# ALPINE CITY PLANNING COMMISSION MEETING

**NOTICE** is hereby given that the **PLANNING COMMISSION** of Alpine City, Utah will hold a **Public Hearing and a Regular Meeting at Alpine City Hall,** 20 North Main, Alpine, Utah on **Tuesday, May 5, 2015 at 7:00 pm** as follows:

**I. GENERAL BUSINESS**

A. Welcome and Roll Call: Steve Cosper
B. Prayer/Opening Comments: Jason Thelin
C. Pledge of Allegiance: By Invitation

**II. PUBLIC COMMENT**

Any person wishing to comment on any item not on the agenda may address the Planning Commission at this point by stepping to the microphone and giving his or her name and address for the record.

**III. ACTION ITEMS**

**A. PUBLIC HEARING - Beck Property Zone Change Request - 621 Westfield Road - Dana and Annalisa Beck**
A proposed zone change will be presented to the Planning Commission. The property is proposed to be changed from the CR-40,000 (1 acre) zone to the TR-10,000 (1/4 acre) zone.

**A. Residential Lot Adjustment Request - 864 East Jackson Lane - John and Amy Ogden**
A proposed adjustment to requirements for a buildable area of a lot will be presented to the Planning Commission.

**A. PUBLIC HEARING - Fence Ordinance Amendment**
The Planning Commission will discuss proposed amendments to the Fence Ordinance related to height, aesthetics and a process for granting an exception.

**A. PUBLIC HEARING - Retaining Wall Ordinance**
The Planning Commission will discuss a proposed ordinance that would regulate retaining walls.

**B. Melby Annexation Discussion**
The Planning Commission will discuss the potential terms of annexation for the Melby area at the northeast corner of the city.

**C. Oberee Annexation Discussion**
The Planning Commission will discuss the potential terms of annexation for the Oberee area at the northeast corner of the city.

**IV. COMMUNICATIONS**

**V. APPROVAL OF PLANNING COMMISSION MINUTES: April 21, 2015**

**ADJOURN**

Chairman Steve Cosper
May 1, 2015

**THE PUBLIC IS INVITED TO ATTEND ALL PLANNING COMMISSION MEETINGS.** If you need a special accommodation to participate in the meeting, please call the City Recorder's Office at 801-756-6347 ext. 5.

CERTIFICATION OF POSTING. The undersigned duly appointed recorder does hereby certify that the above agenda notice was posted in three public places within Alpine City limits. These public places being a bulletin board located inside City Hall at 20 North Main and located in the lobby of the Bank of American Fork, Alpine Branch, 133 S. Main, Alpine, UT; and the bulletin board located at The Junction, 400 S. Main, Alpine, UT. The above agenda notice was sent by e-mail to The Daily Herald located in Provo, UT a local newspaper circulated in Alpine, UT. This agenda is also available on the City's web site at www.alpinecity.org and on the Utah Public Meeting Notices website at www.utah.gov/pmn/index.html.

# PUBLIC MEETING AND PUBLIC HEARING ETIQUETTE

**Please remember all public meetings and public hearings are now recorded.**

- All comments **must** be recognized by the Chairperson and addressed through the microphone.
- When speaking to the Planning Commission, please stand, speak slowly and clearly into the microphone, and state your name and address for the recorded record.
- Be respectful to others and refrain from disruptions during the meeting. Please refrain from conversation with others in the audience as the microphones are very sensitive and can pick up whispers in the back of the room.
- Keep comments constructive and not disruptive.
- Avoid verbal approval or dissatisfaction of the ongoing discussion (i.e., booing or applauding).
- Exhibits (photos, petitions, etc.) given to the City become the property of the City.
- Please silence all cellular phones, beepers, pagers or other noise making devices.
- Be considerate of others who wish to speak by limiting your comments to a reasonable length, and avoiding repetition of what has already been said. Individuals may be limited to two minutes and group representatives may be limited to five minutes.
- Refrain from congregating near the doors or in the lobby area outside the council room to talk as it can be very noisy and disruptive. If you must carry on conversation in this area, please be as quiet as possible. (The doors must remain open during a public meeting/hearing.)

**Public Hearing v. Public Meeting**

If the meeting is a **public hearing**, the public may participate during that time and may present opinions and evidence for the issue for which the hearing is being held. In a public hearing there may be some restrictions on participation such as time limits.

Anyone can observe a **public meeting**, but there is no right to speak or be heard there - the public participates in presenting opinions and evidence at the pleasure of the body conducting the meeting.

# ALPINE PLANNING COMMISSION AGENDA

**SUBJECT: Beck Zone Change Request**

**FOR CONSIDERATION ON: 5 May 2015**

**PETITIONER: Dana and Annalisa Beck**

**ACTION REQUESTED BY PETITIONER: Approve the Zone Change**

**APPLICABLE STATUTE OR ORDINANCE: Section 3.1.9.2 (Zone Change)**

**BACKGROUND INFORMATION:**

Dana and Annalisa Beck are requesting that the zoning for their property located at 621 Westfield Road be changed from CR-40,000 zone to TR-10,000. The ordinance requires that the Planning Commission make a recommendation to the City Council. The City Council may approve or deny the proposed amendment to the zoning map, either as proposed by the Planning Commission or after making any revision the City Council considers appropriate.

**STAFF RECOMMENDATION:**

That the Planning Commission discuss the request for a zone change and make a recommendation to the City Council.

April 21, 2015

RECEIVED APR 24 2015

Alpine City Planning Commission
Attn: Jason Bond
20 North Main
Alpine, Utah 84004

Jason

Thank you for meeting with us during DRC last week.

This is our formal request to change to zoning on our property (see attached legal description) from CR 40,000 to TR 10,000. Consideration should be made for the Walters property to the south, and the Gillman, Vance and Healey property to the north of us based on the owner's wishes and the Cities needs. We make this request for the following reasons:

As you are aware, the high pressure gas line is coming through Alpine. As it is currently designed it goes right through our north field. We have been working with the gas company and an engineer to make the best of this situation and to put a plan in place that works now and in the future. We are having plans drawn up to put the gas line along future lot lines and/or future roads. These designs work with ½, 1/3, or ¼ acre lots, it does not work out with the current zoning of 1 acre lots. We, therefore, are requesting for a change of zoning to TR 10,000 as there is currently no 1/3 acre zone. We feel that this is a great compromise to have the gas line in an accessible area without completely destroying the use of our land.

We also think that it would work better with the overall planning, and feel of the City. We recognize that there is a need for more affordable lots for senior couples and young families in Alpine. We have had two children purchase homes in the last 60 days. Both of them have purchased outside of Alpine because there are no new homes in the $300,000 - $400,000 price range. Anything at that price is an older home that would need updating or demolishing. This is by no means low income housing, however it is a nice second home for a young family, or retirement home for a couple.

There are also no avalanche, flood or geological hazards (3.1.2.2) in this area that would prohibit the zone change requested. A change to zoning would not put current or future residents at risk from natural hazards.

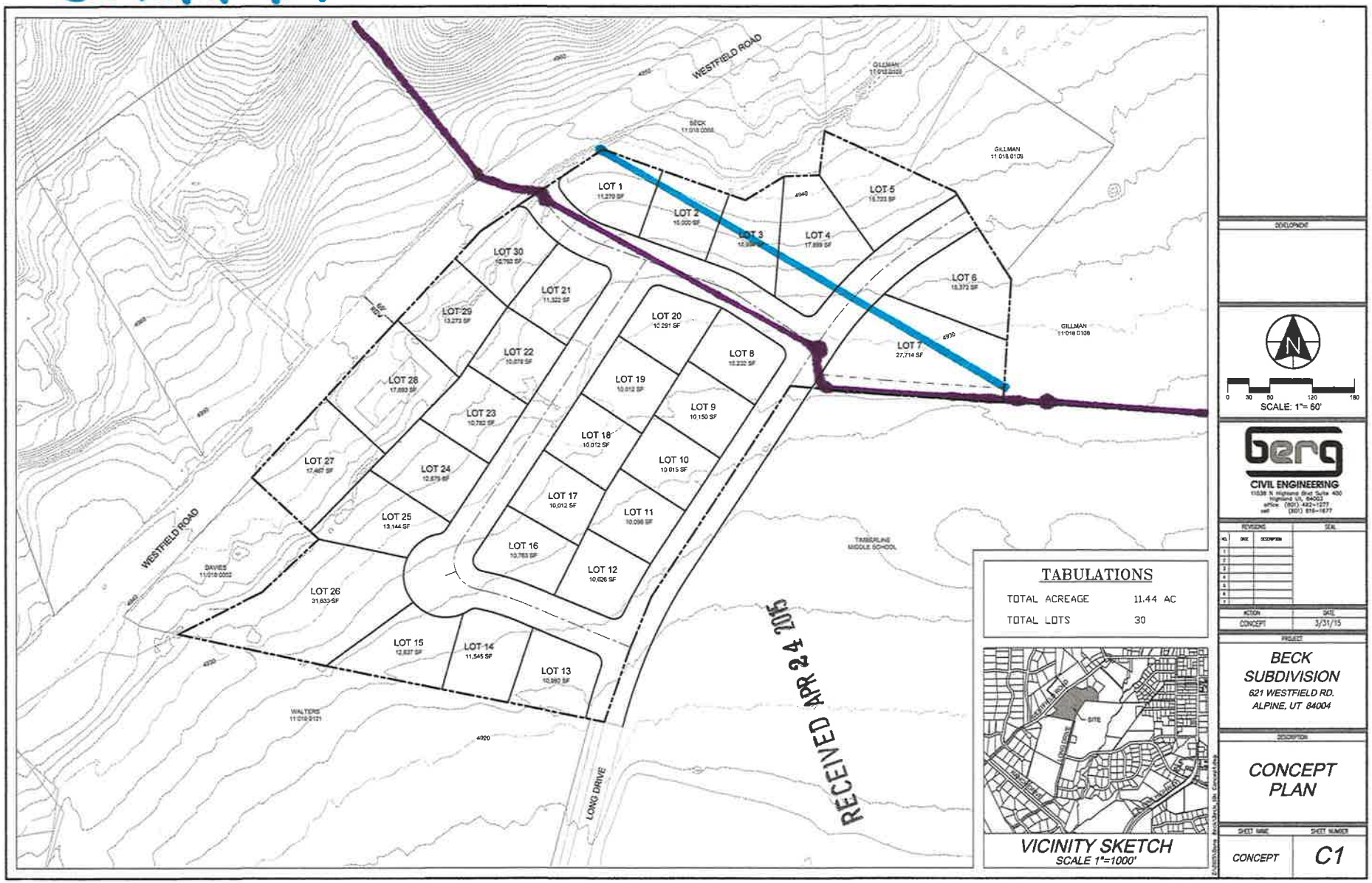
We thank you and the Planning Commission for your consideration.

Sincerely

Dana and Annalisa Beck

— Proposed gas line

— Current line



Utah County
HEART of UTAH

RECEIVED APR 24 2015

## PROPERTY INFORMATION

**Serial Number:** 11:018:0102 **Serial Life:** 2007...

**Property Address:**

**Mailing Address:** 621 WESTFIELD RD ALPINE, UT 84004-1502

**Acreage:** 10.655146

**Last Document:** 15683-2010

**Legal Description:** COM N 89 DEG 48' 18" E 584.58 FT & N 651 FT FR SW COR. SEC. 24, T4S, R1E, SLB&M.; N 63 DEG 11' 36" E 133.26 FT; N 46 DEG 46' 58" E 110.26 FT; N 40 DEG 47' 14" E 113.96 FT; N 48 DEG 53' 58" E 88.84 FT; N 2 DEG 21' 54" E 119.23 FT; N 55 DEG 27' 2" W 57.3 FT; N 42 DEG 58' 0" E 192.5 FT; N 56 DEG 12' 30" E 208 FT; S 70 DEG 12' 0" E 214.25 FT; N 58 DEG 23' 19" E 64.75 FT; N 88 DEG 15' 0" E 50 FT; N 7 DEG 0' 35" E 63.39 FT; S 64 DEG 49' 45" E 203.49 FT; S 32 DEG 30' 45" E 147.36 FT; S 3 DEG 43' 29" W 174.56 FT; N 86 DEG 16' 31" W 188.29 FT; N 84 DEG 39' 14" W 133.88 FT; S 33 DEG 20' 0" W 358.39 FT; S 22 DEG 25' 0" W 83.5 FT; S 19 DEG 22' 0" W 106.27 FT; N 78 DEG 37' 0" W 402.24 FT; N 77 DEG 55' 0" W 214.1 FT TO BEG. AREA 10.655 AC.

Owner Names | Value History | Tax History | Location | Photos | Documents | Exp Legal

| | |
|---|---|
| 2011... | BECK, DANA R |
| 2007-2010 | SKYLINE PROPERTIES LLC |

Additional Information

Main Menu

Comments or Concerns on Value/Appraisal - Assessor's Office
Documents/Owner/Parcel information - Recorder's Office
Address Change for Tax Notice

This page was created on 4/24/2015 8:30:13 AM

# ALPINE PLANNING COMMISSION AGENDA

**SUBJECT: Residential Lot Adjustment Request**

**FOR CONSIDERATION ON: 5 May 2015**

**PETITIONER: John and Amy Ogden**

**ACTION REQUESTED BY PETITIONER: Approve the Adjustment**

**APPLICABLE STATUTE OR ORDINANCE: Section 3.3.8.4 (Buildable Area)**

**BACKGROUND INFORMATION:**

John and Amy Ogden are putting together plans to build a house on a lot at 864 East Jackson Lane. This lot is within the CR-20,000 zone. The plan shows the home to be built outside of the designated building area. The ordinance allows for an adjustment to be made if certain criteria are met (Section 3.3.8.4).

The ordinance does not allow for a buildable area to contain slopes that are 20% or greater (Section 3.1.11.7). The plan shows home being built into a sloped area that is 20% or greater. After reviewing the proposed site plan, it also appears that the home is proposed to be built in a way that would also reduce the setbacks from the southern property line. This would expand the area of what was originally designated as buildable. The Planning Commission needs to determine if the original buildable area was correct in designating the southern setback as a 30 foot rear yard setback or if the southern setback should be designated as a side yard setback. If the setback is designated as a rear yard setback, the Planning Commission or City Council cannot grant an exception to the setbacks and a variance needs to obtained from the Alpine City Hearing Officer. The criteria for granting a variance are laid out by the State of Utah.

**STAFF RECOMMENDATION:**

That the Planning Commission discuss the approval of the buildable area adjustment request and consider the southern setback in their decision.

Date: April 30, 2015

By: Jed Muhlestein, P.E.,
Assistant City Engineer

**Subject: Ogden Buildable Area Adjustment Request**

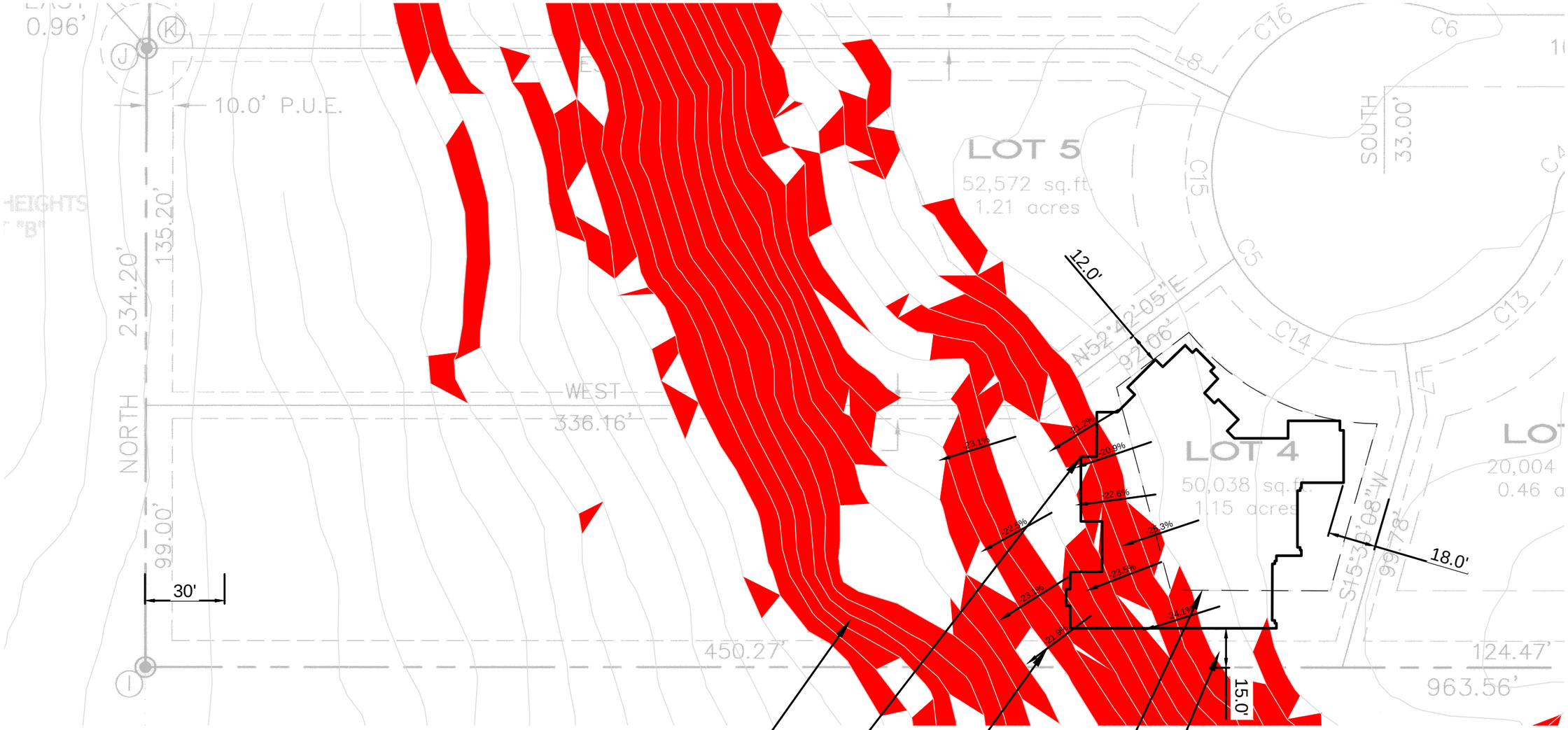
Mr. Ogden has brought forth a building plan that extends beyond the buildable area within Lot 4 of the Jackson Heights subdivision. The property address is located at 864 E. Jackson Lane within the CR-20,000 zone.

The buildable area as defined by section 3.1.11.7 requires that no ground containing slopes over 20 percent are to be located within the buildable area. An analysis was performed to check the buildable area for the above mentioned lot and it appears the original development followed the ordinance when designing the buildable areas. What Mr. Ogden proposes would extend the buildable area into slopes over 20 percent, the highest slope being 25.1%. See attached map.

Section 3.3.8.4.2 states:

*"Each Designated Buildable Area shall conform to the criteria for qualification as a "buildable area" as defined in this ordinance. Except that the Planning Commission may approve or require the placement of the Designated Buildable Area in a location within the lot which does not conform to one or more of the criteria for buildable area, upon a finding that the proposed Designated Buildable Area: (1) will more adequately accommodate subsequent development of the lot, and (2) will not constitute a potential hazard to life or property, and/or (3) will serve to diminish the negative impact of subsequent development upon the lot or community (i.e. extra-ordinary construction of driveway access, mitigate visual intrusion of structure on ridge line)."*

The Planning Commission will need to discuss if the proposed change would fit within the criteria as set forth in items 1 and 3 in the above mentioned section of code. Section 2 would need more data to evaluate. In order to do so Mr. Ogden was asked to provide a geotechnical report for his proposed house plan. The report is positive claiming there will be no issue with slope stability regarding the proposed building. From an engineering stand point we concur with the geotechnical report and agree that the change would not constitute a potential hazard to life or property.




SLOPES OVER 20 PERCENT

PROPOSED BUILDING

SLOPE LABELS

EXISTING BUILDABLE AREA

PROPOSED SETBACKS

| Slopes Table | | | |
|---|---|---|---|
| Number | Minimum Slope | Maximum Slope | Color |
| 1 | 20.00% | 100.00% | |

N

SCALE: 1"=40'

11" x 17"

0 1"

SECONDARY WATER
CULINARY WATER
STORM WATER
ENGINEERING
SEWER

Alpine Public Works

REMARKS

1.

*864 JACKSON LANE*
APRIL 2015
*Slope Analysis*
*Pre-Construction Contours*

*Engineering File Number:*
-

*Drawing:* -
*Sheet:* 1 of 1

GeoStrata 14425 S. Center Point Way, Bluffdale, Utah 84065
T: (801) 501-0583 ~ F: (801) 501-0584

April 29, 2015

Mr. John Ogden
886 Jackson Lane
Alpine, Utah 84004

**Subject: Slope Stability Assessment**
**864 Jackson Lane, Alpine, Utah**
**GeoStrata Project No.: 1091-001**

## INTRODUCTION

At your request, GeoStrata has assessed the stability of the existing slope located along the western portion of the residential lot located at 864 Jackson Lane in Alpine, Utah (see Plate 1, *Site Vicinity Map*). This letter provides the results of this assessment.

Based on discussions with you, we understand that it is planned to construct a single family residence on the subject property. The building is anticipated to be a one to two story structure with basement founded on conventional strip and spread footings. The slope assessed for this study is relatively steep and heavily vegetated, and has a maximum height of approximately 55 feet. The slope is located to the west and below the proposed structures with grades of approximately 4H:1V to 1H:1V.

Three test pits were excavated along the profile of the slope ranging in depths from 7 to 10 feet below existing site grade (see Plate 2, *Exploration Location Map*). Soils observed in the test pits were logged by a geotechnical engineer according to the USCS soil classification system. Approximately 7 feet of fill soils composed of silt, sand, and gravel were observed in test pit TP-3 on the top of the slope. In test pits TP-1 and TP-2, approximately 6 inches of topsoil composed of silt, sand, and gravel was observed to overly the natural slope. Underlying the fill soils and topsoil we observed a Silty SAND (SM) with persisted to the bottom of the depths explored. Logs of the test pits are attached to this letter as Plate 3 through Plate 5. A key to soil symbols and terms is attached as Plate 6.

A sample of the native Silty SAND (SM) was collected and brought to our laboratory for testing. A direct shear test was ran on the sample to obtain strength parameters for our analysis. Results of the direct shear test are attached to this letter as Plate 7. Strength parameters from the test consisted of an internal friction angle of 24° and a cohesion of 645 pounds per square foot. Strength parameters for the fill soils were assumed to be a friction angle of 33° and 50 pounds per square foot based on experience with similar gravelly sand soils in the area.

Seismic screening was completed for the subject property as part of our analysis. Based on the 2012 International Building Code and using the United States Geological Survey U. S. Seismic Design Maps tool (http://earthquake.usgs.gov/designmaps/us/application.php), a peak ground acceleration for the subject property was calculated to be 0.49g.

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## SLOPE STABILITY ANALYSIS

The soil strength parameters and seismic coefficient above were utilized in our slope stability analysis. Soil strength parameters consisted of a friction angle of 24 degrees and a reduced cohesion value of 320 psf for the native sand soil unit and a friction angle of 33 degrees and a cohesion value of 50 psf for the fill soil unit were used in our analysis. Seismic analysis completed for the property yielded a peak horizontal ground acceleration (PGA) of 0.49g for 2% probability of exceedance in 50 years. One half of this value was used in our pseudo static analysis as the horizontal seismic coefficient.

As indicated above, the subject slope has grades of 4H:1V to 1H:1V. The slope has a total height of approximately 55 feet. The grades above and below the slope are relatively horizontal. The stability of the slope was modeled using SLIDE, a computer application incorporating (among others) Bishop's Simplified Method of analysis. Calculations for stability were developed by searching for the minimum factor of safety for a circular-type failure. Homogeneous earth materials and arcuate failure surfaces were assumed. Stability analysis was conducted on representative cross-sections drawn through the critical section of the site (see Plate 2).

Minimum factors of safety of 1.5 for static conditions and 1.1 for seismic conditions were used in evaluating the slope. An assumed footing load of 3000 psf was applied to the slope in our model to account for loading of the proposed residence. Results of slope stability analysis, presented in Plate 8 and Plate 9, show that the existing slope meets the standard of care minimum factors of safety for static and seismic conditions.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our slope stability analysis, the existing slope on the subject property is suitable for the proposed construction.

## LIMITATIONS

The recommendations contained in this report are limited to the stability of the natural slope located on the western portion of the subject property, and are based on the findings of our field investigation, laboratory testing, stability analysis, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the explorations made for this investigation. It is possible that variations in subsurface conditions could exist beyond the points explored. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to the recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, we should be notified.

This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No other warranty, expressed or implied, is made.

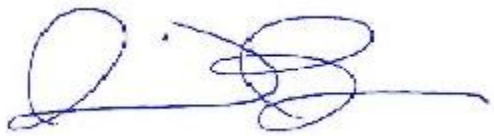
It is the Client's responsibility to see that all parties to the project including the Designer, Contractor,

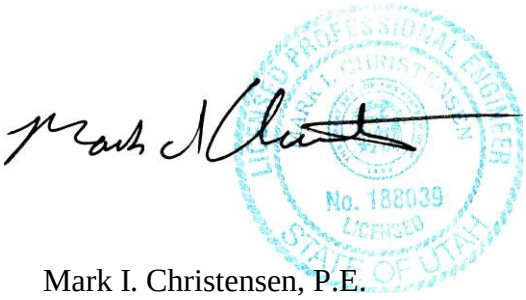
Subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

We appreciate the opportunity to provide these services. Please contact us if you have questions regarding the information provided in this letter.

Respectfully,
**GeoStrata**

Reviewed by






Daniel J. Brown, E.I.T.
Staff Engineer

Mark I. Christensen, P.E.
Senior Geotechnical Engineer

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

1:10,000

Base Map: Utah AGRC Hybrid Base Map

N

GeoStrata

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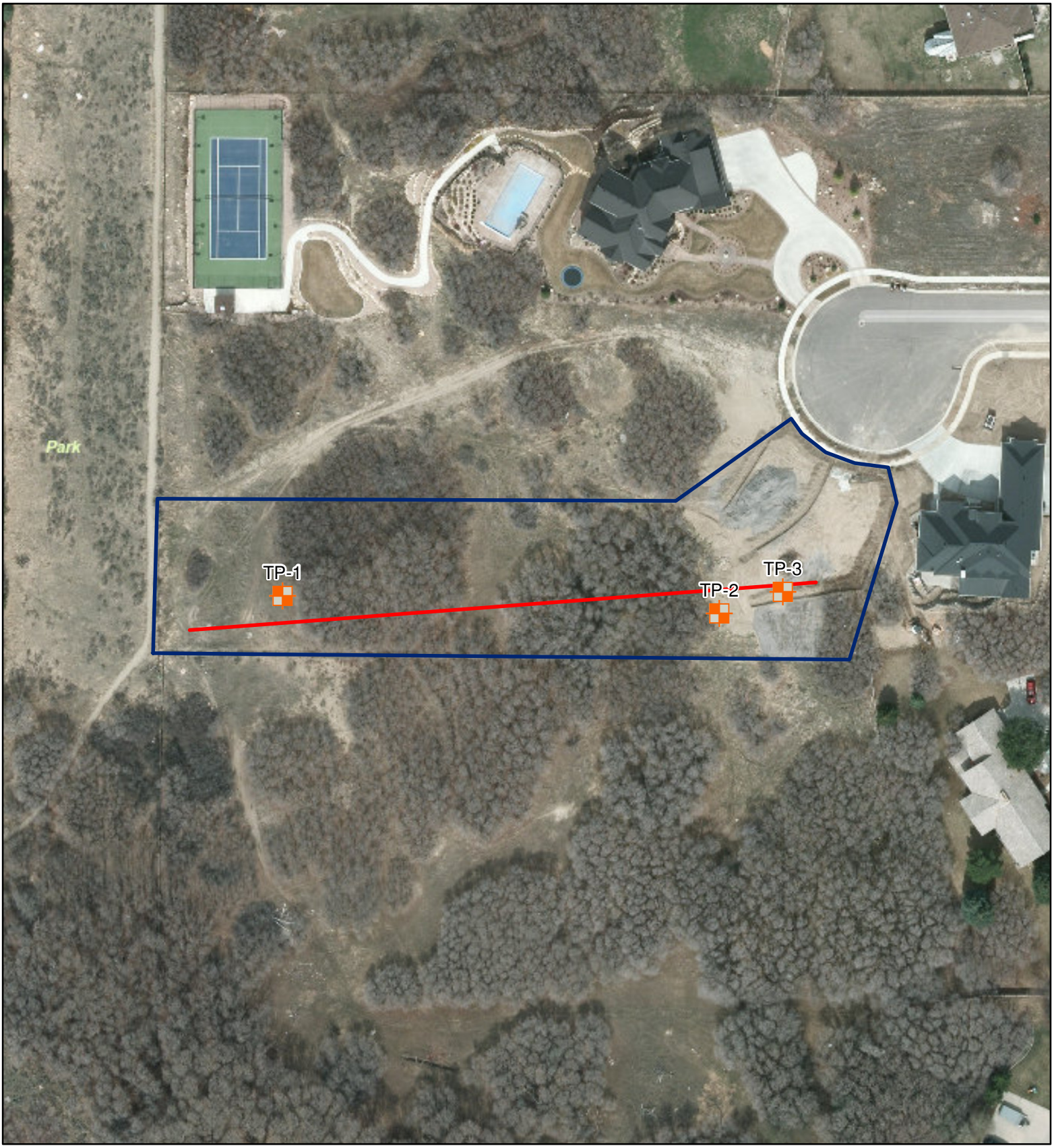
**Legend**

Approximate Site Boundary

John Ogden
864 Jackson Lane
Alpine, UT
Project Number: 1091-001

**Site Vicinity Map**

**Plate 1**




0 25 50 100 150 200 Feet

1:1,000

Base Map: Utah AGRC Hybrid Base Map

N

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**Legend**

- Approximate Test Pit Location
- Slope Profile
- Approximate Site Boundary

John Ogden
864 Jackson Lane
Alpine, UT
Project Number: 1091-001

**Exploration Location Map**

**Plate 2**

| DATE | |
|---|---|
| STARTED: | 4/27/15 |
| COMPLETED: | 4/27/15 |
| BACKFILLED: | 4/27/15 |

John Ogden
864 Jackson Lane
Alpine, UT
Project Number 1091-001

GeoStrata Rep: D. Brown
Rig Type: Trackhoe

TEST PIT NO:
# TP-1
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

| DEPTH METERS | DEPTH FEET | SAMPLES | WATER LEVEL | GRAPHICAL LOG | UNIFIED SOIL CLASSIFICATION | MATERIAL DESCRIPTION | Dry Density(pcf) | Moisture Content % | Percent minus 200 | Liquid Limit | Plasticity Index | Moisture Content and Atterberg Limits (Plastic Limit — Moisture Content — Liquid Limit; 10 20 30 40 50 60 70 80 90) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | | | TOPSOIL; Silty SAND - dark brown, moist | | | | | | |
| | | | | | SM | Silty SAND - dense, light brown, moist, occasional gravel observed up to 1" in diameter, occasional roots to 5 ft | | | | | | |
| 1 | | | | | | | | | | | | |
| | 5 | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | 10 | | | | | Bottom of Test Pit @ 9.5 Feet | | | | | | |

GeoStrata

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

**Plate 3**

| DATE | |
|---|---|
| STARTED: | 4/27/15 |
| COMPLETED: | 4/27/15 |
| BACKFILLED: | 4/27/15 |

John Ogden
864 Jackson Lane
Alpine, UT
Project Number 1091-001

GeoStrata Rep: D. Brown
Rig Type: Trackhoe

TEST PIT NO:
# TP-2
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

| DEPTH METERS | DEPTH FEET | SAMPLES | WATER LEVEL | GRAPHICAL LOG | UNIFIED SOIL CLASSIFICATION | MATERIAL DESCRIPTION | Dry Density(pcf) | Moisture Content % | Percent minus 200 | Liquid Limit | Plasticity Index | Moisture Content and Atterberg Limits (Plastic Limit — Moisture Content — Liquid Limit; 10 20 30 40 50 60 70 80 90) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | | | TOPSOIL; Silty SAND - dark brown, moist | | | | | | |
| | | | | | SM | Silty SAND - dense, light tan, moist, occasional roots to 5 ft | | | | | | |
| 1 | | | | | | | | | | | | |
| | 5 | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| | | | | | | Bottom of Test Pit @ 7 Feet | | | | | | |
| 3 | 10 | | | | | | | | | | | |

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

**Plate 4**

| DATE | |
|---|---|
| STARTED: | 4/27/15 |
| COMPLETED: | 4/27/15 |
| BACKFILLED: | 4/27/15 |

John Ogden
864 Jackson Lane
Alpine, UT
Project Number 1091-001

GeoStrata Rep: D. Brown
Rig Type: Trackhoe

TEST PIT NO:
# TP-3
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

| DEPTH METERS | DEPTH FEET | SAMPLES | WATER LEVEL | GRAPHICAL LOG | UNIFIED SOIL CLASSIFICATION | MATERIAL DESCRIPTION | Dry Density(pcf) | Moisture Content % | Percent minus 200 | Liquid Limit | Plasticity Index | Moisture Content and Atterberg Limits (Plastic Limit — Moisture Content — Liquid Limit; 10 20 30 40 50 60 70 80 90) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | | | FILL; Silty SAND - dark brown, moist | | | | | | |
| | | | | | | FILL; Silty SAND with gravel - light brown to yellow-brown, moist, gravel observed up to 3" in diameter | | | | | | |
| 1 | | | | | | | | | | | | |
| | 5 | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| | | | | | SM | Silty SAND - dense, light brown, moist | | | | | | |
| 3 | 10 | | | | | Bottom of Test Pit @ 10 Feet | | | | | | |

GeoStrata

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

**Plate 5**

## UNIFIED SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS | | | USCS SYMBOL | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|
| COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve) | GRAVELS (More than half of coarse fraction is larger than the #4 sieve) | CLEAN GRAVELS WITH LITTLE OR NO FINES | GW | WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES |
| | | | GP | POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES |
| | | GRAVELS WITH OVER 12% FINES | GM | SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES |
| | | | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES |
| | SANDS (More than half of coarse fraction is smaller than the #4 sieve) | CLEAN SANDS WITH LITTLE OR NO FINES | SW | WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES |
| | | | SP | POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES |
| | | SANDS WITH OVER 12% FINES | SM | SILTY SANDS, SAND-GRAVEL-SILT MIXTURES |
| | | | SC | CLAYEY SANDS SAND-GRAVEL-CLAY MIXTURES |
| FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve) | SILTS AND CLAYS (Liquid limit less than 50) | | ML | INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | | OL | ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | SILTS AND CLAYS (Liquid limit greater than 50) | | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT |
| | | | CH | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS |
| | | | OH | ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY |
| HIGHLY ORGANIC SOILS | | | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

## LOG KEY SYMBOLS

BORING SAMPLE LOCATION

TEST-PIT SAMPLE LOCATION

WATER LEVEL (level after completion)

WATER LEVEL (level where first encountered)

## CEMENTATION

| DESCRIPTION | DESCRIPTION |
|---|---|
| WEAKELY | CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE |
| MODERATELY | CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE |
| STRONGLY | WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE |

## OTHER TESTS KEY

| | | | |
|---|---|---|---|
| C | CONSOLIDATION | SA | SIEVE ANALYSIS |
| AL | ATTERBERG LIMITS | DS | DIRECT SHEAR |
| UC | UNCONFINED COMPRESSION | T | TRIAXIAL |
| S | SOLUBILITY | R | RESISTIVITY |
| O | ORGANIC CONTENT | RV | R-VALUE |
| CBR | CALIFORNIA BEARING RATIO | SU | SOLUBLE SULFATES |
| COMP | MOISTURE/DENSITY RELATIONSHIP | PM | PERMEABILITY |
| CI | CALIFORNIA IMPACT | -200 | % FINER THAN #200 |
| COL | COLLAPSE POTENTIAL | Gs | SPECIFIC GRAVITY |
| SS | SHRINK SWELL | SL | SWELL LOAD |

## MODIFIERS

| DESCRIPTION | % |
|---|---|
| TRACE | <5 |
| SOME | 5 - 12 |
| WITH | >12 |

## MOISTURE CONTENT

| DESCRIPTION | FIELD TEST |
|---|---|
| DRY | ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH |
| MOIST | DAMP BUT NO VISIBLE WATER |
| WET | VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE |

## STRATIFICATION

| DESCRIPTION | THICKNESS | DESCRIPTION | THICKNESS |
|---|---|---|---|
| SEAM | 1/16 - 1/2" | OCCASIONAL | ONE OR LESS PER FOOT OF THICKNESS |
| LAYER | 1/2 - 12" | FREQUENT | MORE THAN ONE PER FOOT OF THICKNESS |

## GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil conditions between individual sample locations.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

## APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

| APPARENT DENSITY | SPT (blows/ft) | MODIFIED CA. SAMPLER (blows/ft) | CALIFORNIA SAMPLER (blows/ft) | RELATIVE DENSITY (%) | FIELD TEST |
|---|---|---|---|---|---|
| VERY LOOSE | <4 | <4 | <5 | 0 - 15 | EASILY PENETRATED WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND |
| LOOSE | 4 - 10 | 5 - 12 | 5 - 15 | 15 - 35 | DIFFICULT TO PENETRATE WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND |
| MEDIUM DENSE | 10 - 30 | 12 - 35 | 15 - 40 | 35 - 65 | EASILY PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER |
| DENSE | 30 - 50 | 35 - 60 | 40 - 70 | 65 - 85 | DIFFICULT TO PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER |
| VERY DENSE | >50 | >60 | >70 | 85 - 100 | PENETRATED ONLY A FEW INCHES WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER |

## CONSISTENCY - FINE-GRAINED SOIL

| CONSISTENCY | SPT (blows/ft) | TORVANE UNTRAINED SHEAR STRENGTH (tsf) | POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf) | FIELD TEST |
|---|---|---|---|---|
| VERY SOFT | <2 | <0.125 | <0.25 | EASILY PENETRATED SEVERAL INCHES BY THUMB. EXUDES BETWEEN THUMB AND FINGERS WHEN SQUEEZED BY HAND. |
| SOFT | 2 - 4 | 0.125 - 0.25 | 0.25 - 0.5 | EASILY PENETRATED ONE INCH BY THUMB. MOLDED BY LIGHT FINGER PRESSURE. |
| MEDIUM STIFF | 4 - 8 | 0.25 - 0.5 | 0.5 - 1.0 | PENETRATED OVER 1/2 INCH BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE. |
| STIFF | 8 - 15 | 0.5 - 1.0 | 1.0 - 2.0 | INDENTED ABOUT 1/2 INCH BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT. |
| VERY STIFF | 15 - 30 | 1.0 - 2.0 | 2.0 - 4.0 | READILY INDENTED BY THUMBNAIL. |
| HARD | >30 | >2.0 | >4.0 | INDENTED WITH DIFFICULTY BY THUMBNAIL. |

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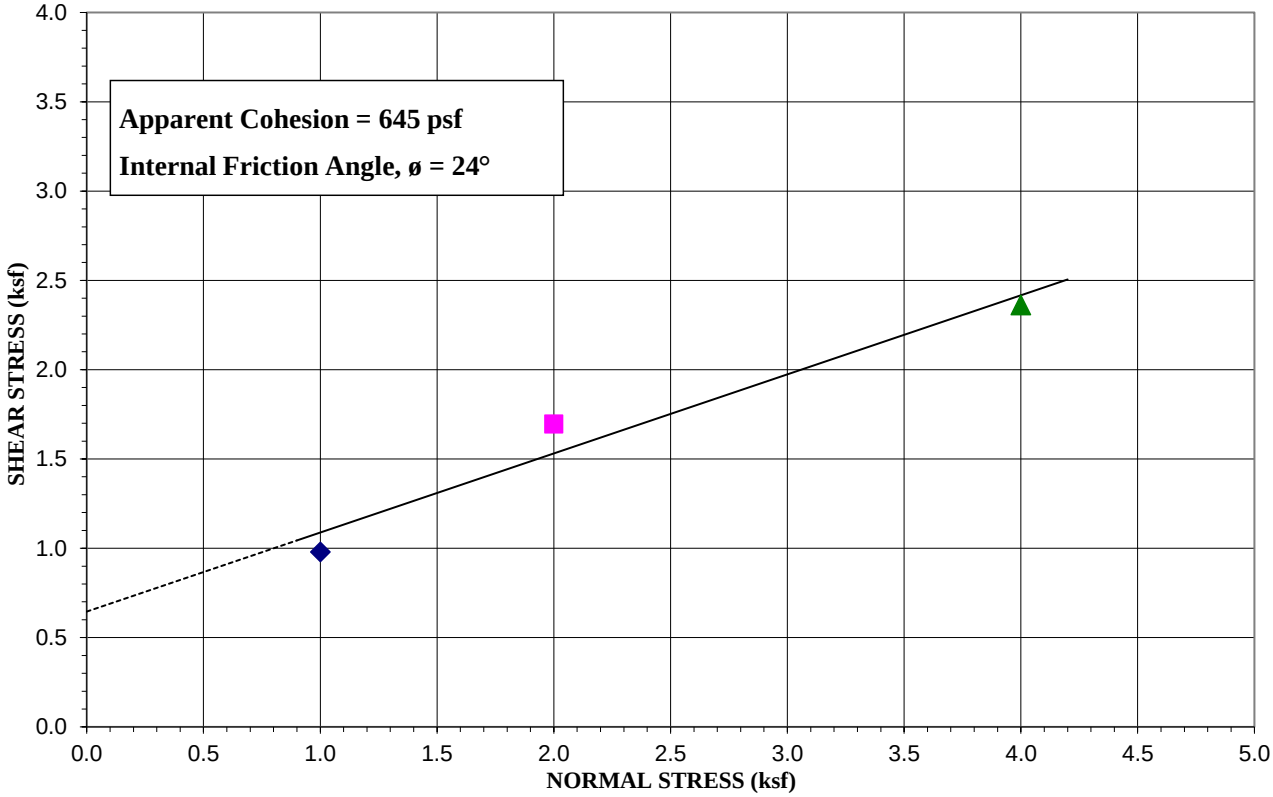
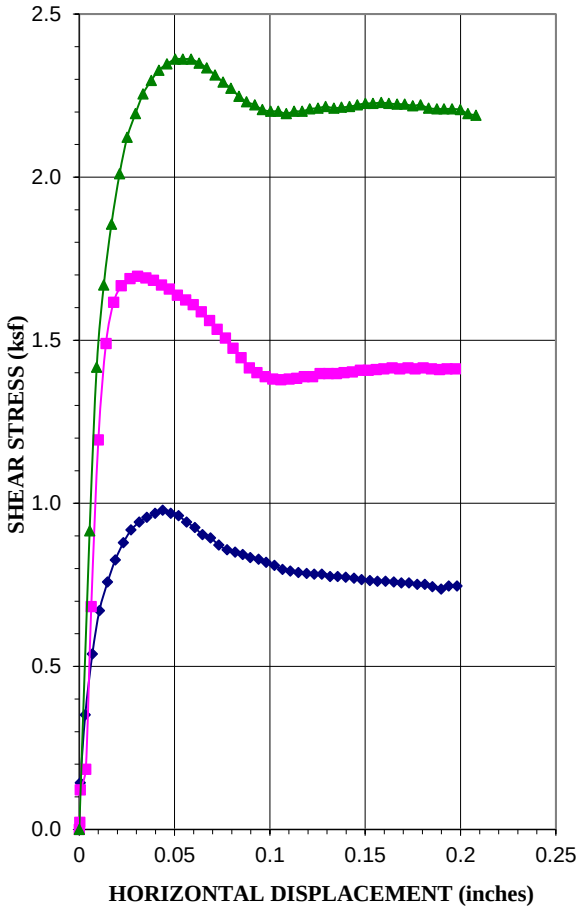
# Soil Symbols Description Key

John Ogden
864 Jackson Lane
Alpine, UT
Project Number: 1091-001

**Plate 6**

# DIRECT SHEAR TEST




| | |
|---|---|
| **Sample Location:** | TP-2 @ 3 ft |
| **Type of Test:** | Consolidated Drained/Saturated |

| **Test No. (Symbol)** | **1 (◆)** | **2 (■)** | **3 (▲)** |
|---|---|---|---|
| **Sample Type** | Remolded | | |
| **Initial Height, in.** | 1 | 1 | 1 |
| **Diameter, in.** | 2.5 | 2.5 | 2.5 |
| **Dry Density Before, pcf** | 98.3 | 98.8 | 94.1 |
| **Dry Density After, pcf** | 99.6 | 100.2 | 95.6 |
| **Moisture % Before** | 11.1 | 11.8 | 10.2 |
| **Moisture % After** | 22.0 | 20.5 | 23.5 |
| **Saturation, % Before** | 43.2 | 46.2 | 35.6 |
| **Saturation, % After** | 88.1 | 83.4 | 85.6 |
| **Normal Load, ksf** | 1.0 | 2.0 | 4.0 |
| **Shear Stress, ksf** | 0.98 | 1.70 | 2.36 |
| **Strain Rate** | 0.0005 IN/MIN | | |

| **Sample Properties** | |
|---|---|
| **Cohesion, psf** | 645 |
| **Friction Angle, ϕ** | 24 |
| **Liquid Limit, %** | --- |
| **Plasticity Index, %** | --- |
| **Percent Gravel** | --- |
| **Percent Sand** | --- |
| **Percent Passing No. 200 sieve** | --- |
| **Classification** | SM |

**PROJECT:** 864 Jackson Lane

**PROJECT NO.:** **1091-001**

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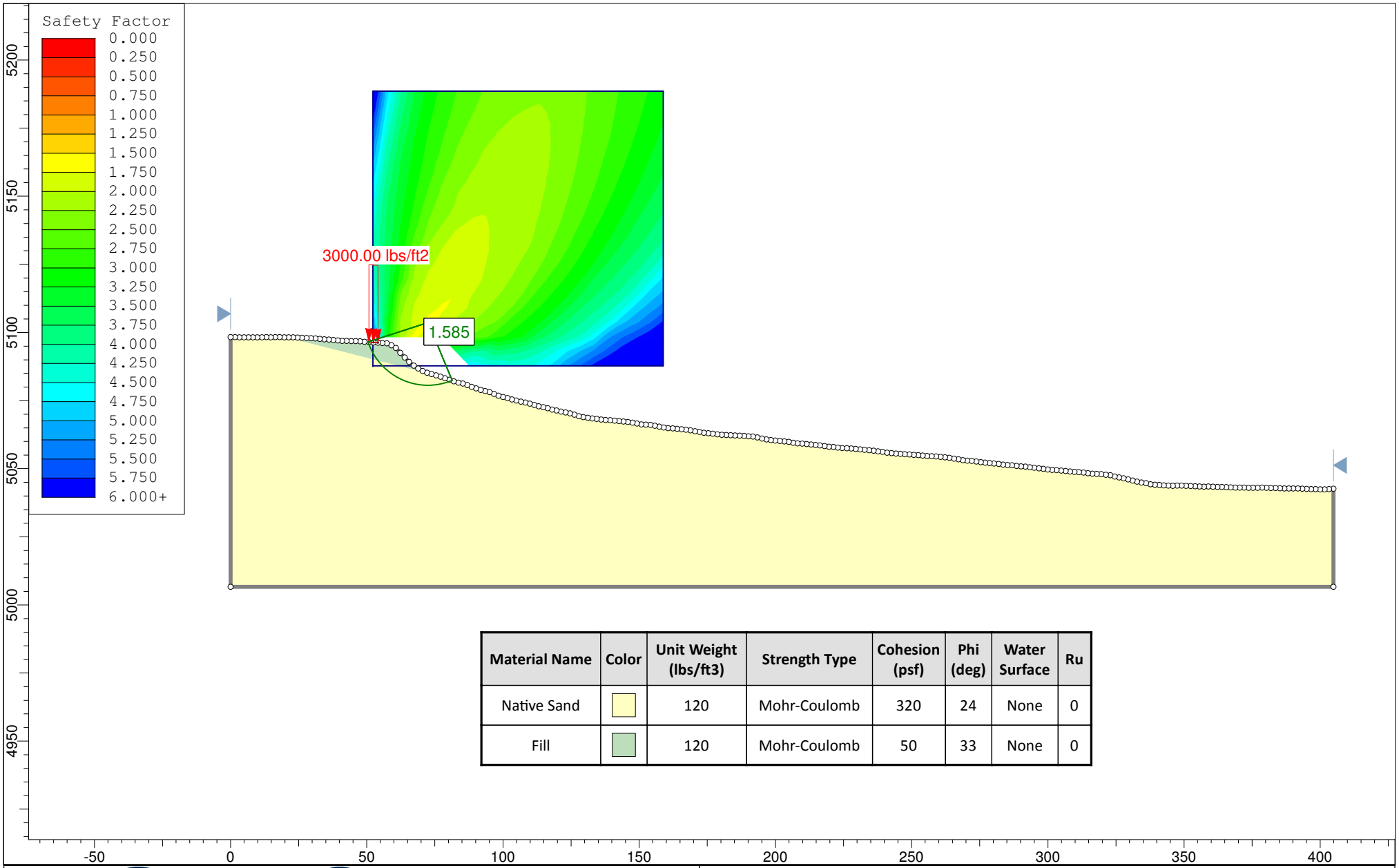
**Plate 7**




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface | Ru |
|---|---|---|---|---|---|---|---|
| Native Sand | | 120 | Mohr-Coulomb | 320 | 24 | None | 0 |
| Fill | | 120 | Mohr-Coulomb | 50 | 33 | None | 0 |

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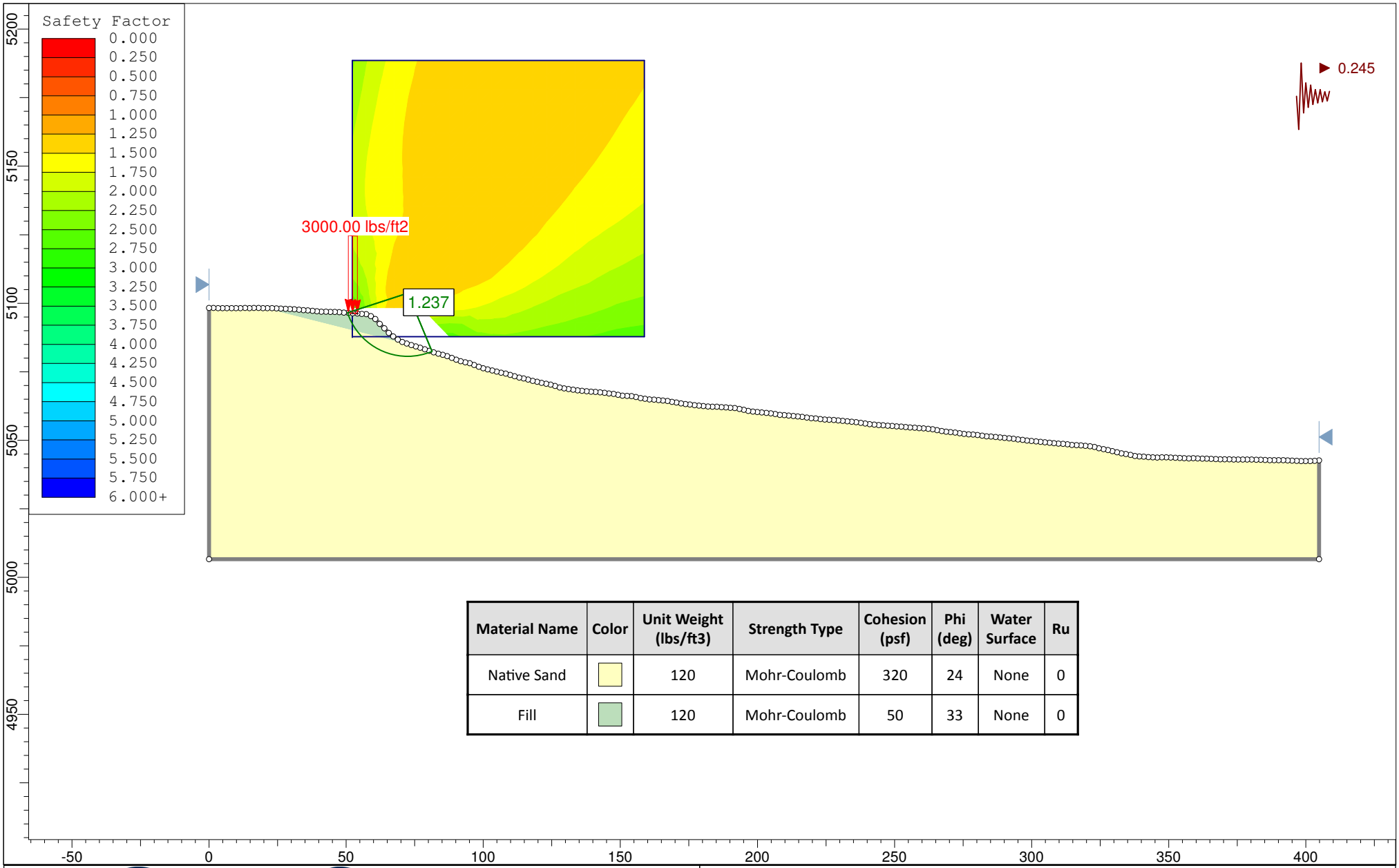
**Slope Stability - Static**

John Ogden
864 Jackson Lane
Alpine, Utah
Project Number: 1091-001

**Plate 8**




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface | Ru |
|---|---|---|---|---|---|---|---|
| Native Sand | | 120 | Mohr-Coulomb | 320 | 24 | None | 0 |
| Fill | | 120 | Mohr-Coulomb | 50 | 33 | None | 0 |

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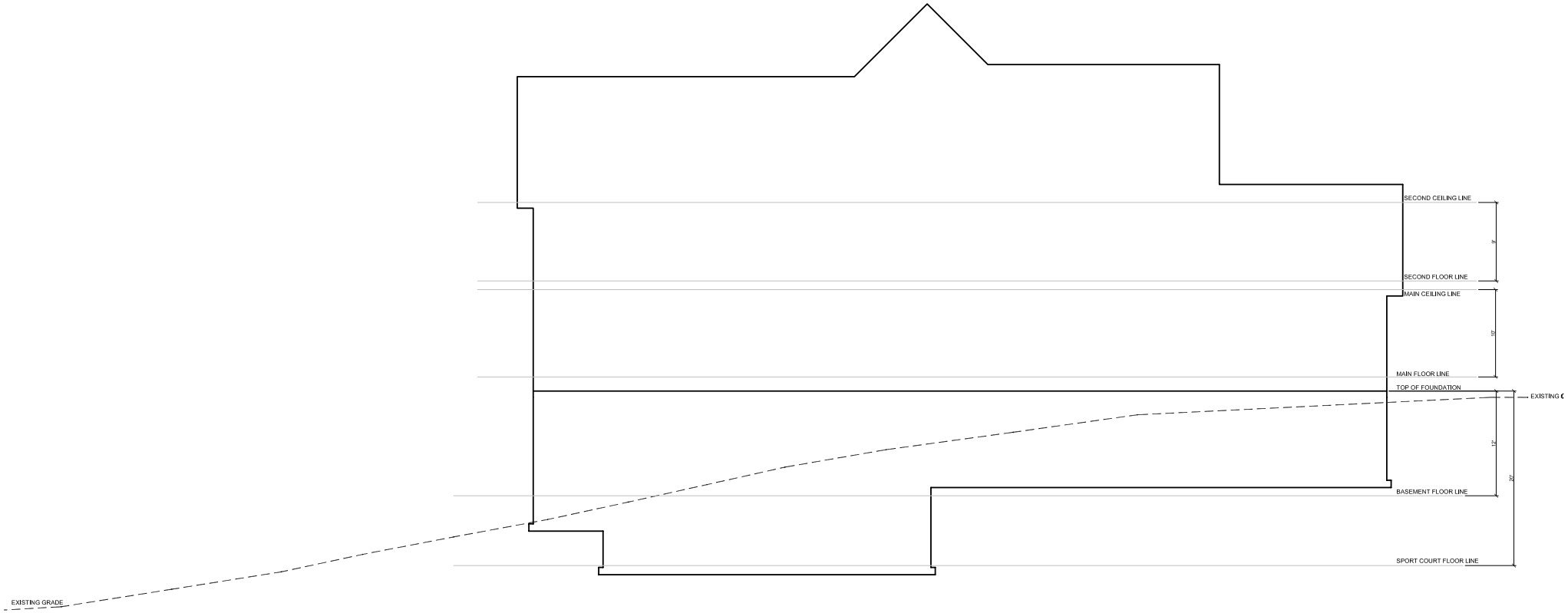
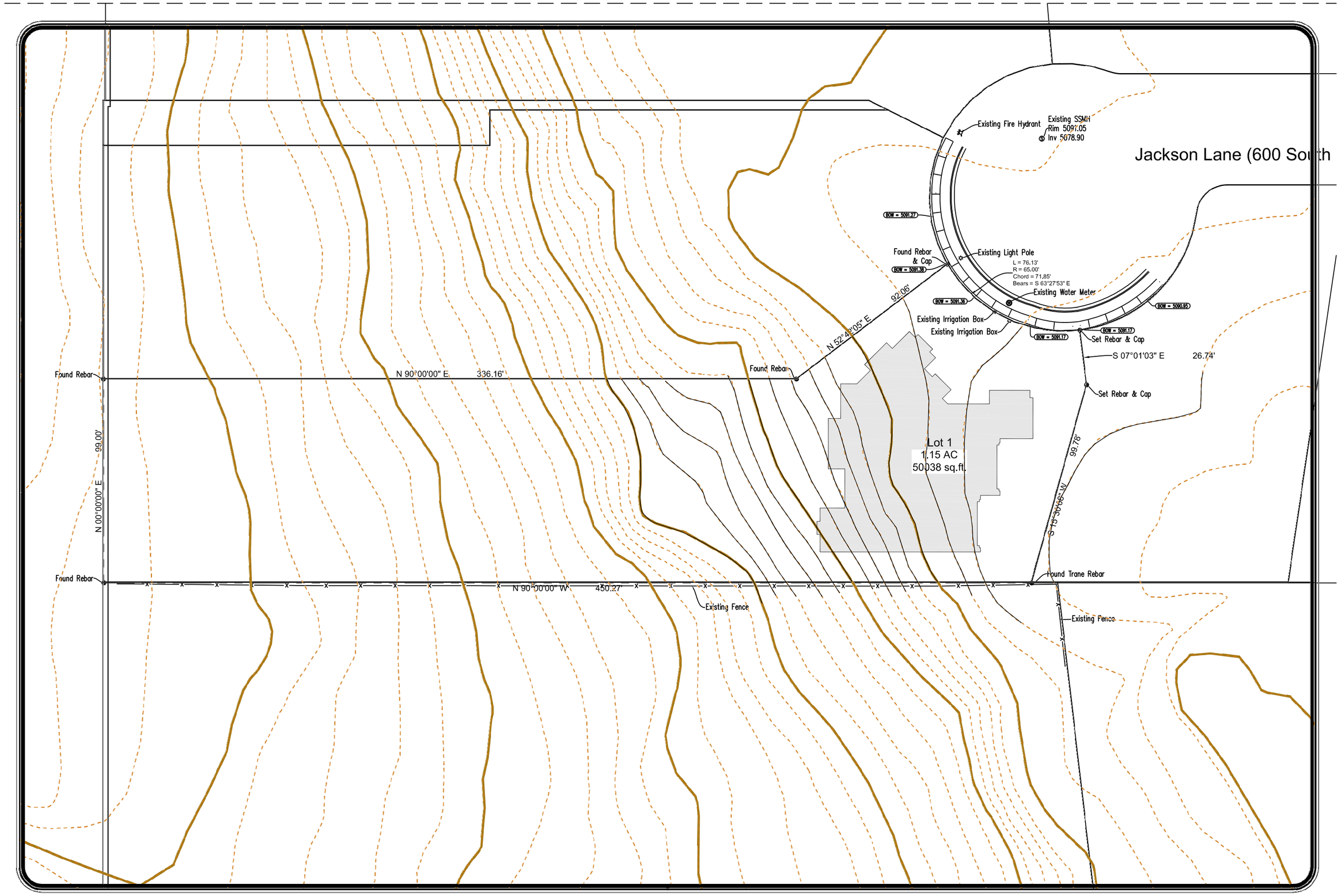
**Slope Stability - Pseudo Static**

John Ogden
864 Jackson Lane
Alpine, Utah
Project Number: 1091-001

**Plate 9**


SECOND CEILING LINE
SECOND FLOOR LINE
MAIN CEILING LINE
MAIN FLOOR LINE
TOP OF FOUNDATION
BASEMENT FLOOR LINE
SPORT COURT FLOOR LINE
EXISTING GRADE




ALPINE CITY
ESTABLISHED 1850

N

1 inch = 60 feet

# ALPINE PLANNING COMMISSION AGENDA

**SUBJECT: Fence Ordinance Amendment**

**FOR CONSIDERATION ON: 5 May 2015**

**PETITIONER: Mark Goodsell / City Council**

**ACTION REQUESTED BY PETITIONER: Discuss Ordinance and make a Recommendation to the City Council**

**APPLICABLE STATUTE OR ORDINANCE: Section 3.1.9.1 (Amendments)**

**PETITION IN COMPLIANCE WITH ORDINANCE: Yes**

**BACKGROUND INFORMATION:**

The Alpine City fence ordinance has recently come up for a few different reasons. (1) Residents have asked that the height restrictions be carefully readdressed particularly as it pertains to keeping deer off of their property and eating their gardens and flowers. (2) The City Council would like to grant some exceptions to the fence ordinance. There currently is no process for exceptions.

**STAFF RECOMMENDATION:**

That the Planning Commission discuss a proposed amendment that would address the recent concerns regarding the fence ordinance and make a recommendation to the City Council.

**3.21.6 FENCES, WALLS AND HEDGES (amended by Ord. No. 2005-02, 2/8/05; Ord. No. 2013-10, 7/9/13)**

**3.21.6.1** **Requirement.** All fences must be approved by the planning and zoning department and a building permit obtained.

**3.21.6.2** **Front Yard Fences**. Privacy fences, walls and hedges along the street frontage of a lot shall not exceed 3 feet in height when placed within 10 feet of the front property line. Open style fences shall not exceed 4 feet in height when placed within 10 feet of the front property line. Front yard fences may be 6 feet in height if they are placed at least 10 feet back from the front property line.

**3.21.6.3** **Interior Side Yard Fences.** Fences along side yards shall not exceed 3 feet in height for privacy fences and 4 feet in height for open style fences when they are within 10 feet of the front property line. Side yard fences may be 6 feet in height when they are located at least 10 feet back from the front property line.

**3.21.6.4** **Rear Yard Fences.** A rear yard fence may be 6 feet in height.

**3.21.6.5** **Corner Lot Fences within the Sight Triangle.** The sight triangle on corner lots shall not be obstructed. Privacy fences, walls, or hedges shall not exceed three (3) feet in height, and open-style fences shall not exceed four (4) feet in height, when located within the sight triangle on a corner lot. The sight triangle is defined as the area formed by connecting the corner of the property to points 35 feet back along each property line abutting the street.

**3.21.6.6** **Corner Lot Fences outside the Sight Triangle**. Side yard fences abutting the street may be 6 feet in height when they are located at least 35 feet back from the front property line, outside the sight triangle. For interior side fence see 3.21.6.2.

**3.21.6.7** **Agricultural Fences.** Fences on property where an identifiable commercial agricultural product is produced shall not exceed eight (8) feet in height, and shall be an open style fence.

**3.21.6.8** **Fences Along Public Open Space and Trails.** See Articles 3.16, Section 3.16.10.1 and Article 3.17 Section 3.17.10.3.1.

Fences or borders along property lines adjacent to a trail or open space must meet with the DRC and meet specific standards.

1. When the width of the open space or trail easement is less than 50 feet, bordering fences may not exceed 6 feet in height, and shall not obstruct visibility. (Open style fences such as rail fences, field fence, or chain link are preferable.)

2. When the width of the open space or trail easement is 50 feet or more, fence standards as specified elsewhere in this ordinance apply.

3. Fences and hedges must be completely within the boundaries of the private property.

4. Hedges or shrubs must be maintained to the same height requirements as fences.

5. The owner of the fence or hedge must maintain the side facing the open space.

# ALPINE PLANNING COMMISSION AGENDA

**SUBJECT: Retaining Wall Ordinance**

**FOR CONSIDERATION ON: 5 May 2015**

**PETITIONER: Planning Commission**

**ACTION REQUESTED BY PETITIONER: Recommend Adoption to the City Council**

**APPLICABLE STATUTE OR ORDINANCE: Section 3.1.9.1 (Amendments)**

**PETITION IN COMPLIANCE WITH ORDINANCE: Yes**

**BACKGROUND INFORMATION:**

The Alpine City Planning Commission asked the staff to look into drafting a retaining wall ordinance. A draft ordinance is attached for the Planning Commission to review.

**STAFF RECOMMENDATION:**

That the Planning Commission discuss the proposed ordinance and make a recommendation to the City Council.

DRAFT

**ORDINANCE_____**

**AN ORDINACE OF ALPINE CITY AMENDING ARTICLE(S)_____OF THE ALPINE CITY DEVELOPMENT CODE RELATED TO THE DESIGN AND REVIEW OF RETAINING WALLS**

**WHEREAS**, retaining wall construction can cause potential danger to life and property;

**WHEREAS**, the International Building Code requires a building permit for walls over four feet;

**WHEREAS**, there are a variety of guidelines and construction specifications to assist in the proper design of retaining walls over four feet prior to submitting for a building permit;

**WHEREAS**, retaining walls perform differently when built in different soils and must be designed with specific soil information incorporated into the design;

**WHEREAS**, Alpine City desires to provide clear direction about what is required for a retaining wall building permit; and

**WHEREAS**, the proposed zoning ordinance text amendment set forth herein has been reviewed by the Planning Commission and the City Council, and all appropriate public hearings have been held in accordance with Utah law to obtain public input regarding the proposed revisions;

**NOW**, **THEREFORE**, BE IT ORDAINED BY THE CITY COUNCIL OF ALPINE CITY, STATE OF UTAH, AS FOLLOWS:

Article 1. **Amendment**. Articles _____ of the Alpine City Development Code is/are hereby amended to read in its entirety as set forth in Exhibit "A" attached hereto and incorporated herein by reference.

Article 2. Severability. ……

Article 3. Effective Date……..

**PASSED AND ADOPTED BY THE CITY COUNCIL OF ALPINE CITY, STATE OF UTAH, THIS____DAY OF_____, 2015**.

ATTEST: ALPINE CITY

_____ By:_____.

City Recorder Mayor

DRAFT

**Article 3.1.11.45** **Retaining Wall:** Any structure designed to resist the lateral displacement of soil or other materials. Examples include block walls, rock walls, concrete walls, and segmented walls. A retaining wall is not considered a fence.

46. **SIGN**. Any device for visual communication to the public displayed out-of-doors, including signs painted on exterior walls, and interior illuminated signs, to be viewed from out-of-doors, but not including a flag, badge, or ensign of any government or government agency.
47. **STREET, PUBLIC**. A thoroughfare which has been dedicated and accepted by proper public authority (or abandoned to the public) or a thoroughfare not less than twenty-four (24) feet wide which has been made public by right of use and which affords the principal means of access to abutting property.
48. **STRUCTURE**. Anything constructed, the use of which requires fixed location upon the ground, or attached to something having a fixed location upon the ground, and which creates an impervious material on or above the ground; definition includes "building."
49. **YARD.** A required space on a lot other than a court, unoccupied and unobstructed from the ground upward, by buildings, except as otherwise provided herein.
50. **YARD, FRONT**. A space between the front of the main building on a lot and the front lot line or line of an abutting street or right-of-way and extending across the full width of a lot. The depth (or setback) of the front yard is the minimum distance between the front lot line, and the front-most part of the primary structure of the nearest main building at the foundation level. (Primary structure includes overhangs, porches, and decks).
51. **YARD, REAR**. A space between the back wall of the nearest main building extending the full width of the lot and the lot line that is most distant from, and is most nearly parallel with, the front lot line. If the rear lot line is less than ten feet (10') in length, or if the lot comes to a point at the rear, the rear lot line shall be deemed to be a ten foot (10') line parallel to the front line, lying wholly within the lot for the purpose of establishing the minimum rear yard. The depth (or setback) of the rear yard is the minimum distance between the rear lot line and the rearmost part of the primary structure of the nearest main building at the foundation level. (Primary structure includes overhangs, porches and decks. See drawing in Appendix A). (Ord. 2004-13, 9/28/04)
52. **YARD, SIDE**. A yard that is neither a front yard nor a rear yard. The depth (or setback) of the side yard is the minimum distance between the side lot line and the nearest part of the primary structure of the nearest main building at the foundation level. (Primary structure includes overhangs, porches and decks).
53. **ZONING LOT** (Ord. 94-02, 2/8/94). A lot or parcel of land which:
    a. Meets all area (lot size), frontage (width), setback (yard), and other zoning requirements applicable within the zone in which it is located;
    b. Abuts upon and has direct access to a street which has been dedicated to the City or otherwise accepted by the City as a City Street;
    c. Is served by the minimum level of improvements required for issuance of a building permit or for which the construction of the minimum level of improvements is secured through the posting of a performance guarantee; and
    d. Is shown as a separate lot on the final plat of a subdivision or similar development, which has been approved in accordance with the applicable ordinance, or is legally exempted from compliance with said ordinance. A parcel which is part of an unapproved or illegal subdivision shall not qualify as a zoning lot.

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**Article 3.32 Retaining Walls (Ord. No. 2015- __)**

**3.32.1. Applicability.** This section applies to all retaining walls as defined in Article 3.1.11.45

**3.32.2. Exceptions from Article 3.32.** When in the opinion of the Development Review Committee (DRC), the best interest of the City would not be served by the literal enforcement of the retaining wall standards as outlined in this ordinance, the City Council may grant an exception from these standards.

Prior to the City Council considering the exception, the DRC shall submit a written recommendation to the Planning Commission. The recommended exception shall be based on generally accepted planning and engineering. The Planning Commission shall review the recommendation and advise the City Council as to whether or not the exception should or should not be granted.

**3.32.3. Purpose and Intent.** The purpose of this ordinance and the intent of the City Council in its adoption is to promote the health and safety and general welfare of the present and future inhabitants of Alpine City. The ordinance will accomplish this purpose by:

1. Building Permit Required. Except as otherwise provided in Subsection (2), all retaining walls require a building permit prior to construction or alteration. Permit applications shall be processed and issued in accordance with building permit procedures and applicable provisions of this section. Building permit review fees will be assessed and collected at the time the permit is issued.
2. Building Permit Exemptions. The following do not require a building permit.
    1. Retaining walls less than four feet in exposed height with less than 10H:1V (Horizontal: Vertical) front and back slopes within ten feet of the wall. Tiered walls allowed, see section 5;
    2. Non-tiered retaining walls less than four feet in exposed height with back slopes flatter than or equal to 2H:1V and having front slopes no steeper than or equal to 4H:1V;
    3. Double tiered retaining walls less than three feet in exposed height per wall and which have front slopes and back slopes of each wall no steeper than or equal to 10H:1V within ten feet of the walls, 1.5 foot spacing between the front face of the upper wall and back edge of the lower wall;
    4. Retaining walls less than 50 square feet in size, less than 4 feet tall
3. Geologic Hazards. If construction of any retaining wall, which requires a building permit, occurs within sensitive land areas as outlined by Article 3.12, then all analyses required for the design of retaining walls or rock protected slopes shall follow the Sensitive Land Ordinance, specifically in regards to limits of disturbance and the required geologic hazard and engineering geology reports (3.12.6.4).
4. Engineer Design Required. All retaining walls required to obtain a building permit shall be designed by an engineer licensed by the State of Utah.
5. Height, Separation, and Plantings.
    1. For the purposes of this subsection, the height of a retaining wall is measured as exposed height (H) of wall of an individual tier.
    2. A single retaining wall shall not exceed nine feet in height if exposed or can be seen from a public right-of-way.
    3. Terracing of retaining walls is permitted where justified by topographic conditions, but the combined height of all walls shall not exceed a height of 18 feet if exposed or can be seen from the public right-of-way or

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neighboring properties. Walls with a separation of at least 2H (H of largest of 2 walls) from face of wall to face of wall shall be considered as separate walls for analysis purposes and applicability to this ordinance. If walls are within 2H (H of largest of 2 walls), then the combined height of the terrace shall be used for limitation of height.

4. In a terrace of retaining walls, a minimum horizontal separation of H/2 (H of largest of 2 walls) is required as measured from back of lower wall to face of higher wall. If the walls are not viewable from the public right-of-way or neighboring properties, then there is no limitation of height.
5. The view of the public right-of-way or neighboring property shall be verified by the City Official during the review process and prior to permit for construction.
6. For terraced walls viewable from a public right-of-way, the horizontal separation between walls shall be planted with a minimum of five shrubs for every 20 linear feet of planting area. The size of the shrubs shall be less than one-half the width of the terrace. Shrubs shall be watered by drip irrigation to minimize erosion.

**6.** Submittals. The following documents and calculations prepared by a licensed engineer of the State of Utah shall be submitted with each retaining wall building permit application:

1. profile drawings if the retaining wall is longer than 50 lineal feet, with the base elevation, exposed base elevation and top of wall labeled at the ends of the wall and every 50 linear feet or change in grade;
2. cross-sectional drawings including surface grades and structures located in front and behind the retaining wall a distance equivalent to three times the height of the retaining wall, and if the retaining wall is supporting a slope, then the cross section shall include the entire slope plus surface grades and structures within a horizontal distance equivalent to one times the height of slope;
3. a site plan showing the location of the retaining walls with the base elevation, exposed base elevation and top of wall labeled at the ends of wall and every 50 lineal feet or change in grade;
4. A copy of the geotechnical report used by the design engineer. The geotechnical report shall include shear testing that substantiates the shear strength parameters and unit weights for the materials used in the analysis; and,
5. Material strength parameters used in the design of the retaining wall, substantiated with laboratory testing of the materials as follows:
    a. for soils, this may include, but is not limited to, unit weights, direct shear tests, triaxial shear tests and unconfined compression tests;
    b. if laboratory testing was conducted from off-site but similar soils in the area, the results of the testing with similar soil classification testing needs to be submitted;
    c. minimum laboratory submittal requirements are the unit weight of retained soils, gradation for cohesionless soils, Atterberg limits for cohesive soils, and shear test data;

DRAFT

   d. soil classification testing shall be submitted for all direct shear or triaxial shear tests;
   e. if a Proctor is completed, classification testing shall be submitted with the Proctor result; and,
   f. laboratory testing should be completed in accordance with applicable American Society for Testing and Materials (ASTM) standards.
   g. for segmented block walls, the manufacturer's test data for the wall facing, soil reinforcement, and connection parameters shall be submitted in an appendix;
6. the design engineer shall indicate the design standard used and supply a printout of the input and output of the files in an appendix with factors of safety within the design standard used as follows;
   a. design calculations ensuring stability against overturning, base sliding, excessive foundation settlement, bearing capacity, internal shear and global stability;
   b. calculations shall include analysis under static and seismic loads, which shall be based on the PGA as determined from probabilistic analysis for the maximum credible earthquake (MCE), with spectral acceleration factored for site conditions in accordance with the IBC;
   c. Mechanically Stabilized Earth (MSE) walls shall be designed in general accordance with 2001 FHWA NHI-00-043 Mechanically Stabilized Earth Walls and Reinforced Soil Slopes or the National Concrete Masonry Association (NCMA) Design Manual for Segmental Retaining Walls.
   d. rock walls shall be designed in general accordance with 2006 FHWA-CFL/TD-06-006 “Rockery Design and Construction Guidelines,” and,
   e. concrete cantilever walls shall be designed in general accordance with specifications provided in current American Concrete Institute or American Society of Civil Engineers publications;
7. a global stability analysis with minimum factors of safety of at least 1.50 under static conditions and at least 1.10 under seismic loading conditions as follows:
   a. factors of safety results shall be presented to the nearest hundredth;
   b. seismic loads shall be based on the PGA as determined from probabilistic analysis for the maximum credible earthquake (MCE), with spectral acceleration factored for site conditions in accordance with the IBC;
   c. the cross-sectional view of each analysis shall be included, and the printout of the input and output files placed in an appendix; and,
   d. the global stability analysis may be omitted for concrete cantilever retaining walls that extend to frost depth, that are less than nine feet in exposed height, absent of supporting structures within 30 feet of the top of the wall, and which have less than 10H:1V front and back slopes within 30 feet of the retaining structure;
8. a drainage design, including a free draining gravel layer wrapped in filter fabric located behind the retaining wall with drain pipe day-lighting to a

DRAFT

proper outlet or weep holes placed through the base of the wall, however,

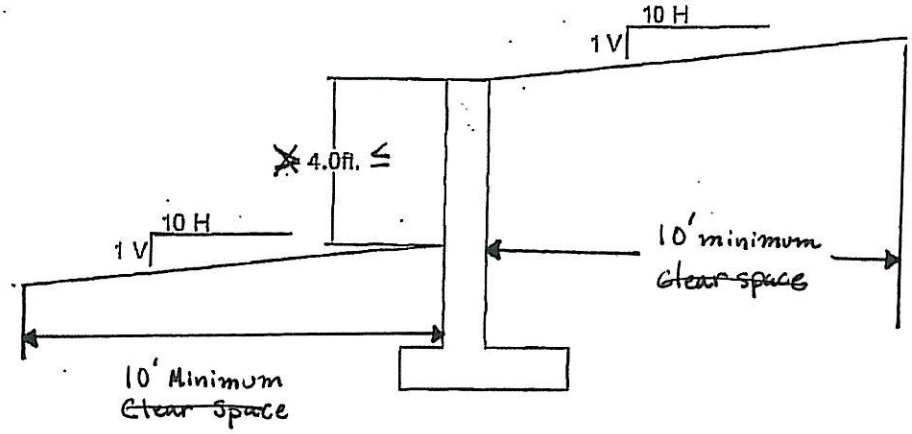
a. a synthetic drainage composite may be used behind MSE walls if a materials specific shear testing is completed to determined friction properties between the backfill and synthetic drainage composite;
b. a synthetic drainage composite is not allowed behind rock walls
c. a synthetic drainage composite may be used behind the stem of the concrete cantilever walls.
d. if the engineering can substantiate proper filtering between the retained soils and the drain rock, then the filter fabric may be omitted; and,
e. if the retaining wall is designed to withstand hydrostatic pressures or the retained soils or backfill is free-draining as substantiated through appropriate testing, then drainage material may be omitted from the design;

9. the design engineer's acknowledgement that the site is suitable for the retaining wall.
10. an inspection frequency schedule.

**7.** Preconstruction Meeting. At least 48 hours prior to the construction of any approved retaining wall, a preconstruction meeting shall be held as directed by the Building Official. The meeting shall include the Building Official, the design engineer, the contractor and the project or property owner. The preconstruction meeting can be waived at the discretion of the Building Official.

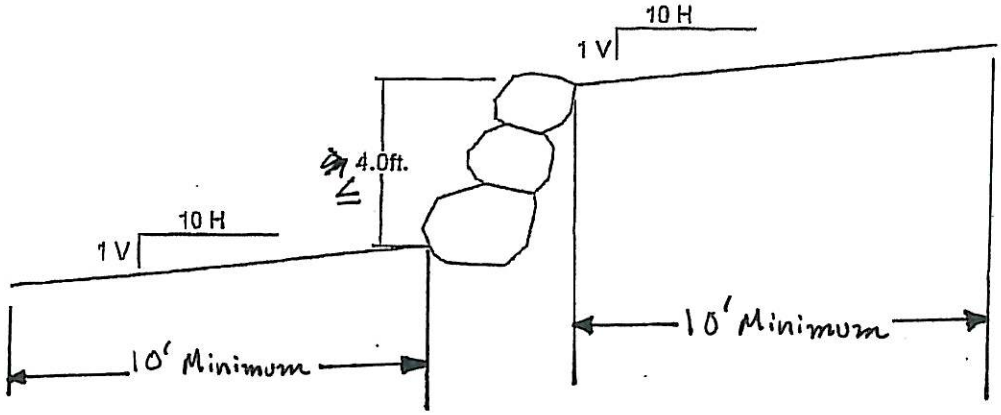
**8.** Inspections and Final Report. The design engineer shall make all inspections needed during construction. A final report from the engineer shall state that the retaining wall was built according to the submitted design. The report shall include detail of the inspections of the wall in accordance with the inspection frequency schedule. All pertinent compaction testing shall also be included with the final report.

**9.** Maintenance. All retaining walls shall be maintained in a structurally safe and sound condition and in good repair.




Building Permit Exemption (c-1) for Concrete Wall

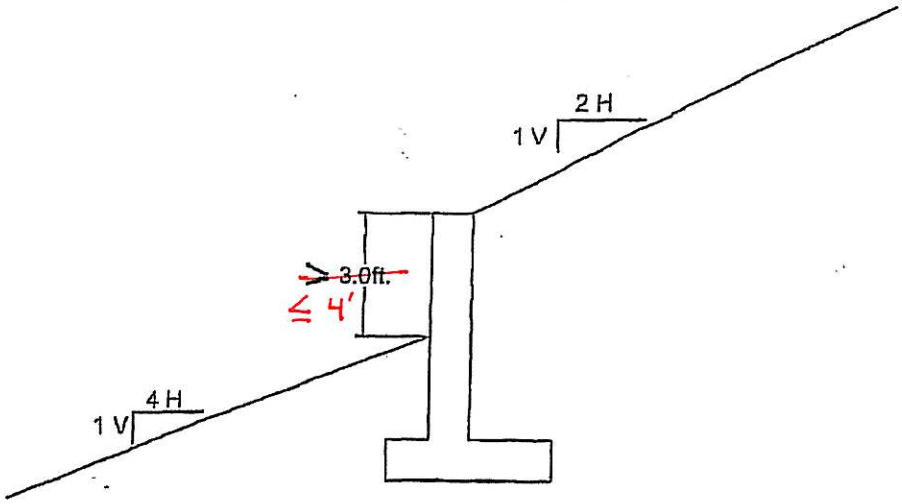
Note: Tiered walls allowed if 10' separation and slopes are met



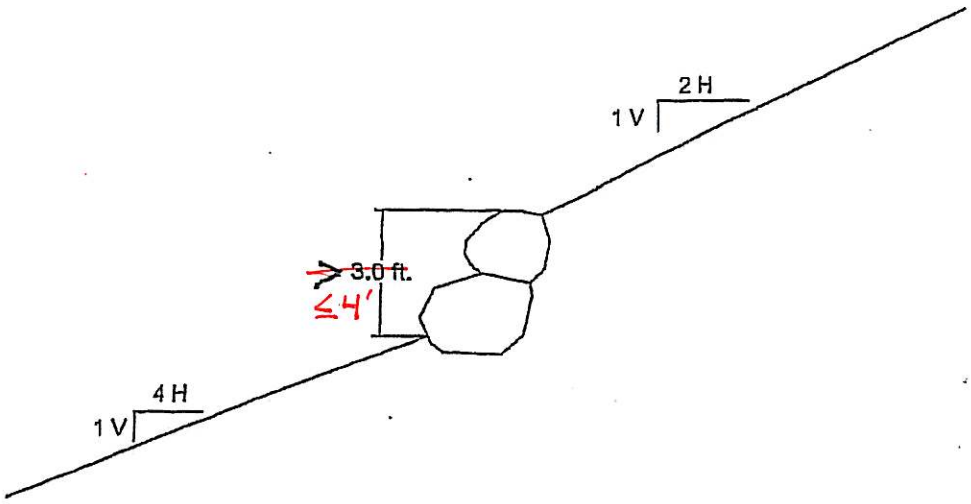

Building Permit Exemption (c-1) for Rock Wall

Note: Same as above

| | | |
|---|---|---|
| TAYLOR GEO ENGINNERING<br>2650 North 150 East<br>Lehi, Utah 84043<br>Ph. 801-400-9784 Fax. 801-766-3246 | Draper City Retaining Wall Ordinance | Sheet 1 |
| | Exemption Figures | Aug. 3, 2010 |

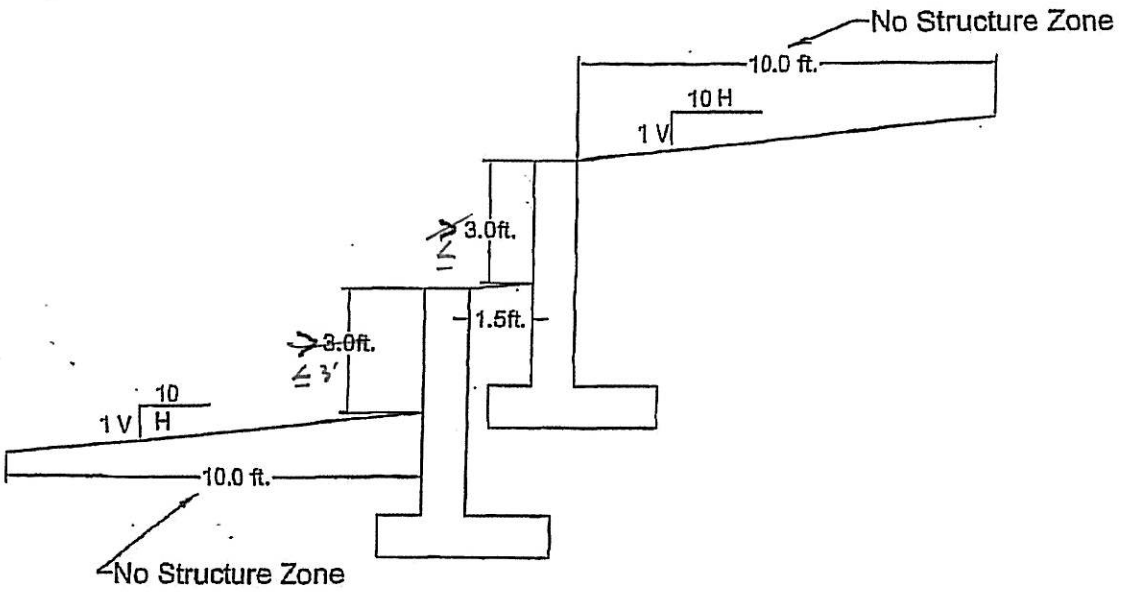



Building Permit Exemption (c-2) for Concrete Wall

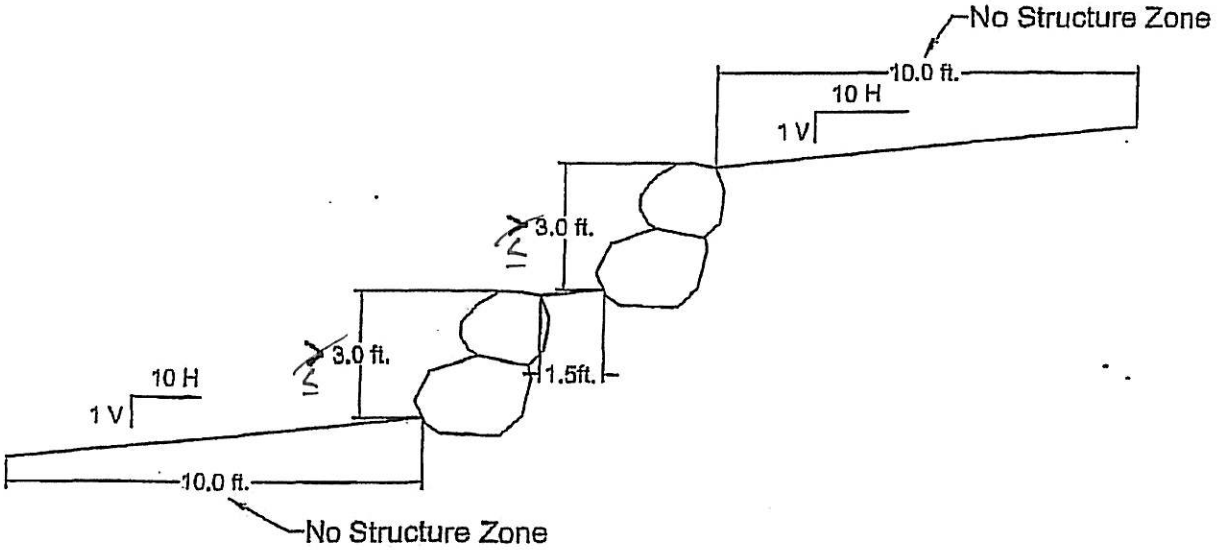



Building Permit Exemption (c-2) for Rock Wall

| | | |
|---|---|---|
| TAYLOR GEO ENGINNERING<br>2650 North 150 East<br>Lehi, Utah 84043<br>Ph. 801-400-9784 Fax. 801-766-3246 | Draper City Retaining Wall Ordinance | Sheet 2 |
| | Exemption Figures | Aug. 3, 2010 |




Building Permit Exemption (c-3) for Concrete Wall




Building Permit Exemption (c-3) for Rock Wall

| | | |
|---|---|---|
| TAYLOR GEO ENGINNERING<br>2650 North 150 East<br>Lehi, Utah 84043<br>Ph. 801-400-9784 Fax. 801-766-3246 | Draper City Retaining Wall Ordinance | Sheet 3 |
| | Exemption Figures | Aug. 3, 2010 |

# ALPINE PLANNING COMMISSION AGENDA

**SUBJECT: Melby Annexation**

**FOR CONSIDERATION ON: 5 May2015**

**PETITIONER: Ken Melby**

**ACTION REQUESTED BY PETITIONER: Discuss Potential Annexation and make a Recommendation to the City Council**

**APPLICABLE STATUTE OR ORDINANCE: Chapter 5 (Annexation)**

**PETITION IN COMPLIANCE WITH ORDINANCE: Yes**

**BACKGROUND INFORMATION:**

The City Council has asked that some discussion take place between the land owners/developer and the City to discuss the possibility of annexation for the Melby property. The Melby property, which includes 68 acres, is located north of the Cove Subdivision. The property is currently not in the City's Annexation Declaration Policy. To help facilitate the discussion, staff has asked that 4 main topics be addressed in helping the City make a decision on the annexation of this area. The four main topics are:

1. Density – How many lots are you proposing for the subdivision?
2. Roads – How are you accessing the subdivision? Because you are in a sensitive lands overlay, you will need at least two accesses to the site.
3. Utilities – How will water and other utilities be provided?
4. Open Space – Where will open space be and how will it be designated?

It was requested at the April 21, 2105 Planning Commission meeting that the Annexation Declaration Policy, potential Melby Annexation and development be considered by the City. This report is not meant to detail specifics about each issue, but rather in a broad sense give the Planning Commission and City Council details to help decide if the City would like to proceed with the request. If it is decided to proceed, more detail and studies can be performed.

**STAFF RECOMMENDATION:**

That the Planning Commission discuss annexation of this area and prepare to make a recommendation to the City Council.

Date: April 30, 2015

By: Staff
Rich Nelson, City Manager
Jason Bond, City Planner
Shane Sorensen, P.E., City Engineer
Jed Muhlestein, P.E., Assistant City Engineer

**Subject: Melby Annexation Report**

The Melby property, which includes 68 acres, is located north of the Cove Subdivision. The property is currently not in the City's Annexation Declaration Policy. It was requested at the April 21, 2105 Planning Commission meeting that the Annexation Declaration Policy, potential Melby Annexation and development be considered by the City. This report is not meant to detail specifics about each issue, but rather in a broad sense give the Planning Commission and City Council details to help decide if the City would like to proceed with the request. If it is decided to proceed, more detail and studies can be performed.

Issues to consider:

1. Annexation in general. A concern was brought forth about annexing the Melby property and no surrounding properties, leaving a large island surrounded by city property. The City Attorney has instructed Staff that it is possible to annex this area without annexing the Cove. There are no legal issues of creating an "island" of non-city property within the city.
2. Secondary Access. The proposed plan appears to meet fire code in terms of secondary access though an official letter from the Fire Marshal has not been received. Oakridge Drive and Alpine Cove Drive are the proposed access points.
3. Traffic. Pertinent information from Staff's "Oberee Annexation Report" dated April 17, 2015 has been included herewith as Appendix A thru D. Table 1 was taken from that information and modified to include the potential traffic impact the Melby Annexation would have on the area. As with the Oberee Annexation request, staff would recommend the developer obtain a traffic study to verify our assumptions and include the impact it would have on the area if fully developed, as well as the impact it would have on the existing street system. Our assumptions show that if 30 lots were added to the street system, they would potentially add 35% traffic to what exists today on Grove Drive.

**TABLE 1 – ESTIMATED TRAFFIC VOLUMES**

Traffic Volume (trips per weekday)

| Existing Lots | Trips | % of Current Total |
|---|---|---|
| Actual Traffic Count | 826 | 100% |
| Approved Lots – Vacant | | |
| Box Elder (30 lots) | 287 | 35% |
| Box Elder South (59 lots) | 565 | 68% |
| The Cove (11 lots) | 105 | 13% |
| Pine Grove (18 lots) | 172 | 21% |
| Three Falls (1/5th of 57 lots)* | 191 | 23% |
| Undeveloped | | |
| Zolman Properties (60 lots) | 574 | 70% |
| Melby Properties (30 lots) | 287 | 35% |
| **TOTAL BUILDOUT VOLUME** | **3007** | 364% |

* See attached Three Falls Traffic Study (Exhibit A)

4. Pressurized Irrigation. The property sits above the 5350' elevation, which is the highest elevation to which the city can supply pressurized irrigation water with the existing infrastructure. Like a few other locations within the city, staff would recommend the area be irrigated with culinary water.
5. Culinary Water. Before the City offers its culinary source to properties not listed in the annexation declaration policy it is recommended all other options are looked at first. One such option for this property could be to negotiate with and expand the system operated by the Alpine Cove Special Service District.

   If it is determined by the City Council that the city is willing to offer culinary services there are three issues to resolve regarding culinary service;

   a. Source
   b. Storage
   c. Supply

   Staff is currently working with Horrocks Engineers modeling potential scenarios that would be required to supply water to the Melby property. We hope to have more information regarding storage and supply by the next meeting. Regarding source, the State of Utah Division of Drinking Water has minimum source requirements of 800 gallons per day (gpd) per connection for indoor use. Actual water use data shows that approximately 208 gpd per connection was used for indoor use on average in the winter. Peak day usage is approximately two times the average. Based on the Division's requirements, the City should have a minimum of 1,875 gpm of source capacity for the current population. From the three culinary water sources, the available capacity is 1,650 gpm. Currently, we do not meet the source requirements based on the Division's rules. However, we are able to take care of all of the indoor needs of the City, in addition to outdoor water for areas where pressurized irrigation water is not available, with Grove Spring alone, which leaves the two culinary wells still available as sources. In addition,

the City has other wells that are currently connected to the pressurized irrigation system that could be connected to the culinary system if it were necessary. In the last six months there has been some discussion from the Division of Drinking Water about lowering the source capacity requirement to something less than 800 gpd per connection. No action has been taken to date. We do not know if/when state legislature will change that requirement but we have learned there is an option to apply for a reduction in source requirement. Staff would recommend the developer fund the process of applying for a reduction in source OR wait for the legislature to modify the current requirement.

6. Sewer. Staff has worked with Horrocks Engineers and modeled the sewer system at buildout volumes, including the potential addition of 30 lots from the Melby properties. It was found that the current sewer system has the capacity to handle any extra flows from the potential extra 30 lots. The development could connect to the sewer system via lines that exist within the Cove.
7. Storm Water. Storm water could be handled onsite via retention/detention ponds.
8. General Remarks. The annexation area contains lands which qualify as geologic hazards. As part of a possible annexation it would be required of the developer to provide a Geologic Hazards Report for the annexation area to help facilitate a discussion considering an allowable density for the area.
   Also, a slope analysis was performed on the property. It was found that a very high percentage of the property consists of lands above 20% which by City Ordinance (3.1.11.7) are non-buildable unless approved otherwise by the Planning Commission. If annexation were to move forward a site plan that met city code would need to be submitted. See Appendix E.

# APPENDIX A – TRAFFIC RELATED PAGES TAKEN FROM STAFF REPORT "OBEREE ANNEXATION REPORT" DATED APRIL 17, 2015

Traffic Studies

The Utah County Public Works Department took traffic counts during the week of November 10, 2014. The average daily traffic volume was 826 vehicle trips. The Horrocks Engineers Study prepared for the Box Elder South development shows that a new single dwelling unit has the potential to add 9.57 vehicles per weekday. Taking this information and assuming 60 lots were granted, an increase of 574 vehicle trips per day would be added to the existing count resulting in a total of 1400 trips per day. However, traffic volumes for approved, un-developed lots as well as the entire northern part of the City also need to be considered. Table 2 was created to show the information more clearly.

Traffic Volume (trips per weekday)

| Existing Lots | Trips | % of Current Total |
|---|---|---|
| Actual Traffic Count | 826 | 100% |
| Approved Lots – Vacant | | |
| Box Elder (30 lots) | 287 | 35% |
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| Three Falls (1/5th of 57 lots)* | 191 | 23% |
| Undeveloped | | |
| Zolman Properties (60 lots) | 574 | 70% |
| **TOTAL BUILDOUT VOLUME** | **2720** | 329% |

* See attached Three Falls Traffic Study (Exhibit A)

**TABLE 2 – ESTIMATED TRAFFIC VOLUMES**

As can be noted from Table 2, the potential 60 lots would add approximately 70% more traffic to Grove Drive than what exists today. At buildout, Grove Drive will experience over three times the traffic that it does today. In terms of impact to our roads, Level of Service (LOS) is a term used by the Highway Capacity Manual (HCM) to describe the traffic operations. It can be applied to multiple-laned highways, freeways, or intersections. It ranges from LOS A to LOS F. LOS A would be ideal uninhibited traffic conditions while LOS F would designate a condition in which improvements are required.

The Horrocks Engineers traffic study for the Box Elder South subdivision used the intersection method to determine the effects on current LOS the subdivision would have to the surrounding primary intersections. It was found that all surrounding intersections were currently operating well within the LOS A criteria and that after development, the intersections would still be within the LOS A range. We assume the Oberee Annexation/Development would have a similar impact, but this will need to be verified with a traffic study which includes the development of the entire northeastern part of the City. It is staff's recommendation that the Developer provide a detailed traffic study if the Planning Commission and City Council decide to move forward with the annexation. If it is found that the LOS will drop to anything less than a LOS A, we

recommend that the traffic study provide recommendations for road improvements to accommodate the change. One recommendation from Staff, regardless of what a traffic study says, would be to improve Grove Drive to the standard street width, with curb-gutter and sidewalk, from Alpine Boulevard to the 90 degree bend in Grove Drive, including safety improvements to the 90 degree bend.

Secondary Access

The Fire Marshall has commented on the secondary access requirements, a copy of these comments can be found in Appendix H. As mentioned in these comments, Staff also feels the connection to Elk Ridge Lane is an important one for safety and traffic flow. Timing of this connection can be a discussion item.

## General Subdivision Remarks

Geologic Hazards

The proposed annexation/development falls within the Geologic Hazards Overlay Zone as well as the Urban/Wildland Interface. As with any development, the developer will be required to obtain and submit a Geologic Hazards Report for the property if allowed to move forward. Copies of the Geologic Hazard reports and related documents completed for the former Alpine Canyon Estates development are included in Appendix I. Of particular concern is the mass grading and fill of an existing ravine that ran through the property since that time. The City has no records of compaction or what type of material was used to fill the ravine. The report would need to pay specific attention to this area to convince Staff it is safe to build on.

Impact Fees

Assuming the property were developed with 60 lots as requested, the developer paid impact fees would be as follows:

| | |
|---|---|
| Storm Water | $48,000 |
| Streets | $70,980 |
| Park/Trails | $161,200 |

All other impact fees are paid by the homeowner at the building permit level and vary depending on lot size. The actual cost of the impact fees will be based on the final number of lots.

The developer is requesting credits towards impact fees based on offsite improvements. There would be no offsite storm water required, streets potentially, and no offsite park/trails. The only potential credit to impact fees that Staff recognizes here is the streets. Staff would like to see improvements to Grove Drive whether the LOS is impacted or not. Staff would recommend the approval of a credit to the streets impact fees if Grove Drive were improved as mentioned earlier.

# APPENDIX B – UTAH COUNTY TRAFFIC MEMO

Utah County
HEART of UTAH
PUBLIC WORKS

**UTAH COUNTY**
Utah County Public Works

2855 South State Street
Provo, UT 84606
TEL: 801-851-8600
FAX: 801-851-8612

# MEMORANDUM

Date: November 18, 2014

To: Whom it May Concern

From: Utah County Public Works

Re: **Zone Change Request Lots 1 & 3 of Pine Grove Plat "A" Amended**

Our office was asked to review the proposed zone change refereed to as Lots 1& 3 of Pine Grove Plat "A" Amended and the potential effects it may have on traffic on Grove Drive. As depicted in the proposal submitted by Patterson Construction in September 2014, a preliminary plat was included that displays an additional 21 lots. Keep in mind - this request for the zone change if granted will allow for the ability to have an increase in the density of single dwelling units due to the smaller lot size associated with the proposed zone change. In reference, a single dwelling unit has the potential to increase the average trip rate by 9.57 vehicles per weekday. Based on this information, 21 lots could potentially generate an additional 201 vehicle trips per weekday. Combining this new amount with the existing average daily traffic volume of 826 which was obtain from a recently completed traffic study of Grove Drive during the week of November 10, 2014, it would total 1,027 vehicle trips per weekday. This increase could potentially alter the level of service of the existing roadway by a small amount. One thing to keep in mind is that this is based on no alterations or improvements to the existing road surface or shoulders, only an increase to the average daily traffic that could be generated based on the increase of single dwelling units.

# APPENDIX C– BOX ELDER SOUTH TRAFFIC STUDY

# BOX ELDER SOUTH

# TRAFFIC IMPACT STUDY

## ALPINE, UTAH

## Updated January 24, 2008

Prepared by

HORROCKS
ENGINEERS

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# INTRODUCTION AND SUMMARY

## *Purpose of Report and Study Objectives*

The purpose of this traffic study is to identify the traffic impacts associated with the proposed Box Elder South development on the existing road network. The study objectives are to describe the development, define the study intersections, estimate trip generation and distribution for the site and adjacent developments, analyze 2007 and 2012 PM peak traffic conditions, describe the traffic impacts of the site under 2007 and 2012 conditions and recommend improvements to mitigate traffic impacts.

## *Executive Summary*

**Site Location and Study Area.**
The Box Elder South development is planned to be located off of Box Elder Drive and off of Grove Drive in north-east Alpine, Utah. The study intersections include Alpine Cove/Grove Drive and Grove, Oakridge Drive/Grove Drive, and Box Elder Drive/Grove Drive, as well as the project accesses.

**Development Description.**
The Box Elder South development consists of approximately 61 single family detached homes. Of these home 46 units will be apart of the development on Box Elder Drive and 15 units will be located along Grove Drive. The surrounding developments consist of residential and undeveloped land. The site proposes two project accesses on Box Elder Drive and additional driveways along Grove Drive.

**Principal Findings.**
At build-out, the Box Elder South development is expected to generate an average of 596 new weekday trips with 45 trips during the AM peak hour and 60 trips during the PM peak hour. Currently, the study intersections operate at LOS A during the PM peak hour.

After traffic generated by the project is added to the roadway network, the study intersections experience some increase in traffic, but remain at an acceptable LOS A. In 2012, the study intersections will operate at LOS A.

**Conclusions and Recommendations.**
The proposed Box Elder South development is anticipated to contribute some new trips to existing roadways. To mitigate the safety and operational concerns with the existing conditions three alternative road systems were analyzed with the existing traffic volumes and with project traffic added. In each of the alternatives, all of the study intersections continue to operate under acceptable conditions with LOS A in the years 2007 and 2012.

No off-site mitigations are required to provide adequate traffic operations.

# PROPOSED DEVELOPMENT

## *Site Location*

The Box Elder South development is planned to be located on the city block with boundaries Center Park Drive and Campus View Drive in West Jordan, Utah. The site location is shown in Figure 1.

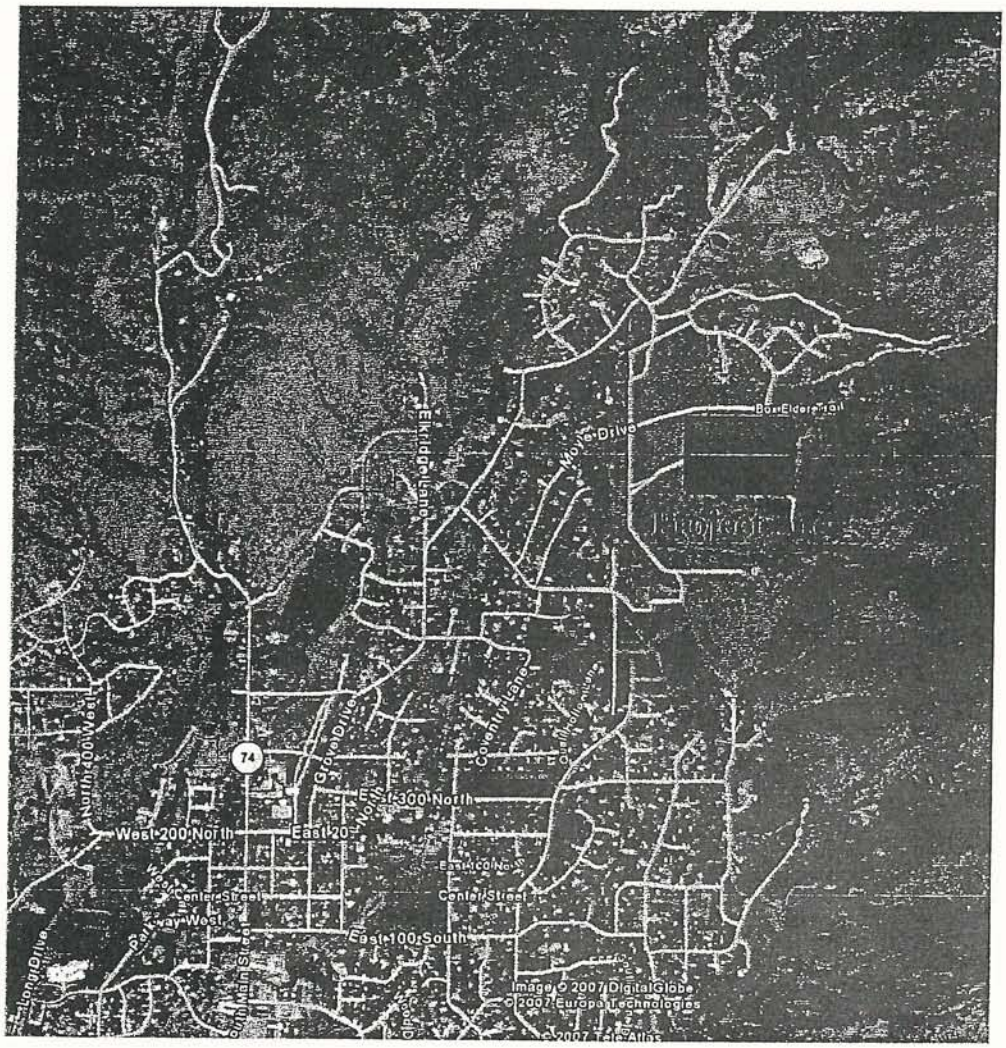



**Figure 1:** *Site Location*

## *Land Use*

The proposed development consists of 61 single family detached homes. Thirty four single family homes will be located in the Box Elder South development off of Box Elder Drive. Fifteen additional single family homes will be located north of the development off of Grove Drive. The adjacent developments consist of residential and undeveloped land.

## Site Plan and Access

The site proposes two project accesses on Box Elder Drive. The fifteen additional homes will directly access Grove Drive. See Figure 2:

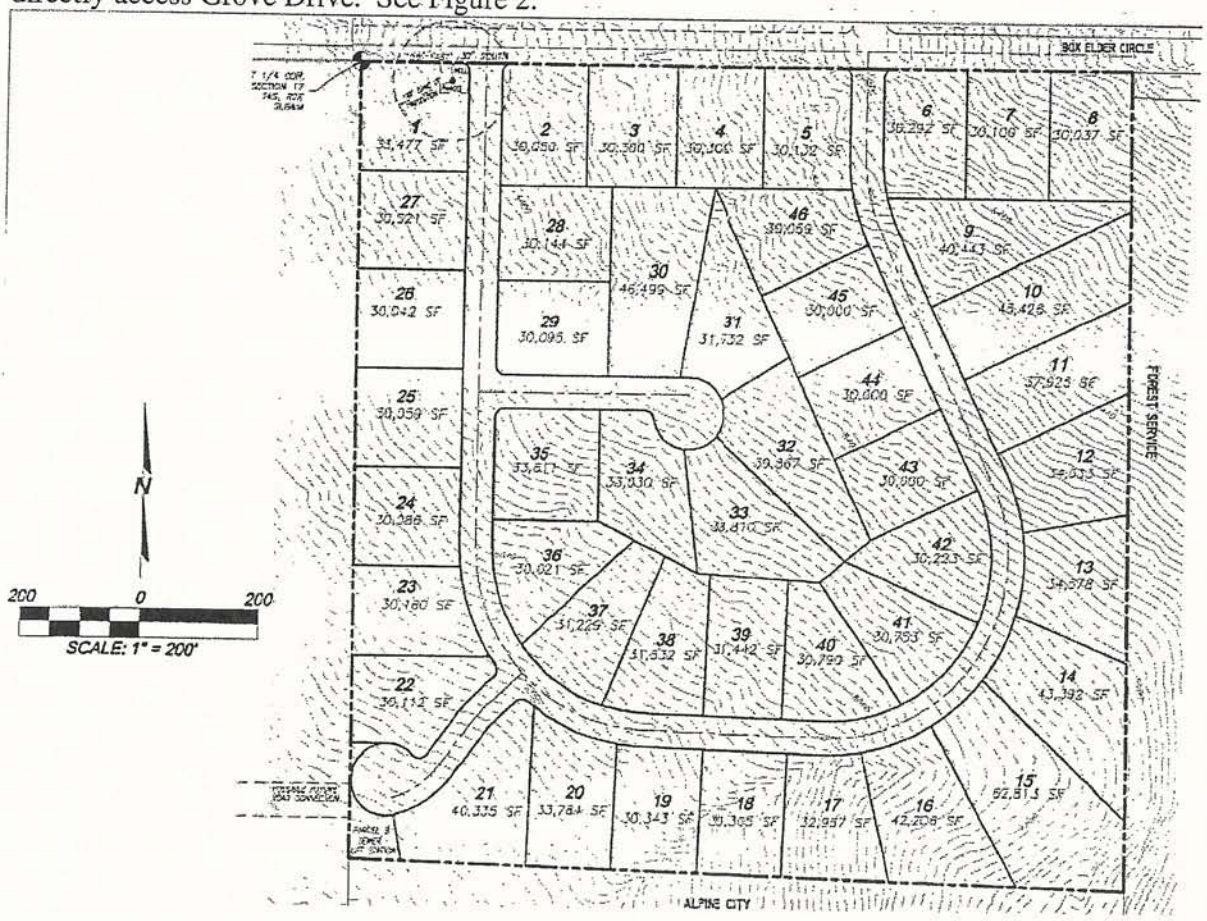



**Figure 2:** *Box Elder South Site Plan*

## Development Phasing and Timing

No development phasing was assumed in this report. The study area was reviewed at full build-out.

# STUDY AREA CONDITIONS

## *Study Area*

The following intersections were studied for this report:

**Alpine Cove Drive and Grove Drive**: This is a three legged unsignalized intersection. Grove Drive is a two-lane road with shared thru and turning lanes. Alpine Cove Drive is a two-lane road with a stop controlled left-right lane.

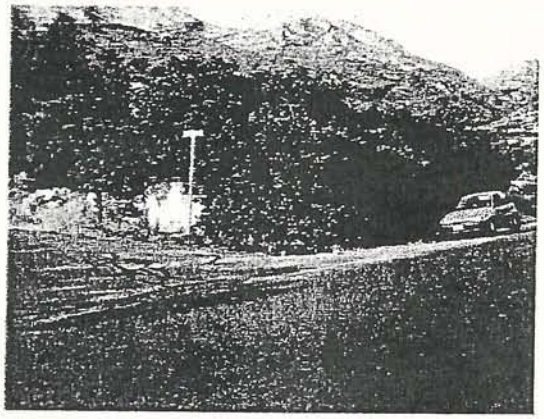


**Figure 3:** *Alpine Cove Drive and Grove Drive.*

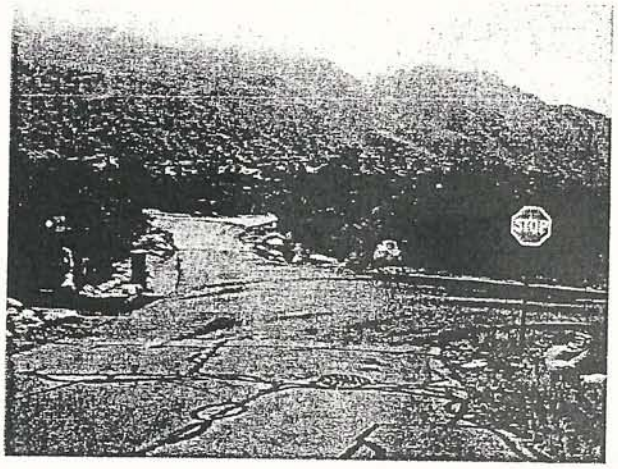



**Figure 4:** *Looking south-east on Oakridge Drive.*

**Oakridge Drive and Grove Drive**: This is a three legged unsignalized intersection. Oakridge Drive is a two-lane road with a stop controlled shared thru-right turn lane. Grove Drive is a two lane road with a shared left-right tuning lane.

**Box Elder Drive and Grove Drive**: This is a three legged unsignalized intersection. Box Elder Drive is a two-lane road that is controlled by a yield sign. Grove Drive is a two-lane road with shared thru-turning lanes.

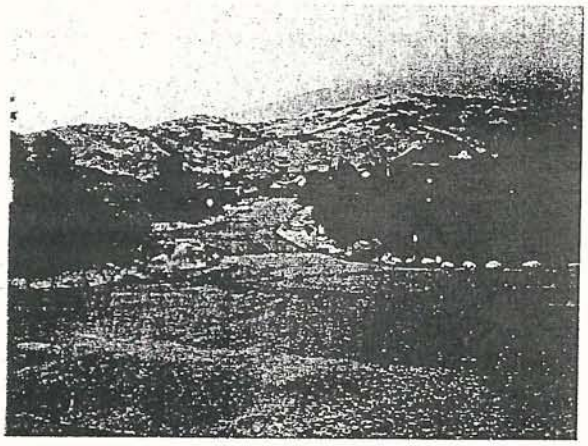


**Figure 5:** *Looking north-west from Box Elder Drive.*

The studied intersections are shown in Figure 7.

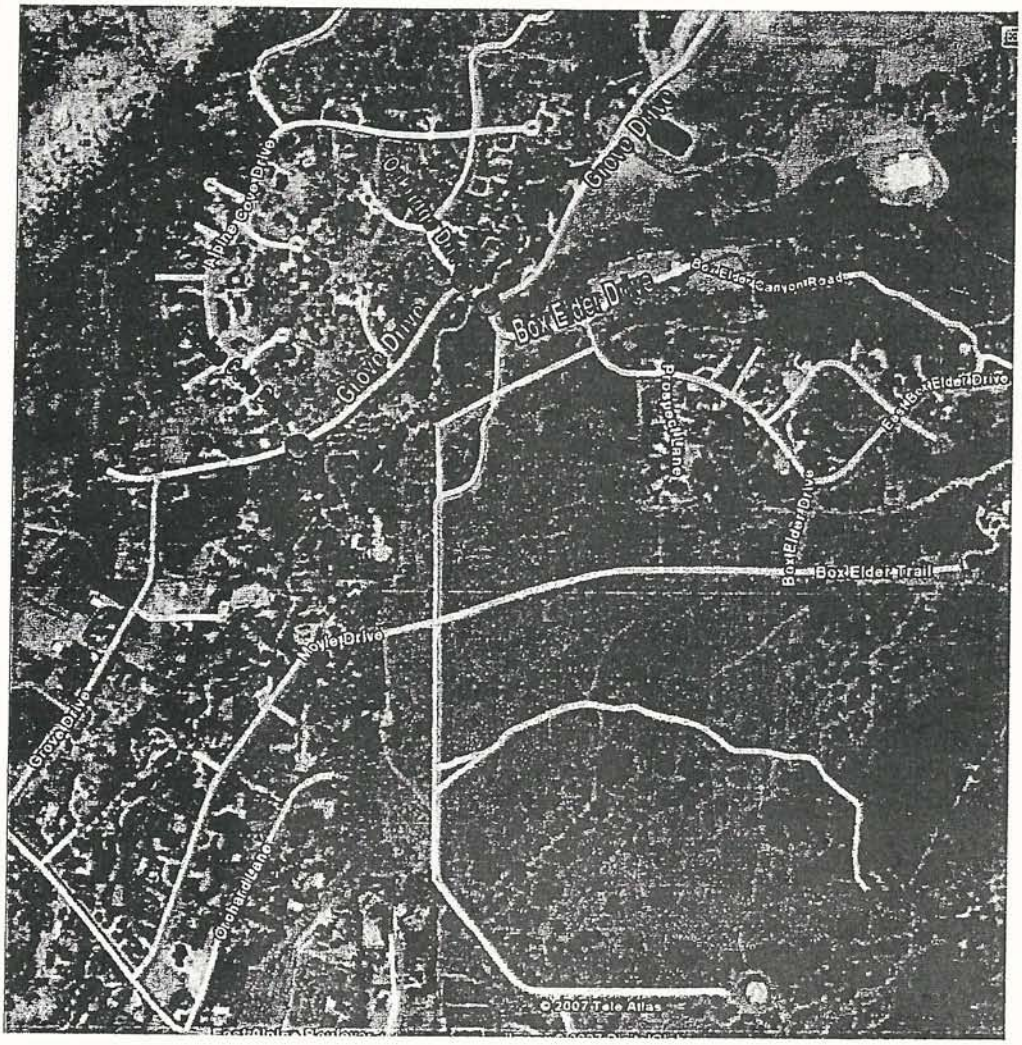



**Figure 6:** *Studied Intersections.*

## *Site Accessibility*

As shown in Figure 2, the proposed development will have one project accesses on Box Elder Drive. The fifteen additional homes will have driveway accesses along Grove Drive. Grove Drive is the main road that connects the project area to the central Alpine area.

# ANALYSIS OF 2007 CONDITIONS

## *Existing Volumes*

Traffic counts for the PM peak hour were performed for the study intersections on September 19 and 20, 2006. The rate for traffic growth was assumed to be about 3.6 percent. This growth was based on UDOT AADT data for 2000 traffic counts compared to 2005 traffic counts on SR 74 that yielded a 3.6 percent annual growth. A 3.6 percent annual growth factor was applied to the study intersections to determine the 2007 volumes. Additional information can be found in the Appendix.

Traffic volumes for the study intersections for the years 2007 and 2012 are shown below in Figures 7 and 8.

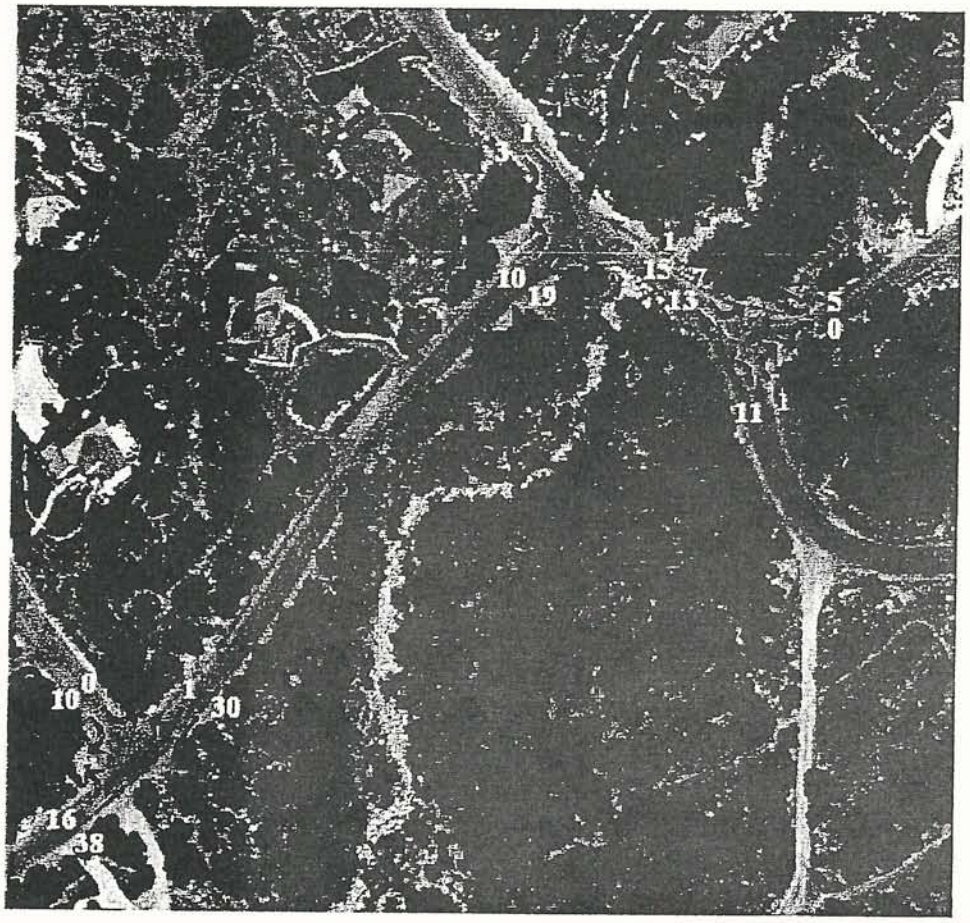



**Figure 7:** *2007 Intersection Volumes.*

**Figure 8:** *2012 Intersection Volumes.*

## *Study Intersection Level of Service*

Level of Service (LOS) is a term used by the Highway Capacity Manual (HCM) to describe the traffic operations of an intersection, based on congestion and delay. It ranges from LOS A (almost no congestion or delay) to LOS F (traffic demand is above capacity and the intersection experiences long queues and delay). LOS C is generally considered acceptable for rural intersections. LOS D is acceptable for urbanized intersections. LOS E is the threshold when the intersection reaches capacity. Table 1 summarizes LOS delay criteria for stop controlled movements at unsignalized intersections.

**Table 1:** LOS – Unsignalized Intersections Criteria

| Level of Service | Average Control delay (s/veh) |
|---|---|
| A | ≤10 |
| B | > 10 – 15 |
| C | > 15 – 25 |
| D | > 25 – 35 |
| E | > 35 – 50 |
| F | > 50 |

**Source:** Highway Capacity Manual (HCM) 2000, Transportation Research Board National Research Council, Washington D.C., 2000.

For this report, the LOS's were calculated using the Synchro/SimTraffic 7 software package. The following table summarizes the existing conditions LOS for the stop controlled movements at the study intersections during the PM peak traffic hour.

**Table 2:** 2007 Traffic Operations Summary – PM Peak Hour without Project

| Intersection | LOS | Delay (sec/veh) |
|---|---|---|
| Alpine Cove Drive / Grove Drive | A | 3.2 |
| Oakridge Drive / Grove Drive | A | 2.7 |
| Box Elder Drive / Grove Drive | A | 1.4 |

* For un-signalized intersections, only the approach with the highest delay is reported

Currently, the study intersections operate at an acceptable LOS A during the PM peak hour. However, there are exists some safety and operational concerns that exists with these study intersections.

## *Existing plus Mitigations*

The topography and vegetation in this area contribute to a lack of adequate sight distance at the study intersections. The existing signing and pavement markings contribute to a less than optimal traffic operations scenario. To mitigate these safety and operational concerns, three alternatives were analyzed with the existing traffic volumes to evaluate possible mitigation measures.

*Existing Conditions:*

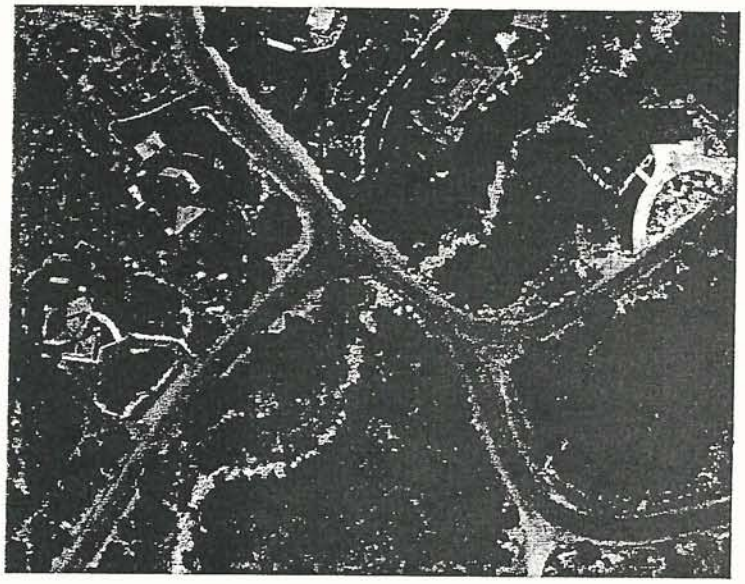


**Figure 9:** *Existing Conditions.*

***Alternative 1 – Grove Drive as a thru street.*** This alternative would require some construction as curves are straightened out and the intersections of Oakridge Drive and Box Elder Drive are brought to be perpendicular with Grove Drive. Stop signs are placed at the new intersections, and new pavement markings are applied to the roads.

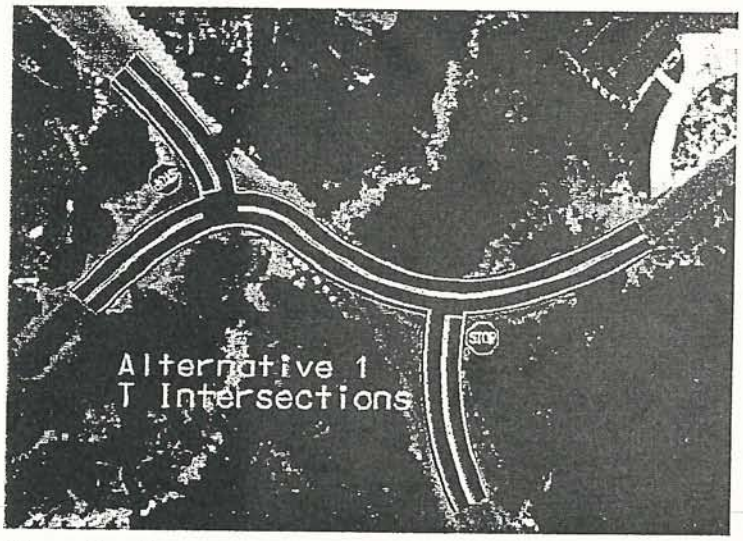



**Figure 10:** *Alternative 1.*

***Alternative 2 – Four-way Stop.*** The close proximity of the private driveway to the intersection of Grove and Oak Ridge can cause some potential conflicts with drivers going through the intersection, and a resident attempting to enter or leave the driveway. Although it is not customary to sign a private driveway with a STOP sign, constructing the driveway in this fashion improves driver expectancy when approaching this intersection. The intersection with Box Elder drive is also squared up to improve sight distance. This alternative would increase the delays to all users due to the four-way stop at Grove and Oak Ridge.

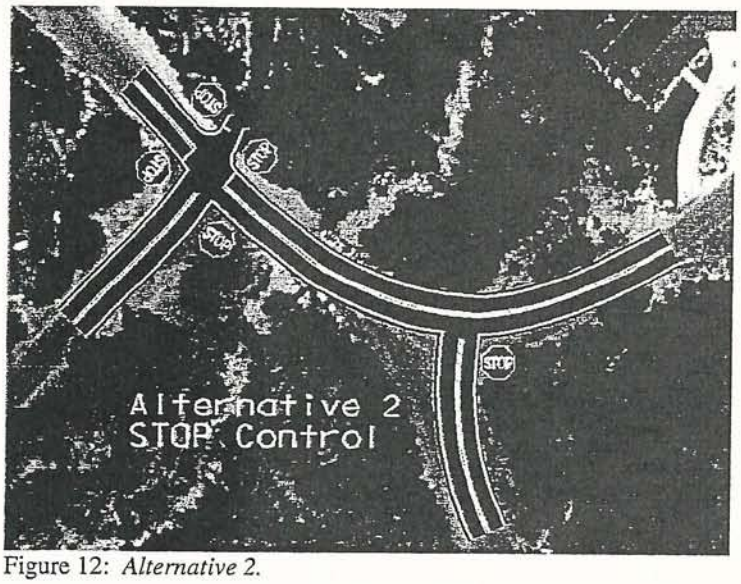



Figure 12: *Alternative 2.*

***Alternative 3 – Box Elder as a thru street.*** This alternative would also require some construction as Oakridge Drive and Box Elder Drive are aligned and the intersections with Grove Drive are brought to be perpendicular. Stop signs are placed at the new intersections, and new pavement markings are applied to the roads.

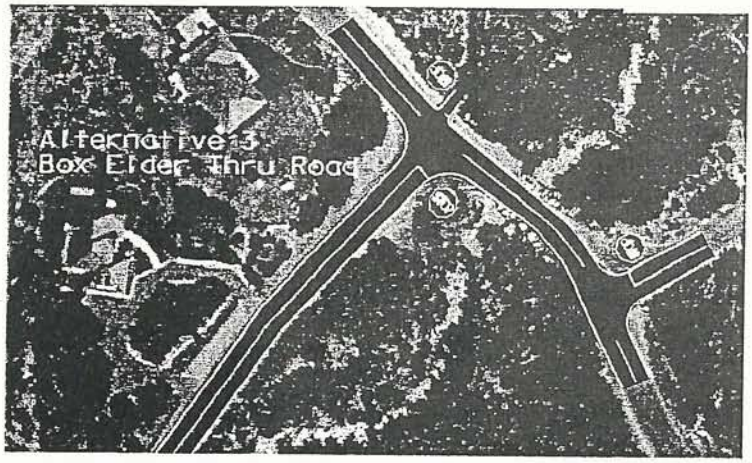



**Figure 11:** ***Alternative 3.***

### *2012 Traffic Projections*

The rate for traffic growth to 2012 was assumed to be about 3.6 percent. This growth was based on UDOT AADT data for 2000 traffic counts compared to 2005 traffic counts on SR 74 that yielded a 3.6 percent annual growth. A 3.6 percent annual growth factor was applied to the study intersections to determine the 2012 volumes. Additional information can be found in the Appendix. The following figures show the analysis of the study intersections for each of the existing alternatives in the years 2007 and 2012.

**Table 3:** 2007 Traffic Operation Summary – Without Project

| Intersection | Control | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Alpine Cove/Grove Drive | Stop | A / 3.3 sec. | A / 3.2 sec. | A / 3.2 sec. |
| Oakridge Drive/Grove Drive | Stop | A / 2.6 sec. | A / 4.2 sec. | A / 3.2 sec. |
| Box Elder Drive/Grove Drive | Stop | A / 3.9 sec. | A / 3.8 sec. | A / 2.9 sec. |

*For un-signalized intersections only the approach with the highest delay is reported

**Table 4:** 2012 Traffic Operation Summary – Without Project

| Intersection | Control | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Alpine Cove/Grove Drive | Stop | A / 3.2 sec. | A / 3.1 sec. | A / 3.1 sec. |
| Oakridge Drive/Grove Drive | Stop | A / 3.0 sec. | A / 4.4 sec. | A / 3.3 sec. |
| Box Elder Drive/Grove Drive | Stop | A / 4.0 sec. | A / 3.9 sec. | A / 2.4 sec. |

*For un-signalized intersections only the approach with the highest delay is reported

As shown in Tables 3 and 4, the study intersections will continue to operate at LOS A in each of the alternatives. The changes in the road system do not highly affect the operation of the intersections.

## PROJECTED TRAFFIC

### *Site Traffic Forecasts*

***Trip Generation.*** The Institute of Transportation Engineers' (ITE) Trip Generation manual, 7th Edition was used to calculate new trip volumes. The project trips were estimated based on 61 Single Family detached homes. Of these, 46 homes are from the proposed Box Elder South Development, and 15 are from other lots expected to be built along Grove Drive. The following table summarizes the results of the trip generation for the proposed development:

**Table 5:** ITE Trip Generation Site Summary

| Variable | Quantity | Weekday Daily Trips | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total | In | Out | Total | In | Out |
| Single-Family Detached Housing (210) | | | | 25% | 75% | | 63% | 37% |
| Units. | 46 | 449 | 34 | 9 | 26 | 46 | 29 | 17 |
| Units. | 15 | 147 | 11 | 3 | 8 | 15 | 9 | 5 |
| Total | 61 | 596 | 45 | 11 | 34 | 60 | 38 | 22 |

As shown in the table, the proposed development is expected to generate an average of 596 new daily weekday trips. Approximately 45 and 60 of these trips occur during the AM and PM peak hours respectively.

***Trip Distribution.*** The trip distribution was calculated based on the existing traffic counts and assumed travel paths. Seventy percent of the new trips will use the access on Box Elder Drive and thirty percent of the new trips will uses accesses off of Grove Drive.

Traffic volumes for the study intersections with project trips for the years 2007 and 2012 are shown below in Figures 12 and 13.

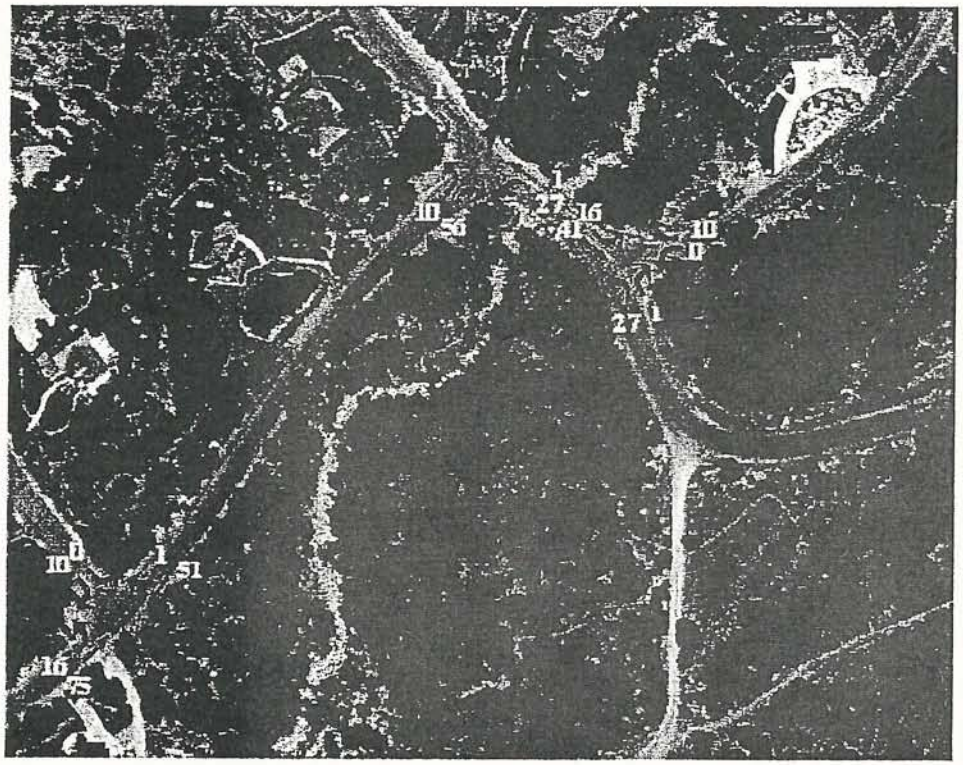



**Figure 12:** ***2007 Intersection Volumes with Project trips.***

**Figure 13:** *2012 Intersection Volumes with Project trips.*

# TRAFFIC AND IMPROVEMENT ANALYSIS

## *Study Intersection Level of Service*

Level of Service (LOS) was calculated with the Synchro/SimTraffic 7 software package. 2007 conditions were analyzed with the new project traffic added to the PM peak hour volumes. The following tables show the results of the analysis.

**Table 6:** 2007 Traffic Operations Summary – With Project

| Intersection | Control | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Alpine Cove/Grove Drive | Stop | A / 3.0 sec. | A / 2.9 sec. | A / 2.9 sec. |
| Oakridge Drive/Grove Drive | Stop | A / 3.4 sec. | A / 4.7 sec. | A / 3.3 sec. |
| Box Elder Drive/Grove Drive | Stop | A / 4.3 sec. | A / 4.4 sec. | A / 2.6 sec. |

*For un-signalized intersections only the approach with the highest delay is reported

**Table 7:** 2012 Traffic Operations Summary –With Project

| Intersection | Control | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Alpine Cove/Grove Drive | Stop | A / 3.0 sec. | A / 3.1 sec. | A / 3.0 sec. |
| Oakridge Drive/Grove Drive | Stop | A / 3.0 sec. | A / 4.7 sec. | A / 3.3 sec. |
| Box Elder Drive/Grove Drive | Stop | A / 4.3 sec. | A / 4.4 sec. | A / 2.7 sec. |

*For un-signalized intersections only the approach with the highest delay is reported

As shown in Tables 6 and 7, after traffic generated by the project and surrounding area is added to the roadway network, the study intersections will continue to operate at acceptable conditions with LOS A for each of the alternatives.

# CONCLUSIONS AND RECOMMENDATIONS

The Box Elder South development consists of approximately 61 single family detached homes. Of these home 46 units will be apart of the development on Box Elder Drive and 15 units will be located along Grove Drive. The surrounding developments consist of residential and undeveloped land. The site proposes two project accesses on Box Elder Drive and additional driveways along Grove Drive.

To mitigate the safety and operational concerns with the existing conditions, three alternative road systems were analyzed with the existing traffic volumes and also with project traffic added. In each of the alternatives, all of the study intersections continue to operate under acceptable conditions with LOS A in the years 2007 and 2012.

At build-out, the Box Elder South development is expected to generate an average of 596 new weekday trips with 45 trips during the AM peak hour and 60 trips during the PM peak hour. Currently, the study intersections operate at Level of Service (LOS) A during the PM peak hour.

The proposed Box Elder South development will contribute some new trips to existing roadways. However, no off-site mitigations are required to provide adequate traffic operations due to this development. After traffic generated by the project is added to the roadway network, the study intersections experience some increase in traffic, but remain at an acceptable LOS A. In 2012, the study intersections will continue to operate at LOS A.

# APPENDIX

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.9 | 0.2 | 3.2 | 0.9 |
| Vehicles Entered | 57 | 28 | 11 | 96 |
| Vehicles Exited | 55 | 28 | 11 | 94 |
| Hourly Exit Rate | 55 | 28 | 11 | 94 |
| Input Volume | 54 | 32 | 10 | 96 |
| % of Volume | 102 | 88 | 110 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Oakridge Drive & Grove Drive Performance by approach

| Approach | SB | NW | NE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 2.7 | 0.1 | 0.1 | 0.3 |
| Vehicles Entered | 5 | 12 | 34 | 51 |
| Vehicles Exited | 5 | 12 | 34 | 51 |
| Hourly Exit Rate | 5 | 12 | 34 | 51 |
| Input Volume | 4 | 16 | 30 | 50 |
| % of Volume | 125 | 75 | 113 | 102 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | WB | NB | SE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.0 | 1.4 | 0.1 | 0.4 |
| Vehicles Entered | 4 | 9 | 23 | 36 |
| Vehicles Exited | 4 | 9 | 23 | 36 |
| Hourly Exit Rate | 4 | 9 | 23 | 36 |
| Input Volume | 5 | 12 | 20 | 37 |
| % of Volume | 80 | 75 | 115 | 97 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.0 |
| Delay / Veh (s) | 39.7 |
| Vehicles Entered | 58 |
| Vehicles Exited | 3 |
| Hourly Exit Rate | 3 |
| Input Volume | 183 |
| % of Volume | 2 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.9 | 0.2 | 3.3 | 0.9 |
| Vehicles Entered | 57 | 28 | 11 | 96 |
| Vehicles Exited | 55 | 28 | 11 | 94 |
| Hourly Exit Rate | 55 | 28 | 11 | 94 |
| Input Volume | 54 | 32 | 10 | 96 |
| % of Volume | 102 | 88 | 110 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Grove Drive & Oakridge Drive Performance by approach

| Approach | NB | SB | SE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.6 | 0.5 | 2.6 | 0.7 |
| Vehicles Entered | 34 | 12 | 5 | 51 |
| Vehicles Exited | 34 | 12 | 5 | 51 |
| Hourly Exit Rate | 34 | 12 | 5 | 51 |
| Input Volume | 30 | 16 | 4 | 50 |
| % of Volume | 113 | 75 | 125 | 102 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.0 | 0.0 | 3.9 | 1.0 |
| Vehicles Entered | 23 | 4 | 9 | 36 |
| Vehicles Exited | 23 | 4 | 9 | 36 |
| Hourly Exit Rate | 23 | 4 | 9 | 36 |
| Input Volume | 20 | 5 | 12 | 37 |
| % of Volume | 115 | 80 | 75 | 97 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.0 |
| Delay / Veh (s) | 53.8 |
| Vehicles Entered | 58 |
| Vehicles Exited | 3 |
| Hourly Exit Rate | 3 |
| Input Volume | 183 |
| % of Volume | 2 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.9 | 0.1 | 3.2 | 0.9 |
| Vehicles Entered | 57 | 28 | 11 | 96 |
| Vehicles Exited | 55 | 28 | 11 | 94 |
| Hourly Exit Rate | 55 | 28 | 11 | 94 |
| Input Volume | 54 | 32 | 10 | 96 |
| % of Volume | 102 | 88 | 110 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Grove Drive & Oakridge Drive Performance by approach

| Approach | NB | SB | NE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 1.3 | 0.0 | 3.2 | 2.4 |
| Vehicles Entered | 12 | 5 | 34 | 51 |
| Vehicles Exited | 12 | 5 | 34 | 51 |
| Hourly Exit Rate | 12 | 5 | 34 | 51 |
| Input Volume | 16 | 4 | 30 | 50 |
| % of Volume | 75 | 125 | 113 | 102 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | WB | NB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 2.9 | 0.2 | 0.7 | 0.8 |
| Vehicles Entered | 4 | 9 | 23 | 36 |
| Vehicles Exited | 4 | 9 | 23 | 36 |
| Hourly Exit Rate | 4 | 9 | 23 | 36 |
| Input Volume | 5 | 12 | 20 | 37 |
| % of Volume | 80 | 75 | 115 | 97 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | 80.2 |
| Vehicles Entered | 58 |
| Vehicles Exited | 3 |
| Hourly Exit Rate | 3 |
| Input Volume | 183 |
| % of Volume | 2 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.9 | 0.2 | 3.2 | 0.9 |
| Vehicles Entered | 57 | 28 | 11 | 96 |
| Vehicles Exited | 55 | 29 | 11 | 95 |
| Hourly Exit Rate | 55 | 29 | 11 | 95 |
| Input Volume | 54 | 32 | 10 | 96 |
| % of Volume | 102 | 91 | 110 | 99 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Oakridge Drive & Grove Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 2.8 | 4.2 | 3.3 | 3.4 |
| Vehicles Entered | 5 | 12 | 34 | 51 |
| Vehicles Exited | 5 | 12 | 34 | 51 |
| Hourly Exit Rate | 5 | 12 | 34 | 51 |
| Input Volume | 4 | 16 | 30 | 50 |
| % of Volume | 125 | 75 | 113 | 102 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.3 | 0.0 | 3.8 | 1.1 |
| Vehicles Entered | 23 | 4 | 9 | 36 |
| Vehicles Exited | 23 | 4 | 9 | 36 |
| Hourly Exit Rate | 23 | 4 | 9 | 36 |
| Input Volume | 20 | 5 | 12 | 37 |
| % of Volume | 115 | 80 | 75 | 97 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | 100.6 |
| Vehicles Entered | 58 |
| Vehicles Exited | 3 |
| Hourly Exit Rate | 3 |
| Input Volume | 183 |
| % of Volume | 2 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.9 | 0.2 | 3.2 | 0.9 |
| Vehicles Entered | 67 | 35 | 11 | 113 |
| Vehicles Exited | 66 | 35 | 11 | 112 |
| Hourly Exit Rate | 66 | 35 | 11 | 112 |
| Input Volume | 64 | 38 | 12 | 114 |
| % of Volume | 103 | 92 | 92 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Grove Drive & Oakridge Drive Performance by approach

| Approach | NB | SB | SE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.7 | 0.6 | 3.0 | 0.9 |
| Vehicles Entered | 44 | 16 | 6 | 66 |
| Vehicles Exited | 44 | 16 | 6 | 66 |
| Hourly Exit Rate | 44 | 16 | 6 | 66 |
| Input Volume | 36 | 19 | 5 | 60 |
| % of Volume | 122 | 84 | 120 | 110 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.1 | 0.0 | 4.0 | 1.2 |
| Vehicles Entered | 28 | 5 | 13 | 46 |
| Vehicles Exited | 28 | 5 | 13 | 46 |
| Hourly Exit Rate | 28 | 5 | 13 | 46 |
| Input Volume | 24 | 6 | 14 | 44 |
| % of Volume | 117 | 83 | 93 | 105 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | 53.3 |
| Vehicles Entered | 70 |
| Vehicles Exited | 4 |
| Hourly Exit Rate | 4 |
| Input Volume | 218 |
| % of Volume | 2 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.9 | 0.2 | 3.1 | 0.9 |
| Vehicles Entered | 67 | 35 | 11 | 113 |
| Vehicles Exited | 66 | 35 | 11 | 112 |
| Hourly Exit Rate | 66 | 35 | 11 | 112 |
| Input Volume | 64 | 38 | 12 | 114 |
| % of Volume | 103 | 92 | 92 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Oakridge Drive & Grove Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.1 |
| Delay / Veh (s) | 3.1 | 4.4 | 3.5 | 3.7 |
| Vehicles Entered | 6 | 16 | 43 | 65 |
| Vehicles Exited | 6 | 16 | 43 | 65 |
| Hourly Exit Rate | 6 | 16 | 43 | 65 |
| Input Volume | 5 | 19 | 36 | 60 |
| % of Volume | 120 | 84 | 119 | 108 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.3 | 0.0 | 3.9 | 1.3 |
| Vehicles Entered | 28 | 5 | 13 | 46 |
| Vehicles Exited | 28 | 5 | 13 | 46 |
| Hourly Exit Rate | 28 | 5 | 13 | 46 |
| Input Volume | 24 | 6 | 14 | 44 |
| % of Volume | 117 | 83 | 93 | 105 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | 99.0 |
| Vehicles Entered | 70 |
| Vehicles Exited | 4 |
| Hourly Exit Rate | 4 |
| Input Volume | 218 |
| % of Volume | 2 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.8 | 0.1 | 3.1 | 0.7 |
| Vehicles Entered | 92 | 53 | 9 | 154 |
| Vehicles Exited | 93 | 52 | 9 | 154 |
| Hourly Exit Rate | 93 | 52 | 9 | 154 |
| Input Volume | 84 | 48 | 10 | 142 |
| % of Volume | 111 | 108 | 90 | 108 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Oakridge Drive & Grove Drive Performance by approach

| Approach | SB | NW | NE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 3.6 | 0.1 | 0.2 | 0.3 |
| Vehicles Entered | 4 | 37 | 67 | 108 |
| Vehicles Exited | 4 | 37 | 67 | 108 |
| Hourly Exit Rate | 4 | 37 | 67 | 108 |
| Input Volume | 4 | 34 | 59 | 97 |
| % of Volume | 100 | 109 | 114 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | WB | NB | SE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.0 | 1.7 | 0.1 | 0.6 |
| Vehicles Entered | 10 | 26 | 56 | 92 |
| Vehicles Exited | 10 | 27 | 56 | 93 |
| Hourly Exit Rate | 10 | 27 | 56 | 93 |
| Input Volume | 10 | 24 | 50 | 84 |
| % of Volume | 100 | 112 | 112 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | 98.9 |
| Vehicles Entered | 93 |
| Vehicles Exited | 2 |
| Hourly Exit Rate | 2 |
| Input Volume | 323 |
| % of Volume | 1 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.8 | 0.1 | 3.1 | 0.7 |
| Vehicles Entered | 92 | 53 | 9 | 154 |
| Vehicles Exited | 93 | 52 | 9 | 154 |
| Hourly Exit Rate | 93 | 52 | 9 | 154 |
| Input Volume | 84 | 48 | 10 | 142 |
| % of Volume | 111 | 108 | 90 | 108 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Grove Drive & Oakridge Drive Performance by approach

| Approach | NB | SB | SE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.5 | 0.6 | 3.5 | 0.7 |
| Vehicles Entered | 67 | 37 | 4 | 108 |
| Vehicles Exited | 67 | 37 | 4 | 108 |
| Hourly Exit Rate | 67 | 37 | 4 | 108 |
| Input Volume | 59 | 34 | 4 | 97 |
| % of Volume | 114 | 109 | 100 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.1 | 0.0 | 4.5 | 1.4 |
| Vehicles Entered | 56 | 10 | 26 | 92 |
| Vehicles Exited | 56 | 10 | 27 | 93 |
| Hourly Exit Rate | 56 | 10 | 27 | 93 |
| Input Volume | 50 | 10 | 24 | 84 |
| % of Volume | 112 | 100 | 112 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | 153.6 |
| Vehicles Entered | 93 |
| Vehicles Exited | 2 |
| Hourly Exit Rate | 2 |
| Input Volume | 323 |
| % of Volume | 1 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.8 | 0.1 | 3.2 | 0.7 |
| Vehicles Entered | 92 | 53 | 9 | 154 |
| Vehicles Exited | 93 | 52 | 9 | 154 |
| Hourly Exit Rate | 93 | 52 | 9 | 154 |
| Input Volume | 84 | 48 | 10 | 142 |
| % of Volume | 111 | 108 | 90 | 108 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Grove Drive & Oakridge Drive Performance by approach

| Approach | NB | SB | NE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.1 | 0.1 |
| Delay / Veh (s) | 1.5 | 0.1 | 3.4 | 2.7 |
| Vehicles Entered | 37 | 4 | 67 | 108 |
| Vehicles Exited | 37 | 4 | 67 | 108 |
| Hourly Exit Rate | 37 | 4 | 67 | 108 |
| Input Volume | 34 | 4 | 59 | 97 |
| % of Volume | 109 | 100 | 114 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | WB | NB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 2.6 | 0.2 | 0.7 | 0.8 |
| Vehicles Entered | 10 | 26 | 56 | 92 |
| Vehicles Exited | 10 | 27 | 56 | 93 |
| Hourly Exit Rate | 10 | 27 | 56 | 93 |
| Input Volume | 10 | 24 | 50 | 84 |
| % of Volume | 100 | 112 | 112 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | 233.4 |
| Vehicles Entered | 93 |
| Vehicles Exited | 2 |
| Hourly Exit Rate | 2 |
| Input Volume | 323 |
| % of Volume | 1 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.8 | 0.1 | 3.3 | 0.7 |
| Vehicles Entered | 92 | 53 | 9 | 154 |
| Vehicles Exited | 93 | 52 | 9 | 154 |
| Hourly Exit Rate | 93 | 52 | 9 | 154 |
| Input Volume | 84 | 48 | 10 | 142 |
| % of Volume | 111 | 108 | 90 | 108 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Oakridge Drive & Grove Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.1 | 0.1 |
| Delay / Veh (s) | 3.7 | 4.4 | 3.5 | 3.8 |
| Vehicles Entered | 4 | 37 | 67 | 108 |
| Vehicles Exited | 4 | 37 | 67 | 108 |
| Hourly Exit Rate | 4 | 37 | 67 | 108 |
| Input Volume | 4 | 34 | 59 | 97 |
| % of Volume | 100 | 109 | 114 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.3 | 0.0 | 4.4 | 1.5 |
| Vehicles Entered | 56 | 10 | 26 | 92 |
| Vehicles Exited | 56 | 10 | 27 | 93 |
| Hourly Exit Rate | 56 | 10 | 27 | 93 |
| Input Volume | 50 | 10 | 24 | 84 |
| % of Volume | 112 | 100 | 112 | 111 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.2 |
| Delay / Veh (s) | 331.0 |
| Vehicles Entered | 93 |
| Vehicles Exited | 2 |
| Hourly Exit Rate | 2 |
| Input Volume | 323 |
| % of Volume | 1 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.8 | 0.2 | 3.0 | 0.7 |
| Vehicles Entered | 98 | 59 | 8 | 165 |
| Vehicles Exited | 99 | 59 | 8 | 166 |
| Hourly Exit Rate | 99 | 59 | 8 | 166 |
| Input Volume | 94 | 54 | 12 | 160 |
| % of Volume | 105 | 109 | 67 | 104 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Oakridge Drive & Grove Drive Performance by approach

| Approach | SB | NW | NE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 3.0 | 0.1 | 0.2 | 0.3 |
| Vehicles Entered | 4 | 42 | 71 | 117 |
| Vehicles Exited | 4 | 42 | 71 | 117 |
| Hourly Exit Rate | 4 | 42 | 71 | 117 |
| Input Volume | 5 | 36 | 65 | 106 |
| % of Volume | 80 | 117 | 109 | 110 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | WB | NB | SE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.0 | 1.8 | 0.2 | 0.7 |
| Vehicles Entered | 8 | 31 | 57 | 96 |
| Vehicles Exited | 8 | 31 | 58 | 97 |
| Hourly Exit Rate | 8 | 31 | 58 | 97 |
| Input Volume | 6 | 26 | 54 | 86 |
| % of Volume | 133 | 119 | 107 | 113 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | |
| Vehicles Entered | 102 |
| Vehicles Exited | 0 |
| Hourly Exit Rate | 0 |
| Input Volume | 352 |
| % of Volume | 0 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.7 | 0.1 | 3.1 | 0.7 |
| Vehicles Entered | 95 | 47 | 14 | 156 |
| Vehicles Exited | 96 | 47 | 14 | 157 |
| Hourly Exit Rate | 96 | 47 | 14 | 157 |
| Input Volume | 94 | 54 | 12 | 160 |
| % of Volume | 102 | 87 | 117 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Grove Drive & Oakridge Drive Performance by approach

| Approach | NB | SB | SE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.4 | 0.7 | 3.3 | 0.6 |
| Vehicles Entered | 65 | 31 | 4 | 100 |
| Vehicles Exited | 64 | 30 | 4 | 98 |
| Hourly Exit Rate | 64 | 30 | 4 | 98 |
| Input Volume | 65 | 36 | 5 | 106 |
| % of Volume | 98 | 83 | 80 | 92 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.1 | 0.0 | 4.1 | 1.2 |
| Vehicles Entered | 55 | 8 | 24 | 87 |
| Vehicles Exited | 54 | 8 | 24 | 86 |
| Hourly Exit Rate | 54 | 8 | 24 | 86 |
| Input Volume | 54 | 11 | 26 | 91 |
| % of Volume | 100 | 73 | 92 | 95 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | |
| Vehicles Entered | 95 |
| Vehicles Exited | 0 |
| Hourly Exit Rate | 0 |
| Input Volume | 357 |
| % of Volume | 0 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.7 | 0.2 | 3.1 | 0.8 |
| Vehicles Entered | 95 | 47 | 14 | 156 |
| Vehicles Exited | 96 | 47 | 14 | 157 |
| Hourly Exit Rate | 96 | 47 | 14 | 157 |
| Input Volume | 94 | 54 | 12 | 160 |
| % of Volume | 102 | 87 | 117 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Grove Drive & Oakridge Drive Performance by approach

| Approach | NB | SB | NE | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.1 | 0.1 |
| Delay / Veh (s) | 1.5 | 0.0 | 3.3 | 2.6 |
| Vehicles Entered | 31 | 4 | 65 | 100 |
| Vehicles Exited | 31 | 4 | 64 | 99 |
| Hourly Exit Rate | 31 | 4 | 64 | 99 |
| Input Volume | 36 | 5 | 65 | 106 |
| % of Volume | 86 | 80 | 98 | 93 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | WB | NB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 2.5 | 0.2 | 0.6 | 0.7 |
| Vehicles Entered | 8 | 24 | 54 | 86 |
| Vehicles Exited | 8 | 24 | 55 | 87 |
| Hourly Exit Rate | 8 | 24 | 55 | 87 |
| Input Volume | 11 | 26 | 54 | 91 |
| % of Volume | 73 | 92 | 102 | 96 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.1 |
| Delay / Veh (s) | |
| Vehicles Entered | 95 |
| Vehicles Exited | 0 |
| Hourly Exit Rate | 0 |
| Input Volume | 357 |
| % of Volume | 0 |
| Denied Entry Before | 0 |

## 2: Grove Drive & Alpine Cove Drive Performance by approach

| Approach | EB | WB | SB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.7 | 0.1 | 3.1 | 0.7 |
| Vehicles Entered | 95 | 47 | 14 | 156 |
| Vehicles Exited | 96 | 47 | 14 | 157 |
| Hourly Exit Rate | 96 | 47 | 14 | 157 |
| Input Volume | 94 | 54 | 12 | 160 |
| % of Volume | 102 | 87 | 117 | 98 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 6: Oakridge Drive & Grove Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.1 | 0.1 |
| Delay / Veh (s) | 3.2 | 4.7 | 3.4 | 3.8 |
| Vehicles Entered | 4 | 31 | 65 | 100 |
| Vehicles Exited | 4 | 30 | 64 | 98 |
| Hourly Exit Rate | 4 | 30 | 64 | 98 |
| Input Volume | 5 | 36 | 65 | 106 |
| % of Volume | 80 | 83 | 98 | 92 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## 9: Grove Drive & Box Elder Drive Performance by approach

| Approach | EB | WB | NB | All |
|---|---|---|---|---|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay / Veh (s) | 0.3 | 0.0 | 4.1 | 1.3 |
| Vehicles Entered | 54 | 8 | 24 | 86 |
| Vehicles Exited | 54 | 8 | 24 | 86 |
| Hourly Exit Rate | 54 | 8 | 24 | 86 |
| Input Volume | 54 | 11 | 26 | 91 |
| % of Volume | 100 | 73 | 92 | 95 |
| Denied Entry Before | 0 | 0 | 0 | 0 |

## Total Zone Performance

| | |
|---|---|
| Total Delay (hr) | 0.2 |
| Delay / Veh (s) | |
| Vehicles Entered | 95 |
| Vehicles Exited | 0 |
| Hourly Exit Rate | 0 |
| Input Volume | 357 |
| % of Volume | 0 |
| Denied Entry Before | 0 |

# APPENDIX D – THREE FALLS TRAFFIC STUDY

# T□REE FALLS RANC□ DE□ELOPMENT

# EN□IRONMENTAL STUDY

# FINAL REPORT

*Al□ine Cit□□Utah*

***Prepared for:***

ALPINE CITY
ESTABLISHED 1850

***Prepared by:***


BearWest

***145 S 400 E***
***Salt Lake City, UT***
***(801) 355-8816***

WESTERN GEOLOGIC

***74 N Street***
***Salt Lake City, Utah 84103***
***(801) 750-0090***

PSOMAS

***2825 E. Cottonwood Parkway, Suite 120***
***Salt Lake City, Utah 84121***
***(801) 270-5777***


***November 2003***

# Traffic

## *Im□a□ts and Remedies*

### Existing Conditions

Major factors that affect the demand for travel include land-use characteristics, socioeconomic conditions, and the availability of transportation facilities and services.

Land-use characteristics are the primary determinant of travel demand. That is, the amount of traffic generated by a parcel of land depends on how the land is used. For example, industrial areas, office buildings, residential areas, and shopping centers all produce different traffic generation patterns.

Socioeconomic characteristics of the population living in the area also influence the number of trips generated. Residential areas consisting of a high-income population will generate more trips per person than a residential area populated by retirees or lower income groups.

The availability of transportation facilities and services also influences the demand for travel as well as traffic generation patterns. The availability of transportation alternatives and the level of service provided by these transportation alternatives will greatly influence the number of trips generated and different traffic patterns. The existing and proposed roadways are shown on Figure 3.

NOTE: THIS STUDY WAS DONE USING EQUATIONS. THE UTAH COUNTY STUDY WAS DONE BY TAKING ACTUAL TRAFFIC COUNTS. THERE IS A DIFFERENCE BETWEEN THE TWO FOR EXISTING VEHICLE TRIPS/DAY, BUT THIS ANALYSIS WAS INSERTED TO SHOW THAT APPROXIMATELY 200 MORE VEHICLE TRIPS/ DAY WILL RESULT ON GROVE DRIVE FROM THE THREE FALLS DEVELOPMENT.

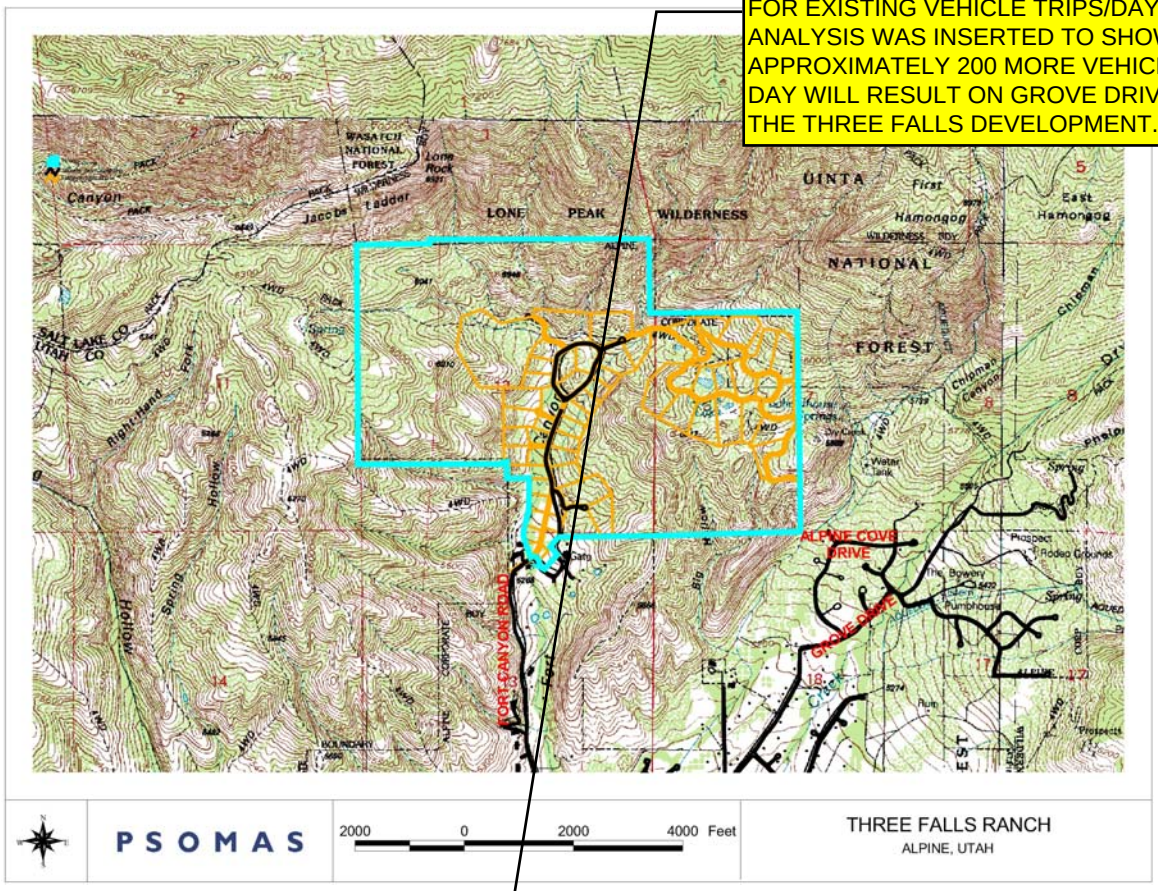



**Figure 3. Roads and Streets in the Project Vicinity.**

An analysis was conducted to estimate the existing traffic conditions in the area as well as to estimate the traffic impacts resulting from the new development. The analysis was based on the cross-classification technique, which was developed by the Federal Highway Administration (FHWA). This technique is used to determine the number of trips that begin or end at home. The home-based generation model, based on the cross-classification technique, can represent up to 80 percent of all trips made in an area of interest. As such, it adequately represents the impact to the area from the proposed development relative to traffic. It should be noted that this method does not take into consideration recreational, specialty, or seasonal traffic.

The parameters used to develop this model are average income and vehicle ownership. All of the assumptions are cross-referenced according to Table 1 in order to obtain additional data used in the impact analysis. The cross-classification equation is shown as follows:

$$P_{gh} = (HH) I_g A_{gh} (P_H)_{gh}$$

where,
□□ = number of households in the zone
$I_g$ = percentage of households in zone with income level g (low, medium, or high)
$A_{gh}$ = percentage of households in income level g with h autos per household (h=0,1,or 2+)
$P_{gh}$ = number of trips per day generated in the zone by householders with income level g and auto ownership h
□$P_{h\square gh}$ = number of trips per day produced in a household at income level g and auto ownership h
$P_t$ = total number of trips generated in the zone

**Table 1. Average Trips per Day per Household**

| Average Trips Per Day Per Household | | | |
|---|---|---|---|
| Annual Income | Number of Automobiles Owned | | |
| | 0 | 1 | > 2 |
| Less than $24K | 3 | 5 | - |
| 24K to 36K | 4 | 6 | 9 |
| 36K to 48K | 5 | 7.5 | 10.5 |
| 48K to 60K | - | 8.5 | 11.5 |
| Greater than 60K | - | 8.5 | 12.7 |

## FORT CANYON ROAD

The main access road to the proposed development is Fort Canyon Road, which is the continuation of North Main Street in Alpine City. Fort Canyon Road can be classified as an Urban Local Street, with the primary purpose to provide access to abutting land and the collector streets. This road in the canyon is paved, of varying width averaging approximately 18 feet wide, and has no existing sidewalk.

According to the GIS and aerial photographic information provided by the City, there are approximately 25 households that have direct use of Fort Canyon Road. The existing traffic volumes for Fort Canyon Road had to be estimated since no traffic counts could be obtained from either The Utah Department of Transportation (UDOT) or Utah County. In order to estimate the existing traffic volumes on Fort Canyon Road, the following assumptions were made:

- All of the households are in the group with an annual income above $60,000.
- All of the households own two or more automobiles.

As a result it is estimated that there are approximately 400 trips per day generated at the base of Fort Canyon Road from the existing households.

## NORTH MAIN STREET

North Main Street can be categorized as an Urban Collector street. By applying the cross-classification method for North Main Street directly above Pioneer Drive (600 North), an

estimated 1,445 trips per day are generated on North Main Street above this location.

## ALPINE COVE-GROVE DRIVE

The proposed development has currently planned to have two access roads. The secondary access road is proposed to connect the development with Alpine Cove Drive, which subsequently ties into Grove drive. This proposed route is shown in Figure 4. The road alignment as proposed, crosses property outside of Alpine City limits and would also require approvals from Utah County. Alpine Cove Drive currently serves 63 lots (either built or approved) for Alpine Cove and Grove Drive also provides access to 48 lots (either built or approved) in for the Box Elder Subdivision. A significant number of these lots are currently vacant. Alpine Cove Drive and Grove Drive can be categorized as Urban Local Streets.

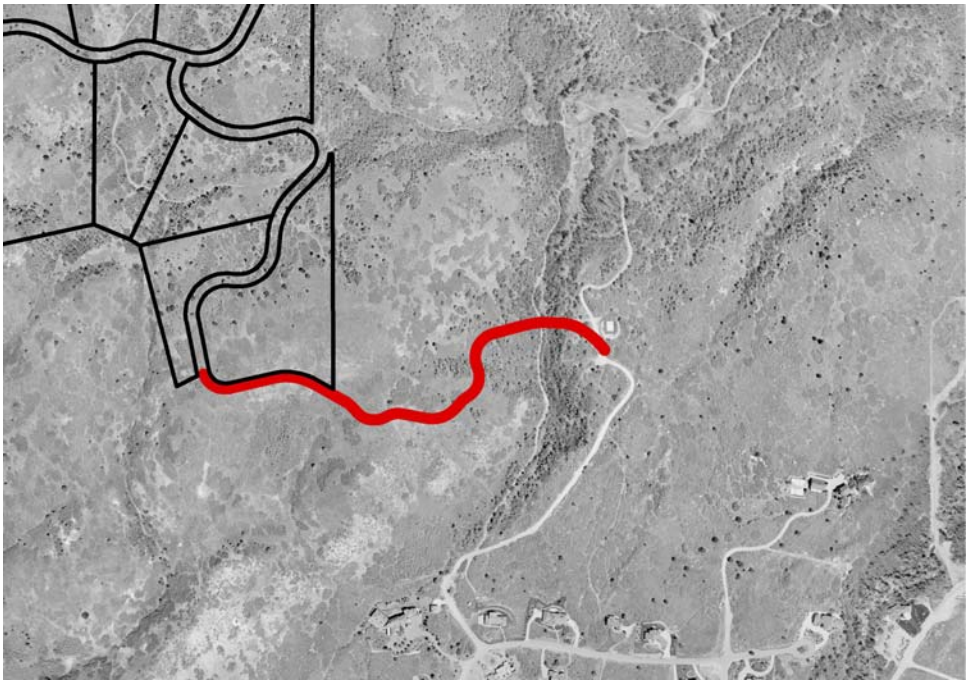


**Figure 4. The proposed route for the secondary access road, shown in red.**

Alpine Cove and Grove Drives are paved and approximately 20 feet wide. Through public meetings and in written comments, residents have indicated that Grove Drive is in need of maintenance and repair.

The same cross-classification technique and the same set of assumptions were used to estimate the traffic generation on this road. As a result, it is estimated that the number of trips generated in the Alpine Cove-Grove Drive area at build out of the Alpine Cove and Box Elder subdivisions could be approximately 1,762 trips per day, assuming all of the Box Elder traffic is routed through this corridor.

## Significance Criteria

Significance of traffic impacts is based on whether the roads would require upgrades because of traffic volume alterations, if the level of service of the road decreased, or if safety issues warrant it.

Other criteria include:

- Traffic noise impacts
- Steep hills
- Steep driveways
- Security issues
- Design standards for subdivisions
- Existing road widths

## Environmental Impacts

### FORT CANYON ROAD

The proposed development will consist of approximately 60 households. There are no planned commercial buildings for the development. At this time there is only one access road (Fort Canyon Road) to the development and no alternative forms of transportation. If the proposed secondary access were not constructed or if it were to be for emergency/fire access only, all of the projected traffic increase would be added to Fort Canyon Road. With the proposed secondary access for fulltime public traffic, it is estimated that approximately 4/5 of the traffic will utilize Fort Canyon Road. To estimate the number of trips generated by the new development, the cross-classification technique was again used with the following assumptions:

- All of the households are in the group with an annual income above $60,000.
- All of the households own two or more automobiles.

As a result, it is estimated that the new development will generate approximately 953 trips per day total. The projected 4/5 traffic split corresponds to 762 trips.

If only 4/5 of the development traffic uses Fort Canyon Road, the number of trips on the existing section of Fort Canyon Road is projected to increase from 400 trips per day to 1,162 trips a day, representing an increase in traffic volume for Fort Canyon Road at 191 percent. Typically, urban local streets can easily handle traffic loads of this volume while still providing an acceptable level of service. Roads such as this are designed to easily handle 3,000 to 5,000 trips/day in terms of capacity. Because there are some narrow stretches of this road and no protected pedestrian way exists along the corridor, the increased traffic does raise some concern for the safety of pedestrians, bicyclists and equestrian uses on the road. The remedies and recommendations listed should adequately address these

concerns. Additional discussion of road cross-sections, especially in the narrower/steeper areas, can be found in the Road Design section of this report.

In the event that a secondary access road is not constructed at all or for fulltime public access to the east from Three Falls, the entire 953 trips per day increase would be expected on Fort Canyon Road. However it is anticipated that the recommendations for traffic volume would be the same. Plans for providing emergency services in the event of an unexpected road closure would need to be addressed.

During the construction phase, traffic is not expected to have reached the projected trip volumes. Concerns associated with construction traffic are related to noise pollution, construction waste, road damage, and safety issues. The remedies and recommendations listed should adequately address these concerns.

## NORTH MAIN

The projected traffic increase of 762 trips (assuming 4/5 of the proposed development traffic uses North Main Street) for North Main Street represents a 53 percent increase to the existing 1,445 trips per day. During the initial public meeting regarding this project, it was noted that an autistic child lives in the vicinity of North Main. Special signage is recommended in the Environmental Remedies section, but frankly, should be given the same consideration even without the proposed development. The exiting traffic conditions already justify continuous sidewalks or pedestrian corridors to separate these use types from the vehicular lanes. The remedies and recommendations listed should adequately address these concerns.

## ALPINE COVE - GROVE DRIVE

The proposed secondary access is currently aligned to connect into Alpine Cove Subdivision. It is estimated that if this roadway is open as a full time standard use access road, approximately one-fifth of the traffic generated in the newly developed area will use the route. This is projected to generate an additional 191 trips per day.

The number of trips on the Alpine Cove drive will increase from the estimated 1,762 to approximately 1,953 per day. This represents an 11 percent increase. This road, from a capacity standpoint, can handle either of these traffic loads.

Residents of Alpine Cove have opposed the construction of a secondary access road from Fort Canyon and filed an appeal with Alpine City on August 2, 2003. They have suggested alternatives to the planned connection into Alpine Cove. Detailed alignment alternatives are beyond the scope of this study, but should be investigated at the time of roadway design.

A sharp curve exists on Grove Drive that has been blamed for some past accidents. An increase in traffic along this route could potentially increase the problems occurring there.

Another option that is being seriously considered is to construct a narrower secondary access road to be used for emergency purposes only (e.g., fire). This would result in no regular traffic except under emergency circumstances, as well as less impact due to road construction.

Environmental remedies are recommended below and should be considered in addition to interagency efforts between the city and county to address existing needs of the area.

## Environmental Remedies

### FORT CANYON ROAD

The following environmental remedies are proposed to address impacts that the traffic increase could otherwise have on the Fort Canyon Road area:

- **Widening of the Fort Canyon Road.** This measure would address the traffic capacity and some of the traffic safety issues. The negative effects of this measure include cuts and fills, impacts on irrigation ditches, acquisition of land, ownership issues, construction conditions, and other environmental impacts. Additional detail on widening can be found in the Road Design section of this report.

- **Sidewalk and/or shoulder addition.** It is anticipated that a sidewalk or protected pedestrian corridor on only one side of the street should be adequate for the projected use. This measure will provide a relatively safe access for pedestrians, horses and bicycles. Challenges associated with this alternative are similar to the problems faced if the road was to be widened.

- **Traffic signing and signaling.** Appropriate signs and traffic signals can be used to increase the level of public safety. The use of traffic signs and signals will increase the level of public awareness for the speed limit, road conditions, pedestrians, and children at play.

- **Construction traffic dust control.** Trucks and machinery used to transport construction debris will need to be sprinkled and covered or otherwise treated. This will minimize the pollution caused by construction traffic.

- **Construction traffic noise pollution.** The hours of construction can be limited. For properties that are close to the construction areas and/or the road temporary sound

barriers can be installed where appropriate. After the initial construction phase, it is expected that the noise pollution caused by the traffic increase will be in line with the Land Use Category A level. Federal Housing Association (FHA) sets noise standards for new construction (Category A) are applicable in the tracts of lands in which serenity and quiet are of extraordinary significance and serve an important public need. Local laws, regulations, and ordinances relative to construction should be adhered to.

## NORTH MAIN STREET

- **New sidewalk(s) should be constructed as required.** It is anticipated that a single sidewalk is adequate in the northern stretches but as the road approaches the more heavily developed areas nearer the city center, double sidewalks should be constructed to bring the area in line with city standards. This will increase the level of safety for pedestrians.

- **Add traffic signs.** With an autistic child in the area, there is already a need for additional signs to increase awareness.

## ALPINE COVE-GROVE DRIVE

It is the recommendation of this report that the secondary access road be designed, constructed, and used for emergency/fire access only, rather than for fulltime public access. Otherwise, the following environmental remedies could serve to ease traffic impacts experienced to Alpine Cove and Grove Drives:

- **Traffic signing and signaling.** In addition to traffic signing and signaling, traffic calming measures may be used to increase the level of safety on the road.

- Grove Drive could be widened in areas above Alpine Blvd. to better accommodate existing as well as future traffic flows.

- **Construction traffic dust control.** Same measures as proposed for Fort Canyon Road.

- **Construction traffic noise pollution.** Same measures as proposed for Fort Canyon Road.

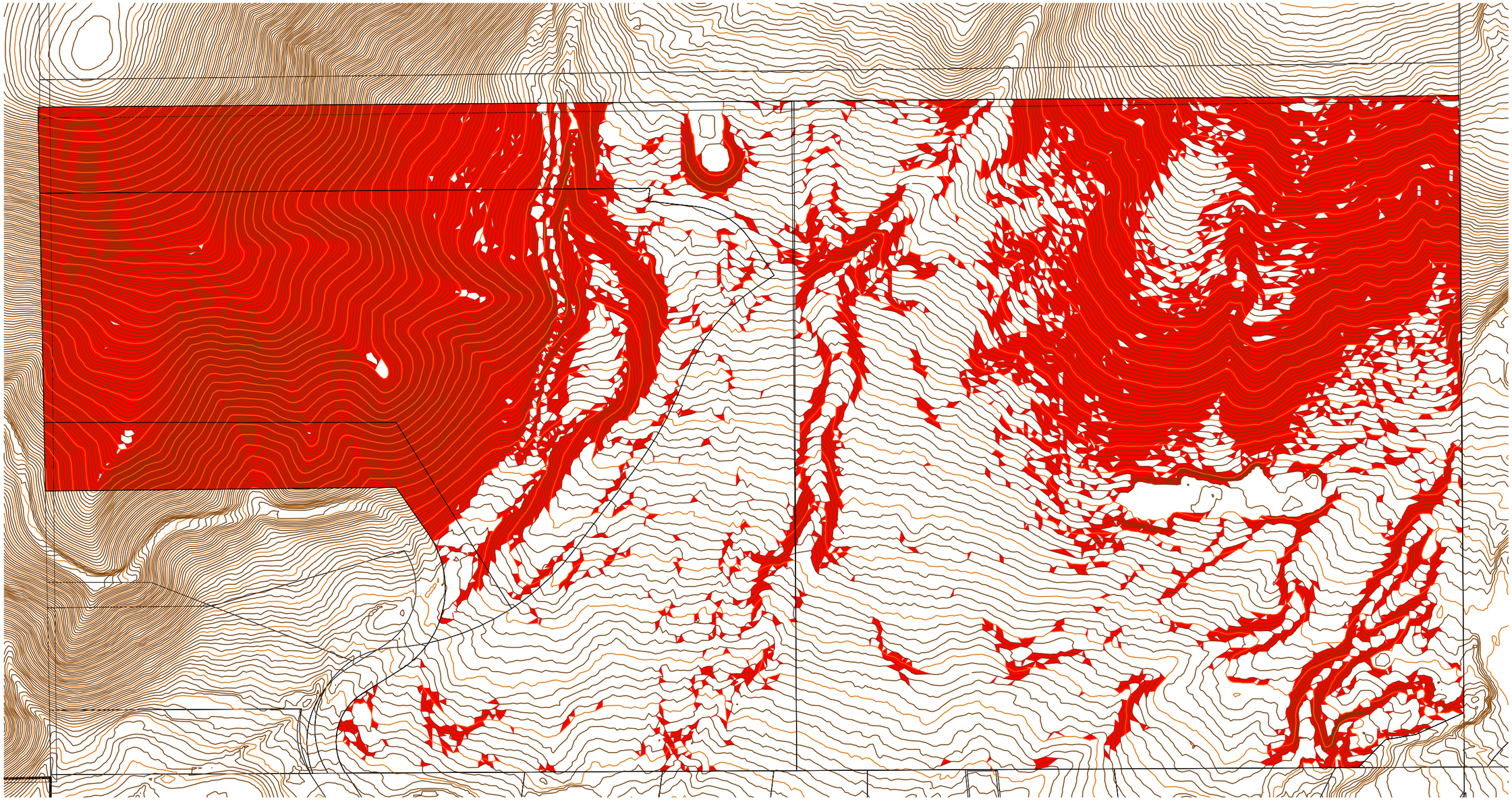
- **Existing roadway maintenance.** The existing roads are reportedly in need of maintenance and repair. Residents of Alpine Cove have strongly requested agreement between Alpine City and Utah County regarding maintenance of these roadways. If construction traffic is routed through these old roadways, the increased surfacing damage would need to be repaired by the development. It may also be appropriate for

the City to consider smoothing out the sharp curve on Grove Drive. Some degree of resident support for widening Grove Drive exists as well.

- **Alternative alignments.** Alpine Cove residents have suggested alternatives to the planned connection into Alpine Cove. Detailed alignment alternatives are beyond the scope of this study, but should be investigated at the time of roadway design.

- **Box Elder Subdivision Roads.** It has been reported that the majority of traffic from much of the Box Elder Subdivision is already routed through Alpine Cove. Although other accesses exist for Box Elder, they are not paved and therefore not preferred routes. Appropriate jurisdictions should consider the improvements to these other roads as a possible solution to existing and proposed conditions.

# APPENDIX E - NON-BUILBABLE AREAS
# SLOPES GREATER THAN 20%



| Slopes Table | | | | |
|---|---|---|---|---|
| Number | Minimum Slope | Maximum Slope | Area | Color |
| 1 | 20.00% | 153.23% | 1360281.58 | |

SCALE: N.T.S.

11" x 17"

0 1"

SECONDARY WATER
CULINARY WATER
STORM WATER
ENGINEERING
SEWER

ALPINE CITY ESTABLISHED 1850

Alpine Public Works

REMARKS

1.

MELBY PROPERTIES
APRIL 2015
BUILDABLE AREA
2013 Lidar Contours

Engineering File Number:
-

Drawing: -

Sheet: 1 of 1

# ALPINE PLANNING COMMISSION AGENDA

**SUBJECT: Oberee Annexation**

**FOR CONSIDERATION ON: 5 May 2015**

**PETITIONER: Paul Kroff**

**ACTION REQUESTED BY PETITIONER: Discuss Potential Annexation and make a Recommendation to the City Council**

**APPLICABLE STATUTE OR ORDINANCE: Chapter 5 (Annexation)**

**PETITION IN COMPLIANCE WITH ORDINANCE: Yes**

**BACKGROUND INFORMATION:**

The City Council has asked that some discussion take place between the land owners/developer and the City to discuss the terms of annexation for the Oberee area. To help facilitate the discussion, staff has asked that 4 main topics be addressed in helping the City make a decision on annexation of this area. The four main topics are:

1. Density – How many lots are you proposing for the subdivision?
2. Roads – How are you accessing the subdivision? Because you are in a sensitive lands overlay, you will need at least two accesses to the site.
3. Utilities – How will water and other utilities be provided?
4. Open Space – Where will open space be and how will it be designated?

At the April 7th meeting, the Planning Commission gave staff some questions and items that they would like clarification on. A report was given to the Planning Commission at the April 21st meeting.

The attached report is meant to supplement the original staff report dated April 17, 2015 titled "Oberee Annexation Report." That report contains basic information and background regarding the proposed Oberee Annexation. New information will be reported in addendums such as this.

**STAFF RECOMMENDATION:**

That the Planning Commission discuss annexation of this area and make a recommendation to the City Council.

Date: April 30, 2015

By: Staff
Rich Nelson, City Manager
Jason Bond, City Planner
Shane Sorensen, P.E., City Engineer
Jed Muhlestein, P.E., Assistant City Engineer

**Subject: Oberee Annexation Report – Addendum 1**

**Background** This report is meant to supplement the original staff report dated April 17, 2015 titled "Oberee Annexation Report." That report contains basic information and background regarding the proposed Oberee Annexation. New information will be reported in addendums such as this.

**Pressurized Irrigation** Something to consider for both pressurized irrigation and culinary water is the fact that this area was taken into consideration when the master plans for these services were drafted. Meaning, if the master plans were followed with associated improvements, then the services in the Oberee area would work. See email dated Thursday, April 30, 2015 attached as Appendix A.

The "source of water" issue was discussed for the high zone in the previous report. Outdoor source requirements for the area have been calculated and are shown in Table 1.

**TABLE 1 – OUTDOOR SOURCE REQUIREMENT**

| | Lots | Proposed Zone | Size of Lot (sf x 1000) | Average Landscaped Area Per Lot (sf x1000) | Total acreage to provide secondary water to (acres) | Open Space (acres) | **Water Consumption Requirement (ac-ft)** |
|---|---|---|---|---|---|---|---|
| Non-PRD Development | 48 | CR-40 | 40 | 28 | 30.9 | none | **145** |
| PRD | 60 | CR-40 | 20 | 14 | 19.3 | 28 | **222** |
| PRD Easement* | 60 | CR-40 | 30 | 21 | 28.9 | conservation easement | **136** |

The city implemented a "pilot program" for installing meters on the pressurized irrigation system five years ago. Meters were installed on twenty five homes around the city. To calculate the

Water Consumption Requirement as noted in Table 1, data was taken from the five years' worth of data we have collected from these twenty five locations.

The master plan lists two options to remedy the "source of water" issue.

- One - Install three booster pumps that could pump water from the low zone into the high zone.
- Two – Connect to the CUP water line via pumps and lines outside the city.

Both these options are expensive and would serve much more than just the proposed development. The source at Fort Creek is approximately 1000 to 1500 gpm. One pump, pumping at 500 gpm (~ 403 ac-ft per 6 month irrigation season) could provide for the outdoor use of the proposed development no matter what density is settled upon for the development (assuming it is 60 lots or less). If this approach were taken the developer's needs would be taken care of, it could benefit the city, and the city could add on to/finish that project at some future point as needed. If the City Council would consider this option, it is an option staff feels would be more palatable to the developer and would be a win-win situation for both developer and City. At this point specific costs have not been put together but are being worked on and should be available soon.

<u>The following is a summary of where we stand with the pressurized irrigation</u>:

- Staff recommends the developer install a 12-inch irrigation main extending from Grove Drive to Elk Ridge Lane. A cost share approach can be worked out if annexation moves forward.
- Staff recommends the City Council consider the option of the developer providing and installing one booster pump and infrastructure to provide another water source (approximately 500 gpm) to the high zone. Staff will work with Horrocks Engineers to provide a cost estimate.

**<u>Culinary Water</u>** Staff worked with Horrocks Engineers to model the fire flows for this area with and without system buildout improvements in place. It was discovered that fire flow for this area depends on the Three Falls tank and PRV system as outlined in the culinary master plan. See Appendix A of this report and Appendix C of the original staff report. The developer has options regarding culinary water if annexation moved forward:

- Wait for Three Falls to build their tank and PRV then…
    - Install the 10-inch main from the 12-inch Box Elder main line to the 90 degree bend in Grove Drive
    - Install 8-inch mains within the development
    - Install the 8-inch connection at Elk Ridge Lane. This is a required connection as it provides looping of the system and ensures fire flows
- Develop now, do not wait for Three Falls
    - Install a 12-inch line from the 12-inch Box Elder main line to the 90 degree bend in Grove Drive
    - Install 10-inch lines in the northern portion of development
    - Install the 8-inch looping connection to Elk Ridge Lane

It should be noted that the water model was set for minimum fire flows of 1750 gpm at each hydrant. 1750 gpm provides enough fire protection for a 4,800 square foot home without fire sprinklers. The email mentions a larger pipe option if the developer seeks to have more fire flow, allowing larger homes to be built without the need for fire sprinklers. This can be further discussed if annexation moves forward, the main point here is that culinary water can be supplied but the infrastructure details hinge on the Three Falls system improvements.

It was mentioned in the previous report that the state requirements for source are approximately four times higher than our current use. We do not know if/when state legislature will change that requirement but we have learned there is an option to apply for a reduction in source requirement. Staff would recommend the developer fund the process of applying for a reduction in source OR wait for the legislature to modify the current requirement.

The following is a summary of where we stand with the culinary water:

- Staff recommends the developer install whatever culinary improvements are necessary to supply adequate fire flows to the development based on the option chosen for development, see above options. The specifics of a cost-share can be negotiated if annexation moves forward as some of the improvements do benefit the city.
- Staff recommends the developer make a decision on either waiting for an outcome from state legislature regarding water source requirement or funding the process of applying for a reduction in source requirement.

**Sewer, Storm Water, Traffic, Street System, Secondary Access, Geologic Hazards** There are no new recommendations for these subjects. A cost estimate for the Grove Drive improvements is being worked on.

The following is a summary of where we stand with these items:

- Staff would recommend the developer improve Grove Drive from Alpine Boulevard to the bend with standard street widths including curb-gutter on both sides and sidewalk on at least one side. The improvements would need to address the safety concerns at the bend. Street impact fees of the development could be credited towards the Grove Drive improvements.
- Staff would recommend that if annexation moves forward, the Developer provide a detailed traffic study. If it is found that the LOS will drop to anything less than a LOS A, we recommend that the traffic study provide recommendations for road improvements to accommodate the change.
- If annexation moves forward, staff would require the developer to obtain and submit a Geologic Hazards Report for the property. Of particular concern is the areas where mass grading and filling of an existing ravine has occurred.

**PRD vs Non-PRD Development, Conservation Easement** The details of these subjects can be found in the previous staff report.

- Staff recommends the Planning Commission and City Council consider the size of lots being irrigated when determining what kind of density will be allowed within the development if annexation occurs. See Table 1.

# APPENDIX A – HORROCKS EMAIL

## Jed Muhlestein

**From:** John Schiess <JSchiess@horrocks.com>
**Sent:** Thursday, April 30, 2015 2:39 PM
**To:** Jed Muhlestein
**Subject:** Oberee Annexation (Pack Farms) Hydraulic Review

Jed,

As requested I have looked at the Culinary, Pressurized Irrigation, and Sewer models and master plans to see if the proposed development will work. In all three cases the master plans have anticipated that this area will develop and be annexed into Alpine City. In fact the anticipated number of homes that have been modeled in this area is greater than the proposed development. The master plans are adequate for the proposed developments.

The next step I took is to determine what are the minimum improvements necessary to connect to the existing systems and provide the service necessary for each system

For the Culinary system the master planned fire flow service is 1,750 gpm. Just installing the master planned pipe sizes to the area is not enough to ensure fire flow service of 1,750 gpm. This area benefits from the master planned tank and PRV in Fort Canyon. If these were installed in addition to the master planned piping everything would work fine. If this development wishes to proceed prior to Fort Canyon then the following improvements need to be made.

- Install a 12 inch line from the 12 inch tank line near Box Elder along Grove Drive to the proposed development
- Install a 10 inch line from the 12 inch line north to the end of the proposed cul-de-sac.
- Install a 8 inch loop down to Elk Ridge Lane.

If desired to increase the fire flows to 2,750 gpm in the northern most cul-de-sac the first two recommendations could be changed to a 16 inch and 12 inch respectively. This would allow 11,300 sf homes without fire sprinklers.

As far as the pressurized irrigation goes I recommend they install the pipe sizes as shown in the master plan including the loop between Grove Drive and Elk Ridge Lane. The loop between Grove Drive and Elk Ridge fixes both an existing deficiency and serves future growth. It should be funded as noted in Table 12 of the master plan.

They should also participate in a project to get additional source in the High Zone because of limited source capacity prior to July 10 each year. The master plan calls for the Fort Creek Booster Pump expansion to meet this need. It may be possible to construct a limited project now with the full expansion later. Let me know if you would like a cost estimate for the limited project. I see the limited project as replacing one of the existing pumps with a new higher head pump on a VFD with a new discharge line connecting to the High Zone.

There are no improvements necessary to connect to the Sewer system.

If you have any questions please let me know.

Thanks

**John E. Schiess,** Senior Engineer
**HORROCKS ENGINEERS**
2162 W. Grove Parkway, Suite 400 | Pleasant Grove, Utah 84062
**Work** 801 763 5201 | **Fax** 801 763 5101 | **Mobile** 801 361 6439
**Email** jschiess@horrocks.com www.horrocks.com

**ALPINE CITY PLANNING COMMISSION MEETING at**
**Alpine City Hall, 20 North Main, Alpine, Utah**
**Apr 21, 2015**

## I. GENERAL BUSINESS

**A. Welcome and Roll Call:** The meeting was called to order at 7:00pm by Chairman Steve Cosper. The following commission members were present and constituted a quorum.

Chairman: Steve Cosper
Commission Members: Bryce Higbee, Jason Thelin, David Fotheringham, Steve Cosper, Jane Griener, Steve Swanson, Judi Pickell
Commission Members Not Present: Jason Thelin, Judi Pickell
Staff: Jason Bond, Marla Fox, Jed Muhlestein, Shane Sorensen, David Church
Others: Paul Bennett, Mark Goodsell, Tom Henroid, Ken Melby, Michael Melby, Paul Kroff, Logan Hunter, Lon Lott, Alanson Taylor, Larry Ellertson, Myrna Grant, M Eric Grant, Will Jones, Roger Bennett

**B. Prayer/Opening Comments:** Bryce Higbee
**C. Pledge of Allegiance:** Jane Griener

## II. PUBLIC COMMENT

Mark Goodsell asked about a fence permit that would keep the deer out of his yard and greenhouse. He said a six foot fence was too short and he would like the City to give him permission to build an 8 foot fence. Steve Cosper said this is a staff issue. Jason Bond said he would like the Planning Commission to take a look at the ordinance to see if it needs to be amended because our ordinance states fences can only be 6 feet high. He said he would like some direction from the Planning Commission on what they think about the current ordinance. Is the ordinance good as is, does it need to be amended because of the deer problem in Alpine. Steve Cosper asked if this limit was placed because of safety or for aesthetics. Jason Bond said he knows agricultural farms are allowed to have an 8 foot fence but not sure why residential are limited to 6 feet. Steve Cosper said because of the deer problem, this is something that should be addressed. Jason Bond said he will write something up and get a Public Hearing set in two weeks. He also said he will include some of the things the City Council brought up regarding fences so they can be addressed as well.

Utah County Commissioner Ellertson said he was here to lend moral support for the discussion of annexation. He said the County would prefer that development was done within the City as opposed to in the County. He said he would encourage the City to move forward very seriously on that.

## III. ACTION ITEMS

### A. Retaining Wall Ordinance

The Alpine City Planning Commission asked the staff to look into drafting a retaining wall ordinance. A draft ordinance has been prepared for the Planning Commission to review.

Jed Muhlestein said we've seen large retaining walls in the City and more will be needed so we felt like we needed a retaining walls ordinance. He said we have taken Draper City's ordinance and modified it for Alpine City. He said currently it is not required to get a building permit for retaining walls lower than 4 feet. Jed Muhlestein said in Section 2, it is proposed to have an ordinance put in place for walls lower than 4 feet because of the slope of the yard. In some cases, walls are breaking and falling down because they are trying to hold up a steep hill and this section would help with that issue.

Jed Muhlestein said Section 3 states that any walls that are in our Sensitive Lands areas should be looked at a little more closely and a geology report should be required. Section 4 states that any kind of retaining wall that requires a permit will require a licensed engineer.

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Jed Muhlestein said Section 5 takes into consideration the height of the wall. It limits retaining walls to 9 feet in heights no matter what. It also states that you can tier the wall but the wall can't go higher than 18 feet. He said Section 6 deals with specific items that need to be addressed by an engineer that need to be turned in for a review.

Alan Taylor from Taylor Geotechnical said he wrote this ordinance when he worked for Draper City. He was asked to look at walls in the City that were falling down. He took what was required to build a wall and put it into an ordinance. He said you can't go back and change existing walls but you can control what's coming in the door now. He said you can also control any modifications to existing walls. He said the other thing to keep in mind is that the engineer has to sign off on the project and will be involved in the process.

Steve Cosper asked if Mr. Taylor had reviewed the ordinance and wanted to make any revisions to it. Mr. Taylor said there are a few changes he would like to make and updates made. Jason Bond said we have to make sure the ordinance is enforceable and who is going to enforce it. Jane Griener said the inspector will be there and should sign off on it. Steve Swanson asked who in the City would be giving the permits. Steve Swanson asked if developments already in process will have to follow this new ordinance. Jason Bond said one development has already been through the process with the current ordinance. Steve Swanson asked because of safety issues, can that be changed.

**MOTION:** Bryce Higbee moved to have a Public Hearing for the Retaining Wall Ordinance drafted with any changes on May 5, 2015.

Steve Swanson seconded the motion 5 Ayes and 0 Nays. Bryce Higbee, David Fotheringham, Steve Cosper, Jane Griener, and Steve Swanson all voted Aye.

**B. Melby annexation Discussion**

The City Council has asked that some discussion take place between the land owners/developer and the City to discuss the possibility of annexation for the Melby property which is located just north of the Alpine Cove. This area is currently not within the Alpine City Annexation Policy Plan. To help facilitate the discussion, staff has asked that 4 main topics be addressed in helping the City make a decision on the annexation of this area. The four main topics are:

1. Density – How many lots are you proposing for the subdivision?
2. Roads – How are you accessing the subdivision? Because you are in a sensitive lands overlay, you will need at least two accesses to the site.
3. Utilities – How will water and other utilities be provided?
4. Open Space – Where will open space be and how will it be designated?

Jason Bond said this property is not in the Annexation Master Plan and that would be needed in order for this to move forward.

Tom Henroid said they came tonight to make an application to the City to see if there is interest in annexing the Melby property into the City. If the City is not interested, they will go to the County. He said for them to make full application for annexation, they want to know what the code is they would need to follow. He said they would give detail of a traffic impact study, environmental impact study, wildlife study, and debris flow study. He said without knowing if they could be annexed, he didn't think they would provide that information.

Mr. Henroid said they will have 33 units based on the Alpine City PRD ordinance. He said open space is shown on the Concept Plan and they are proposing that utilities would be served by the City. Ken Melby said 2 lots are currently permitted in the Cove Subdivision. He said this also includes lot 14 which has an existing home on it.

Mr. Henroid said access to the property would be from Grove Drive up through the Cove. Jane Griener asked what the total acreage was. Tom Henroid said 68 acres with roughly 20 acres of open space. He said the Cove is in the 40,000 zone and this property borders the Cove and they would like to be the same zone. Jane Griener asked what type of open space this would be. Tom Henroid said it would be privately owned open space with some public access.

Jed Muhlestein said they would need their own water tank and it would probably have to go in the open space. Tom Henroid said this property was at one time contemplated to be phase two of the Cove and water from the tank used for this property. He said it has already been discussed tonight that if these properties are not annexed in to the City, they will go to the County and then the City can't make the improvements they want to.

Steve Swanson asked if this would be considered an island. Jason Bond said we will have to talk to David Church about the interpretation of an island and hear his thoughts on it. Jane Griener asked if this property was put on the Annexation Plan, is it then going to be expected by the developer to be annexed. Shane Sorensen said it probably would be expected. Jason Bond said it would not be binding by law but good planning is planning for the future and what we want to do. Steve Swanson asked why we would keep annexing to the North when we don't have access to get them out. Bryce Higbee said because the County will let them build and they will have to access out through Alpine anyway only we won't have any say. David Fotheringham said the question we need to ask ourselves is can we live with 33 lots in this development and can we service them. Steve Swanson said we don't have to accept that and we can say if it is annexed, it has to be at a lower number of lots.

Bryce Higbee said the difference between this development and the Cove is that the Cove has very restrictive covenants. Because of the natural habitat, watering yards is minimal. Tom Henroid said they have a lot of experience putting in developments with similar restrictive codes and said they have no issue doing the same with this development.

Tom Henroid said they would seek reimbursement if their impact fees were disproportionate to the impact of their subdivision. Jane Griener asked what zone this would be in and does that have to be listed in the annexation plan. Jason Bond said there are study areas that would have to be addressed and land use and zoning is one of the study areas. Tom Henroid said they are agreeable to answer questions as long as they are not outside the code or ordinance that is required for being adopted into the annexation policy.

**C. Oberee Annexation Discussion**

The City Council has asked that some discussion take place between the land owners/developer and the City to discuss the terms of annexation for the Oberee area. To help facilitate the discussion, staff has asked that 4 main topics be addressed in helping the City make a decision on the annexation of this area. The four main topics are:

1. Density – How many lots are you proposing for the subdivision?
2. Roads – How are you accessing the subdivision? Because you are in a sensitive lands overlay, you will need at least two accesses to the site.
3. Utilities – How will water and other utilities be provided?
4. Open Space – Where will open space be and how will it be designated?

At the April 7th meeting, the Planning Commission gave staff some questions and items that they would like clarification on. Due to the limited amount of time, staff is working hard to get that information prepared and given to the Planning Commission the day before the meeting.

Steve Cosper said some of the questions are cost to the City, road improvements, water and all the issues that come along with an annexation.

Jed Muhlestein said some of the questions the Planning Commission had were how would this annexation impact irrigation, culinary water, sewer, storm drain, traffic, secondary access, impact fees and whether this would be a PRD.

Jed Muhlestein said the Oberee annexation came before the Planning Commission two weeks ago. He said that most of the items on the list for discussion will take some time to consider to see if the City can serve this area and the positive or negative impacts that will result from an annexation. He said another key point he wanted to bring up was that during an annexation the City Council is not required to follow City ordinances regarding density.

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Jed said in order for us to evaluate this annexation we have to assume some sort of density to be able to analyze it. The developer has come forward and is requesting sixty lots. Jed Muhlestein said interestingly enough, when the PRD versus the non-PRD was run on the analysis of the area to be developed, if it came in as a straight subdivision, excluding the conservation easement, they could come in at forty-eight lots if this was in the 40,000 zone. Jed Muhlestein said if this was a PRD and they were able to maximize their bonus they would come in at sixty lots.

Jed Muhlestein said the City is working on a Pressurized Irrigation Master Plan. He said it would be a 12 inch line extending from the bend in the corner at Grove Drive through the Oberee property, and then connect to Elk Ridge Lane. He said as part of the annexation, the City would require the developer to build that 12 inch line. This line would improve water pressure for many existing Alpine citizens and is listed as an existing system improvement need in the current draft Irrigation Master Plan. Jed Muhlestein said the next thing we need to talk about is the source of the water. He said currently this development would be coming into the City's high zone. He said we have three main zones that are similar to the zones of a sprinkler system.

Jed Muhlestein showed on a map the annexation boundary and said it included more than just the Oberee property. Jane Griener asked if this line would serve only the Oberee property or would it be for other properties in the area and other properties looking for annexation. Jed Muhlestein said the plan would be for future use as well. Steve Cosper said it would be good to know what percent the Oberee property would be using and what percentage would be left for the remaining properties.

David Church said we need to plan for the future and changes in the infrastructure would need to be made as well so we don't over tax the system for existing users. He said if we can't do it for the next guy up the line, then we shouldn't do it now for just one property. He said the secondary water is different than the culinary water and he said we're not supplying secondary water up past a certain point.

Steve Swanson wanted to know where the water is coming from especially when we are in a drought. Jed Muhlestein said the source of water is an ongoing problem for our high zone. He said the high zone is fed by two springs and Dry Creek. We don't have any wells in the higher zones and no booster systems in the lower zones to push water to the high zones. Because Dry Creek is really dry this year, we're going to go through some learning processes.

Steve Swanson asked if we will have to buy water. Jed Muhlestein said that is one possibility that has been listed in the Master Plan. Steve Cosper asked where the water is coming from to supply the high zone. Jed Muhlestein said high zone water is coming from Dry Creek, and Box Elder Spring. Grove Spring is supplying our culinary water. Jed Muhlestein said we could install some booster pumps in the higher zones or connect to the CUP Water and we would have to connect a line and booster pumps outside of the City and this option would be expensive. The third option would be to drill a well and Shane Sorensen said the other wells drilled in the City are approx 700 feet to 1500 feet deep. He said they have been a good water source for the City.

Steve Cosper asked if we should be talking about costs tonight to help with the Planning Commission recommendation. David Church said the City Council wants a recommendation on land uses. If this property is annexed, the density costs should be this much, and the infrastructure costs should be calculated based on that density. David Church said the water costs should be the same whether or not there are 40 lots or 60 lots. He said to come up withy the density and then the engineers can come up with the numbers. He said the City needs to decide if they are going to help with infrastructure costs if it is to some benefit to the City; in the past, annexation has come with its own costs and the development pays whatever that cost is.

Steve Swanson said we are talking about drilling wells, putting in new pipes, or buying expensive CUP water. He wanted to know if this is something that the City was going to do regardless of annexation. David Church said it wouldn't be fair to the developer to cure an insufficient deficiency but the City engineers are saying that something needs to be done with the higher zones anyway. He said the question is how much of that should be City costs and how much developer costs. He said to the extent that it doesn't cure a deficiency, then 100% of the cost should go to the developer. He said this concept is similar to a new subdivision that comes into town or similar to Fort Canyon Road. He said we don't make new developers cure our existing deficiencies.

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David Church said we may have excess capacity and when that happens, that gets to be a difficult thing. He said for example, we have excess ground water rights but we don't have a source or wells. He said it wouldn't make any sense for someone to give us more ground water because we don't have any way of using the ground water because we need a well and a pump or a water line to CUP.

David Church said we own some of CUP and we are committed to pay for that water. He said 25 years ago we signed a contract with CUP and we currently have an agreement with them where they're using our water to grow fish in the Provo River and so we don't have to pay for it. He said there will come a time when they say that we now need to pay for the water and unless we have a line, we're going to pay for water that we can't drink.

Shane Sorensen said we have a grant for our irrigation system and we have about 700 acre feet allocated for us. Once we start using this water it will cost the City $112,000 per year to use CUP water regardless whether we use one foot or all 700 acre feet. He said the water is stored in Deer Creek and Jordanelle and it will be taken from there if we need it. He said we don't have any way to store the water here in the City. Steve Cosper asked how much water this annexation would need to service their area.

Bryce Higbee asked how the area north of Fort Canyon is getting their water. Jed Muhlestein showed on the map where to booster pump was located on the north side of Main Street. He said the City may put in a well at that location to help get water to the high zone. He said Alpine takes all the water from Dry Creek up to July 10th and then it is released to Lehi. Jed Muhlestein said we are already struggling with the high zone but said there are options to get more water but at a cost. He said the next question is if this property is annexed into the City, should developers help pay for some of these infrastructure costs up front.

Steve Swanson said he is concerned about where the water supply is going to come from to service 60 more homes. Shane Sorensen said we have a good source of water in the pressurized irrigation system. He said there have been challenges these past three years with the drought and having to have restrictions on the water. He said we don't run our wells 24 hours a day we pretty much run the wells at night.

David Church said you could recommend that there be no secondary water system in this annexation because of the cost and the elevation and it is too much of a burden on the City. Steve Swanson asked if we had adequate water pressure for culinary water. The engineers said culinary water is not a problem unless home sizes are too large and then you get into fire flow issues. Jed Muhlestein said it will take some time to evaluate the impact of all these homes on the system.

Jed Muhlestein said low density, big acre lots puts a large tax on our pressurized irrigation system. Whereas higher density, small lots use less water because there is less landscaping. He said it is typical in the City, no matter the size of the lot, to landscape 70% of the lots. He said if this development was not allowed to use the conservation easement as open space, they would need an additional twenty eight acres of open space. The property has been scraped down to bare dirt with zero natural landscaping. Twenty eight acres would have to be landscaped and watered.

Steve Cosper said it sounds like engineering is making a case for higher density. Jed Muhlestein said it makes sense as far as secondary water is concerned. He said that's if they came in as a straight subdivision and we gave them credit for the conservation easement. Jane Griener asked if the City has put in stipulations that landscaping is limited or zero scape. Jed Muhlestein said yes, that has been done for Three Falls because they have some pretty big acreage lots up there. He said that was restricted to one acre of developable ground. David Church said the City imposed the restriction on the plat amendment and the development agreed to it. He also said they have no secondary water. Shane Sorensen said those restrictions were put in place because the lots were steep and had natural landscaping. He said the Oberee property is different.

Jed Muhlestein said Alpine City has the right to build, at its own expense, a trail through the property when there are connection points on both sides, meaning Three Falls needs to be developed with a potential trail connection and the Grant properties also need a connection point. Until that happens, the City has no right to the trail on that property. Steve Zolman currently has the right to fence the entire property and continue to graze animals. Paul Kroff said they propose to keep the conservation easement with the City as the Holder, and keep it in private open space. He said

they will put in the trail at their expense after waiting for future developments to happen and alter the location of the trail in trade for density.

Jane Griener asked what the difference between public and private open space was. David Church said two years ago a previous owner, Mr. Chapel, came to the City and asked the City to be the Holder of this conservation easement so he could get a tax deduction. The City Council agreed to be the Holder of the conservation easement. David Church said Mr. Chapel gave away a portion of his rights even though he still owns the property and can use the property. David Church said the City doesn't want to develop this property and they don't want to maintain it, so it is put into private open space. He said another type of private space is when a developer puts open space into a park and then an HOA maintains it. David Church said sometimes a developer is given density bonus if they give open space for public use if the form of a park or other use. David Church said Mr. Zolman can't get rid of the conservation easement because he bought the property with that stipulation on it. He said the City has to decide if they want to give credit for the easement or not. He said this conservation easement can't be built on. David Church said it's possible to do the PRD where we're not crediting anything for the conservation easement. They are still getting a certain number of lots and there's public open space in the twenty eight acres that would have to be landscaped and watered.

Jed Muhlestein said the culinary water system is similar to the pressurized irrigation system. In order for this development to have adequate pressure it would require a 10 inch line from the Box Elder water tank down to the development at the bend in the road at Grove Drive. By current state statutes, the City doesn't have enough source on culinary water. Having said that, the statues base water usage on 800 gallons per connection per day and our current usage is 208 gallons per connection per day. By current State regulations, we are using four times less water than we're required to have. He said we have three sources of culinary water and we only need one of them.

Jed Muhlestein said by bringing another development into the City by annexation, we are further in the hole. Should they be required to find another water source even though technically we wouldn't even use it? He said this is an issue that is actually with the Legislature right now. He said he doesn't know what or when the outcome will be. Jane Griener asked what happens if we don't meet the State requirement.

Shane Sorensen said we have never had an issue with the culinary water but Jed Muhlestein said we can't currently meet the state standards. Shane Sorensen said the State would have us spend a million dollars to drill a new well, but because we don't need the water, it would just sit there going to waste. Steve Swanson asked if there would be a problem getting pressure to this area. Jed Muhlestein said that is what the 10 inch line would be for and it would also help the City. David Church said the City will require this development to bring water rights so it's not a question of water, but do we have the tanks and the lines to get it to them.

Jed Muhlestein said the sewer system for this area has been considered in the Sewer Master Plan for Alpine City. It was determined that the existing system has capacity for development via connection to Grove Drive and Elk Ridge Lane. David Church said the Master Sewer Plan was developed in a way that whether a property was developed in the City or the County, the sewer gets to the treatment plant because the City doesn't want septic tanks. Jed Muhlestein said the upper portion of the property can gravity flow out to Grove Drive while the lower portion would require a sewer easement and connection through Kevin Towles property.

Jed Muhlestein said 60 lots would potentially add 70% more traffic to Grove Drive. A study was done in Box Elder South and the maximum time a car should be stopped at an intersection was ten seconds. The study showed traffic was stopped for only 3 seconds at the intersections during peak hours, well below the standard. Steve Cosper repeated what David Church had said about developers not curing an existing deficiency. David Church said the last time this area came in for annexation, part of the condition was some very significant road improvements on Grove Drive and provide a future second access. He said the cost of doing these improvements killed the deal because the City said the cost of annexing was making these improvements to Grove Drive.

David Church said Grove Drive is a problem that people have identified and that is a main concern for annexation. Jed Muhlestein said total build out volume is three times higher than what it is today. He said if the annexation were to move forward the City would require a traffic study to be done. Steve Swanson said if this development gets developed in the County, none of these improvements would be made. Jed Muhlestein said the developer may fix the 90 degree bend in the road, but infrastructure improvements would not be made.

Paul Kroff said their development meets the County ordinances if it's rezoned. Steve Cosper said the County is in favor of this development working things out with the City. Jane Griener said double the traffic would upset neighborhoods along Grove Drive no matter what the wait time was. She asked where the County line was and how far the road would be repaired. Jed Muhlestein said from the 90 degree bend all the way down to the intersection of Alpine Blvd and Heritage Hills. Jane Griener asked about impact fees and Paul Kroff said they would seek credits if they make improvements that benefited more than just his development.

Jed Muhlestein said they gave the secondary access plan to the Fire Marshall and he said his concern was that this road meets the letter of the law but said he would feel better if the connection point was on Elk Ridge Lane. Paul Kroff said this development meets the code and Mr. Zolman is not ready to develop the second phase because he plans to live there with his family. Steve Cosper said if the Fire Marshall is concerned about safety and he feels strongly about it, it would over ride other considerations. Paul Kroff said there are other ways to get to the property and one is through Lambert Park from the emergency access road. Bryce Higbee said he didn't know if that road would be improved. Jane Griener asked if this is a negotiation point in the annexation.

Steve Cosper said this was a good discussion and asked the Planning Commission to review all the information in the packet to be prepared for the next meeting. Jed Muhlestein said the staff will get some numbers on water together for next time. He said they will take a look at vacant lots in the City, developments that are coming into the City to get a better feel for the future. Paul Kroff said they are looking for a recommendation and that would be the Planning Commission supports annexation under these conditions or we don't support annexation under this scenario.

**COMMUNICATION:**
Jason Bond said Lawrence Hilton wants to take away 250 feet from his building to meet the square footage requirements. This footage would come off the front of the building. Steve Cosper said he thought it was discussed in City Council that the building would need to come off the north setback a few feet by moving the overhang columns back a couple of feet to the south. He said that Roger Bennett said in City Council that it shouldn't be so close to the property line. Steve Cosper said it was discussed in Planning Commission that Mr. Lawrence would meet code. Jason Bond said it was discussed that Mr. Lawrence would need an exception to be so close to the property line. Bryce Higbee said it was recommended as an exception.

David Fotheringham asked what the process was going forward with the annexation of these properties. He wanted to understand what his responsibility was and how he can get prepared for the next meeting. The Planning Commission had a discussion about the decision making process so they could come prepared for the next meeting. Steve Cosper said we don't need to dissect every dollar because the staff will do that. Jason Bond said the Planning Commission will talk about the details of how you would like to see this property developed. Things like the number of lots, the access, the zone, water, etc.

Jason Bond told the Planning Commission to go to the City Website and look up the Annexation Policy.
Bryce Higbee asked what the plan is if the County develops this property. Our roads would be heavily used without any tax benefits. Steve Cosper asked Jason Bond have a Public Hearing before they make a decision.

**VI. APPROVAL OF PLANNING COMMISSION MINUTES OF:** Apr 07, 2015

**MOTION:** Bryce Higbee moved to approve the Planning Commission Minutes for Apr 07, 2015 subject to changes.

David Fotheringham seconded the motion. The motion passed unanimously with 5 Ayes and 0 Nays. Bryce Higbee, Steve Cosper, David Fotheringham, Steve Swanson and Judi Pickell all voted Aye.

Steve Cosper stated that the Planning Commission had covered all of the items on the agenda and adjourned the meeting at 10:05pm.

DRAFT