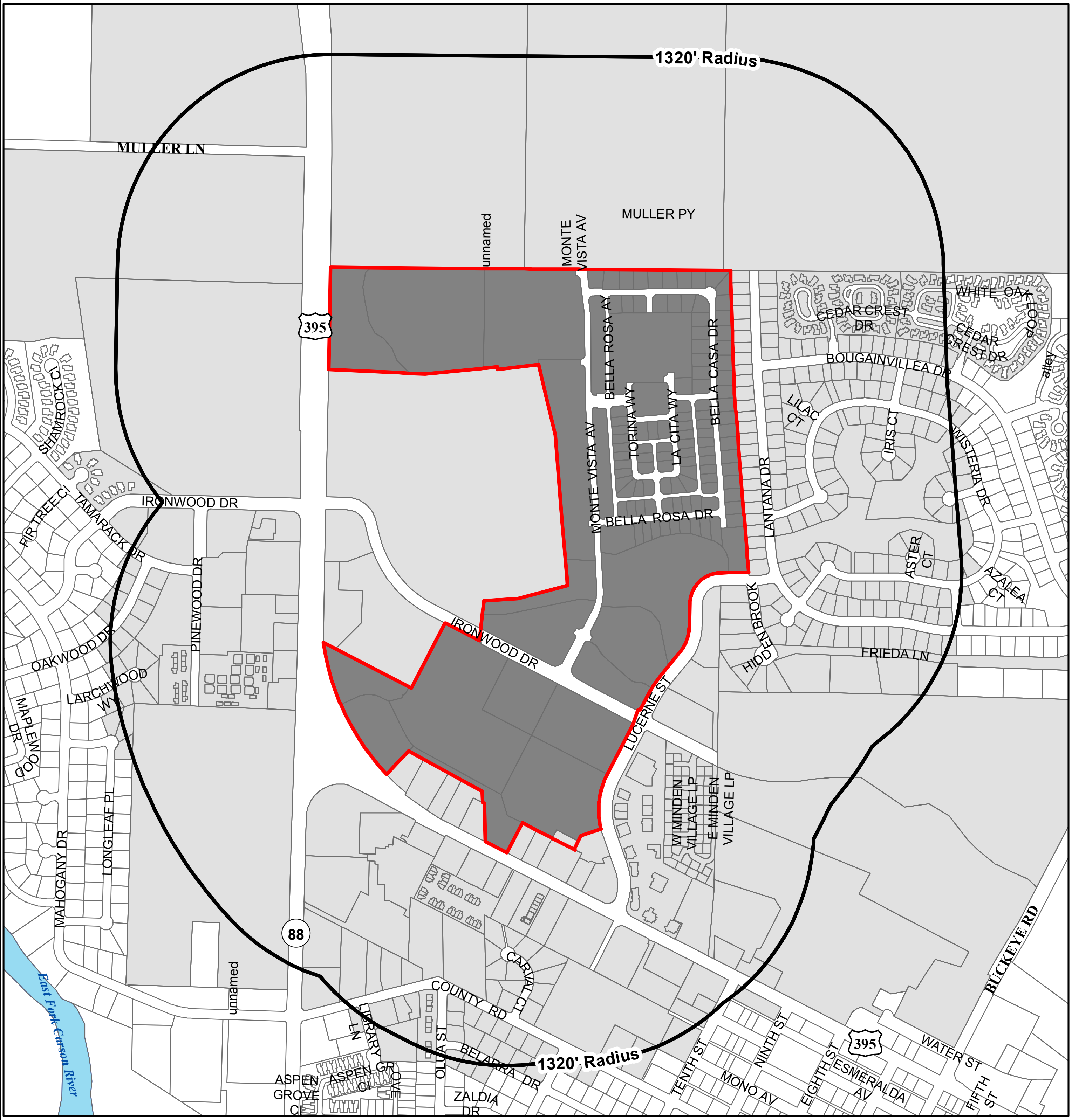
1327-006 **FIGURE A** 05/31/18

Y:\Client Files\1327\1327-006\CAD\Planning\Exhibits\SPA\1327-006 VICINITY MAP SPA.dwg 5/18/2018 8:12:40 AM Marie A. Hulse

Douglas County Noticing Radius Map

1320' Radius

MULTIPLE APN'S



1 inch = 834 feet

Print Date: 5/16/2018

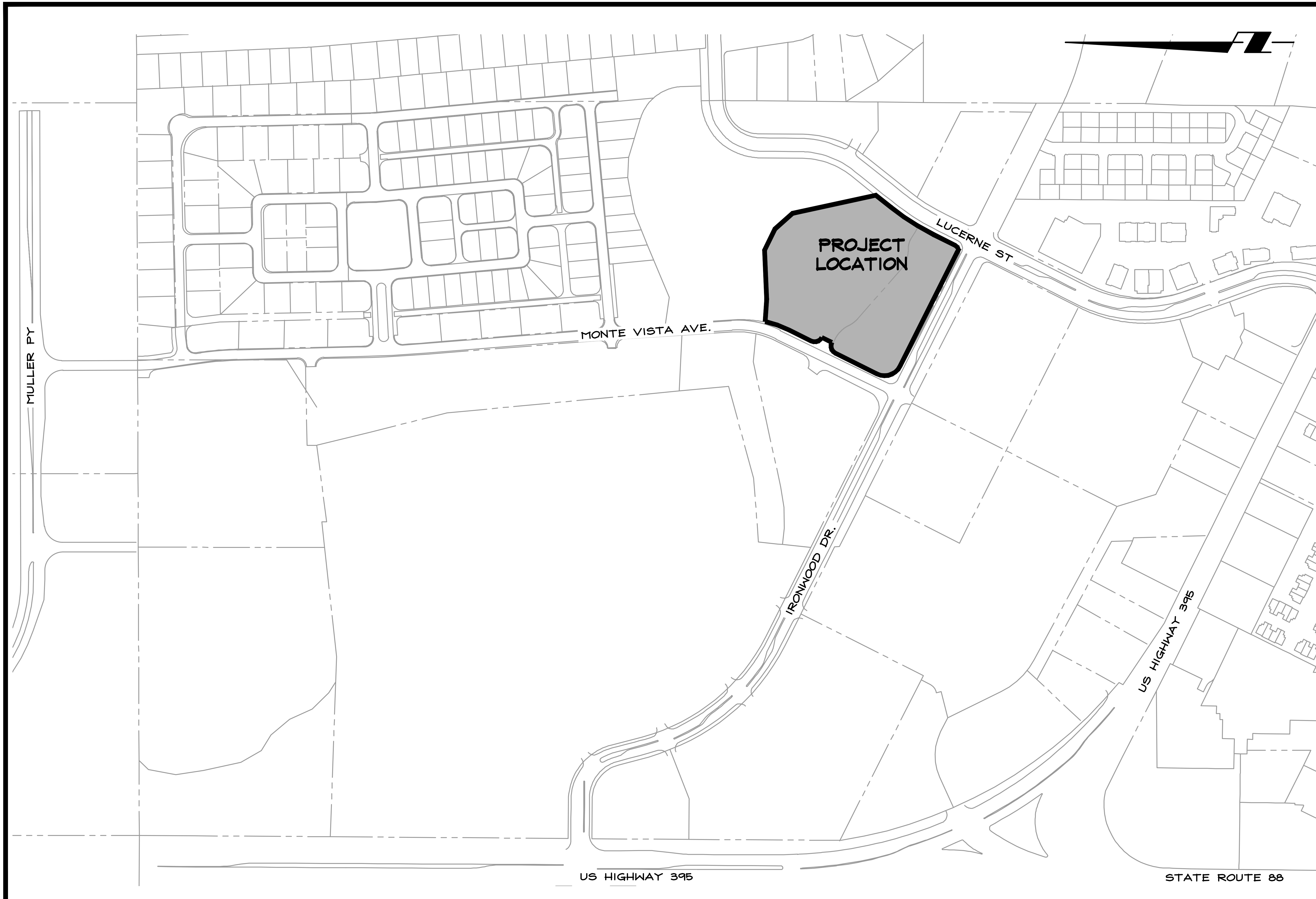
Noticing Radius
Nevada Northwest Specific Plan Boundary
Parcels Within Noticing Radius
Subject Parcel(s)

Figure B

N W E S

The data contained herein has been compiled on a geographic information system for the use of Douglas County. The data does not represent survey delineation and should not be construed as a replacement for the authoritative source, plat maps, deeds, resurveys, etc. No liability is assumed by Douglas County as to the sufficiency or accuracy of the data.

DOUGLAS COUNTY GIS



SUBJECT AREA

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FIGURE B1

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CONCEPTUAL SITE PLAN

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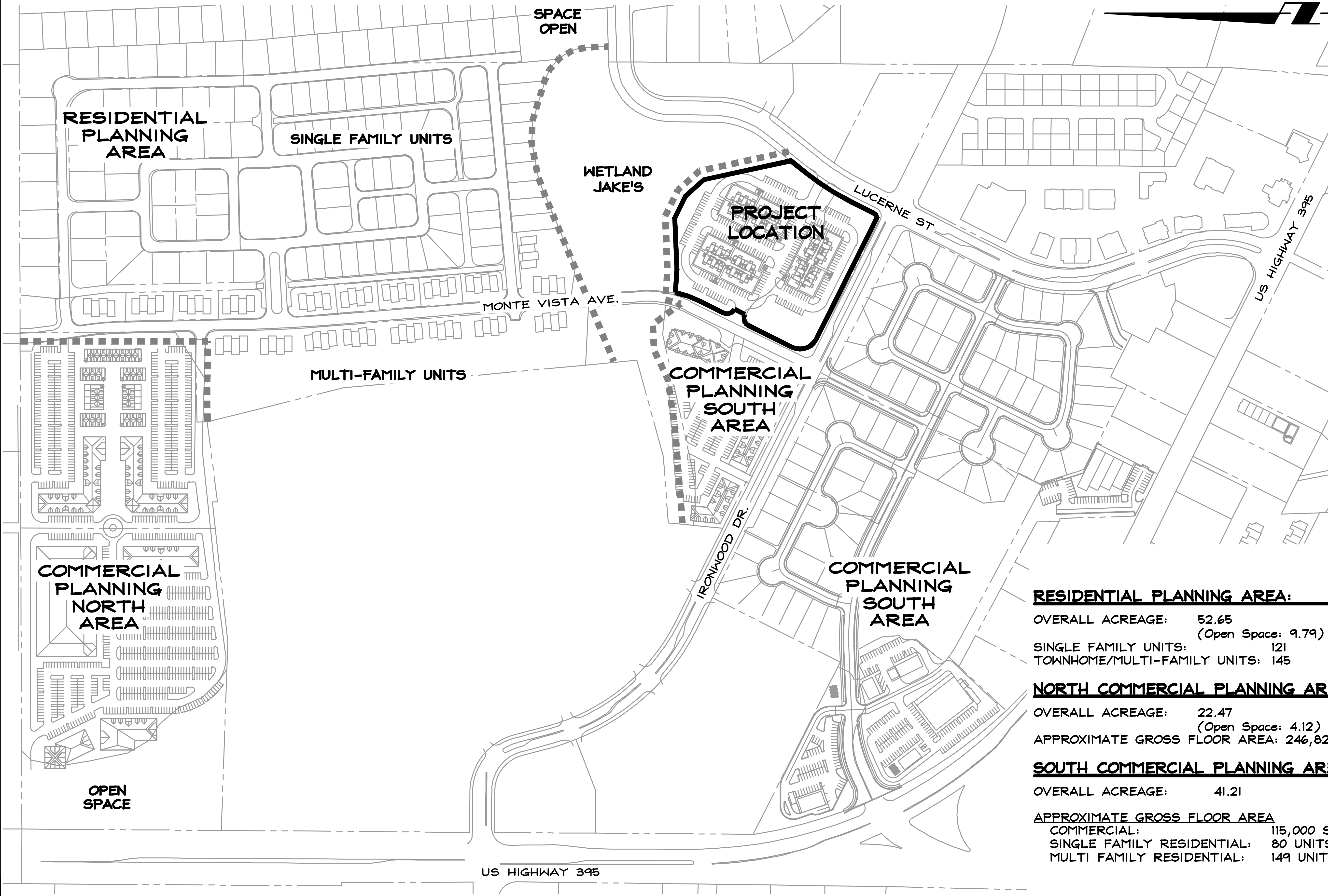
FIGURE C



RESIDENTIAL PLANNING AREA:

OVERALL ACREAGE: 52.65 (Open Space: 9.79)
SINGLE FAMILY UNITS: 121
TOWNHOME/MULTI-FAMILY UNITS: 145

NORTH COMMERCIAL PLANNING AREA:

OVERALL ACREAGE: 22.47 (Open Space: 4.12)
APPROXIMATE GROSS FLOOR AREA: 246,825 SF

SOUTH COMMERCIAL PLANNING AREA:

OVERALL ACREAGE: 41.21

APPROXIMATE GROSS FLOOR AREA

COMMERCIAL:	115,000 S.F.
SINGLE FAMILY RESIDENTIAL:	80 UNITS
MULTI FAMILY RESIDENTIAL:	149 UNITS

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PRELIMINARY TREE PLAN

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FIGURE C-1

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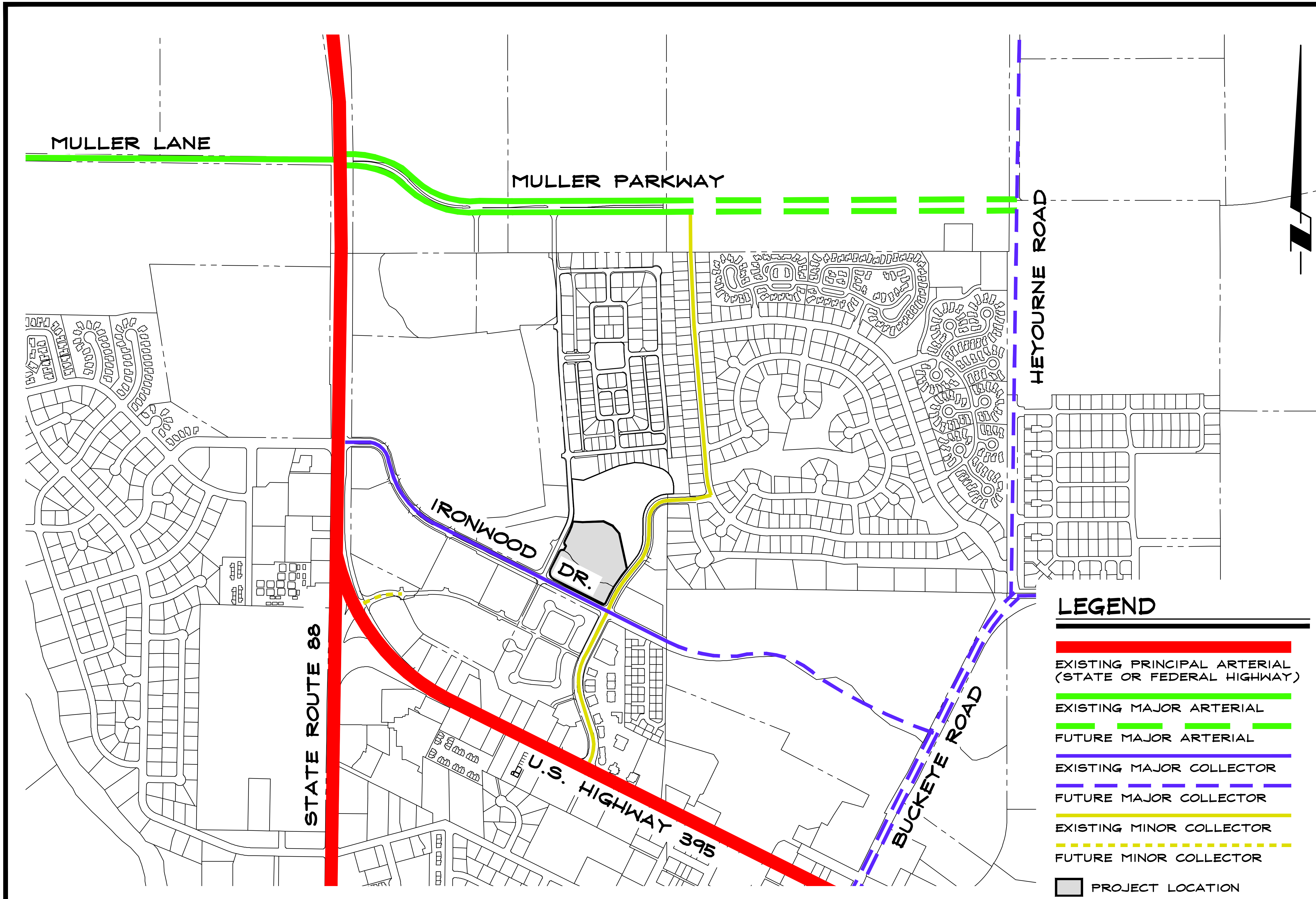

CIRCULATION PLAN: TRANSPORTATION
NEVADA NW SPECIFIC PLAN AMENDMENT #3
DUANE DEVERILL CHARITABLE TRUST
FIGURE D

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CIRCULATION PLAN: PEDESTRIAN
NEVADA NW SPECIFIC PLAN AMENDMENT #3
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FIGURE D1

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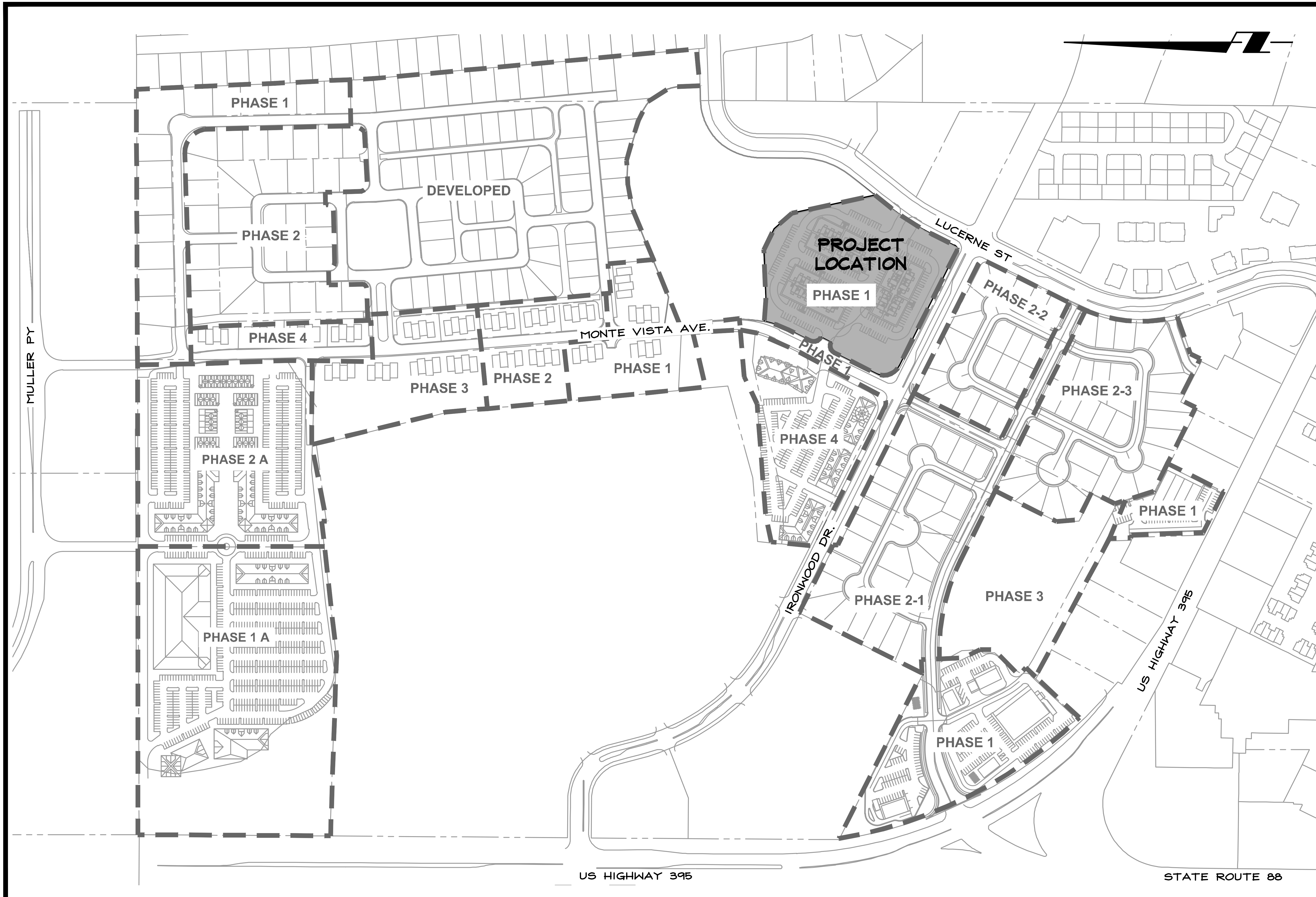

CONCEPTUAL PHASING PLAN

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FIGURE E

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NO.	DATE	REVISION BLOCK	BY

1 0 1 2
50 0 50 100
SCALE: 1" = 50'

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CONCEPTUAL

UTILITY PLAN

FIGURE F

DRAWN: MAH	JOB: 1327-006
ENGINEER: ROA	DRAWING: GRADE
SCALE: 1"=50'	SHEET: C1
DATE: 05/31/18	OF: 1 SHEETS

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Nevada Northwest Specific Plan - South Commercial Planning Area
Figure F.1 - Utility Systems Design Criteria & Summary
April 25, 2018

Estimate of Domestic Water Demands:

Proposed Land Uses:	No. of Units	No. of Acres	Estimated Demand/Unit		Total Estimated Average Daily Water Demand (gpd)
Single Family Residential	80	-	500	gpd/unit	40,000
Multi-Family Residential	149	-	500	gpd/unit	74,500
Neighborhood Commercial	-	6.07	1,500	gpd/Acre	9,105
Allowance for Landscaping	19		2.5	Af/Acre/yr	42,402
Totals	229	6.07	2,503		166,007

Average Daily Demand estimated at build-out	166,007	gallons
Average Daily Demand gpm	115	gpm
Peak Hour Demand (estimated)	461	gpm
Project Water Right Requirement	186	Ac-Ft/Yr

Estimated Fire Flow Requirements: East Fork Fire and Paramedic District
2500 gpm for 4 hour duration

NO.	DATE	REVISION BLOCK	BY

SCALE: 1" = 50'

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CONCEPTUAL DRAINAGE PLAN FIGURE G

DRAWN: MAH	JOB: 1327-006
ENGINEER: ROA	DRAWING: GRADE
SCALE: 1"=50'	SHEET: C1
DATE: 05/31/18	OF: 1 SHEETS

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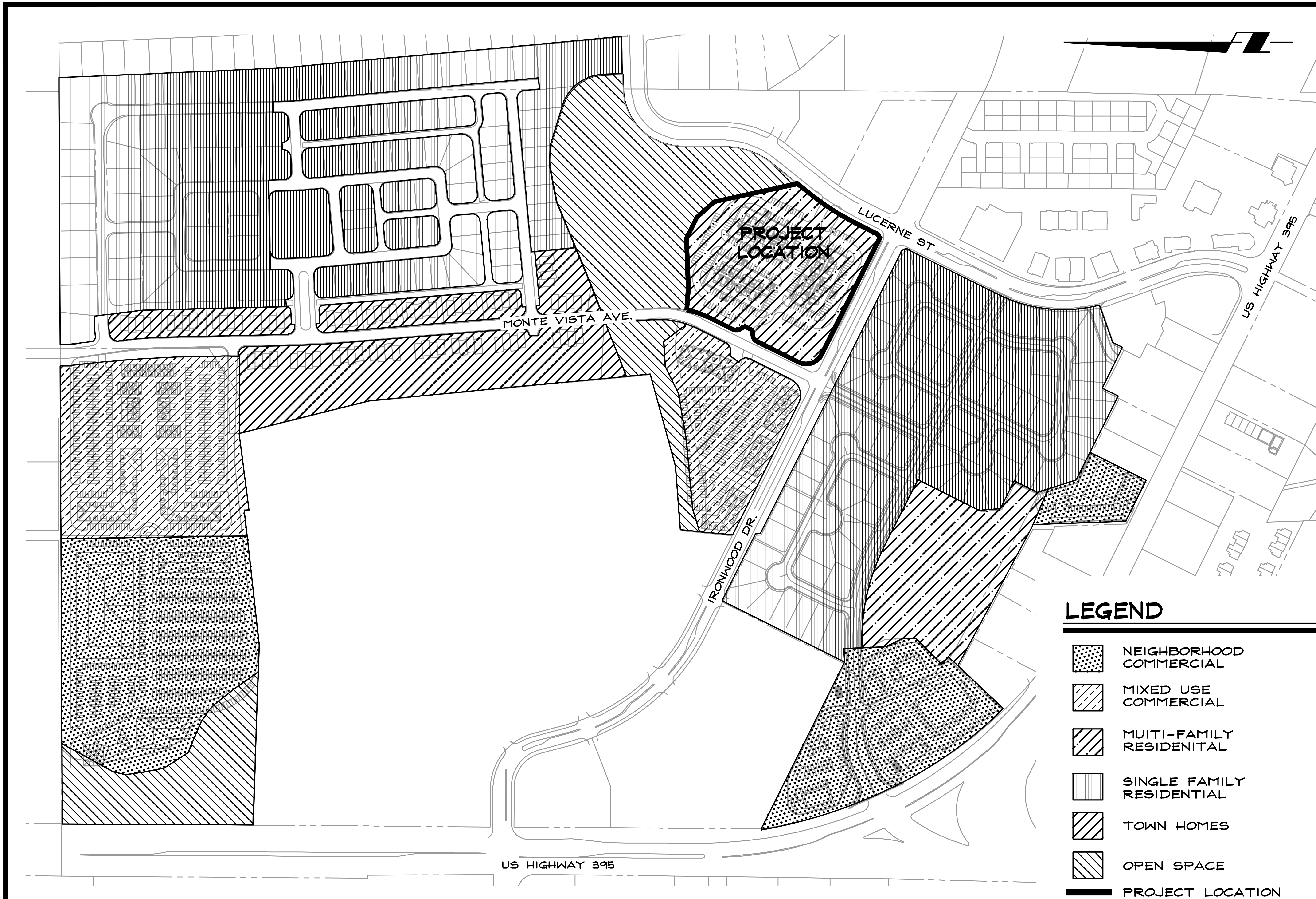

LAND USE PLAN

NEVADA NW SPECIFIC PLAN AMENDMENT #3
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FIGURE H

1327-006

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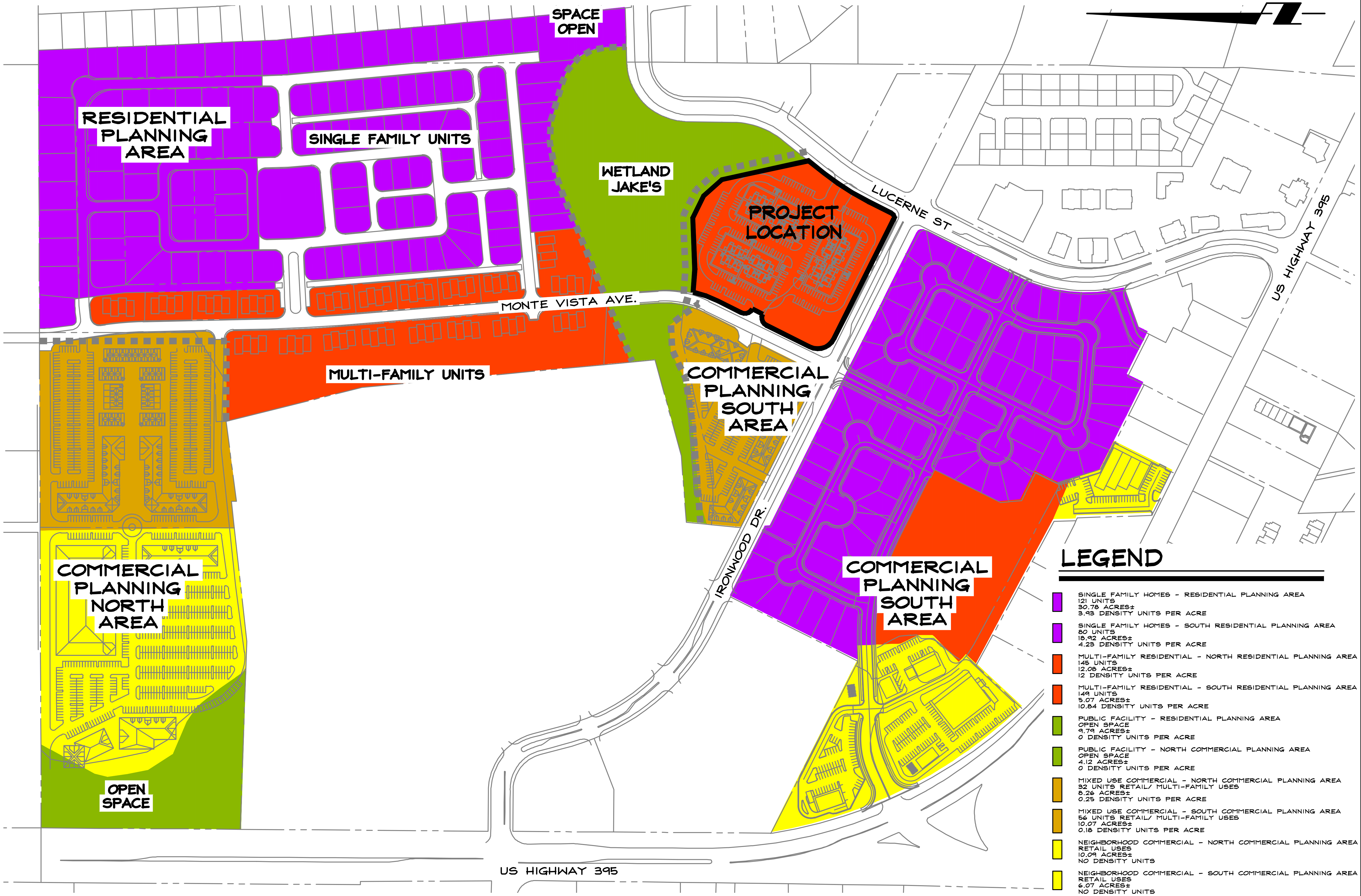

LEGEND

SINGLE FAMILY HOMES – RESIDENTIAL PLANNING AREA
121 UNITS
30.78 ACRES±
3.93 DENSITY UNITS PER ACRE

SINGLE FAMILY HOMES – SOUTH RESIDENTIAL PLANNING AREA
80 UNITS
18.92 ACRES±
4.23 DENSITY UNITS PER ACRE

MULTI-FAMILY RESIDENTIAL – NORTH RESIDENTIAL PLANNING AREA
145 UNITS
12.08 ACRES±
12 DENSITY UNITS PER ACRE

MULTI-FAMILY RESIDENTIAL – SOUTH RESIDENTIAL PLANNING AREA
149 UNITS
5.07 ACRES±
10.84 DENSITY UNITS PER ACRE

PUBLIC FACILITY – RESIDENTIAL PLANNING AREA
OPEN SPACE
9.79 ACRES±
0 DENSITY UNITS PER ACRE

PUBLIC FACILITY – NORTH COMMERCIAL PLANNING AREA
OPEN SPACE
4.12 ACRES±
0 DENSITY UNITS PER ACRE

MIXED USE COMMERCIAL – NORTH COMMERCIAL PLANNING AREA
32 UNITS RETAIL/ MULTI-FAMILY USES
8.26 ACRES±
0.25 DENSITY UNITS PER ACRE

MIXED USE COMMERCIAL – SOUTH COMMERCIAL PLANNING AREA
56 UNITS RETAIL/ MULTI-FAMILY USES
10.07 ACRES±
0.18 DENSITY UNITS PER ACRE

NEIGHBORHOOD COMMERCIAL – NORTH COMMERCIAL PLANNING AREA
RETAIL USES
10.09 ACRES±
NO DENSITY UNITS

NEIGHBORHOOD COMMERCIAL – SOUTH COMMERCIAL PLANNING AREA
RETAIL USES
6.07 ACRES±
NO DENSITY UNITS

PROJECT LOCATION

USE AND DENSITY PLAN

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FIGURE H-1

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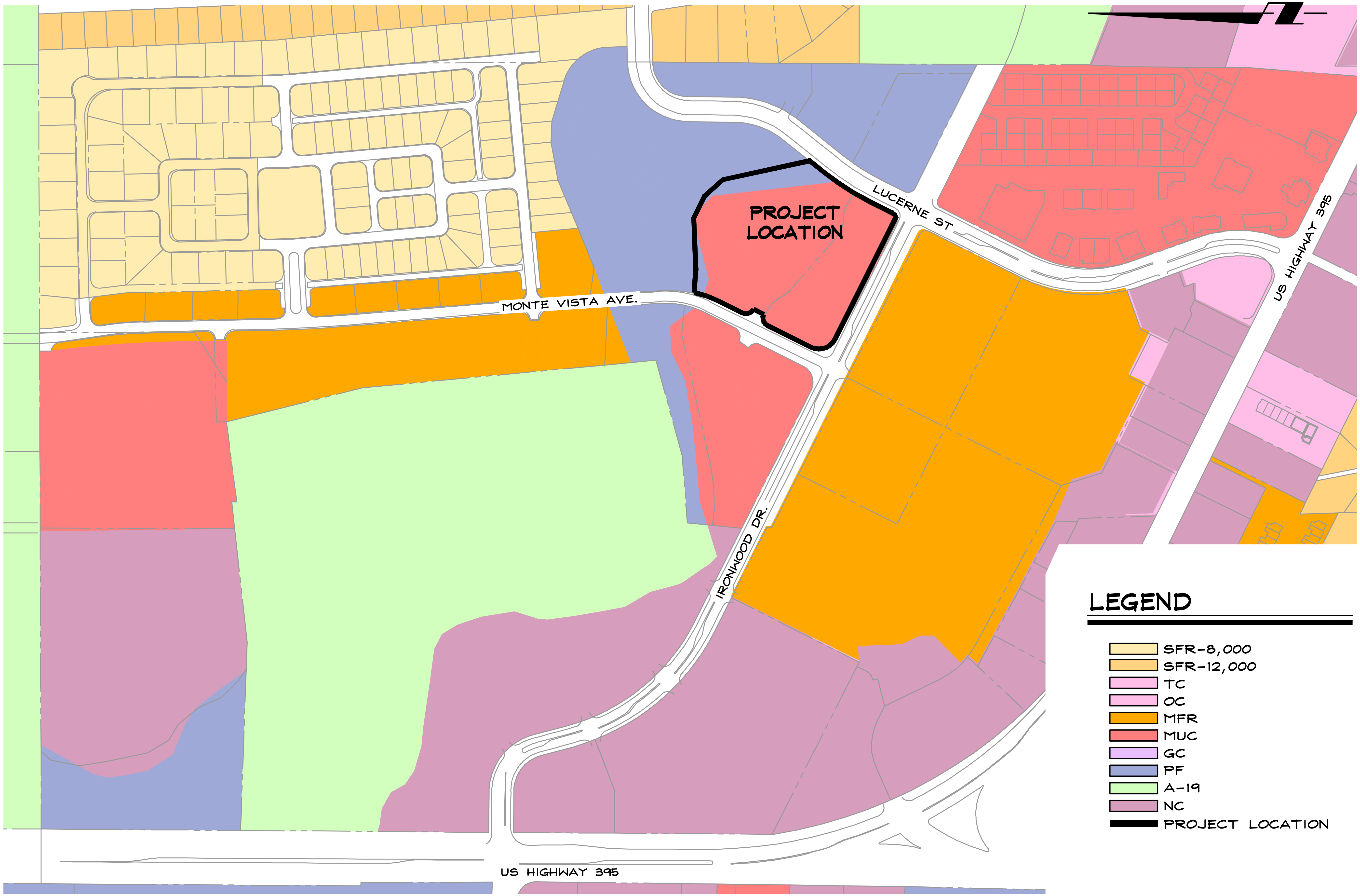

EXISTING ZONING PLAN (2017)

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FIGURE H-2

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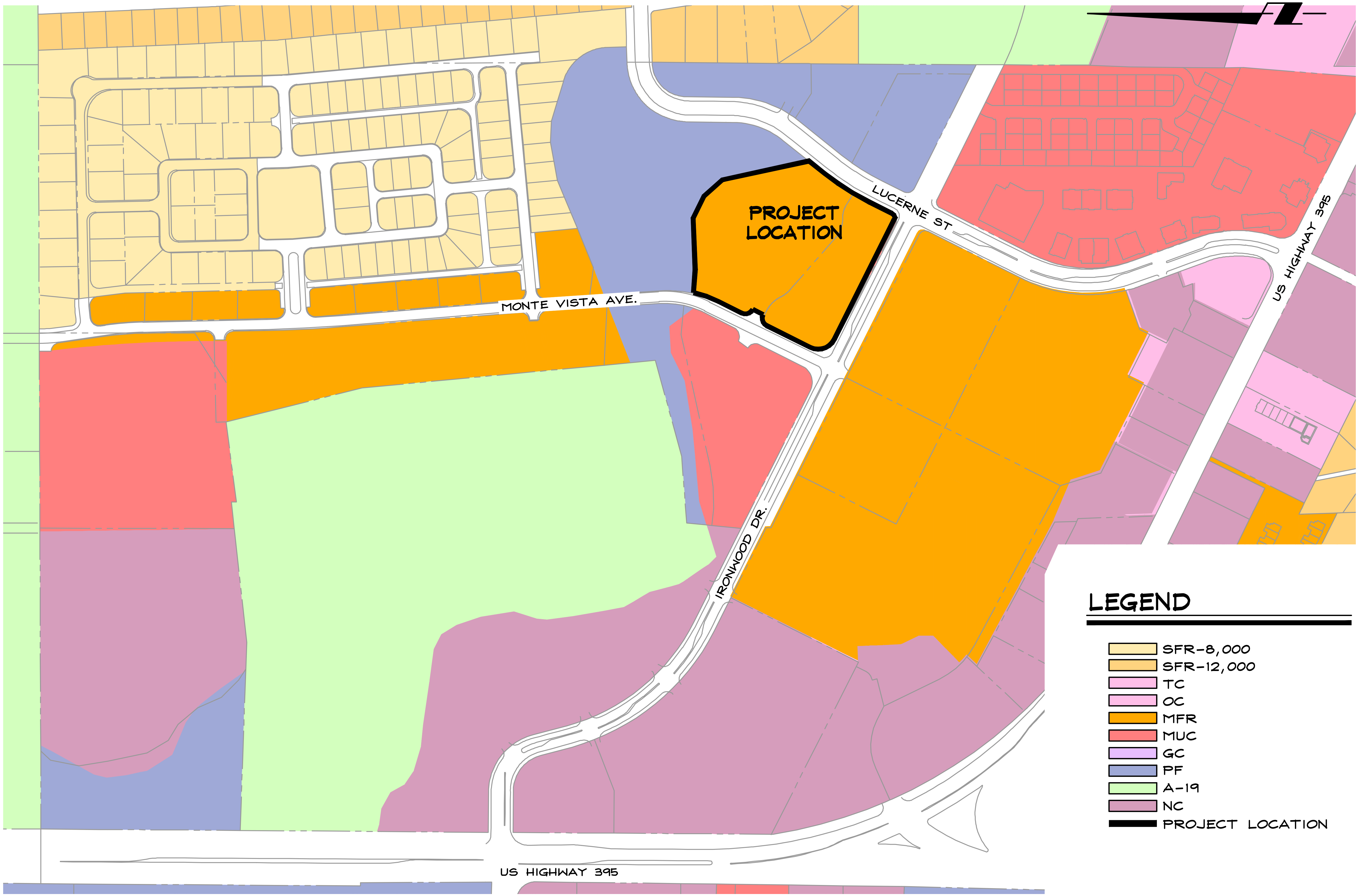

PROPOSED ZONING PLAN (2018)
NEVADA NW SPECIFIC PLAN AMENDMENT #3
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FIGURE H-3

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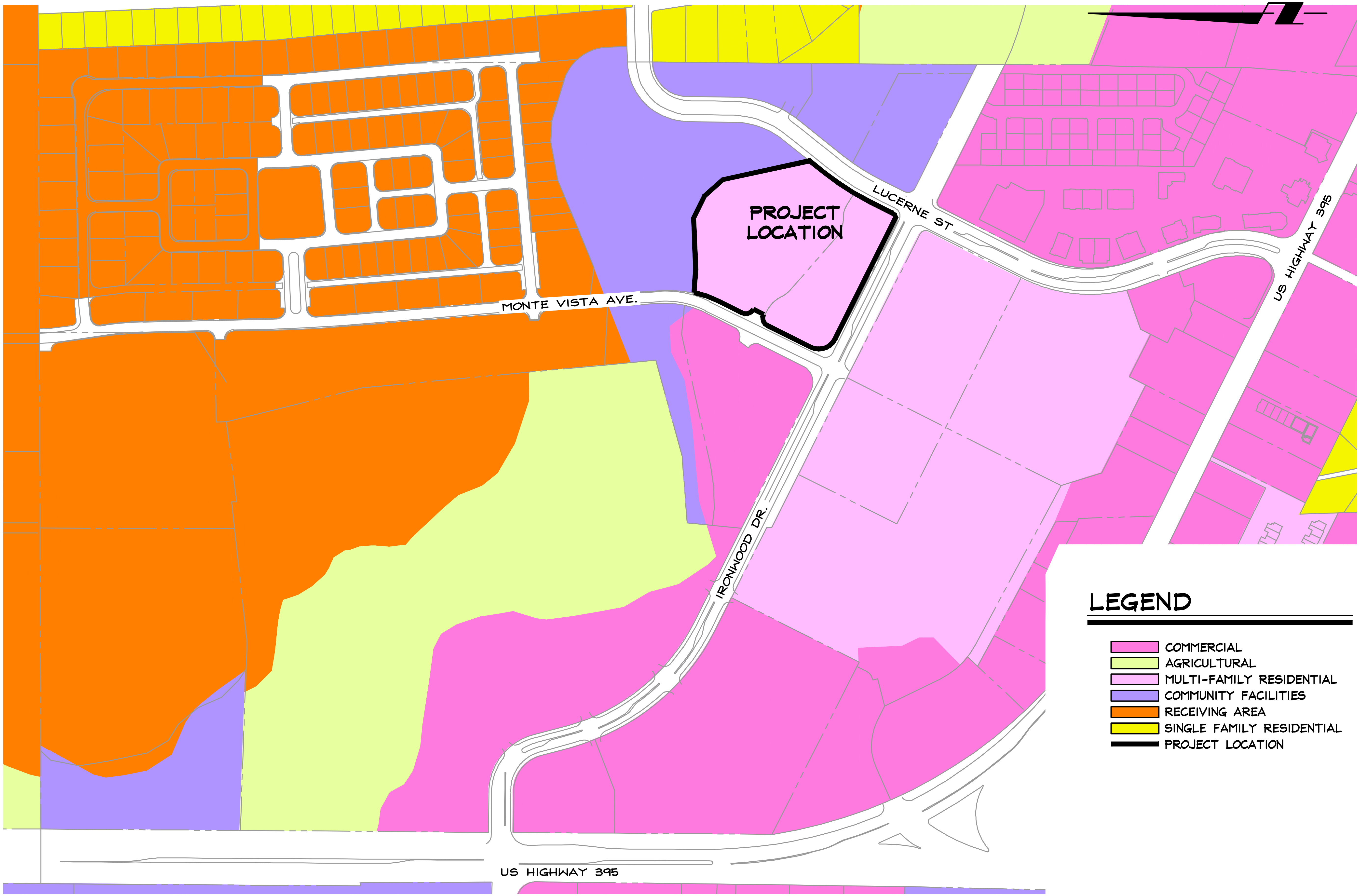

EXISTING LAND USE PLAN (2017)

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FIGURE H-4

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FRONT ELEVATION (12 PLEX 1 BEDROOM)

RESIDENCE 732 SQ. FT.

FRONT ELEVATION (12 PLEX 2 BEDROOM)

RESIDENCE 965 SQ. FT.

CONCEPTUAL ARCHITECTURAL ELEVATIONS
NEVADA NW SPECIFIC PLAN AMENDMENT #3
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FIGURE 1

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OPEN SPACE PLAN

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FIGURE K

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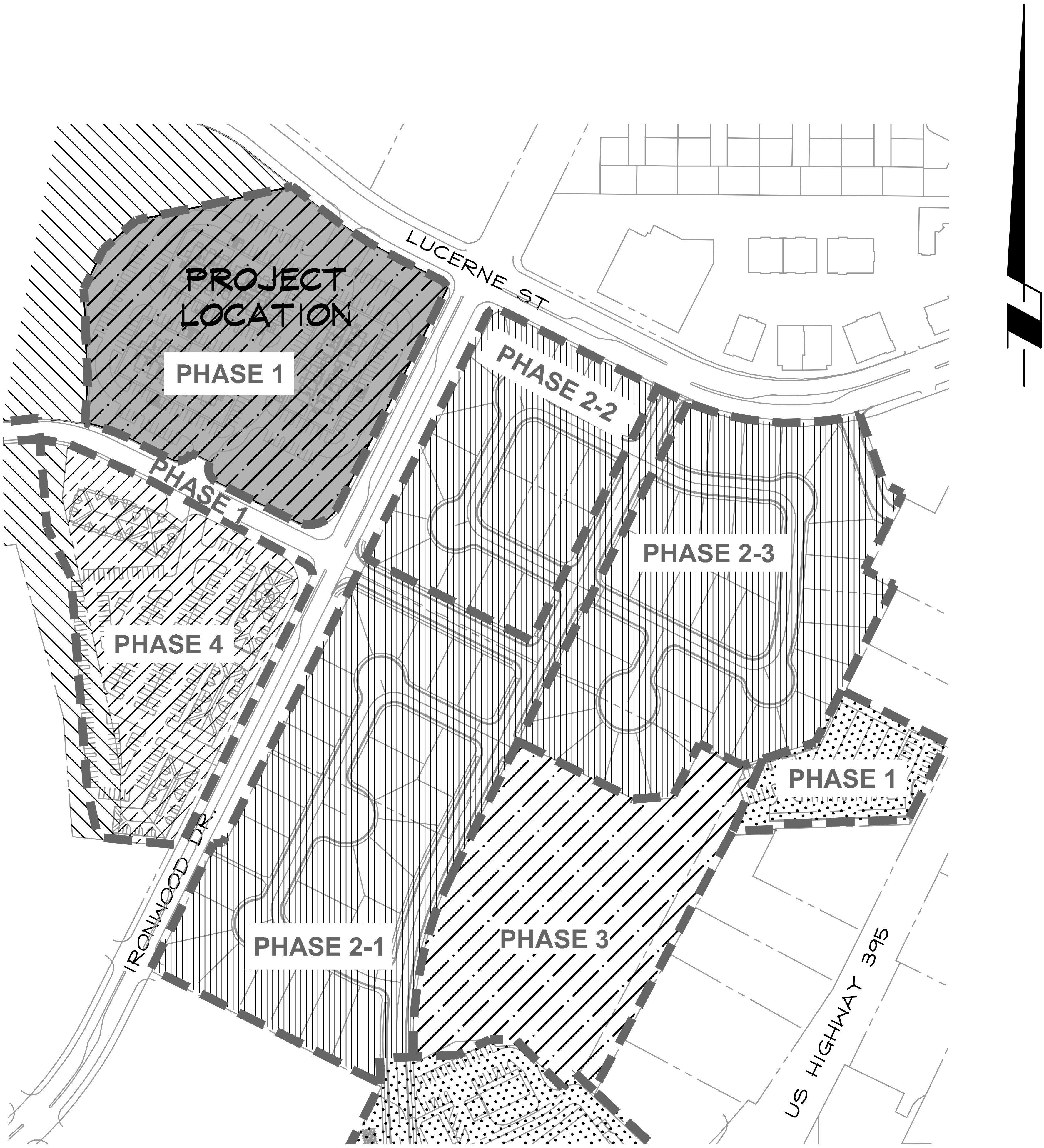

LEGEND

- NEIGHBORHOOD COMMERCIAL
- MIXED USE COMMERCIAL
- MUITI-FAMILY RESIDENITAL
- SINGLE FAMILY RESIDENTIAL
- TOWN HOMES
- OPEN SPACE
- PROJECT LOCATION

DEVELOPMENT SUMMARY

LAND USE	CFA	UNITS
PHASE 5		
MULTI FAMILY RESIDENTIAL	N/A	94

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DEVELOPMENT SUMMARY - SOUTH
NEVADA NW SPECIFIC PLAN AMENDMENT #3
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FIGURE L

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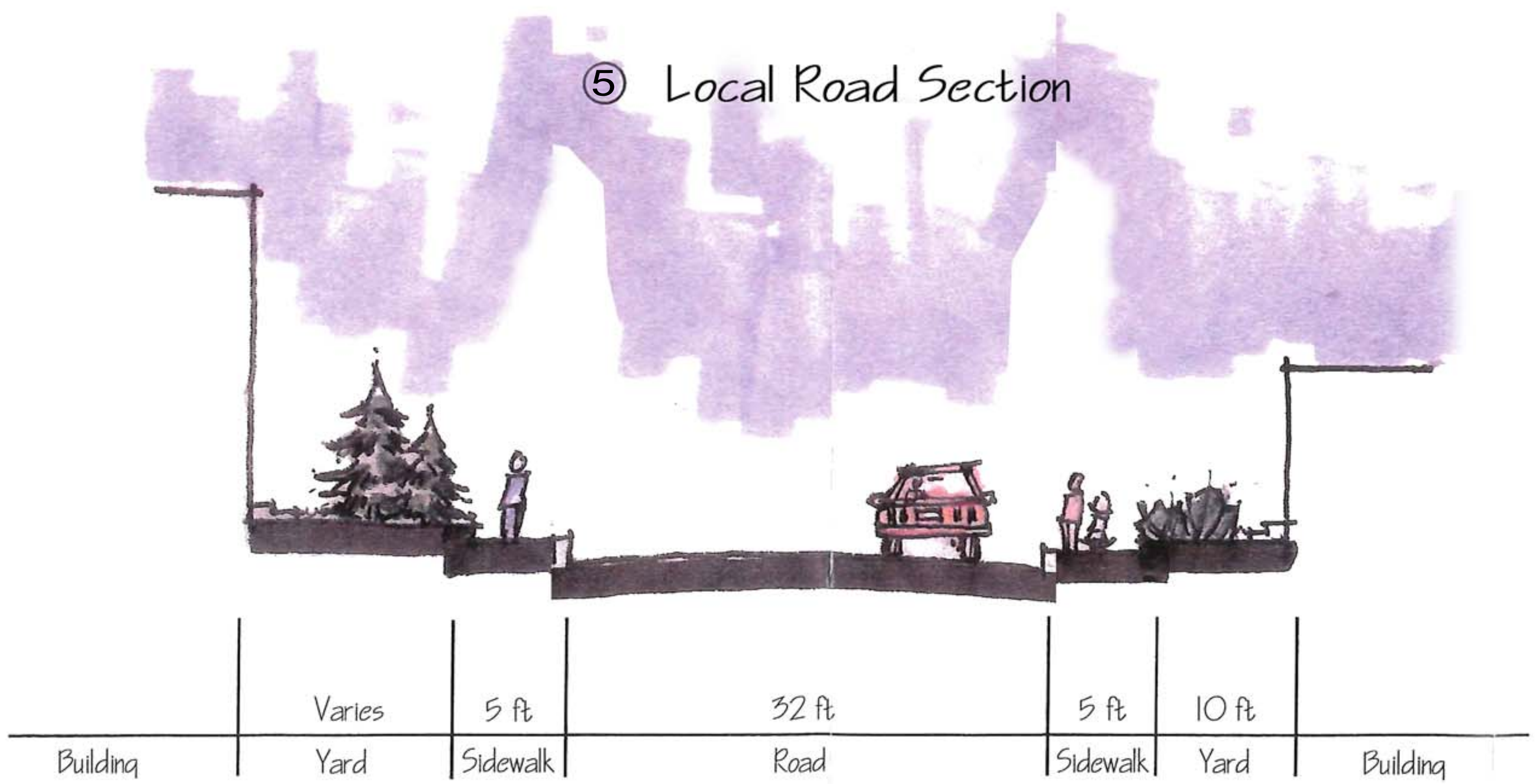

ROAD SECTIONS
NEVADA NW SPECIFIC PLAN AMENDMENT #2
FIGURE M

04/26/18

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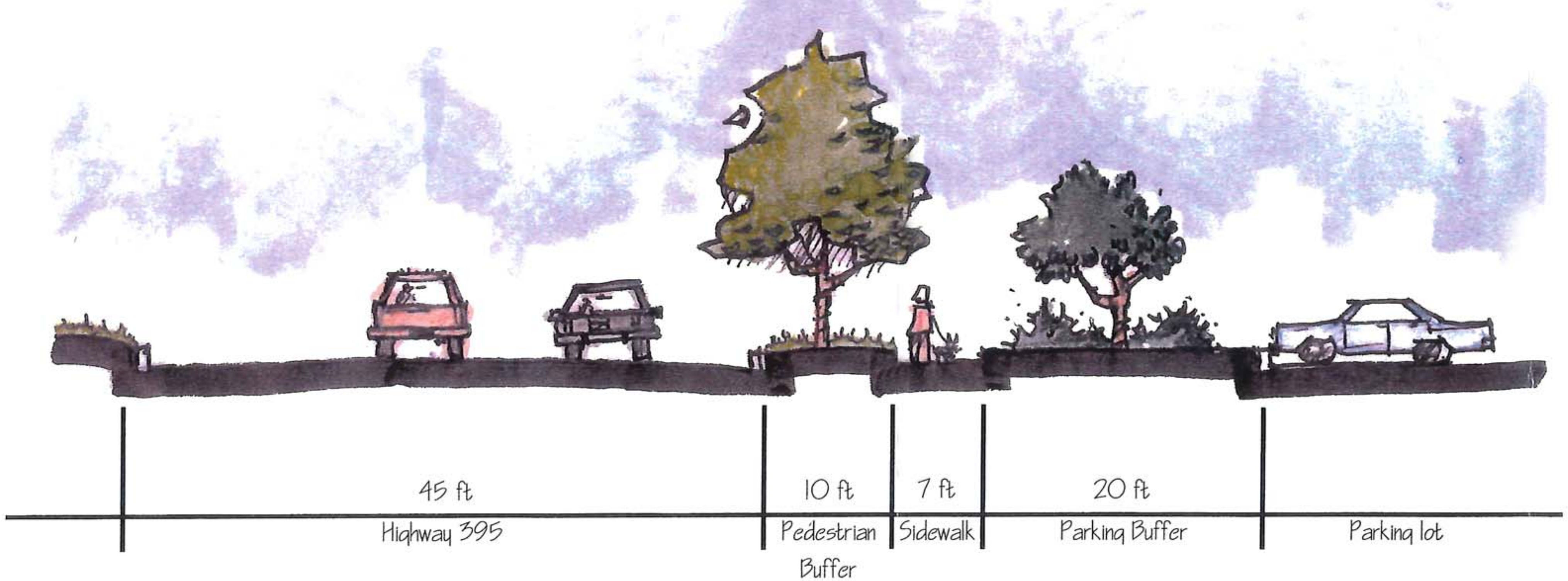
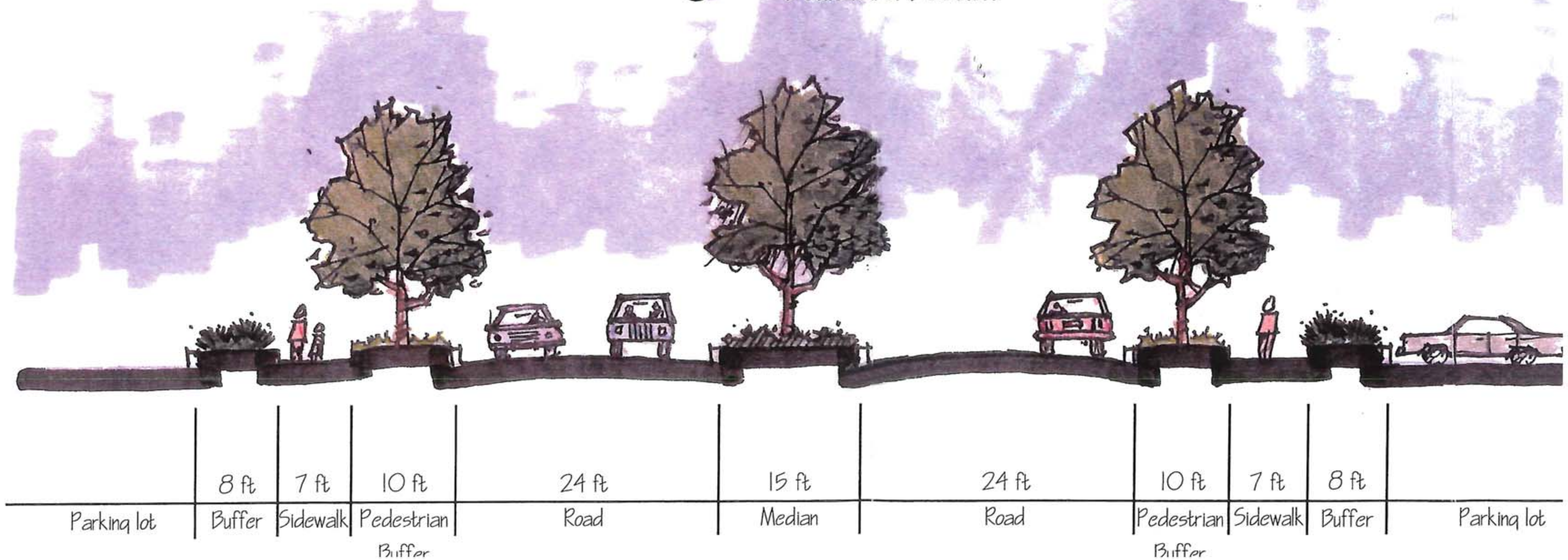
① Highway 395 Section



② Boulevard Section



ROAD SECTIONS

NEVADA NW SPECIFIC PLAN AMENDMENT #2

FIGURE M

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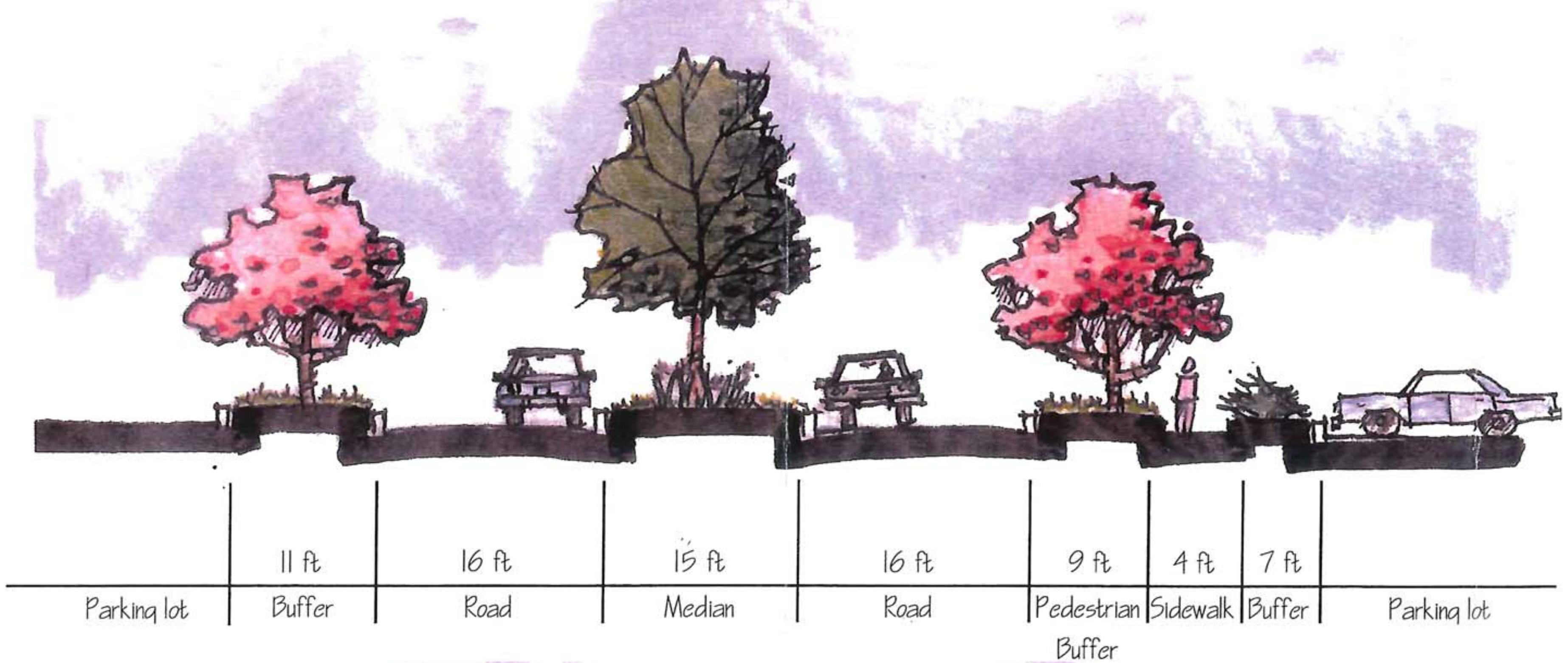
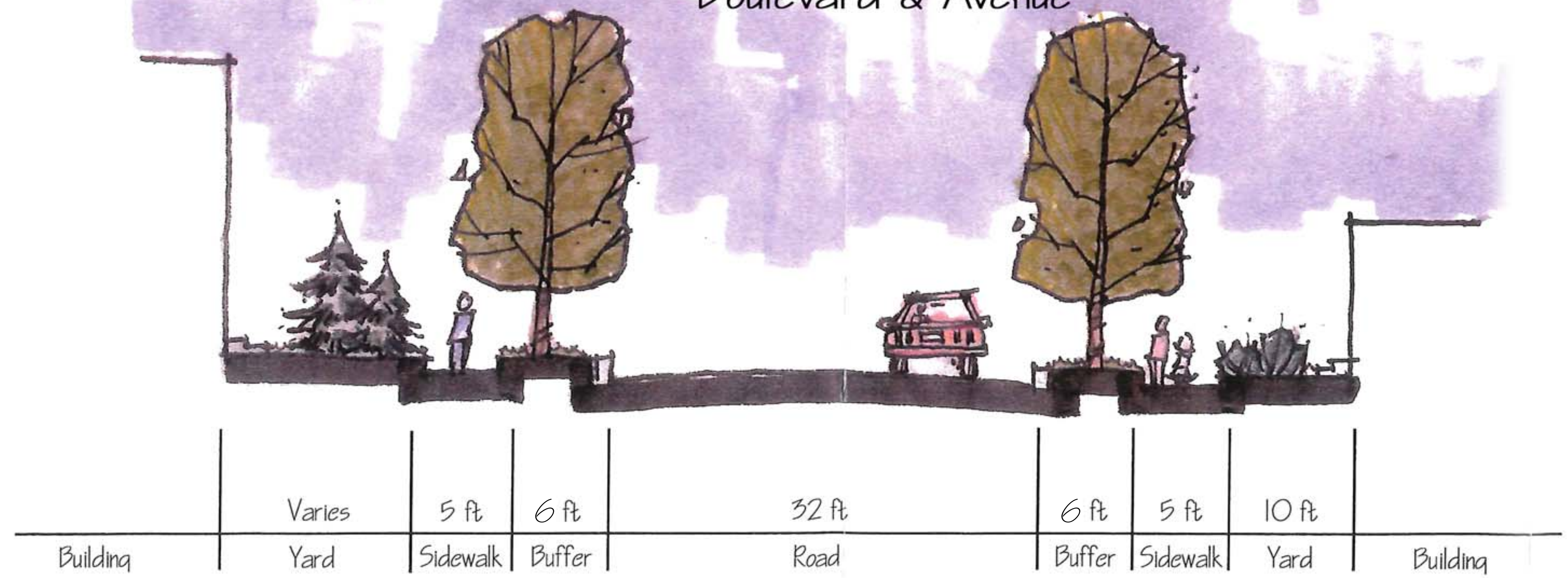
③ Ironwood Drive Section



④ South Commercial Area Boulevard & Avenue



ROAD SECTIONS

NEVADA NW SPECIFIC PLAN AMENDMENT #2

FIGURE M

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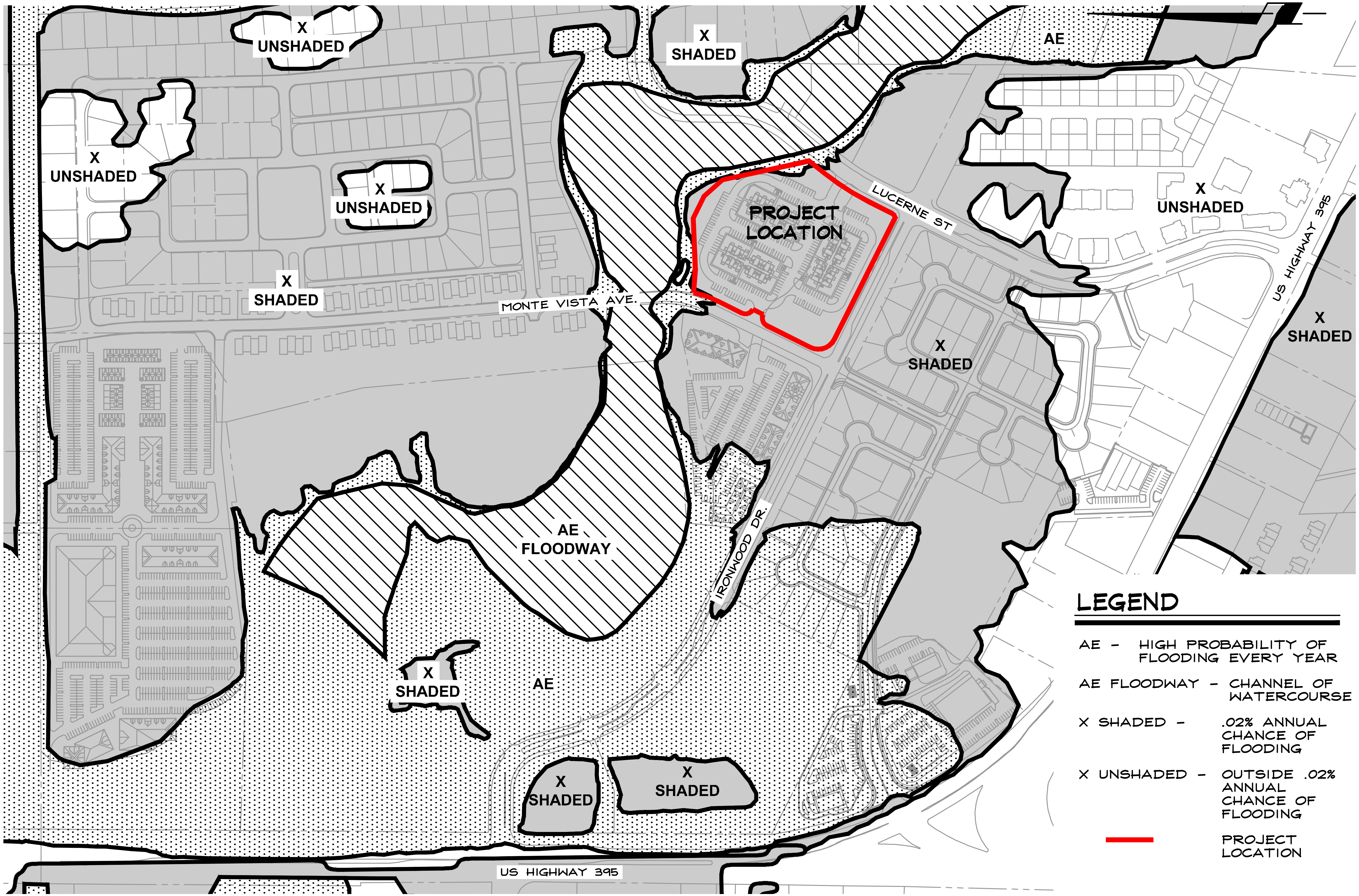

FLOOD ZONE MAP

NEVADA NW SPECIFIC PLAN AMENDMENT #3

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FIGURE N

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I. EXECUTIVE SUMMARY

A. Overview

The Nevada Northwest LLC Specific Plan represents a comprehensive planning effort to create a sensitive, site specific framework to govern the long-term development of the sites identified in the Nevada Northwest LLC Specific Plan. Development standards, goals, objectives, policies, regulatory procedures and implementation are combined to ensure a high quality program consistent with the goals and policies embodied in the Douglas County Master Plan.

The Nevada Northwest LLC Specific Plan establishes the type, location, intensity and character of the development. The Specific Plan guides the coordinated layout of infrastructure and related amenities and ensures that the completed development will meet the high quality standards envisioned at the time of approval. The Specific Plan also functions as a regulatory tool establishing the zoning controls, standards and procedures to govern the successful completion of the Nevada Northwest LLC Specific Plan.

On September 18, 2017, the Douglas County Board of Commissioners approved land use amendments to property located in the South Commercial Planning Area portion of the Nevada Northwest Specific Plan. This 3rd amendment to the Nevada Northwest Specific Plan is an update in response to these land use changes. This update to the Nevada Northwest Specific Plan (Amendment #3) only affects land identified in Figure B-1, an area situated within the South Commercial Planning Area boundaries.

B. Project Description

The Nevada Northwest LLC Specific Plan development approach is to provide for a mixed-use area in the Town of Minden while providing for open space preservation and enhancing Douglas County's economic base.

The proposed development site has few development constraints based on environmental conditions. Per the Douglas County Master Plan documents, the site does not contain any known faults or geological conditions which could pose a hazard. The site is relatively level, and is not located within a Hillside area. The site is not located in a high fire hazard area. The site is not identified or mapped as containing any significant cultural or historical resources. Portions of the site are located within the primary and secondary flood zone, particularly those areas within or immediately adjacent to the Martin Slough.

The Martin Slough is proposed to be set aside as a permanent open space feature and dedicated to Douglas County for the Town of Minden's beneficial use as a future linear park. Since the initial adoption of this plan, Douglas County and FEMA studied the Martin Slough and adopted a Floodway designation. Per this designation, fringe areas adjacent to the floodway designation may be filled and a LOMR filed to remove the area from the primary floodplain. Accordingly, any ~~No~~ residential land development proposing parcels less than 19 acres in size ~~uses are proposed~~ within the primary flood zone will require that a LOMR application be approved by FEMA prior to recordation of a final map, effectively removing any such residential development from the primary flood zone.

The project includes essentially three project areas which have different applications under this specific plan. A summary of these project areas from north to south are as follows:

- North Commercial Planning Area: This planning area is 22.47 acres in size and is planned for approximately 246,825 square feet in commercial floor area. This area is proposed to be zoned General Commercial and is anticipated to be able to accept uses acceptable within the GC zoning district.

- South Commercial Planning Area: This planning area is 41.21 acres in size and is planned for approximately 41,000~~569,325~~ square feet of commercial floor area~~, which also includes the estimated hotel gross floor area~~ and includes 80 single-~~-~~family residential units and 149 multifamily residential units. This area is proposed to be zoned ~~both Tourist Commercial and~~ Neighborhood Commercial and Multifamily Residential. ~~The area proposed for TC zoning is planned to contain a Casino Hotel complex, entertainment-bowling center, 100 space recreation vehicle park, restaurants, meeting rooms and some retail space. Additional specialty retail space is included within the areas proposed for NC zoning .~~

- Residential Planning Area: This planning area contains 52.65 acres, including 9.79 acres of open space aligned along the Martin Slough. 121 single family detached homes and 145 residential townhomes/multifamily homes are proposed within this development area.

C. Goals, Objectives and Policies

The following abbreviated list highlights the goals, objectives and policies of the Nevada Northwest LLC Specific Plan. The complete listing and discussion of the Master Plan goals, objectives and policies is provided in Section III, "Master Plan Conformance".

1. Land Use

Goal: Respect the physical environment of the Nevada Northwest LLC Specific Plan site.

a) Objective: To create a development which integrates with the natural environment and existing developed areas.

b) Policies:

1) Incorporate land uses into the Development Plan which are compatible with surrounding land uses.

~~compatible with surrounding land uses.~~

2) Develop conservation design standards and landscape criteria reflective of the natural environment of the Carson Valley and the vernacular of the Town of Minden.

3) Ensure development respects the unique character of Minden and the surrounding development patterns.

- Compatible, but not identical, physical design shall be used.
- ~~A.~~ Building materials shall be similar to or complementary with those used throughout the development area.

2. Provision of Community Facilities and Infrastructure

Goal: Provide financing, facilities and infrastructure which are necessary as a result of new development, and which minimize financial impacts to the existing community.

a) Objectives: Devise a system of improvements, streets, landscaping, utilities, drainage facilities, water system and sewer system which is provided through developer funding or builder funding.

b) Policies:

1) Dedicate rights-of-way and/or construct on-site major roads to ultimate street configurations to provide adequate capacity as a result of impacts caused by the Nevada Northwest LLC Specific Plan.

2) Builders shall finance and construct subdivision infrastructure necessary at the time of construction.

Goal: Minimize short term financial impacts to the surrounding community.

a) Objective: Incorporate a phasing program which anticipates necessary improvements and infrastructure so as to minimize costs.

b) Policies:

1) Roadway phasing criteria shall provide adequate levels of service on- and off-site.

3. Open Space

Goal: Provide open space for both passive and active use that is equally accessible to the community.

a) Objective: Provide for agricultural open space which provides the highest environmental benefit by protecting in perpetuity riverine and flood plain areas adjacent to the Carson River. Promote hiking, biking-, running, sightseeing activities to enjoy the viewsheds that these protected areas afford to the public while not interfering with agricultural activities.

b) Policies:

1) Encourage the development and provision of recreation opportunities that are both active and passive; e.g., hiking and biking trails, running, sightseeing, etc.

2) Incorporate access to encourage pedestrian and biking activities.

4. Housing

Goal: Create housing availability and opportunity for all market sectors.

a) Objective: To validate the Transfer of Development Rights (TDR) system identified in the Douglas County Master Plan

b) Policies:

1) Create development standards which allow flexibility to respond to changing community needs.

2) Ensure that TDR's on the site are used to provide housing in areas identified to accept these units as provided for in the master plan and development code.

5. Transportation

Goal: Provide balanced transportation systems for the safe and efficient movement of people, goods, and services throughout Nevada Northwest LLC Specific Plan.

a) Objectives:

1) Design and construct the transportation system and individual development projects to provide capacities that are needed to adequately serve the projected travel demand.

2) Promote bicycle and pedestrian trails as both a circulation and recreation alternative.

b) Policies:

1) Develop and promote interconnected bike and pedestrian trail routes.

2) Limit access to arterial streets and ensure sufficient distance between points at which traffic may enter arterial streets, in order to reduce congestion.

3) Ensure that each new development satisfactorily meets the standards set by fire and safety planning with regard to traffic access.

4) Ensure that regional circulation connections are considered and provided for at the appropriate time.

6. Public Services and Utilities.

Goal: Promote adequate public and semi-public services consistent with the needs of Nevada Northwest LLC Specific Plan in an efficient and cost effective manner.

a) Objective: Ensure that the basic and essential public facilities, services and utilities are available at the time of development.

b) Policies:

1) The rate at which development at Nevada Northwest LLC Specific Plan occurs shall not exceed the capacities of both public and semi-public services.

2) Development shall not adversely impact the provision of services (e.g., sewerage, water, fire, police, parks and schools) to other residents of Douglas County.

3) Adequate assurance of the long-term operation and maintenance of private service systems shall be required prior to development approval for those developments to be served.

Goal: Develop and maintain a water supply system capable of meeting normal and emergency demands at Nevada Northwest LLC Specific Plan.

a) Objective: Nevada Northwest LLC Specific Plan shall be served by water supply systems meeting minimum standards for domestic and emergency supply and quality.

b) Policies:

1) Evaluate the water supply and distribution system to ensure its continued adequacy.

2) Require new development to incorporate water conservation in the overall design, landscaping and installation of fixtures.

Goal: Maintain a sewage system adequate to protect the health and safety of all residents.

a) Objective: All development areas shall be served by sewage disposal systems which are adequately sized to handle expected wastewater flows and designed and maintained to protect the health of residents.

b) Policy:

1) Provide sanitary sewer service to all development within Nevada Northwest LLC Specific Plan.

7. Aesthetics

Goal: Preserve and enhance the unique aesthetic qualities of Nevada Northwest LLC Specific Plan.

a) Objective: Perpetuate and enhance the site-built environment and the architectural character of Minden.

b) Policies:

1) Devise design standards which address visual and aesthetic concerns within Nevada Northwest LLC Specific Plan.

2) Incorporate architectural, landscape and fence and wall guidelines into the Specific Plan.

8. Safety

Goal: Minimize hazards to public health, safety, and welfare resulting from natural and man-made hazards.

a) Objective: Incorporate measures into the Specific Plan to reduce natural and man-made hazards.

b) Policies:

1) Ensure that the Nevada Northwest LLC Specific Plan water distribution and supply facilities have adequate capacity to supply both everyday and emergency fire-flow needs.

2) Comply with all building and fire codes.

3) Require conformance with the County Flood Hazard Ordinance in the Primary and Secondary FEMA floodplain

II. INTRODUCTION

A. Purpose and Intent

Superior community development can be ensured through the approval of a development control mechanism that reflects thorough and comprehensive land use planning. Douglas County has adopted a mechanism which allows for flexibility in design while creating concomitant understandings between the developer, the County and the community at large as to how land designated as Receiving Area in the Douglas County Master Plan would be developed. The planning tool the County chose in achieving this goal is a Specific Plan.

The Specific Plan is generally considered to be the most appropriate method of zoning control for large properties containing a variety of land uses. Douglas County code requires the use of a Specific Plan for projects greater than 160 acres located within Receiving Areas. For smaller projects, Douglas County code permits the use of Specific Plans (but does not require the use of) down to 40 acres, although certainly in most cases the variety of land uses would be diminished accordingly. The Specific Plan must anticipate physical and environmental issues, and can be structured to provide flexibility to respond to changing conditions which will arise during the completion of a comprehensively planned development. The Specific Plan process is appropriate and desirable in this instance because all of these attributes are found in the Nevada Northwest LLC Specific Plan.

Douglas County Code Chapter 20.612 establishes the authority, the required contents of a Specific Plan and its necessary consistency with the Master Plan. According to Section 20.612.020, the Specific Plan shall include text and a diagram or diagrams which specify all of the following in detail:

A. A map showing proposed specific plan area boundaries and the relationship of the area to abutting uses and structures;

B. A map of the specific plan area showing sufficient topographical data to indicate clearly the character of the terrain, the location of ridgelines and drainage patterns and active or potentially active faults;

C. A plan indicating the existing and proposed uses, approximate gross floor area, lot coverage, height, parking and density;

D. A circulation plan, showing proposed streets and the relationship to the local and regional circulation system, and a traffic impact analysis;

E. A preliminary development schedule indicating phases or tentative subdivision boundaries, the sequence and timing of development and the timetable for provision of adequate public facilities and services;

F. A plan for extension of public facilities and services and for flood control and drainage, including proposed financing arrangements for public improvements;

G. Guidelines for the physical development of the property, including illustrations for proposed architectural, urban design, landscape and signing concepts;

H. Any additional requirements as are needed to meet approval standards; and

I. Terms for abandonment or termination of the project. (Ord. 96-763)

In addition, Douglas County Code requires the following findings be made before approval of a Specific Plan:

~~1.~~A. That the proposed location of the development and the proposed conditions under which it will be operated or maintained is consistent with the goals and policies embodied in the master plan;

~~2.~~B. That the proposed development is in accordance with the purposes and objectives of this title and, in particular, will further the purposes stated for each zoning district;

~~3.~~C. That the proposed development conforms to the adequate public facilities policies of Part I, Division D of this title;

~~4.~~D. That the development will not be detrimental to the public health, safety or welfare of persons residing or working in or adjacent to such a development; and will not be detrimental to the properties or improvements in the vicinity or to the general welfare of the county; and

~~5.~~E. That the applicant has demonstrated the ability to provide transfer development rights (TDR's) to meet project phasing. (Ord. 96-763)

The purpose and benefit of a Specific Plan might best be demonstrated through comparison with the Master Plan. The purpose of the Master Plan is to express, in general terms, the County's planning of its future environment. The Master Plan functions as a general blueprint of future development within the County. The Master Plan is adopted by the County as a legislative act and may thereafter be amended up to two (2) times a year as required by changing circumstances.

The Specific Plan, on the other hand, is a device used to implement the Master Plan. In the simplest sense, a Specific Plan is a more detailed, site specific version of the Master Plan. The Specific Plan focuses on particular parcels, articulates the planning considerations for such parcels and imposes regulations or controls on the use of such parcels. It serves to implement the physical and economic development of the project site by establishing major infrastructure requirements and addressing specific land uses within the property. Further, the Specific Plan identifies areas to be preserved as visual resources and specified standards employed to ensure compatibility with adjacent land uses and mitigations required for reduction of environmental impacts.

The Nevada Northwest LLC Specific Plan establishes the type, location, intensity and character of development to take place while allowing for flexible community design concepts. The elements of the Specific Plan are focused on providing the integration of the commercial and residential development and assurances for concomitant phasing of necessary infrastructure. The Nevada Northwest LLC Specific Plan establishes development controls to provide the County and the community at large with the assurance that the completed project will reflect the level of excellence envisioned at the time of approval.

~~a)~~B. *Project Location*

The project is located on approximately 116.33 acres located on the west side of the Winhaven development, east of US Highway 395, south of Muller Lane and North of Lucerne Drive. (see Figure A). The location of the land subject to the Amendment #3 of the Nevada Northwest Specific Plan is graphically depicted in Exhibit B-1.

~~b)~~C. *Authority and Scope*

The Nevada Northwest LLC Specific Plan has been prepared in accordance with the provisions of Chapter 20.612 of Douglas County Code. Generally, the purpose of a specific plan is to provide a comprehensive means of implementing the Master Plan for specific properties. The Specific Plan will implement development according to the standards and policies provided herein. All subsequent development plans for the site shall be consistent with the approved Specific Plan which by virtue of its approval, deemed consistent with the Master Plan.

D. *Relationship to the Master Plan*

The overall relationship between the Nevada Northwest LLC Specific Plan and the Douglas County Master Plan is that the Specific Plan provides a site specific, detailed program of regulations, standards and guidelines for implementation of

Master Plan policies and priorities. In order to accomplish this, the Specific Plan must be in conformance with and be consistent with the Master Plan.

Consistency with the Master Plan exists when the land uses contained in the Specific Plan are compatible with the objectives, policies and general pattern of land uses and programs contained in the Master Plan. Planners have defined consistency as “An action, program or project consistent with the General Plan (Master Plan) if, considering all its aspects, will further the objectives and policies in the General Plan (Master Plan) and not obstruct their attainment” (Governor’s Office of Planning and Research, Sacramento). A detailed element by element discussion of Master Plan conformance is contained in Section III, “Master Plan Conformance” of this document.

E. Relationship between the Specific Plan and Development Code

Specific Plans are typically adopted by ~~ordinance~~ resolution and serve as the zoning regulatory document for the area included as part of the Specific Plan. This would allow the Specific Plan to be carried out as intended, which is to serve as the Land Use Policy Plan for the area covered under this Specific Plan as well as the zoning regulatory document. Where there is a conflict between this Specific Plan and Douglas County zoning ordinance, the terms of this Specific Plan shall prevail. The Specific Plan will be implemented through the approval of subsequent tentative and final subdivision and planned development maps as well as design review applications. The County shall require compliance with the Specific Plan in its review of the aforementioned development applications.

F. Site Analysis

The following discussion provides the background which forms the basis for the Development Plan and Development Standards contained in the Specific Plan.

~~10~~1. Existing Land Use

The Nevada Northwest LLC Specific Plan sites total 115 acres and is located adjacent to and north of the Town of Minden. The exhibit titled “Existing Land Use” depicts the current area development and the how the project area is situated in existing and planned development areas. The site is eligible for annexation to the Town of Minden. It will be able to receive water service upon annexation. The parcel is located within the district boundaries of M.G.S.D. Power, telephone and gas will be available within the U.S. Highway 395 and Ironwood Drive right of way.

~~11~~2. Existing and Proposed Zoning

~~Exhibit 2~~Figures H-2 and H-3, entitled "Existing Zoning Map 2017" and "Proposed Zoning Map 2018," graphically depict~~s~~ the existing zoning and proposed zoning of the Nevada Northwest LLC Specific Plan South Commercial Planning area site and the surrounding area.

~~12~~3. Existing and Proposed Master Plan

~~Exhibit 1~~Figures titled "Existing Land Use 2017" and "Proposed Land Use 2018" graphically depicts the current and proposed Master Plan designations for the Specific Plan sites and the surrounding area. The North Commercial Planning Area is designated as Agriculture and Receiving Area as is all of the adjacent and surrounding properties. The Residential Planning Area is designated as Receiving Area, with adjacent lands and surrounding lands to the south and north as Receiving Area, and lands to the southeast as Agriculture, land to the east is designated as Single Family Residential. The South Commercial Planning Area is designated as MultiFamily Residential and Commercial.

~~13~~4. Topography and Slope

Exhibit 6 titled "Elevation Contour Map" indicates all of the Plan Areas in relation to topography. All of the plan areas generally slope west by northwest at less than 1% slope.

~~14~~5. Flood Plain

Exhibit 5 titled "Flood Zone Map" graphically depicts plan areas with respect to F.E.M.A. mapped flood plains.

~~15~~6. Soils and Geology

Exhibits 4 and 11 titled "Soil Map" and "Geologic Features Map" graphically depict the soils and geology in the site. Geology maps show the site in alluvium of the Quaternary Age with no faults within several miles of the site. Bedrock is expected to be at a depth of 1,000 feet per the Report Geohydrology and Simulated Response to Ground-Water Pumpage in Carson Valley, by the U.S.G.S., Water Resource Investigations Report 86-4328.

~~16~~7. Circulation

Site access to North Commercial Planning Area and the Residential Planning Area will be provided from the realignment of Muller Lane via U.S. Highway 395. Muller is proposed to be realigned approximately between the exiting alignment and the northern project boundary. A connecting street to the realigned Muller Lane will run north to connect with Muller. A two means of access would be extended to Lucerne Street. Stub streets are extended to project boundaries for future development within the Dreyer Ranch. The South Commercial Area will be directly accessed from the signal at US Hwy 395 and State Route 88. Other means of access include driveways from Lucerne Street and Ironwood Drive, and US Hwy. 395 between Lucerne Street and US Hwy.395/SR 88 intersection. The key study area roadways and intersections are analyzed in the traffic report found in the appendix of this specific plan originally prepared by LSC Transportation Consultants and updated by Solaegui Engineers. New signals, as permitted by NDOT, would be developed at Muller Lane as realigned, and ~~either Ironwood Drive or~~ Lucerne Street. Channelization improvements, restriping and signal coordination is also recommended within the traffic study and will be the responsibility of the project proponents.

Exhibits 12 and 13 graphically depict the "Master Plan Transportation Map" and the "Bikeways and Scenic Corridor Map". A multipurpose trail is shown along the alignment of Ironwood Drive and the North Commercial Planning Area is located at the entry/exit point of a scenic corridor. Muller Lane is identified as a ~~minor collector~~ Major Arterial road and Ironwood Drive is shown as a major collector in the Master Transportation Plan Map.

III. MASTER PLAN CONFORMANCE

Amendment #3 does not propose any changes to this section of the original document; therefore, in the interest of brevity it was not reproduced here. This section can be found in its entirety in the 2001 Nevada Northwest Specific Plan.

IV. DEVELOPMENT PLAN

A. Introduction

The focus and emphasis driving the Development Plan for Nevada Northwest LLC was architectural motif, integration with the Town and walkability. These elements form the backbone of a distinct community which creates a distinct "sense of place". This is established by details of design, such as the landscape treatment along all local streets and the integrated open space and trail/bikeway network within the development.

The principal land uses within Nevada Northwest LLC is residential and commercial. These ~~commercial~~ areas are proposed to be developed with a distinct feel of urban space and intensity~~ and with a European flair~~. The use of street trees, ~~round-a-bouts, old style European~~ development with integrated open spaces with walkable connectivity to nearby commercial, institutional and recreational spaces creates a sense of quality for the residential component of the specific plan.

Each Planning Area has a density based on the types of housing products, site constraints and surrounding amenities. Overall, the distinct character of the individual development areas will be tied into the overall Nevada Northwest LLC community through the use of compatible architectural finish materials, color, landscaping, lighting, and other design elements.

The Design Guidelines is the pictorial summary of all land use designations and the basis for the Development Standards described in Section VI. Commercial Development Areas are limited to the zoning districts in which they are located. Each residential Development Area is designated on the Development Plan and on the statistical summaries which have a target not-to-exceed residential density based on gross acres. Each Development Area has an approximate location, an estimated area in acres and a specific number of permitted dwelling units. During the site plan and tentative map stages of design, it is anticipated that the boundary configurations of each Development Area may vary slightly (not to exceed ten percent of the expanding Development Area) provided, however, that the density per gross acre is maintained.

B. Land Use and Density

1. Park and Open Space Sites

One distinct area is located within the Specific Plan site to accommodate the open space needs of the development. This open space area is identified in the Conceptual Open Space Plan Figure K. This open space area identified generally as the Martin Slough provides the 25% open space set aside required in Douglas County Code for the Single Family and Multi-Family Residential areas within a planned development. The commercial areas will provide the required 15% of parking areas for landscaping within the commercial area itself. The Martin Slough area consists of approximately 9.8 acres that will be the backbone of a trail system linking all of the specific plan areas. ~~Several o~~Based on County code, other open space amenities ~~are planned as well~~will be required for the 94 unit multifamily development in the south commercial planning area~~,~~ including "park like" improvements, ~~a Community meeting hall with small business center, Olympic size swimming pool, totland, basketball and volleyball court, a putting green and park with barbecue areas.~~ the number of which and type of amenities determined by Douglas County Code.

The open space sites also serve as the backbone to the Specific Plan drainage system. It is anticipated that portions of Slough will be suitable for placement of the bike/walking trail system.

Design and facilities planning of parks shall be to the satisfaction of the Douglas County Community Development Department.

All open space areas within the Specific Plan, not including the Martin Slough area, will be owned and maintained by a Homeowners Association or similar responsible entity, and shall be fully improved by the Nevada Northwest LLC Developer. Such improvements are to include but not be limited to grading, landscaping, installation of irrigation systems, utilities, and park equipment, and the improvement of abutting streets, curbs, gutters, walkways, sewer, water, storm drainage and other improvements. The Martin Slough area is offered for dedication to Douglas County for the benefit of Town of Minden. The Town anticipates using the Slough for an eventual linear park and watershed management area.

Unless otherwise stated, ~~T~~the type and amount of the specific open space improvements for each development area will be according to the schedule of improvements listed in Douglas County Code Section 20.664.120 C. and will be submitted with the Tentative Subdivision Map or Design Review for each Development Area for approval.

a. Open Space Construction Phasing

Open Space and Drainage improvements will be constructed per the Conceptual Phasing Plan (Figure E). The improvements will be constructed concurrent with building permits or site improvement permits as delineated on the plan.

2. Residential Planning Units

Compatibility between adjacent uses is of paramount importance in determining the specific locations of the land uses for Nevada Northwest LLC. The densities and housing types are arranged to provide for a compatible interface between uses.

The use of and arrangement of roads, landscaped areas and open spaces was employed to provide open space relief for higher density housing.

a. Single Family Detached Homes

The Single Family Detached Development Area is 30.78 acres in size and is proposed to accommodate higher residential densities in a single family detached setting. Net density is proposed at a target of 4.11 dwellings per gross acre with a total of 121 homes. These densities correspond to the Master Plan category of Receiving Area 3 to 12 dwelling units per acre. Single Family, as with all residential uses, are additionally subject to the Nevada Northwest LLC Design Guidelines to assure attractive community design. Areas closest to the existing Winhaven development would be restricted to single story units to provide for the privacy of the existing residents. This restricted area for multi-story buildings is delineated on Figure I. Furthermore, home sites directly adjacent to Lantana are a minimum of 9,000 square feet in size. For Amendment # 3, the conceptual site plan for the subject site within the South Commercial planning area includes up to 94 multifamily units which is the subject of this amendment. The conceptual elevations for these multifamily units is included within this Specific Plan Amendment (see Figure I).

b. Residential Townhomes

The Residential Townhome land use area is adjacent to the Martin Slough area. The area is proposed at 12.08 acres in size with a target of 12 dwelling units per gross acre based on zoning, and the Master Plan category of Receiving Area, 3 to 12 dwelling units per acre would correspond to this category. This would provide a total of 145 single family attached homes. The intended housing products to be constructed would include a combination of single family attached homes as well as stacked two-story multi-family units, between three and six units per building.

This location was chosen for multiple family use due to the proximity to the planned commercial areas, the existing Dreyer Ranch uses and the separation from lower density residential uses on and off the property.

c. Multifamily Residential

The Multifamily Residential area for Amendment #3 is located in the South Commercial planning area and is located on the northeast corner of Monte Vista

Avenue and Ironwood Drive. Based on the conceptual plan, this area is proposed at 5.93 acres in size with a maximum of 16 units per acre for a maximum of 94 units of total density. Amendment #2 has a multifamily residential area proposed at 5.07 acres in size with a maximum of approximately 10.84 units per acre with a maximum density of 55 units of total density.

3. Population

Nevada Northwest LLC will be developed in multiple phases, creating an incremental population increase over an estimated 15-year build-out cycle. The population increase, approximated using a standard of 2.7 persons per household, results in a resident population of approximately 1020 persons. The population of the Minden/Gardnerville area is expected to grow at a rate of 2.5 to 3 percent annually (DC Master Plan, 1996). Throughout its development phase, the project will represent a relatively consistent proportion of the area's total population. However, the project will contribute a lesser portion of the subregional population by the year 2010. By the year 2010 when the project is completed, the project population will represent approximately 6 percent of the projected population of Gardnerville/Minden.

The approximate number of residents based on 2.7 persons per household delineated by housing product type is estimated below:

RESIDENTIAL PRODUCT TYPE	NO. OF UNITS	POPULATION
Single Family Detached	201~~121~~	543~~338~~
Townhome/Multi-family	145	391
Mixed Use Commercial	88	238
Multifamily Residential	149	~~149~~402
TOTAL	~~354~~583	~~967~~1574

C. Circulation

The Nevada Northwest LLC Specific plan relies on, for the most part, the developed existing street network for primary access to US Hwy. 395. These primary points of access are the intersection of S.R. 88/US Hwy. 395, Ironwood Drive/US Hwy. 395, Lucerne Street/US Hwy 395, and the possible realignment of Muller Lane.

In 2001, ~~A~~a traffic analysis was performed by LSC Traffic Engineers which analyzed the impacts associated with Nevada Northwest LLC Specific Plan. The study indicates that the major road system, per the traffic study included in the appendix of this Specific Plan, can accommodate levels of service of C or better within Nevada Northwest LLC at project build-out. Additionally, the study which analyzed build-out traffic and levels of service projected to the year 2015. Based upon the study, project and background growth traffic can be accommodated by the proposed circulation system within Nevada Northwest LLC through the year 2015 and beyond. To maintain level of service standards required by NDOT and Douglas County, signal improvements will need to be made at various affected intersections as well as channelization improvements and signal coordination. The traffic study was prepared as a planning level document. As each development area moves forward with design review or tentative subdivision map plans and applications, a more detailed traffic analysis for each area will be prepared to address specific channelization, road striping and specific signal improvements and coordination. In 2017, an updated traffic study was prepared by Solaegui Engineers, Ltd. that considered changes in land use and related traffic impacts. These land use changes (replacing the casino/hotel commercial complex with single family, multifamily and neighborhood commercial land uses) significantly reduced the volume of projected traffic. The Solaegui traffic analysis was scoped by both NDOT and Douglas County transportation staff, with the final recommendations provided to both agencies. ~~The applicant has met with NDOT and County staff and has reached an understanding regarding the scope of the transportation system improvements and cost share recommendations for both NDOT and Town/County roads associated with the South Commercial planning area. As a result of these meetings, the applicant is in the process of preparing an NDOT encroachment permit application. It is anticipated that this permit will be submitted to NDOT prior to July 1, 2018~~. Based on the location of the site, it is anticipated that future development will make a pro-rata contribution towards the cost of a future signal at Lucerne Street and US Highway 395, consistent with prior approvals of the proposed multifamily residential site.

All rights-of-way within Nevada Northwest LLC shall be offered for dedication to the Town ~~of Gardnerville~~of Minden. The Nevada Northwest LLC Specific Plan identifies those measures to be included within the development of the Nevada Northwest LLC Specific Plan area ~~in order to~~to mitigate transportation impacts of the project.

1. US. Hwy. 395/State Route 88 Intersection

The Specific Plan phasing plan requires the construction complete signal and intersection improvements at this intersection with commencement of Phase 1 improvements within the South Commercial Planning Area. The scope of these improvements will be determined by the encroachment permit (by others) issued by NDOT.

~~a.~~2. U.S. Hwy. 395/Ironwood Drive/Lucerne Street

~~The Specific Plan requires that~~ The scope of the Lucerne Street intersection improvements will be determined by the encroachment permit issued by NDOT. The timing to provide for a signalized intersection at US 395 and Lucerne Street will be determined by NDOT. The applicant will contribute their pro-rata share towards future signal improvements for the Lucerne/US Hwy. 395 intersection, with the methodology to determine amount subject to the approval of Douglas County. ~~and that Ironwood Drive be converted to a right in-right out turning movement only with the completion of the connection to Lucerne Street from the Residential Planning Area or with the commencement of any commercial improvements within the South Commercial Planning Area beyond Phase 1.~~

~~b.~~3. U.S. Hwy. 395/Muller Lane

It is anticipated that Muller Lane will be realigned and placed on the Master Transportation Plan. When this occurs, then the Specific Plan requires that Muller Lane/U.S. Hwy. 395 intersection be signalized and the intersection improvements completed with completion of improvements within the North Commercial Planning Area.

4. Residential Streets

Street standards for residential streets and cul-de-sacs will meet Douglas County's urban street standards per the most current Design Manual. Local public street rights-of-way shall be offered for dedication to the Town of Minden. All street improvements shall be the responsibility of the applicable Development Area builder.

5. Adjacent Property Access

Access to the property directly adjacent to the south of the North Commercial Planning Area east shall be provided by one street stub connecting to the proposed realigned Muller Lane. Conceptual alignments of these connections are shown on Figure C-, "Conceptual Site Plans".

6. Non-Vehicular Circulation

In addition to the roadways, a system of hiking trails, sidewalks and bike lanes have been designed into the overall plan for Nevada Northwest LLC. The objective is to provide a safe and enjoyable system for bicycles and pedestrians to access schools, parks, commercial sites and open space areas. The intent is to encourage non-vehicular transportation within Nevada Northwest LLC and to provide a recreational and enjoyable experience for walkers, hikers, and cyclists. Construction of the hiking trail as part of the open space improvements within the single family detached development area will occur with the first phase of the development. Maintenance will be provided by a landscape assessment district formed to provide maintenance of all landscaped medians, parkways, and dedicated public open space areas. All other sidewalks and bike lanes will be constructed per the phasing plan. These facilities will be dedicated to Douglas County or the Town of Minden for maintenance.

D. Drainage Plan

The project site is located within the hydrologic basin of the Martin Slough (Slough), a tributary to the East Fork of the Carson River. Commencing at an existing diversion box located near Lampe Drive in Gardnerville, the Slough meanders through the Towns of Gardnerville and Minden collecting storm water and conveying some tailwater generated from adjoining agricultural fields. Along its three mile length upstream of the project site, the Slough is crossed by numerous public streets including U.S. Highway 395, Gilman Avenue, Zerolene Place, Sixth Street and Lucerne Street at the project's southeasterly limits. In addition to the street crossings, at the Chichester Estates project, the Slough is routed through an in-stream detention basin that serves to mitigate storm water impacts from that residential project and as a regional water quality improvement project. At its extreme westerly limits, prior its terminus in the Klauber Ponds, the Slough crosses beneath U.S. Highway 395 just downstream of the project site. Slightly upstream and just below the Lucerne Street crossing, the Slough traverses through that portion of project site proposed as open space and to be zoned as "Public Facilities".

A preliminary plan for collecting storm water generated within the project and conveying it to the Martin Slough system is provided on the plan entitled "Conceptual Grading Plan". This plan depicts possible pipeline alignments, locations of catch basins and discharge points to existing facilities and should be considered a general plan intended only to confirm the viability of such a collection system. A conceptual drainage plan providing additional analysis and recommendations for mitigation of storm water run-off from the project site is provided at Exhibit F to the appendix of this document. During final design efforts for each respective phase of the project, after final building locations and elevations are more defined, a detailed analysis of hydraulic conditions will be conducted and pipe sizes determined. This analysis will be provided to Douglas County and the Town of Minden for their review and approval prior to plan approval.

Based upon the master drainage plan included within this document, including the recommended mitigation measures, the proposed project can be developed consistent with Douglas County code without significant impacts to downstream or adjoining facilities.

E. Community Water System Plan

Water supply for the project will be provided by the Town of Minden by utilizing its existing supply sources and expanding its distribution system. As shown on the Conceptual Utility Plan, the greatest portion of the project site is located adjacent to and abuts Ironwood Drive and Lucerne Street. There exists within these streets relatively large diameter water distribution mains that convey and distribute water from the Town’s existing wells to the remainder of the system. Due west of the site approximately 700 feet, along Ironwood Drive-extended, is the Town’s largest production well, Well No. 4. The Town's second largest production well, Well No. 5, lies due east of the site, on the easterly side of the Winhaven development. Currently this area of the Town of Minden’s water system is well looped and large volumes of water can readily be distributed without significant pressure losses occurring.

A preliminary estimate of water system demands has been made based upon proposed land uses and their relative densities. This summary is provided in the appendix. Based upon the assumptions underlying these calculations, at buildout, this project will generate and additional daily demand of approximately 305 gallons per minute (gpm). Similarly, at project build-out, it is estimated that the project will require approximately 492 acre-feet annually (afa) of water rights.

A preliminary plan depicting the water distribution system improvement that will be required to provide water service to the proposed uses is shown on the “Conceptual Utility Plan”. This plan provides suggested pipeline alignments, valving configurations and a preliminary layout of fire hydrants demonstrating the feasibility of such improvements. As indicated on the plan, due to the site’s location, several connections to existing mains will be made and new mains constructed resulting in a well-looped water distribution system thereby minimizing potential pressure losses. This plan represents a “planning level effort” for these facilities and no attempt has been made to provide sizes of the mains that may be required. During final design efforts for the proposed phases a hydraulic model and analysis of the water system capabilities will be conducted to determine water main sizes and confirm fire flows can be delivered at acceptable pressures.

The following mitigation measures will be implemented within the project to minimize and reduce water demands;

1. Interior Water Consumption Reduction Measures

    a. Use of ultra-low flush toilets (1.5 gallons per flush) in all residential buildings.

    b. Use of water-saver type shower heads.

    c. Use of low-flow faucet fixtures.

2. Exterior Water Consumption Reduction Measures

a. The use of turf shall be limited and the use of drip irrigated landscaping areas throughout the project.

b. Landscape easements, right-of-way medians, entry' statements and all manufactured slopes shall be landscaped with drought tolerant species.

c. Use mulch and other inorganic and organic ground cover extensively in appropriate landscaped areas. Ground covering applied on top of soil improves the water-holding capacity of the soil by reducing evaporation and soil compaction.

d. Group plants of similar water demand to reduce over-irrigation of low-water using plants.

e. Drip irrigation or other water-conserving irrigation will be used where appropriate.

F. Sewage Collection Plan

The project site lies within the adopted Service Area of the Minden-Gardnerville Sanitation District (MGSD). MGSD operates waste treatment and disposal facilities for its service area under a Waste Discharge Permit issued and administered by Nevada Division of Environmental Protection (NDEP). In addition to treatment and disposal facilities, MGSD also operates and maintains public sewer mains within its service area.

A preliminary estimate has been made of sewage generated from proposed uses within this plan. Based upon the assumptions included within these calculations it is estimated that this project, through build-out, will generate an additional 0.23 million gallons per day of sewage. This volume represents approximately 929 equivalent dwelling units (EDU's) and is estimated to constructed over a 20-year period of time. MGSD has historically constructed additional system capacities as required and in compliance with its approved Facilities Plan.

As shown on the Conceptual Utility Plan, this site is located adjacent to Ironwood Drive and U.S. Highway 395 within which exist large diameter sewer interceptors. These interceptors convey sewage collected upstream of the site to the MGSD's plant located due westerly of the project site. To collect sewage generated within the South Commercial Planning Area, a series of small diameter sewer mains will be required; their general alignment is depicted on this same utility plan. Due to the relative elevations of the existing interceptors and administrative and physical impediments to constructing improvements with the right-of-way of U.S. Highway 395, it is anticipated that these collection system improvements will be connected to the existing interceptor within Ironwood Drive. So as not to disturb recently constructed street improvements, proposed mains will be connected, where possible, to existing stubs for mains. Depending on final design elevations, it may also be necessary to construct a new point of connection to the existing interceptor.

To collect sewage generated within the North Commercial Planning Area a new sewer main will be required. It is proposed and anticipated that this new main will connect to the existing manhole located on the easterly side of U.S. Highway 395 immediately upstream of MGSD's headworks and extended northerly from this point to the proposed Muller Parkway. From this main extension a series of mains will be required throughout both the proposed commercial areas and the residential areas to collect and convey sewage generated within these portions of the plan. The Conceptual Utility Plan referenced above provides a plan of main alignments and demonstrates the general feasibility of collecting sewage generated within this portion of the project. This plan should be considered a "planning level effort". During final design detailed plans, including hydraulic analysis and sizes of proposed mains, will be prepared and submitted to MGSD for their review and approval.

G. Public Utilities and Services

Public Utilities and Services at Nevada Northwest LLC are identified below followed by the responsible servicing agency. The servicing agencies, identified below, have indicated they will be able to supply the project's anticipated demand. Improvements will be made to existing facilities and services as applicable prior to project build-out and occupancy. Subdivision design shall consider appropriate adjacent tract requirements for utilities and shall coordinate alignments and facility sizing according to requirements by the Community Development Department.

UTILITY OR SERVICE	SERVICING AGENCY	IMPLEMENTATION
Telephone	~~Verizon~~Frontier	Extension of service pursuant to Agency requirements
Electric pursuant to	~~Sierra Pacific Power~~NV Energy	Extension of service Agency requirements
Gas	Southwest Gas	Extension of service pursuant to Agency requirements
Cable	~~AT&T~~ Charter	Extension of service pursuant to Agency requirements

Sewer	MGSD	Extension of service pursuant to Agency requirements
Water	Town of Minden	Extension of service pursuant to Agency requirements
Refuse Collection	Town of Minden	Extension of service pursuant to Agency requirements
Refuse Disposal	Douglas Disposal	Extension of service pursuant to Agency requirements

H. Grading Concept

The Nevada Northwest LLC Specific Plan site contains flat or gently sloping terrain averaging between one and two percent in slope. These areas are proposed to be graded so as to provide efficient drainage, efficient sanitary sewer operation and balanced cut and fill within phases. Within these Development Areas, grading is anticipated to average less than 5000 cubic yards per acre. These Development Areas are subject to general grading standards applicable to conventional development.

I. Construction and Maintenance Responsibility

Due to the amount of public improvements, open space and landscaped areas provided within Nevada Northwest LLC, provisions for construction and maintenance responsibility of public, semi-public and private open space is essential. Table 1 "Infrastructure Maintenance and Implementation", identifies street improvements, parks, specific types of open space and the party responsible for continued maintenance of the open space area, unless otherwise determined by modification to this Specific Plan. It is anticipated that all landscaped areas along road medians and parkways, park and bike trails would be maintained by a public entity funded through a landscape assessment district. If the public agency is unwilling or unable to accept these areas for maintenance, then a landscape assessment district board should be formed from the property owners in the area to administer private contracts for maintenance. If this cannot be accomplished, then a property owners association will be formed for each separate development area. Landscape improvements (~~inside and~~ outside of rights-of-way) within the development area shall be the responsibility of each POA for that area.

Table 1

ITEM	IMPROVEMENT RESPONSIBILITY	MAINTENANCE RESPONSIBILITY
1. STREETS		
a. Muller Lane Realigned	DEV	DC
b. Local Streets	DEV	MIN
2. SIDEWALKS		
~~c~~a. In R/W or Easement	DEV	MIN
3. OPEN SPACE	DEV	LAD
4. LANDSCAPING		
a. In Muller Lane Right-of-way	DEV	DC
b. In Local Street Easements	DEV	PO
5. PEDESTRIAN TRAIL	DEV	MIN
6. WATER SYSTEM	DEV	MIN
7. SEWER SYSTEM	DEV	MGSD

KEY TO ABBREVIATIONS:

DEV:	Nevada Northwest LLC Companies	MIN:	Town of Minden
DC:	Douglas County	MGSD:	Minden-Gardnerville Sanitation District
POA:	Property Owners Association	LAD:	Landscape Assessment District
PO:	Property Owner		

All final improvements are subject to Douglas County's approval and determination during the Development Review application process.

V. DESIGN GUIDELINES

A. Purpose and Intent

The purpose of this section of the Specific Plan is to provide~~.~~ design criteria for future potential development of the Nevada Northwest LLC property. Design statements and graphic illustrations are included regarding the following:

1. Community Design Theme
2. Open Space and Recreation

As outlined in Section VI~~I~~. ~~M.~~I., "Design Guidelines Conformance,"~~,~~ all development subject to this amendment within Nevada Northwest LLC shall consider the applicable Design Guidelines contained in this section, and shall utilize these criteria in the design of each individual planning area as appropriate.

The following pages outline the design guidelines for the commercial and residential areas, as well as the guidelines and plans for the open space areas.

SOUTH COMMERCIAL PLANNING AREA

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Purpose: **DESIGN CRITERIA GUIDELINES**

The design criteria/guidelines and supporting documents (plans, perspectives, etc.) are intended to provide conceptual sketches for the South Commercial Planning Area. It is intended to assist in the visualization of the project's size, density, scale, orientation, and theming. The supporting documents are intended to provide possible solutions that support the project 's mission and subsequent goals. The design criteria/guidelines and supporting documents are not intended to limit or mandate the final design, as continued investigation into a project 's goals and needs often produces a more effective and coherent design. The purpose of these guidelines is not to supplant but to support the adopted Douglas County Design Criteria and Improvements Standards and articulate the character of the areas within the Nevada Northwest Specific Plan as amended.

Mission Statement:

To create a tourist and retail district that will strengthen the current recreational and shopping district of Minden and give tourists and the residents of Douglas County an exciting place to shop and~~,~~ dine. ~~and participate in Nevada's greatest past time.~~

Goals:

- A ~~European~~ Intermountain west village theme is envisioned to capitalize on the diversity of and interest in ~~Europe's~~ areas history, culture and customs.
- The district will capitalize on the majestic Carson Valley views of the Sierras ~~and will provide a plaza for street festivals, outdoor markets, and outdoor dining~~.
- A path system will be designed to encourage pedestrians to comfortably walk from one side of the development to the other and beyond.
- ~~Multiple paths into the retail/restaurant village (including links from hotel/casino, surrounding neighborhood, and parking) will increase foot traffic and year-round use.~~
- ~~Landmarks and visual nodes will be integrated within the district to provide distinguishing elements, meeting places, assist in way finding, and encourage exploration.~~
- ~~Retail shops and restaurants should be placed in close proximity to one another and linked with shared plazas, planters, and green spaces. Parking directly adjacent to storefronts provides the most convenient access but would otherwise destroy the character and nature of a European Village. Parking within the retail/restaurant village should be minimized if not eliminated entirely.~~
- ~~Recreation venues such as trails for bike, skate, and scooter rentals, arcades, miniature golf, and amusement rides should be considered for children as well as adults.~~
- ~~Future integration of professional offices at the district periphery or above retail would provide added diversity.~~

General Design Principles

Required Theme Materials

All new commercial buildings in the south commercial planning area will utilize at least two of the following theme materials. Examples of how these theme materials can be included in building architecture can be found in “Exhibit B - Commercial Building Elevations” found in the appendix :

- **Heavy timber columns or supports**
- **Stucco**
- **Rusted Tin awnings or wainscoting**
- **Red brick**

Desirable elements

The most desirable qualities and design elements for this project include:

1. Richness of surface and texture;
2. ~~Significant w~~Wall articulation and relief (insets, canopies~~, arcades, colonnades, balconies~~);
3. Multiple height~~, pitched~~ roofs;
4. Pedestrian accessibility with parking to separate it from the road way;
5. Articulated mass and bulk; articulated wall surfaces;
6. ~~Courtyards and Plazas~~;
7. ~~Outside dining;~~
8. ~~Separation between pedestrians and automobiles;~~
9. Buildings should not look the same, but instead express respect and complement one another. Similar characteristics should include but are not limited to: Design, style, material, and color;
10. ~~Places for the public to sit or stop. (Fountains, benches, obelisks, terraces, etc.);~~
11. ~~Visual Complexity (street lamps, trees, lights, kiosks, signs, canopies and other landscaping).~~

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Undesirable Elements

The elements to avoid or minimize include:

1. Highly reflective surfaces;
2. Large blank, unarticulated wall surfaces;
3. Unpainted concrete precision block walls;

4. Reflective glass;

5. Reflective Corrugated metal siding;

6. Plastic siding;

7. Irregular, modernistic window shapes and rhythm;

8. Square "boxlike" buildings without any building articulation or fenestration as described in these guidelines.;

9. Standing seam metal walls; and

10. Mix of unrelated styles.

Height

Building heights shall follow the provisions found in Title 20 and in the Douglas County Design Criteria and ImprovementStandards. ~~ould relate to open spaces to allow maximum sun and ventilation as well as provide protection from prevailing winds and enhance public views of surrounding mountains. The height of the building should lend itself to a personal scale and enhance the pedestrian feeling to the plaza space as well as the street side of the buildings.~~

~~Taller structures should be reserved for distinguishing landmarks and nodes. (i.e. clocktowers, monuments, etc.)~~

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Massing

Large buildings, which give the appearance of "square box" buildings are generally unattractive and detract from the overall scale and characteristic of the design. There are several ways to increase the visual complexity of the project and reduce the appearance of large buildings.

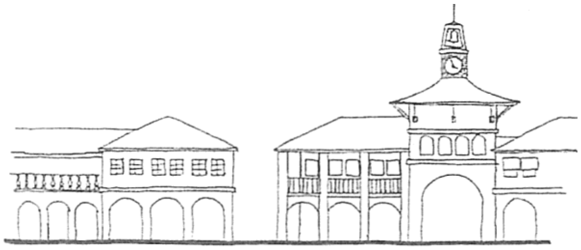
1. Vary the planes of the exterior walls in depth and/or direction

2. Vary the height of the building so that it appears to be divided into distinct massing elements. Many buildings or appearance thereof add to the diversity.

3. Articulate the different parts of a building's façade by arrangement of façade elements or a change in materials.

4. Use landscaping and architectural detailing at the ground level to lessen the impact of an otherwise bulky building.

5. Avoid blank walls at the ground floor level. Utilize windows, wall articulation, change in material or other features.



Preferred

Scale

Scale, for purposes here, is the relationship between building size and the size of adjoining permanent structures. It is also how the proposed building's size relates to the size of a human being. Large scale building elements will appear imposing if they are situated in a visual environment of a smaller scale.

(Picture Deleted)

1. Building scale can be reduced through window patterns, structural bays, roof overhangs, siding, awnings, moldings, fixtures and details.

2. The scale of buildings should be carefully related to adjacent pedestrian areas, streets and buildings.

3. Large dominating buildings should be broken up by: (i) landscape materials; (ii) adding awnings, eaves, windows or other architectural ornamentation; (iii) creating horizontal emphasis; and (iv) use of combinations of complementary colors.

~~4. Utilize "infill" structures to create transitions in bulk and scale between large buildings and adjacent smaller buildings.~~

(Picture Deleted)

Color

1. The palette of colors can be selected from those found in the natural environment.

2. The dominant color of new buildings should relate to the inherent color of the primary building's finish materials.

3. Large areas of bright white color should be avoided. While subdued colors usually work best as dominant overall color, a bright trim or awning color might be appropriate if it can be shown to enhance the nearby visual environment.

4. The color palette chosen for a building should be compatible with the colors of adjacent buildings.

5. Wherever possible, minimize the number of colors appearing on the building exterior. Small commercial buildings should use no more than four colors, except when the design warrants additional colors.

6. Depending on the overall color scheme, accent colors may be effective in highlighting the dominant color by providing contrast or by harmonizing with the dominant color.

7. Primary colors shall only be used to accent building elements, such as door and window frames

and architectural details. Bright or intense colors (but not including fluorescent colors) can also be used to accent appropriate scale and proportion or to promote visual interest in harmony with the immediate environment.

8. This project is of a particular ~~historical~~ character or architectural style, and the exterior color should be in keeping with the buildings proposed character and style.

9. Architectural detailing should complement the façade and tie in with adjacent buildings.

10. Accent colors for trim should be used sparingly and be limited in number for each building. Accent colors on adjacent buildings should be chosen to complement one another.

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Architectural Design Guidelines

Exterior Walls

1. Buildings shall be designed ~~to avoid a simple "boxlike" structure.~~ With ~~H~~horizontal or vertical wall articulation ~~should be~~ expressed through the use of ~~full roofs,~~ recesses, entries, and awnings.~~,~~ ~~second floor setbacks and/or covered arcades and balconies.~~

2. The following materials are not considered appropriate for primary exterior walls:

   a. Standing seam metal walls;
   b. Plywood (painted or otherwise);
   c. Corrugated fiberglass;
   d. Asphalt shingles;
   e. Illuminated sidings
   f. Plastic laminate;
   g. Unmilled, bare aluminum;
   h. Painted white brick; and
   i. Unpainted concrete block/precision block with smooth finish.

~~3. Freestanding buildings with walls at or less than 100 ft. from a curb line should not have continuous, visually unbroken walls. The front plane of the wall shall be a maximum 40 ft. in length, at which point horizontal or vertical articulation is required in order to be consistent with these guidelines. This articulation could be established through the use of varying front wall setbacks, multi-planed roofs, second floor setbacks, porches, arcades, awnings recessed entries, balconies, etc.~~

~~4. Retail commercial storefront construction should provide a minimum 60% open exposure to the street. This exposure can be achieved through the use of windows, glass doors or open façades. Storefronts employing more than 40% solid, opaque walls are generally unacceptable. Retail windows need something behind them, not just blinds.~~

(Picture Deleted)

~~Roofs~~ (Section Deleted)

1. ~~The roofline shall not nm in a continuous plane for more than 90 ft. without offsetting or jogging the roof plan or the addition of architectural elements such as chimneys, dormers, etc.~~

2. ~~Nearly vertical roofs will not meet the intent of these guidelines.~~

Color

The dominant color of new buildings should be similar to the inherent color of earth tones. The following colors are strongly discouraged as primary wall colors;

a. Aquamarine;
b. Bright or hunters orange;
c. Chartreuse;
d. Cherry or "fire engine" red;
e. Chrome yellow;
f. All day-glow colors;
g. Purple
h. Turquoise; and
i. In general no bright colors should be used as a primary wall color.

The following soft earthtone colors are recommended as primary wall colors:

1. Brick;
2. Cobblestone
3. In general any earth tone or true material color should be used as a primary color.

Other colors within the above color scheme may also be acceptable.

Awnings

1. General use of awnings along a row of alike buildings should be restricted to awnings of the same form and location. Color of the awnings should be consistent with the heavy timber and rusted tin motif and a minimum eight-foot vertical clearance to the ground plane is required.

2. Signage painted on the awnings themselves ~~will be restricted to the awning's flap (valance) or to the end panels of angles, curved or box awnings~~ is not permitted.

3. Internal illumination of awnings ~~should be used conservatively~~ is not permitted.

~~Architectural Landscape Design Guidelines~~
(Section Deleted)

~~Plazas~~

~~Plazas and town squares will play a crucial role in creating the vitality and character of a European village. These spaces will serve as connections between the hotel/casino and the restaurant/retail areas and should provide places to stop and sit as well as encourage movement throughout the village.~~

1. ~~Landscaping should extend building themes through the use of color, material, and pattern.~~

2. ~~Signage, kiosks, and banners should be integrated to assist in way finding and add to the visual complexity and color of the plazas.~~

3. ~~Various forms of seating such as fountains, planters, benches, and steps should be incorporated throughout the plazas. There should be ample opportunities to sit in both the sun and shade.~~

4. ~~Patterns in the plaza floors should be created with material, texture, and color.~~

5. ~~Street lamps should be consistent with overall theme and should be provide adequate lighting for pedestrian safety and encourage nighttime use.~~

6. ~~Bicycle parking should be provided and integrated within landscape design.~~

7. ~~Plaza spaces should be flexible and versatile so they are able to accommodate outdoor dining, open markets, and pedestrian traffic in various modes and speeds.~~

8. ~~Planters of various sizes should be integrated to accommodate outdoor cafes, rest areas, and green spaces.~~

~~**Colonnades**~~

~~Colonnades and arcades are effective transitions from the plazas to the retail shops. Covered walkways provide shelter in inclement weather and shade in the summer months. These areas especially need careful integration and collaboration between architecture and landscape architecture.~~

1. ~~Flowers and plants in hanging baskets or pots should be integrated with colonnade structures.~~

2. ~~Raised walkways would help define arcades from the plaza and provide opportunities for terraces, platforms, and steps that create distinct entries and sitting spaces.~~

3. ~~Landscaping should be used conservatively in areas where views and connections to the plaza are sought after and in other conditions used to create more intimate walkways.~~

4. ~~Lighting fixtures should be consistent with overall theme and provide adequate lighting for security.~~

DESIGN CRITERIA / GUIDELINES

RESIDENTIAL

Mission Statement

To establish Nevada Northwest LLC as a master planned community that provides an attractive landscaped environment with an "open space and recreational lifestyle" appropriate to a residential community.

To provide a defined "sense of community" by creating unique major project entryways to Nevada Northwest LLC that enhance the community appearance.

To create special streetscape and landscape features along all local streets and main drive isles in parking areas that provide a safe and aesthetically pleasing drive through and from Nevada Northwest LLC.

To provide pedestrian, hiking and biking access that allows for the enjoyment of the open space setting and recreational theme of the Nevada Northwest LLC community.

To utilize landscaping and site planning techniques in a manner which respects environmental conditions.

General Design Principles

Desirable elements

The most desirable qualities and design elements for this project include:

1. Richness of surface and texture;
2. Significant wall articulation (insets, canopies, colonnades, balconies);
3. Multiple height, pitched roofs;
4. Pedestrian accessibility with parking to separate it from the roadway;
5. Articulated mass and bulk;
6. Interesting and articulated wall surfaces;
7. Separation between pedestrians and automobiles on main thoroughfares;

8. Complementary buildings, buildings do not want to look the same, yet want to express respect to one another. Similar characteristics should include but not limited to: Design, style, material, and color;

9. Visual Complexity (street lamps, trees, lights, ~~kiosks, signs, canopies,~~ and other landscaping).

Undesirable Elements

The elements to avoid or minimize include:

1. Highly reflective surfaces;

2. Large blank, unarticulated wall surfaces;

3. Unpainted concrete precision block walls;

4. Reflective glass;

5. Corrugated metal siding;

6. Plastic siding;

7. Irregular, modernistic window shapes and rhythm;

8. Square "boxlike" buildings;

9. Standing seam metal wall~~it~~s; and

10. Mix of unrelated styles.

Height

Building heights should relate to open spaces to allow maximum sun and ventilation as well as provide protection from prevailing winds. ~~Building heights near existing neighborhoods are restricted to single story to preserve the privacy of these existing neighborhoods~~.

Massing

Large buildings, which give the appearance of "square box" buildings are generally unattractive and detract from the overall scale and characteristic of the design. There are several ways to increase the visual complexity of the project and reduce the appearance of large buildings.

1. Vary the planes of the exterior walls in depth and/or direction

2. Vary the height of the building so that it appears to be divided into distinct massing elements. Many buildings or appearance thereof add to the diversity.

3. Articulate the different pans of a building's façade by arrangement of façade elements or a change in materials.

4. Use landscaping and architectural detailing at the ground level to lessen the impact of an otherwise bulky building.

5. Avoid blank walls at the ground floor level. Utilize windows, wall articulation, change in material, or other features.

Scale

Scale, for purposes here, is the relationship between building size and the size of adjoining permanent structures. It is also how the proposed building's size relates to the size of a human being. Large-scale building elements will appear imposing if they are situated in a visual environment of a smaller scale.

1. Building scale can be reduced through window patterns, structural bays, roof overhangs, siding, awnings, moldings, fixtures, and details.

2. The scale of buildings should be carefully related to adjacent pedestrian areas, streets, and buildings.

3. Large dominating buildings should be broken up by (i) landscape materials; (ii) adding awnings, eaves, windows, or other architectural ornamentation; (iii) creating horizontal emphasis; and (iv) use of combinations of complementary colors.

4. Utilize "infill" structures to create transitions in bulk and scale between large buildings and adjacent smaller buildings.

Color

1. The palette of colors can be selected from those found in the natural environment.

2. The dominant color of new buildings should relate to the inherent color of the primary building's finish materials.

3. Large areas of bright white color should be avoided.

4. The color palette chosen for a building should be compatible with the colors of adjacent buildings.

5. Wherever possible, minimize the number of colors appearing on the building exterior.

6. Depending on the overall color scheme, accent colors may be effective in highlighting the dominant color by providing contrast or by harmonizing with the dominant color.

7. Primary colors shall only be used to accent building elements, such as door and window frames and architectural details. Bright or intense colors (but not including fluorescent colors) can also be used to accent appropriate scale and proportion or to promote visual interest in harmony with the immediate environment.

8. This project is of a particular historical character or architectural style, and the exterior color should be in keeping with the buildings proposed character and style.

9. Architectural detailing should complement the façade and tie in with adjacent buildings.

10. Accent colors for trim should be used sparingly and be limited in number for each building. Accent colors on adjacent buildings should be chosen to complement one another.

Architectural Design Guidelines

<u>Exterior Walls</u>

1. The followings material are not considered appropriate for primary exterior walls:

    a. Standing seam metal walls;
    b. Plywood (painted or otherwise);
    c. Corrugated fiberglass;
    d. Asphalt shingles;
    e. Illuminated sidings
    f. Plastic laminate;
    g. Unmilled, bare aluminum;
    h. Painted white brick; and
    i. Unpainted concrete block/precision block with smooth finish.

Roofs

1. The rooflines in the differing restricted height areas shall have a minimum build-up plate line established with the planned development application. Above this line, residential structures may have varying roof lines and pitches.

2. Roof materials will be of the same color and material established at the time of Planned Development application.

Color

The dominant color of new buildings should be similar to the inherent color of earth tones. The following colors are strongly discouraged as primary wall colors;

1. Aquamarine;

2. Bright or hunter's orange;

3. Chartreuse;

4. Cherry or "fire engine" red;

5. Chrome yellow;

6. All day-glow colors:

7. Purple

8. Turquoise; and

9. Pastels

10. In central no bright colors should be used as a primary color.

The following soft earth tone colors are recommended as primary wall colors:

1. Brick;

2. Cobblestone

3. In general any earth tone or true material color should be used as a primary color.

Other colors within the above color scheme may also be acceptable.

Streets and Streetscapes

1. Street layouts will consider pedestrian access and connections between long stretches of road and between cul-de-sac termination points.

2. The use of terminal greens and joint use of necessary detention ponds as landscaped are will be considered in the design of the residential areas.

3. "Snout" houses are not permitted. Garages are not permitted to be the dominant feature of the streetscape, and all single- family homes must be either rear loaded via an alley or garages accessed from main roads must be recessed from the front building line, preferably with the garage doors not directly facing the street.

4. On main thoroughfares, r~~R~~oad designs will use street profiles with sidewalks buffered by parkways away from the street. The use of chicanes at intersections is encouraged to slow traffic, define on-street parking areas, and provide for traffic calming.

LANDSCAPE DESIGN PROGRAM

GENERAL DESIGN

PURPOSE

The Landscape Design Program serves as a unifying design element with transition designed between land uses. It provides basic guidelines for design, selection and implementation of landscaping. The Landscape Design Program provides specific design treatments for each land use. The intent is to enhance the visual quality of the environment, screen views, buffer noise, and contribute to the overall aesthetics of the Nevada Northwest Specific Plan.

GENERAL GUIDELINES

The general guidelines listed below are applicable to all land use designations throughout the Specific Plan area.

1. Landscaping should be used to soften, frame, and enhance the visual quality of the environment, screen undesirable views and provide visual relief for large expanses of parking and structural exteriors.

2. Landscaping should function to enhance land use and user comfort. These functions may include wind deflection, moderation of heat and glare, muffling noise and reducing soil erosion.

3. Landscaping should be in scale with adjacent structures and be of appropriate size and maturity to accomplish its intended purpose.

4. Landscaping should incorporate multi-layering of plant materials by including trees and shrubs in addition to grass or ground cover.

5. Vines and climbing plants integrated upon buildings, trellises, and perimeter walls are strongly encouraged on otherwise undetailed walls or surfaces.

6. All plant materials should be spaced so that they do not interfere with adequate lighting or restrict access to emergency apparatus such as fire hydrants or fire alarm boxes.

7. Landscaping should allow adequate sight distance for motorists, particularly at neighborhood and project entries.

8. Areas for onsite retention of water should emulate natural forms such as ponds or streams. These features should incorporate the use of earth

berming, native rock or boulders and indigenous wetland or riparian vegetation.

9. All efforts shall be made to incorporate existing trees and other vegetation and natural features into the fabric of the landscape setting. Before final site planning is completed, areas or existing vegetation shall be located for incorporation into the final site plan where practicality and grading allow for preservation.

XERISCAPEIWATER CONSERVATION

1. The Xeriscape concept should be used in the development of all landscaping; plants of similar water use should be grouped to reduce irrigation needs.

2. Use of lawn should be limited to areas for public use, not as groundcover treatment.

3. Soil amendments and surface mulching of landscape areas shall be provided to increase water retention capacity of native soil.

LANDSCAPE ZONE GUIDELINES AND DESIGN THEMES

PURPOSE

Landscape concepts have been organized into landscape "zones" according to their hierarchy as visual elements, specific design, and implementation characteristics. The landscape concept for each zone consists of a primary palette of recommended plant materials, recommended design techniques, and minimum standards for landscape implementation.

DESIGN THEMES

Zone 1 -Tourist Commercial

The Tourist Commercial land designation is intended to support the Casino, Hotel Lodging, Recreational Vehicles (RV), and support uses. Extensive landscaping will be needed to enhance the Casino atmosphere.

The plant palette for this zone includes a rich variety of native and ornamental plant species. Entry areas and focal points are punctuated with masses of perennial color to enhance the casino resort image during the spring, summer, and autumn months. Areas of turf should provide for specific limited recreational opportunities where appropriate. Ornamental trees and shrub planting should define use areas, complement building architecture, and provide seasonal interest.

Zone 2 - Commercial

The Commercial land use designation is intended to provide commercial lands for public use. A major element in developing land within this designation is to provide landscaping that complements the architectural elements of the design guidelines. The Commercial boulevard is a key gateway and circulation component of the plan for this zone. It provides an opportunity for a strong first impression and defining element of the plan.

Zone 3 – Multi-Family

The Multi-Family land designation is intended to provide various types of housing opportunities ranging from single family detached units to townhomes. Emphasis on buffer yards, formal planting yards, and pedestrian friendly streetscapes are key elements of this multi-density setting.

Landscape planting in this zone should enhance the identity of the various multi-family projects. Landscape screening with trees and shrubs for privacy is of primary importance. Smaller scale, people friendly spaces such as courtyards or pocket parks create a sense of neighborhoods within the larger framework of the multi-family zone. Turf areas should be provided for passive, family-oriented recreation. Durable planting of shrubs, trees, and perennial color will define spaces, create a sense of identity, and provide seasonal interest. Occasional areas of perennial color are included to add detail and interest.

Zone 4 – Residential

The Residential land use designations are intended to provide low density residential housing opportunities.

Private homeowner landscaping should emphasize the use of indigenous and adaptive species with very limited areas of turf or ornamental planting. In this way, the residential areas will blend in color and texture with the surrounding environment. Graded areas should be protected from erosion and re-vegetated with native species.

Zone 5 – Open Space

The Open Space land use designation is intended to provide for and promote the natural character of the area.

VI. IMPLEMENTATION

A. Purpose and Intent

The purpose and intent of the Implementation Section is to establish direction and procedures for the implementation and administration of the Nevada Northwest LLC Specific Plan including annexation, entitlements, conformance, revisions and alternative financing programs. It also serves as the zoning provisions governing the future development of Nevada Northwest LLC.

These standards were formulated to insure compliance with the spirit and intent of the Douglas County Zoning Code (Title 20). This Specific Plan provides for innovative community design and site planning which is consistent with orderly development along with a logical and timely sequence of governmental review.

B. Development Standards

General Provisions

1) All Douglas County Zoning Regulations in effect at the time of adoption of the Nevada Northwest LLC Specific Plan shall apply, except where expressly addressed and/or modified by the Nevada Northwest LLC Specific Plan. (See Appendix herein for applicable Douglas County zoning requirements.)

2) In addition to the Nevada Northwest LLC Development Standards, development within the project is subject to the applicable Nevada Northwest LLC Design Guidelines contained in Section V of this Specific Plan. All subsequent tentative maps, special use permits, site plans, and planned residential developments etc., shall be reviewed to determine consistency with these Development Standards and Design Guidelines.

3) If any regulation, condition, program or portion of this Specific Plan is held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct and independent provision, and the invalidity of such provision shall not affect the validity of the remaining provisions hereof.

4) If a situation arises which is not sufficiently addressed in the Specific Plan or is not clearly understandable, then the Community Development Director shall render a determination or appropriate regulation deemed consistent with the intent of the Specific Plan and/or the Douglas County Development Code.

5) The Development Standards of the Nevada Northwest LLC Specific Plan were established in accordance with Douglas County Code Section 20.612. If, at any time, a conflict arises between the Nevada Northwest LLC Specific Plan

Development Standards and the currently adopted Douglas County Code, or any future modification thereof, the Nevada Northwest LLC Specific Plan Development Standards shall prevail and be deemed applicable, unless otherwise provided herein.

6) The development must comply with all applicable subdivision and construction requirements in effect at the time of development, except as modified herein.

7) Construction of drainage facilities shall comply with the requirements of the Douglas County. Maintenance of drainage facilities having regional significance shall be maintained by the Town of Minden.

8) Sewer facilities shall be designed and constructed in accordance with the requirements of the Minden-Gardnerville Sanitation District.

9) Community water system improvements shall be designed and constructed in accordance with the Town of Minden requirements.

10) All improvements within public street rights-of-way and landscape easements shall be installed, maintained and paid for by the responsible party as stated in Section IV., Table 1, Infrastructure Maintenance and Implementation.

11) The project's gross density is computed by dividing the total number of dwelling units in the Specific Plan area by the total number of acres in the Specific Plan area.

~~1)~~12) The residential density is computed by dividing the total number of dwelling units in the zoning district in which it is located by the gross residential acres designated for that zoning district. The gross residential acres of a Planning Area shall be the total number of acres within that Planning Area which are to be developed for residential uses, including but not limited to residential building sites, local streets, driveways, private recreation, landscaping and open space areas for the use of the residents of the Planning Area, including additional publicly and/or privately-owned open space within the individual designated R~~r~~esidential Planning Area, minor easements serving the Planning Area and customary uses and structures accessory to residential development. Open Space will be computed by determining the net acreage of the planning areas, which is exclusive of road rights-of-way proposed to be dedicated to a public entity and delineated public and private open space areas. The requirement to provide 25% open space will be determined from the net acreage as described herein. For areas receiving development right transfers, open space requirements are waived per Douglas County Code. The Multifamily development area and the single family residential uses in the south commercial planning ~~may~~area may use the open space area dedicated along the Martin Slough as credit towards open space requirements. All of the density in the R~~r~~esidential P~~p~~lanning A~~a~~rea must use TDR's which exempts this area from the open space requirements. Therefore, the 13.91 acres of dedicated open space in the overall specific plan is available as a credit towards the 4.73 acres of open space required for the single family residential development in the south commercial planning area.

13) The Residential Planning Area must utilize transfer of development rights. To fully realize the planned ~~290~~266 unit density, all units must be transferred to this area. This transfer must be made in compliance with Douglas County Code together with any future amendments.

14) A planned development application must be filed and approved for the entire Residential Planning Area and for the single family residential area in the South Commercial Planning Area, and the North Commercial Planning Area. This may be filed in conjunction with a tentative subdivision map or design review approval.

15) Future development in the Residential Planning Area shall comply with the building height restrictions depicted in the Figure entitled "Residential Building Story Restrictions".

16) All commercial building heights shall comply with the zoning district height restrictions per the zoning district in which they are located. ~~Exceptions and variances to building heights in the area zoned Tourist Commercial are approved per Figure J for the heights indicated.~~

17) Minor modifications to Development Area boundaries may result from final road alignment and/or final subdivision map modifications. Such minor modifications shall be permitted as provided in Section VI. N. 2., "Minor Modifications".

18) Design Review applications are required to be filed and approved prior to commercial or multifamily construction within the North or South Commercial Planning Areas. Tentative and Final Subdivision Map(s)/ Planned Development applications are required to be filed for the Residential Planning Area and for the Single Family Residential area in the South Commercial Planning Area prior to construction within the Development Area.

19) A Landscape Assessment District is required to be formed for maintenance of facilities as outlined in Section IV., Table 1, Infrastructure Maintenance and Implementation.

20) The Water Conveyance Advisory Committee shall review all subsequent development proposals. Piping of irrigation ditches shall comply with Title 20.100.060, 070 & 080, and direction of the Water Conveyance Advisory Committee as may be imposed on future applications.

21) The drainage facilities serving the Specific Plan shall provide for the use of Low Impact Development measures (LID), or if not feasible, use and regular

maintenance of sand/oil separators.

22) Annexation to the Town of Minden and MGSD is required prior to issuance of a building permit or recording of a final subdivision map or commercial development on any site within the Specific Plan.

23) The development shall adhere to the requirements of the Douglas County “Right to Farm” ordinance.

24) If any historically significant artifacts are encountered during excavation or construction on the site, construction must cease in the area affected and the resource must be cataloged and/or recovered by an Archaeologist. A report of its findings must be filed with the State Historic Preservation Office.

25) Traffic control devices will be constructed consistent with Douglas County Master Plan Policies 10.19.02.1 through 10.19.02.5 and consistent with Title 20 of Douglas County Code.

26) All Single Family Detached homes within the Specific Plan will be fenced and have front yard landscaping (including street trees, if within a parkway) as a condition of the issuance of a certificate of occupancy for each unit.

27) Where the Nevada Northwest LLC Development standards are silent or do not address specific needs, Douglas County Code and Douglas County Design Criteria and Improvement Standards, adopted September 17, 1998, and subsequent amendments, shall prevail.

28) The Nevada Northwest LLC Specific Plan is valid for 3~~2~~0 years after the effective date of the ordinance adoption by the Douglas County Commission.

29) Phasing of improvements will comply with the phasing plan Figure E, unless otherwise approved through the tentative map or planned development permit.

30) Future traffic improvements must comply with the recommendations contained within the Traffic Impact Analysis dated July 10, 2001 prepared by LSC Traffic Engineers as well as all approved amendments and updates to the study. Increases in commercial floor area or residential density within the planning areas may require updates to the traffic study, and as a result additional mitigation may be required.

31) Possible wetlands may be encountered at the proposed residential street intersecting Lucerne Street. A wetlands delineation will be conducted in this area, the results of which will be provided with the improvement plans and any required mitigation.

32) The North Commercial Planning Area cannot be constructed until the Muller

Lane connection as shown on Figure D is completed.

B. Governmental Processing

The Douglas County is responsible for the processing and administration of the Nevada Northwest LLC Specific Plan, including on-going and subsequent applications prescribed by state and local statutes relating to the development of the Nevada Northwest LLC property.

C. Master Plan Amendments/Updates

In conjunction with the processing of the Nevada Northwest LLC Specific Plan, a Master Plan Amendment was required in order to revise locations of land uses and circulation within Nevada Northwest LLC. The adoption of any Amendment to the Master Plan or any Master Plan Update by the County shall not require amendment of the Specific Plan. However, any subsequent discretionary approval or Specific Plan Amendment must be consistent with the Master Plan as amended and/or updated except to the extent that such change in the Master Plan deals with matters with respect to which the Developer shall possess vested rights.

D. Specific Plan Adoption

The Nevada Northwest LLC Specific Plan was adopted by resolution~~Ordinance~~ in accordance with County policy.

The Nevada Northwest LLC Specific Plan has been developed as both a regulatory document as well as a land use policy plan. The development standards have been structured in a format consistent with the Douglas County Zoning Ordinance, incorporating general provisions, permitted uses, development standards, project approval procedures and other zoning related provisions. The remaining sections of the Nevada Northwest LLC Specific Plan are oriented to land use policies and include background and project information, planning policies, design criteria, conceptual plans and infrastructure proposals.

E. Subdivision

Development of Nevada Northwest LLC will be implemented through a series of tentative maps, tentative parcel maps and Final Maps, and Design Review applications. Subsequently, in conjunction with the Phasing Plan, each parcel or parcels designated for development purposes will have one or more tentative subdivision maps submitted to create developable lots or parcels. It is intended that the tentative subdivision maps will be followed by final maps at the appropriate times for phased development.

The tentative maps or tentative parcel maps shall be consistent with the Douglas County Development Code.

F. Administrative Review/Staff Review

All development proposals and land use within Nevada Northwest LLC are subject to Staff Review (also called "Administrative Review") in addition to any required discretionary review by the Douglas County Planning Department, unless otherwise exempted by State or Federal law or the Douglas County Planning Department. This is to ensure compliance with the Nevada Northwest LLC Specific Plan (including Design Guidelines and Development Standards) and applicable sections of the Douglas County Development Code.

Staff Review is a "staff level" review process which may include "over the counter" review or "plan check" review, depending upon the magnitude of the project submittal. Staff Review will not typically require review by the Planning Commission. The Director may, at his or her discretion, forward a Staff Review approval item or a use consistency determination to the Planning Commission for an interpretation of the purpose and intent of the Specific Plan relative to the project under review. Denial of a Staff Review request by the Director may be appealed to the Planning Commission for a decision.

G. Design Review

The Design Review process is a site specific review process aimed at providing high quality development on a given site. The Nevada Northwest LLC Development Standards and Title 20 identify types of projects which require the Design Review process. The Development Standards and Design Guidelines provide the standards and guidelines by which the Douglas County shall evaluate all project submittals. Projects requiring Design Review shall be processed in accordance with Title 20, "Design Review", of the Douglas County Code which is contained in Appendix D of the Specific Plan.

H. Concurrent Processing

When any project involves multiple applications to be processed concurrently and where Staff and Planning Commission review are specified, said applications shall be reviewed and approved by the Planning Commission.

I. Design Guideline Conformance

All proposed development at Nevada Northwest LLC is subject to the Nevada Northwest LLC Design Guidelines. In conjunction with the applicable review process (i.e., Staff Review, Design Review, Special Use Permit, Subdivision, etc.), the Douglas County shall review project submittals for consistency with the Nevada Northwest LLC Design Guidelines. In addition to any Douglas County required "findings" of approval of a given development application, the following Design Guideline "findings" of approval for development requests shall also be made:

1. The proposed project conforms with the Nevada Northwest LLC Specific Plan including all applicable Development Standards and Design Guidelines.

2. The proposed project is compatible with and enhances the established design theme in the surrounding area, where applicable.

J. Specific Plan Amendments

Because the Nevada Northwest LLC development will be phased over a period of approximately twenty (30~~20~~) years, it is anticipated that market conditions and development practices may change, thereby necessitating specific plan amendments. Amendments may be requested at any time pursuant to Section 20.612.060 of Douglas County Code. If the amendment is deemed major by the Director, it will be processed in the same manner as the original Specific Plan. Proposed amendments deemed to be Minor Modifications by the Director as defined herein will be processed administratively by the Administrative Review process.

K. Minor Modifications

The following Minor Modifications to the Specific Plan do not require a Specific Plan Amendment and are subject to review and approval by the Director. The Director, however, shall have the discretion to refer any such request for modification to the Planning Commission for decision.

1) Utility alignments and minor adjustments to phasing of utilities. Minor adjustments may include earlier construction, substitution of oversized facilities in adjacent phases and similar adjustments.

2) Utility service road alignments.

3) Final facility sizing and precise location of water, sewer and storm drainage improvements when directed by the County Engineer.

4) Change in utility and/or infrastructure servicing agency.

5) Arterial road alignment revisions when the centerline moves by less than 200 feet.

6) Collector street alignments including but not limited to off-road connections and 4-way intersections at arterial roads.

7) Decrease in project density.

8) Adjustment of planning area boundaries of less than 250 feet which do not result in an increase in visual impact, a significant reduction of open space or a significant increase of residential areas.

9) Minor landscape, wall material, wall alignment and streetscape design modifications which are consistent with the design guidelines contained in this document.

10) Modifications to Architectural Design Guidelines, such as variations of materials within the particular architectural style and minor variations in colors, excluding hillside building or roof color requirements.

11) Changes in park facilities or conceptual park drawings.

12) Minor revisions to project graphics which do not substantially change the intent of the graphics in the Nevada Northwest LLC Specific Plan.

13) Deletion of unnecessary drainage facilities or infrastructure when approved by the County Engineer.

14) Specific modifications of a similar nature to those listed above, which are deemed minor by the Director, which are in keeping with the spirit and intent of the Specific Plan and which are in conformance with the Master Plan.

L. Variances

All variance requests shall be processed in accordance with Title 20 of Douglas County unless otherwise approved within this specific plan.

APPENDIX
EXHIBIT A

See Nevada Northwest Specific Plan dated November 8, 2001

EXHIBIT B
COMMERCIAL ELEVATIONS
(AMENDED)

EXHIBIT B: COMMERCIAL ELEVATIONS

Nevada Northwest Specific Plan

Commercial Area – Architectural Theme

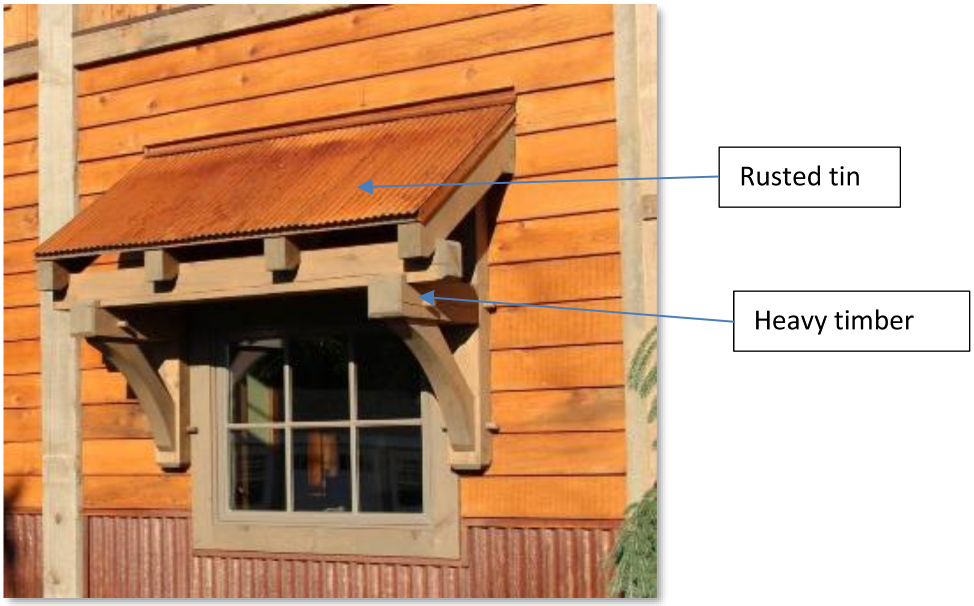
Stucco walls

Brick or rusted tin wainscoting

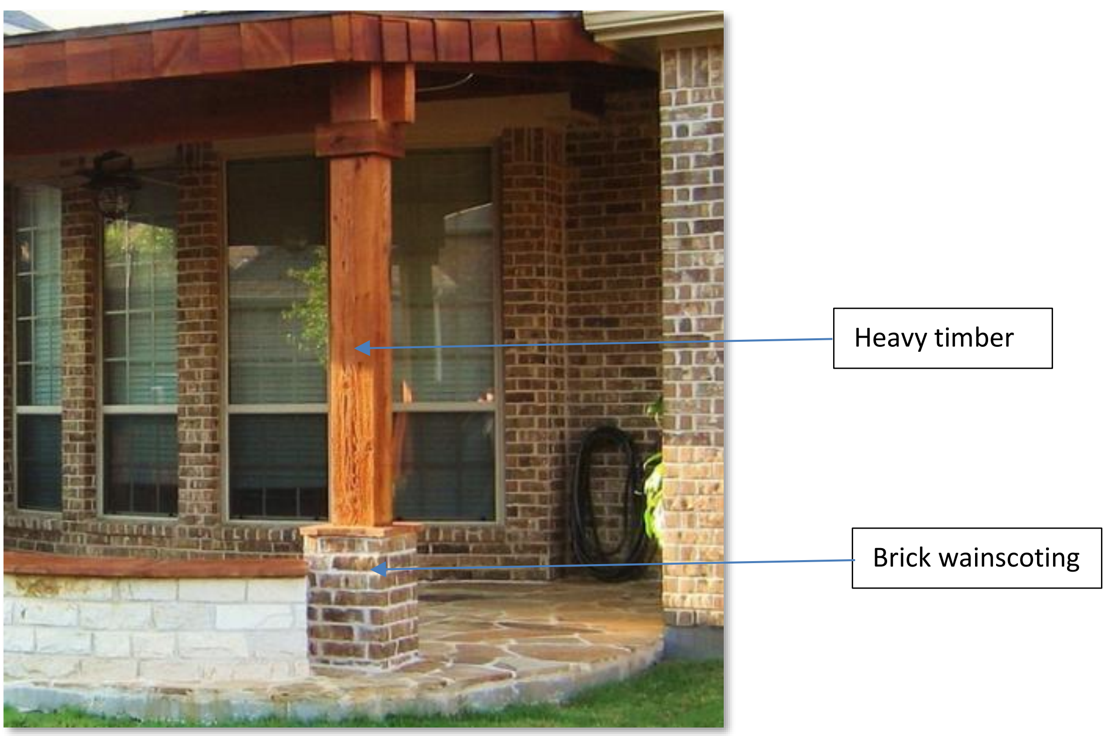
Exterior Walls

Wester roof lines with varying levels

Roof Lines



Window and Door Awnings



Exterior Columns

EXHIBIT C
SINGLE FAMILY ELEVATIONS
(AMENDED)

R|O|Anderson
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MINDEN
1603 Esmeralda Ave
P.O. Box 2229
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f 775.782.7084

RENO
140 W. Huffaker Lane
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Reno, NV 89511
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f 775.782.7084

ARCHITECTURAL ELEVATIONS
NEVADA NW SPECIFIC PLAN AMENDMENT #2
EXHIBIT C

1877-015

04/26/18

EXHIBIT D
MULTIFAMILY ELEVATIONS
(AMENDED)

FRONT ELEVATION (12 PLEX 1 BEDROOM)

RESIDENCE 732 SQ. FT.

FRONT ELEVATION (12 PLEX 2 BEDROOM)

RESIDENCE 965 SQ. FT.

CONCEPTUAL ARCHITECTURAL ELEVATIONS

NEVADA NW SPECIFIC PLAN AMENDMENT #3

DUANE DEVERILL CHARITABLE TRUST

EXHIBIT D

05/31/18

1327-006

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Y:\Client Files\1327\1327-006\CAD\Planning\Exhibits\SPA\1327-006 ARCHITECTURAL ELEV SPA.dwg 5/30/2018 6:00:57 PM Marie A. Hulse

EXHIBIT E
TRAFFIC IMPACT ANALYSIS
(AMENDED)

SOLAEGUI
ENGINEERS, LTD

NEVADA NORTHWEST

TRAFFIC ANALYSIS

DECEMBER 2017

PROFESSIONAL ENGINEER · STATE OF NEVADA
PAUL W. SOLAEGUI
CIVIL
No. 7163
REGISTERED

12-28-17
EXP 6-30-18

Prepared by:
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NEVADA NORTHWEST

TRAFFIC ANALYSIS

INTRODUCTION AND SUMMARY

Purpose of Report and Study Objectives

The purpose of this traffic study is to address the impacts of constructing the Nevada Northwest development on the adjacent street network. The result of this traffic analysis is to provide recommendations to mitigate project traffic impacts.

Executive Summary

The Nevada Northwest development is located in Minden, Nevada. The project site is generally located northeast of US-395, south of Ironwood Drive, and west of Lucerne Street. This study also includes analysis of the Deverill property located in the northwest corner of the Ironwood Drive/Lucerne Street intersection. The project sites are currently undeveloped land. The purpose of this study is to address the project's impact upon the adjacent street network. The US-395 intersections with Muller Lane, Ironwood Drive, SR-88, and Lucerne Street; the Ironwood Drive/ Lucerne Street intersection, and the project access and driveway intersections have been identified for AM and PM peak hour capacity analysis for the existing, existing plus project, 2037 base, and 2037 base plus project scenarios.

The Nevada Northwest development will include the construction of a mixed-use project containing 79 single family dwelling homes, 78 multi-family dwelling units, a 15,000 square foot pharmacy, a 4,500 square foot bank, 7,200 square feet of fast food restaurants, and 14,167 square feet of retail floor area. The Deverill property will include the construction of 94 multi-family dwelling units. The project is anticipated to generate 8,194 average weekday trips with 594 trips occurring during the AM peak hour and 732 trips occurring during the PM peak hour.

Traffic generated by the Nevada Northwest development will have some impact on the adjacent street network. The following recommendations are made to mitigate project traffic impacts.

It is recommended that any required signing, striping, or traffic control improvements comply with Nevada Department of Transportation (NDOT) and Douglas County requirements.

It is recommended that the US-395/SR-88 intersection be improved as a four-leg intersection with one left turn lane, two through lanes, and one right turn lane at the north and south US-395 approaches; dual left turn lanes, one through lane, and one right turn lane at the west SR-88 approach; and one left turn lane, one through lane, and one right turn lane at the east project access approach.

It is recommended that the Ironwood Drive/Monte Vista Avenue/Project Access intersection be improved as a four-leg intersection with stop sign control and a minimum of one shared left turn-through-right turn lane at the south approach.

It is recommended that the Ironwood Drive/Project Access intersection be improved as a three-leg intersection with stop sign control and a minimum of one shared left turn-right turn lane at the south approach.

It is recommended that the Monte Vista Avenue/Project Access intersection be improved as a three-leg intersection with stop sign control and a minimum of one shared left turn-right turn lane at the east approach.

It is recommended that the Lucerne Street/Commercial Driveway/Project Access intersection be improved as a four-leg intersection with stop sign control and a minimum of one shared left turn-through-right turn lane at the west approach.

It is recommended that the project's internal roadways, cul-de-sacs, and driveways be designed per Douglas County standards.

PROPOSED DEVELOPMENT

Summary of Development

The proposed Nevada Northwest development is located in Minden, Nevada. The project site is generally located northeast of US-395, south of Ironwood Drive, and west of Lucerne Street. The Deverill property is located in the northwest corner of the Ironwood Drive/Lucerne Street intersection. The location of the project sites are shown on Figure 1. The Nevada Northwest development will include the construction of a mixed-use project containing 79 single family dwelling homes, 78 multi-family dwelling units, a 15,000 square foot pharmacy, a 4,500 square foot bank, 7,200 square feet of fast food restaurants, and 14,167 square feet of retail floor area. The Deverill property will include the construction of 94 multi-family dwelling units.

Area Conditions

The project site is currently undeveloped land. Adjacent properties generally include an existing medical center complex to the northwest, commercial development to the south and east, and undeveloped land or agricultural land to the north.

Site Accessibility

The site plan indicates that access to the Nevada Northwest development will be provided from two locations on US-395, two existing median opening locations on Ironwood Drive, and one existing median opening location on Lucerne Street. Access to the Deverill site will be provided from one existing median opening location on Monte Vista Avenue. The study area roadways and intersections are described below.

US-395 is a four-lane roadway with two lanes in each direction in the vicinity of the site. The roadway follows a north/south alignment near Muller Lane and Ironwood Drive and generally an east/west alignment near Lucerne Street. The speed limit is posted for 65 miles per hour north of Muller Lane, 55 miles per hour north of Ironwood Drive, 45 miles per hour north of SR-88, 35 miles per hour west of Lucerne Street, and 25 miles per hour east of Lucerne Street. Roadway improvements generally include curb, gutter, and sidewalk on both sides of the street. A raised center median with left turn pockets exists from east of SR-88 to north of Muller Lane and a center two-way left turn lane exists east of the raised center median.

SR-88 is a four-lane roadway with two lanes in each direction south of US-395. The speed limit is posted for 35 miles per hour. Roadway improvements generally include curb, gutter, and sidewalk on both sides of the street and a raised center median near US-395.

Ironwood Drive is a two-lane roadway with one lane in each direction in the vicinity of the site. The speed limit is posted for 25 miles per hour east of US-395. Roadway improvements generally include curb and gutter on both sides of the street, sidewalk on the south side of the street, and a raised center median with left turn pockets at median openings.

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N.T.S.

LEGEND

PROJECT SITE

NEVADA NORTHWEST

VICINITY MAP
FIGURE 1

Muller Lane is a two-lane roadway with one lane in each direction west of US-395 and a four-lane roadway with two lanes in each direction east of US-395. The speed limit is posted for 55 miles per hour west of US-395. Roadway improvements include graded shoulders with white edgelines and a yellow centerline west of US-395 and curb and gutter with a raised center median with left turn pockets east of US-395.

Lucerne Street is a two-lane roadway with one lane in each direction in the vicinity of the site. The speed limit is posted for 25 miles per hour. Roadway improvements include curb, gutter, and sidewalk on both sides of the street and a raised center median with left turn pockets at median openings.

Monte Vista Avenue is a two-lane roadway with one lane in each direction north of Ironwood Drive. The speed limit is posted for 25 miles per hour. Roadway improvements include curb, gutter, and sidewalk on both sides of the street and a raised center median with left turn pockets at median openings.

The US-395/SR-88 intersection is a signalized three-leg intersection with green arrow indications for the northbound left turn and southbound u-turn movements. The north US-395 approach contains one left turn lane, two through lanes, and one right turn lane. The south US-395 approach contains one left turn lane and two through lanes. The west SR-88 approach contains dual left turn lanes, a hatched-out through lane, and one right turn lane. Pedestrian crosswalks exist at all approaches. The east leg is currently constructed to the curb returns and will be fully improved with development of the project.

The US-395/Muller Lane intersection is an unsignalized four-leg intersection with stop sign control at the east and west Muller Lane approaches. The north and south approaches each contain one left turn lane, two through lanes, and one right turn lane. The east and west approaches each contain one left turn lane, one through lane, and one right turn lane. Pedestrian crosswalks exist at the east and west approaches.

The US-395/Ironwood Drive intersection is an unsignalized four-leg intersection with stop sign control at the east and west Ironwood Drive approaches. The north and south approaches each contain one left turn lane, two through lanes, and one right turn lane. The east and west approaches each contain one left turn lane, one through lane, and one right turn lane. A pedestrian crosswalk exists at the east approach.

The US-395/Lucerne Street intersection is an unsignalized four-leg intersection with stop sign control at the north and south Lucerne Street approaches. The north and south approaches each contain one left turn lane and one shared through-right turn lane. The east and west approaches each contain one left turn lane, one through lane, and one shared through-right turn lane. Pedestrian crosswalks exist at the north, south and west approaches.

The Ironwood Drive/Lucerne Street intersection is an unsignalized four-leg intersection with stop sign control at all approaches. The north and east approaches each contain one shared left turn-through-right turn lane. The south approach contains one left turn lane, one through lane, and one right turn lane. The west approach contains one left turn lane and one shared through-right turn lane. A pedestrian crosswalk exists at the north approach.

The Ironwood Drive/Monte Vista Avenue intersection is an unsignalized three-leg intersection with stop sign control at the north approach. The intersection contains one left turn lane, one through lane, and one right turn lane at the north approach and one left turn lane and one shared through-right turn lane at the east and west approaches. The south approach is currently constructed to the curb returns. With development of the project the intersection will be improved as a four-leg intersection that will include stop control and an anticipated shared left turn-through-right turn lane at the south project access approach.

The Ironwood Drive/Project Access intersection is not fully improved but will be constructed as an unsignalized three-leg intersection with stop sign control at the south approach with development of the project. The intersection currently contains one left turn lane and one shared through-right turn lane at the east and west approaches. It is anticipated that the south project access approach will contain one shared left turn-right turn lane.

The Lucerne Street/Existing Commercial Driveway intersection is an unsignalized three-leg intersection with stop control at the east commercial driveway approach. The intersection contains one shared left turn-through-right turn lane at the east approach and one left turn lane and one shared through-right turn lane at the north and south approaches. The west approach is currently constructed to the curb returns. With development of the project the intersection will be improved as a four-leg intersection that will include stop sign control and an anticipated shared left turn-through-right turn lane at the west project access approach.

The Monte Vista Avenue/Project Access intersection is not fully improved but is anticipated to be constructed as an unsignalized three-leg intersection with stop sign control at the east approach with development of the project. The intersection currently contains one left turn lane and one shared through-right turn lane at the north and south approaches. It is anticipated that the east project access approach will contain stop sign control and one shared left turn-right turn lane with development of the Deverill site.

The US-395/Project Driveway intersection does not currently exist but will an unsignalized three-leg intersection with stop control at the north project driveway approach with development of the project. The intersection is anticipated to contain one shared left turn-right turn lane at the north approach, one left turn lane and two through lanes at the west approach, and one through lane and one shared through-right turn lane at the east approach.

EXISTING AND PROJECTED TRAFFIC

Existing Traffic Volumes

Existing AM and PM peak hour traffic volumes at the key intersections and driveways were obtained from traffic counts conducted in December of 2016 and 2017. Figure 2 shows the existing AM and PM peak hour traffic volumes at the key intersections.

Trip Generation

In order to assess the magnitude of traffic impacts of the proposed development on the key intersections, trip generation rates and peak hours had to be determined. Trip generation rates were obtained from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* (9th Edition) for Land Uses 210: Single Family Detached Housing, 220 Apartments, 820: Shopping Center, 881: Pharmacy/Drugstore with Drive-Thru, 912: Drive-In Bank, and 934: Fast Food Restaurant with Drive-Thru.

The Nevada Northwest development will include the construction of a mixed-use project containing 79 single family dwelling homes, 78 multi-family dwelling units, a 15,000 square foot pharmacy, a 4,500 square foot bank, 7,200 square feet of fast food restaurants, and 14,167 square feet of retail floor area. The Deverill property will include the construction of 94 multi-family dwelling units.

Chapter 7 of the *Trip Generation Manual* provides guidelines for estimating internal trips for multi-use developments. A key characteristic of a multi-use development is that trips among the various land uses can be made on site and these trips are not made on the major street system. Internal PM peak hour trips were therefore calculated for this mix-use project based on procedures presented in the *Trip Generation Manual* for the residential and retail land uses. The *Trip Generation Manual* does not contain internal capture information for the AM peak hour.

Chapter 7 of the *Trip Generation Manual* also provides guidelines for quantifying pass-by trips for the shopping center, pharmacy, bank, and fast food restaurant land uses. Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination and are attracted directly from the adjacent street traffic stream (US-395). The *Trip Generation Manual* indicates that 34% of the PM peak hour trips generated by the shopping center land use, 49% of the PM peak hour trips generated by the pharmacy with drive-thru land use, 47% of the PM peak hour trips generated by the drive-in bank, and 49% of the AM peak hour trips and 50% of the PM peak hour trips generated by the fast food restaurant with drive-thru land use are pass-by trips.

The trip generation for the proposed development was calculated for the peak hours occurring between 7:00 and 9:00 AM and 4:00 and 6:00 PM, which correspond to the peak hours of adjacent street traffic.

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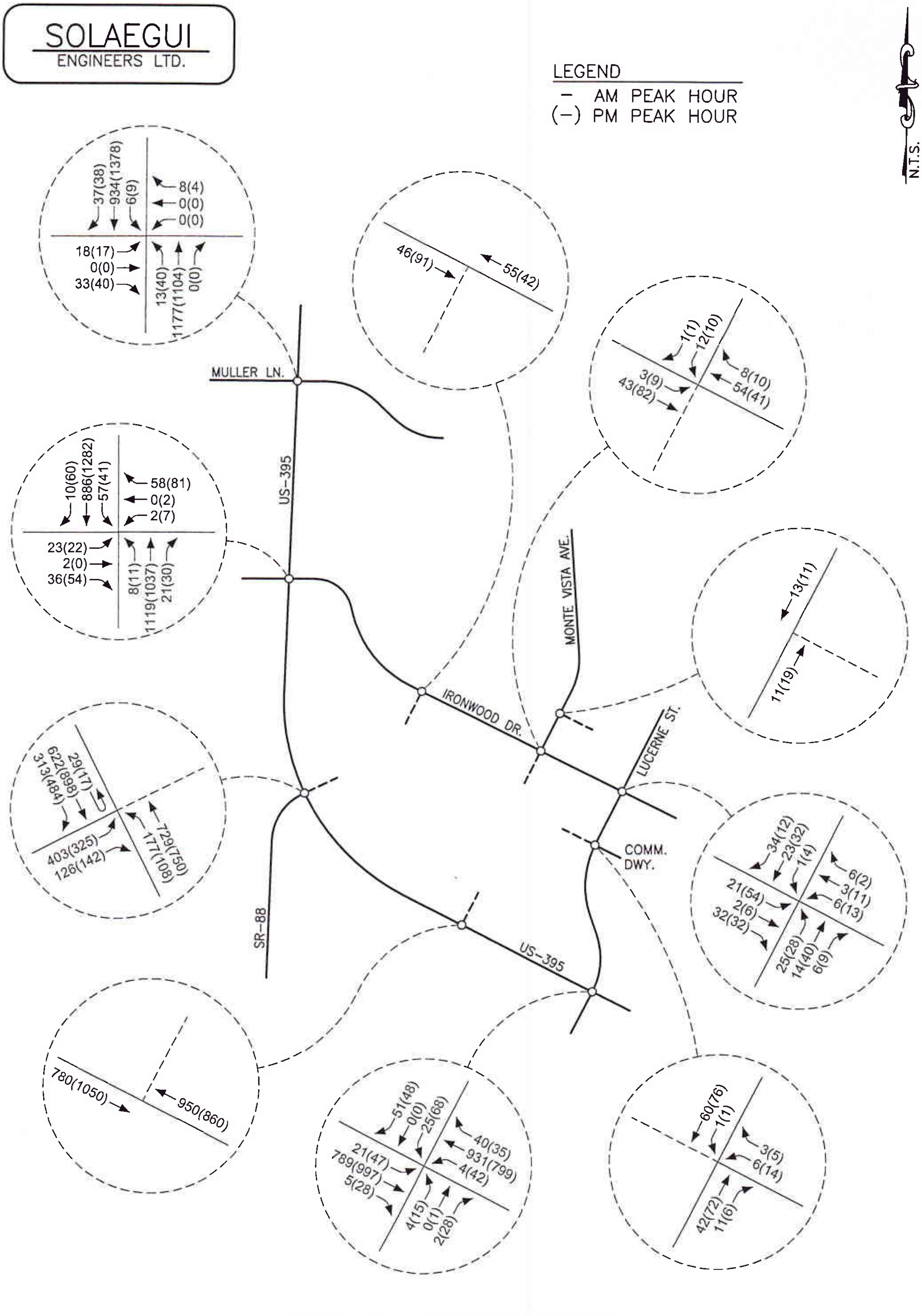

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EXISTING TRAFFIC VOLUMES
FIGURE 2

Table 1 shows a summary of the average daily traffic (ADT) volumes and peak hour volumes generated by the project. The trip generation worksheets are included in the Appendix.

TABLE 1 TRIP GENERATION							
		AM PEAK HOUR			PM PEAK HOUR		
LAND USE	ADT	IN	OUT	TOTAL	IN	OUT	TOTAL
Single Family (79 DU)	752	5	44	59	50	29	79
Apartments (172 DU)	1,144	18	70	88	70	37	107
Shopping Center (14,167 SF)	605	9	5	14	25	28	53
Pharmacy w/Drive-Thru (15,000 SF)	1,454	27	25	52	75	74	149
Drive-In Bank (4,500 SF)	667	31	23	54	55	54	109
Fast Food Restaurant w/Drive (7,200 SF)	3,572	167	160	327	122	113	235
Total Trips	8,194	267	327	594	397	335	732
Total Internal Trips	N/A	-0	-0	-0	-42	-42	-84
Total Off-Site Trips	N/A	267	327	594	355	293	648
Total Pass-By Trips	N/A	-80	-80	-160	-94	-94	-188
Total New Off-Site Trips	N/A	187	247	434	261	199	460

Trip Distribution and Assignment

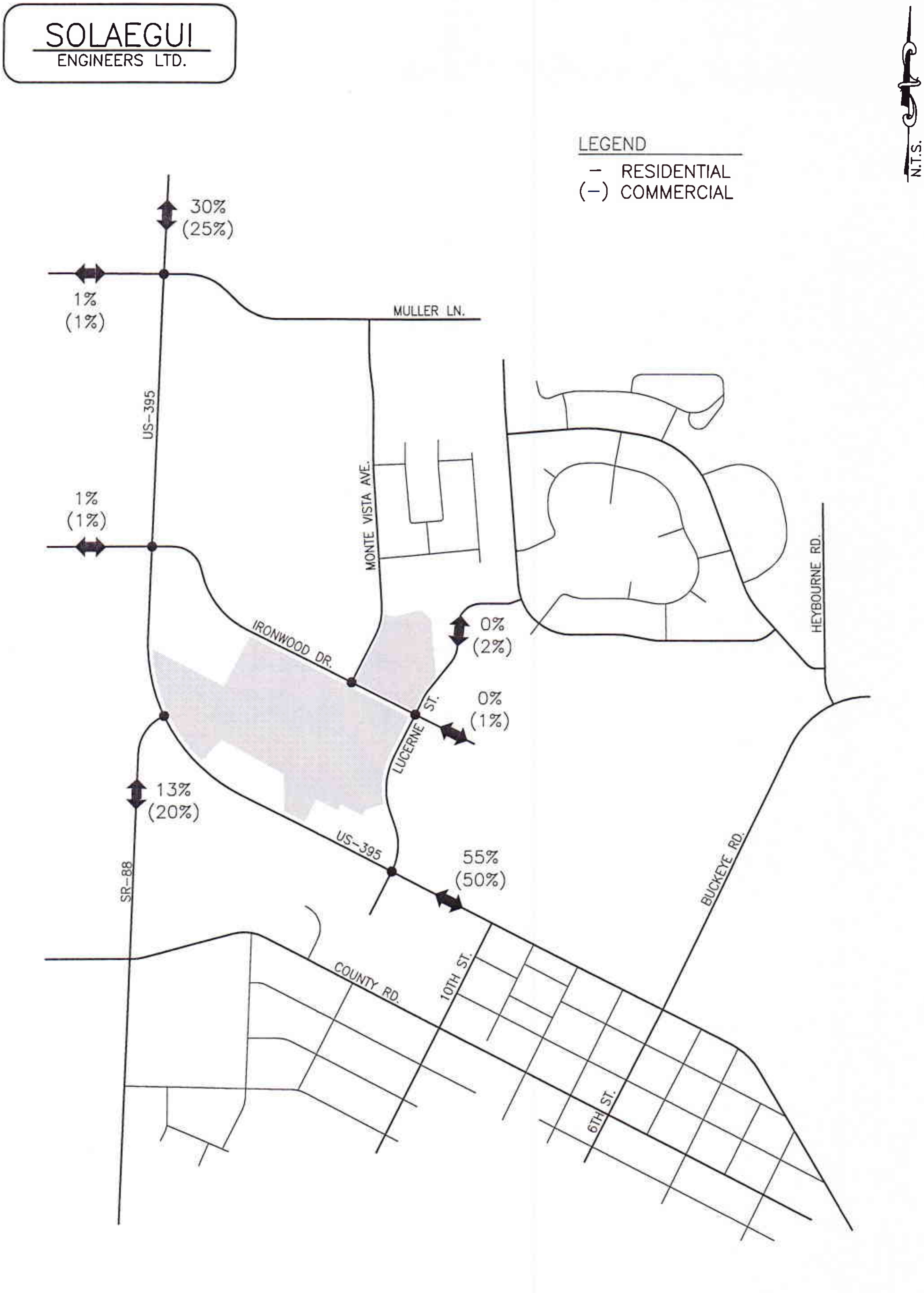
The distribution of the project trips to the key intersections was estimated based on existing peak hour traffic patterns and the locations of attractions and productions in the area. The anticipated trip distribution is shown on Figure 3. The project trips were subsequently assigned to the key intersections based on the trip distribution presented on Figure 3. Figure 4 shows the trip assignment during the AM and PM peak hours.

Projected Traffic Volumes

Figure 5 shows the existing plus project traffic volumes at the key intersections during the AM and PM peak hours. The existing plus project traffic volumes were obtained by adding the trip assignment volumes shown on Figure 4 to the existing traffic volumes shown on Figure 2.

Figure 6 shows the 2037 base traffic volumes at the key intersections during the AM and PM peak hours. The 2037 base volumes were estimated by applying a 1.0% average annual growth rate to the existing traffic volumes and then re-assigning 15% of the US-395 through volume to the Muller Lane by-pass. The growth rate was derived from 20-year historic traffic count data obtained from NDOT's Annual Traffic Reports for count stations on US-395, SR-88, and Muller Lane in the vicinity of the site.

Figure 7 shows the 2037 base plus project traffic volumes at the key intersections during the AM and PM peak hours. The 2037 base plus project traffic volumes were obtained by adding the trip assignment volumes shown on Figure 4 to the 2037 base traffic volumes shown on Figure 6.



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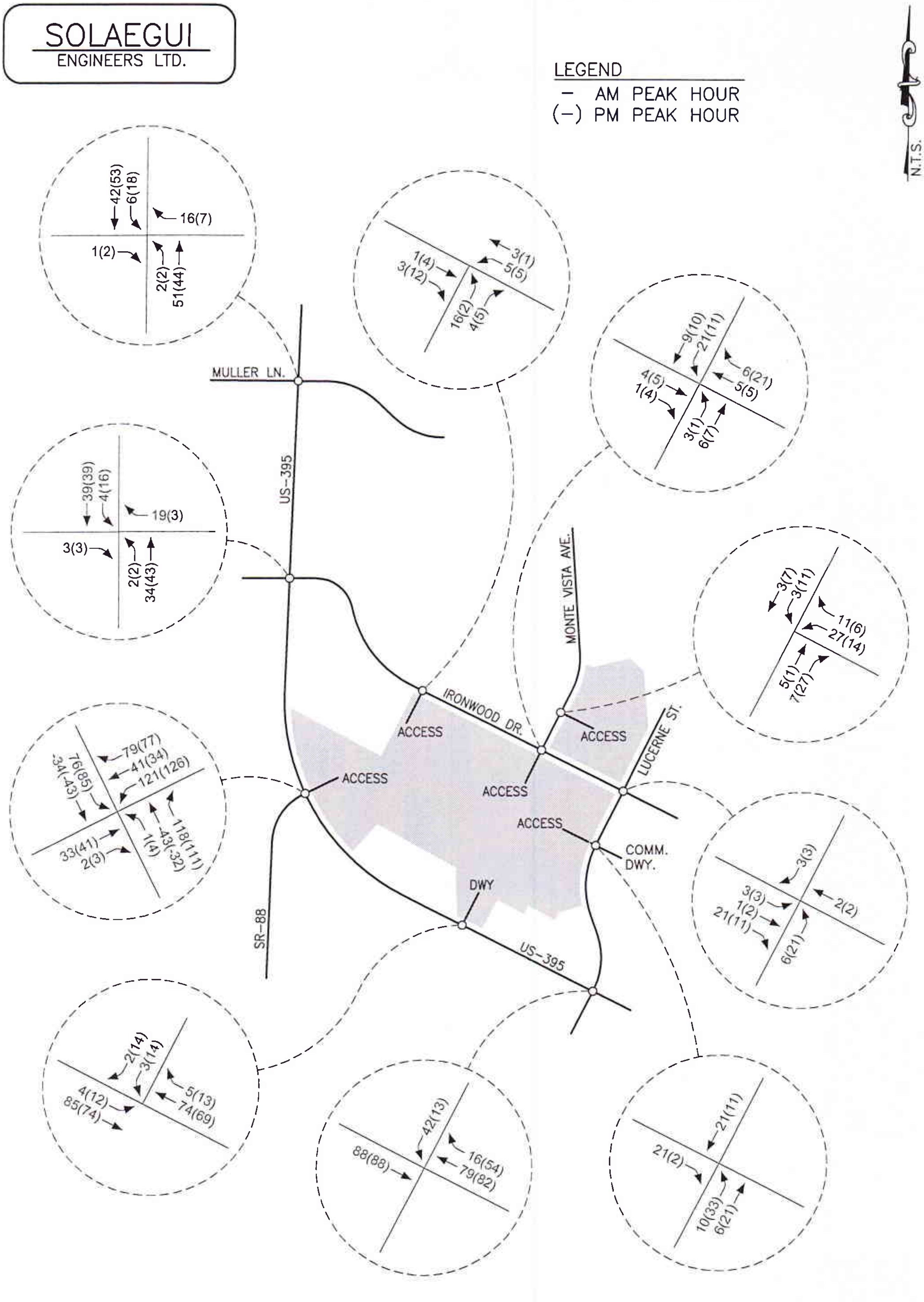
TRIP DISTRIBUTION
FIGURE 3



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TRIP ASSIGNMENT
FIGURE 4

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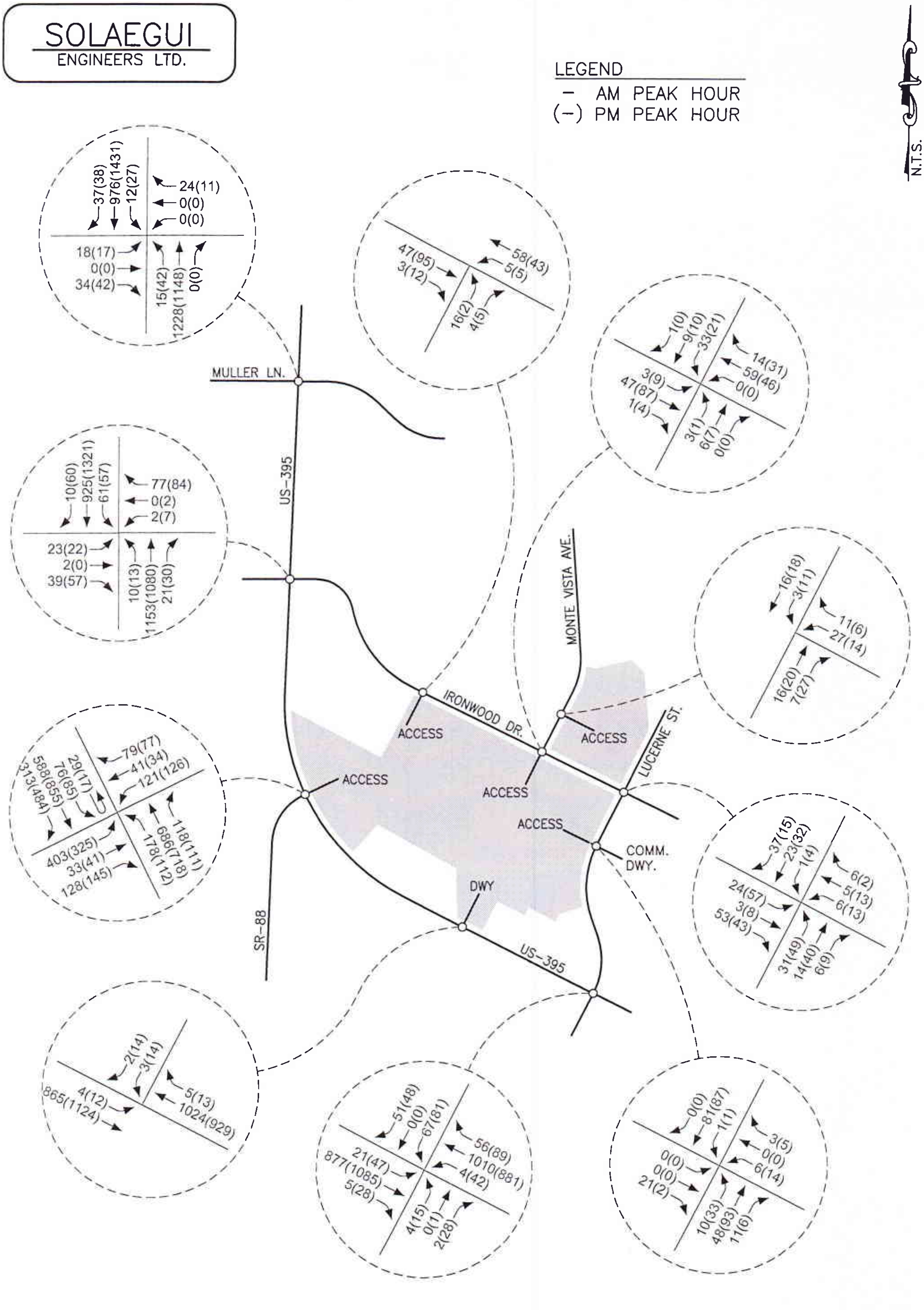
LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR



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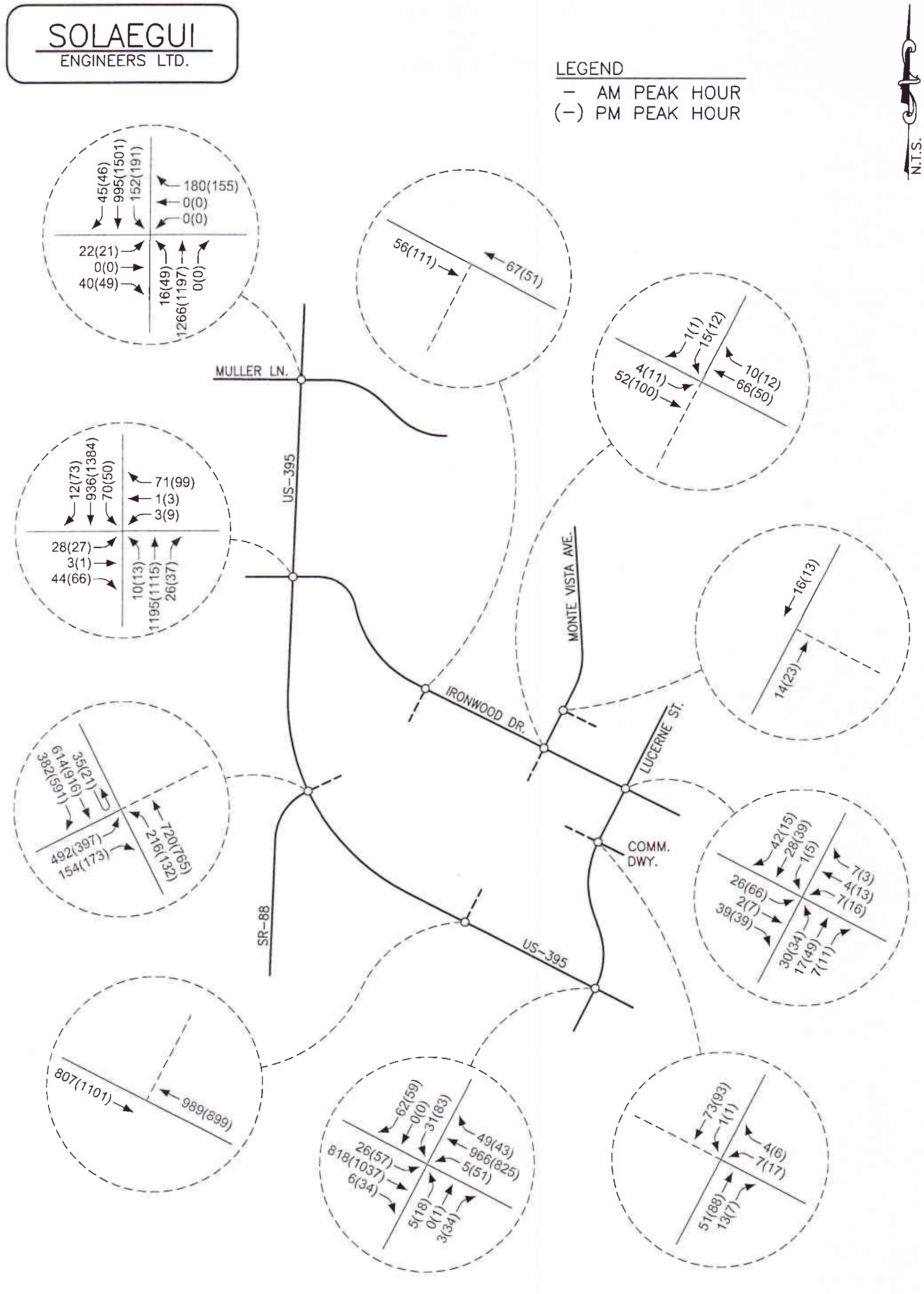
EXISTING PLUS PROJECT TRAFFIC VOLUMES
FIGURE 5



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2037 BASE TRAFFIC VOLUMES
FIGURE 6

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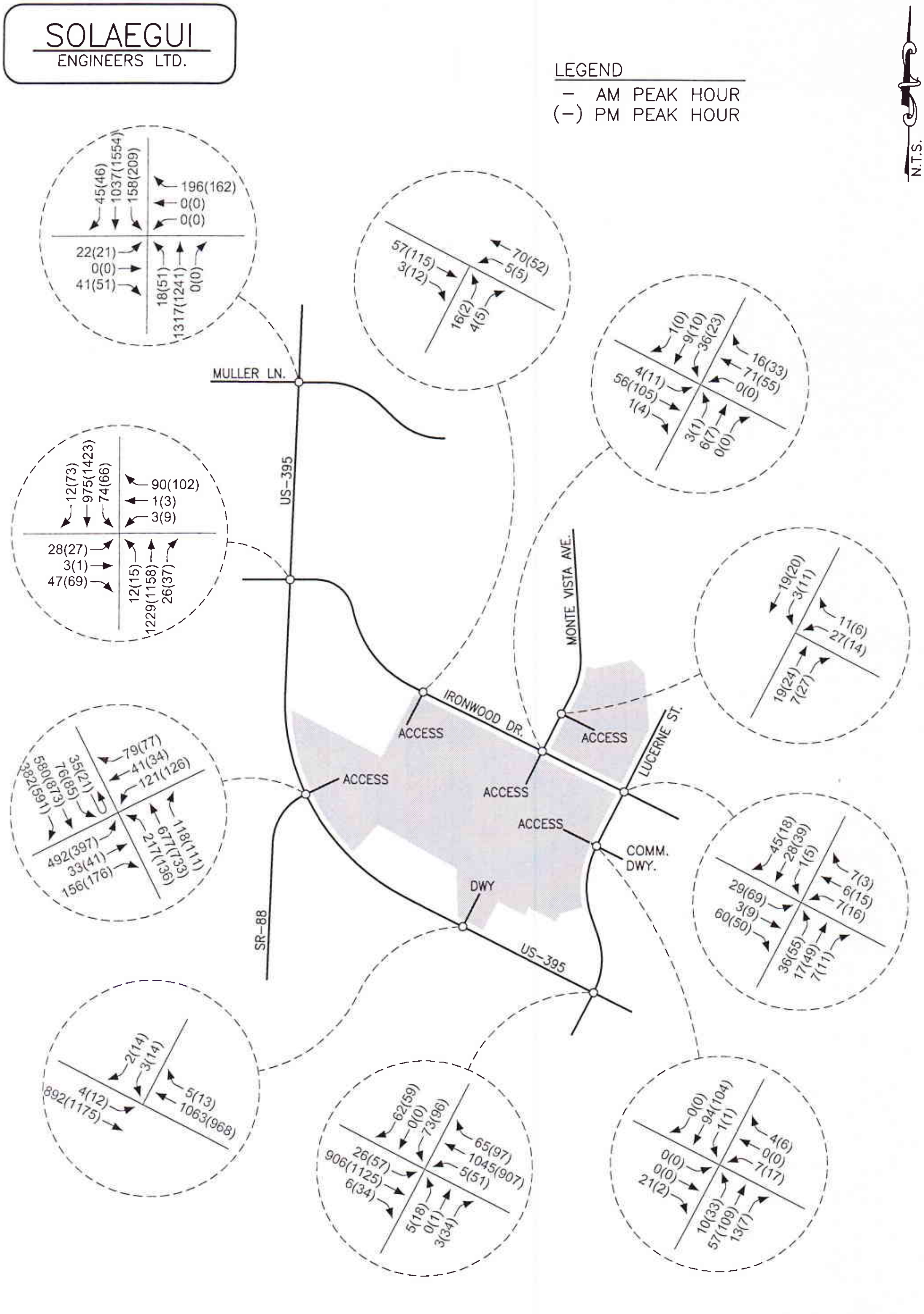

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2037 BASE PLUS PROJECT TRAFFIC VOLUMES
FIGURE 7

TRAFFIC ANALYSIS

Intersection Capacity and Level of Service

The key intersections were analyzed for capacity based on procedures presented in the *Highway Capacity Manual (6th Edition)*, prepared by the Transportation Research Board, for unsignalized and signalized intersections using the latest version of the Highway Capacity software.

The result of capacity analysis is a level of service (LOS) rating for each signalized intersection, all-way stop controlled intersection, or minor movement at a two-way stop controlled intersection. Level of service is a qualitative measure of traffic operating conditions where a letter grade "A" through "F", corresponding to progressively worsening traffic operation, is assigned to the signalized intersection or unsignalized intersection minor movement.

The *Highway Capacity Manual* defines level of service for stop controlled intersections in terms of computed or measured control delay for each minor movement. Level of service is not defined for the intersection as a whole. The unsignalized intersection LOS criteria are shown in Table 2.

TABLE 2
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	DELAY RANGE (SEC/VEH)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Level of service for signalized intersections is stated in terms of the average control delay per vehicle for a peak 15 minute analysis period. The signalized intersection level of service criteria are shown in Table 3.

TABLE 3
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SEC)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Table 4 shows a summary of the level of service and delay results at the key intersections for the existing, existing plus project, 2037 base and 2037 base plus project scenarios.

TABLE 4
INTERSECTION LEVEL OF SERVICE AND DELAY RESULTS

INTERSECTION	EXISTING		EXISTING + PROJECT		2037 BASE		2037 BASE + PROJECT	
	AM	PM	AM	PM	AM	PM	AM	PM
US-395/SR-88 (Signalized)	B19.6	C20.9	C31.0	C32.4	C20.9	C23.9	C33.4	C34.4
US-395/Muller (Stop East/West)								
Eastbound Left	F98.5	F369.7	F132.7	F554.4	F999+	F999+	F999+	F999+
Eastbound Through	F107.9	F231.3	F129.7	F303.4	F322.3	F999+	F407.9	F999+
Eastbound Right	B12.6	C16.6	B12.9	C17.3	B13.1	C18.5	B13.5	C19.3
Westbound Left	F88.3	F145.2	F105.2	F188.1	F257.6	F613.8	F320.8	F831.2
Westbound Through	F114.2	F245.8	F137.3	F322.6	F346.8	F999+	F439.1	F999+
Westbound Right	B13.8	B13.2	B14.6	B13.6	C23.3	C19.6	D26.8	C21.1
Northbound Left	B10.6	B14.4	B10.9	B15.0	B11.0	C16.1	B11.3	C16.9
Southbound Left	B11.8	B11.3	B12.2	B11.9	C15.9	C16.2	C17.0	C17.8
US-395/Ironwood (Stop East/West)								
Eastbound Left	F156.8	F489.25	F216.6	F705.2	F318.3	F999+	F452.7	F999+
Eastbound Through	F127.3	F185.7	F148.7	F233.5	F182.1	F287.0	F216.6	F373.0
Eastbound Right	B12.3	C16.1	B12.6	C16.6	B12.8	C17.8	B13.1	C18.5
Westbound Left	F106.7	F158.7	F124.3	F212.5	F160.6	F300.8	F192.0	F432.0
Westbound Through	F117.6	F215.8	F135.9	F278.7	F163.4	F353.2	F191.6	F473.1
Westbound Right	B14.6	B14.4	C15.5	B14.9	C15.7	C15.8	C16.9	C16.5
Northbound Left	B10.2	B13.0	B10.4	B13.4	B10.5	B14.1	B10.7	B14.5
Southbound Left	B12.3	B11.5	B12.6	B12.0	B13.2	B12.2	B13.6	B12.9
US-395/Lucerne (Stop North/South)								
Eastbound Left	B10.7	B10.2	B11.3	B11.0	B11.0	B10.4	B11.6	B11.3
Westbound Left	A9.7	B11.2	B10.1	B11.8	A9.8	B11.7	B10.2	B12.3
Northbound Left	F50.4	F119.8	F64.1	F173.7	F59.0	F187.5	F76.2	F286.8
Northbound Through-Right	B11.3	C16.4	B11.8	C18.8	B11.5	C17.2	B12.0	C19.8
Southbound Left	F72.3	F350.9	F285.8	F744.7	F99.1	F658.6	F411.0	F999+
Southbound Through-Right	B13.2	B12.2	B13.9	B13.1	B13.8	B12.6	B14.6	B13.6
Ironwood/Lucerne (All-Way Stop)	A7.6	A8.1	A7.7	A8.2	A7.7	A8.3	A7.9	A8.5
Ironwood/Monte Vista (Stop North)								
Eastbound Left	A7.4	A7.3	N/A	N/A	A7.4	A7.4	N/A	N/A
Southbound Left	A9.2	A9.4	N/A	N/A	A9.3	A9.6	N/A	N/A
Southbound Right	A8.6	A8.5	N/A	N/A	A8.7	A8.6	N/A	N/A
Ironwood/Monte/Access (Stop N/S)								
Eastbound Left	N/A	N/A	A7.4	A7.4	N/A	N/A	A7.4	A7.4
Westbound Left	N/A	N/A	A7.3	A7.4	N/A	N/A	A7.3	A7.5
Northbound Left-Thru-Right	N/A	N/A	A9.7	B10.2	N/A	N/A	A9.9	B10.5
Southbound Left	N/A	N/A	A9.5	A9.9	N/A	N/A	A9.7	B10.2
Southbound Thru	N/A	N/A	A9.8	B10.2	N/A	N/A	A9.9	B10.4
Southbound Right	N/A	N/A	A8.6	A8.6	N/A	N/A	A8.7	A8.7

TABLE 4 (CONTINUED) INTERSECTION LEVEL OF SERVICE AND DELAY RESULTS								
	EXISTING		EXISTING + PROJECT		2037 BASE		2037 BASE + PROJECT	
INTERSECTION	AM	PM	AM	PM	AM	PM	AM	PM
Ironwood/Access (Stop at South)								
Westbound Left	N/A	N/A	A7.3	A7.5	N/A	N/A	A7.4	A7.5
Northbound Left-Right	N/A	N/A	A9.2	A9.1	N/A	N/A	A9.4	A9.2
Monte Vista/Access (Stop at East)								
Westbound Left-Right	N/A	N/A	A8.8	A8.9	N/A	N/A	A8.8	A8.8
Southbound Left	N/A	N/A	A7.3	A7.3	N/A	N/A	A7.3	A7.3
Lucerne/Comm. Dwy (Stop East)								
Westbound Left-Right	A9.0	A9.3	N/A	N/A	A9.1	A9.5	N/A	N/A
Southbound Left	A7.3	A7.4	N/A	N/A	A7.4	A7.4	N/A	N/A
Lucerne/Comm. Dwy/Access (Stop at East and West)								
Eastbound Left-Thru-Right	N/A	N/A	A8.8	A8.8	N/A	N/A	A8.9	A8.9
Westbound Left-Thru-Right	N/A	N/A	A9.5	B10.2	N/A	N/A	A9.6	B10.4
Northbound Left	N/A	N/A	A7.4	A7.5	N/A	N/A	A7.4	A7.5
Southbound Left	N/A	N/A	A7.3	A7.4	N/A	N/A	A7.4	A7.5
US-395/Project Dwy (Stop at North)								
Eastbound Left	N/A	N/A	B10.8	B10.4	N/A	N/A	B11.1	B10.7
Southbound Left-Right	N/A	N/A	E39.9	E47.9	N/A	N/A	E43.5	F55.0

US-395/SR-88 INTERSECTION

The US-395/SR-88 intersection was initially analyzed as a signalized three-leg intersection with the existing approach lanes for the existing and 2037 base scenarios. The intersection currently operates at LOS B with a delay of 19.6 seconds during the AM peak hour and LOS C with a delay of 20.9 seconds per vehicles during the PM Peak hour. For the 2037 base traffic volumes the intersection operates at LOS C with a delay of 20.9 seconds per vehicle during the AM peak hour and LOS C with a delay of 23.9 seconds per vehicles during the PM peak hour. The US-395/SR-88 intersection was subsequently analyzed as a signalized four-leg intersection for the existing plus project and 2037 base plus project scenarios. For the existing plus project traffic volumes the intersection operates at LOS C with a delay of 31.0 seconds per vehicle during the AM peak hour and LOS C with a delay of 32.4 seconds per vehicles during the PM peak hour. For the 2037 base plus project traffic volumes the intersection operates at LOS C with a delay of 33.4 seconds per vehicle during the AM peak hour and LOS C with a delay of 34.4 seconds per vehicles during the PM peak hour. The four-leg intersection was analyzed with one left turn lane, two through lanes, and one right turn lane at the north and south US-395 approaches; dual left turn lanes, one through lane, and one right turn lane at the west SR-88 approach; and one left turn lane, one through lane, and one right turn lane at the east project access approach.

US-395/MULLER LANE INTERSECTION

The US-395/Muller Lane intersection was analyzed as an unsignalized four-leg intersection with stop control at the east and west approaches for all scenarios. For the existing traffic volumes the left turn and through movements at the east and west approaches operate at LOS F during the AM and PM peak hours. For the existing plus project traffic volumes the left turn and through movements at the east and west approaches continue to operate at LOS F during the AM and PM peak hours with increased delay. For the 2037 base traffic volumes the left turn and through movements at the east and west approaches operate at LOS F during the AM and PM peak hours. For the 2037 base plus project traffic volumes the left turn and through movements at the east and west approaches continue to operate at LOS F during the AM and PM peak hours with increased delay. The intersection was analyzed with the existing approach lanes for all scenarios.

US-395/IRONWOOD DRIVE INTERSECTION

The US-395/Ironwood Drive intersection was analyzed as an unsignalized four-leg intersection with stop control at the east and west approaches for all scenarios. For the existing traffic volumes the left turn and through movements at the east and west approaches operate at LOS F during the AM and PM peak hours. For the existing plus project traffic volumes the left turn and through movements at the east and west approaches continue to operate at LOS F during the AM and PM peak hours with increased delay. For the 2037 base traffic volumes the left turn and through movements at the east and west approaches operate at LOS F during the AM and PM peak hours. For the 2037 base plus project traffic volumes the left turn and through movements at the east and west approaches continue to operate at LOS F during the AM and PM peak hours with increased delay. The intersection was analyzed with the existing approach lanes for all scenarios.

US-395/LUCERNE STREET INTERSECTION

The US-395/Lucerne Street intersection was analyzed as an unsignalized four-leg intersection with stop control at the north and south approaches for all scenarios. The intersection minor movements currently operate at LOS C or better except for the northbound and southbound left turn movements which operate at LOS F during the AM and PM peak hours. For the existing plus project traffic volumes the northbound and southbound left turn movements continue to operate at LOS F during the AM and PM peak hours with increased delay. For the 2037 base traffic volumes the intersection minor movements are anticipated to operate at LOS C or better except for the northbound and southbound left turn movements which operate at LOS F during the AM and PM peak hours. For the 2037 base plus project traffic volumes the northbound and southbound left turn movements continue to operate at LOS F during the AM and PM peak hours with increased delay. The intersection was analyzed with the existing approach lanes for all scenarios.

IRONWOOD DRIVE/LUCERNE STREET INTERSECTION

The Ironwood Drive/Lucerne Street intersection was analyzed as an unsignalized four-leg intersection with all-way stop sign control for all scenarios. The intersection currently operates at LOS A during the AM and PM peak hours. For the existing plus project traffic volumes the intersection continues to operate at LOS A during the AM and PM peak hours. For the 2037 base traffic volumes the intersection is anticipated to operate at LOS A during the AM and PM peak hours. For the 2037 base plus project traffic volumes the intersection continues to operate at LOS A during the AM and PM peak hours. The intersection was analyzed with the existing approach lanes for all scenarios.

IRONWOOD DRIVE/MONTE VISTA AVENUE/PROJECT ACCESS INTERSECTION

The Ironwood Drive/Monte Vista Avenue intersection was initially analyzed as an unsignalized three-leg intersection with the existing traffic control and approach lanes for the existing and 2037 base scenarios. The intersection minor movements currently operate at LOS A during the AM and PM peak hours. For the 2037 base traffic volumes the intersection minor movements continue to operate at LOS A during the AM and PM peak hours. The Ironwood Drive/Monte Vista Avenue/Project Access intersection was subsequently analyzed as an unsignalized four-leg intersection with stop control at the north and south approaches for the existing plus project and 2037 base plus project scenarios. For the existing plus project traffic volumes the intersection minor movements operate at LOS B or better during the AM and PM peak hours. For the 2037 base plus project traffic volumes the intersection minor movements also operate at LOS B or better during the AM and PM peak hours. The four-leg intersection was analyzed with one shared left turn-through-right turn lane at the south approach and the existing lanes at the north, east, and west approaches.

IRONWOOD DRIVE/PROJECT ACCESS INTERSECTION

The Ironwood Drive/Project Access intersection was analyzed as an unsignalized three-leg intersection with stop control at the south approach for the existing plus project and 2037 base plus project scenarios. For the existing plus project traffic volumes the intersection minor movements are anticipated to operate at LOS A during the AM and PM peak hours. For the 2037 base plus project traffic volumes the intersection minor movements continue to operate at LOS A during the AM and PM peak hours. The intersection was analyzed with one shared left turn-right turn lane at the south approach and the existing lanes at the east and west approaches.

MONTE VISTA AVENUE/PROJECT ACCESS INTERSECTION

The Monte Vista Avenue/Project Access intersection was analyzed as an unsignalized three-leg intersection with stop control at the south approach for the existing plus project and 2037 base plus project scenarios. For the existing plus project traffic volumes the intersection minor movements are anticipated to operate at LOS A during the AM and PM peak hours. For the 2037 base plus project traffic volumes the intersection minor movements continue to operate at LOS A during the AM and PM peak hours. The intersection was analyzed with one shared left turn-right turn lane at the east approach and the existing lanes at the north and south approaches.

LUCERNE STREET/COMMERCIAL DRIVEWAY/PROJECT ACCESS INTERSECTION

The Lucerne Street/Commercial Driveway intersection was initially analyzed as an unsignalized three-leg intersection with the existing traffic control and approach lanes for the existing and 2037 base scenarios. The intersection minor movements currently operate at LOS A during the AM and PM peak hours. For the 2037 base traffic volumes the intersection minor movements continue to operate at LOS A during the AM and PM peak hours. The Lucerne Street/Commercial Driveway/Project Access intersection was subsequently analyzed as an unsignalized four-leg intersection with stop control at the east and west approaches for the existing plus project and 2037 base plus project scenarios. For the existing plus project traffic volumes the intersection minor movements operate at LOS B or better during the AM and PM peak hours. For the 2037 base plus project traffic volumes the intersection minor movements continue to operate at LOS B or better during the AM and PM peak hours. The four-leg intersection was analyzed with one shared left turn-through-right turn lane at the west approach and the existing lanes at the north, south, and east approaches.

US-395/PROJECT DRIVEWAY INTERSECTION

The US-395/Project Driveway intersection was analyzed as an unsignalized three-leg intersection with stop control at the north approach for the existing plus project and 2037 base plus project scenarios. For the existing plus project traffic volumes the southbound left turn movement is anticipated to operate at LOS E during the AM and PM peak hours. For the 2037 base plus project traffic volumes the southbound left turn movement is anticipated to operate at LOS E during the AM peak hour and LOS F during the PM peak hour. The intersection was analyzed with one shared left turn-right turn lane at the north approach and the existing lanes at the east and west approaches.

Site Access and Circulation

The site plan indicates that access to the Nevada Northwest development will be provided from two locations on US-395, two existing median opening locations on Ironwood Drive, and one existing median opening location on Lucerne Street. Access to the Deverill site will be provided from one existing median opening location on Monte Vista Avenue. The main project access is from the east leg of the US-395/SR-88 intersection which connects to a primary on-site roadway that extends through the site to the Ironwood Drive/Monte Vista Avenue intersection. The secondary project access roadways from Ironwood Drive and Lucerne Street will also connect to the primary on-site roadway. Roadways and cul-de-sacs serving the residential areas and driveways serving the commercial areas will also connect to the primary on-site roadway. These project accesses, driveways, and on-site roadways are anticipated to provide good access and internal circulation. The project driveway on US-395 will exclusively serve an isolated commercial portion of the site. It is recommended that the internal roadways, cul-de-sacs, and driveways be designed per Douglas County standards.

IMPROVEMENT ANALYSIS

US-395/SR-88 INTERSECTION

The US-395/SR-88 intersection currently operates at LOS C during the AM and PM peak hours and will continue to do so with the existing lane configurations for the 2037 base traffic volumes. Improving the intersection to a four-leg intersection with development of the project will result in LOS C operation during the AM and PM peak hours for the existing plus project and 2037 base plus project traffic volumes. The signalized intersection will maintain NDOT's policy LOS D or better operation for the existing plus project and 2037 base plus project scenarios with one left turn lane, two through lanes, and one right turn lane at the north and south US-395 approaches; dual left turn lanes, one through lane, and one right turn lane at the west SR-88 approach; and one left turn lane, one through lane, and one right turn lane at the east project access approach.

Storage, deceleration, and taper length requirements were reviewed for the proposed right turn lane at the south US-395 approach. A minimum of 100 feet of storage length is required based on NDOT's access management standards. The access management standards also indicate that 220 feet of desirable deceleration length with a 180 foot taper (15:1 ratio) is required for the right turn lane based on the 45 mile per hour speed limit on US-395. Approximately 550 feet of distance is available on US-395 between SR-88 and an existing driveway to the southeast which will accommodate the required storage, deceleration, and taper lengths.

Storage, deceleration, and taper length requirements were reviewed for the existing left turn lane at the north US-395 approach. A minimum of 125 feet of left turn storage length is required for the existing plus project volumes based on the Poisson Method for signalized intersections with a 95th percentile confidence level. NDOT's access management standards indicate that 220 feet desirable or 145 feet minimum deceleration length with a 180 foot taper (15:1 ratio) is required based on the 45 mile per hour speed limit on US-395. These left turn lane requirements amount to a total desirable length of 525 feet or a total minimum length of 450 feet. The existing left turn lane, including the taper, is approximately 265 feet long which is insufficient for both existing and existing plus project conditions. The existing median on US-395 between SR-88 and the existing shopping center driveway to the north contains ±525 feet of available length. This available median length could potentially be reallocated to provide 125 feet of storage and 100 feet of deceleration length for the southbound left turn lane at SR-88, 100 feet of storage and 100 feet of deceleration length for the northbound left turn lane at the shopping center driveway, and a 100 foot back-to-back taper between the two left turn pockets with a portion of the deceleration occurring in the through lanes and taper. It is suggested that final left turn storage, deceleration, and taper lengths on US-395 between SR-88 and the existing shopping center driveway to the north be re-evaluated during the intersection design process.

Left turn storage was also reviewed for the proposed left and right turn lanes at the east approach of the US-395/SR-88 intersection. A minimum of 150 feet of left turn storage length is required for the existing plus project volumes based on the Poisson Method for signalized intersections with a 95th percentile confidence level. It is suggested that the right turn lane also contain a minimum of 150 feet of storage length.

It is recommended that the US-395/SR-88 intersection be improved as a four-leg intersection with one left turn lane, two through lanes, and one right turn lane at the north and south US-395 approaches; dual left turn lanes, one through lane, and one right turn lane at the west SR-88 approach; and one left turn lane, one through lane, and one right turn lane at the east project access approach.

US-395/MULLER LANE INTERSECTION

The eastbound and westbound left turn and through movements at the US-395/Muller Lane intersection currently operate at LOS F during the AM and PM peak hours and will continue to do so for the existing plus project, 2037 base, and 2037 base plus project traffic volumes. The Draft 2016 Douglas County Transportation Plan identifies the US-395/Muller Lane intersection as a potential location for a roundabout or traffic signal. A roundabout at this location will operate at LOS B or better during the AM and PM peak hours for all scenarios. The peak hour traffic signal warrant is not met at the intersection for the existing and projected traffic volumes.

Storage and deceleration requirements were reviewed for the southbound left turn movement at the US-395/Muller Lane intersection. NDOT's unsignalized criteria of providing three minutes of storage during the peak hour results in 100 feet of left turn storage for the existing plus project volumes and 275 feet of storage for the 2037 base plus project volumes. NDOT's access management standards indicate that the left turn pocket should also contain a desirable deceleration length of 365 feet based on the 55 mile per hour speed on US-395. The left turn pocket at the north approach contains approximately 850 feet of storage/deceleration length which will accommodate the existing and projected traffic volumes. No improvements are recommended at the US-395/Muller Lane intersection with development of the project.

US-395/IRONWOOD DRIVE INTERSECTION

The eastbound and westbound left turn and through movements at the US-395/Ironwood Drive intersection currently operate at LOS F during the AM and PM peak hours and will continue to do so for the existing plus project, 2037 base and 2037 base plus project traffic volumes. The Draft 2016 Douglas County Transportation Plan identifies the elimination of the eastbound and westbound left turn movements at the US-395/Ironwood Drive intersection as a recommended near-term safety improvement. The Draft 2016 Douglas County Transportation Plan also identifies the widening of US-395 from four to six lanes from Muller Parkway to SR-88 in the 2026 to 2040 timeframe as a proposed transportation project needed to maintain policy level of service. These improvements will result in LOS D or better operation for the 2037 base and 2037 base plus project traffic volumes.

Storage and deceleration requirements were reviewed for the southbound left turn movement at the US-395/Ironwood Drive intersection. A minimum of 100 feet of left turn storage length is required for both the existing and projected volumes based on NDOT's unsignalized criteria of providing three minutes of storage. NDOT's access management standards indicate that the left turn pocket should also contain a desirable deceleration length of 220 feet based on the 45 mile per hour speed on US-395. The existing left turn pocket at the north approach is approximately 200 feet in length which is inadequate for both existing and future conditions.

It is suggested that the left turn pocket at the north approach be reviewed and lengthened if necessary with future US-395 improvement projects. No improvements are recommended at the US-395/ Ironwood Drive intersection with development of the project.

US-395/LUCERNE STREET INTERSECTION

The northbound and southbound left turn movements at the US-395/Lucerne Street intersection currently operate at LOS F during the AM and PM peak hours and will continue to do so for the existing plus project, 2037 base, and 2037 base plus project traffic volumes. The Draft 2016 Douglas County Transportation Plan identifies the US-395/Lucerne Street as a potential location for a traffic signal or roundabout. With traffic signal control the intersection is anticipated to operate at LOS B during the AM and PM peak hours for all scenarios. A roundabout at this location will operate at LOS A during the AM and PM peak hours for all scenarios.

Left turn storage requirements were reviewed for the left turn movement at the north approach of the US-395/Lucerne Street intersection based on the unsignalized criteria of providing three minutes of storage during the peak hour. A minimum of 100 feet of left turn storage is needed for both the existing and existing plus project traffic volumes. The existing striped left turn lane contains approximately 50 feet of storage length. However, additional width and length exists on Lucerne Street to accommodate the anticipated left turn queue. No improvements are recommended at the US-395/Lucerne Street intersection with development of the project.

IRONWOOD DRIVE/LUCERNE STREET INTERSECTION

The Ironwood Drive/Lucerne Street intersection currently operate at LOS A during the AM and PM peak hours and will contain to do so for the existing plus project, 2037 base, and 2037 base plus project traffic volumes. The intersection is anticipated to maintain Douglas County's policy LOS C operation for all scenarios with the existing lane configurations and traffic control.

Storage requirements were reviewed for the left turn movements at the south and west approaches of the Ironwood Drive/Lucerne Street intersection based on the unsignalized criteria of providing three minutes of storage during the peak hour. A minimum of 75 feet of left turn storage is needed at both approaches based on the existing plus project traffic volumes. The left turn lanes at the south and west approaches each contain approximately 100 feet of storage length which will accommodate project traffic volumes. No improvements are recommended at the Ironwood Drive/Lucerne Street intersection with development of the project.

IRONWOOD DRIVE/MONTE VISTA AVENUE/PROJECT ACCESS INTERSECTION

The minor movements at the existing Ironwood Drive/Monte Vista Avenue intersection currently operate at LOS A during the AM and PM peak hours and will contain to do so for the 2037 base traffic volumes. The minor movements at the Ironwood Drive/Monte Vista Avenue/Project Access intersection will operate at LOS B or better during the AM and PM peak hours for the existing plus project and 2037 base plus project traffic volumes. The intersection will therefore meet Douglas County's policy LOS C or better standard.

Storage requirements were reviewed for the left turn movements at the north and west approaches of the Ironwood Drive/Monte Vista Avenue/Project Access intersection based on the unsignalized criteria of providing three minutes of storage during the peak hour. Less than 50 feet of left turn storage is needed at both approaches based on the existing plus project traffic volumes. The left turn lanes at the north and west approaches each contain approximately 75 feet of storage length which will accommodate project traffic volumes. It is recommended that the Ironwood Drive/Monte Vista Avenue/Project Access intersection be improved as a four-leg intersection with stop sign control and a minimum of one shared left turn-through-right turn lane at the south approach.

IRONWOOD DRIVE/PROJECT ACCESS INTERSECTION

The minor movements at the proposed Ironwood Drive/Project Access intersection are anticipated to operate at LOS A during the AM and PM peak hours for the existing plus project and 2037 base plus project traffic volumes. The intersection will therefore meet Douglas County's policy LOS C or better standard.

Storage requirements were subsequently reviewed for the left turn movement at the east approach of the intersection based on the unsignalized criteria of providing three minutes of storage during the peak hour. Less than 50 feet of left turn storage is needed at the east approach based on the existing plus project traffic volumes. The left turn lane contains more than 75 feet of storage length which will accommodate the projected traffic volumes. It is recommended that the Ironwood Drive/Project Access intersection be improved as a three-leg intersection with stop sign control and a minimum of one shared left turn-right turn lane at the south approach.

MONTE VISTA AVENUE/PROJECT ACCESS INTERSECTION

The minor movements at the proposed Monte Vista Avenue/Project Access intersection will operate at LOS A during the AM and PM peak hours for the existing plus project and 2037 base plus project traffic volumes. The intersection will therefore meet Douglas County's policy LOS C or better standard.

Storage requirements were subsequently reviewed for the left turn movement at the north approach of the intersection based on the unsignalized criteria of providing three minutes of storage during the peak hour. Less than 50 feet of left turn storage is needed at the north approach based on the existing plus project traffic volumes. The left turn lane contains approximately 75 feet of storage length which will accommodate the projected traffic volumes. It is recommended that the Monte Vista Avenue/Project Access intersection be improved as a three-leg intersection with stop sign control and a minimum of one shared left turn-right turn lane at the east approach.

LUCERNE STREET/COMMERCIAL DRIVEWAY/PROJECT ACCESS INTERSECTION

The minor movements at the Lucerne Street/Existing Commercial Driveway intersection currently operate at LOS A during the AM and PM peak hours and will contain to do so for the 2037 base traffic volumes. The minor movements at the Lucerne Street/Commercial Driveway/Project Access intersection will operate at LOS B or better during the AM and PM peak hours for the existing plus project and 2037 base plus project traffic volumes. The intersection is anticipated to maintain Douglas County's policy LOS C operation for all scenarios.

Storage requirements were subsequently reviewed for the left turn movement at the south approach of the intersection based on the unsignalized criteria of providing three minutes of storage during the peak hour. Less than 50 feet of left turn storage is needed at the south approach based on the existing plus project traffic volumes. The left turn lane contains approximately 75 feet of storage length which will accommodate project traffic volumes. It is recommended that the Lucerne Street/Commercial Driveway/Project Access intersection be improved as a four-leg intersection with stop sign control and a minimum of one shared left turn-through-right turn lane at the west approach.

US-395/PROJECT DRIVEWAY INTERSECTION

The southbound left turn movement at the US-395/Project Driveway intersection will operate at LOS E during the AM and PM peak hours for the existing plus project traffic volumes and LOS F during the PM peak hour for the 2037 base plus project traffic volumes. The intersection will not meet NDOT's policy LOS D or better standard.

Spacing requirements were subsequently reviewed for the driveway based on NDOT's access management standards. The access management standards indicate that spacing for unsignalized driveways shall be a minimum of 250 feet based on the posted 35 mile per hour speed limit on US-395. It does not appear that the project driveway will meet the 250 feet spacing requirement from existing driveways located to the east and west.

RECOMMENDATIONS

Traffic generated by the proposed Nevada Northwest development will have some impact on the adjacent street network. The following recommendations are made to mitigate project traffic impacts.

It is recommended that any required signing, striping, or traffic control improvements comply with Nevada Department of Transportation (NDOT) and Douglas County requirements.

It is recommended that the US-395/SR-88 intersection be improved as a four-leg signalized intersection with one left turn lane, two through lanes, and one right turn lane at the north and south US-395 approaches; dual left turn lanes, one through lane, and one right turn lane at the west SR-88 approach; and one left turn lane, one through lane, and one right turn lane at the east project access approach.

It is recommended that the Ironwood Drive/Monte Vista Avenue/Project Access intersection be improved as a four-leg intersection with stop sign control and a minimum of one shared left turn-through-right turn lane at the south approach.

It is recommended that the Ironwood Drive/Project Access intersection be improved as a three-leg intersection with stop sign control and a minimum of one shared left turn-right turn lane at the south approach.

It is recommended that the Monte Vista Avenue/Project Access intersection be improved as a three-leg intersection with stop sign control and a minimum of one shared left turn-right turn lane at the east approach.

It is recommended that the Lucerne Street/Commercial Driveway/Project Access intersection be improved as a four-leg intersection with stop sign control and a minimum of one shared left turn-through-right turn lane at the west approach.

It is recommended that the project's internal roadways, cul-de-sacs, and driveways be designed per Douglas County standards.

APPENDIX

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 12/28/2017
Analysis Date: 12/28/2017

		Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
ITE	Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
210	SFHOUSE 1 79 Dwelling Units	376	376	752	15	44	59	50	29	79
	Unadjusted Volume	0	0	0	0	0	0	0	0	0
	Internal Capture Trips	0	0	0	0	0	0	0	0	0
	Pass-By Trips	0	0	0	0	0	0	0	0	0
	Volume Added to Adjacent Streets	0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project:	New Project	Open Date:	12/28/2017
Alternative:	Alternative 1	Analysis Date:	12/28/2017

		Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
ITE	Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
220	APT 1	572	572	1144	18	70	88	70	37	107
	172 Dwelling Units									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 12/28/2017
Analysis Date: 12/28/2017

		Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
ITE	Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
820	CENTERSHOPPING 1 14.17 Gross Leasable Area 1000 SF	303	302	605	9	5	14	25	28	53
	Unadjusted Volume	0	0	0	0	0	0	0	0	0
	Internal Capture Trips	0	0	0	0	0	0	0	0	0
	Pass-By Trips	0	0	0	0	0	0	0	0	0
	Volume Added to Adjacent Streets	0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 12/28/2017
Analysis Date: 12/28/2017

		Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
ITE	Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
881	STOREDRUGDT 1 15 Gross Floor Area 1000 SF	727	727	1454	27	25	52	75	74	149
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 12/28/2017
Analysis Date: 12/28/2017

ITE	Land Use	Average Daily Trips Enter	Average Daily Trips Exit	Average Daily Trips Total	AM Peak Hour of Adjacent Street Traffic Enter	AM Peak Hour of Adjacent Street Traffic Exit	AM Peak Hour of Adjacent Street Traffic Total	PM Peak Hour of Adjacent Street Traffic Enter	PM Peak Hour of Adjacent Street Traffic Exit	PM Peak Hour of Adjacent Street Traffic Total
912	BANKDRIVEIN 1 4.5 Gross Floor Area 1000 SF	334	333	667	31	23	54	55	54	109
	Unadjusted Volume	0	0	0	0	0	0	0	0	0
	Internal Capture Trips	0	0	0	0	0	0	0	0	0
	Pass-By Trips	0	0	0	0	0	0	26	25	51
	Volume Added to Adjacent Streets	0	0	0	0	0	0	-26	-25	-51

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 12/28/2017
Analysis Date: 12/28/2017

		Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
ITE	Land Use	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
934	FASTFOODDT 1	1786	1786	3572	167	160	327	122	113	235
	7.2 Gross Floor Area 1000 SF									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

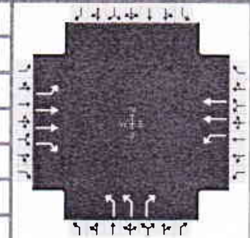
Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

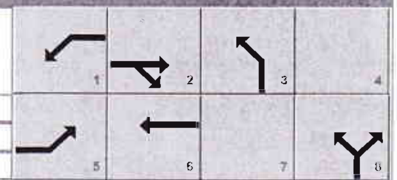
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	US-395 & SR-88	File Name	UsUs17ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	29	622	313	177	729		403		126			

Signal Information										
Cycle, s	80.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	6.0	5.0	34.0	20.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	0.0



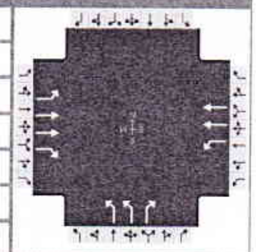
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		
Case Number	2.0	3.0	2.0	4.0		9.0		
Phase Duration, s	11.0	39.0	16.0	44.0		25.0		
Change Period, ($Y+R_c$), s	5.0	5.0	0.0	5.0		5.0		
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.2		
Queue Clearance Time (g_s), s	3.3		9.7			10.8		
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0		1.1		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	1.00		0.04			0.03		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h	32	676	286	192	792		438		137			
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1781	1537	1781	1781		1712		1550			
Queue Service Time (g_s), s	1.3	10.8	10.5	7.7	11.7		8.8		5.8			
Cycle Queue Clearance Time (g_c), s	1.3	10.8	10.5	7.7	11.7		8.8		5.8			
Green Ratio (g/C)	0.08	0.42	0.42	0.20	0.49		0.25		0.25			
Capacity (c), veh/h	134	1513	653	356	1736		856		387			
Volume-to-Capacity Ratio (X)	0.236	0.447	0.438	0.540	0.456		0.512		0.353			
Back of Queue (Q), ft/ln (95 th percentile)	26.1	193.1	172.7	148.5	200		156.7		94.1			
Back of Queue (Q), veh/ln (95 th percentile)	1.0	7.6	6.8	5.8	7.9		6.2		3.7			
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh	34.8	16.3	16.2	28.7	13.5		25.8		24.7			
Incremental Delay (d_2), s/veh	0.3	1.0	2.1	0.9	0.9		0.2		0.2			
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh	35.2	17.3	18.4	29.6	14.4		26.0		24.9			
Level of Service (LOS)	D	B	B	C	B		C		C			
Approach Delay, s/veh / LOS	18.2	B		17.4	B		25.8	C		0.0		
Intersection Delay, s/veh / LOS	19.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.3	A	1.3	A		F		

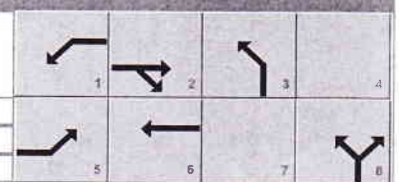
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	US-395 & SR-88	File Name	UsUs17px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	17	898	484	108	750		325		142			

Signal Information										
Cycle, s	80.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	6.0	5.0	34.0	20.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		
Case Number	2.0	3.0	2.0	4.0		9.0		
Phase Duration, s	11.0	39.0	16.0	44.0		25.0		
Change Period, ($Y+R_c$), s	5.0	5.0	0.0	5.0		5.0		
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.2		
Queue Clearance Time (g_s), s	2.8		6.5			8.9		
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		1.0		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	0.80		0.00			0.01		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h	18	976	472	117	815		353		154			
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1781	1537	1781	1781		1712		1550			
Queue Service Time (g_s), s	0.8	17.4	20.4	4.5	12.2		6.9		6.6			
Cycle Queue Clearance Time (g_c), s	0.8	17.4	20.4	4.5	12.2		6.9		6.6			
Green Ratio (*g/C*)	0.08	0.42	0.42	0.20	0.49		0.25		0.25			
Capacity (*c*), veh/h	134	1513	653	356	1736		856		387			
Volume-to-Capacity Ratio (*X*)	0.138	0.645	0.722	0.330	0.470		0.413		0.398			
Back of Queue (*Q*), ft/ln (95 th percentile)	15.2	286.1	314.8	85.1	205.9		122.7		107.3			
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	11.3	12.4	3.4	8.1		4.8		4.2			
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh	34.6	18.2	19.1	27.4	13.6		25.1		25.0			
Incremental Delay (d_2), s/veh	0.2	2.1	6.8	0.2	0.9		0.1		0.2			
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh	34.8	20.4	25.9	27.6	14.5		25.2		25.2			
Level of Service (LOS)	C	C	C	C	B		C		C			
Approach Delay, s/veh / LOS	22.3	C		16.2	B		25.2	C		0.0		
Intersection Delay, s/veh / LOS	20.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.7	B	1.3	A		F		

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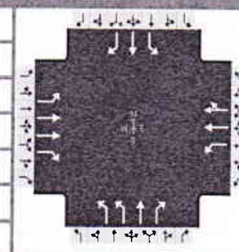
HCS7 Signalized Intersection Results Summary

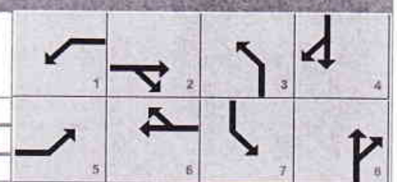
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	US-395 & SR-88	File Name	UsUs17aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	105	588	313	178	686	118	403	33	128	121	41	79

Signal Information				
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	2.0	23.0	15.0	16.0	0.0
Yellow	4.0	0.0	4.0	0.0	4.0	0.0
Red	1.0	0.0	1.0	0.0	0.0	0.0



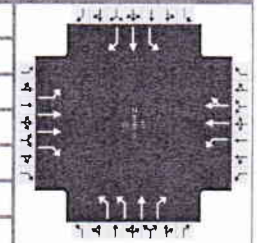
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	15.0	28.0	17.0	30.0	15.0	20.0	15.0	20.0
Change Period, ($Y+R_c$), s	5.0	5.0	0.0	5.0	0.0	5.0	4.0	5.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.3	3.1	3.3
Queue Clearance Time (g_s), s	6.8		9.7		11.4	7.1	7.5	4.8
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0	0.4	0.3	0.1	0.4
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.90		0.01		0.71	0.02	0.64	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	114	639	286	193	434	412	438	36	112	132	45	64
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1781	1530	1781	1870	1774	1730	1870	1544	1781	1870	1544
Queue Service Time (g_s), s	4.8	12.5	13.1	7.7	16.6	16.7	9.4	1.3	5.1	5.5	1.6	2.8
Cycle Queue Clearance Time (g_c), s	4.8	12.5	13.1	7.7	16.6	16.7	9.4	1.3	5.1	5.5	1.6	2.8
Green Ratio (g/C)	0.12	0.29	0.29	0.21	0.31	0.31	0.19	0.19	0.19	0.14	0.19	0.19
Capacity (c), veh/h	223	1024	440	379	584	554	649	351	290	245	351	290
Volume-to-Capacity Ratio (X)	0.513	0.624	0.650	0.511	0.743	0.744	0.675	0.102	0.387	0.537	0.127	0.221
Back of Queue (Q), ft/ln (95 th percentile)	93.5	232.6	232.5	145.2	328.4	312	180.8	25.2	83.6	108.1	31.5	46.2
Back of Queue (Q), veh/ln (95 th percentile)	3.7	9.2	9.2	5.7	12.9	12.5	7.1	1.0	3.3	4.3	1.2	1.8
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	32.7	24.7	25.0	27.8	24.6	24.6	30.2	26.9	28.5	32.1	27.1	27.6
Incremental Delay (d_2), s/veh	0.9	2.9	7.3	0.5	8.3	8.8	2.3	0.0	0.3	1.3	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	33.6	27.6	32.2	28.3	32.9	33.4	32.5	27.0	28.8	33.4	27.1	27.7
Level of Service (LOS)	C	C	C	C	C	C	C	C	C	C	C	C
Approach Delay, s/veh / LOS	29.5	C		32.3	C		31.5	C		30.7	C	
Intersection Delay, s/veh / LOS	31.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	C	2.5	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.3	A	1.3	A	1.5	A	0.9	A

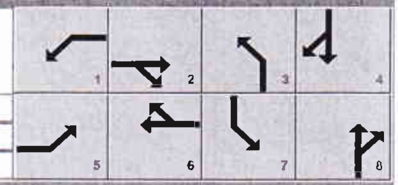
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	US-395 & SR-88	File Name	UsUs17pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	102	855	484	112	718	111	325	41	145	126	34	77

Signal Information										
Cycle, s	85.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	10.0	2.0	28.0	15.0	16.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	0.0	4.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	0.0	0.0	0.0



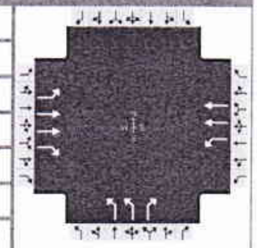
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	15.0	33.0	17.0	35.0	15.0	20.0	15.0	20.0
Change Period, ($Y+R_c$), s	5.0	5.0	0.0	5.0	0.0	5.0	4.0	5.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.3	3.1	3.3
Queue Clearance Time (g_s), s	7.0		7.0		10.0	8.5	8.2	5.2
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0	0.4	0.3	0.1	0.4
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		0.00		0.20	0.08	1.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	111	929	417	122	447	427	353	45	130	137	37	67
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1781	1533	1781	1870	1785	1730	1870	1543	1781	1870	1543
Queue Service Time (g_s), s	5.0	20.1	21.3	5.0	17.3	17.3	8.0	1.7	6.5	6.2	1.4	3.2
Cycle Queue Clearance Time (g_c), s	5.0	20.1	21.3	5.0	17.3	17.3	8.0	1.7	6.5	6.2	1.4	3.2
Green Ratio (g/C)	0.12	0.33	0.33	0.20	0.35	0.35	0.18	0.18	0.18	0.13	0.18	0.18
Capacity (c), veh/h	210	1173	505	356	660	630	610	330	272	231	330	272
Volume-to-Capacity Ratio (X)	0.529	0.792	0.827	0.342	0.677	0.678	0.579	0.135	0.479	0.594	0.112	0.247
Back of Queue (Q), ft/ln (95 th percentile)	99.2	350	363.5	95.1	326	310.4	150.2	34.4	108	126.6	28.3	53.2
Back of Queue (Q), veh/ln (95 th percentile)	3.9	13.8	14.3	3.7	12.8	12.4	5.9	1.4	4.3	5.0	1.1	2.1
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	35.3	25.9	26.3	29.2	23.4	23.4	32.1	29.5	31.5	34.9	29.4	30.1
Incremental Delay (d_2), s/veh	1.3	5.5	14.4	0.2	5.5	5.8	0.9	0.1	0.5	2.9	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	36.6	31.4	40.6	29.4	28.9	29.2	33.0	29.6	32.0	37.7	29.5	30.3
Level of Service (LOS)	D	C	D	C	C	C	C	C	C	D	C	C
Approach Delay, s/veh / LOS	34.4	C		29.1	C		32.5	C		34.4	C	
Intersection Delay, s/veh / LOS	32.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	C	2.4	B	2.9	C	3.1	C
Bicycle LOS Score / LOS	1.7	B	1.3	A	1.4	A	0.9	A

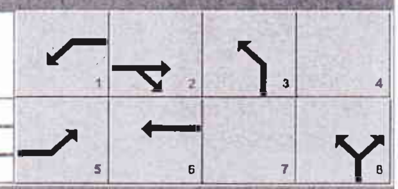
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2037 Base	Analysis Period	1> 7:00
Intersection	US-395 & SR-88	File Name	UsUs37ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	35	614	382	216	720		492		154			

Signal Information										
Cycle, s	80.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	6.0	5.0	34.0	20.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		
Case Number	2.0	3.0	2.0	4.0		9.0		
Phase Duration, s	11.0	39.0	16.0	44.0		25.0		
Change Period, (*Y+R* $_c$), s	5.0	5.0	0.0	5.0		5.0		
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.2		
Queue Clearance Time (g_s), s	3.6		11.7			13.1		
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0		1.2		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	1.00		0.34			0.16		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h	38	667	361	235	783		535		167			
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1781	1537	1781	1781		1712		1550			
Queue Service Time (g_s), s	1.6	10.6	14.1	9.7	11.5		11.1		7.3			
Cycle Queue Clearance Time (g_c), s	1.6	10.6	14.1	9.7	11.5		11.1		7.3			
Green Ratio (*g/C*)	0.08	0.42	0.42	0.20	0.49		0.25		0.25			
Capacity (*c*), veh/h	134	1513	653	356	1736		856		387			
Volume-to-Capacity Ratio (*X*)	0.285	0.441	0.552	0.659	0.451		0.625		0.432			
Back of Queue (*Q*), ft/ln (95 th percentile)	31.7	190.4	225.6	196.2	197.2		199.9		117.7			
Back of Queue (*Q*), veh/ln (95 th percentile)	1.2	7.5	8.9	7.7	7.8		7.9		4.6			
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh	35.0	16.3	17.3	29.5	13.5		26.7		25.2			
Incremental Delay (d_2), s/veh	0.4	0.9	3.3	3.6	0.8		1.1		0.3			
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh	35.4	17.2	20.6	33.0	14.3		27.7		25.5			
Level of Service (LOS)	D	B	C	C	B		C		C			
Approach Delay, s/veh / LOS	19.0	B		18.6	B		27.2	C		0.0		
Intersection Delay, s/veh / LOS	20.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.4	A	1.3	A		F		

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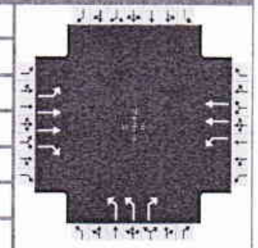
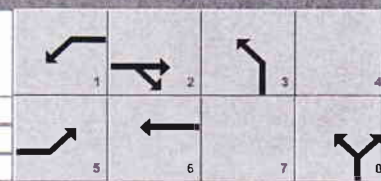
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2037 Base	Analysis Period	1> 7:00
Intersection	US-395 & SR-88	File Name	UsUs37px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	21	916	591	132	765		397		173			

Signal Information										
Cycle, s	80.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	6.0	5.0	34.0	20.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	0.0



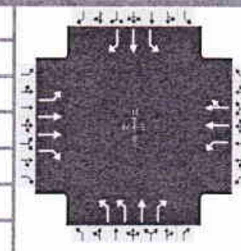
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		
Case Number	2.0	3.0	2.0	4.0		9.0		
Phase Duration, s	11.0	39.0	16.0	44.0		25.0		
Change Period, (*Y+R c*), s	5.0	5.0	0.0	5.0		5.0		
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.2		
Queue Clearance Time (*g s*), s	3.0		7.6			10.7		
Green Extension Time (*g e*), s	0.0	0.0	0.1	0.0		1.2		
Phase Call Probability	1.00		1.00			1.00		
Max Out Probability	1.00		0.00			0.04		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h	23	996	588	143	832		432		188			
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1781	1537	1781	1781		1712		1550			
Queue Service Time (*g s*), s	1.0	17.9	28.5	5.6	12.5		8.7		8.3			
Cycle Queue Clearance Time (*g c*), s	1.0	17.9	28.5	5.6	12.5		8.7		8.3			
Green Ratio (*g/C*)	0.08	0.42	0.42	0.20	0.49		0.25		0.25			
Capacity (*c*), veh/h	134	1513	653	356	1736		856		387			
Volume-to-Capacity Ratio (*X*)	0.171	0.658	0.900	0.403	0.479		0.504		0.485			
Back of Queue (*Q*), ft/ln (95 th percentile)	18.8	293.1	462.3	105.8	210		153.9		134.3			
Back of Queue (*Q*), veh/ln (95 th percentile)	0.7	11.5	18.2	4.2	8.3		6.1		5.3			
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (*d 1*), s/veh	34.7	18.4	21.4	27.8	13.7		25.7		25.6			
Incremental Delay (*d 2*), s/veh	0.2	2.3	17.8	0.3	0.9		0.2		0.4			
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh	34.9	20.6	39.2	28.1	14.7		25.9		26.0			
Level of Service (LOS)	C	C	D	C	B		C		C			
Approach Delay, s/veh / LOS	27.6		C	16.6		B	25.9		C	0.0		
Intersection Delay, s/veh / LOS	23.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.8	B	1.3	A		F		

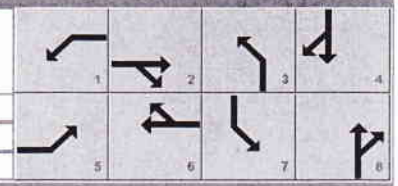
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	Solaegui Engineers			Duration, h	0.25	
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other	
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92	
Urban Street		Analysis Year	2037 + Project	Analysis Period	1> 7:00	
Intersection	US-395 & SR-88	File Name	UsUs37aw.xus			
Project Description						



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	111	580	382	217	677	118	492	33	156	121	41	79

Signal Information										
Cycle, s	80.0	Reference Phase	2							
Offset, s	0	Reference Point	End							
Uncoordinated	No	Simult. Gap E/W	On	Green	10.0	2.0	23.0	15.0	16.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	0.0	4.0	0.0	4.0	0.0
				Red	1.0	0.0	1.0	0.0	0.0	0.0



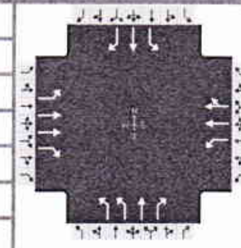
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	15.0	28.0	17.0	30.0	15.0	20.0	15.0	20.0
Change Period, ($Y+R_c$), s	5.0	5.0	0.0	5.0	0.0	5.0	4.0	5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.3	3.1	3.3
Queue Clearance Time (g_s), s	7.1		11.6		13.9	8.6	7.5	4.8
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0	0.2	0.3	0.1	0.4
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		0.12		1.00	0.09	0.64	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	121	630	361	236	429	408	535	36	142	132	45	64
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1781	1530	1781	1870	1773	1730	1870	1544	1781	1870	1544
Queue Service Time (g_s), s	5.1	12.3	17.6	9.6	16.4	16.4	11.9	1.3	6.6	5.5	1.6	2.8
Cycle Queue Clearance Time (g_c), s	5.1	12.3	17.6	9.6	16.4	16.4	11.9	1.3	6.6	5.5	1.6	2.8
Green Ratio (*g/C*)	0.12	0.29	0.29	0.21	0.31	0.31	0.19	0.19	0.19	0.14	0.19	0.19
Capacity (*c*), veh/h	223	1024	440	379	584	554	649	351	290	245	351	290
Volume-to-Capacity Ratio (*X*)	0.542	0.616	0.821	0.623	0.735	0.735	0.825	0.102	0.492	0.537	0.127	0.221
Back of Queue (*Q*), ft/ln (95 th percentile)	100.8	229.2	318.4	190.3	323.4	307.2	235.5	25.2	108.8	108.1	31.5	46.2
Back of Queue (*Q*), veh/ln (95 th percentile)	4.0	9.0	12.5	7.5	12.7	12.3	9.3	1.0	4.3	4.3	1.2	1.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	32.9	24.7	26.6	28.6	24.5	24.5	31.2	26.9	29.1	32.1	27.1	27.6
Incremental Delay (d_2), s/veh	1.5	2.8	15.7	2.4	8.0	8.4	8.0	0.0	0.5	1.3	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	34.3	27.4	42.2	31.0	32.5	33.0	39.3	27.0	29.6	33.4	27.1	27.7
Level of Service (LOS)	C	C	D	C	C	C	D	C	C	C	C	C
Approach Delay, s/veh / LOS	33.0	C		32.4	C		36.7	D		30.7	C	
Intersection Delay, s/veh / LOS	33.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	C	2.5	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.4	A	1.4	A	1.7	B	0.9	A

HCS7 Signalized Intersection Results Summary

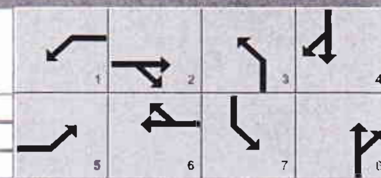
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Dec 26, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2037 + Project	Analysis Period	1> 7:00
Intersection	US-395 & SR-88	File Name	UsUs37pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	106	873	591	136	733	111	397	41	176	126	34	77

Signal Information				
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	2.0	28.0	15.0	16.0	0.0
Yellow	4.0	0.0	4.0	0.0	4.0	0.0
Red	1.0	0.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	15.0	33.0	17.0	35.0	15.0	20.0	15.0	20.0
Change Period, ($Y+R_c$), s	5.0	5.0	0.0	5.0	0.0	5.0	4.0	5.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.3	3.1	3.3
Queue Clearance Time (g_s), s	7.2		8.2		12.0	10.3	8.2	5.2
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0	0.4	0.3	0.1	0.5
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		0.00		1.00	0.37	1.00	0.01

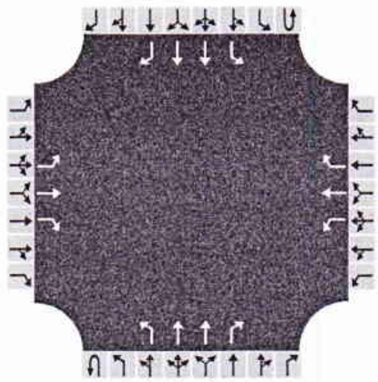
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	115	949	452	148	455	435	432	45	164	137	37	67
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1781	1533	1781	1870	1786	1730	1870	1543	1781	1870	1543
Queue Service Time (g_s), s	5.2	20.7	23.9	6.2	17.7	17.7	10.0	1.7	8.3	6.2	1.4	3.2
Cycle Queue Clearance Time (g_c), s	5.2	20.7	23.9	6.2	17.7	17.7	10.0	1.7	8.3	6.2	1.4	3.2
Green Ratio (g/C)	0.12	0.33	0.33	0.20	0.35	0.35	0.18	0.18	0.18	0.13	0.18	0.18
Capacity (c), veh/h	210	1173	505	356	660	630	610	330	272	231	330	272
Volume-to-Capacity Ratio (X)	0.550	0.809	0.896	0.415	0.690	0.690	0.707	0.135	0.603	0.594	0.112	0.247
Back of Queue (Q), ft/ln (95 th percentile)	104.5	360.4	421.1	117.5	333.3	317.5	195.3	34.4	146.2	126.6	28.3	53.2
Back of Queue (Q), veh/ln (95 th percentile)	4.1	14.2	16.6	4.6	13.1	12.7	7.7	1.4	5.8	5.0	1.1	2.1
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	35.4	26.1	27.1	29.7	23.5	23.5	32.9	29.5	32.3	34.9	29.4	30.1
Incremental Delay (d_2), s/veh	1.8	6.1	21.1	0.3	5.8	6.1	3.2	0.1	2.7	2.9	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	37.2	32.1	48.2	29.9	29.3	29.6	36.1	29.6	34.9	37.7	29.5	30.3
Level of Service (LOS)	D	C	D	C	C	C	D	C	C	D	C	C
Approach Delay, s/veh / LOS	37.3	D		29.5	C		35.4	D		34.4	C	
Intersection Delay, s/veh / LOS	34.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	C	2.4	B	2.9	C	3.2	C
Bicycle LOS Score / LOS	1.7	B	1.3	A	1.5	B	0.9	A

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Muller Lane
Analysis Year	2017	North/South Street	US-395
Time Analyzed	AM Existing	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		18	0	33		0	0	8		13	1177	0		6	934	37
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

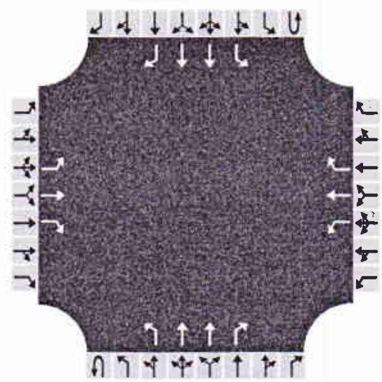
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		20	0	36		0	0	9		14				7		
Capacity, c (veh/h)		57	35	510		43	33	418		656				539		
v/c Ratio		0.35	0.00	0.07		0.00	0.00	0.02		0.02				0.01		
95% Queue Length, Q_{95} (veh)		1.3	0.0	0.2		0.0	0.0	0.1		0.1				0.0		
Control Delay (s/veh)		98.5	107.9	12.6		88.3	114.2	13.8		10.6				11.8		
Level of Service, LOS		F	F	B		F	F	B		B				B		
Approach Delay (s/veh)	43.3				13.8				0.1				0.1			
Approach LOS	E				B											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Muller Lane
Analysis Year	2017	North/South Street	US-395
Time Analyzed	PM Existing	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		17	0	40		0	0	4		40	1104	0		9	1378	38
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

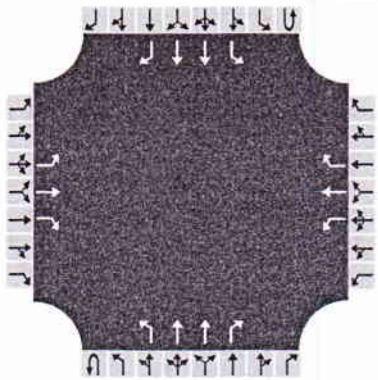
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18	0	43		0	0	4		43				10		
Capacity, c (veh/h)		22	16	354		26	15	444		428				577		
v/c Ratio		0.81	0.00	0.12		0.00	0.00	0.01		0.10				0.02		
95% Queue Length, Q_{95} (veh)		2.3	0.0	0.4		0.0	0.0	0.0		0.3				0.1		
Control Delay (s/veh)		369.7	231.3	16.6		145.2	245.8	13.2		14.4				11.3		
Level of Service, LOS		F	F	C		F	F	B		B				B		
Approach Delay (s/veh)	120.8				13.2				0.5				0.1			
Approach LOS	F				B											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Muller Lane
Analysis Year	2017	North/South Street	US-395
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		18	0	34		0	0	24		15	1228	0		12	976	37
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		20	0	37		0	0	26		16				13		
Capacity, c (veh/h)		46	29	494		36	27	401		630				513		
v/c Ratio		0.43	0.00	0.07		0.00	0.00	0.06		0.03				0.03		
95% Queue Length, Q_{95} (veh)		1.6	0.0	0.2		0.0	0.0	0.2		0.1				0.1		
Control Delay (s/veh)		132.7	129.7	12.9		105.2	137.3	14.6		10.9				12.2		
Level of Service, LOS		F	F	B		F	F	B		B				B		
Approach Delay (s/veh)	54.9				14.6				0.1				0.1			
Approach LOS	F				B											

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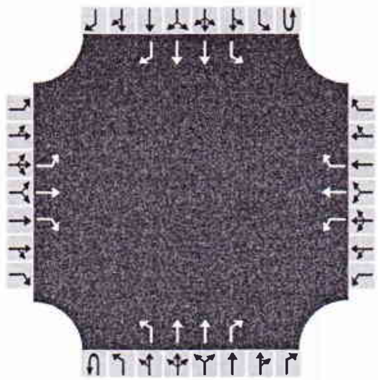
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Muller Lane
Analysis Year	2017	North/South Street	US-395
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		17	0	42		0	0	11		42	1148	0		27	1431	38
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

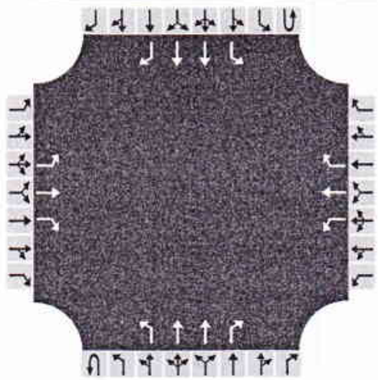
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18	0	46		0	0	12		46				29		
Capacity, c (veh/h)		17	12	339		20	11	428		407				554		
v/c Ratio		1.07	0.00	0.14		0.00	0.00	0.03		0.11				0.05		
95% Queue Length, Q_{95} (veh)		2.7	0.0	0.5		0.0	0.0	0.1		0.4				0.2		
Control Delay (s/veh)		554.4	303.4	17.3		188.1	322.6	13.6		15.0				11.9		
Level of Service, LOS		F	F	C		F	F	B		B				B		
Approach Delay (s/veh)	168.3				13.6				0.5				0.2			
Approach LOS	F				B											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Muller Lane
Analysis Year	2037	North/South Street	US-395
Time Analyzed	AM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		22	0	40		0	0	180		16	1266	0		152	995	45
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

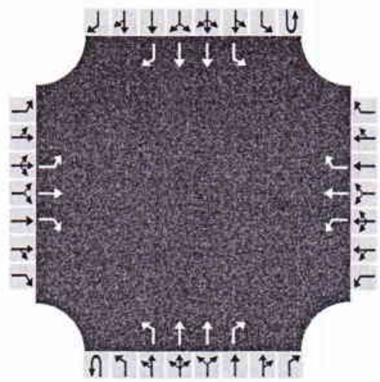
Delay, Queue Length, and Level of Service

	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Flow Rate, v (veh/h)		24	0	43		0	0	196		17				165		
Capacity, c (veh/h)		10	11	485		14	11	389		614				494		
v/c Ratio		2.39	0.00	0.09		0.00	0.00	0.50		0.03				0.33		
95% Queue Length, Q_{95} (veh)		4.0	0.0	0.3		0.0	0.0	2.7		0.1				1.5		
Control Delay (s/veh)		1368.9	322.3	13.1		257.6	346.8	23.3		11.0				15.9		
Level of Service, LOS		F	F	B		F	F	C		B				C		
Approach Delay (s/veh)	498.8				23.3				0.1				2.0			
Approach LOS	F				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Muller Lane
Analysis Year	2037	North/South Street	US-395
Time Analyzed	PM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		21	0	49		0	0	155		49	1197	0		191	1501	46
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23	0	53		0	0	168		53				208		
Capacity, c (veh/h)		3	3	320		6	3	412		377				528		
v/c Ratio		7.38	0.00	0.17		0.00	0.00	0.41		0.14				0.39		
95% Queue Length, Q_{95} (veh)		4.4	0.0	0.6		0.0	0.0	1.9		0.5				1.9		
Control Delay (s/veh)		5021.7	1045.8	18.5		613.8	1129.8	19.6		16.1				16.2		
Level of Service, LOS		F	F	C		F	F	C		C				C		
Approach Delay (s/veh)	1532.6				19.6				0.6				1.8			
Approach LOS	F				C											

HCS7 Two-Way Stop-Control Report

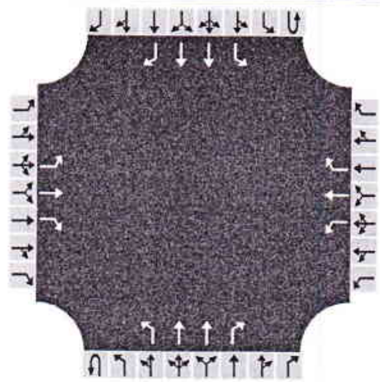
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2037
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	US-395 & Muller
Jurisdiction	Douglas County
East/West Street	Muller Lane
North/South Street	US-395
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		22	0	41		0	0	196		18	1317	0		158	1037	45
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

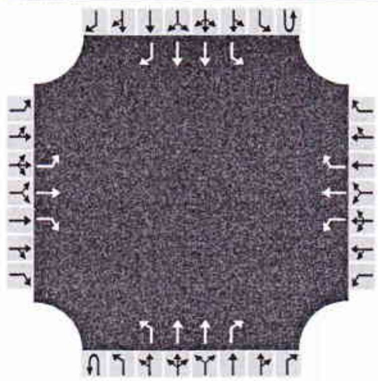
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		24	0	45		0	0	213		20				172		
Capacity, c (veh/h)		7	9	469		11	8	373		590				471		
v/c Ratio		3.39	0.00	0.10		0.00	0.00	0.57		0.03				0.37		
95% Queue Length, Q_{95} (veh)		4.2	0.0	0.3		0.0	0.0	3.4		0.1				1.7		
Control Delay (s/veh)		2080.1	407.9	13.5		320.8	439.1	26.8		11.3				17.0		
Level of Service, LOS		F	F	B		F	F	D		B				C		
Approach Delay (s/veh)	732.3				26.8				0.2				2.2			
Approach LOS	F				D											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Muller Lane
Analysis Year	2037	North/South Street	US-395
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		21	0	51		0	0	162		51	1241	0		209	1554	46
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23	0	55		0	0	176		55				227		
Capacity, c (veh/h)		2	2	307		4	2	397		358				506		
v/c Ratio		10.58	0.00	0.18		0.00	0.00	0.44		0.15				0.45		
95% Queue Length, Q_{95} (veh)		4.5	0.0	0.6		0.0	0.0	2.2		0.5				2.3		
Control Delay (s/veh)		7354.1	1464.5	19.3		831.2	1582.9	21.1		16.9				17.8		
Level of Service, LOS		F	F	C		F	F	C		C				C		
Approach Delay (s/veh)	2182.1				21.1				0.7				2.1			
Approach LOS	F				C											

HCS7 Roundabouts Report

General Information

Analyst	MSH
Agency or Co.	Solaegui Engineers
Date Performed	12/27/2017
Analysis Year	2017
Time Analyzed	AM Existing
Project Description	

Site Information

Intersection	US-395 & Muller
E/W Street Name	Muller Lane
N/S Street Name	US-395
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	18	1	33	0	1	1	8	0	13	1177	1	0	6	934	37
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	20	1	37	0	1	1	9	0	14	1305	1	0	7	1036	41
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		58			11		620	700		509	575	
Entry Volume veh/h		57			11		608	686		499	563	
Circulating Flow (v_c), pc/h	1044			1339			28			16		
Exiting Flow (v_{ex}), pc/h	9			56			1334			1074		
Capacity (c_{pce}), pc/h		585			455		1384	1384		1399	1399	
Capacity (c), veh/h		573			446		1350	1350		1364	1364	
v/c Ratio (x)		0.10			0.02		0.45	0.51		0.37	0.41	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		7.5			8.4		7.1	7.9		6.0	6.5	
Lane LOS		A			A		A	A		A	A	
95% Queue, veh		0.3			0.1		2.4	3.0		1.7	2.1	
Approach Delay, s/veh	7.5			8.4			7.5			6.3		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.0						A					

HCS7 Roundabouts Report

General Information

Analyst	MSH
Agency or Co.	Solaegui Engineers
Date Performed	12/27/2017
Analysis Year	2017
Time Analyzed	PM Existing
Project Description	

Site Information

Intersection	US-395 & Muller
E/W Street Name	Muller Lane
N/S Street Name	US-395
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	17	1	40	0	1	1	4	0	40	1104	1	0	9	1378	38
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	19	1	44	0	1	1	4	0	44	1224	1	0	10	1528	42
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		64			6		596	673		743	837	
Entry Volume veh/h		63			6		585	659		728	821	
Circulating Flow (v_c), pc/h	1539			1287			30			46		
Exiting Flow (v_{ex}), pc/h	12			87			1247			1573		
Capacity (c_{pce}), pc/h		384			476		1382	1382		1362	1362	
Capacity (c), veh/h		376			466		1347	1347		1328	1328	
v/c Ratio (x)		0.17			0.01		0.43	0.49		0.55	0.62	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		12.3			7.9		6.9	7.7		8.7	10.1	
Lane LOS		B			A		A	A		A	B	
95% Queue, veh		0.6			0.0		2.2	2.8		3.5	4.5	
Approach Delay, s/veh	12.3			7.9			7.3			9.4		
Approach LOS	B			A			A			A		
Intersection Delay, s/veh | LOS	8.6						A					

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency or Co.	Solaegui Engineers	E/W Street Name	Muller Lane
Date Performed	12/27/2017	N/S Street Name	US-395
Analysis Year	2017	Analysis Time Period (hrs)	0.25
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Project Description		Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	18	1	34	0	1	1	24	0	15	1228	1	0	12	976	37
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	20	1	38	0	1	1	27	0	17	1361	1	0	13	1082	41
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		59			29		648	731		534	602	
Entry Volume veh/h		58			28		635	717		523	590	
Circulating Flow (v_c), pc/h	1096			1398			34			19		
Exiting Flow (v_{ex}), pc/h	15			59			1408			1121		
Capacity (c_{pce}), pc/h		559			433		1377	1377		1396	1396	
Capacity (c), veh/h		548			424		1342	1342		1361	1361	
v/c Ratio (x)		0.11			0.07		0.47	0.53		0.38	0.43	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		7.9			9.4		7.4	8.4		6.2	6.8	
Lane LOS		A			A		A	A		A	A	
95% Queue, veh		0.4			0.2		2.6	3.3		1.8	2.2	
Approach Delay, s/veh	7.9			9.4			7.9			6.5		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.3						A					

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency or Co.	Solaegui Engineers	E/W Street Name	Muller Lane
Date Performed	12/27/2017	N/S Street Name	US-395
Analysis Year	2017	Analysis Time Period (hrs)	0.25
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Project Description		Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	17	1	42	0	1	1	11	0	42	1148	1	0	27	1431	38
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	19	1	47	0	1	1	12	0	47	1273	1	0	30	1587	42
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		67			14		621	700		780	879	
Entry Volume veh/h		66			14		609	686		764	862	
Circulating Flow (v_c), pc/h	1618			1339			50			49		
Exiting Flow (v_{ex}), pc/h	32			90			1304			1635		
Capacity (c_{pce}), pc/h		359			455		1357	1357		1358	1358	
Capacity (c), veh/h		352			446		1323	1323		1324	1324	
v/c Ratio (x)		0.19			0.03		0.46	0.52		0.58	0.65	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		13.5			8.5		7.3	8.2		9.2	10.9	
Lane LOS		B			A		A	A		A	B	
95% Queue, veh		0.7			0.1		2.5	3.1		3.9	5.1	
Approach Delay, s/veh	13.5			8.5			7.8			10.1		
Approach LOS	B			A			A			B		
Intersection Delay, s/veh | LOS	9.2						A					

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency or Co.	Solaegui Engineers	E/W Street Name	Muller Lane
Date Performed	12/27/2017	N/S Street Name	US-395
Analysis Year	2037	Analysis Time Period (hrs)	0.25
Time Analyzed	AM Base	Peak Hour Factor	0.92
Project Description		Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	22	1	40	0	1	1	180	0	16	1266	1	0	152	995	45
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	24	1	44	0	1	1	200	0	18	1404	1	0	169	1103	50
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		69			202		669	754		621	701	
Entry Volume veh/h		68			198		656	739		609	687	
Circulating Flow (v_c), pc/h	1273			1446			194			20		
Exiting Flow (v_{ex}), pc/h	171			69			1628			1148		
Capacity (c_{pce}), pc/h		481			415		1190	1190		1394	1394	
Capacity (c), veh/h		472			407		1161	1161		1359	1359	
v/c Ratio (x)		0.14			0.49		0.56	0.64		0.45	0.51	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.6			19.4		9.9	11.5		7.0	7.8	
Lane LOS		A			C		A	B		A	A	
95% Queue, veh		0.5			2.6		3.7	4.8		2.4	3.0	
Approach Delay, s/veh	9.6			19.4			10.8			7.5		
Approach LOS	A			C			B			A		
Intersection Delay, s/veh | LOS	9.9						A					

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency or Co.	Solaegui Engineers	E/W Street Name	Muller Lane
Date Performed	12/27/2017	N/S Street Name	US-395
Analysis Year	2037	Analysis Time Period (hrs)	0.25
Time Analyzed	PM Base	Peak Hour Factor	0.92
Project Description		Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	21	1	49	0	1	1	155	0	49	1197	1	0	191	1501	46
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	23	1	54	0	1	1	172	0	54	1327	1	0	212	1664	51
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		78			174		650	732		906	1021	
Entry Volume veh/h		76			171		637	718		888	1001	
Circulating Flow (v_c), pc/h	1877			1404			236			56		
Exiting Flow (v_{ex}), pc/h	214			106			1522			1719		
Capacity (c_{pce}), pc/h		288			431		1146	1146		1349	1349	
Capacity (c), veh/h		282			422		1118	1118		1316	1316	
v/c Ratio (x)		0.27			0.40		0.57	0.64		0.67	0.76	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		18.8			16.2		10.2	12.0		11.6	14.6	
Lane LOS		C			C		B	B		B	B	
95% Queue, veh		1.1			1.9		3.7	4.9		5.6	7.9	
Approach Delay, s/veh	18.8			16.2			11.2			13.2		
Approach LOS	C			C			B			B		
Intersection Delay, s/veh | LOS	12.7						B					

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency or Co.	Solaegui Engineers	E/W Street Name	Muller Lane
Date Performed	12/27/2017	N/S Street Name	US-395
Analysis Year	2037	Analysis Time Period (hrs)	0.25
Time Analyzed	AM Base + Project	Peak Hour Factor	0.92
Project Description		Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	22	1	41	0	1	1	196	0	18	1317	1	0	158	1037	45
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	24	1	45	0	1	1	217	0	20	1460	1	0	175	1150	50
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		70			219		696	785		646	729	
Entry Volume veh/h		69			215		682	770		634	714	
Circulating Flow (v_c), pc/h	1326			1504			200			22		
Exiting Flow (v_{ex}), pc/h	177			71			1701			1196		
Capacity (c_{pce}), pc/h		460			395		1184	1184		1392	1392	
Capacity (c), veh/h		451			388		1155	1155		1357	1357	
v/c Ratio (x)		0.15			0.55		0.59	0.67		0.47	0.53	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		10.2			23.0		10.5	12.4		7.3	8.2	
Lane LOS		B			C		B	B		A	A	
95% Queue, veh		0.5			3.2		4.1	5.4		2.6	3.2	
Approach Delay, s/veh	10.2			23.0			11.5			7.8		
Approach LOS	B			C			B			A		
Intersection Delay, s/veh | LOS	10.6						B					

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Muller
Agency or Co.	Solaegui Engineers	E/W Street Name	Muller Lane
Date Performed	12/27/2017	N/S Street Name	US-395
Analysis Year	2037	Analysis Time Period (hrs)	0.25
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Project Description		Jurisdiction	NDOT

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	0
Lane Assignment			LTR				LTR		LT		TR		LT		TR	
Volume (V), veh/h	0	21	1	51	0	1	1	162	0	51	1241	1	0	209	1554	46
Percent Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Flow Rate (v_{PCE}), pc/h	0	23	1	57	0	1	1	180	0	57	1376	1	0	232	1723	51
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	5				5				5				5			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276			4.3276		4.5436	4.5436		4.5436	4.5436	
Follow-Up Headway (s)		2.5352			2.5352		2.5352	2.5352		2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		81			182		674	760		943	1063	
Entry Volume veh/h		79			178		661	745		924	1042	
Circulating Flow (v_c), pc/h	1956			1456			256			59		
Exiting Flow (v_{ex}), pc/h	234			109			1579			1781		
Capacity (c_{pce}), pc/h		269			412		1125	1125		1346	1346	
Capacity (c), veh/h		264			404		1098	1098		1312	1312	
v/c Ratio (x)		0.30			0.44		0.60	0.68		0.70	0.79	

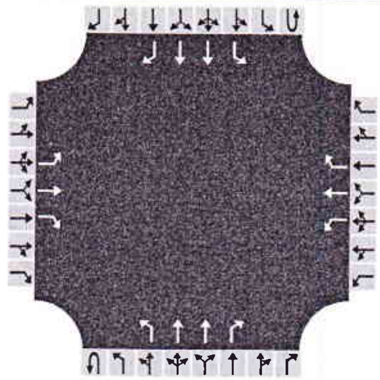
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		20.9			18.0		11.1	13.3		12.5	16.3	
Lane LOS		C			C		B	B		B	C	
95% Queue, veh		1.2			2.2		4.2	5.6		6.3	9.1	
Approach Delay, s/veh	20.9			18.0			12.3			14.5		
Approach LOS	C			C			B			B		
Intersection Delay, s/veh | LOS	14.0						B					

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	US-395
Time Analyzed	AM Existing	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		23	2	36		2	0	58		8	1119	21		57	886	10
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

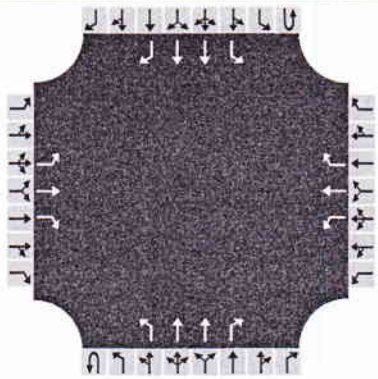
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		25	2	39		2	0	63		9				62		
Capacity, c (veh/h)		45	31	530		37	32	439		704				558		
v/c Ratio		0.55	0.06	0.07		0.05	0.00	0.14		0.01				0.11		
95% Queue Length, Q_{95} (veh)		2.0	0.2	0.2		0.2	0.0	0.5		0.0				0.4		
Control Delay (s/veh)		156.8	127.3	12.3		106.7	117.6	14.6		10.2				12.3		
Level of Service, LOS		F	F	B		F	F	B		B				B		
Approach Delay (s/veh)	70.5				17.4				0.1				0.7			
Approach LOS	F				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	US-395
Time Analyzed	PM Existing	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		22	0	54		7	2	81		11	1037	30		41	1282	60
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		24	0	59		8	2	88		12				45		
Capacity, c (veh/h)		22	20	384		31	19	469		460				598		
v/c Ratio		1.12	0.00	0.15		0.26	0.11	0.19		0.03				0.08		
95% Queue Length, Q_{95} (veh)		3.2	0.0	0.5		0.8	0.3	0.7		0.1				0.2		
Control Delay (s/veh)		489.2	185.7	16.1		158.7	215.8	14.4		13.0				11.5		
Level of Service, LOS		F	F	C		F	F	B		B				B		
Approach Delay (s/veh)	152.9				30.3				0.1				0.3			
Approach LOS	F				D											

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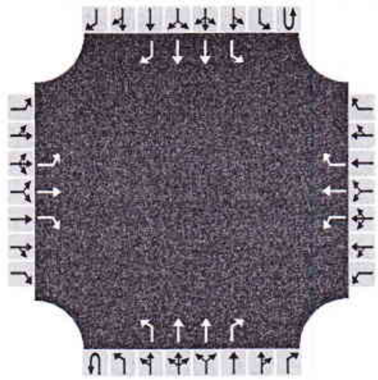
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	US-395
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		23	2	39		2	0	77		10	1153	21		61	925	10
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Approach	Eastbound				Westbound				Northbound				Southbound			
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

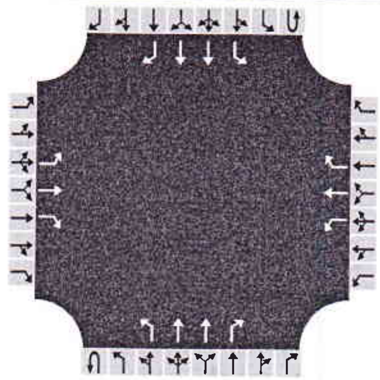
Delay, Queue Length, and Level of Service

Approach	Eastbound				Westbound				Northbound				Southbound			
Flow Rate, v (veh/h)		25	2	42		2	0	84		11				66		
Capacity, c (veh/h)		37	27	515		32	27	427		679				540		
v/c Ratio		0.68	0.07	0.08		0.06	0.00	0.20		0.02				0.12		
95% Queue Length, Q_{95} (veh)		2.4	0.2	0.3		0.2	0.0	0.7		0.0				0.4		
Control Delay (s/veh)		216.6	148.7	12.6		124.3	135.9	15.5		10.4				12.6		
Level of Service, LOS		F	F	B		F	F	C		B				B		
Approach Delay (s/veh)	90.5				18.0				0.1				0.8			
Approach LOS	F				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	US-395
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		22	0	57		7	2	84		13	1080	30		57	1321	60
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

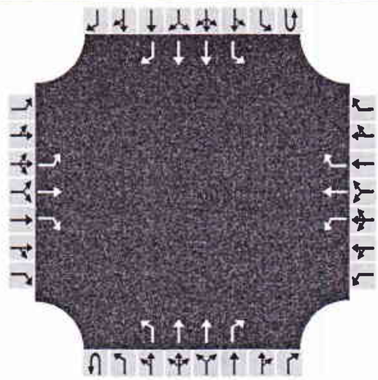
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		24	0	62		8	2	91		14				62		
Capacity, c (veh/h)		17	16	372		24	15	453		443				574		
v/c Ratio		1.44	0.00	0.17		0.33	0.13	0.20		0.03				0.11		
95% Queue Length, Q_{95} (veh)		3.5	0.0	0.6		1.0	0.4	0.7		0.1				0.4		
Control Delay (s/veh)		705.2	233.5	16.6		212.5	278.7	14.9		13.4				12.0		
Level of Service, LOS		F	F	C		F	F	B		B				B		
Approach Delay (s/veh)	208.8				35.8				0.2				0.5			
Approach LOS	F				E											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	US-395
Time Analyzed	AM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		28	3	44		3	1	71		10	1195	26		70	936	12
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		30	3	48		3	1	77		11				76		
Capacity, c (veh/h)		32	23	510		26	24	412		670				516		
v/c Ratio		0.93	0.13	0.09		0.11	0.04	0.19		0.02				0.15		
95% Queue Length, Q_{95} (veh)		3.2	0.4	0.3		0.3	0.1	0.7		0.1				0.5		
Control Delay (s/veh)		318.3	182.1	12.8		160.0	163.4	15.7		10.5				13.2		
Level of Service, LOS		F	F	B		F	F	C		B				B		
Approach Delay (s/veh)	132.2				22.9				0.1				0.9			
Approach LOS	F				C											

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HCS7 Two-Way Stop-Control Report

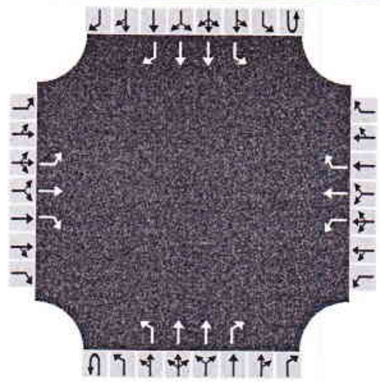
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2037
Time Analyzed	PM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	US-395 & Ironwood
Jurisdiction	Douglas County
East/West Street	Ironwood Drive
North/South Street	US-395
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		27	1	66		9	3	99		13	1115	37		50	1384	73
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		29	1	72		10	3	108		14				54		
Capacity, c (veh/h)		13	14	353		20	13	440		411				552		
v/c Ratio		2.26	0.07	0.20		0.50	0.23	0.25		0.03				0.10		
95% Queue Length, Q_{95} (veh)		4.5	0.2	0.8		1.4	0.6	1.0		0.1				0.3		
Control Delay (s/veh)		1177.0	287.0	17.8		300.8	353.2	15.8		14.1				12.2		
Level of Service, LOS		F	F	C		F	F	C		B				B		
Approach Delay (s/veh)	350.0				47.7				0.2				0.4			
Approach LOS	F				E											

HCS7 Two-Way Stop-Control Report

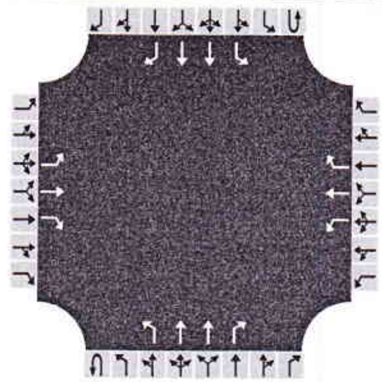
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2037
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	US-395 & Ironwood
Jurisdiction	Douglas County
East/West Street	Ironwood Drive
North/South Street	US-395
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		28	3	47		3	1	90		12	1229	26		74	975	12
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

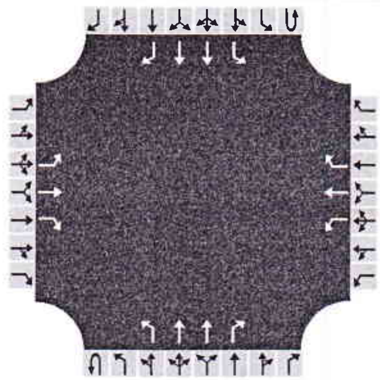
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		30	3	51		3	1	98		13				80		
Capacity, c (veh/h)		26	20	494		22	20	401		646				500		
v/c Ratio		1.16	0.15	0.10		0.14	0.05	0.24		0.02				0.16		
95% Queue Length, Q_{95} (veh)		3.6	0.4	0.3		0.4	0.1	0.9		0.1				0.6		
Control Delay (s/veh)		452.7	216.6	13.1		192.0	191.6	16.9		10.7				13.6		
Level of Service, LOS		F	F	B		F	F	C		B				B		
Approach Delay (s/veh)	177.4				23.7				0.1				0.9			
Approach LOS	F				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	US-395
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		1	1	1	0	1	2	1	0	1	2	1
Configuration		L	T	R		L	T	R		L	T	R		L	T	R
Volume, V (veh/h)		27	1	69		9	3	102		15	1158	37		66	1423	73
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

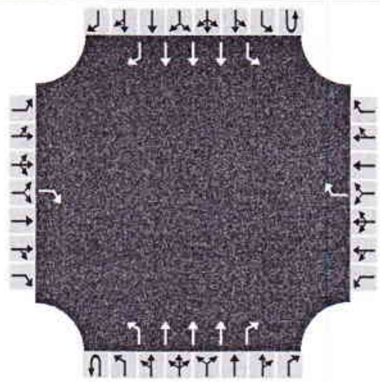
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		29	1	75		10	3	111		16				72		
Capacity, c (veh/h)		9	11	341		15	10	424		396				529		
v/c Ratio		3.08	0.09	0.22		0.65	0.30	0.26		0.04				0.14		
95% Queue Length, Q_{95} (veh)		4.7	0.3	0.8		1.6	0.7	1.0		0.1				0.5		
Control Delay (s/veh)		1721.4	373.0	18.5		432.0	473.1	16.5		14.5				12.9		
Level of Service, LOS		F	F	C		F	F	C		B				B		
Approach Delay (s/veh)	492.2				61.0				0.2				0.5			
Approach LOS	F				F											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	US-395
Time Analyzed	AM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Restricted		

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	1	0	1	3	1	0	1	3	1
Configuration				R				R		L	T	R		L	T	R
Volume, V (veh/h)				44				71		10	1195	26		70	936	12
Percent Heavy Vehicles (%)				2				2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

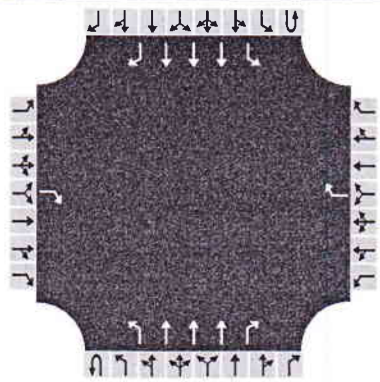
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				48				77		11				76		
Capacity, c (veh/h)				437				353		379				271		
v/c Ratio				0.11				0.22		0.03				0.28		
95% Queue Length, Q_{95} (veh)				0.4				0.8		0.1				1.1		
Control Delay (s/veh)				14.3				18.0		14.8				23.4		
Level of Service, LOS				B				C		B				C		
Approach Delay (s/veh)	14.3				18.0				0.1				1.6			
Approach LOS	B				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	US-395
Time Analyzed	PM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Restricted		

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	1	0	1	3	1	0	1	3	1
Configuration				R				R		L	T	R		L	T	R
Volume, V (veh/h)				66				99		13	1115	37		50	1384	73
Percent Heavy Vehicles (%)				2				2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

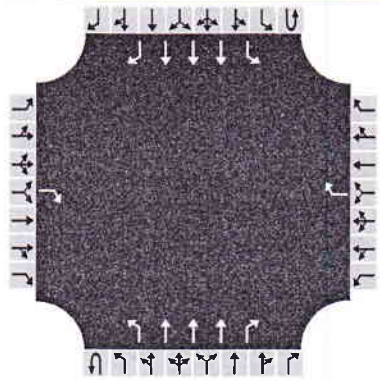
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				72				108		14				54		
Capacity, c (veh/h)				303				377		203				295		
v/c Ratio				0.24				0.29		0.07				0.18		
95% Queue Length, Q_{95} (veh)				0.9				1.2		0.2				0.7		
Control Delay (s/veh)				20.6				18.3		24.1				19.9		
Level of Service, LOS				C				C		C				C		
Approach Delay (s/veh)	20.6				18.3				0.3				0.7			
Approach LOS	C				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	US-395
Time Analyzed	AM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Restricted		

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	1	0	1	3	1	0	1	3	1
Configuration				R				R		L	T	R		L	T	R
Volume, V (veh/h)				47				90		12	1229	26		74	975	12
Percent Heavy Vehicles (%)				2				2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

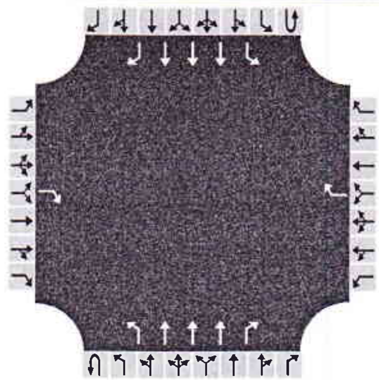
Delay, Queue Length, and Level of Service

	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Flow Rate, v (veh/h)				51				98		13				80		
Capacity, c (veh/h)				423				344		361				260		
v/c Ratio				0.12				0.29		0.04				0.31		
95% Queue Length, Q_{95} (veh)				0.4				1.2		0.1				1.3		
Control Delay (s/veh)				14.7				19.6		15.3				24.9		
Level of Service, LOS				B				C		C				C		
Approach Delay (s/veh)	14.7				19.6				0.1				1.7			
Approach LOS	B				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Ironwood
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	US-395
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Restricted		

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	1	0	1	3	1	0	1	3	1
Configuration				R				R		L	T	R		L	T	R
Volume, V (veh/h)				69				102		15	1158	37		66	1423	73
Percent Heavy Vehicles (%)				2				2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

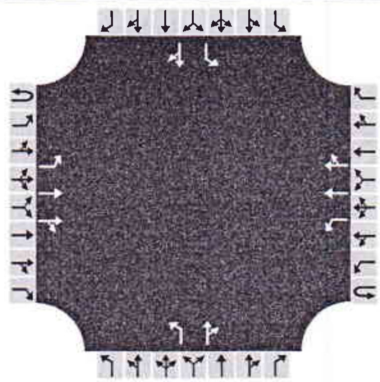
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				75				111		16				72		
Capacity, c (veh/h)				293				364		193				280		
v/c Ratio				0.26				0.31		0.08				0.26		
95% Queue Length, Q_{95} (veh)				1.0				1.3		0.3				1.0		
Control Delay (s/veh)				21.5				19.2		25.3				22.2		
Level of Service, LOS				C				C		D				C		
Approach Delay (s/veh)	21.5				19.2				0.3				0.9			
Approach LOS	C				C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2017	North/South Street	Lucerne Street
Time Analyzed	AM Existing	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		21	789	5		4	931	40		4	0	2		25	0	51
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

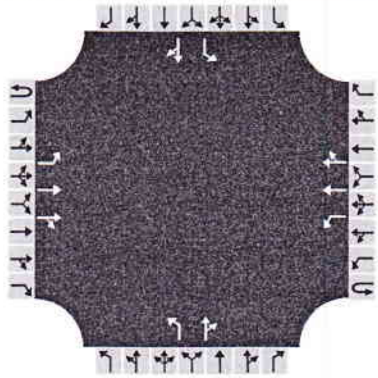
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				4				4		2		27		55
Capacity, c (veh/h)		656				775				83		572		79		495
v/c Ratio		0.04				0.01				0.05		0.00		0.34		0.11
95% Queue Length, Q_{95} (veh)		0.1				0.0				0.1		0.0		1.3		0.4
Control Delay (s/veh)		10.7				9.7				50.4		11.3		72.3		13.2
Level of Service, LOS		B				A				F		B		F		B
Approach Delay (s/veh)	0.3				0.0				37.4				32.7			
Approach LOS									E				D			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2017	North/South Street	Lucerne Street
Time Analyzed	PM Existing	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		47	997	28		42	799	35		15	1	28		68	0	48
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		51				46				16		31		74		52
Capacity, c (veh/h)		747				623				46		347		56		554
v/c Ratio		0.07				0.07				0.35		0.09		1.32		0.09
95% Queue Length, Q_{95} (veh)		0.2				0.2				1.2		0.3		6.5		0.3
Control Delay (s/veh)		10.2				11.2				119.8		16.4		350.9		12.2
Level of Service, LOS		B				B				F		C		F		B
Approach Delay (s/veh)	0.4				0.5				51.6				211.1			
Approach LOS									F				F			

HCS7 Two-Way Stop-Control Report

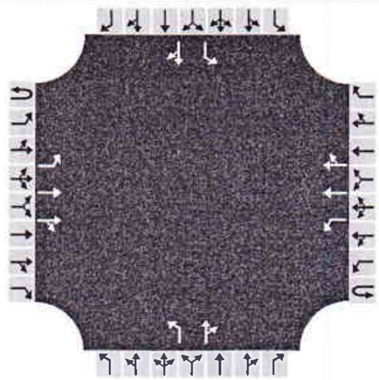
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2017
Time Analyzed	AM Existing + Project
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	US-395 & Lucerne
Jurisdiction	Douglas County
East/West Street	US-395
North/South Street	Lucerne Street
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		21	877	5		4	1010	56		4	0	2		67	0	51
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

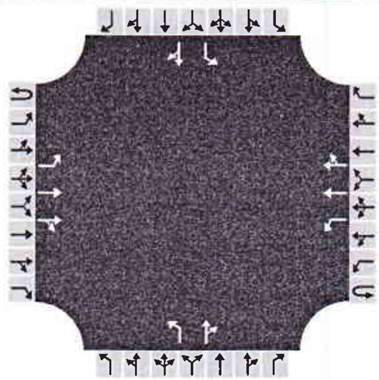
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				4				4		2		73		55
Capacity, c (veh/h)		599				714				65		533		62		458
v/c Ratio		0.04				0.01				0.06		0.00		1.18		0.12
95% Queue Length, Q_{95} (veh)		0.1				0.0				0.2		0.0		6.0		0.4
Control Delay (s/veh)		11.3				10.1				64.1		11.8		285.8		13.9
Level of Service, LOS		B				B				F		B		F		B
Approach Delay (s/veh)	0.3				0.0				46.7				169.0			
Approach LOS									E				F			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2017	North/South Street	Lucerne Street
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		47	1085	28		42	881	89		15	1	28		81	0	48
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

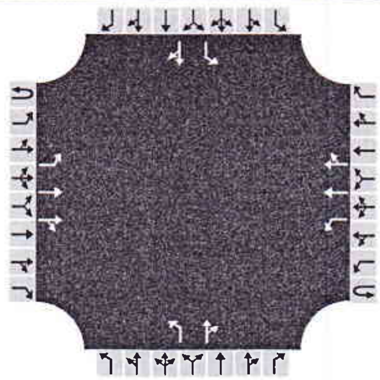
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		51				46				16		31		88		52
Capacity, c (veh/h)		656				573				35		292		41		495
v/c Ratio		0.08				0.08				0.45		0.11		2.16		0.11
95% Queue Length, Q_{95} (veh)		0.3				0.3				1.5		0.4		9.4		0.3
Control Delay (s/veh)		11.0				11.8				173.7		18.8		744.7		13.1
Level of Service, LOS		B				B				F		C		F		B
Approach Delay (s/veh)	0.4				0.5				71.5				472.9			
Approach LOS									F				F			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2037	North/South Street	Lucerne Street
Time Analyzed	AM Base	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		26	818	6		5	966	49		5	0	3		31	0	62
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

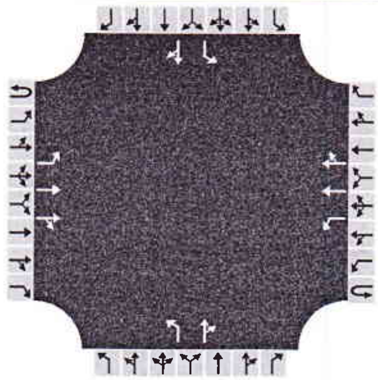
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		28				5				5		3		34		67
Capacity, c (veh/h)		629				753				72		558		69		477
v/c Ratio		0.04				0.01				0.07		0.01		0.49		0.14
95% Queue Length, Q_{95} (veh)		0.1				0.0				0.2		0.0		2.0		0.5
Control Delay (s/veh)		11.0				9.8				59.0		11.5		99.1		13.8
Level of Service, LOS		B				A				F		B		F		B
Approach Delay (s/veh)	0.3				0.0				41.2				42.5			
Approach LOS									E				E			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2037	North/South Street	Lucerne Street
Time Analyzed	PM Base	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		57	1037	34		51	825	43		18	1	34		83	0	59
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		62				55				20		38		90		64
Capacity, c (veh/h)		723				596				37		334		45		538
v/c Ratio		0.09				0.09				0.55		0.11		2.00		0.12
95% Queue Length, Q_{95} (veh)		0.3				0.3				1.9		0.4		9.3		0.4
Control Delay (s/veh)		10.4				11.7				187.5		17.2		658.6		12.6
Level of Service, LOS		B				B				F		C		F		B
Approach Delay (s/veh)	0.5				0.6				75.9				390.1			
Approach LOS									F				F			

HCS7 Two-Way Stop-Control Report

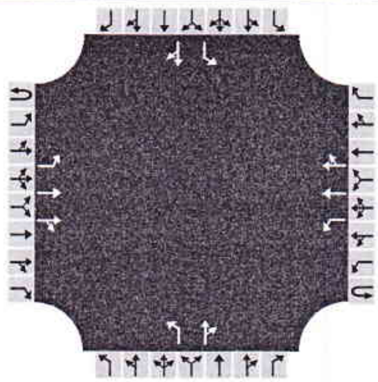
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2037
Time Analyzed	AM Base + Project
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	US-395 & Lucerne
Jurisdiction	Douglas County
East/West Street	US-395
North/South Street	Lucerne Street
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		26	906	6		5	1045	65		5	0	3		73	0	62
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

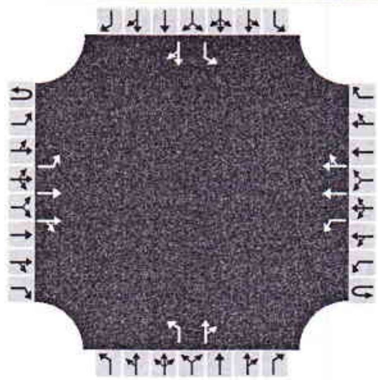
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		28				5				5		3		79		67
Capacity, c (veh/h)		574				693				55		519		54		441
v/c Ratio		0.05				0.01				0.09		0.01		1.47		0.15
95% Queue Length, Q_{95} (veh)		0.2				0.0				0.3		0.0		7.2		0.5
Control Delay (s/veh)		11.6				10.2				76.2		12.0		411.0		14.6
Level of Service, LOS		B				B				F		B		F		B
Approach Delay (s/veh)	0.3				0.0				52.1				229.1			
Approach LOS									F				F			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2037	North/South Street	Lucerne Street
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume, V (veh/h)		57	1125	34		51	907	97		18	1	34		96	0	59
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

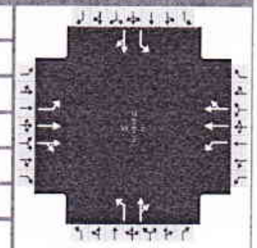
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		62				55				20		38		104		64
Capacity, c (veh/h)		635				548				28		281		33		482
v/c Ratio		0.10				0.10				0.72		0.14		3.19		0.13
95% Queue Length, Q_{95} (veh)		0.3				0.3				2.3		0.5		12.1		0.5
Control Delay (s/veh)		11.3				12.3				286.8		19.8		1241.1		13.6
Level of Service, LOS		B				B				F		C		F		B
Approach Delay (s/veh)	0.5				0.6				111.9				773.5			
Approach LOS									F				F			

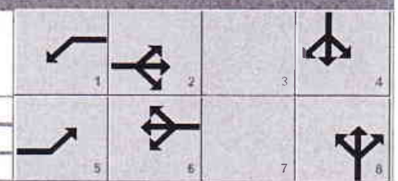
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu17ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	21	789	5	4	931	40	4	0	2	25	0	51

Signal Information									
Cycle, s	85.0	Reference Phase	2						
Offset, s	0	Reference Point	End	Green	6.0	44.0	20.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.3		3.3
Queue Clearance Time (g_s), s	2.5		2.1			4.6		4.4
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.1		0.1
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.42		0.10			0.00		0.00

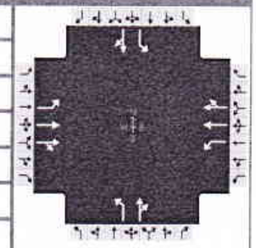
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	23	432	431	4	532	523	4	2		27	55	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1865	1781	1870	1838	1341	1549		1406	1549	
Queue Service Time (g_s), s	0.5	12.3	12.3	0.1	16.3	16.3	0.2	0.1		1.3	2.4	
Cycle Queue Clearance Time (g_c), s	0.5	12.3	12.3	0.1	16.3	16.3	2.6	0.1		1.4	2.4	
Green Ratio (*g/C*)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (*c*), veh/h	372	968	966	434	968	951	362	364		414	364	
Volume-to-Capacity Ratio (*X*)	0.061	0.446	0.446	0.010	0.550	0.550	0.012	0.006		0.066	0.152	
Back of Queue (*Q*), ft/ln (95 th percentile)	7	221.7	217.8	1.3	279.9	271.9	3.1	1.5		19.1	39.5	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	8.7	8.7	0.1	11.0	10.9	0.1	0.1		0.8	1.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	9.4	12.9	12.9	8.4	13.8	13.8	26.8	24.9		25.4	25.8	
Incremental Delay (d_2), s/veh	0.0	1.5	1.5	0.0	2.2	2.3	0.0	0.0		0.0	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.4	14.3	14.4	8.4	16.1	16.1	26.8	24.9		25.4	25.8	
Level of Service (LOS)	A	B	B	A	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	14.2	B		16.1	B		26.2	C		25.7	C	
Intersection Delay, s/veh / LOS	15.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.4	A	0.5	A	0.6	A

 HCS7™ Streets Version 7.3 Generated: 12/28/2017 1:25:29 PM

HCS7 Signalized Intersection Results Summary

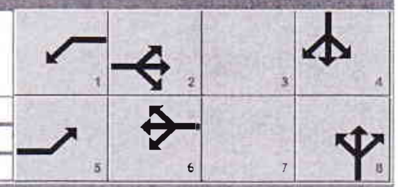
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu17px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	47	997	28	42	799	35	15	1	28	68	0	48

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	44.0	20.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0



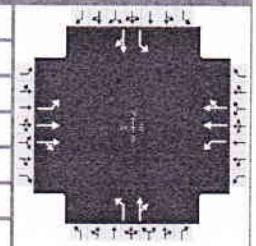
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.3		3.3
Queue Clearance Time (g_s), s	3.0		2.9			5.1		7.1
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.3		0.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	51	560	554	46	457	449	16	32		74	52	
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1870	1849	1781	1870	1837	1345	1558		1370	1549	
Queue Service Time (g_s), s	1.0	17.5	17.5	0.9	13.3	13.3	0.8	1.3		3.8	2.3	
Cycle Queue Clearance Time (g_c), s	1.0	17.5	17.5	0.9	13.3	13.3	3.1	1.3		5.1	2.3	
Green Ratio (*g/C*)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (c), veh/h	418	968	957	356	968	951	365	367		385	364	
Volume-to-Capacity Ratio (X)	0.122	0.579	0.579	0.128	0.472	0.472	0.045	0.086		0.192	0.143	
Back of Queue (Q), ft/ln (95 th percentile)	16	297.7	290.6	14.3	235.7	228.9	11.8	22.2		55.2	37.1	
Back of Queue (Q), veh/ln (95 th percentile)	0.6	11.7	11.6	0.6	9.3	9.2	0.5	0.9		2.2	1.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	8.9	14.1	14.1	9.9	13.1	13.1	26.9	25.4		27.4	25.7	
Incremental Delay (d_2), s/veh	0.0	2.5	2.6	0.1	1.7	1.7	0.0	0.0		0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	9.0	16.6	16.7	9.9	14.7	14.8	27.0	25.4		27.5	25.8	
Level of Service (LOS)	A	B	B	A	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	16.3	B		14.5	B		25.9	C		26.8	C	
Intersection Delay, s/veh / LOS	16.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	0.6	A	0.7	A

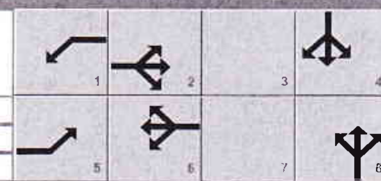
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu17aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	21	877	5	4	1010	56	4	0	2	67	0	51

Signal Information										
Cycle, s	85.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	6.0	44.0	20.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.2		3.2
Queue Clearance Time (g_s), s	2.5		2.1			4.6		5.6
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.2		0.2
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.42		0.10			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	23	480	479	4	586	573	4	2		73	55	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1866	1781	1870	1829	1341	1549		1406	1549	
Queue Service Time (g_s), s	0.5	14.2	14.2	0.1	18.7	18.7	0.2	0.1		3.6	2.4	
Cycle Queue Clearance Time (g_c), s	0.5	14.2	14.2	0.1	18.7	18.7	2.6	0.1		3.6	2.4	
Green Ratio (*g/C*)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (*c*), veh/h	343	968	966	402	968	947	362	364		414	364	
Volume-to-Capacity Ratio (*X*)	0.066	0.496	0.496	0.011	0.605	0.605	0.012	0.006		0.176	0.152	
Back of Queue (*Q*), ft/ln (95 th percentile)	7.1	248.3	244	1.3	314.4	305.1	3.1	1.5		52.9	39.5	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	9.8	9.8	0.1	12.4	12.2	0.1	0.1		2.1	1.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	9.9	13.3	13.3	8.8	14.4	14.4	26.8	24.9		26.3	25.8	
Incremental Delay (d_2), s/veh	0.0	1.8	1.8	0.0	2.8	2.9	0.0	0.0		0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	10.0	15.1	15.1	8.8	17.2	17.3	26.8	24.9		26.4	25.8	
Level of Service (LOS)	A	B	B	A	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	15.0	B		17.2	B		26.2	C		26.1	C	
Intersection Delay, s/veh / LOS	16.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.3	A	1.4	A	0.5	A	0.7	A

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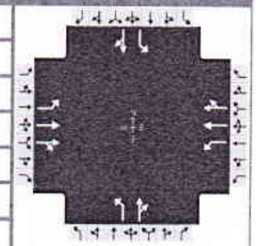
HCS7 Signalized Intersection Results Summary

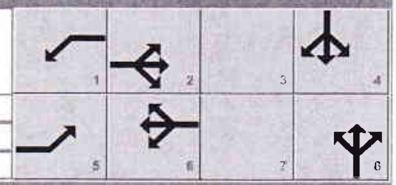
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu17pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	47	1085	28	42	881	89	15	1	28	81	0	48

Signal Information				
Cycle, s	85.0	Reference Phase	2	
Offset, s	0	Reference Point	End	
Uncoordinated	No	Simult. Gap E/W	On	
Force Mode	Fixed	Simult. Gap N/S	On	

Green	6.0	44.0	20.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0



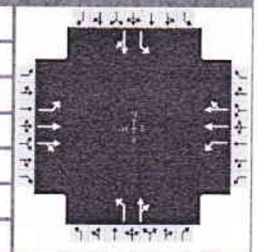
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, (*Y+R c*), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.3		3.3
Queue Clearance Time (*g s*), s	3.0		2.9			5.1		7.9
Green Extension Time (*g e*), s	0.0	0.0	0.0	0.0		0.3		0.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	51	608	602	46	537	517	16	32		88	52	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1850	1781	1870	1798	1345	1558		1370	1549	
Queue Service Time (*g s*), s	1.0	19.7	19.8	0.9	16.5	16.5	0.8	1.3		4.6	2.3	
Cycle Queue Clearance Time (*g c*), s	1.0	19.7	19.8	0.9	16.5	16.5	3.1	1.3		5.9	2.3	
Green Ratio (*g/C*)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (*c*), veh/h	371	968	958	331	968	931	365	367		385	364	
Volume-to-Capacity Ratio (*X*)	0.138	0.628	0.628	0.138	0.555	0.555	0.045	0.086		0.228	0.143	
Back of Queue (*Q*), ft/ln (95 th percentile)	16	330.1	322.5	14.3	283.3	270.9	11.8	22.2		66.4	37.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	13.0	12.9	0.6	11.2	10.8	0.5	0.9		2.6	1.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (*d 1*), s/veh	9.7	14.7	14.7	10.5	13.9	13.9	26.9	25.4		27.7	25.7	
Incremental Delay (*d 2*), s/veh	0.1	3.1	3.1	0.1	2.3	2.4	0.0	0.0		0.1	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.7	17.7	17.8	10.6	16.2	16.3	27.0	25.4		27.8	25.8	
Level of Service (LOS)	A	B	B	B	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	17.4	B		16.0	B		25.9	C		27.0	C	
Intersection Delay, s/veh / LOS	17.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.5	B	1.4	A	0.6	A	0.7	A

HCS7 Signalized Intersection Results Summary

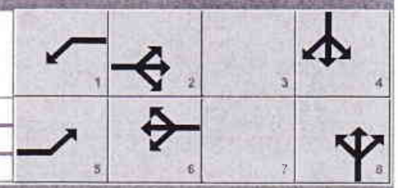
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2037 Base	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu37ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	26	818	6	5	966	49	5	0	3	31	0	62

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	44.0	20.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.3		3.3
Queue Clearance Time (g_s), s	2.6		2.1			5.2		5.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.2		0.2
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.54		0.12			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	28	449	447	5	557	546	5	3		34	67	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1865	1781	1870	1832	1327	1549		1404	1549	
Queue Service Time (g_s), s	0.6	12.9	12.9	0.1	17.4	17.4	0.3	0.1		1.6	3.0	
Cycle Queue Clearance Time (g_c), s	0.6	12.9	12.9	0.1	17.4	17.4	3.2	0.1		1.7	3.0	
Green Ratio (*g/C*)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (*c*), veh/h	358	968	965	423	968	948	351	364		413	364	
Volume-to-Capacity Ratio (*X*)	0.079	0.463	0.463	0.013	0.576	0.576	0.015	0.009		0.082	0.185	
Back of Queue (*Q*), ft/ln (95 th percentile)	8.7	231	226.8	1.7	295.7	286.8	4	2.2		23.8	48.5	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	9.1	9.1	0.1	11.6	11.5	0.2	0.1		0.9	1.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	9.7	13.0	13.0	8.6	14.1	14.1	27.3	24.9		25.6	26.0	
Incremental Delay (d_2), s/veh	0.0	1.6	1.6	0.0	2.5	2.5	0.0	0.0		0.0	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.7	14.6	14.6	8.6	16.6	16.6	27.3	24.9		25.6	26.1	
Level of Service (LOS)	A	B	B	A	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	14.5	B		16.6	B		26.4	C		25.9	C	
Intersection Delay, s/veh / LOS	16.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	1.4	A	0.5	A	0.7	A

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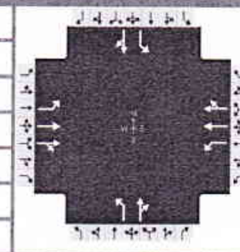
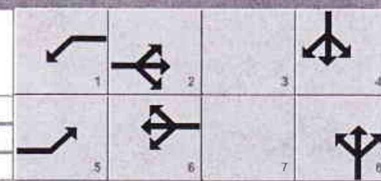
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2037 Base	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu37px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	57	1037	34	51	825	43	18	1	34	83	0	59

Signal Information										
Cycle, s	85.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	6.0	44.0	20.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.3		3.3
Queue Clearance Time (g_s), s	3.3		3.1			5.8		8.4
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.3		0.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.00		0.00

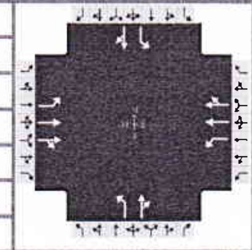
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	62	586	578	55	477	467	20	38		90	64	
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1870	1845	1781	1870	1831	1330	1556		1362	1549	
Queue Service Time (g_s), s	1.3	18.7	18.7	1.1	14.0	14.0	1.0	1.6		4.7	2.8	
Cycle Queue Clearance Time (g_c), s	1.3	18.7	18.7	1.1	14.0	14.0	3.8	1.6		6.4	2.8	
Green Ratio (g/C)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (c), veh/h	406	968	955	343	968	948	354	366		379	364	
Volume-to-Capacity Ratio (X)	0.153	0.605	0.605	0.162	0.492	0.492	0.055	0.104		0.238	0.176	
Back of Queue (Q), ft/ln (95 th percentile)	19.5	314.5	307.1	17.5	246.5	238.8	14.4	26.8		68.6	46.1	
Back of Queue (Q), veh/ln (95 th percentile)	0.8	12.4	12.3	0.7	9.7	9.6	0.6	1.1		2.7	1.8	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	9.2	14.4	14.4	10.3	13.3	13.3	27.5	25.5		28.0	25.9	
Incremental Delay (d_2), s/veh	0.1	2.8	2.8	0.1	1.8	1.8	0.0	0.0		0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	9.2	17.2	17.2	10.4	15.1	15.1	27.5	25.5		28.1	26.0	
Level of Service (LOS)	A	B	B	B	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	16.8	B		14.8	B		26.2	C		27.2	C	
Intersection Delay, s/veh / LOS	16.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.5	A	1.3	A	0.6	A	0.7	A

 HCS7™ Streets Version 7.3 Generated: 12/28/2017 1:27:26 PM

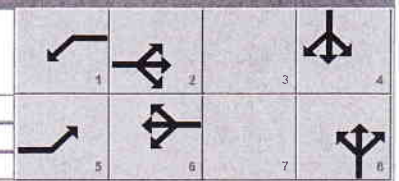
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2037 With	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu37aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	26	906	6	5	1045	65	5	0	3	73	0	62

Signal Information										
Cycle, s	85.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	6.0	44.0	20.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0



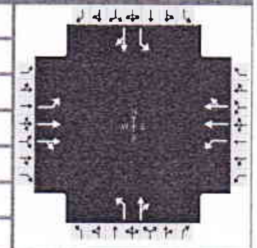
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0		3.2		3.2
Queue Clearance Time (g_s), s	2.6		2.1			5.2		6.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.2		0.2
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.54		0.12			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	28	496	495	5	610	596	5	3		79	67	
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1870	1865	1781	1870	1824	1327	1549		1404	1549	
Queue Service Time (g_s), s	0.6	14.8	14.8	0.1	19.9	19.9	0.3	0.1		3.9	3.0	
Cycle Queue Clearance Time (g_c), s	0.6	14.8	14.8	0.1	19.9	19.9	3.2	0.1		4.0	3.0	
Green Ratio (g/C)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (c), veh/h	331	968	965	392	968	944	351	364		413	364	
Volume-to-Capacity Ratio (X)	0.085	0.513	0.513	0.014	0.630	0.631	0.015	0.009		0.192	0.185	
Back of Queue (Q), ft/ln (95 th percentile)	8.7	258	253.4	1.7	331.9	321.1	4	2.2		58.1	48.5	
Back of Queue (Q), veh/ln (95 th percentile)	0.3	10.2	10.1	0.1	13.1	12.8	0.2	0.1		2.3	1.9	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	10.3	13.5	13.5	8.9	14.7	14.7	27.3	24.9		26.5	26.0	
Incremental Delay (d_2), s/veh	0.0	1.9	1.9	0.0	3.1	3.2	0.0	0.0		0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	10.4	15.4	15.4	8.9	17.8	17.9	27.3	24.9		26.5	26.1	
Level of Service (LOS)	B	B	B	A	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	15.3	B		17.8	B		26.4	C		26.3	C	
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.3	A	1.5	A	0.5	A	0.7	A

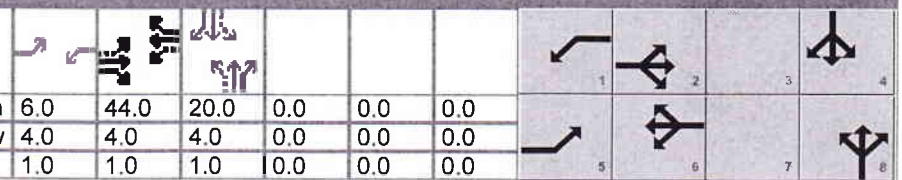
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	Solaegui Engineers	Analysis Date	Dec 27, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2037 With	Analysis Period	1> 7:00
Intersection	US-395 & Lucerne	File Name	UsLu37pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	57	1125	34	51	907	97	18	1	34	96	0	59

Signal Information											
Cycle, s	85.0	Reference Phase	2								
Offset, s	0	Reference Point	End	Green	6.0	44.0	20.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		6.0		6.0
Phase Duration, s	11.0	49.0	11.0	49.0		25.0		25.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.3		3.3
Queue Clearance Time (g_s), s	3.3		3.1			5.8		9.2
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.4		0.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			0.00		0.00

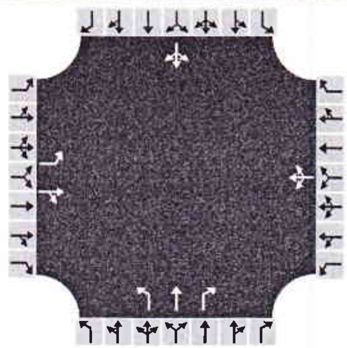
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	62	634	626	55	557	535	20	38		104	64	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1847	1781	1870	1794	1330	1556		1362	1549	
Queue Service Time (g_s), s	1.3	21.0	21.0	1.1	17.4	17.4	1.0	1.6		5.5	2.8	
Cycle Queue Clearance Time (g_c), s	1.3	21.0	21.0	1.1	17.4	17.4	3.8	1.6		7.2	2.8	
Green Ratio (*g/C*)	0.59	0.52	0.52	0.59	0.52	0.52	0.24	0.24		0.24	0.24	
Capacity (*c*), veh/h	360	968	956	319	968	929	354	366		379	364	
Volume-to-Capacity Ratio (*X*)	0.172	0.654	0.655	0.174	0.575	0.575	0.055	0.104		0.275	0.176	
Back of Queue (*Q*), ft/ln (95 th percentile)	19.6	348.5	340.3	17.5	295.5	282.3	14.4	26.8		80.3	46.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.8	13.7	13.6	0.7	11.6	11.3	0.6	1.1		3.2	1.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	10.0	15.0	15.0	11.0	14.1	14.1	27.5	25.5		28.3	25.9	
Incremental Delay (d_2), s/veh	0.1	3.4	3.5	0.1	2.5	2.6	0.0	0.0		0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	10.1	18.4	18.5	11.1	16.6	16.7	27.5	25.5		28.4	26.0	
Level of Service (LOS)	B	B	B	B	B	B	C	C		C	C	
Approach Delay, s/veh / LOS	18.0	B		16.4	B		26.2	C		27.5	C	
Intersection Delay, s/veh / LOS	18.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.6	B	1.4	A	0.6	A	0.8	A

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	AM Existing		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	21	2	32	6	3	6	25	14	6	1	23	34
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	23	37		16			27	15	7	63		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.020	0.033		0.014			0.024	0.014	0.006	0.056		
Final Departure Headway, hd (s)	5.36	4.20		4.86			5.27	4.77	4.07	4.44		
Final Degree of Utilization, x	0.034	0.043		0.022			0.040	0.020	0.007	0.078		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.06	1.90		2.56			2.97	2.47	1.77	2.14		

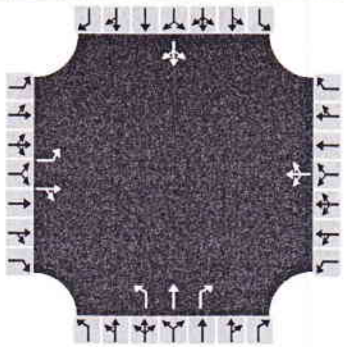
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	23	37		16			27	15	7	63		
Capacity	672	857		740			683	755	885	811		
95% Queue Length, Q_{95} (veh)	0.1	0.1		0.1			0.1	0.1	0.0	0.3		
Control Delay (s/veh)	8.2	7.1		7.7			8.2	7.6	6.8	7.5		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	7.5			7.7			7.8			7.5		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.6						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	PM Existing		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	54	6	32	13	11	2	28	40	9	4	32	12
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	59	41		28			30	43	10	52		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.052	0.037		0.025			0.027	0.039	0.009	0.046		
Final Departure Headway, hd (s)	5.48	4.39		5.33			5.43	4.92	4.22	4.96		
Final Degree of Utilization, x	0.089	0.050		0.042			0.046	0.059	0.011	0.072		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.18	2.09		3.03			3.13	2.62	1.92	2.66		

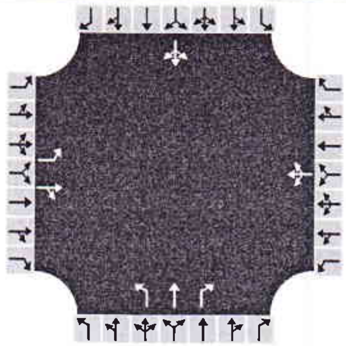
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	59	41		28			30	43	10	52		
Capacity	657	820		676			663	731	853	726		
95% Queue Length, Q_{95} (veh)	0.3	0.2		0.1			0.1	0.2	0.0	0.2		
Control Delay (s/veh)	8.7	7.3		8.3			8.4	7.9	7.0	8.0		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	8.1			8.3			8.0			8.0		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	8.1						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	AM Existing + Project		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	24	3	53	6	5	6	31	14	6	1	23	37
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	26	61		18			34	15	7	66		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.023	0.054		0.016			0.030	0.014	0.006	0.059		
Final Departure Headway, hd (s)	5.40	4.24		4.96			5.35	4.85	4.14	4.52		
Final Degree of Utilization, x	0.039	0.072		0.025			0.050	0.020	0.008	0.083		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.10	1.94		2.66			3.05	2.55	1.84	2.22		

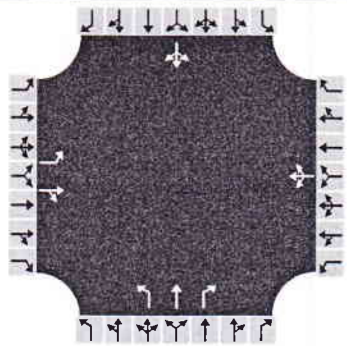
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	26	61		18			34	15	7	66		
Capacity	666	850		726			673	743	869	796		
95% Queue Length, Q_{95} (veh)	0.1	0.2		0.1			0.2	0.1	0.0	0.3		
Control Delay (s/veh)	8.3	7.3		7.8			8.3	7.6	6.9	7.6		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	7.6			7.8			8.0			7.6		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.7						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	PM Existing + Project		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	57	8	43	13	13	2	49	40	9	4	32	15
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	62	55		30			53	43	10	55		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.055	0.049		0.027			0.047	0.039	0.009	0.049		
Final Departure Headway, hd (s)	5.57	4.48		5.43			5.48	4.98	4.28	5.04		
Final Degree of Utilization, x	0.096	0.069		0.046			0.081	0.060	0.012	0.078		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.27	2.18		3.13			3.18	2.68	1.98	2.74		

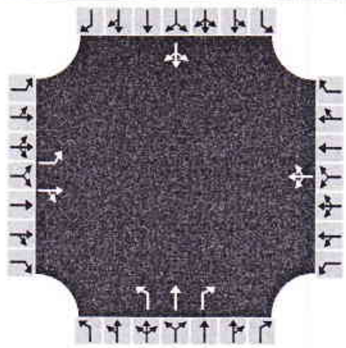
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	62	55		30			53	43	10	55		
Capacity	646	804		663			656	723	841	715		
95% Queue Length, Q_{95} (veh)	0.3	0.2		0.1			0.3	0.2	0.0	0.3		
Control Delay (s/veh)	8.9	7.5		8.4			8.7	8.0	7.0	8.2		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	8.2			8.4			8.2			8.2		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	8.2						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	AM Base		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	26	2	39	7	4	7	30	17	7	1	28	42
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	28	45		20			33	18	8	77		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.025	0.040		0.017			0.029	0.016	0.007	0.069		
Final Departure Headway, hd (s)	5.44	4.27		4.97			5.33	4.83	4.13	4.51		
Final Degree of Utilization, x	0.043	0.053		0.027			0.048	0.025	0.009	0.097		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.14	1.97		2.67			3.03	2.53	1.83	2.21		

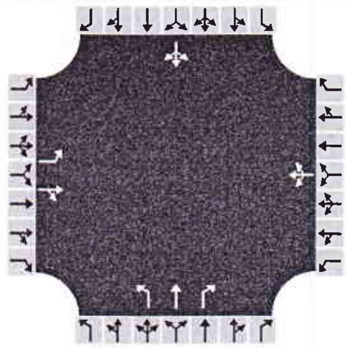
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	28	45		20			33	18	8	77		
Capacity	662	843		725			676	746	872	799		
95% Queue Length, Q_{95} (veh)	0.1	0.2		0.1			0.2	0.1	0.0	0.3		
Control Delay (s/veh)	8.4	7.2		7.8			8.3	7.7	6.9	7.7		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	7.7			7.8			7.9			7.7		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.7						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	PM Base		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	66	7	39	16	13	3	34	49	11	5	39	15
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	72	50		35			37	53	12	64		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.064	0.044		0.031			0.033	0.047	0.011	0.057		
Final Departure Headway, hd (s)	5.59	4.50		5.46			5.52	5.02	4.32	5.09		
Final Degree of Utilization, x	0.111	0.062		0.053			0.057	0.074	0.014	0.091		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.29	2.20		3.16			3.22	2.72	2.02	2.79		

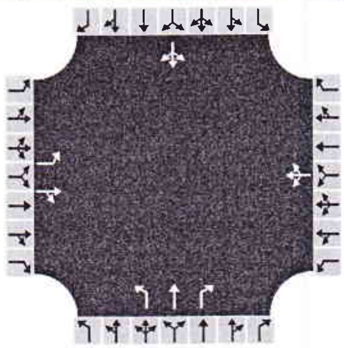
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	72	50		35			37	53	12	64		
Capacity	644	801		659			652	717	833	707		
95% Queue Length, Q_{95} (veh)	0.4	0.2		0.2			0.2	0.2	0.0	0.3		
Control Delay (s/veh)	9.0	7.5		8.5			8.6	8.1	7.1	8.3		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	8.4			8.5			8.2			8.3		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	8.3						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	AM Base + Project		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	3	60	7	6	7	36	17	7	1	28	45
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	32	68		22			39	18	8	80		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.028	0.061		0.019			0.035	0.016	0.007	0.071		
Final Departure Headway, hd (s)	5.48	4.31		5.06			5.41	4.91	4.20	4.59		
Final Degree of Utilization, x	0.048	0.082		0.031			0.059	0.025	0.009	0.103		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.18	2.01		2.76			3.11	2.61	1.90	2.29		

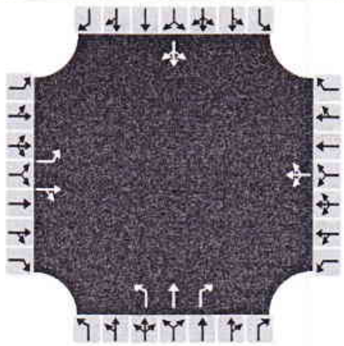
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	32	68		22			39	18	8	80		
Capacity	657	835		711			666	734	857	784		
95% Queue Length, Q_{95} (veh)	0.2	0.3		0.1			0.2	0.1	0.0	0.3		
Control Delay (s/veh)	8.5	7.4		7.9			8.4	7.7	6.9	7.8		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	7.7			7.9			8.1			7.8		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.9						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Lucerne
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	Lucerne Street
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	PM Base + Project		
Project Description			

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	69	9	50	16	15	3	55	49	11	5	39	18
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	TR		LTR			L	T	R	LTR		
Flow Rate, v (veh/h)	75	64		37			60	53	12	67		
Percent Heavy Vehicles	2	2		2			2	2	2	2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20		3.20			3.20	3.20	3.20	3.20		
Initial Degree of Utilization, x	0.067	0.057		0.033			0.053	0.047	0.011	0.060		
Final Departure Headway, hd (s)	5.68	4.59		5.57			5.58	5.08	4.38	5.18		
Final Degree of Utilization, x	0.118	0.082		0.057			0.093	0.075	0.015	0.097		
Move-Up Time, m (s)	2.3	2.3		2.3			2.3	2.3	2.3	2.3		
Service Time, ts (s)	3.38	2.29		3.27			3.28	2.78	2.08	2.88		

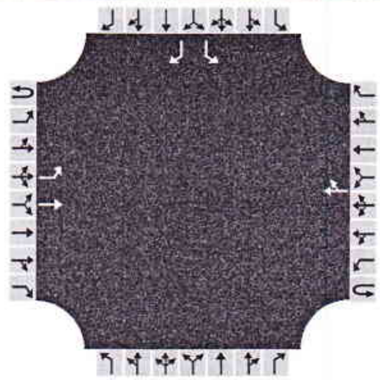
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	75	64		37			60	53	12	67		
Capacity	634	785		646			645	708	822	695		
95% Queue Length, Q_{95} (veh)	0.4	0.3		0.2			0.3	0.2	0.0	0.3		
Control Delay (s/veh)	9.1	7.7		8.6			8.9	8.2	7.1	8.4		
Level of Service, LOS	A	A		A			A	A	A	A		
Approach Delay (s/veh)	8.5			8.6			8.4			8.4		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	8.5						A					

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Monte Vista
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwwod Drive
Analysis Year	2017	North/South Street	Monte Vista Avenue
Time Analyzed	AM Existing	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume, V (veh/h)		3	43				54	8						12		1
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

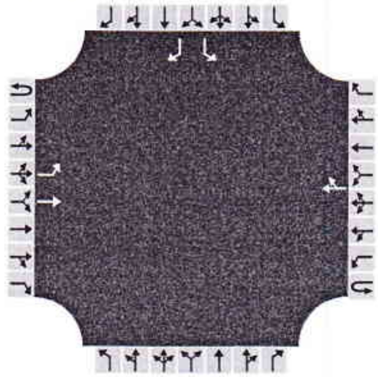
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		3												13		1
Capacity, c (veh/h)		1532												878		1000
v/c Ratio		0.00												0.01		0.00
95% Queue Length, Q_{95} (veh)		0.0												0.0		0.0
Control Delay (s/veh)		7.4												9.2		8.6
Level of Service, LOS		A												A		A
Approach Delay (s/veh)	0.4												9.1			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Monte Vista
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwwod Drive
Analysis Year	2017	North/South Street	Monte Vista Avenue
Time Analyzed	PM Existing	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume, V (veh/h)		9	82				41	10						10		1
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

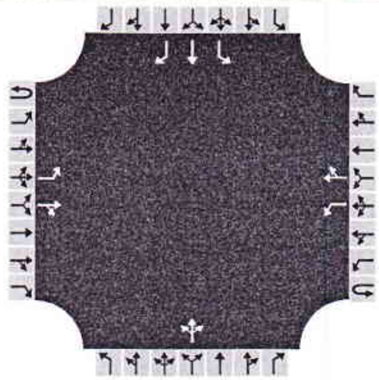
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		10												11		1
Capacity, c (veh/h)		1548												825		1018
v/c Ratio		0.01												0.01		0.00
95% Queue Length, Q_{95} (veh)		0.0												0.0		0.0
Control Delay (s/veh)		7.3												9.4		8.5
Level of Service, LOS		A												A		A
Approach Delay (s/veh)	0.7												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Monte Vista
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwwod Drive
Analysis Year	2017	North/South Street	Monte Vista Avenue
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		1	1	1
Configuration		L		TR		L		TR			LTR			L	T	R
Volume, V (veh/h)		3	47	1		0	59	14		3	6	0		33	9	1
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

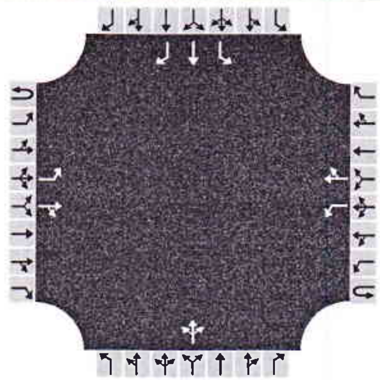
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		3				0					10			36	10	1
Capacity, c (veh/h)		1518				1553					774			833	759	990
v/c Ratio		0.00				0.00					0.01			0.04	0.01	0.00
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.0			0.1	0.0	0.0
Control Delay (s/veh)		7.4				7.3					9.7			9.5	9.8	8.6
Level of Service, LOS		A				A					A			A	A	A
Approach Delay (s/veh)	0.4				0.0				9.7				9.6			
Approach LOS									A				A			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Monte Vista
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwwod Drive
Analysis Year	2017	North/South Street	Monte Vista Avenue
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		1	1	1
Configuration		L		TR		L		TR			LTR			L	T	R
Volume, V (veh/h)		9	87	4		0	46	31		1	7	0		21	10	1
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		10				0					9			23	11	1
Capacity, c (veh/h)		1512				1493					697			761	704	996
v/c Ratio		0.01				0.00					0.01			0.03	0.02	0.00
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.0			0.1	0.0	0.0
Control Delay (s/veh)		7.4				7.4					10.2			9.9	10.2	8.6
Level of Service, LOS		A				A					B			A	B	A
Approach Delay (s/veh)	0.7				0.0				10.2				9.9			
Approach LOS									B				A			

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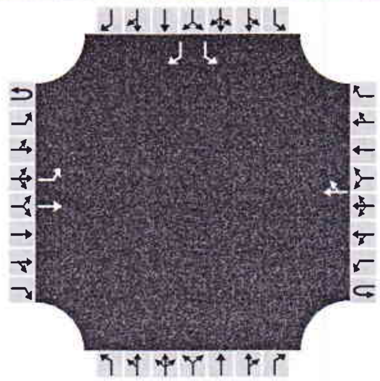
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Monte Vista
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwwod Drive
Analysis Year	2037	North/South Street	Monte Vista Avenue
Time Analyzed	AM Base	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume, V (veh/h)		4	52				66	10						15		1
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4												16		1
Capacity, c (veh/h)		1513												848		982
v/c Ratio		0.00												0.02		0.00
95% Queue Length, Q_{95} (veh)		0.0												0.1		0.0
Control Delay (s/veh)		7.4												9.3		8.7
Level of Service, LOS		A												A		A
Approach Delay (s/veh)	0.5												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

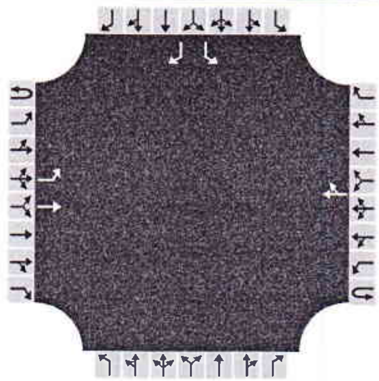
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2037
Time Analyzed	PM Base
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	Ironwood & Monte Vista
Jurisdiction	Douglas County
East/West Street	Ironwwod Drive
North/South Street	Monte Vista Avenue
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume, V (veh/h)		11	100				50	12						12		1
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

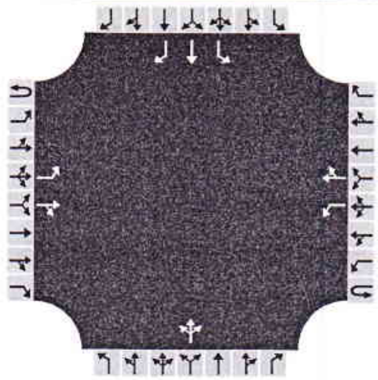
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		12												13		1
Capacity, c (veh/h)		1533												788		1005
v/c Ratio		0.01												0.02		0.00
95% Queue Length, Q_{95} (veh)		0.0												0.1		0.0
Control Delay (s/veh)		7.4												9.6		8.6
Level of Service, LOS		A												A		A
Approach Delay (s/veh)	0.7												9.6			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Monte Vista
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwwod Drive
Analysis Year	2037	North/South Street	Monte Vista Avenue
Time Analyzed	AM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		1	1	1
Configuration		L		TR		L		TR			LTR			L	T	R
Volume, V (veh/h)		4	56	1		0	71	16		3	6	0		36	9	1
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4				0					10			39	10	1
Capacity, c (veh/h)		1499				1540					745			800	734	972
v/c Ratio		0.00				0.00					0.01			0.05	0.01	0.00
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.0			0.2	0.0	0.0
Control Delay (s/veh)		7.4				7.3					9.9			9.7	10.0	8.7
Level of Service, LOS		A				A					A			A	A	A
Approach Delay (s/veh)	0.4				0.0				9.9				9.8			
Approach LOS									A				A			

HCS7 Two-Way Stop-Control Report

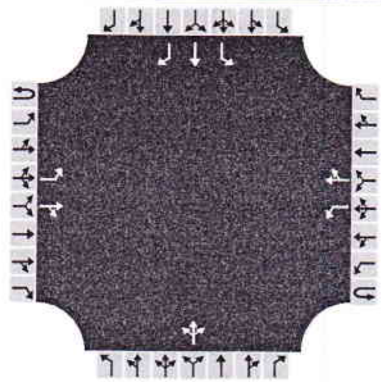
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2037
Time Analyzed	PM Base + Project
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	Ironwood & Monte Vista
Jurisdiction	Douglas County
East/West Street	Ironwwod Drive
North/South Street	Monte Vista Avenue
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		1	1	1
Configuration		L		TR		L		TR			LTR			L	T	R
Volume, V (veh/h)		11	105	4		0	55	33		1	7	0		23	10	1
Percent Heavy Vehicles (%)		2				2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

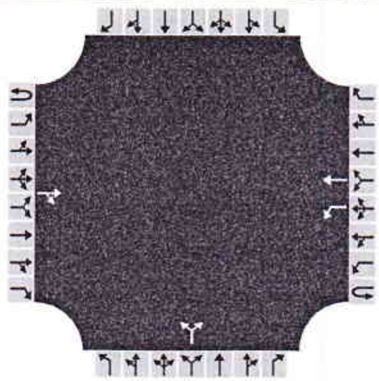
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		12				0					9			25	11	1
Capacity, c (veh/h)		1496				1469					665			722	673	982
v/c Ratio		0.01				0.00					0.01			0.03	0.02	0.00
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.0			0.1	0.0	0.0
Control Delay (s/veh)		7.4				7.5					10.5			10.2	10.4	8.7
Level of Service, LOS		A				A					B			B	B	A
Approach Delay (s/veh)	0.7				0.0				10.5				10.2			
Approach LOS									B				B			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	Project Access
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		0	1	0		0	0	0
Configuration				TR		L	T				LR					
Volume, V (veh/h)			47	3		5	58			16		4				
Percent Heavy Vehicles (%)						2				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

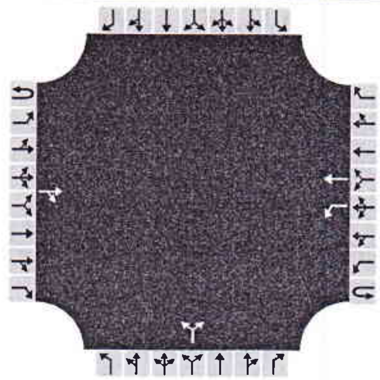
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						5					21					
Capacity, c (veh/h)						1550					873					
v/c Ratio						0.00					0.02					
95% Queue Length, Q_{95} (veh)						0.0					0.1					
Control Delay (s/veh)						7.3					9.2					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.5				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2017	North/South Street	Project Access
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		0	1	0		0	0	0
Configuration				TR		L	T				LR					
Volume, V (veh/h)			95	12		5	43			2		5				
Percent Heavy Vehicles (%)						2				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

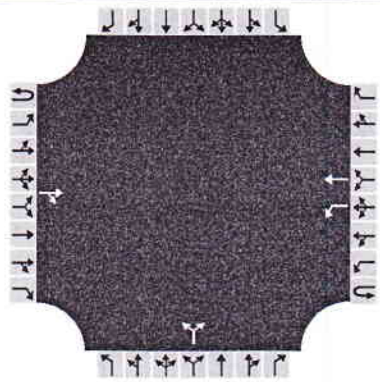
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						5					7					
Capacity, c (veh/h)						1472					896					
v/c Ratio						0.00					0.01					
95% Queue Length, Q_{95} (veh)						0.0					0.0					
Control Delay (s/veh)						7.5					9.1					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.7				9.1							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	Project Access
Time Analyzed	AM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		0	1	0		0	0	0
Configuration				TR		L	T				LR					
Volume, V (veh/h)			57	3		5	70			16		4				
Percent Heavy Vehicles (%)						2				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

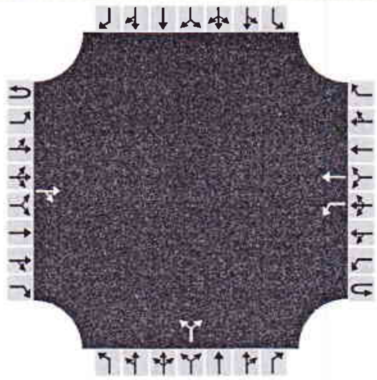
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						5					21					
Capacity, c (veh/h)						1536					845					
v/c Ratio						0.00					0.02					
95% Queue Length, Q_{95} (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.4					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.5				9.4							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Ironwood & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Ironwood Drive
Analysis Year	2037	North/South Street	Project Access
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		0	1	0		0	0	0
Configuration				TR		L	T				LR					
Volume, V (veh/h)			115	12		5	52			2		5				
Percent Heavy Vehicles (%)						2				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

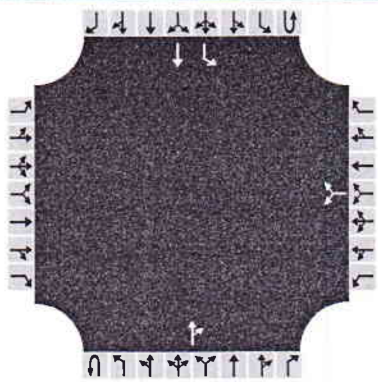
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						5					7					
Capacity, c (veh/h)						1445					865					
v/c Ratio						0.00					0.01					
95% Queue Length, Q_{95} (veh)						0.0					0.0					
Control Delay (s/veh)						7.5					9.2					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.6				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Monte Vista & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Project Access
Analysis Year	2017	North/South Street	Monte Vista Avenue
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						27		11			16	7		3	16	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

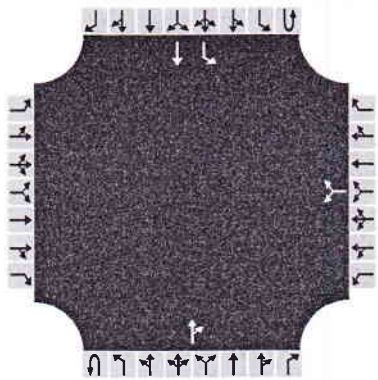
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							41							3		
Capacity, c (veh/h)							989							1588		
v/c Ratio							0.04							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							8.8							7.3		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					8.8								1.1			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Monte Vista & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Project Access
Analysis Year	2017	North/South Street	Monte Vista Avenue
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						14		6			20	27		11	18	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

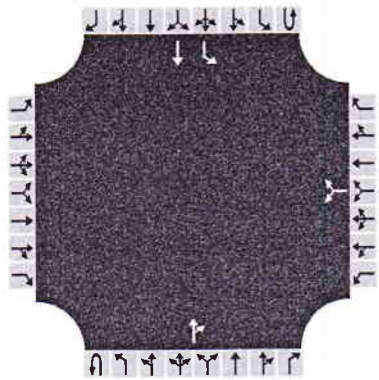
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							22							12		
Capacity, c (veh/h)							950							1554		
v/c Ratio							0.02							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							8.9							7.3		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					8.9								2.8			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Monte Vista & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Project Access
Analysis Year	2037	North/South Street	Monte Vista Avenue
Time Analyzed	AM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						27		11			19	7		3	19	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

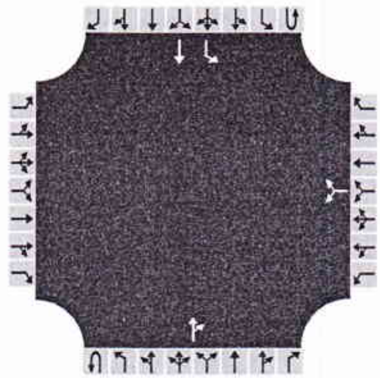
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							41							3		
Capacity, c (veh/h)							981							1583		
v/c Ratio							0.04							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							8.8							7.3		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					8.8								0.9			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Monte Vista & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Project Access
Analysis Year	2037	North/South Street	Monte Vista Avenue
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						14		16			24	27		11	20	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							32							12		
Capacity, c (veh/h)							969							1549		
v/c Ratio							0.03							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							8.8							7.3		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					8.8								2.6			
Approach LOS					A											

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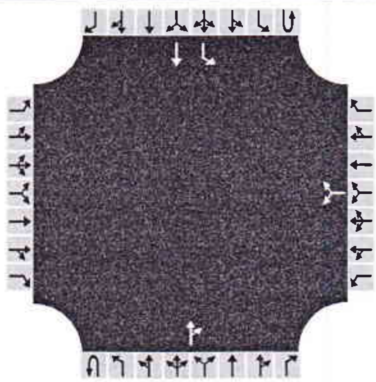
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Lucerne & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Existing Access
Analysis Year	2017	North/South Street	Lucerne Street
Time Analyzed	AM Existing	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						6		3			42	11		1	60	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

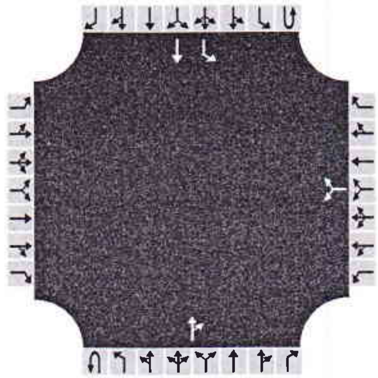
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							10							1		
Capacity, c (veh/h)							913							1545		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							9.0							7.3		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					9.0								0.1			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Lucerne & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Existing Access
Analysis Year	2017	North/South Street	Lucerne Street
Time Analyzed	PM Existing	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						14		5			72	6		1	76	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

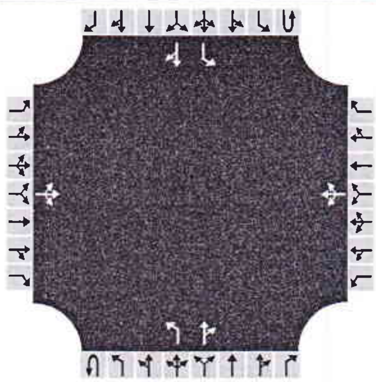
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							20							1		
Capacity, c (veh/h)							857							1510		
v/c Ratio							0.02							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							9.3							7.4		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					9.3								0.1			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Lucerne & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Project Access
Analysis Year	2017	North/South Street	Lucerne Street
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume, V (veh/h)		0	0	21		6	0	3		10	48	11		1	81	0
Percent Heavy Vehicles (%)		3	3	3		2	3	2		3				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

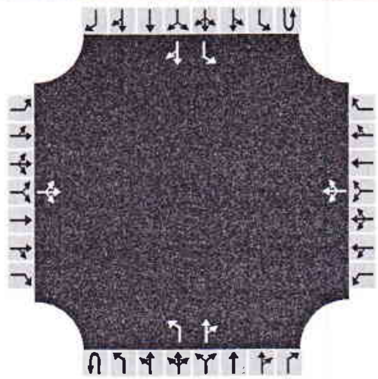
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			23				10			11				1		
Capacity, c (veh/h)			967				817			1500				1537		
v/c Ratio			0.02				0.01			0.01				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.0			0.0				0.0		
Control Delay (s/veh)			8.8				9.5			7.4				7.3		
Level of Service, LOS			A				A			A				A		
Approach Delay (s/veh)	8.8				9.5				1.1				0.1			
Approach LOS	A				A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Lucerne & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Project Access
Analysis Year	2017	North/South Street	Lucerne Street
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume, V (veh/h)		0	0	2		14	0	5		33	93	6		1	87	0
Percent Heavy Vehicles (%)		3	3	3		2	3	2		3				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

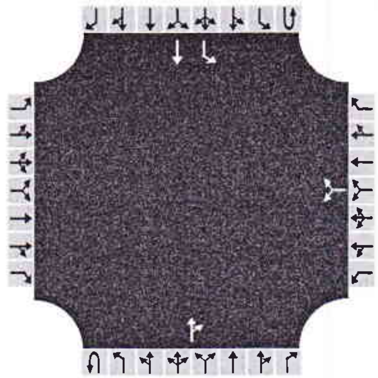
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			2				20			36				1		
Capacity, c (veh/h)			958				718			1491				1481		
v/c Ratio			0.00				0.03			0.02				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.1				0.0		
Control Delay (s/veh)			8.8				10.2			7.5				7.4		
Level of Service, LOS			A				B			A				A		
Approach Delay (s/veh)	8.8				10.2				1.9				0.1			
Approach LOS	A				B											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Lucerne & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Existing Access
Analysis Year	2037	North/South Street	Lucerne Street
Time Analyzed	AM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						7		4			51	13		1	73	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

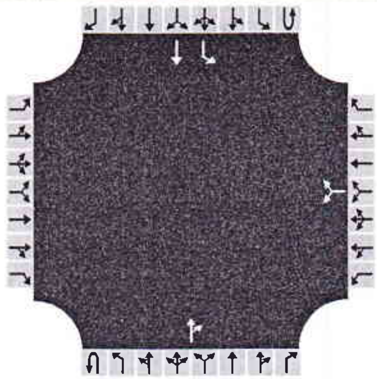
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							12							1		
Capacity, c (veh/h)							894							1531		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							9.1							7.4		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					9.1								0.1			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Lucerne & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Existing Access
Analysis Year	2037	North/South Street	Lucerne Street
Time Analyzed	PM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						17		6			88	7		1	93	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

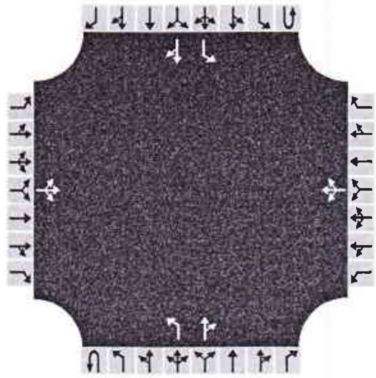
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							25							1		
Capacity, c (veh/h)							826							1486		
v/c Ratio							0.03							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							9.5							7.4		
Level of Service, LOS							A							A		
Approach Delay (s/veh)					9.5								0.1			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Lucerne & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	Project Access
Analysis Year	2037	North/South Street	Lucerne Street
Time Analyzed	AM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume, V (veh/h)		0	0	21		7	0	4		10	57	13		1	94	0
Percent Heavy Vehicles (%)		3	3	3		2	3	2		3				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			23				12			11				1		
Capacity, c (veh/h)			950				800			1482				1522		
v/c Ratio			0.02				0.02			0.01				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.0			0.0				0.0		
Control Delay (s/veh)			8.9				9.6			7.4				7.4		
Level of Service, LOS			A				A			A				A		
Approach Delay (s/veh)	8.9				9.6				0.9				0.1			
Approach LOS	A				A											

HCS7 Two-Way Stop-Control Report

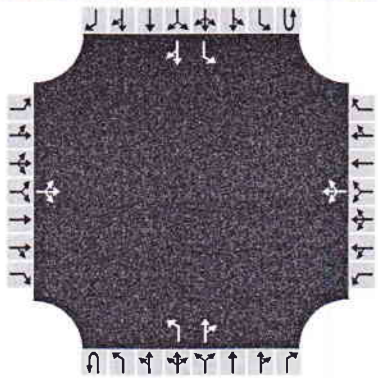
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	12/26/2017
Analysis Year	2037
Time Analyzed	PM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Lucerne & Access
Jurisdiction	Douglas County
East/West Street	Project Access
North/South Street	Lucerne Street
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume, V (veh/h)		0	0	2		17	0	6		33	109	7		1	104	0
Percent Heavy Vehicles (%)		3	3	3		2	3	2		3				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

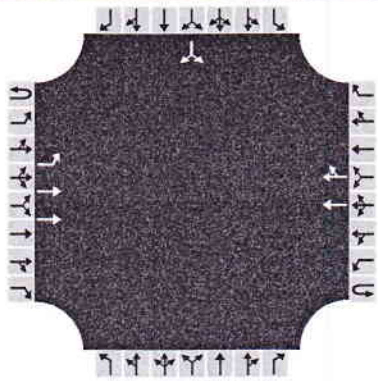
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			2				25			36				1		
Capacity, c (veh/h)			936				691			1468				1459		
v/c Ratio			0.00				0.04			0.02				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.1				0.0		
Control Delay (s/veh)			8.9				10.4			7.5				7.5		
Level of Service, LOS			A				B			A				A		
Approach Delay (s/veh)	8.9				10.4				1.7				0.1			
Approach LOS	A				B											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2017	North/South Street	Project Access
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration		L	T				T	TR							LR	
Volume, V (veh/h)		4	865				1024	5						3		2
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.5		6.9
Critical Headway (sec)		4.14												7.54		6.94
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.22												3.52		3.32

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4													5	
Capacity, c (veh/h)		621													108	
v/c Ratio		0.01													0.05	
95% Queue Length, Q_{95} (veh)		0.0													0.1	
Control Delay (s/veh)		10.8													39.9	
Level of Service, LOS		B													E	
Approach Delay (s/veh)	0.0												39.9			
Approach LOS													E			

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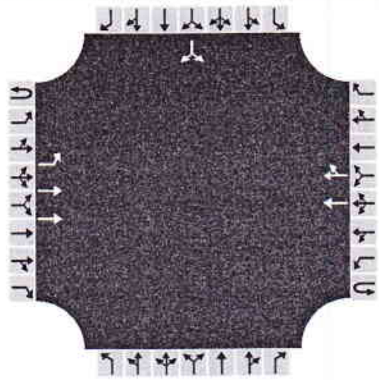
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2017	North/South Street	Project Access
Time Analyzed	PM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration		L	T				T	TR							LR	
Volume, V (veh/h)		12	1124				929	13						14		14
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

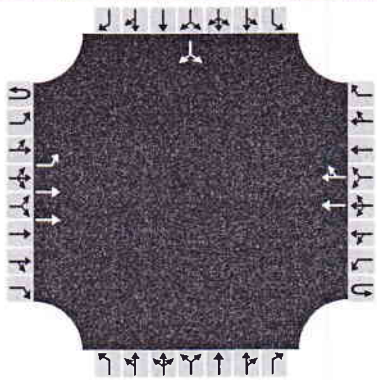
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		13													30	
Capacity, c (veh/h)		674													113	
v/c Ratio		0.02													0.27	
95% Queue Length, Q_{95} (veh)		0.1													1.0	
Control Delay (s/veh)		10.4													47.9	
Level of Service, LOS		B													E	
Approach Delay (s/veh)	0.1												47.9			
Approach LOS													E			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2037	North/South Street	Project Access
Time Analyzed	AM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration		L	T				T	TR							LR	
Volume, V (veh/h)		4	892				1063	5						3		2
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

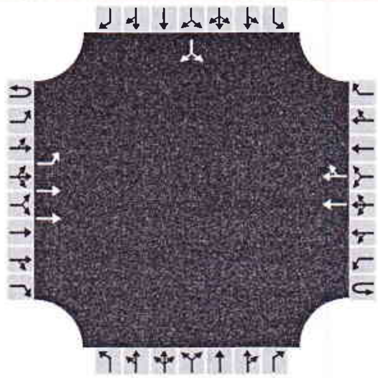
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4													5	
Capacity, c (veh/h)		598													99	
v/c Ratio		0.01													0.05	
95% Queue Length, Q_{95} (veh)		0.0													0.2	
Control Delay (s/veh)		11.1													43.5	
Level of Service, LOS		B													E	
Approach Delay (s/veh)	0.0												43.5			
Approach LOS													E			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	US-395 & Access
Agency/Co.	Solaegui Engineers	Jurisdiction	Douglas County
Date Performed	12/26/2017	East/West Street	US-395
Analysis Year	2037	North/South Street	Project Access
Time Analyzed	PM Base + Project	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration		L	T				T	TR							LR	
Volume, V (veh/h)		12	1175				968	13						14		14
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		13													30	
Capacity, c (veh/h)		650													101	
v/c Ratio		0.02													0.30	
95% Queue Length, Q_{95} (veh)		0.1													1.1	
Control Delay (s/veh)		10.7													55.0	
Level of Service, LOS		B													F	
Approach Delay (s/veh)	0.1												55.0			
Approach LOS													F			

EXHIBIT F
DRAINAGE REPORT

CONCEPTUAL DRAINAGE REPORT

FOR THE

NEVADA NORTHWEST SPECIFIC PLAN

Prepared for:

NEVADA NORTHWEST, LLC
1245 "B" Centerville Lane
Gardnerville, Nevada 89410

Prepared by:

R.O. ANDERSON ENGINEERING, INC.
P.O. Box 2229
Minden, Nevada 89423
(775) 782-2322
(775) 782-7084 Facsimile

July 20, 2001

PROFESSIONAL ENGINEER STATE OF NEVADA
ROBERT O. ANDERSON
CIVIL
No. 7767

7·20·01

1.0 INTRODUCTION

i. Site Location Map:

The project site is generally located at the intersection of U.S. Highway 395 and State Route 88 in Minden, Nevada. It is more particular location is within a portion of Section 30, Township 13 North, Range 20 East, M.D.M. The site's relative location to other facilities within the area is more fully depicted on Figure 1 – Vicinity Map.

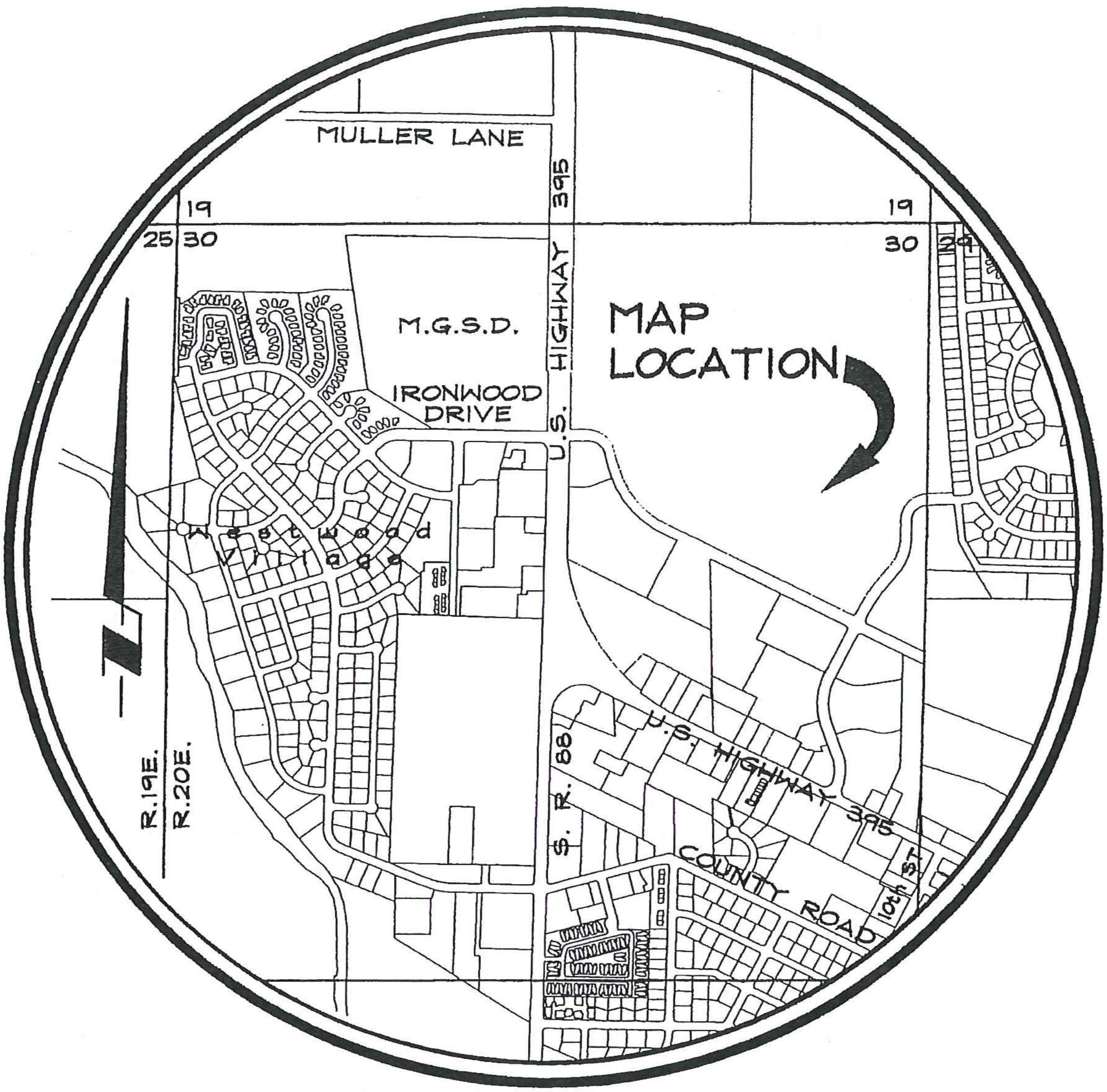
Surrounding land uses include agricultural lands to the north; U.S. Highway 395, commercial and public facilities to the west; the Winhaven residential development on the east, and general commercial development along the south boundary.

ii. Site Description:

Areas of the project site have historically been utilized as agricultural fields and flood irrigated. As such, they were leveled to have minimal slopes and generally slope from east to west.

Within the South Commercial Planning Area, the Dreyer ditch bisects the property flowing in a northwest direction to the Martin Slough. This ditch conveys irrigation water to the Dreyer Ranch and is also utilized to capture and convey storm water from a substantial portion of the Town of Minden.

Similarly, along the westerly project boundary in the North Commercial/Residential Planning Area an irrigation ditch extends from where it enters the property at Lucerne Street northerly to the north property line and then follows the north property line westerly to approximately the midpoint of the property. From this location the irrigation ditch flows southerly to irrigate the northwesterly portion of the project site.



VICINITY MAP

NO SCALE

FIGURE #1

The Martin Slough traverses through that portion of the property that is planned for public facilities. The Slough conveys irrigation waters and storm water from significant portions of the Towns of Minden and Gardnerville to its terminus at the Klauber Ponds located westerly of U.S. Highway 395. From its origination point near Lampe Park in Gardnerville, the length of the Slough to U.S. Highway 395 on the westerly limits of the project site is approximately three miles.

The project site is constrained by special flood hazard areas inundated by 100-year flood within the Martin Slough. Specifically, there exists a portion of the site within the AE Zone that is defined as "Areas where base flood elevations were determined." In addition, other portions of the site are within areas designated by Federal Emergency Management Agency (FEMA) as "Other Flood Areas", and are solely confined to those areas designated as being within the "Shaded X" zone. The Shaded X zone is defined by FEMA as "Areas of the 500-year flood; areas of 100-year flood with average depths less than 1-foot or with drainage areas less than one square mile; and areas protected by levees from 100-year flood." The extent of these flood plain areas were determined by FEMA and are depicted on their Flood Insurance Rate Map (FIRM), Panel No. 32005C0235 F, dated November 8, 1999. Pursuant to Douglas County's Flood Hazard ordinance, residential development cannot be located with Special Flood Hazard areas. Accordingly, no such encroachments are proposed within the project plan.

The Owner proposes to develop approximately 117 acres into a planned commercial and residential development. Its proposal contemplates a hotel/casino, RV Park, considerable retail commercial areas, single family residential and a multi-family residential area. The conceptual development plan is attached as Figure 2.

2.0 HISTORICAL DRAINAGE SYSTEM

i. Identify Major Basins

Figure 3, Watershed Plan identifies the extent of the Martin Slough hydrologic basin and its individual subbasins. The hydrologic basin was divided into 9 distinct subbasins varying is size from 38 to 213 acres. In total, it is estimated that this subbasin of the East Fork of the Carson River drains approximately 785 acres.

As identified previously, surrounding properties within this subbasin are existing agricultural fields that are flood irrigated with established cover including alfalfa and pasture grasses. In addition to the irrigated fields the Martin Slough serves to convey considerable storm water from both the Town of Gardnerville and Minden to its terminus at the Klauber Pond just upstream of East Fork of the Carson River.

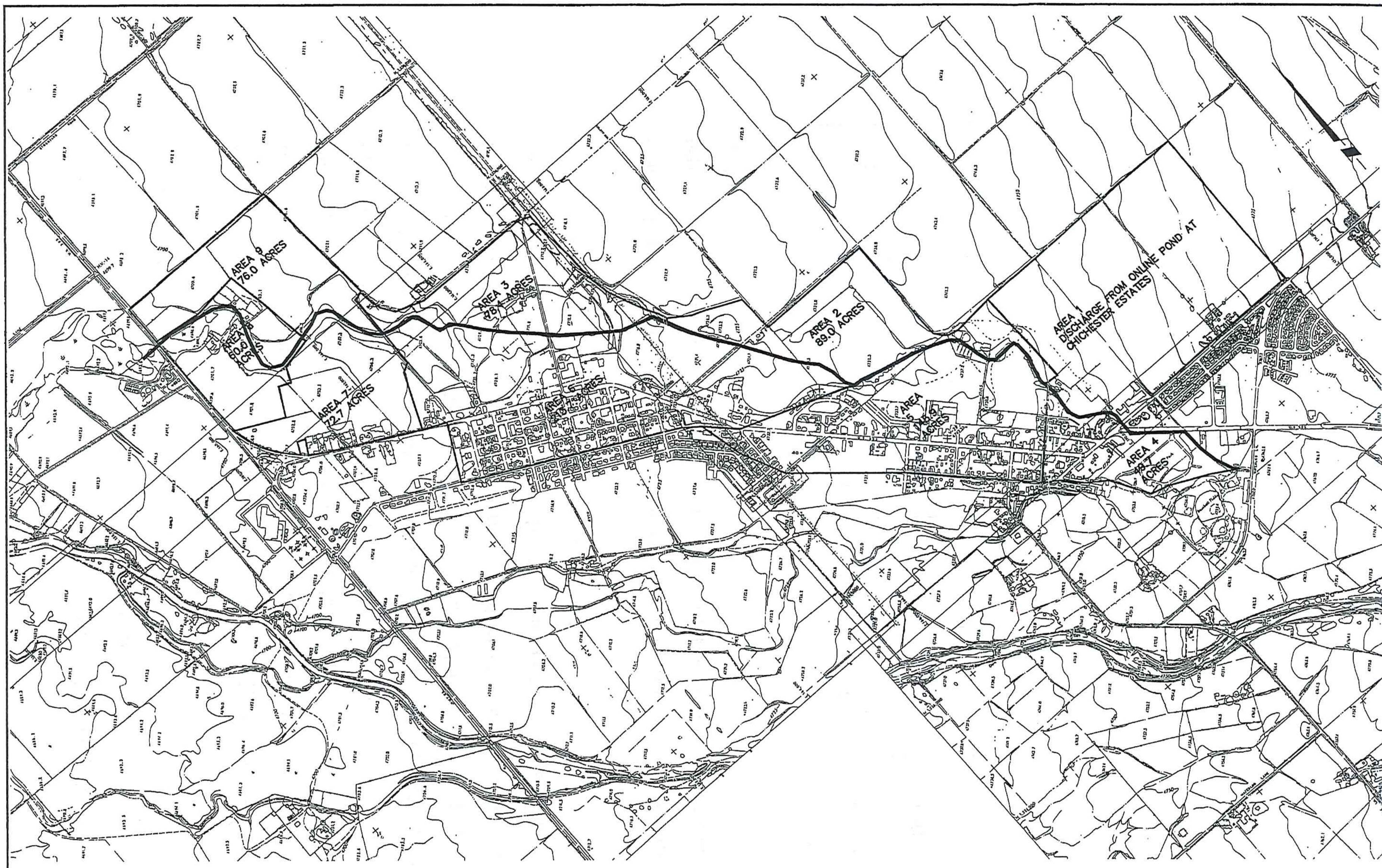
Soil types in this area are generally characterized as clayey loam with some silts.

ii. Identify sub-basins and site drainage:

Existing drainage from the project site is generally undeveloped. In significant storm events runoff from the existing fields and the other undeveloped areas is conveyed by overland flow patterns ultimately to the Martin Slough.

Projected discharges from the subbasins were estimated using the TR-55 method as adopted by the United States Department of Agriculture, Soil Conservation Service (SCS). To determine and establish the existing hydrograph for the project, estimated discharges from each subbasin

ROJECTS\39547\dwg\CONCEPT\395.. .dwg Fri Jul 20 08:03:16 2001



NO.	DATE	REVISION BLOCK	BY

SCALE: 1" = 600'

Anderson ENGINEERING INC

NEVADA NORTHWEST, LLC

CONCEPTUAL
WATERSHED PLAN
FIGURE #3

DRAWN: LNW	JOB: 396-47-00
ENGINEER: ROA	DRAWING: 39647WS
SCALE: 1"=600'	SHEET: WS
DATE: 7/19/01	OF: WS SHEETS

were routed through the Slough system to the U.S. Highway 395 crossing using estimates of travel times. Travel times were also estimated using SCS methods.

Subbasin 1 is generally represented by the Chichester Estates residential development. Discharges from within the Chichester Estates are routed by a system of storm drain pipes through the development to an existing detention basin located within the Martin Slough stream. Discharges from the Chichester detention pond, and smaller water quality mitigation ponds constructed by the Town of Gardnerville, were added to discharges from the other subbasins to obtain the combined discharges of the system. Copies of previously developed discharge estimates from the Chichester Estates development are attached to this report.

Calculations of travel times and times of concentration are attached to this report and are summarized together with corresponding peak discharges as follows;

	$T_{c,}$ (hrs)	AREA (Acres)	$T_{t,}$ (hrs)	$Q_{2,}$ (cfs)	Q_{25} (cfs)
Pre-development	2.7	785	15	69	160

3.0 WITH PROJECT DRAINAGE SYSTEM

i. Criteria & Methodology:

The TR-55 Method has also been used to approximate potential storm water discharges from the project site. These discharges were then added to the appropriate subbasin of the pre-development hydrograph to obtain the With-project hydrograph.

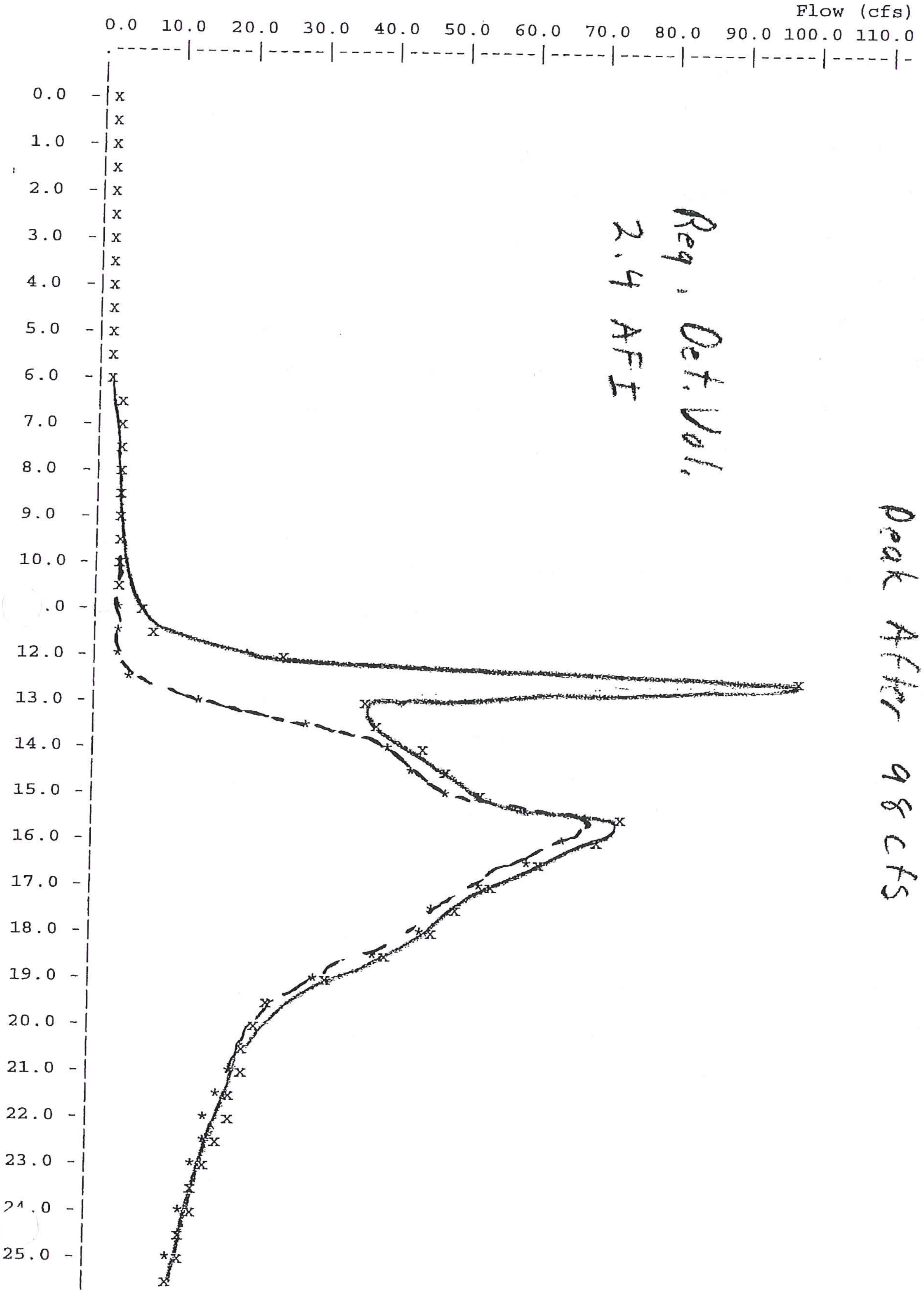
ii. Provide storm water runoff for 2-yr. & 25-yr. peak flows

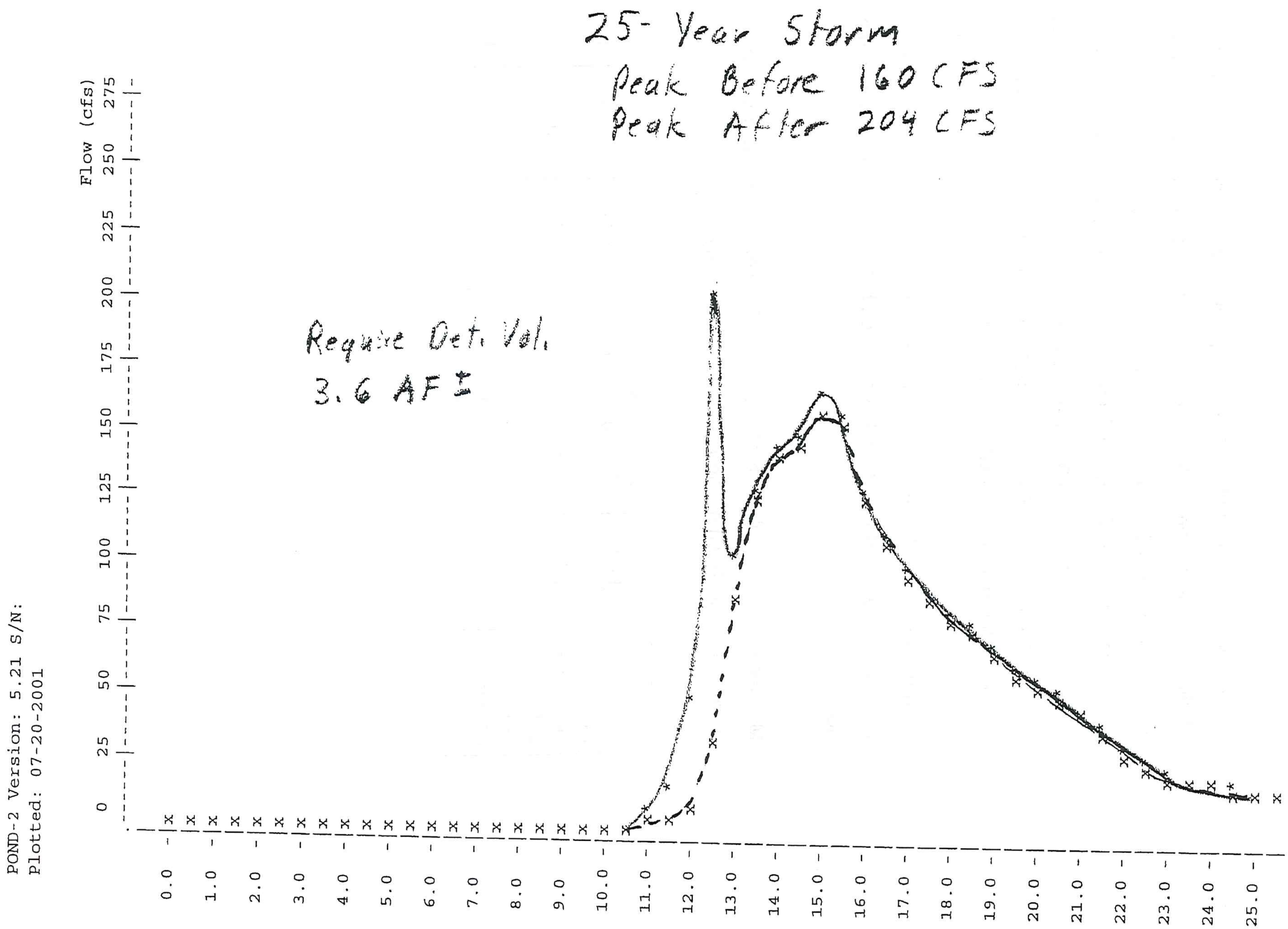
Based upon the underlying assumptions and the attached calculations the estimated with-project peak discharges for the 2-yr & 25-yr storm events are 98 cfs and 204 cfs, respectively. The increase in these discharges is due to the proposed project. Due to the project site's close proximity to the Slough it has a very short time of concentration. These conditions result in an abnormal peak discharge spike in the with-project hydrograph at approximately T=12.5 hours. Copies of the hydrographs for both the 2-year and the 25-year storm events are attached.

iii. Identify size, capacity and location of conveyance facilities

The size and capacity of existing and proposed conveyance facilities have not been determined at this planning level analysis. However, to comply with Douglas County code the peak discharge from either of the design storm events can't be increased above that level estimated under pre-development conditions. The proposed project will comply with this requirement by developing relatively small detention basins at critical locations immediately upstream of discharge points to the Martin Slough. Alternatively, if acceptable to those agencies having jurisdiction, during final design efforts consideration will be given to constructing, a regional, in-stream detention basin similar to that constructed with the Chichester development. Such a facility would simplify maintenance

POND-2 Version: 5.21 S/N:
Plotted: 07-20-2001





25- Year Storm
Peak Before 160 CFS
Peak After 204 CFS
Require Det. Vol.
3.6 AF±
Flow (cfs)
0
25
50
75
100
125
150
175
200
225
250
275
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
POND-2 Version: 5.21 S/N:
Plotted: 07-20-2001

requirements and may also serve to improve water quality in the slough system. Preliminary calculations indicate that a detention facility having a storage volume of 2.4 acre-feet would be required to mitigate with-project increases to the 2-year peak discharge. Similarly, to mitigate the with-project discharges to the 25-year event a detention basin having a capacity of 3.6 acre-feet would be required. Discharges from this proposed facility(ies) will be regulated by outlet structures located at the discharge points to the Martin Slough.

Formal hydraulic calculations for proposed storm drains within the project areas have not been performed and are beyond the scope of this planning level document.

Maintenance responsibility for the proposed regional drainage improvements will be by either the Town of Minden or Douglas County.

	T_C (hrs)	AREA (Acres)	T_t (hrs)	Q_2 (cfs)	Q_{25} (cfs)	
Pre-Development	2.7	785	2.7	69	160	
With-project	2.7	785	2.7	98	204	

4.0 CONCLUSIONS & RECOMMENDATIONS

i. Discuss identified impacts from proposed development:

Upon successfully completing the site development activities, including implementation of detention facilities having the rated capacities summarized within this report, no adverse impacts from this project have been identified or are anticipated.

During the design development and review process detailed analysis and design of specific storm drainage elements will be undertaken. The results of these evaluations will be incorporated into final improvement plans and a technical drainage study. These documents will be submitted for review and approval by those agencies having jurisdiction over such improvements. Ultimately, the successful implementation of requisite improvements will be monitored during the normal course of construction by site inspections conducted in accordance with building and site improvement permits as issued by Douglas County.

Table 2-2c.—Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
		EX AG			
Brush—brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods—grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

[3]*Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4]Actual curve number is less than 30; use CN = 30 for runoff computations.

[5]CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6]*Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

New Dev.

ex, Dev

[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

```
Quick TR-55 Ver.5.46    S/N:
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                         NEVADA NORTHWEST
                            SUBAREA 1
                           TRAVEL TIME


              Tt COMPUTATIONS FOR: TRAVEL TIME

 SHEET FLOW (Applicable to Tc only)
     Segment ID
     Surface description
     Manning's roughness coeff., n                   0.0000
     Flow length, L (total < or = 300)      ft          0.0
     Two-yr 24-hr rainfall, P2              in        0.000
     Land slope, s                       ft/ft       0.0000
                          0.8
            .007 * (n*L)
     T =   --------------                  hrs         0.00            =  0.00
                0.5      0.4
              P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                         ft          0.0
     Watercourse slope, s                ft/ft       0.0000

                         0.5
     Avg.V =   Csf *    (s)                ft/s      0.0000
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                       hrs        0.00            =  0.00


 CHANNEL FLOW
     Segment ID                                      SLOUGH
     Cross Sectional Flow Area, a        sq.ft        10.00
     Wetted perimeter, Pw                   ft        15.00
     Hydraulic radius, r = a/Pw             ft        0.667
     Channel slope, s                    ft/ft       0.0035
     Manning's roughness coeff., n                   0.0400

                    2/3      1/2
          1.49  *  r    *   s
     V = --------------------               ft/s      1.6818
                    n

     Flow length, L                          ft       16200

     T = L / (3600*V)                       hrs        2.68            =  2.68

 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                        TOTAL TIME (hrs)                  2.68
```

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Quick TR-55 Ver.5.46    S/N:
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                              NEVADA NORTHWEST
                                 SUBAREA 2


                    Tc COMPUTATIONS FOR: ALL AG

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                      OVERLAD
     Surface description                          PASTURE
     Manning's roughness coeff., n                       0.2400
     Flow length, L (total < or = 300)       ft      100.0
     Two-yr 24-hr rainfall, P2               in      1.600
     Land slope, s                        ft/ft      0.0040
                       0.8
          .007 * (n*L)
     T =  --------------                     hrs       0.64            =  0.64
              0.5     0.4
            P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                      FURROW
     Surface (paved or unpaved)?                     Unpaved
     Flow length, L                          ft      2200.0
     Watercourse slope, s                 ft/ft      0.0040

                            0.5
     Avg.V =   Csf *   (s)                 ft/s      1.0204
     where:    Unpaved Csf  = 16.1345
               Paved   Csf  = 20.3282

     T = L / (3600*V)                        hrs       0.60            =  0.60


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a        sq.ft        0.00
     Wetted perimeter, Pw                   ft        0.00
     Hydraulic radius, r = a/Pw             ft       0.000
     Channel slope, s                    ft/ft      0.0000
     Manning's roughness coeff., n                  0.0000

                     2/3    1/2
          1.49   *   r    *   s
     V =  --------------------              ft/s    0.0000
                     n

     Flow length, L                         ft          0

     T = L / (3600*V)                       hrs       0.00             =  0.00

 :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                TOTAL TIME (hrs)       1.24
```

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Quick TR-55 Ver.5.46    S/N:
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                         NEVADA NORTHWEST
                            SUBAREA 2
                           TRAVEL TIME


              Tt COMPUTATIONS FOR: TRAVEL TIME

 SHEET FLOW (Applicable to Tc only)
     Segment ID
     Surface description
     Manning's roughness coeff., n                 0.0000
     Flow length, L (total < or = 300)     ft       0.0
     Two-yr 24-hr rainfall, P2             in      0.000
     Land slope, s                       ft/ft     0.0000
                          0.8
           .007 * (n*L)
     T =  --------------                 hrs        0.00          =  0.00
              0.5    0.4
            P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                        ft       0.0
     Watercourse slope, s                ft/ft     0.0000

                           0.5
     Avg.V =  Csf *    (s)               ft/s      0.0000
     where:   Unpaved Csf  = 16.1345
              Paved   Csf  = 20.3282

     T = L / (3600*V)                    hrs        0.00          =  0.00


 CHANNEL FLOW
     Segment ID                                   SLOUGH
     Cross Sectional Flow Area, a        sq.ft     10.00
     Wetted perimeter, Pw                  ft      15.00
     Hydraulic radius, r = a/Pw            ft      0.667
     Channel slope, s                    ft/ft     0.0035
     Manning's roughness coeff., n                 0.0400

                      2/3     1/2
          1.49   *   r    *   s
     V =  --------------------           ft/s      1.6818
                      n

     Flow length, L                        ft       9370

     T = L / (3600*V)                    hrs        1.55          =  1.55

 :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                          TOTAL TIME (hrs)        1.55
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:37:23 07-19-2001

NEVADA NORTHWEST
AREA 2

RUNOFF CURVE NUMBER DATA

::

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
100% AG	89.00	71	
COMPOSITE AREA --->	89.00	71.0	(71)

::

```
Quick TR-55 Ver.5.46   S/N:
Executed: 21:08:33   07-19-2001    3963.TCT

                         NEVADA NORTHWEST
                            SUBAREA 3


              Tc COMPUTATIONS FOR: 90% AG

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                    OVERLAD
     Surface description                       PASTURE
     Manning's roughness coeff., n                  0.2400
     Flow length, L (total < or = 300)   ft         100.0
     Two-yr 24-hr rainfall, P2           in         1.600
     Land slope, s                       ft/ft      0.0040
                            0.8
          .007 * (n*L)
     T =  --------------                 hrs        0.64          =  0.64
              0.5    0.4
            P2   *  s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                    FURROW
     Surface (paved or unpaved)?                   Unpaved
     Flow length, L                      ft         2000.0
     Watercourse slope, s                ft/ft      0.0040

                         0.5
     Avg.V =   Csf *   (s)               ft/s       1.0204
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                    hrs        0.54          =  0.54


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a        sq.ft      0.00
     Wetted perimeter, Pw                ft         0.00
     Hydraulic radius, r = a/Pw          ft         0.000
     Channel slope, s                    ft/ft      0.0000
     Manning's roughness coeff., n                  0.0000

                      2/3     1/2
          1.49   *   r    *   s
     V =  -------------------            ft/s       0.0000
                     n

     Flow length, L                      ft         0

     T = L / (3600*V)                    hrs        0.00          =  0.00
 :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                          TOTAL TIME (hrs)        1.18
```

```
Quick TR-55 Ver.5.46   S/N:
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                         NEVADA NORTHWEST
                            SUBAREA 3
                           TRAVEL TIME


                 Tt COMPUTATIONS FOR: TRAVEL TIME

 SHEET FLOW (Applicable to Tc only)
     Segment ID
     Surface description
     Manning's roughness coeff., n                  0.0000
     Flow length, L (total < or = 300)      ft       0.0
     Two-yr 24-hr rainfall, P2              in       0.000
     Land slope, s                        ft/ft     0.0000
                        0.8
          .007 * (n*L)
     T = --------------                    hrs       0.00           =   0.00
              0.5     0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                          ft       0.0
     Watercourse slope, s                 ft/ft     0.0000

                         0.5
     Avg.V =  Csf *   (s)                 ft/s      0.0000
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                      hrs       0.00           =   0.00


 CHANNEL FLOW
     Segment ID                                    SLOUGH
     Cross Sectional Flow Area, a         sq.ft     10.00
     Wetted perimeter, Pw                   ft      15.00
     Hydraulic radius, r = a/Pw             ft      0.667
     Channel slope, s                     ft/ft     0.0035
     Manning's roughness coeff., n                  0.0400

                      2/3    1/2
          1.49  *  r    *  s
     V = --------------------               ft/s     1.6818
                      n

     Flow length, L                          ft       4430

     T = L / (3600*V)                       hrs       0.73           =   0.73

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                               TOTAL TIME (hrs)       0.73
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:39:19 07-19-2001

NEVADA NORTHWEST
AREA 3

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
90% AG	70.60	71	
10% EXISTING DEVELOPMENT	7.80	83	
COMPOSITE AREA --->	78.40	72.2	(72)

```
Quick TR-55 Ver.5.46   S/N:
Executed: 21:09:58   07-19-2001    3964.TCT

                          NEVADA NORTHWEST
                             SUBAREA 4


              Tc COMPUTATIONS FOR: 0%  AG

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                      OVERLAD
     Surface description                       LAWN
     Manning's roughness coeff., n                    0.2400
     Flow length, L (total < or = 300)         ft      50.0
     Two-yr 24-hr rainfall, P2                 in      1.600
     Land slope, s                           ft/ft    0.0100
                       0.8
          .007 * (n*L)
     T =  --------------                       hrs      0.25          =  0.25
            0.5    0.4
          P2   *  s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                      GUTTER
     Surface (paved or unpaved)?                      Paved
     Flow length, L                            ft    2000.0
     Watercourse slope, s                    ft/ft    0.0050


                          0.5
     Avg.V =  Csf *  (s)                     ft/s    1.4374
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                          hrs      0.39          =  0.39


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a           sq.ft      0.00
     Wetted perimeter, Pw                      ft      0.00
     Hydraulic radius, r = a/Pw                ft     0.000
     Channel slope, s                        ft/ft    0.0000
     Manning's roughness coeff., n                    0.0000

                   2/3    1/2
          1.49  *  r   *  s
     V =  -------------------                ft/s    0.0000
                   n

     Flow length, L                            ft         0

     T = L / (3600*V)                          hrs      0.00          =  0.00

 :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                         TOTAL TIME (hrs)          0.64
```

```
Quick TR-55 Ver.5.46   S/N:
Executed: 21:30:25   07-19-2001    3964TT.TCT

                         NEVADA NORTHWEST
                            SUBAREA 4
                           TRAVEL TIME


               Tt COMPUTATIONS FOR: TRAVEL TIME

SHEET FLOW (Applicable to Tc only)
    Segment ID
    Surface description
    Manning's roughness coeff., n                  0.0000
    Flow length, L (total < or = 300)    ft          0.0
    Two-yr 24-hr rainfall, P2            in        0.000
    Land slope, s                        ft/ft     0.0000
                       0.8
         .007 * (n*L)
    T =  --------------                  hrs        0.00          =  0.00
             0.5    0.4
           P2   *  s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                       ft          0.0
    Watercourse slope, s                 ft/ft     0.0000

                        0.5
    Avg.V =  Csf *  (s)                  ft/s      0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                     hrs        0.00          =  0.00


CHANNEL FLOW
    Segment ID                                    SLOUGH
    Cross Sectional Flow Area, a         sq.ft     10.00
    Wetted perimeter, Pw                 ft        15.00
    Hydraulic radius, r = a/Pw           ft        0.667
    Channel slope, s                     ft/ft    0.0035
    Manning's roughness coeff., n                 0.0400

                   2/3    1/2
        1.49  *  r    *  s
    V = --------------------             ft/s     1.6818
                  n

    Flow length, L                       ft        15700

    T = L / (3600*V)                     hrs        2.59          =  2.59

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                          TOTAL TIME (hrs)        2.59
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:40:30 07-19-2001

NEVADA NORTHWEST
AREA 4

RUNOFF CURVE NUMBER DATA

::

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
0% AG	0.00	71	
100% EXISTING DEVELOPMENT	49.70	83	
COMPOSITE AREA --->	49.70	83.0	(83)

:::

Quick TR-55 Ver.5.46   S/N:
Executed: 21:11:37   07-19-2001   3965.TCT

NEVADA NORTHWEST
SUBAREA 5

Tc COMPUTATIONS FOR: 20% AG

SHEET FLOW (Applicable to Tc only)

Segment ID		OVERLAD
Surface description		PASTURE
Manning's roughness coeff., n		0.2400
Flow length, L (total < or = 300)	ft	100.0
Two-yr 24-hr rainfall, P2	in	1.600
Land slope, s	ft/ft	0.0040

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.64 = 0.64

SHALLOW CONCENTRATED FLOW

Segment ID		FURROW	GUTTER
Surface (paved or unpaved)?		Unpaved	Paved
Flow length, L	ft	2000.0	2000.0
Watercourse slope, s	ft/ft	0.0040	0.0050

$$Avg.V = Csf * (s)^{0.5}$$ ft/s 1.0204 1.4374

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V)   hrs   0.54 + 0.39 = 0.93

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L   ft   0

T = L / (3600*V)   hrs   0.00 = 0.00

::

TOTAL TIME (hrs)   1.57

```
Quick TR-55 Ver.5.46   S/N:
Executed: 21:31:11   07-19-2001    3965TT.TCT

                    NEVADA NORTHWEST
                       SUBAREA 5
                      TRAVEL TIME


          Tt COMPUTATIONS FOR: TRAVEL TIME

SHEET FLOW (Applicable to Tc only)
     Segment ID
     Surface description
     Manning's roughness coeff., n                 0.0000
     Flow length, L (total < or = 300)    ft        0.0
     Two-yr 24-hr rainfall, P2            in      0.000
     Land slope, s                      ft/ft    0.0000
                        0.8
          .007 * (n*L)
     T = --------------                 hrs      0.00          =  0.00
                0.5    0.4
             P2    *  s

SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                       ft        0.0
     Watercourse slope, s               ft/ft    0.0000

                         0.5
     Avg.V =   Csf *   (s)              ft/s     0.0000
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                   hrs      0.00          =  0.00


CHANNEL FLOW
     Segment ID                                  SLOUGH
     Cross Sectional Flow Area, a       sq.ft    10.00
     Wetted perimeter, Pw                 ft     15.00
     Hydraulic radius, r = a/Pw           ft     0.667
     Channel slope, s                   ft/ft    0.0035
     Manning's roughness coeff., n               0.0400

                     2/3     1/2
          1.49   *  r    *  s
     V = --------------------           ft/s     1.6818
                    n

     Flow length, L                       ft      11800

     T = L / (3600*V)                   hrs      1.95          =  1.95

:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                    TOTAL TIME (hrs)           1.95
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:46:01 07-19-2001

NEVADA NORTHWEST
AREA 5

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
20% AG	29.20	71	
80% EXISTING DEVELOPMENT	116.70	83	
COMPOSITE AREA --->	145.90	80.6	(81)

```
Quick TR-55 Ver.5.46    S/N:
Executed: 21:12:36    07-19-2001    3966.TCT

                    NEVADA NORTHWEST
                       SUBAREA 6


              Tc COMPUTATIONS FOR: 20% AG

SHEET FLOW (Applicable to Tc only)
    Segment ID                                    OVERLAD
    Surface description                        PASTURE
    Manning's roughness coeff., n                 0.2400
    Flow length, L (total < or = 300)    ft       100.0
    Two-yr 24-hr rainfall, P2            in       1.600
    Land slope, s                        ft/ft    0.0040
                        0.8
         .007 * (n*L)
    T =  --------------                  hrs       0.64              =  0.64
            0.5      0.4
          P2      *   s

SHALLOW CONCENTRATED FLOW
    Segment ID                                FURROW     GUTTER
    Surface (paved or unpaved)?               Unpaved     Paved
    Flow length, L                       ft   1200.0     3000.0
    Watercourse slope, s              ft/ft   0.0040     0.0050

                          0.5
    Avg.V =  Csf  *   (s)                ft/s  1.0204     1.4374
    where:   Unpaved Csf  = 16.1345
             Paved   Csf  = 20.3282

    T = L / (3600*V)                     hrs    0.33   +   0.58    =  0.91


CHANNEL FLOW
    Segment ID
    Cross Sectional Flow Area, a      sq.ft     0.00
    Wetted perimeter, Pw              ft        0.00
    Hydraulic radius, r = a/Pw        ft        0.000
    Channel slope, s                  ft/ft     0.0000
    Manning's roughness coeff., n               0.0000

                    2/3     1/2
         1.49   *   r    *   s
    V =  --------------------         ft/s     0.0000
                    n

    Flow length, L                    ft          0

    T = L / (3600*V)                  hrs       0.00              =  0.00

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                                          TOTAL TIME (hrs)       1.55
```

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Quick TR-55 Ver.5.46   S/N:
Executed: 21:31:46   07-19-2001    3966TT.TCT

                    NEVADA NORTHWEST
                       SUBAREA 6
                      TRAVEL TIME

            Tt COMPUTATIONS FOR: TRAVEL TIME

SHEET FLOW (Applicable to Tc only)
    Segment ID
    Surface description
    Manning's roughness coeff., n                   0.0000
    Flow length, L (total < or = 300)      ft          0.0
    Two-yr 24-hr rainfall, P2              in        0.000
    Land slope, s                          ft/ft    0.0000
                         0.8
         .007 * (n*L)
    T =  --------------                    hrs        0.00          =  0.00
            0.5     0.4
          P2    *  s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                         ft          0.0
    Watercourse slope, s                   ft/ft    0.0000

                         0.5
    Avg.V =  Csf *  (s)                    ft/s     0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                       hrs        0.00          =  0.00

CHANNEL FLOW
    Segment ID                                      SLOUGH
    Cross Sectional Flow Area, a           sq.ft     10.00
    Wetted perimeter, Pw                   ft        15.00
    Hydraulic radius, r = a/Pw             ft        0.667
    Channel slope, s                       ft/ft    0.0035
    Manning's roughness coeff., n                   0.0400

                  2/3     1/2
        1.49  *  r    *  s
    V = --------------------               ft/s     1.6818
                  n

    Flow length, L                         ft         4800

    T = L / (3600*V)                       hrs        0.79          =  0.79

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                           TOTAL TIME (hrs)         0.79
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:47:05 07-19-2001

NEVADA NORTHWEST
AREA 6

RUNOFF CURVE NUMBER DATA

::

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
20% AG	42.70	71	
80% EXISTING DEVELOPMENT	171.00	83	
COMPOSITE AREA --->	213.70	80.6	(81)

::

```
Quick TR-55 Ver.5.46    S/N:
 xecuted: 21:13:53    07-19-2001     3967.TCT

                          NEVADA NORTHWEST
                              SUBAREA 7


                  Tc COMPUTATIONS FOR: 90% AG

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                    OVERLAD
     Surface description                       PASTURE
     Manning's roughness coeff., n                  0.2400
     Flow length, L (total < or = 300)     ft       100.0
     Two-yr 24-hr rainfall, P2              in       1.600
     Land slope, s                        ft/ft     0.0040
                         0.8
          .007 * (n*L)
     T = --------------                  hrs       0.64          =  0.64
              0.5     0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                   FURROW
     Surface (paved or unpaved)?                  Unpaved
     Flow length, L                        ft     1600.0
     Watercourse slope, s                 ft/ft    0.0040

                          0.5
     Avg.V =   Csf *   (s)                ft/s     1.0204
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                      hrs      0.44          =  0.44


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a        sq.ft      0.00
     Wetted perimeter, Pw                  ft       0.00
     Hydraulic radius, r = a/Pw            ft      0.000
     Channel slope, s                    ft/ft    0.0000
     Manning's roughness coeff., n                0.0000

                    2/3    1/2
         1.49   *  r    *  s
     V = --------------------            ft/s     0.0000
                   n

     Flow length, L                        ft          0

     T = L / (3600*V)                      hrs      0.00          =  0.00

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                                          TOTAL TIME (hrs)        1.08
```

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Quick TR-55 Ver.5.46   S/N:
 ecuted: 21:34:19   07-19-2001    3967TT.TCT

                        NEVADA NORTHWEST
                           SUBAREA 7
                          TRAVEL TIME


            Tt COMPUTATIONS FOR: TRAVEL TIME

SHEET FLOW (Applicable to Tc only)
    Segment ID
    Surface description
    Manning's roughness coeff., n                0.0000
    Flow length, L (total < or = 300)    ft        0.0
    Two-yr 24-hr rainfall, P2            in      0.000
    Land slope, s                       ft/ft    0.0000
                         0.8
           .007 * (n*L)
    T =   --------------                hrs       0.00            =  0.00
              0.5    0.4
            P2    *  s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                       ft        0.0
    Watercourse slope, s                ft/ft    0.0000

                          0.5
    Avg.V =   Csf *   (s)               ft/s     0.0000
    where:    Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

    T = L / (3600*V)                    hrs       0.00            =  0.00


CHANNEL FLOW
    Segment ID                                  DITCH     PIPE
    Cross Sectional Flow Area, a       sq.ft     8.00      3.20
    Wetted perimeter, Pw                 ft     12.00      6.00
    Hydraulic radius, r = a/Pw           ft     0.667     0.533
    Channel slope, s                   ft/ft   0.0035    0.0025
    Manning's roughness coeff., n              0.0400    0.0130

                    2/3     1/2
          1.49  *  r    *  s
    V =  --------------------          ft/s    1.6818    3.7689
                   n

    Flow length, L                      ft       1000       600

    T = L / (3600*V)                    hrs      0.17  +   0.04   =  0.21

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                                         TOTAL TIME (hrs)         0.21
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:51:47 07-19-2001

NEVADA NORTHWEST
AREA 7

RUNOFF CURVE NUMBER DATA

::

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
90% AG	65.40	71	
10% EXISTING DEVELOPMENT	7.30	83	
COMPOSITE AREA --->	72.70	72.2	(72)

::

```
Quick TR-55 Ver.5.46   S/N:
Executed: 21:14:43   07-19-2001    3968.TCT

                    NEVADA NORTHWEST
                       SUBAREA 8


              Tc COMPUTATIONS FOR: 80% AG

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                    OVERLAD
     Surface description                        PASTURE
     Manning's roughness coeff., n                  0.2400
     Flow length, L (total < or = 300)     ft      100.0
     Two-yr 24-hr rainfall, P2              in      1.600
     Land slope, s                        ft/ft    0.0040
                          0.8
          .007 * (n*L)
     T =  --------------                  hrs      0.64          =  0.64
             0.5     0.4
           P2    *  s

SHALLOW CONCENTRATED FLOW
     Segment ID                                    FURROW
     Surface (paved or unpaved)?                   Unpaved
     Flow length, L                        ft      1200.0
     Watercourse slope, s                 ft/ft    0.0040

                             0.5
     Avg.V =   Csf *   (s)                ft/s     1.0204
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                     hrs      0.33          =  0.33


CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a        sq.ft     0.00
     Wetted perimeter, Pw                  ft      0.00
     Hydraulic radius, r = a/Pw            ft      0.000
     Channel slope, s                    ft/ft     0.0000
     Manning's roughness coeff., n                 0.0000

                     2/3     1/2
          1.49   *  r    *  s
     V = --------------------             ft/s     0.0000
                    n

     Flow length, L                        ft         0

     T = L / (3600*V)                     hrs      0.00          =  0.00
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                         TOTAL TIME (hrs)          0.97
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:59:14 07-19-2001

NEVADA NORTHWEST
AREA 8

RUNOFF CURVE NUMBER DATA

::

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
80% AG	48.00	71	
20% EXISTING DEVELOPMENT	12.00	83	
COMPOSITE AREA --->	60.00	73.4	(73)

::

```
Quick TR-55 Ver.5.46   S/N:
xecuted: 21:15:45   07-19-2001    3969.TCT

                         NEVADA NORTHWEST
                            SUBAREA 9


                 Tc COMPUTATIONS FOR: 100% AG

SHEET FLOW (Applicable to Tc only)
    Segment ID                                    OVERLAD
    Surface description                        PASTURE
    Manning's roughness coeff., n                 0.2400
    Flow length, L (total < or = 300)    ft       100.0
    Two-yr 24-hr rainfall, P2            in       1.600
    Land slope, s                        ft/ft    0.0040
                      0.8
         .007 * (n*L)
    T =  --------------                  hrs      0.64          =  0.64
             0.5    0.4
          P2    *  s

SHALLOW CONCENTRATED FLOW
    Segment ID                                    FURROW
    Surface (paved or unpaved)?                   Unpaved
    Flow length, L                       ft       1600.0
    Watercourse slope, s                 ft/ft    0.0040

                            0.5
    Avg.V =  Csf *   (s)                 ft/s     1.0204
    where:   Unpaved Csf  = 16.1345
             Paved   Csf  = 20.3282

    T = L / (3600*V)                     hrs      0.44          =  0.44


CHANNEL FLOW
    Segment ID
    Cross Sectional Flow Area, a         sq.ft    0.00
    Wetted perimeter, Pw                 ft       0.00
    Hydraulic radius, r = a/Pw           ft       0.000
    Channel slope, s                     ft/ft    0.0000
    Manning's roughness coeff., n                 0.0000

                  2/3     1/2
        1.49  *  r    *  s
    V = --------------------             ft/s     0.0000
                 n

    Flow length, L                       ft           0

    T = L / (3600*V)                     hrs      0.00          =  0.00

:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                          TOTAL TIME (hrs)       1.08
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:57:09 07-19-2001

NEVADA NORTHWEST
AREA 9

RUNOFF CURVE NUMBER DATA

::

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
100% AG	76.00	71	
00% EXISTING DEVELOPMENT	0.00	83	
COMPOSITE AREA --->	76.00	71.0	(71)

::

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:47:15
Watershed file: --> 3962 .WSD
Hydrograph file: --> 3962 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
AREA 2	89.00	71.0	1.25	1.50	1.68	0.15	.49	.50
AREA 3	78.40	72.0	1.25	0.75	1.68	0.17	.46	.50
AREA 4	49.70	83.0	0.75	2.50	1.68	0.49	.24	.30
AREA 5	145.90	81.0	1.50	2.00	1.68	0.41	.28	.30
AREA 6	213.70	81.0	1.50	0.75	1.68	0.41	.28	.30
AREA 7	72.70	72.0	1.00	0.30	1.68	0.17	.46	.50
APEA 8	60.00	73.0	1.00	0.00	1.68	0.19	.44	.50
[illegible] 9	76.00	71.0	1.00	0.00	1.68	0.15	.49	.50

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 785.40 acres or 1.2272 sq.mi
Peak discharge = 45 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
AREA 2	1.24	1.55	1.25	1.50	No	--
AREA 3	1.18	0.73	1.25	0.75	No	--
AREA 4	0.64	2.59	0.75	2.50	No	--
AREA 5	1.57	1.95	1.50	2.00	No	--
AREA 6	1.55	0.79	1.50	0.75	No	--
AREA 7	1.08	0.21	1.00	0.30	No	--
AREA 8	0.97	0.00	1.00	0.00	No	--
AREA 9	1.08	0.00	1.00	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:47:15
Watershed file: --> 3962 .WSD
Hydrograph file: --> 3962 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
AREA 2	3	15.0
AREA 3	3	13.8
AREA 4	8	15.5
AREA 5	17	15.5
AREA 6	27	14.0
AREA 7	3	13.2
AREA 8	3	13.0
AREA 9	3	13.0
Composite Watershed	45	15.0

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:47:15
Watershed file: --> 3962 .WSD
Hydrograph file: --> 3962 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
AREA 2	0	0	0	0	0	0	0	0	0
AREA 3	0	0	0	0	0	0	0	0	0
AREA 4	0	0	0	0	0	0	0	0	0
AREA 5	0	0	0	0	0	0	0	0	0
AREA 6	0	0	0	0	0	0	0	0	0
AREA 7	0	0	0	0	0	0	0	0	0
AREA 8	0	0	0	0	0	0	0	0	0
AREA 9	0	0	0	0	0	0	0	0	0
Total (cfs)	0	0	0	0	0	0	0	0	0

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
AREA 2	0	0	0	0	0	0	0	0	1
AREA 3	0	0	0	0	0	1	1	2	3
AREA 4	0	0	0	0	0	0	0	0	0
AREA 5	0	0	0	0	0	0	0	0	0
AREA 6	0	0	1	1	4	9	16	22	26
AREA 7	0	0	1	1	2	3	3	3	2
AREA 8	1	1	2	2	3	3	2	2	2
AREA 9	1	1	2	2	3	3	2	2	2
Total (cfs)	2	2	6	6	12	19	24	31	36

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:47:15
Watershed file: --> 3962 .WSD
Hydrograph file: --> 3962 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
AREA 2	1	2	2	3	2	2	2	1	1
AREA 3	3	3	2	2	2	1	1	1	1
AREA 4	0	1	4	7	8	5	3	2	2
AREA 5	1	4	9	15	17	13	9	7	5
AREA 6	27	25	20	15	11	8	7	6	5
AREA 7	2	2	2	1	1	1	1	1	1
AREA 8	2	2	1	1	1	1	1	1	1
AREA 9	2	2	1	1	1	1	1	1	1
Total (cfs)	38	41	41	45	43	32	25	20	17

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
AREA 2	1	1	1	1	0
AREA 3	1	1	1	1	0
AREA 4	2	1	1	1	1
AREA 5	5	4	3	2	2
AREA 6	5	4	4	3	1
AREA 7	1	1	1	1	0
AREA 8	1	1	1	0	0
AREA 9	1	1	1	0	0
Total (cfs)	17	14	13	9	4

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:47:15
Watershed file: --> 3962 .WSD
Hydrograph file: --> 3962 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	0	14.8	43
11.1	0	14.9	44
11.2	0	15.0	45
11.3	0	15.1	45
11.4	0	15.2	44
11.5	0	15.3	44
11.6	0	15.4	43
11.7	0	15.5	43
11.8	0	15.6	41
11.9	0	15.7	39
12.0	0	15.8	36
12.1	0	15.9	34
12.2	0	16.0	32
12.3	0	16.1	31
12.4	0	16.2	29
12.5	2	16.3	28
12.6	2	16.4	26
12.7	6	16.5	25
12.8	6	16.6	24
12.9	9	16.7	23
13.0	12	16.8	22
13.1	16	16.9	21
13.2	19	17.0	20
13.3	22	17.1	19
13.4	24	17.2	19
13.5	27	17.3	18
13.6	31	17.4	18
13.7	34	17.5	17
13.8	36	17.6	17
13.9	37	17.7	17
14.0	38	17.8	17
14.1	39	17.9	17
14.2	40	18.0	17
14.3	41	18.1	17
14.4	41	18.2	16
14.5	41	18.3	16
14.6	41	18.4	16

14.7	42	18.5	16

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:47:15
Watershed file: --> 3962 .WSD
Hydrograph file: --> 3962 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
18.6	15	22.4	8
18.7	15	22.5	8
18.8	15	22.6	8
18.9	14	22.7	8
19.0	14	22.8	8
19.1	14	22.9	8
19.2	14	23.0	8
19.3	14	23.1	8
19.4	14	23.2	8
19.5	14	23.3	7
19.6	13	23.4	7
19.7	13	23.5	7
19.8	13	23.6	7
19.9	13	23.7	7
20.0	13	23.8	7
20.1	13	23.9	7
20.2	13	24.0	6
20.3	12	24.1	6
20.4	12	24.2	6
20.5	12	24.3	6
20.6	12	24.4	6
20.7	12	24.5	6
20.8	11	24.6	6
20.9	11	24.7	6
21.0	11	24.8	6
21.1	11	24.9	5
21.2	11	25.0	5
21.3	10	25.1	5
21.4	10	25.2	5
21.5	10	25.3	5
21.6	10	25.4	5
21.7	10	25.5	5
21.8	9	25.6	4
21.9	9	25.7	4
22.0	9	25.8	4
22.1	9	25.9	4
22.2	9		
22.3	9		

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:51:42
Watershed file: --> 39625 .WSD
Hydrograph file: --> 39625 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
AREA 2	89.00	71.0	1.25	1.50	2.60	0.54	.31	.30
AREA 3	78.40	72.0	1.25	0.75	2.60	0.58	.3	.30
AREA 4	49.70	83.0	0.75	2.50	2.60	1.13	.16	.10
AREA 5	145.90	81.0	1.50	2.00	2.60	1.01	.18	.10
AREA 6	213.70	81.0	1.50	0.75	2.60	1.01	.18	.10
AREA 7	72.70	72.0	1.00	0.30	2.60	0.58	.3	.30
AREA 8	60.00	73.0	1.00	0.00	2.60	0.62	.28	.30
9	76.00	71.0	1.00	0.00	2.60	0.54	.31	.30

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 785.40 acres or 1.2272 sq.mi
Peak discharge = 142 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
AREA 2	1.24	1.55	1.25	1.50	No	--
AREA 3	1.18	0.73	1.25	0.75	No	--
AREA 4	0.64	2.59	0.75	2.50	No	--
AREA 5	1.57	1.95	1.50	2.00	No	--
AREA 6	1.55	0.79	1.50	0.75	No	--
AREA 7	1.08	0.21	1.00	0.30	No	--
AREA 8	0.97	0.00	1.00	0.00	No	--
AREA 9	1.08	0.00	1.00	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:51:42
Watershed file: --> 39625 .WSD
Hydrograph file: --> 39625 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
AREA 2	15	14.6
AREA 3	15	13.6
AREA 4	23	15.0
AREA 5	50	15.0
AREA 6	81	13.8
AREA 7	17	13.2
AREA 8	17	13.0
AREA 9	19	13.0
Composite Watershed	142	14.6

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:51:42
Watershed file: --> 39625 .WSD
Hydrograph file: --> 39625 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
AREA 2	0	0	0	0	0	0	0	0	0
AREA 3	0	0	0	0	0	0	0	0	0
AREA 4	0	0	0	0	0	0	0	1	1
AREA 5	0	0	1	1	1	1	1	1	1
AREA 6	2	2	3	4	4	4	5	5	6
AREA 7	0	0	0	0	0	0	0	0	1
AREA 8	0	0	0	0	0	0	1	2	5
AREA 9	0	0	0	0	0	0	1	3	5
Total (cfs)	2	2	4	5	5	5	8	12	19

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
AREA 2	0	0	0	0	0	0	1	2	5
AREA 3	0	0	0	1	3	7	12	15	15
AREA 4	1	1	1	1	1	1	1	1	2
AREA 5	2	2	2	2	2	3	4	5	8
AREA 6	7	8	11	14	26	42	60	75	81
AREA 7	3	5	8	11	16	17	15	13	10
AREA 8	8	11	14	16	17	13	10	8	7
AREA 9	9	13	16	17	19	15	11	9	8
Total (cfs)	30	40	52	62	84	98	114	128	136

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:51:42
Watershed file: --> 39625 .WSD
Hydrograph file: --> 39625 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
AREA 2	9	14	15	13	9	6	5	4	3
AREA 3	15	12	9	7	5	4	3	3	3
AREA 4	3	8	15	23	19	11	6	4	3
AREA 5	13	25	40	50	43	29	19	13	10
AREA 6	79	65	50	34	23	16	13	11	9
AREA 7	8	6	5	4	3	3	3	2	2
AREA 8	6	5	4	3	3	2	2	2	2
AREA 9	6	5	4	4	3	3	2	2	2
Total (cfs)	139	140	142	138	108	74	53	41	34

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
AREA 2	3	2	2	2	1
AREA 3	2	2	2	1	0
AREA 4	3	2	2	1	1
AREA 5	8	6	5	4	3
AREA 6	8	7	6	4	2
AREA 7	2	2	2	1	0
AREA 8	2	2	1	1	0
AREA 9	2	2	1	1	0
Total (cfs)	30	25	21	15	7

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:51:42
Watershed file: --> 39625 .WSD
Hydrograph file: --> 39625 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	2	14.8	140
11.1	2	14.9	139
11.2	2	15.0	138
11.3	2	15.1	132
11.4	3	15.2	126
11.5	3	15.3	120
11.6	4	15.4	114
11.7	4	15.5	108
11.8	5	15.6	101
11.9	5	15.7	94
12.0	5	15.8	88
12.1	5	15.9	81
12.2	8	16.0	74
12.3	12	16.1	70
12.4	19	16.2	66
12.5	30	16.3	61
12.6	40	16.4	57
12.7	52	16.5	53
12.8	62	16.6	51
12.9	73	16.7	48
13.0	84	16.8	46
13.1	91	16.9	43
13.2	98	17.0	41
13.3	106	17.1	40
13.4	114	17.2	38
13.5	121	17.3	37
13.6	128	17.4	35
13.7	132	17.5	34
13.8	136	17.6	33
13.9	138	17.7	32
14.0	139	17.8	32
14.1	139	17.9	31
14.2	140	18.0	30
14.3	140	18.1	30
14.4	141	18.2	29
14.5	141	18.3	28
14.6	142	18.4	28

14.7	141	18.5	28

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:51:42
Watershed file: --> 39625 .WSD
Hydrograph file: --> 39625 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)
18.6	27
18.7	26
18.8	26
18.9	26
19.0	25
19.1	25
19.2	24
19.3	24
19.4	23
19.5	23
19.6	23
19.7	22
19.8	22
19.9	21
20.0	21
20.1	21
20.2	20
20.3	20
20.4	20
20.5	20
20.6	19
20.7	19
20.8	19
20.9	18
21.0	18
21.1	18
21.2	17
21.3	17
21.4	17
21.5	16
21.6	16
21.7	16
21.8	16
21.9	15
22.0	15
22.1	15
22.2	15
22.3	14

Time (hrs)	Flow (cfs)
22.4	14
22.5	14
22.6	14
22.7	14
22.8	13
22.9	13
23.0	13
23.1	13
23.2	13
23.3	12
23.4	12
23.5	12
23.6	12
23.7	12
23.8	11
23.9	11
24.0	11
24.1	11
24.2	11
24.3	10
24.4	10
24.5	10
24.6	10
24.7	10
24.8	9
24.9	9
25.0	9
25.1	9
25.2	9
25.3	8
25.4	8
25.5	8
25.6	8
25.7	8
25.8	7
25.9	7

Quick TR-55 Version: 5.46 S/N:

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:53:20
Watershed file: --> 39650 .WSD
Hydrograph file: --> 39650 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 50- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input	Ia/p used
AREA 2	89.00	71.0	1.25	1.50	3.12	0.83	.26	.30
AREA 3	78.40	72.0	1.25	0.75	3.12	0.88	.25	.30
AREA 4	49.70	83.0	0.75	2.50	3.12	1.54	.13	.10
AREA 5	145.90	81.0	1.50	2.00	3.12	1.41	.15	.10
AREA 6	213.70	81.0	1.50	0.75	3.12	1.41	.15	.10
AREA 7	72.70	72.0	1.00	0.30	3.12	0.88	.25	.30
AREA 8	60.00	73.0	1.00	0.00	3.12	0.93	.24	.30
[illegible] 9	76.00	71.0	1.00	0.00	3.12	0.83	.26	.30

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 785.40 acres or 1.2272 sq.mi
Peak discharge = 203 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
AREA 2	1.24	1.55	1.25	1.50	No	--
AREA 3	1.18	0.73	1.25	0.75	No	--
AREA 4	0.64	2.59	0.75	2.50	No	--
AREA 5	1.57	1.95	1.50	2.00	No	--
AREA 6	1.55	0.79	1.50	0.75	No	--
AREA 7	1.08	0.21	1.00	0.30	No	--
AREA 8	0.97	0.00	1.00	0.00	No	--
AREA 9	1.08	0.00	1.00	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:53:20
Watershed file: --> 39650 .WSD
Hydrograph file: --> 39650 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 50- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
AREA 2	23	14.6
AREA 3	24	13.8
AREA 4	31	15.0
AREA 5	70	15.0
AREA 6	113	13.8
AREA 7	26	13.2
AREA 8	25	13.0
AREA 9	29	13.0
Composite Watershed	203	14.6

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:53:20
Watershed file: --> 39650 .WSD
Hydrograph file: --> 39650 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 50- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
AREA 2	0	0	0	0	0	0	0	0	0
AREA 3	0	0	0	0	0	0	0	0	0
AREA 4	0	0	0	0	0	1	1	1	1
AREA 5	0	1	1	1	1	2	2	2	2
AREA 6	2	3	4	5	6	6	7	8	8
AR 7	0	0	0	0	0	0	0	1	2
8	0	0	0	0	0	0	1	4	7
A 9	0	0	0	0	0	0	2	4	8
Total (cfs)	2	4	5	6	7	9	13	20	28

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
AREA 2	0	0	0	0	0	0	1	4	8
AREA 3	0	0	1	2	5	11	18	22	24
AREA 4	1	1	1	1	1	1	2	2	3
AREA 5	2	2	3	3	3	4	5	7	11
AREA 6	10	12	15	20	36	59	84	105	113
AREA 7	4	7	12	17	25	26	23	19	15
AREA 8	12	17	21	24	25	20	16	12	10
AREA 9	14	19	24	27	29	22	18	14	12
Total (cfs)	43	58	77	94	124	143	167	185	196

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:53:20
Watershed file: --> 39650 .WSD
Hydrograph file: --> 39650 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 50- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
AREA 2	14	21	23	20	14	9	7	6	5
AREA 3	22	18	14	10	7	6	5	4	4
AREA 4	4	10	20	31	26	15	8	6	4
AREA 5	18	35	55	70	60	41	26	18	14
AREA 6	110	91	70	48	32	23	18	15	13
AREA 7	12	10	8	6	5	4	4	4	3
AR 8	9	7	6	5	4	4	3	3	3
9	10	8	7	5	5	4	4	3	3
Total (cfs)	199	200	203	195	153	106	75	59	49

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
AREA 2	5	4	3	3	2
AREA 3	4	3	3	2	1
AREA 4	4	3	2	2	1
AREA 5	11	8	7	5	4
AREA 6	11	9	8	6	2
AREA 7	3	3	2	2	0
AREA 8	3	2	2	2	0
AREA 9	3	3	2	2	0
Total (cfs)	44	35	29	24	10

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:53:20
Watershed file: --> 39650 .WSD
Hydrograph file: --> 39650 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 50- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	2	14.8	199
11.1	3	14.9	197
11.2	3	15.0	195
11.3	4	15.1	187
11.4	4	15.2	178
11.5	5	15.3	170
11.6	5	15.4	161
11.7	5	15.5	153
11.8	6	15.6	144
11.9	6	15.7	134
12.0	7	15.8	125
12.1	9	15.9	115
12.2	13	16.0	106
12.3	20	16.1	100
12.4	28	16.2	94
12.5	43	16.3	87
12.6	58	16.4	81
12.7	77	16.5	75
12.8	94	16.6	72
12.9	109	16.7	69
13.0	124	16.8	65
13.1	134	16.9	62
13.2	143	17.0	59
13.3	155	17.1	57
13.4	167	17.2	55
13.5	176	17.3	53
13.6	185	17.4	51
13.7	190	17.5	49
13.8	196	17.6	48
13.9	198	17.7	47
14.0	199	17.8	46
14.1	199	17.9	45
14.2	200	18.0	44
14.3	200	18.1	43
14.4	201	18.2	42
14.5	202	18.3	41
14.6	203	18.4	40

14.7	201	18.5	40

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:53:20
Watershed file: --> 39650 .WSD
Hydrograph file: --> 39650 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 50- YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
18.6	39	22.4	23
18.7	38	22.5	22
18.8	37	22.6	22
18.9	36	22.7	22
19.0	35	22.8	21
19.1	34	22.9	21
19.2	34	23.0	20
19.3	33	23.1	20
19.4	33	23.2	20
19.5	32	23.3	19
19.6	31	23.4	19
19.7	31	23.5	19
19.8	30	23.6	18
19.9	30	23.7	18
20.0	29	23.8	18
20.1	29	23.9	17
20.2	28	24.0	17
20.3	28	24.1	17
20.4	28	24.2	16
20.5	28	24.3	16
20.6	28	24.4	16
20.7	27	24.5	15
20.8	27	24.6	15
20.9	27	24.7	15
21.0	26	24.8	14
21.1	26	24.9	14
21.2	26	25.0	14
21.3	26	25.1	13
21.4	26	25.2	13
21.5	25	25.3	12
21.6	25	25.4	12
21.7	25	25.5	12
21.8	24	25.6	11
21.9	24	25.7	11
22.0	24	25.8	11
22.1	24	25.9	10
22.2	23		
22.3	23		

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:54:56
Watershed file: --> 396100 .WSD
Hydrograph file: --> 396100 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 100 YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input	Ia/p used
AREA 2	89.00	71.0	1.25	1.50	3.60	1.13	.23	.30
AREA 3	78.40	72.0	1.25	0.75	3.60	1.19	.22	.30
AREA 4	49.70	83.0	0.75	2.50	3.60	1.94	.11	.10
AREA 5	145.90	81.0	1.50	2.00	3.60	1.79	.13	.10
AREA 6	213.70	81.0	1.50	0.75	3.60	1.79	.13	.10
AREA 7	72.70	72.0	1.00	0.30	3.60	1.19	.22	.30
A . 8	60.00	73.0	1.00	0.00	3.60	1.25	.21	.30
.A 9	76.00	71.0	1.00	0.00	3.60	1.13	.23	.30

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 785.40 acres or 1.2272 sq.mi
Peak discharge = 263 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
AREA 2	1.24	1.55	1.25	1.50	No	--
AREA 3	1.18	0.73	1.25	0.75	No	--
AREA 4	0.64	2.59	0.75	2.50	No	--
AREA 5	1.57	1.95	1.50	2.00	No	--
AREA 6	1.55	0.79	1.50	0.75	No	--
AREA 7	1.08	0.21	1.00	0.30	No	--
AREA 8	0.97	0.00	1.00	0.00	No	--
AREA 9	1.08	0.00	1.00	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:54:56
Watershed file: --> 396100 .WSD
Hydrograph file: --> 396100 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 100 YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
AREA 2	32	14.6
AREA 3	32	13.8
AREA 4	39	15.0
AREA 5	89	15.0
AREA 6	143	13.8
AREA 7	36	13.2
AREA 8	34	13.0
AREA 9	39	13.0
Composite Watershed	263	14.6

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:54:56
Watershed file: --> 396100 .WSD
Hydrograph file: --> 396100 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 100 YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
AREA 2	0	0	0	0	0	0	0	0	0
AREA 3	0	0	0	0	0	0	0	0	0
AREA 4	0	0	0	1	1	1	1	1	1
AREA 5	0	1	1	2	2	2	2	2	2
AREA 6	3	4	5	7	7	8	8	10	11
AREA 7	0	0	0	0	0	0	0	1	2
AREA 8	0	0	0	0	0	0	2	5	10
AREA 9	0	0	0	0	0	1	2	6	11
Total (cfs)	3	5	6	10	10	12	15	25	37

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
AREA 2	0	0	0	0	0	0	2	5	11
AREA 3	0	0	1	2	7	15	24	30	32
AREA 4	1	1	1	1	2	2	2	3	4
AREA 5	3	3	3	4	4	5	7	9	14
AREA 6	13	15	19	25	45	75	107	133	143
AREA 7	6	10	16	23	33	36	32	26	21
AREA 8	16	23	28	32	34	27	21	17	14
AREA 9	18	26	33	36	39	30	24	19	16
Total (cfs)	57	78	101	123	164	190	219	242	255

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:54:56
Watershed file: --> 396100 .WSD
Hydrograph file: --> 396100 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 100 YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
AREA 2	19	29	32	27	18	13	10	8	7
AREA 3	30	24	19	14	10	8	7	6	5
AREA 4	6	13	26	39	33	19	11	7	5
AREA 5	23	45	70	89	76	51	33	23	18
AREA 6	139	115	88	61	40	29	23	19	16
AREA 7	17	13	11	8	7	6	5	5	4
AREA 8	11	9	8	6	6	5	4	4	4
AREA 9	13	11	9	7	6	6	5	5	4
Total (cfs)	258	259	263	251	196	137	98	77	63

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
AREA 2	6	5	5	3	2
AREA 3	5	4	4	3	1
AREA 4	5	4	3	2	2
AREA 5	14	10	9	7	4
AREA 6	14	12	11	8	3
AREA 7	4	4	3	3	0
AREA 8	4	3	3	2	0
AREA 9	4	4	3	3	0
Total (cfs)	56	46	41	31	12

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:54:56
Watershed file: --> 396100 .WSD
Hydrograph file: --> 396100 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 100 YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	3	14.8	257

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 22:54:56
Watershed file: --> 396100 .WSD
Hydrograph file: --> 396100 .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 100 YEAR STORM
BEFORE PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
18.6	50	22.4	29
18.7	49	22.5	29
18.8	48	22.6	28
18.9	47	22.7	28
19.0	46	22.8	27
19.1	46	22.9	27
19.2	45	23.0	26
19.3	44	23.1	26
19.4	44	23.2	25
19.5	44	23.3	25
19.6	43	23.4	24
19.7	42	23.5	24
19.8	42	23.6	23
19.9	42	23.7	23
20.0	41	23.8	22
20.1	40	23.9	22
20.2	40	24.0	22
20.3	40	24.1	21
20.4	39	24.2	21
20.5	38	24.3	20
20.6	38	24.4	20
20.7	38	24.5	19
20.8	37	24.6	19
20.9	36	24.7	18
21.0	36	24.8	18
21.1	36	24.9	17
21.2	35	25.0	17
21.3	34	25.1	16
21.4	34	25.2	16
21.5	34	25.3	15
21.6	33	25.4	15
21.7	32	25.5	14
21.8	32	25.6	14
21.9	32	25.7	13
22.0	31	25.8	13
22.1	31	25.9	12
22.2	30		
22.3	30		

POND-2 Version: 5.21 S/N:

Executed 07-19-2001 23:34:09

Before Project

Data directory: *.HYD

File Summary for Composite Hydrograph

Travel Time from Pond

Time (hrs)	39612 (cfs)	3962 (cfs)	3962OFF (Total)
0.00	0.0	0.0	0.0
0.50	0.0	0.0	0.0
1.00	0.0	0.0	0.0
1.50	0.0	0.0	0.0
2.00	0.0	0.0	0.0
2.50	0.0	0.0	0.0
3.00	0.0	0.0	0.0
3.50	0.1	0.0	0.1
4.00	0.2	0.0	0.2
4.50	0.4	0.0	0.4
5.00	0.6	0.0	0.6
5.50	0.7	0.0	0.7
6.00	0.8	0.0	0.8
6.50	0.9	0.0	0.9
7.00	1.0	0.0	1.0
7.50	1.1	0.0	1.1
8.00	1.1	0.0	1.1
8.50	1.2	0.0	1.2
9.00	1.2	0.0	1.2
9.50	1.3	0.0	1.3
10.00	1.3	0.0	1.3
10.50	1.3	0.0	1.3
11.00	1.4	0.0	1.4
11.50	1.4	0.0	1.4
12.00	1.4	0.0	1.4
12.50	1.4	2.0	3.4
13.00	1.5	12.0	13.5
13.50	1.5	27.0	28.5
14.00	1.6	38.0	39.6
14.50	1.8	41.0	42.8
15.00	2.9	45.0	47.9
15.50	25.7	43.0	68.7
16.00	33.8	32.0	65.8
16.50	34.7	25.0	59.7
17.00	33.0	20.0	53.0
17.50	30.3	17.0	47.3
18.00	27.3	17.0	44.3
18.50	22.5	16.0	38.5
19.00	15.6	14.0	29.6
19.50	10.1	14.0	24.1

discharge all other areas

discharge from Chichester Pond

Executed 07-19-2001 23:34:09

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	39612 (cfs)	3962 (cfs)	3962OFF (Total)
20.00	8.4	13.0	21.4
20.50	7.8	12.0	19.8
21.00	7.3	11.0	18.3
21.50	7.0	10.0	17.0
22.00	6.6	9.0	15.6
22.50	6.3	8.0	14.3
23.00	6.0	8.0	14.0
23.50	5.6	7.0	12.6
24.00	5.4	6.0	11.4
24.50	5.2	6.0	11.2
25.00	5.2	5.0	10.1
25.50	5.1	5.0	10.1
26.00	5.0	Missing	5.0
26.50	4.9	Missing	4.9
27.00	4.9	Missing	4.9
27.50	4.4	Missing	4.4
28.00	3.0	Missing	3.0
28.50	3.0	Missing	3.0
29.00	3.0	Missing	3.0
29.50	2.9	Missing	2.9
30.00	2.9	Missing	2.9
30.50	2.9	Missing	2.9
31.00	2.7	Missing	2.7
31.50	2.5	Missing	2.5
32.00	2.4	Missing	2.4
32.50	2.2	Missing	2.2
33.00	2.1	Missing	2.1
33.50	1.9	Missing	1.9
34.00	1.6	Missing	1.6
34.50	1.4	Missing	1.4
35.00	1.2	Missing	1.2
35.50	1.0	Missing	1.0
36.00	0.9	Missing	0.9
36.50	0.7	Missing	0.7
37.00	0.6	Missing	0.6
37.50	0.6	Missing	0.6
38.00	0.5	Missing	0.5
38.50	0.4	Missing	0.4
39.00	0.3	Missing	0.3
39.50	0.3	Missing	0.3
40.00	0.3	Missing	0.3

Executed 07-19-2001 23:34:09

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	39612 (cfs)	3962 (cfs)	3962OFF (Total)
40.50	0.2	Missing	0.2
41.00	0.2	Missing	0.2
41.50	0.2	Missing	0.2
42.00	0.1	Missing	0.1
42.50	0.1	Missing	0.1
43.00	0.1	Missing	0.1
43.50	0.0	Missing	0.0
44.00	0.0	Missing	0.0
44.50	0.0	Missing	0.0
45.00	0.0	Missing	0.0
45.50	0.0	Missing	0.0
46.00	0.0	Missing	0.0
46.50	0.0	Missing	0.0
47.00	0.0	Missing	0.0
47.50	0.0	Missing	0.0
48.00	0.0	Missing	0.0

```
  uick TR-55 Ver.5.46    S/N:
 ecuted: 21:22:47    07-19-2001     3967A.TCT

                    NEVADA NORTHWEST
                       SUBAREA 7
                     AFTER PROJECT

              Tc COMPUTATIONS FOR: 0% AG

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                     OVERLAD
     Surface description                        LAWN
     Manning's roughness coeff., n                   0.2400
     Flow length, L (total < or = 300)      ft        50.0
     Two-yr 24-hr rainfall, P2              in       1.600
     Land slope, s                       ft/ft      0.0100
                           0.8
          .007 * (n*L)
     T =  --------------                  hrs        0.25          =  0.25
              0.5     0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                     GUTTER
     Surface (paved or unpaved)?                      Paved
     Flow length, L                        ft        500.0
     Watercourse slope, s               ft/ft       0.0040

                             0.5
     Avg.V =   Csf *   (s)                ft/s      1.2857
     where:    Unpaved Csf  = 16.1345
               Paved   Csf  = 20.3282

     T = L / (3600*V)                     hrs        0.11          =  0.11


 CHANNEL FLOW
     Segment ID                                     SD
     Cross Sectional Flow Area, a      sq.ft          3.20
     Wetted perimeter, Pw                 ft          6.50
     Hydraulic radius, r = a/Pw           ft         0.492
     Channel slope, s                  ft/ft        0.0025
     Manning's roughness coeff., n                  0.0130

                       2/3      1/2
          1.49   *   r     *   s
     V =  --------------------            ft/s      3.5730
                     n

     Flow length, L                        ft        1100

     T = L / (3600*V)                     hrs        0.09          =  0.09

 :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                          TOTAL TIME (hrs)          0.45
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Quick TR-55 Ver.5.46   S/N:
Executed: 21:35:16   07-19-2001    3967TTA.TCT

                         NEVADA NORTHWEST
                            SUBAREA 7
                           TRAVEL TIME
                        AFTER DEVELOPMENT

              Tt COMPUTATIONS FOR: TRAVEL TIME

 SHEET FLOW (Applicable to Tc only)
     Segment ID
     Surface description
     Manning's roughness coeff., n               0.0000
     Flow length, L (total < or = 300)    ft        0.0
     Two-yr 24-hr rainfall, P2            in      0.000
     Land slope, s                        ft/ft  0.0000
                      0.8
         .007 * (n*L)
     T = --------------                  hrs       0.00            =  0.00
             0.5    0.4
          P2    *  s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                       ft        0.0
     Watercourse slope, s                 ft/ft  0.0000

                        0.5
     Avg.V =  Csf *  (s)                  ft/s   0.0000
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                     hrs      0.00            =  0.00


 CHANNEL FLOW
     Segment ID                                              PIPE
     Cross Sectional Flow Area, a         sq.ft    0.00      3.20
     Wetted perimeter, Pw                 ft       0.00      6.00
     Hydraulic radius, r = a/Pw           ft      0.000     0.533
     Channel slope, s                     ft/ft  0.0000    0.0025
     Manning's roughness coeff., n               0.0000    0.0130

                    2/3    1/2
         1.49  *  r    *  s
     V = ------------------               ft/s   0.0000    3.7689
                   n

     Flow length, L                       ft          0      1600

     T = L / (3600*V)                     hrs      0.00  +   0.12  =  0.12

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                                          TOTAL TIME (hrs)        0.12
```

Quick TR-55 Ver.5.46   S/N:
Executed: 21:53:08   07-19-2001

NEVADA NORTHWEST
AREA 7
AFTER DEVELOPMENT

RUNOFF CURVE NUMBER DATA

::

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
00% AG	0.00	71	
00% EXISTING DEVELOPMENT	0.00	83	
100% FUTURE DEVELOPMENT	72.70	91	
COMPOSITE AREA --->	72.70	91.0	(91)

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Quick TR-55 Ver.5.46   S/N:
Executed: 21:20:47   07-19-2001    3968A.TCT

                         NEVADA NORTHWEST
                            SUBAREA 8
                          AFTER PROJECT

              Tc COMPUTATIONS FOR: 70%  AG

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                      OVERLAD
     Surface description                         PASTURE
     Manning's roughness coeff., n                    0.2400
     Flow length, L (total < or = 300)      ft       100.0
     Two-yr 24-hr rainfall, P2              in       1.600
     Land slope, s                        ft/ft      0.0040
                         0.8
          .007 * (n*L)
     T =  --------------                    hrs       0.64          =  0.64
              0.5    0.4
            P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID                                      FURROW
     Surface (paved or unpaved)?                       Paved
     Flow length, L                          ft      1200.0
     Watercourse slope, s                  ft/ft     0.0040

                          0.5
     Avg.V =  Csf *  (s)                   ft/s      1.2857
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                       hrs       0.26          =  0.26


 CHANNEL FLOW
     Segment ID
     Cross Sectional Flow Area, a         sq.ft       0.00
     Wetted perimeter, Pw                    ft       0.00
     Hydraulic radius, r = a/Pw              ft      0.000
     Channel slope, s                      ft/ft     0.0000
     Manning's roughness coeff., n                   0.0000

                    2/3     1/2
          1.49  *  r    *  s
     V =  --------------------              ft/s     0.0000
                    n

     Flow length, L                          ft          0

     T = L / (3600*V)                       hrs       0.00          =  0.00

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                              TOTAL TIME (hrs)       0.90
```

Quick TR-55 Ver.5.46 S/N:
Executed: 21:55:10 07-19-2001

NEVADA NORTHWEST
AREA 8
AFTER DEVELOPMENT

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
70% AG	42.00	71	
20% EXISTING DEVELOPMENT	12.00	83	
10 % FUTURE DEVELOPMENT	6.00	91	
COMPOSITE AREA --->	60.00	75.4	(75)

ick TR-55 Ver.5.46 S/N:
xecuted: 21:18:48 07-19-2001 3969A.TCT

NEVADA NORTHWEST
SUBAREA 9
AFTER PROJECT

Tc COMPUTATIONS FOR: 0% AG

SHEET FLOW (Applicable to Tc only)

Segment ID		OVERLAD	
Surface description	LAWN		
Manning's roughness coeff., n		0.2400	
Flow length, L (total < or = 300)	ft	50.0	
Two-yr 24-hr rainfall, P2	in	1.600	
Land slope, s	ft/ft	0.0100	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.25	= 0.25

SHALLOW CONCENTRATED FLOW

Segment ID		GUTTER	
Surface (paved or unpaved)?		Paved	
Flow length, L	ft	500.0	
Watercourse slope, s	ft/ft	0.0040	
Avg.V = $Csf * (s)^{0.5}$	ft/s	1.2857	
where: Unpaved Csf = 16.1345			
Paved Csf = 20.3282			
T = L / (3600*V)	hrs	0.11	= 0.11

CHANNEL FLOW

Segment ID		SD	
Cross Sectional Flow Area, a	sq.ft	3.20	
Wetted perimeter, Pw	ft	6.50	
Hydraulic radius, r = a/Pw	ft	0.492	
Channel slope, s	ft/ft	0.0025	
Manning's roughness coeff., n		0.0130	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	3.5730	
Flow length, L	ft	1000	
T = L / (3600*V)	hrs	0.08	= 0.08

:::

TOTAL TIME (hrs) 0.44

Quick TR-55 Ver.5.46 S/N:
Executed: 21:56:06 07-19-2001

NEVADA NORTHWEST
AREA 9
AFTER DEVELOPMENT

RUNOFF CURVE NUMBER DATA

Composite Area:

SURFACE DESCRIPTION	AREA (acres)	CN	
00% AG	0.00	71	
00% EXISTING DEVELOPMENT	0.00	83	
100% FUTURE DEVELOPMENT	76.00	91	
COMPOSITE AREA --->	76.00	91.0	(91)

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 23:26:39
Watershed file: --> 3962A .WSD
Hydrograph file: --> 3962A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input	Ia/p used
AREA 2	89.00	71.0	1.25	1.50	1.68	0.15	.49	.50
AREA 3	78.40	72.0	1.25	0.75	1.68	0.17	.46	.50
AREA 4	49.70	83.0	0.75	2.50	1.68	0.49	.24	.30
AREA 5	145.90	81.0	1.50	2.00	1.68	0.41	.28	.30
AREA 6	213.70	81.0	1.50	0.75	1.68	0.41	.28	.30
AREA 7	72.70	91.0	0.50	0.10	1.68	0.89	.12	.10
AREA 8	60.00	75.0	1.00	0.00	1.68	0.24	.4	.50
AREA 9	76.00	91.0	0.40	0.00	1.68	0.89	.12	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 785.40 acres or 1.2272 sq.mi
Peak discharge = 110 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
AREA 2	1.24	1.55	1.25	1.50	No	--
AREA 3	1.18	0.73	1.25	0.75	No	--
AREA 4	0.64	2.59	0.75	2.50	No	--
AREA 5	1.57	1.95	1.50	2.00	No	--
AREA 6	1.55	0.79	1.50	0.75	No	--
AREA 7	0.45	0.12	0.50	0.10	No	--
AREA 8	0.97	0.00	1.00	0.00	No	--
AREA 9	0.44	0.00	0.40	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 23:26:39
Watershed file: --> 3962A .WSD
Hydrograph file: --> 3962A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
AREA 2	3	15.0
AREA 3	3	13.8
AREA 4	8	15.5
AREA 5	17	15.5
AREA 6	27	14.0
AREA 7	50	12.5
AREA 8	4	13.0
AREA 9	63	12.3
Composite Watershed	110	12.4

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 23:26:39
Watershed file: --> 3962A .WSD
Hydrograph file: --> 3962A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
AREA 2	0	0	0	0	0	0	0	0	0
AREA 3	0	0	0	0	0	0	0	0	0
AREA 4	0	0	0	0	0	0	0	0	0
AREA 5	0	0	0	0	0	0	0	0	0
AREA 6	0	0	0	0	0	0	0	0	0
AREA 7	2	2	3	5	8	14	25	40	49
AREA 8	0	0	0	0	0	0	0	0	0
AREA 9	2	3	4	8	15	29	49	63	61
Total (cfs)	4	5	7	13	23	43	74	103	110

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
AREA 2	0	0	0	0	0	0	0	0	1
AREA 3	0	0	0	0	0	1	1	2	3
AREA 4	0	0	0	0	0	0	0	0	0
AREA 5	0	0	0	0	0	0	0	0	0
AREA 6	0	0	1	1	4	9	16	22	26
AREA 7	50	44	35	27	16	11	8	7	6
AREA 8	1	2	2	3	4	3	3	3	2
AREA 9	46	31	23	17	11	8	7	6	5
Total (cfs)	97	77	61	48	35	32	35	40	43

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 23:26:39
Watershed file: --> 3962A .WSD
Hydrograph file: --> 3962A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
AREA 2	1	2	2	3	2	2	2	1	1
AREA 3	3	3	2	2	2	1	1	1	1
AREA 4	0	1	4	7	8	5	3	2	2
AREA 5	1	4	9	15	17	13	9	7	5
AREA 6	27	25	20	15	11	8	7	6	5
AREA 7	5	4	4	3	3	3	2	2	2
AREA 8	2	2	2	2	1	1	1	1	1
AREA 9	5	4	4	3	3	3	2	2	2
Total (cfs)	44	45	47	50	47	36	27	22	19

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
AREA 2	1	1	1	1	0
AREA 3	1	1	1	1	0
AREA 4	2	1	1	1	1
AREA 5	5	4	3	2	2
AREA 6	5	4	4	3	1
AREA 7	2	2	1	1	0
AREA 8	1	1	1	1	0
AREA 9	2	2	1	1	0
Total (cfs)	19	16	13	11	4

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 23:26:39
Watershed file: --> 3962A .WSD
Hydrograph file: --> 3962A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	4	14.8	48
11.1	4	14.9	49
11.2	5	15.0	50
11.3	5	15.1	49
11.4	6	15.2	49
11.5	6	15.3	48
11.6	7	15.4	48
11.7	9	15.5	47
11.8	11	15.6	45
11.9	13	15.7	43
12.0	23	15.8	40
12.1	43	15.9	38
12.2	74	16.0	36
12.3	103	16.1	34
12.4	110	16.2	32
12.5	97	16.3	31
12.6	77	16.4	29
12.7	61	16.5	27
12.8	48	16.6	26
12.9	41	16.7	25
13.0	35	16.8	24
13.1	34	16.9	23
13.2	32	17.0	22
13.3	34	17.1	21
13.4	35	17.2	21
13.5	37	17.3	20
13.6	40	17.4	20
13.7	42	17.5	19
13.8	43	17.6	19
13.9	44	17.7	19
14.0	44	17.8	19
14.1	44	17.9	19
14.2	45	18.0	19
14.3	45	18.1	19
14.4	46	18.2	18
14.5	46	18.3	18
14.6	47	18.4	18

14.7	48	18.5	18

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-19-2001 23:26:39
Watershed file: --> 3962A .WSD
Hydrograph file: --> 3962A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 2 - YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
18.6	17	22.4	10
18.7	17	22.5	10
18.8	17	22.6	10
18.9	16	22.7	10
19.0	16	22.8	10
19.1	16	22.9	9
19.2	15	23.0	9
19.3	15	23.1	9
19.4	15	23.2	9
19.5	14	23.3	9
19.6	14	23.4	9
19.7	14	23.5	8
19.8	14	23.6	8
19.9	13	23.7	8
20.0	13	23.8	8
20.1	13	23.9	8
20.2	13	24.0	8
20.3	13	24.1	7
20.4	13	24.2	7
20.5	12	24.3	7
20.6	12	24.4	7
20.7	12	24.5	7
20.8	12	24.6	6
20.9	12	24.7	6
21.0	12	24.8	6
21.1	12	24.9	6
21.2	12	25.0	6
21.3	12	25.1	6
21.4	12	25.2	5
21.5	12	25.3	5
21.6	11	25.4	5
21.7	11	25.5	5
21.8	11	25.6	5
21.9	11	25.7	5
22.0	11	25.8	4
22.1	11	25.9	4
22.2	11		
22.3	10		

Executed 07-19-2001 23:37:18

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	39612 (cfs)	3962A (cfs)	3962AOF (Total)
0.00	0.0	Missing	0.0
0.50	0.0	Missing	0.0
1.00	0.0	Missing	0.0
1.50	0.0	Missing	0.0
2.00	0.0	Missing	0.0
2.50	0.0	Missing	0.0
3.00	0.0	Missing	0.0
3.50	0.1	Missing	0.1
4.00	0.2	Missing	0.2
4.50	0.4	Missing	0.4
5.00	0.6	Missing	0.6
5.50	0.7	Missing	0.7
6.00	0.8	Missing	0.8
6.50	0.9	Missing	0.9
7.00	1.0	Missing	1.0
7.50	1.1	Missing	1.1
8.00	1.1	Missing	1.1
8.50	1.2	Missing	1.2
9.00	1.2	Missing	1.2
9.50	1.3	Missing	1.3
10.00	1.3	Missing	1.3
10.50	1.3	Missing	1.3
11.00	1.4	4.0	5.4
11.50	1.4	6.0	7.4
12.00	1.4	23.0	24.4
12.50	1.4	97.0	~~98.4~~
13.00	1.5	35.0	36.5
13.50	1.5	37.0	38.5
14.00	1.6	44.0	45.6
14.50	1.8	46.0	47.8
15.00	2.9	50.0	52.9
15.50	25.7	47.0	72.7
16.00	33.8	36.0	69.8
16.50	34.7	27.0	61.7
17.00	33.0	22.0	55.0
17.50	30.3	19.0	49.3
18.00	27.3	19.0	46.3
18.50	22.5	18.0	40.5
19.00	15.6	16.0	31.6
19.50	10.1	14.0	24.1

>>>>>>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<
Peaks were missed during interpolation for the following files:
3[illegible] .HYD

Executed 07-19-2001 23:37:18

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	39612 (cfs)	3962A (cfs)	3962AOF (Total)
20.00	8.4	13.0	21.4
20.50	7.8	12.0	19.8
21.00	7.3	12.0	19.3
21.50	7.0	12.0	19.0
22.00	6.6	11.0	17.6
22.50	6.3	10.0	16.3
23.00	6.0	9.0	15.0
23.50	5.6	8.0	13.6
24.00	5.4	8.0	13.4
24.50	5.2	7.0	12.2
25.00	5.2	6.0	11.1
25.50	5.1	5.0	10.1
26.00	5.0	Missing	5.0
26.50	4.9	Missing	4.9
27.00	4.9	Missing	4.9
27.50	4.4	Missing	4.4
28.00	3.0	Missing	3.0
28.50	3.0	Missing	3.0
29.00	3.0	Missing	3.0
29.50	2.9	Missing	2.9
30.00	2.9	Missing	2.9
30.50	2.9	Missing	2.9
31.00	2.7	Missing	2.7
31.50	2.5	Missing	2.5
32.00	2.4	Missing	2.4
32.50	2.2	Missing	2.2
33.00	2.1	Missing	2.1
33.50	1.9	Missing	1.9
34.00	1.6	Missing	1.6
34.50	1.4	Missing	1.4
35.00	1.2	Missing	1.2
35.50	1.0	Missing	1.0
36.00	0.9	Missing	0.9
36.50	0.7	Missing	0.7
37.00	0.6	Missing	0.6
37.50	0.6	Missing	0.6
38.00	0.5	Missing	0.5
38.50	0.4	Missing	0.4
39.00	0.3	Missing	0.3
39.50	0.3	Missing	0.3
40.00	0.3	Missing	0.3

>>[illegible] >>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<
E[illegible]s were missed during interpolation for the following files:
3962A .HYD

Executed 07-19-2001 23:37:18

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	39612 (cfs)	3962A (cfs)	3962AOF (Total)
40.50	0.2	Missing	0.2
41.00	0.2	Missing	0.2
41.50	0.2	Missing	0.2
42.00	0.1	Missing	0.1
42.50	0.1	Missing	0.1
43.00	0.1	Missing	0.1
43.50	0.0	Missing	0.0
44.00	0.0	Missing	0.0
44.50	0.0	Missing	0.0
45.00	0.0	Missing	0.0
45.50	0.0	Missing	0.0
46.00	0.0	Missing	0.0
46.50	0.0	Missing	0.0
47.00	0.0	Missing	0.0
47.50	0.0	Missing	0.0
48.00	0.0	Missing	0.0

>>>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<<

..ks were missed during interpolation for the following files:

3962A .HYD

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-20-2001 00:01:21
Watershed file: --> 39625A .WSD
Hydrograph file: --> 39625A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input	Ia/p used
AREA 2	89.00	71.0	1.25	1.50	2.60	0.54	.31	.30
AREA 3	78.40	72.0	1.25	0.75	2.60	0.58	.3	.30
AREA 4	49.70	83.0	0.75	2.50	2.60	1.13	.16	.10
AREA 5	145.90	81.0	1.50	2.00	2.60	1.01	.18	.10
AREA 6	213.70	81.0	1.50	0.75	2.60	1.01	.18	.10
AREA 7	72.70	91.0	0.50	0.10	2.60	1.70	.08	.10
AREA 8	60.00	75.0	1.00	0.00	2.60	0.71	.26	.30
AREA 9	76.00	91.0	0.40	0.00	2.60	1.70	.08	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 785.40 acres or 1.2272 sq.mi
Peak discharge = 223 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
AREA 2	1.24	1.55	1.25	1.50	No	--
AREA 3	1.18	0.73	1.25	0.75	No	--
AREA 4	0.64	2.59	0.75	2.50	No	--
AREA 5	1.57	1.95	1.50	2.00	No	--
AREA 6	1.55	0.79	1.50	0.75	No	--
AREA 7	0.45	0.12	0.50	0.10	No	Computed Ia/p < .1
AREA 8	0.90	0.00	1.00	0.00	No	--
AREA 9	0.44	0.00	0.40	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-20-2001 00:01:21
Watershed file: --> 39625A .WSD
Hydrograph file: --> 39625A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
AREA 2	15	14.6
AREA 3	15	13.6
AREA 4	23	15.0
AREA 5	50	15.0
AREA 6	81	13.8
AREA 7	96	12.5
AREA 8	19	13.0
AREA 9	120	12.3
Composite Watershed	223	12.4

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-20-2001 00:01:21
Watershed file: --> 39625A .WSD
Hydrograph file: --> 39625A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
AREA 2	0	0	0	0	0	0	0	0	0
AREA 3	0	0	0	0	0	0	0	0	0
AREA 4	0	0	0	0	0	0	0	1	1
AREA 5	0	0	1	1	1	1	1	1	1
AREA 6	2	2	3	4	4	4	5	5	6
AREA 7	3	4	6	10	15	27	49	76	93
AREA 8	0	0	0	0	0	0	1	3	6
AREA 9	4	5	7	16	28	55	94	120	116
Total (cfs)	9	11	17	31	48	87	150	206	223

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
AREA 2	0	0	0	0	0	0	1	2	5
AREA 3	0	0	0	1	3	7	12	15	15
AREA 4	1	1	1	1	1	1	1	1	2
AREA 5	2	2	2	2	2	3	4	5	8
AREA 6	7	8	11	14	26	42	60	75	81
AREA 7	96	84	66	51	31	21	15	13	11
AREA 8	9	13	16	18	19	15	12	10	8
AREA 9	87	60	44	33	21	16	13	11	10
Total (cfs)	202	168	140	120	103	105	118	132	140

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-20-2001 00:01:21
Watershed file: --> 39625A .WSD
Hydrograph file: --> 39625A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Composite Hydrograph Summary (cfs)

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
AREA 2	9	14	15	13	9	6	5	4	3
AREA 3	15	12	9	7	5	4	3	3	3
AREA 4	3	8	15	23	19	11	6	4	3
AREA 5	13	25	40	50	43	29	19	13	10
AREA 6	79	65	50	34	23	16	13	11	9
AREA 7	9	8	7	6	6	5	4	4	4
AREA 8	7	5	4	4	3	3	3	2	2
AREA 9	9	8	7	6	6	5	4	4	4
Total (cfs)	144	145	147	143	114	79	57	45	38

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
AREA 2	3	2	2	2	1
AREA 3	2	2	2	1	0
AREA 4	3	2	2	1	1
AREA 5	8	6	5	4	3
AREA 6	8	7	6	4	2
AREA 7	4	3	3	2	0
AREA 8	2	2	2	1	0
AREA 9	4	3	3	2	0
Total (cfs)	34	27	25	17	7

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-20-2001 00:01:21
Watershed file: --> 39625A .WSD
Hydrograph file: --> 39625A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
11.0	9	14.8	145
11.1	10	14.9	144
11.2	10	15.0	143
11.3	11	15.1	137
11.4	13	15.2	131
11.5	15	15.3	126
11.6	17	15.4	120
11.7	22	15.5	114
11.8	26	15.6	107
11.9	31	15.7	100
12.0	48	15.8	93
12.1	87	15.9	86
12.2	150	16.0	79
12.3	206	16.1	75
12.4	223	16.2	70
12.5	202	16.3	66
12.6	168	16.4	61
12.7	140	16.5	57
12.8	120	16.6	55
12.9	112	16.7	52
13.0	103	16.8	50
13.1	104	16.9	47
13.2	105	17.0	45
13.3	112	17.1	44
13.4	118	17.2	42
13.5	125	17.3	41
13.6	132	17.4	39
13.7	136	17.5	38
13.8	140	17.6	37
13.9	142	17.7	36
14.0	144	17.8	36
14.1	144	17.9	35
14.2	145	18.0	34
14.3	145	18.1	33
14.4	146	18.2	33
14.5	146	18.3	32
14.6	147	18.4	31

14.7	146	18.5	30

TR-55 TABULAR HYDROGRAPH METHOD
Type II Distribution
(24 hr. Duration Storm)

Executed: 07-20-2001 00:01:21
Watershed file: --> 39625A .WSD
Hydrograph file: --> 39625A .HYD

NEVADA NORTHWEST
FLOW AT HWY 395 25- YEAR STORM
AFTER PROJECT
AREAS 2 THROUGH 9

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
18.6	30	22.4	16
18.7	29	22.5	16
18.8	28	22.6	16
18.9	28	22.7	15
19.0	27	22.8	15
19.1	27	22.9	15
19.2	27	23.0	14
19.3	26	23.1	14
19.4	26	23.2	14
19.5	26	23.3	14
19.6	26	23.4	14
19.7	26	23.5	13
19.8	25	23.6	13
19.9	25	23.7	13
20.0	25	23.8	12
20.1	25	23.9	12
20.2	24	24.0	12
20.3	24	24.1	12
20.4	23	24.2	12
20.5	23	24.3	11
20.6	23	24.4	11
20.7	22	24.5	11
20.8	22	24.6	10
20.9	21	24.7	10
21.0	21	24.8	10
21.1	21	24.9	10
21.2	20	25.0	10
21.3	20	25.1	9
21.4	19	25.2	9
21.5	19	25.3	9
21.6	19	25.4	8
21.7	18	25.5	8
21.8	18	25.6	8
21.9	17	25.7	8
22.0	17	25.8	8
22.1	17	25.9	7
22.2	16		
22.3	16		

Executed 07-20-2001 00:04:33

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	396125 (cfs)	39625 (cfs)	39625OF (Total)
0.00	0.0	Missing	0.0
0.50	0.0	Missing	0.0
1.00	0.0	Missing	0.0
1.50	0.0	Missing	0.0
2.00	0.0	Missing	0.0
2.50	0.0	Missing	0.0
3.00	0.0	Missing	0.0
3.50	0.1	Missing	0.1
4.00	0.2	Missing	0.2
4.50	0.4	Missing	0.4
5.00	0.6	Missing	0.6
5.50	0.7	Missing	0.7
6.00	0.8	Missing	0.8
6.50	0.9	Missing	0.9
7.00	1.0	Missing	1.0
7.50	1.1	Missing	1.1
8.00	1.1	Missing	1.1
8.50	1.2	Missing	1.2
9.00	1.2	Missing	1.2
9.50	1.3	Missing	1.3
10.00	1.3	Missing	1.3
10.50	1.4	Missing	1.4
11.00	1.4	2.0	3.4
11.50	1.4	3.0	4.4
12.00	1.5	5.0	6.5
12.50	1.6	30.0	31.6
13.00	1.8	84.0	85.8
13.50	2.2	121.0	123.2
14.00	2.8	139.0	141.8
14.50	3.0	141.0	144.0
15.00	21.6	138.0	159.6
15.50	45.1	108.0	153.1
16.00	50.7	74.0	124.7
16.50	54.0	53.0	106.9
17.00	54.6	41.0	95.6
17.50	53.2	34.0	87.2
18.00	50.6	30.0	80.6
18.50	47.4	28.0	75.4
19.00	42.4	25.0	67.4
19.50	37.4	23.0	60.4

>>>>>>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<

Pe[illegible] were missed during interpolation for the following files:

3[illegible]5 .HYD

Executed 07-20-2001 00:04:33

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	396125 (cfs)	39625 (cfs)	39625OF (Total)
20.00	33.4	21.0	54.4
20.50	30.0	20.0	50.0
21.00	26.5	18.0	44.5
21.50	21.9	16.0	37.9
22.00	15.4	15.0	30.4
22.50	11.2	14.0	25.2
23.00	9.9	13.0	22.9
23.50	9.1	12.0	21.1
24.00	8.7	11.0	19.7
24.50	8.4	10.0	18.4
25.00	8.2	9.0	17.2
25.50	8.1	8.0	16.0
26.00	7.9	Missing	7.9
26.50	7.8	Missing	7.8
27.00	7.7	Missing	7.7
27.50	6.8	Missing	6.8
28.00	4.2	Missing	4.2
28.50	3.0	Missing	3.0
29.00	3.0	Missing	3.0
29.50	3.0	Missing	3.0
30.00	2.9	Missing	2.9
30.50	2.9	Missing	2.9
31.00	2.8	Missing	2.8
31.50	2.6	Missing	2.6
32.00	2.5	Missing	2.5
32.50	2.3	Missing	2.3
33.00	2.2	Missing	2.2
33.50	2.1	Missing	2.1
34.00	2.0	Missing	2.0
34.50	1.9	Missing	1.9
35.00	1.9	Missing	1.9
35.50	1.8	Missing	1.8
36.00	1.8	Missing	1.8
36.50	1.7	Missing	1.7
37.00	1.7	Missing	1.7
37.50	1.7	Missing	1.7
38.00	1.6	Missing	1.6
38.50	1.6	Missing	1.6
39.00	1.6	Missing	1.6
39.50	1.6	Missing	1.6
40.00	1.6	Missing	1.6

>>>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<

were missed during interpolation for the following files:

39625 .HYD

Executed 07-20-2001 00:04:33

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	396125 (cfs)	39625 (cfs)	39625OF (Total)
40.50	1.6	Missing	1.6
41.00	1.5	Missing	1.5
41.50	1.5	Missing	1.5
42.00	1.5	Missing	1.5
42.50	1.5	Missing	1.5
43.00	1.5	Missing	1.5
43.50	1.4	Missing	1.4
44.00	1.2	Missing	1.2
44.50	1.0	Missing	1.0
45.00	0.9	Missing	0.9
45.50	0.7	Missing	0.7
46.00	0.6	Missing	0.6
46.50	0.6	Missing	0.6
47.00	0.5	Missing	0.5
47.50	0.4	Missing	0.4
48.00	0.3	Missing	0.3

>>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<<

ks were missed during interpolation for the following files:

39625 .HYD

POND-2 Version: 5.21 S/N:

Executed 07-20-2001 00:05:39

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	396125 (cfs)	39625A (cfs)	396A250 (Total)
0.00	0.0	Missing	0.0
0.50	0.0	Missing	0.0
1.00	0.0	Missing	0.0
1.50	0.0	Missing	0.0
2.00	0.0	Missing	0.0
2.50	0.0	Missing	0.0
3.00	0.0	Missing	0.0
3.50	0.1	Missing	0.1
4.00	0.2	Missing	0.2
4.50	0.4	Missing	0.4
5.00	0.6	Missing	0.6
5.50	0.7	Missing	0.7
6.00	0.8	Missing	0.8
6.50	0.9	Missing	0.9
7.00	1.0	Missing	1.0
7.50	1.1	Missing	1.1
8.00	1.1	Missing	1.1
8.50	1.2	Missing	1.2
9.00	1.2	Missing	1.2
9.50	1.3	Missing	1.3
10.00	1.3	Missing	1.3
10.50	1.4	Missing	1.4
11.00	1.4	9.0	10.4
11.50	1.4	15.0	16.4
12.00	1.5	48.0	49.5
12.50	1.6	202.0	203.6
13.00	1.8	103.0	104.8
13.50	2.2	125.0	127.2
14.00	2.8	144.0	146.8
14.50	3.0	146.0	149.0
15.00	21.6	143.0	164.6
15.50	45.1	114.0	159.1
16.00	50.7	79.0	129.7
16.50	54.0	57.0	110.9
17.00	54.6	45.0	99.6
17.50	53.2	38.0	91.2
18.00	50.6	34.0	84.6
18.50	47.4	30.0	77.4
19.00	42.4	27.0	69.4
19.50	37.4	26.0	63.4

>>>>>>>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<<

Pe[illegible] were missed during interpolation for the following files:

[illegible]A .HYD

Executed 07-20-2001 00:05:39

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	396125 (cfs)	39625A (cfs)	396A250 (Total)
20.00	33.4	25.0	58.4
20.50	30.0	23.0	53.0
21.00	26.5	21.0	47.5
21.50	21.9	19.0	40.9
22.00	15.4	17.0	32.4
22.50	11.2	16.0	27.2
23.00	9.9	14.0	23.9
23.50	9.1	13.0	22.1
24.00	8.7	12.0	20.7
24.50	8.4	11.0	19.4
25.00	8.2	10.0	18.2
25.50	8.1	8.0	16.0
26.00	7.9	Missing	7.9
26.50	7.8	Missing	7.8
27.00	7.7	Missing	7.7
27.50	6.8	Missing	6.8
28.00	4.2	Missing	4.2
28.50	3.0	Missing	3.0
29.00	3.0	Missing	3.0
29.50	3.0	Missing	3.0
30.00	2.9	Missing	2.9
30.50	2.9	Missing	2.9
31.00	2.8	Missing	2.8
31.50	2.6	Missing	2.6
32.00	2.5	Missing	2.5
32.50	2.3	Missing	2.3
33.00	2.2	Missing	2.2
33.50	2.1	Missing	2.1
34.00	2.0	Missing	2.0
34.50	1.9	Missing	1.9
35.00	1.9	Missing	1.9
35.50	1.8	Missing	1.8
36.00	1.8	Missing	1.8
36.50	1.7	Missing	1.7
37.00	1.7	Missing	1.7
37.50	1.7	Missing	1.7
38.00	1.6	Missing	1.6
38.50	1.6	Missing	1.6
39.00	1.6	Missing	1.6
39.50	1.6	Missing	1.6
40.00	1.6	Missing	1.6

>> >>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<<
[illegible] were missed during interpolation for the following files:
9[illegible]5A .HYD

Executed 07-20-2001 00:05:39

Data directory: *.HYD

File Summary for Composite Hydrograph

Time (hrs)	396125 (cfs)	39625A (cfs)	396A250 (Total)
40.50	1.6	Missing	1.6
41.00	1.5	Missing	1.5
41.50	1.5	Missing	1.5
42.00	1.5	Missing	1.5
42.50	1.5	Missing	1.5
43.00	1.5	Missing	1.5
43.50	1.4	Missing	1.4
44.00	1.2	Missing	1.2
44.50	1.0	Missing	1.0
45.00	0.9	Missing	0.9
45.50	0.7	Missing	0.7
46.00	0.6	Missing	0.6
46.50	0.6	Missing	0.6
47.00	0.5	Missing	0.5
47.50	0.4	Missing	0.4
48.00	0.3	Missing	0.3

>>>>>>>>>>>> SUMMATION WARNING <<<<<<<<<<<<<<<<

..s were missed during interpolation for the following files:

39625A .HYD

Ty... Node: Addition Summary
N ... OUTFALL
File. ... .\sample\27716.PPK
Storm... TypeII 24hr Tag: 2 yr

TOTAL NODE INFLOW...
HYG file =
HYG ID = OUTFALL
HYG Tag = 2 yr

Peak Discharge	=	34.77 cfs
Time to Peak	=	13.4000 hrs
HYG Volume	=	16.501 ac-ft

Discharge from Existing Chichester Estates + Town Ponds From Chichester Estates Drainage Report

note travel time for this flow to reach Hwy 395 is 2.9 Hours

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.00	.02	.03	.05	.06
.5000	.08	.09	.12	.16	.20
1.0000	.24	.27	.31	.35	.38
:000	.41	.45	.48	.51	.54
..0000	.57	.60	.62	.65	.67
2.5000	.70	.72	.75	.77	.79
3.0000	.81	.83	.85	.87	.89
3.5000	.91	.93	.94	.96	.98
4.0000	.99	1.01	1.02	1.04	1.05
4.5000	1.06	1.08	1.09	1.10	1.11
5.0000	1.12	1.14	1.15	1.16	1.17
5.5000	1.18	1.19	1.20	1.21	1.21
6.0000	1.22	1.23	1.24	1.25	1.25
6.5000	1.26	1.27	1.28	1.28	1.29
7.0000	1.30	1.30	1.31	1.32	1.32
7.5000	1.33	1.34	1.34	1.35	1.36
8.0000	1.36	1.37	1.37	1.38	1.38
8.5000	1.39	1.39	1.40	1.40	1.41
9.0000	1.41	1.42	1.43	1.43	1.44
9.5000	1.44	1.45	1.45	1.46	1.46
10.0000	1.47	1.47	1.48	1.48	1.49
10.5000	1.50	1.50	1.52	1.53	1.54
11.0000	1.56	1.59	1.62	1.65	1.70
11.5000	1.75	1.82	1.91	2.07	2.37
12.0000	2.90	2.98	9.55	16.81	22.03
12.5000	25.72	28.43	30.44	31.94	33.02
13.0000	33.80	34.31	34.62	34.76	34.77
13.5000	34.66	34.45	34.17	33.81	33.41
0000	32.96	32.48	31.97	31.44	30.89
5000	30.33	29.77	29.21	28.66	28.05

..e.... .\sample\27716.PPK
Storm... TypeII 24hr Tag: 2 yr

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
15.0000	27.30	26.41	25.45	24.47	23.49
15.5000	22.55	21.64	20.77	19.49	17.60
16.0000	15.62	13.93	12.60	11.55	10.73
16.5000	10.09	9.60	9.21	8.90	8.65
17.0000	8.44	8.27	8.12	7.99	7.87
17.5000	7.77	7.67	7.58	7.50	7.42
18.0000	7.34	7.27	7.19	7.12	7.05
18.5000	6.98	6.91	6.84	6.77	6.70
19.0000	6.63	6.56	6.50	6.43	6.36
19.5000	6.30	6.23	6.16	6.10	6.03
20.0000	5.96	5.89	5.83	5.76	5.69
20.5000	5.63	5.57	5.52	5.47	5.43
21.0000	5.39	5.35	5.32	5.29	5.27
21.5000	5.24	5.22	5.20	5.19	5.17
0000	5.15	5.13	5.12	5.10	5.09
.5000	5.07	5.06	5.04	5.03	5.02
23.0000	5.00	4.99	4.98	4.97	4.95
23.5000	4.94	4.93	4.92	4.91	4.90
24.0000	4.88	4.86	4.82	4.73	4.59
24.5000	4.38	4.13	3.84	3.54	3.25
25.0000	2.98	3.00	2.99	2.99	2.99
25.5000	2.98	2.98	2.98	2.97	2.97
26.0000	2.96	2.96	2.95	2.95	2.95
26.5000	2.94	2.94	2.93	2.93	2.92
27.0000	2.92	2.92	2.91	2.91	2.90
27.5000	2.88	2.84	2.80	2.76	2.72
28.0000	2.68	2.65	2.61	2.58	2.54
28.5000	2.51	2.48	2.45	2.42	2.39
29.0000	2.36	2.33	2.31	2.28	2.26
29.5000	2.23	2.21	2.19	2.17	2.14
30.0000	2.12	2.09	2.04	1.99	1.93
30.5000	1.87	1.81	1.75	1.70	1.64
31.0000	1.59	1.54	1.49	1.45	1.40
31.5000	1.36	1.32	1.28	1.24	1.20
32.0000	1.17	1.13	1.10	1.07	1.03
32.5000	1.00	.97	.94	.92	.89
33.0000	.86	.84	.81	.79	.76
33.5000	.74	.72	.70	.68	.66
34.0000	.64	.62	.60	.58	.56
34.5000	.55	.53	.51	.50	.48
0000	.47	.46	.44	.43	.42
5.5000	.40	.39	.38	.37	.36
6.0000	.35	.34	.33	.32	.31
36.5000	.30	.29	.28	.27	.26

Type.... Node: Addition Summary Page 7.12
Name.... OUTFALL Event: 2 yr
File.... .\sample\27716.PPK
Storm... TypeII 24hr Tag: 2 yr

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
37.0000	.26	.25	.24	.23	.23
37.5000	.22	.21	.21	.20	.19
38.0000	.19	.18	.18	.17	.17
38.5000	.16	.16	.15	.15	.14
39.0000	.14	.14	.13	.13	.12
39.5000	.12	.12	.11	.11	.11
40.0000	.10	.10	.10	.10	.10
40.5000	.10	.09	.09	.09	.09
41.0000	.09	.09	.09	.09	.09
41.5000	.09	.09	.08	.08	.08
42.0000	.08	.08	.08	.08	.08
42.5000	.08	.08	.08	.08	.07
43.0000	.07	.07	.07	.07	.07
43.5000	.07	.07	.07	.07	.07
.0000	.07	.07	.07	.06	.06
.5000	.06	.06	.06	.06	.06
45.0000	.06	.06	.06	.06	.06
45.5000	.06	.06	.06	.06	.05
46.0000	.05	.05	.05	.05	.05
46.5000	.05	.05	.05	.05	.05
47.0000	.05	.05	.05	.05	.05
47.5000	.05	.05	.05	.05	.04
48.0000	.04				

TOTAL NODE INFLOW...
HYG file =
HYG ID = OUTFALL
HYG Tag = 25 yr

Peak Discharge	=	54.63 cfs
Time to Peak	=	13.9000 hrs
HYG Volume	=	32.346 ac-ft

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.00	.02	.03	.05	.06
.5000	.08	.09	.12	.16	.20
1.0000	.24	.27	.31	.35	.38
[illegible].5000	.41	.45	.48	.51	.54
[illegible].0000	.57	.60	.62	.65	.67
2.5000	.70	.72	.75	.77	.79
3.0000	.81	.83	.85	.87	.89
3.5000	.91	.93	.94	.96	.98
4.0000	.99	1.01	1.02	1.04	1.05
4.5000	1.06	1.08	1.09	1.10	1.11
5.0000	1.13	1.14	1.15	1.16	1.17
5.5000	1.18	1.19	1.20	1.21	1.22
6.0000	1.23	1.24	1.25	1.26	1.27
6.5000	1.28	1.29	1.30	1.31	1.31
7.0000	1.32	1.33	1.34	1.35	1.36
7.5000	1.36	1.37	1.38	1.39	1.39
8.0000	1.40	1.41	1.42	1.42	1.43
8.5000	1.44	1.45	1.46	1.48	1.49
9.0000	1.51	1.53	1.55	1.58	1.60
9.5000	1.64	1.67	1.71	1.75	1.79
10.0000	1.84	1.90	1.95	2.02	2.09
10.5000	2.18	2.27	2.37	2.48	2.61
11.0000	2.75	2.90	2.92	2.94	2.97
11.5000	3.00	6.33	9.53	12.92	16.72
12.0000	21.65	27.66	33.54	38.46	42.28
12.5000	45.14	46.33	47.52	48.66	49.73
13.0000	50.70	51.58	52.34	52.98	53.52
13.5000	53.95	54.26	54.48	54.60	54.63
14.0000	54.57	54.44	54.23	53.96	53.63
[illegible]5000	53.24	52.80	52.32	51.79	51.23

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
15.0000	50.64	50.02	49.39	48.73	48.06
15.5000	47.37	46.66	45.93	45.19	43.82
16.0000	42.42	41.21	40.14	39.17	38.26
16.5000	37.39	36.55	35.74	34.95	34.18
17.0000	33.44	32.71	32.01	31.33	30.67
17.5000	30.03	29.40	28.80	28.17	27.39
18.0000	26.50	25.55	24.58	23.64	22.73
18.5000	21.87	21.05	20.19	18.84	17.05
19.0000	15.41	14.08	13.06	12.26	11.65
19.5000	11.18	10.81	10.51	10.27	10.06
20.0000	9.88	9.71	9.56	9.42	9.28
20.5000	9.15	9.04	8.93	8.83	8.75
21.0000	8.67	8.60	8.53	8.48	8.43
21.5000	8.38	8.34	8.30	8.27	8.23
22.0000	8.20	8.17	8.14	8.11	8.08
22.5000	8.05	8.03	8.00	7.97	7.94
23.0000	7.92	7.89	7.87	7.85	7.82
23.5000	7.80	7.77	7.74	7.72	7.69
24.0000	7.67	7.63	7.56	7.41	7.16
24.5000	6.78	6.30	5.77	5.21	4.68
25.0000	4.20	3.77	3.40	3.09	3.00
25.5000	3.00	2.99	2.99	2.98	2.98
26.0000	2.98	2.97	2.97	2.96	2.96
26.5000	2.96	2.95	2.95	2.94	2.94
27.0000	2.93	2.93	2.93	2.92	2.92
27.5000	2.91	2.91	2.90	2.90	2.86
28.0000	2.82	2.77	2.74	2.70	2.66
28.5000	2.62	2.59	2.55	2.52	2.49
29.0000	2.46	2.43	2.40	2.37	2.34
29.5000	2.32	2.29	2.26	2.24	2.22
30.0000	2.19	2.17	2.15	2.13	2.11
30.5000	2.09	2.07	2.06	2.04	2.02
31.0000	2.00	1.99	1.97	1.96	1.94
31.5000	1.93	1.92	1.90	1.89	1.88
32.0000	1.87	1.86	1.84	1.83	1.82
32.5000	1.81	1.80	1.79	1.78	1.78
33.0000	1.77	1.76	1.75	1.74	1.74
33.5000	1.73	1.72	1.71	1.71	1.70
34.0000	1.69	1.69	1.68	1.68	1.67
34.5000	1.67	1.66	1.66	1.65	1.65
35.0000	1.64	1.64	1.63	1.63	1.63
35.5000	1.62	1.62	1.61	1.61	1.61
36.0000	1.60	1.60	1.60	1.59	1.59
36.5000	1.59	1.59	1.58	1.58	1.58

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
37.0000	1.58	1.57	1.57	1.57	1.57
37.5000	1.56	1.56	1.56	1.56	1.56
38.0000	1.55	1.55	1.55	1.55	1.55
38.5000	1.55	1.55	1.54	1.54	1.54
39.0000	1.54	1.54	1.54	1.54	1.53
39.5000	1.53	1.53	1.53	1.53	1.53
40.0000	1.53	1.52	1.48	1.44	1.40
40.5000	1.36	1.32	1.28	1.24	1.20
41.0000	1.17	1.13	1.10	1.07	1.03
41.5000	1.00	.97	.94	.92	.89
42.0000	.86	.84	.81	.79	.76
42.5000	.74	.72	.70	.68	.66
43.0000	.64	.62	.60	.58	.56
43.5000	.55	.53	.51	.50	.48
.0000	.47	.46	.44	.43	.42
5000	.40	.39	.38	.37	.36
5.0000	.35	.34	.33	.32	.31
45.5000	.30	.29	.28	.27	.26
46.0000	.26	.25	.24	.23	.23
46.5000	.22	.21	.21	.20	.19
47.0000	.19	.18	.18	.17	.17
47.5000	.16	.16	.15	.15	.14
48.0000	.14				

Type.... Node: Addition Summary
e.... OUTFALL
ie.... .\sample\27716.PPK
Storm... TypeII 24hr Tag: 50 YR

TOTAL NODE INFLOW...
HYG file =
HYG ID = OUTFALL
HYG Tag = 50 YR

Peak Discharge = 71.39 cfs
Time to Peak = 13.5000 hrs
HYG Volume = 41.833 ac-ft

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time on Left represents time for first value in each row.

Time hrs					
.0000	.00	.02	.03	.05	.06
.5000	.08	.09	.12	.16	.20
1.0000	.24	.27	.31	.35	.38
1.5000	.41	.45	.48	.51	.54
.0000	.57	.60	.62	.65	.67
2.5000	.70	.72	.75	.77	.79
3.0000	.81	.83	.85	.87	.89
3.5000	.91	.93	.94	.96	.98
4.0000	.99	1.01	1.02	1.04	1.05
4.5000	1.07	1.08	1.09	1.11	1.12
5.0000	1.13	1.14	1.16	1.17	1.18
5.5000	1.19	1.20	1.21	1.22	1.24
6.0000	1.25	1.26	1.27	1.28	1.29
6.5000	1.30	1.31	1.32	1.33	1.34
7.0000	1.34	1.35	1.36	1.37	1.38
7.5000	1.39	1.40	1.42	1.43	1.45
8.0000	1.46	1.48	1.50	1.52	1.55
8.5000	1.57	1.60	1.64	1.67	1.71
9.0000	1.75	1.80	1.86	1.91	1.98
9.5000	2.05	2.13	2.21	2.30	2.39
10.0000	2.49	2.60	2.71	2.84	2.91
10.5000	2.92	2.94	2.96	2.98	3.94
11.0000	6.27	8.18	9.83	11.38	12.92
11.5000	14.57	16.18	17.70	19.60	22.75
12.0000	27.76	34.28	41.04	45.83	48.03
12.5000	50.08	52.01	53.81	55.46	56.97
13.0000	59.23	62.59	65.98	68.73	70.54
13.5000	71.39	71.34	70.59	69.60	68.70
14.0000	67.88	67.11	66.38	65.67	64.99
5000	64.32	63.66	63.00	62.35	61.69

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)

Time hrs	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
15.0000	61.03	60.37	59.68	58.99	58.29
15.5000	57.57	56.85	56.11	55.37	54.61
16.0000	53.84	53.06	52.28	51.49	50.69
16.5000	49.89	49.10	48.30	47.49	46.68
17.0000	45.86	45.05	43.38	41.94	40.71
17.5000	39.63	38.66	37.75	36.89	36.07
18.0000	35.28	34.52	33.78	33.07	32.38
18.5000	31.72	31.07	30.44	29.83	29.24
19.0000	28.67	28.05	27.29	26.42	25.51
19.5000	24.58	23.68	22.80	21.96	21.17
20.0000	20.43	19.29	17.64	15.99	14.60
20.5000	13.52	12.69	12.05	11.57	11.20
21.0000	10.92	10.71	10.55	10.42	10.31
21.5000	10.23	10.16	10.09	10.04	9.99
.0000	9.94	9.90	9.86	9.82	9.78
.5000	9.75	9.71	9.68	9.64	9.61
23.0000	9.58	9.55	9.51	9.48	9.45
23.5000	9.41	9.38	9.35	9.32	9.29
24.0000	9.25	9.21	9.12	8.94	8.64
24.5000	8.21	7.63	6.96	6.24	5.56
25.0000	4.93	4.38	3.91	3.51	3.17
25.5000	3.00	3.00	2.99	2.99	2.99
26.0000	2.98	2.98	2.97	2.97	2.97
26.5000	2.96	2.96	2.95	2.95	2.94
27.0000	2.94	2.93	2.93	2.93	2.92
27.5000	2.92	2.91	2.91	2.91	2.90
28.0000	2.87	2.83	2.79	2.75	2.71
28.5000	2.67	2.63	2.60	2.56	2.53
29.0000	2.50	2.47	2.44	2.41	2.38
29.5000	2.35	2.32	2.30	2.27	2.25
30.0000	2.22	2.20	2.18	2.16	2.14
30.5000	2.12	2.10	2.08	2.06	2.04
31.0000	2.03	2.01	1.99	1.98	1.96
31.5000	1.95	1.93	1.92	1.91	1.89
32.0000	1.88	1.87	1.86	1.85	1.84
32.5000	1.83	1.82	1.81	1.80	1.79
33.0000	1.78	1.77	1.76	1.75	1.75
33.5000	1.74	1.73	1.72	1.72	1.71
34.0000	1.70	1.70	1.69	1.68	1.68
34.5000	1.67	1.67	1.66	1.66	1.65
000	1.65	1.64	1.64	1.63	1.63
.5000	1.63	1.62	1.62	1.61	1.61
6.0000	1.61	1.60	1.60	1.60	1.60
36.5000	1.59	1.59	1.59	1.58	1.58

[illegible]pe.... Node: Addition Summary
[illegible].... OUTFALL
[illegible]le.... .\sample\27716.PPK
Storm... TypeII 24hr Tag: 50 YR

Event: 50 yr

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
37.0000	1.58	1.58	1.57	1.57	1.57
37.5000	1.57	1.56	1.56	1.56	1.56
38.0000	1.56	1.56	1.55	1.55	1.55
38.5000	1.55	1.55	1.55	1.54	1.54
39.0000	1.54	1.54	1.54	1.54	1.54
39.5000	1.54	1.53	1.53	1.53	1.53
40.0000	1.53	1.52	1.50	1.49	1.47
40.5000	1.46	1.44	1.43	1.42	1.40
41.0000	1.39	1.38	1.37	1.35	1.34
41.5000	1.33	1.32	1.31	1.30	1.29
42.0000	1.28	1.28	1.27	1.26	1.25
42.5000	1.24	1.24	1.23	1.22	1.22
43.0000	1.21	1.20	1.20	1.19	1.19
43.5000	1.18	1.17	1.17	1.16	1.16
[illegible].0000	1.15	1.15	1.15	1.14	1.14
[illegible].5000	1.13	1.13	1.13	1.12	1.12
45.0000	1.11	1.11	1.11	1.10	1.10
45.5000	1.10	1.10	1.09	1.09	1.09
46.0000	1.08	1.08	1.08	1.08	1.07
46.5000	1.07	1.07	1.07	1.07	1.06
47.0000	1.06	1.06	1.06	1.06	1.06
47.5000	1.05	1.05	1.05	1.05	1.05
48.0000	1.05				