# 2013

# Minturn Council Meeting

Wednesday March 20, 2013

**Work Session: 5:15pm**
**(Town Center)**

**Regular Session: 6:30pm**
**(Town Center)**

**TOP COUNCIL PRIORITIES:**

- Street and Drainage Projects Eagle Street, Toledo, Norman, Nelson
- Submit Grants for Infrastructure and Prioritize/Create a Regular Schedule
- 100 Block Streetscape
- Sidewalks/ Engineering South Minturn
- Submit DOLA Grant for Microfiltration Plant
- Electronic Packets (I-Pads or Comparable)
- Loop Water Lines

# Agenda

**MEETING OF THE MINTURN TOWN COUNCIL**
**Minturn Town Center, 302 Pine Street**
**Minturn, CO 81645 • (970) 827-5645**

## Wednesday March 20, 2013

## Work Session – 5:15pm
## Regular Session – 6:30pm

**MAYOR – Gordon "Hawkeye" Flaherty**
**MAYOR PRO TEM – George Brodin**
**TOWN MANAGER – Jim White**
**TOWN CLERK/TREAS – Jay Brunvand**

**COUNCIL MEMBERS:**
Shelley Bellm
Earle Bidez
Jerry Bumgarner
Aggie Martinez
John Rosenfeld

When addressing the Council, please state your name and your address for the record prior to providing your comments. Please address the Council as a whole through the Mayor. All supporting documents are available for public review in the Town Offices – located at 302 Pine Street, Minturn CO 81645 – during regular business hours between 8:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays.

## Work Session – 5:15pm

- Farewell to Building Inspector Chuck Lanci – White (10min)
- Work Session: Eagle County Board of County Commissioners – White (60min)

## Regular Session – 6:30 pm

1. **Call to Order**
   a. Roll Call
   b. Pledge of Allegiance

2. **Approval of Agenda**
   a. Items to be Pulled or Added

3. **Approval of Minutes and Action Report**
   - March 6, 2013 pg 4
   - Action Item Report pg 11

4. **Public comments on items, which are NOT on the agenda (5 minute time limit per person)**

5. **Special Presentations**
   - TST Drainage Report Update – White (20min) pg 13
   - Active Energies Update on Solar Garden – White (20min) pg 57
   - Skijoring survey results – Metteer (15 min) pg 68

## PUBLIC HEARINGS AND DISCUSSION/ACTION ITEMS

6. **Discussion/Action Item: CMC Scholarship – White/Christensen (20 min)**

7. **Discussion/Action Item: Resolution 4 – Series 2013 a Resolution concerning banking practices for the Town of Minturn – Brunvand (5 min)** pg 93

## OTHER MATTERS

8. **Planning Department Update**

9. **Town Manager's Report** pg 95

10. **Town Council Comments**

## EXECUTIVE SESSION

11. **Executive Session – To convene in Executive Session Pursuant to CRS 24-6-402(4)(a) for the purposes of discussing possible purchase of the property at 64 Harrison Ave – Christensen/White** pg 97

12. **Executive Session – Direction to Staff as a result of the Executive Session – White (5min)**

## FUTURE AGENDA ITEMS

13. **Next Meeting – April 3, 2013**

14. **Future Meeting**

**15. Set Future Meeting Dates**

**a)** Council Meetings:
- April 3, 2013
- April 17, 2013
- May 1, 2013

b) Planning & Zoning Commission Meetings:
- April 10, 2013
- May 8, 2013
- June 12, 2013

**16. Other Dates:**
- 1st Day of Spring – March 20, 2013

**17. Adjournment**

# Official Minutes

**MEETING OF THE MINTURN TOWN COUNCIL**
**Minturn Town Center, 302 Pine Street**
**Minturn, CO 81645 • (970) 827-5645**

## Wednesday March 6, 2013

## Work Session – 5:00pm
## Regular Session – 6:30pm

**MAYOR – Gordon "Hawkeye" Flaherty**
**MAYOR PRO TEM – George Brodin**
**TOWN MANAGER – Jim White**
**TOWN CLERK/TREAS – Jay Brunvand**

**COUNCIL MEMBERS:**
Shelley Bellm
Earle Bidez
Jerry Bumgarner
Aggie Martinez
John Rosenfeld

These minutes are formally submitted to the Town of Minturn Town Council for approval as the official written record of the proceedings at the identified Council Meeting. Additionally, all Council meetings are tape-recorded and are available to the public for listening at the Town Center Offices from 8:30am – 2:00 pm, Monday through Friday, by contacting the Town Clerk at 970/827-5645 302 Pine St. Minturn, CO 81645

## Work Session – 5:00pm

- Johnie's Garden Flower Barrel Inserts – White (5min)
- Safebuilt Proposal Review – White (30min)
- IGA with Eagle County regarding the Bone Yard Property – White (25min)

  Council directed Staff to review the following:
  - Boneyard Property IGA to consider a three year time frame as opposed to two.
  - Boneyard Property IGA; possible additional extension of time frame for the bathroom installations. Consider removing "bathroom" from IGA language.

- Discussion regarding a Minturn Scholarship update with CMC Scholarship – White (30min) Staff directed to consider CMC investment options with a partner, or independently; Town may consider contributing $40,000 to create an endowment at Colorado Mountain College (CMC).

# Regular Session – 6:30 pm

1. **Call to Order**
    a. Roll Call
    b. Pledge of Allegiance

The meeting was called to order by Mayor Hawkeye Flaherty at 6:37 pm.

Those present included: Mayor Hawkeye Flaherty, Town Council members George Brodin, Earle Bidez, Shelley Bellm, Aggie Martinez, John Rosenfeld. (Note: Jerry Bumgarner was excused, absent.)

Staff present: Town Manager Jim White, Town Attorney Allen Christensen, Deputy Clerk Michelle Metteer, and Town Clerk/Treasurer Jay Brunvand.

2. **Approval of Agenda**
    a. Items to be Pulled or Added

Motion by George B., second by Aggie M., to approve the agenda as presented. Motion passed (6-0) (Note: Jerry Bumgarner was excused, absent.)

3. **Approval of Minutes and Action Report**
    - February 20, 2013

Motion by John R., second by George B., to approve the Minutes of February 20, 2013 as presented. Motion passed (6-0). (Note: Jerry Bumgarner was excused, absent.)

- Action Item Report

4. **Public comments on items, which are NOT on the agenda (5 minute time limit per person)**

5. **Special Presentations**
    - Shop N Hop update from State of Colorado Engineer Vinny Secondo regarding Environmental issues – White (20min)

Mr. Vinny Secondo, State of Colorado, provided an update regarding the remediation system addressing the petroleum impacts resulting from the fuel spill a few years ago (2008) at the Shop N Hop store. Work is being done for the interim measure of remediation. A chemical injection "in place" is being conducted with a pilot test to determine the effectiveness of the oxidant injection. Initial results from the field parameters show that the injection was effective. In the spring, March 18th, 2013, water samples will be taken to see how they have reacted to the injection. This is a less intrusive, yet effective method.

Mr. Terry Marcum, Shop N Hop Owner, wanted to emphasize that the injection remediation process was approved by the EPA. In addition, and in a separate circumstance, one of the caps,

on one of the pipes installed 15 years ago, had a small leak several months ago. That leak has been repaired and it does not appear the leak has caused concern with water table contamination.

- Kelley Collier, ECO Transit – White (30min)

Kelley Collier, ECO Transit, provided an overview of the ECO Transit Spine Feasibility Study, a copy of which was included in the Council packet. She looks to get transit feedback from the Minturn community for future phases of implementation.

Council request to see ridership numbers according to times of day. Kelley will provide.

## PUBLIC HEARINGS AND DISCUSSION/ACTION ITEMS

6. **<u>Discussion/Action</u>: Resolution 3 – 2013 a Resolution for the Ratification of a Severance Agreement – White (10min)**

Motion by Shelley B, second by George B, to approve Resolution 3 – 2013 a Resolution for the Ratification of a Severance Agreement. Motion passed (6-0). (Note: Jerry Bumgarner was excused absent.)

7. **<u>Discussion/Action Item</u>: CMC Scholarship – White/Christensen (20 min)**

Council discussed the need to fund this program at the $40,000.00 level to achieve endowment status. This would allow the scholarship to run in perpetuity. Council directed Staff to pursue discussions at the $40,000 level. It was stressed by all Council Members that this scholarship program only be extended to Minturn residents.

Recommendation to consider options: find additional funding partners who would increase the funding level under the condition that they agree to the existing terms of the Minturn Scholarship application, or consider Town of Minturn contribution of the full $40,000 amount. Discuss at next Town Council meeting.

8. **<u>Discussion/Action Item</u>: Review of IGA with Eagle County regarding the Bone Yard Property – White (20min)**

Mr. Keith Montag, Eagle County Manager, expressed his pleasure at the collaboration, communication and cooperation in the process of the purchase of the Boneyard property. Kudos given to Town staff and Eagle County staff.

9. **<u>Discussion/Action</u>: Safebuilt approval of a Building Department Services Proposal – White/Cerimele (15min)**

Eric Pendley, Safe Built Inc, provided an overview of their proposal for the Building Department services for the Town of Minturn. The contract is for one year and may be renewed at that time if so desired, at the same fee schedule. Charlie Davis, Safebuilt, was also present.

Motion by Shelley B, second by John R, to approve the Safebuilt Building Department Services Proposal. Motion passed (6-0). (Note: Jerry Bumgarner was excused absent.)

**10. Discussion/Action: Resolution 2 – 2013 a Resolution of Endorsement for Holy Cross Energy funding for OSAC purchase – White (10min)**

Motion by John R, second by Aggie M, to approve Resolution 2 – 2013 a Resolution of Endorsement for Holy Cross Energy funding toward OSAC purchase. Motion passed (6-0). (Note: Jerry Bumgarner was excused absent.)

## OTHER MATTERS

**11. Planning Department Update**

**12. Town Manager's Report**

**Human Performance Center/Fitness Center at Maloit Park**
The subcommittee met on February 28, 2013 to continue discussions now moving toward planning and future construction of Phase 1 of the Human Performance Center/Fitness Center facility. A May 1, 2013 groundbreaking has been targeted. Plans to review the design at the Planning Commission have been outlined and a timeline created. We continue to use the professional guidance of our consultants, Craig Bouck and Frank Buono of Barker, Rinker, Seacat on design elements along with RDK Architects. We are also working with Kelly Lyle, CPA, to determine the correct entity to create.

**School District Parking Issue/Fitness Center**
The School District will be convening a meeting with its land development committee the first week of March to address parking requirements related to Phase 1 at the Minturn Fitness Center site. The Town has been invited to participate.

**Weed Mitigation Grant Submitted**
On Thursday, February 21, 2013, I completed and submitted an application to the State of Colorado Department of Agriculture a weed mitigation grant proposal. It was in the amount of $3000 in tandem with Eagle County. Scott Griffin, Eagle County Noxious Weed Control Program Manager, assisted with the grant. On Monday, February 25, 2013, Chris Cerimele and I cooperatively created a budget for the grant and submitted it as an addendum to the grant request, again to the Colorado Department of Agriculture.

**Bone Yard Property**
We continue to work in conjunction with the Eagle County staff and County Commissioners in an effort to secure the purchase of the Bone Yard property in Minturn. Our revised bid has been accepted and the Town has contributed 10% of the outstanding balance ($205,000) to GSA. The closing date has been set for March 14, 2013. We will be submitting the remaining $27,000 just prior to the closing date. A draft IGA plan between the Town of Minturn and Eagle County

regarding the management plan for the Bone yard property will be reviewed at the March 6, 2013 meeting.

**Auditors Visit**

Swanhorst and Associates were here the week of February 19- February 22, 2013 to complete preparations for our 2012 audit report. They will return prior to June of this year to provide the audit findings and present them to Town Council.

**Little Beach Park Improvements Planned**

The Town has secured the services of Zehren and Associates to lead the design phase of improvements for Little Beach Park. Pedro Campos of Zehren and Associates continues to update the plans on proposed park improvements. We are now working on land issues related to the project. We will be submitting a GOCO grant by August, 2013.

**Police Chief Search**

The acceptance period for Police Chief applications closed on March 4, 2013. The applications are now being reviewed. Additionally, Brad Lamb, Eagle County Deputy, has been hired as a temporary employee (Training Officer), one day a week for eight weeks to assist in training for Officer Belz. He was sworn in by Judge Terry Quinn on Tuesday, February 26, 2013. He will have his first shift during the first week of March.

**Scholarship Committee**

Our scholarship committee is working to formally complete the documents and register with the State of Colorado as the Minturn Education Foundation as a formal 501 (c) entity. We have submitted the payments for the short and long term annuities as our investment options through 1st and Main Advisors, on behalf of the Town. Town Council has also discussed a smaller scholarship fund ($25,000) to be considered with Colorado Mountain College here in Eagle County. We have secured the services of Kelly Lyle, CPA, to assist with the financial aspects of our preparation and planning. The committee will meet on the afternoon of March 5, 2013 to consider scholarship awards.

**EPA Meeting**

Town Councilman, Earle Bidez and the Town Manager attended a meeting on Thursday, February 28, 2013 in Denver at the EPA along with representatives from Battle Mountain and its consultants, CDPHE, and EPA reps. The meeting focused on bringing new EPA staff up to speed on the Superfund site issues, wetlands, and Bolts Lake.

**13. Town Council Comments**

Pink Vail is this weekend and so far $220,000 has been raised. Donations can be made online at www.pinkvail.com.

It was noted that the ice buildup at the Post Office and around the Town Hall is getting to be extremely dangerous. The snow and the ice needs to be removed. Water is additionally leaking in the Post Office as a result of the ice dams. Request by Council to move this to the top of the priority list and address the problem now. Council requested Staff to mitigate this concern as

soon as possible. It was noted this would probably have to be done several times again yet this winter but that the maintenance and safety of the building was a priority. Additional repairs may be required as well during the spring and summer.

## EXECUTIVE SESSION

**14. <u>Executive Session</u> –To convene in Executive Session Pursuant to CRS 24-6-402(4)(a) for the purposes of discussing possible purchase of the property at 64 Harrison Ave – Christensen/White**

No executive session was conducted.

## FUTURE AGENDA ITEMS

**15. Next Meeting – March 20, 2013**

- Spec Presentation: TST Drainage Report Update – White/Cerimele (20min)
- Little Beach Park Improvements Master Plan and GOCO grant application update and review of cost estimates by Zehren & Associates – Cerimele (20 min)
- Discussion/Action - CMC Scholarship discussion – White (30min)
- Special Presentation / Discussion / Action: Kayak Course – White (20min)
- Work Session: Eagle County Board of County Commissioners – White (60min)

**16. Future Meeting**

**17. Set Future Meeting Dates**

**a)** Council Meetings:
- March 20, 2013
- April 3, 2013
- April 17, 2013

b) Planning & Zoning Commission Meetings:
- April 10, 2013
- May 8, 2013
- June 12, 2013

**18. Other Dates:**
- St Patrick's Day – March 17, 2013

## 19. Adjournment

Motion by George B., second by Shelley B., to adjourn the meeting at 8:30pm.

_____
Mayor Hawkeye Flaherty

ATTEST:

_____
Town Clerk, Jay Brunvand

**Town of Minturn**
**Council Action Item Memo**

**TO:** Council Members/Staff Members
**FROM:** Jim White/Town Manager
**DATE:** March 20, 2013
**SUBJECT:** Status of Action Items from Town Council Meetings

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| Action Item | Responsible Party | Progress Report |
|---|---|---|
| Minturn Education Fund | White | Funding is from the Battle Mountain Annexation escrow money. We are nearing completion of the documentation to form the 501(c) corporation. We submitted payment on February 26, 2013 for the annuities invested through 1st and Main Advisors. The subcommittee ~~will also reconvene~~ met on March 5, 2013 and distributed three ~~to consider requests for~~ scholarship awards to Jessica Guthrie, Ashlet Atencio, and Rodney Cordova. ~~and continue final preparation for investments~~. |
| OSAC Funding for Boneyard Purchase | White | The Eagle County Commissioners and the Town of Minturn closed~~have set~~ on March 14, 2013 ~~as the closing date~~ with the USFS to purchase the Minturn Bone yard parcel. Staff has prepared a draft management plan and is working with Eagle Valley Land Trust on a Conservation Easement. We hope to complete ~~are now working an~~ the IGA with Eagle County at the March 20, 2013 meeting.~~.~~ |
| Parks and Recreation Master Plan | Cerimele | Staff continues its work on a Park Master Plan for Planning Commission review. The Town is working with Zehren and Associates to complete the design features for Little Beach Park improvements. Community involvement will be crucial. ~~. Cost projections were presented at the February 20, 2013 meeting~~. We are working on land ownership issues. |
| 2012 Goal: Town Street Repairs and Drainage. | White/ Cerimele | Staff received a storm drainage study proposal from TST Engineering and received DOLA grant approval of $17, 325 to complete the study. The results of the study will be presented at the March 20, 2013 Town Council meeting. We have requested and received a short extension of the contract to allow review with Town Council and to complete the scope of services. A final report will then be sent to the Department of Local Affiars.~~.~~ |
| 2012 Goal: Continue Sidewalk Installation Program/Improve Plan with Lafarge | White/A. Martinez | We are working with LaFarge representatives and engineers in planning to repair sidewalks on the east side and west side of the 100 block next year. Conversations with CDOT are ~~being planned~~ scheduled on Friday, March 15, 2013.. |

| Action Item | Responsible Party | Progress Report (move this heading) |
|---|---|---|
| 2012 Goal: Implement Streetscape Plan | White /Cerimele | Staff has reviewed previously submitted plans from OZ, and DCI. We have secured info on streetlights; and worked with the primary local property owner on design ideas for a mall/pedestrian area. We will continue to work on this over the winter to prepare for work in 2013. |
| 2012 Goal: Strengthen Marketing and Events | Metteer | Staff is coordinating scheduled co-op advertising opportunities for Minturn business license holders. Special events permits now required for event planning. Ski Joring was well attended and considered a success. Our survey report results will be discussed at the March 20, 2013 meeting with updated information.~~indicated approximately 450 people in attendance on Saturday~~. |
| 2012 Goal: Clean Up Parking Area on North Taylor St | White/Cerimele//A. Martinez | Continue to monitor and remove abandoned vehicles to allow for organized and structured short term parking. Staff d~~D~~iscussed this area again on February 25, 2013 with UPRR. ~~.~~ UPRR wants to lease a larger portion of the north end of Taylor Street and seek help from the Town in removing encroachments. UPRR will send a draft encroachment letter for staff review. We are addressing neighbors concerns with the UPRR officials as we consider this lease. |
| 2012 Goal: Opportunities & Submittals and scheduling and apply for infrastructure grants/loans | White/Cerimele | Staff to provide periodic updates to Council. Received $17, 325 DOLA grant for Master Drainage Plan. Staff completed a Tier 1 DOLA grant for water system improvements. We met the grant deadline of December 3, 2012 for the Energy Mineral Impact DOLA grant and were awarded the full grant request with each share being $106, 739; 50% by the Town and 50% by the Department of Local Affairs.~~.~~ ~~. The review period by DOLA is expected to conclude in March 2013~~. We are now working on a GOCO grant application for Little Beach Park improvements (August submittal. We submitted a Weed Mitigation grant proposal in cooperation with Eagle County on February 22, 2013 and were awarded that grant too. Our share is $6,000 and we will receive $3,000. |
| 2012 Goal: South Minturn sidewalks | White/Cerimele | We met with~~Over the winter, we will continue to work with~~ CDOT on March 15, 2013 to discuss~~etermine~~ right of way issues, investigate grant funding opportunities, and begin planning and implementation for future Minturn projects. VSSA may be interested in multi-purpose path between Town and Maloit Park. |
| Water Subcommittee | White | The response to the initial request for data has been prepared and provided to the subcommittee. The Water Subcommittee met to review the information and develop our strategy and to propose next steps to present to Town Council. We ~~will be~~ submitted~~ing~~ information to the Colorado Rural Water Association which will subsequently provide a preliminary water rate study for the Town's review.~~.~~ |

# APPENDIX - A

# Old Town Master Drainage Plan

## Historical Conditions Analysis

## For

## The Town of Minturn

submitted to:

**Town of Minturn, Colorado**

February 15, 2013

**DRAFT**

TST, Inc. Consulting Engineers

February 15, 2013

Mr. Jim White
Town of Minturn
Town Administrator
302 Pine Street
Minturn, CO 81645

*Re: Old Town Master Drainage Plan – Appendix A*
*Historic Conditions Analysis*
*Project No. 1149.0000.01*

DRAFT

Dear Mr. White,

We have completed our study of the historic drainage patterns through the Town of Minturn. The portions of the Town evaluated within this study were the Old Town and South Town character areas from the current Town of Minturn master plan. We are pleased to present this report of our evaluation and the attachments comprising the results and deliverables of our study.

**Investigation of the Surrounding Topography and Field Observations**

In October of 2012, TST conducted a field investigation and informational topographic survey of the Town of Minturn and its existing storm systems. Attached herewith is a photographic journal of the Town, taken during the survey, to aid in documenting condition of the drainage pathways, storm systems and the pertinent flood control structures in place.

The Town of Minturn is divided by the Martin Creek into two distinct drainage basins that discharge into the Eagle River. The Martin Creek basin is hydraulically separated from the Old Town and South Town basins. Exhibit A is attached, showing the location and size of the existing basins and sub-basins.

The topography of the drainage basins affecting the Town is generally steep and heavily wooded except for a large and relatively flat meadow area located just above the bluff to the west of town. The meadow area collects runoff from a large portion of the wooded area and conveys it across Nelson Avenue/Meadow Road into the Old Town Basin. Multiple service roads and trails make their way up into the forest and have intercepted and re-directed some of the natural drainage basins and flow paths. The excavations for the historic water tanks and other structures located on the hills have also had some similar effects on historic flow paths.

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Fort Collins, CO 80525
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970.226.0204 fax

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*Old Town Basin*

Historically, the Old Town drainage basin was divided into approximately 5 significant sub-basins with separate minor discharges to the River. With the development of Old Town, portions of the runoff from these basins have been re-directed to developed catchments, as shown in Exhibit B, within the Town. Generally, each east-west road has become a conveyance route for some portion of the historic drainage basins west of the Town.

The most significant of the Old Town sub-basins is the Meadow Sub-Basin, as described above, which collects runoff from approximately 260-acres of hillside and discharges into the town by way of the west meadow along a two track road referred to as Meadow Lane. There is generally no defined conveyance through the meadow. An alluvial fan of sorts, has built up over the years creating a split flow condition in major events. Runoff from this basin generally finds its way to the storm systems located within Harrison Avenue or an east-west corridor referred to as Bayer Avenue, just north of Meek Avenue.

Sub-basins 1 and 2 are located south of Meek Avenue. Both are generally wide but shallow and only extend to the top of the hill at Nelson Avenue/Meadow Road (as referred to by the County). The southernmost basin drains fairly consistently with pre-development condition and discharges to a highway culvert roughly 325-feet north of the Cemetery Road Bridge. The northernmost sub-basin is divided into developed catchments as it reaches the residential neighborhood. Discharges from these catchments are mostly un-controlled through the residential neighborhood but are small enough that the resulting runoff is minimal. The only inlets to the storm system intended to convey these minimal discharges are located along Pine Street and at the intersection of Mann Avenue and Main Street.

Sub-basins 3 and 4 in the Old Town area discharge mostly to Pine Street or Williams Street where runoff is distributed to the nearest east-west storm conveyance within the developed catchments. The storm systems in Toledo Avenue and Nelson Avenue are constructed with inlets along the west side of the Town. These were constructed with the intent to collect runoff from the sub-basins prior to reaching Pine Street or William Street but their effectiveness is questionable.

The condition of the storm system within the Old Town area is deteriorating, mostly built of small diameter corrugated metal pipe (CMP), improvised CMP inlets without frame grates or structural inverts making maintenance problematic. Pipes appear to be partially collapsed in places also leaving the capacity of the system in question. Storm systems around newer construction within the town, such as the post office and fire station, have more modern and robust systems but continue to tie into antiquated systems.

Water quality appears to have been a point of concern in the past. Storm separators have been constructed at the outlet of a number of the storm systems including at Meek Avenue, Toledo Avenue and Eagle Street although some outlets remain unprotected. The maintenance schedule for the interceptors is unknown.

*South Town Basins*

There are generally only two definable sub-basins located in the South Town area. The first is minimal in extent, located around Tank Road and extending halfway up to the tank. The sub-basin was divided by the highway into two developed catchments with discharge points being directly below the tank and just south of the Cemetery Road Bridge.

The second basin is much larger at nearly 260-acres but is nearly devoid of storm systems. Maps indicate that the basin drains to the US Forest Service parcel without any defined outlet to the Eagle River.

## Collection of Existing Topographical and Flood Protection Data

Attached with this report is a collection of information pertaining to drainage and flooding within the Town. The attachments include:

1. The FEMA regulated floodway maps (Exhibit C).
2. A digital delineation of the FEMA floodway for the Eagle River with flood elevations sections.
3. High resolution digital aerial photos of the portions of the Town most important to drainage planning.
4. 15-foot digital ground elevation contour maps of the major basins draining through the study area.
5. 2-foot digital ground elevation contour maps of the developed portion of the town and areas directly affecting flow pathways.
6. Digital delineation of the historic drainage basins and developed catchments.

## Field Survey of the Town Streets and Drainage Structures

Attached with this report is a digital file of the information collected from field survey of the town in October of 2012. This information verifies flow directions, locations and ground surface elevations of existing storm structures and helps to identifies potential drainage issues for future planning.

## Areas of Concern

The most significant areas of concern pertaining to drainage in the Town of Minturn are as follows in order of importance:

1. *Flood Safety* - Ensuring sufficient capacity of storm sewer crossings or safe flood conveyances to pass the major storm across the highway while maintaining emergency traffic routes
2. *Flood Protection* - Protecting property from flood damage in major storm events.
3. *Nuisance Flows* - Controlling nuisance flows to prevent further deterioration of public property.
4. *Drainage Improvement* - Improving drainage through public thoroughfares and away from private property wherever practical.

Exhibit D is a map of some of the specific locations where the above mentioned areas of concern should be addressed as resources become available in the order of importance.

To summarize, we have conducted a drainage specific survey of the Town of Minturn and collection of information needed to provide a master storm plan for the Town of Minturn. This information is presented herewith or attached to this report. Three major drainage basins must be planned for including passage of floodwaters and control of property damage through improvement of drainage.

We look forward to your review and comments in preparation of the master drainage plan for Minturn and will gladly answer any questions that you may have.

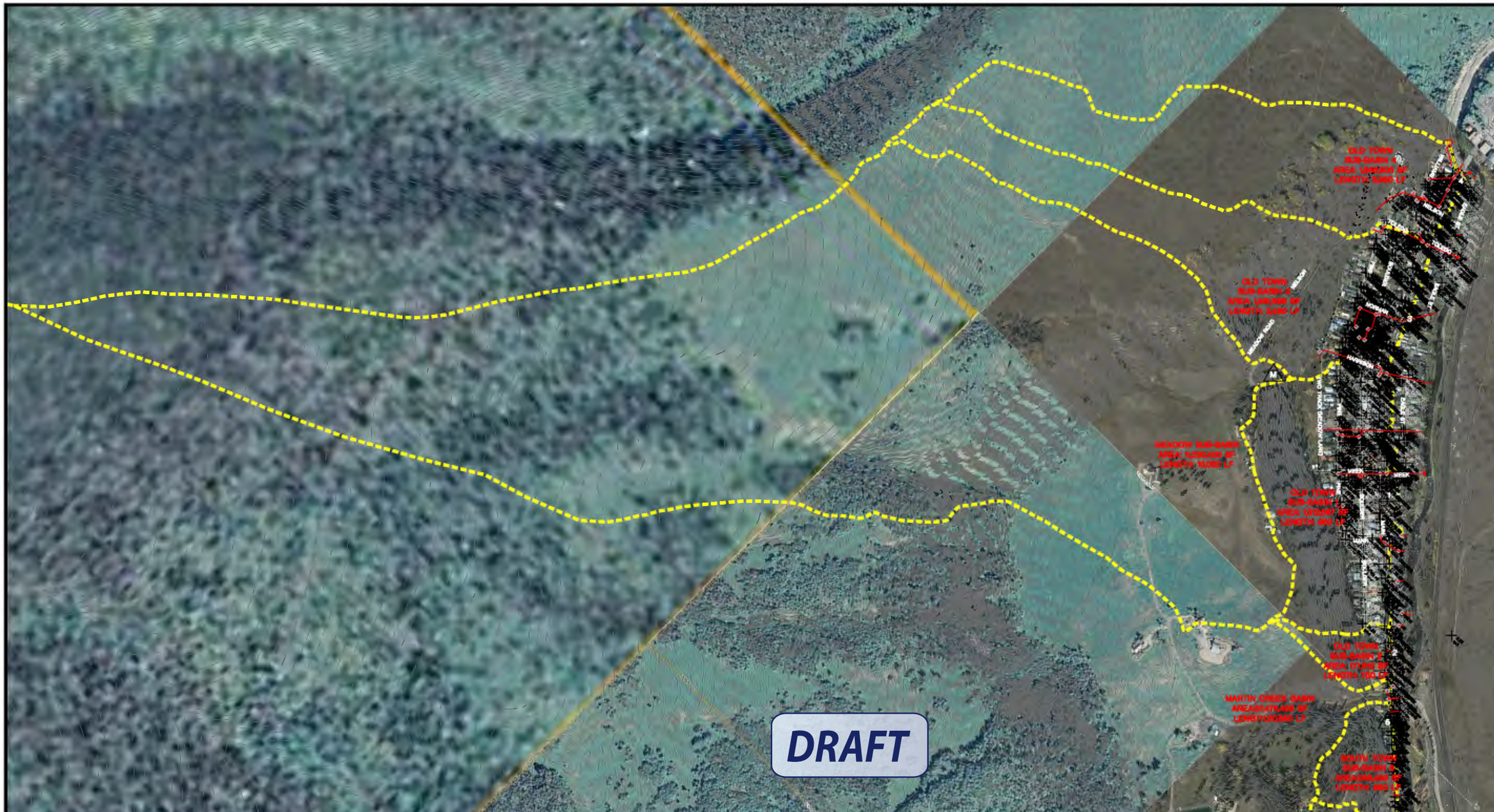
Sincerely,

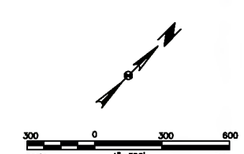
TST, INC. CONSULTING ENGINEERS

DRAFT

Ryan O. Banning, P.E. Steve F. Humann, P.E.

ROB/SFH




| REVISIONS | | |
|---|---|---|
| BY | DATE | DESCRIPTION |

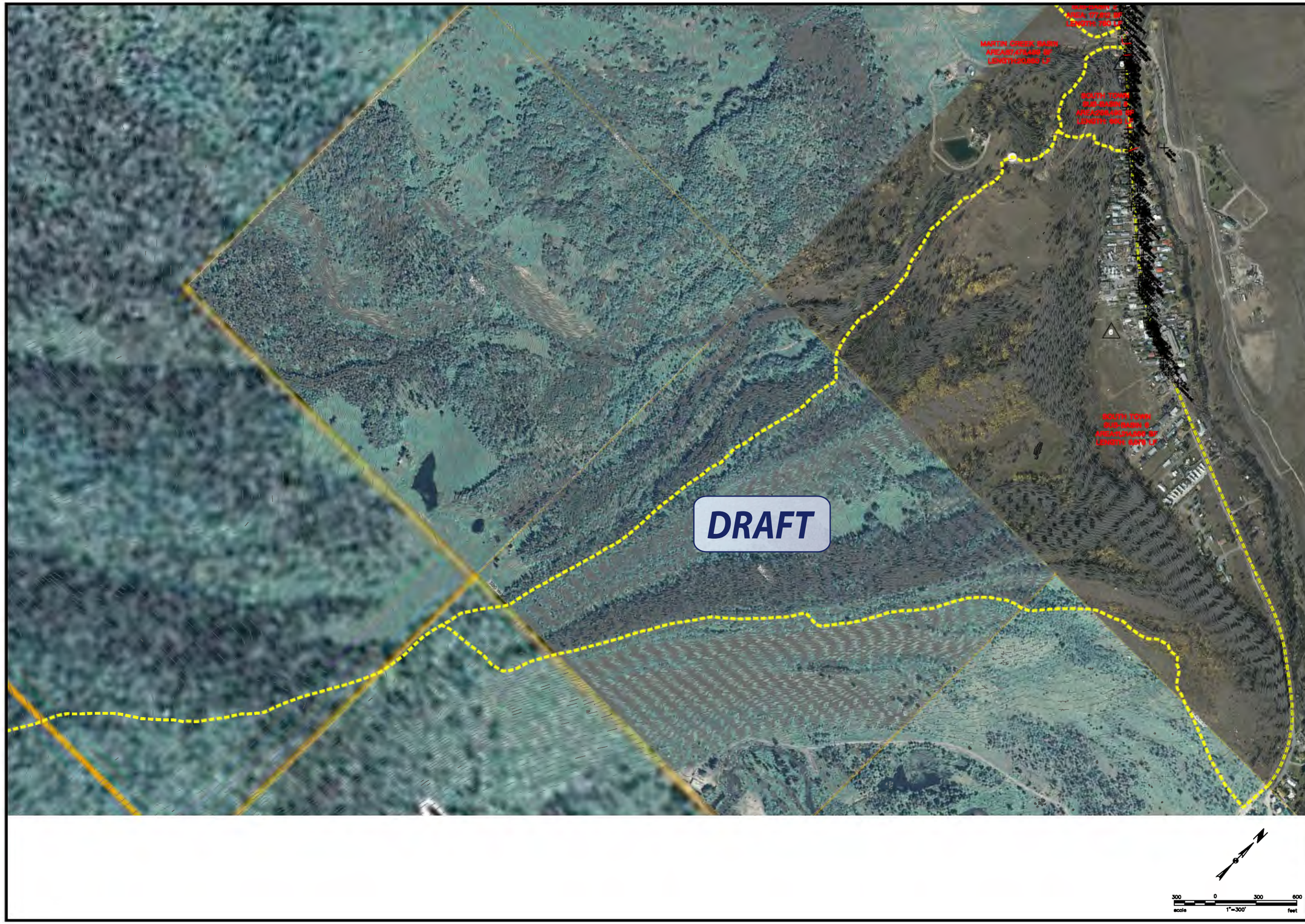
DRAWN: R.O.B.
CHECKED: S.F.H.
DESIGNED: R.O.B.
FILENAME: 00_01_HISTORIC BASINS

# MINTURN EXISTING CONDITIONS SURVEY

## EXHIBIT A
## EXISTING BASINS

TST
TST, INC.
CONSULTING ENGINEERS
760 Whalers Way
Building C, Suite 200
Fort Collins, Colorado
Phone: 970.226.0557
Fax: 970.226.0204

JOB NO. 0879.0004.00
SCALE HORIZONTAL: 1"=300'
DATE JANUARY, 2013
SHEET 1 of 3




REVISIONS

| BY | DATE | DESCRIPTION |
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DRAWN R.O.B.

CHECKED S.F.H.

DESIGNED R.O.B.

FILENAME 00_01_HISTORIC BASINS

# MINTURN EXISTING CONDITIONS SURVEY

## EXHIBIT A
## EXISTING BASINS

TST
TST, INC.
CONSULTING ENGINEERS
760 Whalers Way
Building C, Suite 200
Fort Collins, Colorado
Phone: 970.226.0557
Fax: 970.226.0204

JOB NO. 0879.0004.00

SCALE HORIZONTAL: 1"=300'

DATE JANUARY, 2013

SHEET 2 of 3

| REVISIONS | | |
|---|---|---|
| BY | DATE | DESCRIPTION |

DRAWN R.O.B.

CHECKED S.F.H.

DESIGNED R.O.B.

FILENAME 00_01_HISTORIC BASINS

# MINTURN EXISTING CONDITIONS SURVEY

## EXHIBIT A
## EXISTING BASINS

TST

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JOB NO. 0879.0004.00

SCALE HORIZONTAL: 1"=600'

DATE JANUARY, 2013

SHEET 3 of 3

| REVISIONS | | |
|---|---|---|
| BY | DATE | DESCRIPTION |

DRAWN: R.O.B.
CHECKED: S.F.H.
DESIGNED: R.O.B.
FILENAME: 00_01_EXISTING CATCHMENTS

MINTURN EXISTING CONDITIONS SURVEY

EXHIBIT B
EXISTING DEVELOPED CATCHMENTS

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DATE JANUARY, 2013
SHEET 1 of 3

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SCALE HORIZONTAL: 1"=60'
DATE JANUARY, 2013
SHEET 2 of 3

| REVISIONS | | |
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DRAWN R.O.B.

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DESIGNED R.O.B.

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SCALE HORIZONTAL: 1"=150'

DATE JANUARY, 2013

SHEET 3 of 3

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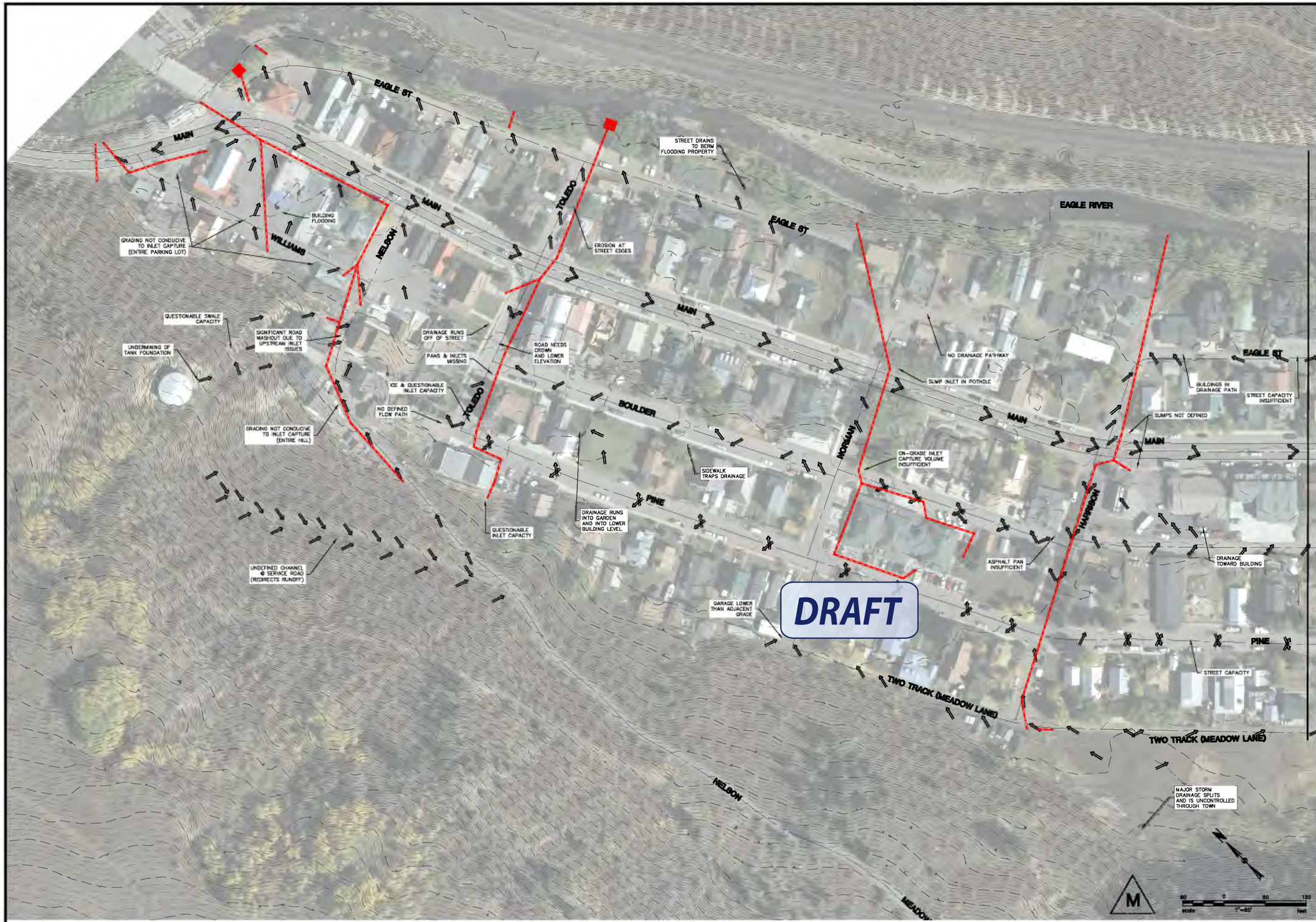
scale 1"=150' feet




| REVISIONS | | |
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| BY | DATE | DESCRIPTION |

DRAWN R.O.B.
CHECKED S.F.H.
DESIGNED R.O.B.
FILENAME 00_01_AREAS OF CONCERN

# MINTURN EXISTING CONDITIONS SURVEY

## EXHIBIT D
## TYPICAL DRAINAGE AREAS OF CONCERN

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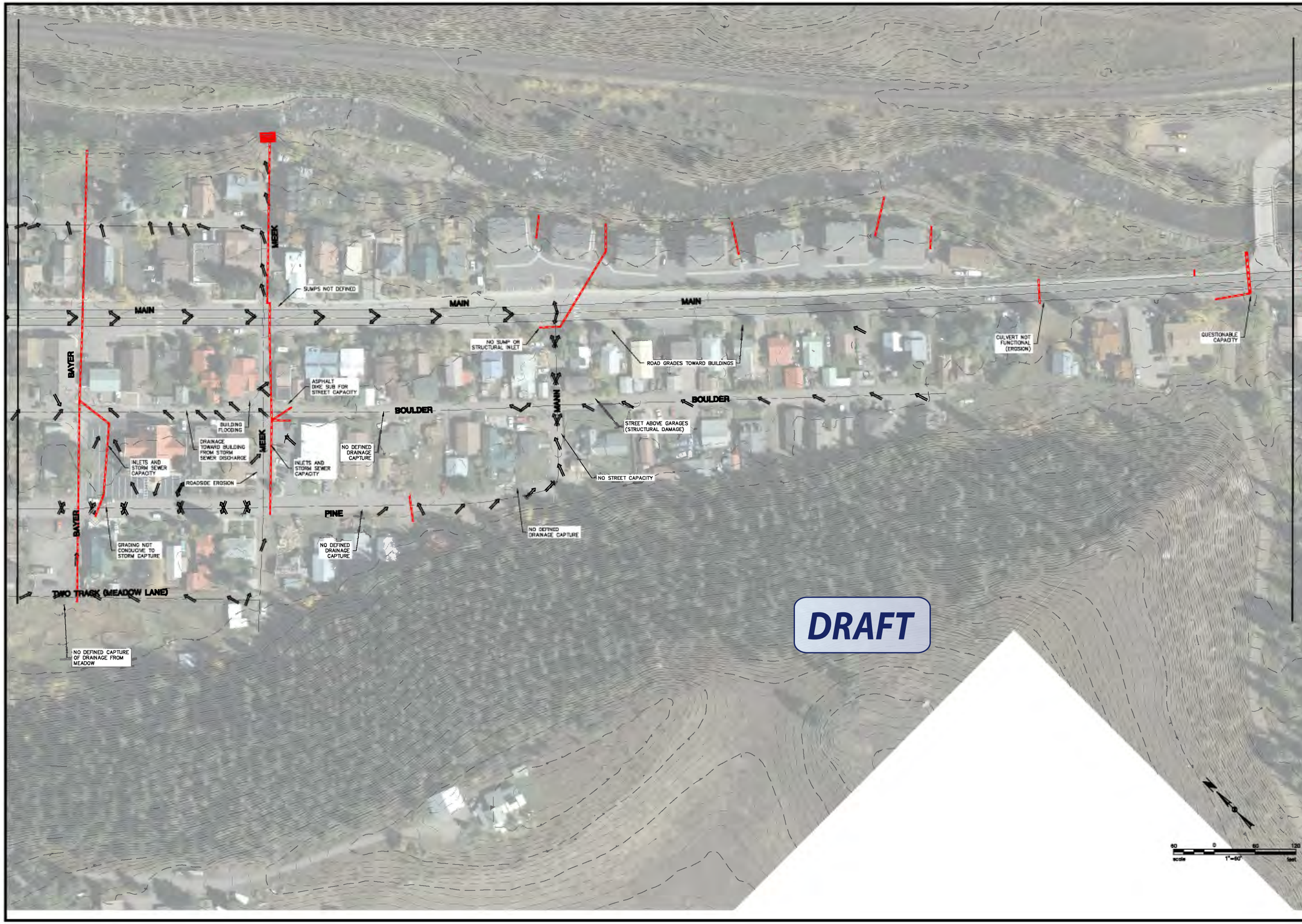
DATE JANUARY, 2013
SHEET 1 of 3

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| BY | DATE | DESCRIPTION |

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## EXHIBIT D
## TYPICAL DRAINAGE AREAS OF CONCERN

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DATE JANUARY, 2013

SHEET 2 of 3

| REVISIONS | | |
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SCALE HORIZONTAL: 1"=150'

DATE JANUARY, 2013

SHEET 3 of 3

# Old Town Master Drainage Plan

# For

# The Town of Minturn

submitted to:

**Town of Minturn, Colorado**

February 15, 2013

**DRAFT**

TST, Inc. Consulting Engineers

TST, INC. CONSULTING ENGINEERS

February 12, 2013

Mr. Jim White
Town Manager
Town of Minturn
302 Pine Street
Minturn, CO 81645

*Re: Town of Minturn – Old Town Master Drainage Plan*
*Project No. 1149.0000.01*

DRAFT

Dear Mr. White,

We have completed our master drainage plan and existing conditions evaluation for the Old Town and South Town areas. We believe that this is a comprehensive plan that can be useful in planning future infrastructure and directing redevelopment projects. A list of priority items has been created as part of this document to help the Town focus on areas in the most need.

We look forward to your review and comments and will gladly answer any questions that you may have.

Sincerely,

TST, INC. CONSULTING ENGINEERS

Ryan O. Banning, P.E. Steve F. Humann, P.E.

ROB/SFH

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DRAFT

## 1.0 Introduction

The Town of Minturn lies is the Eagle River Valley of Eagle County Colorado and was incorporated in 1904. It has built up around a transportation corridor paralleling the Eagle River including Colorado Highway 24 and a major railway. Colorado Highway 24 becomes Main Street as the road passes through Town and development has occurred adjacent to the road where the limited area of the valley allows.

The Town is a unique community with typical mountain-town development related issues and concerns. As the Town has grown, the character of the Town has developed with a strong core of residents and businesses in the Old Town Core with less organized development in South Town, being constrained by limited adjacent public streets and area limitation of the surrounding national forest.

Most buildings in Old Town Minturn have developed along roads and alleys that were historically gravel with little variation from adjacent grade, which is typical of late 1800/early 1900 development. The lower levels of the buildings are generally at the same elevation of the adjacent roads, providing little protection from any runoff or snowmelt that finds its way into the Town core. As use of the roads increased and population grew, the roads were paved, many times with little consideration of the appropriate elevation for such improvements. Over time, multiple overlays of the asphalt streets have also raised the elevation of the streets, further limiting the conveyance capacity.

Now that the Town has organized and is starting to redevelop and find a new identity among the mountain communities, the community is putting forth an effort to rethink and modernize the infrastructure that serves its residents and develop a common sense plan for drainage along its redeveloping roads.

### 1.1 Scope and Purpose

This master plan is intended to aid the Town in its redevelopment of the drainage infrastructure and streets serving the Town. Specifically the intent is to evaluate and plan for the needs of the Town in the Old Town and South Town areas for storm infrastructure to be designed with the repaving of Main Street and the adjacent residential roads. This plan is intended as a tool to be used with the design of individual repaving and infrastructure improvement projects to effectively improve drainage and flood protection cohesively as projects occur. Completion of this Master Plan involved the development of a planning document that would:

a) Evaluate the capacity and effectiveness of the existing storm system.
b) Identify capital improvement projects needed for flood protection to benefit the health, safety and welfare of the town residents.
c) Comprehensively plan for storm drainage as a guide in individual project designs.
d) Promote sound engineering designs that protect both public improvements and private property from drainage related damage.
e) Be a tool for implementing future improvements affecting the Town Core.

## 1.2 Project Location and Description

This master planning effort has focused on the Old Town and South Town Cores and the basins contributing runoff to these areas. The project is roughly 75 acres of developed town including the area from the base of the hill west of town to the Eagle River on the east and from the Main Street Bridge on the north to the start of the southward curve in Highway 24 prior to the Cross Creek area residential zone. The basins contributing runoff to the project area total more than 4-square miles of wilderness area including the Martin Creek basin.

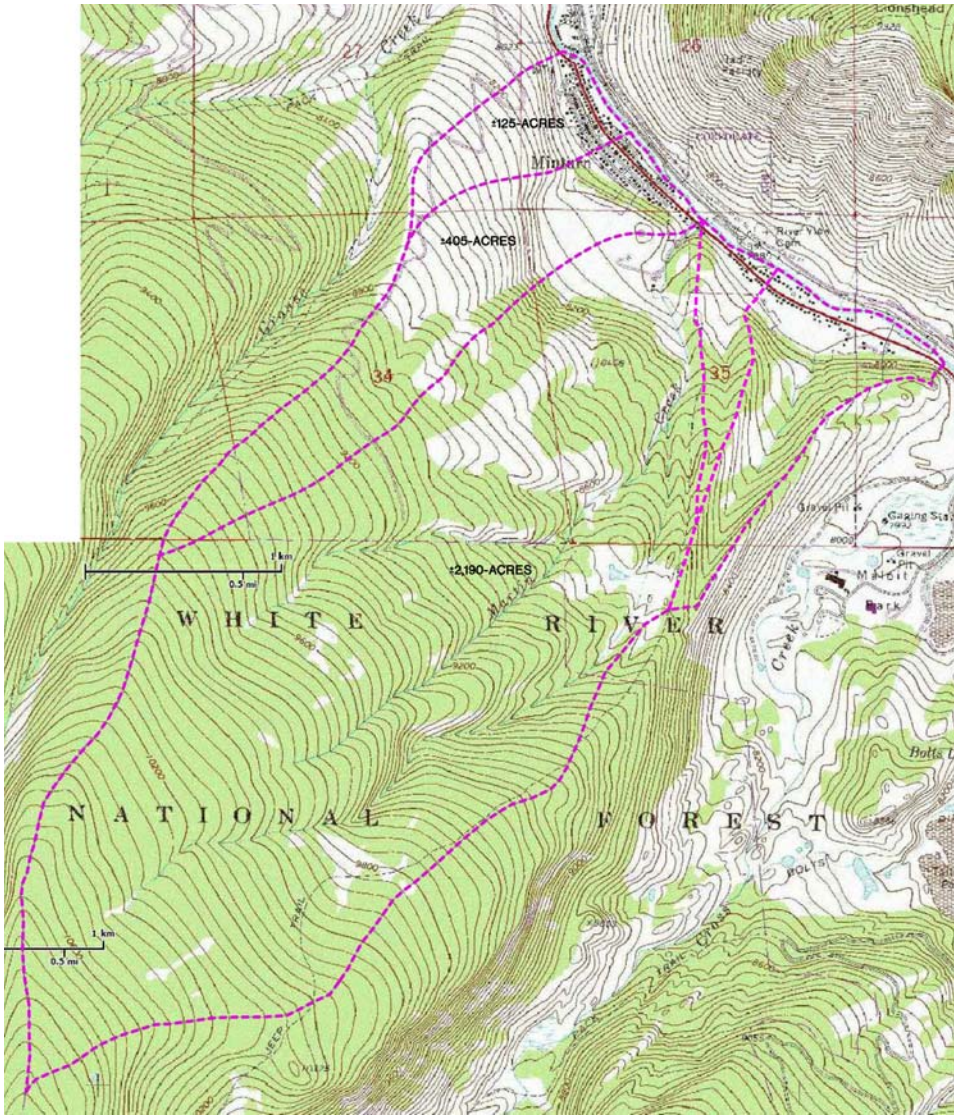


**Figure 1 - Basin Map**
**N.T.S.**

## 2.0 Existing Conditions

The historical and existing conditions of the basins within the project were documented in a historical conditions analysis prepared for the Town of Minturn as part of this project attached as appendix A. In general, the drainage system within the Town is antiquated and beginning to fail. Streets within the Town were not constructed to be a conveyance of runoff. As a result, uncontrolled runoff and accumulated standing water is causing damage to both public improvements and private property. No design for safe conveyance of the major storm runoff is provided and storm system capacities are limited.

As part of the historical conditions analysis a photographic and topographic survey of the town was completed. These surveys document the condition of the drainage systems and existing property, the current drainage patterns and locations/elevations of important drainage related facilities. This survey was used as the basis for all analysis and master planning.

## 3.0 Existing Drainage Evaluation

### 3.1 Design Criteria

The drainage concept presented in this report has been developed using standard engineering principles, guidelines from the USGS and published methodologies for storm system analysis. Where applicable, design guidelines and information were obtained from the Urban Drainage and Flood Control Districts Urban Storm Drainage Criteria Manual (USDCM).

#### 3.1.1 Rainfall Determination

The baseline design depth of rainfall was determined using the Urban Drainage and Flood Control District “Design Rainfall Statistics” worksheet and NOAA Atlas 2, Volume III. The 6 and 24-hour, 100-year rainfall depths were found to be 2.20 and 3.00-in respectively. The calculation has been provided in Appendix B.

#### 3.1.2 Runoff Determination

Runoff from the watershed was determined through regression analysis using the method presented in the USGS Scientific Investigations Report 2009-5136 and the TR-55 “Urban Hydrology for Small Watersheds”. Both were used for comparison and to validate the results. Further regression analysis was used to project storm runoff from smaller sub-basins to determine storm sewer sizing. Where USGS methods do not apply due to small basin size, manual regression was used by producing a trend-line from various area-runoff relationships for different portions of the overall watershed.

The TR-55 method requires more user control of the input variables and produced resulting runoff for all contributing area to the project of between 175 and 200-cfs. Regression analysis uses knowledge of stream gauge and precipitation records, basin size and USGS records of soils and topography to determine runoff. Regression analysis for the entire contributing area

produces resulting runoff of 106-cfs with an estimation error of up to 38-cfs (max 100-yr design flow 144-cfs).

## 3.2 Martin Creek Basin

Martin Creek Basin is 2.88-$mi^2$ of wilderness area discharging to the Eagle River through a culvert located at the Cemetery Road Bridge, separating the Old Town Basin from the South Town Basin.

### 3.2.1 Basin Condition & Impact

The Martin Creek Basin comprises the majority of the overall Minturn watershed. It is heavily wooded but passes through the south portion of the meadow above the Meadow Road bluff. Flooding of the Hwy 24 crossing by this basin's runoff would cut off emergency service to all of the South Town and Cross Creek areas as well as annexed parcels reserved for future development. It is recommended that no overtopping of the highway be allowed in the major storm event due to critical nature of this crossing and the very heavy runoff from this basin.

### 3.2.2 Runoff Evaluation

The calculated 100-yr runoff from the Martin Creek Basin using the TR-55 method is approximately 132-cfs. This is between 65% and 75% of the attenuated runoff calculated using the same method for the Overall Minturn Basin. The high percentage is due to the smaller time of concentration and should not discount the runoff through the Town from the smaller drainage basins. The sum of the peak runoffs from the Martin Creek Basin and the smaller town basins should be much higher than the overall attenuated runoff.

The calculated 100-yr runoff using regression analysis is 86.5-cfs with an estimation error of up to 31-cfs (max 100-yr design flow 118-cfs). This is provided for comparison of the two methods and for perspective in the timing of the crossing improvements.

### 3.2.3 Existing Storm Drainage Facility Evaluation

Currently the crossing is made by a single +/-36" culvert. The capacity of this culvert is approximately 78-cfs prior to overtopping of the highway, assuming a roadway crest elevation that is 5.5 feet above the upstream invert of the culvert. The crossing capacity is approximately sufficient to pass a storm roughly equivalent to the 15-year storm with a chance of flooding in any given year ranging from 2% to 6% due to uncertainty of the calculation. The crossing is slightly undersized for the probable 100-yr storm event and it is recommended that the crossing be upgraded to pass 132-cfs, and should be comprised of at least two 36" culverts or larger at 6% grade. Timing of the installation will depend on the Town's aversion to the current flooding risk and its ability to finance or find cooperatives for such a project.

## 3.3 Old Town Basin

The Old Town Basin is 380-acres comprised of the 260-acre Meadow Sub-basin and four

smaller historic sub-basins. There are multiple discharge point for the basin through the developed town catchments.

### 3.3.1 Basin Condition & Impact

The Old Town Basin is slightly under half wooded with a large portion of meadow or brush land toward the lower portion of the basin prior to developed catchments. Much of the runoff from the basin is directly attributed to the historic Meadow Sub-Basin. Runoff collects in the upper meadow area above Nelson Avenue/Meadow Road prior to discharging from the Meadow Sub-basin into the developed catchments within the Town. Historic Old Town sub-basins 1-4 discharge directly into developed catchments and are intended to be controlled by the existing storm system.

### 3.3.2 Runoff Evaluation

The calculated 100-yr runoff from the Old Town Basin using the TR-55 method is approximately 64-cfs. The calculated 100-yr runoff using regression analysis is 30-cfs with an estimation error of up to 11-cfs (max 100-yr design flow 41-cfs). This is provided for comparison of the two methods and for perspective in the timing of the crossing improvements.

### 3.3.3 Sub-Basin Runoff

*Meadow Sub-Basin* – The Meadow Sub-basin is 258-acres and discharges over Nelson Avenue/Meadow Road at a historic 100-year storm rate of 35-cfs to 45-cfs as determined by regression and the TR-55 methods respectively. After the road crossing, runoff proceeds down the hillside into the lower meadow to the west of Pine Street. Within the lower meadow, the major storm splits and enters the lower portion of Old Town Sub-basins 1 and 3. Flooding of the basin generally spills into town although there have been storm inlets installed near the meadow at Bayer Avenue and Harrison Avenue in an attempt to control storm flows. Ice and property damage are major concerns of storm flows from this basin. Control of the minor storm runoff and safe conveyance of the major storm runoff is recommended for this basin.

*Old Town Sub-basin 1* – OT Sub-Basin 1 is 30.5-acres and discharges into developed catchments to the south of Meek Avenue at a historic 100-yr storm rate of 24-cfs according to the Regression Methods. Discharge of only 1.5-cfs was calculated from TR-55 method but the small size of the basin increases the amount of influence that ground cover and soil types have on the calculation enough where judgment of the reliability of the results is important. Less than 0.5-cfs per acre is atypical even from undeveloped land and therefore the regression analysis results are assumed to be more reasonable for this basin. Ice and property damage are major concerns of storm flows from this basin. Safe conveyance of the major storm runoff is recommended for this basin due to the small flow rate as well as improved inlet locations and improved low-flow drainage facilities.

*Old Town Sub-basin 2* – OT Sub-Basin 2 is 4-acres and discharges to a highway culvert located near the center of the basin. The developed catchment is not well defined as there is no perceivable flow path to the outlet however the historic runoff from the basin is very small, less

than 5-cfs for the 100-year storm event calculated by TR-55 and Regression. Rational method results in 10.7-cfs for the 100-year event but that is very conservative for this basin due to error introduced from the inability to accurately represent the abstraction from wooded ground cover. Flooding of the basin overtops basin divides and the highway centerline. Property damage is possible from flooding due to low elevations adjacent to the highway. Improved collection and safe conveyance of the runoff up to the major storm is recommended for the basin due to the small flow rate.

*Old Town Sub-basin 3* – OT Sub-basin 3 is 42-acres and discharges to developed catchments within the Town at a historic rate of 25-cfs as calculated using regression and 19.4-cfs from the TR-55 method. An inlet is located along the Two-Track road (Meadow Lane) to the west of Pine Street that is intended to collect runoff spilling into the sub-basin from the Meadow Sub-basin. The inlet location is currently not conducive to proper storm water collection. Runoff from the un-developed portion of the sub-basin generally finds its way to the west flow-line of Pine Street where it is directed to an on-grade inlet at Toledo Avenue. Flooding of the undeveloped portion of the sub-basin passes over the centerline of Pine Street into other developed catchments and overtops the Toledo Avenue on-grade inlet causing un-necessary nuisance flow and winter ice down Toledo Avenue.

Other developed catchments in the sub-basin direct runoff at a high early rate to the Town storm systems in the Norman and Toledo Avenue corridors. The location and number of inlets in the developed catchments should be adjusted with re-development as well as the capacity of the associated storm systems. The flow rate of the major storm is small enough where it is recommended that the storm system be designed to collect and pass the 25-cfs prior to Main Street.

*Old Town Sub-basin 4* – OT Sub-basin 4 is 42-acres and discharges to developed catchments within the Town at a historic rate of 25-cfs as calculated using regression and 19.4-cfs from the TR-55 method. Runoff from the majority of the basin is intercepted by the north water tank service road and directed downhill to an inlet behind the fire station. The inlet is sufficient for most nuisance flows but the configuration allows spill of larger storm runoff around the building and onto Pine Street.

Other runoff from the undeveloped portion the basin is intercepted by Nelson Avenue, Williams Street and small drainage rundowns below the north water tank. Stormwater on Nelson Avenue currently is not directed to the adjacent inlets and causes erosion of the unpaved road as it spills into the commercial portion of town.

Runoff at a higher early rate from the developed catchments in the sub-basin is intended to be collected by the inlets throughout the corridor but the grading is ineffective in many locations. The fairly uncontrolled manner by which stormwater is collected is due to mostly the tight development in the commercial area without effective stormwater planning as the Town developed. Property damage in the area is a great concern from flows bypassing inlets or spilling into catchments without effective grading. The location and number of inlets in the developed catchments should be adjusted with re-development as well as the capacity of the associated storm systems. The flow rate of the major storm is small enough where it is

recommended that the storm system be designed to collect and pass the 25-cfs prior to Main Street.

### 3.3.4 Existing Storm Drainage Facility Evaluation

*Run-off Interception* – The service road for the north water tank is currently serving as a method of intercepting run-off from the un-developed portion of the OT Basin 4. Additional swales have been installed below the water tank to protect property along Nelson Avenue and Williams Street. Nelson Avenue proceeding up toward Meadow Road also served the same purpose in locations although less control of discharge points is provided along this road.

Interception by the service road is a very effective and practical method of protecting property below the hill from flood events. The service road should be maintained and the conveyance capacity improved toward a discharge point near the Toledo Avenue storm sewer. Improved conveyance of runoff, down the hill is recommended to control erosion and prevent washout of the service road and Nelson Avenue/Meadow Road. This includes installation of an inlet and culvert under Nelson Avenue/Meadow Road, improved sump condition behind the fire station and armoring of the slope where concentrated runoff is to occur.

The swales below the tank should be maintained and/or improved to re-direct runoff down the hill to the Nelson Avenue storm sewer. Major erosion and undermining of the tank has been occurring over the years and should be addressed as soon as possible. Assuming the tank will remain in-place, the slope should be rehabilitated and the drainage should be directed to a controlled a discharge point, possibly down the service road. The undermining is occurring due to the tank being installed in a natural wash/arroyo that concentrates runoff around the foundation of the tank, subsequently carrying away the materials below the slab as it proceeds down the hill.

*Surface Drainage* - With the exception of parts of Main Street and some newer construction in Town, including the Town Hall and Pine Street, there is currently no control of nuisance flows in the Old Town Basin. Improvised surface improvements such as asphalt dikes and hand-dug channels have been implemented with varying success to protect private property where problems have been documented.

As re-development occurs the elevation of most roads should be lowered slightly where possible, curb and gutter or centerline pans should be installed with flowline grading conducive to proper drainage. The location/capacity of inlets should be adjusted to optimize inlet capture. Along Nelson Avenue and Williams Street, road grades, and storm sewer should be planned so that private improvements within the parking lots and around the buildings can be effectively tied into public storm systems as private improvements are made.

*Storm Sewer* – Most storm sewer in the Town is sized for nuisance flows only and is constructed of antiquated materials such as corrugated metal. As a result the pipes and inlets are deteriorating and in places collapsing. Conveyance capacity has been affected by the deterioration of the storm sewer.

The storm sewer should be replaced as redevelopment occurs. The storm sewer should be constructed of more modern materials with inlets and manholes that will allow proper maintenance of the system. Concrete inlet structures with fabricated frames and grates would be preferred and will go a long way to improve the longevity and effectiveness of the system.

*Water Quality Structures* – Multiple storm separators have been installed at the discharge points of the storm system from the Town to the Eagle River. The structures are located at the north end of Eagle Street and the discharge points from the Toledo and Meek Avenue storm systems. These are a common sense method of improving water quality from stormwater discharges but need regular maintenance. If the Town is capable of maintaining these structures, additional structures should be located at the discharge points of all major storm systems within the Town including additional structures at Bayer, Harrison and Norman Avenues.

## 3.4 South Town Basin

The South Town Basin is 260-acres mostly within a single sub-basin. The basin drains primarily to the low point on west side of the highway, primarily within the national forest access land. The discharge points to the river are highway culverts at the northwest end of the basin.

### 3.4.1 Basin Condition & Impact

The South Town Basin is slightly more than half wooded with the majority of the remainder being combination woods and meadow or brush land. There is not much development in the basin, mostly confined to lower end of the basin adjacent to the highway. Runoff from the basin collects in the national forest land and appears to pass through and around building pads prior to the discharge point. Flooding of the basin appears to inundate several buildings prior to passing along the southwest edge of the highway. Overflow of drainage structures overtops the highway or passes along the highway edge, down to culverts near the the Cemetery Road Bridge and the Martin Creek outfall.

### 3.4.2 Runoff Evaluation

The calculated 100-yr runoff from the South Town Basin using the TR-55 method is approximately 16.4-cfs. The calculated 100-yr runoff using regression analysis is 26-cfs with an estimation error of up to 9-cfs (max 100-yr design flow 35-cfs). The low calculated rate from the TR-55 is mostly due to ground cover in the calculation. Using 26-cfs as the design flow seems appropriately conservative for this basin due to the limited development within the basin that is susceptible to flooding. Providing a safe overflow route for an additional 10-cfs of runoff is an advisable precaution.

### 3.4.3 Sub-Basin Runoff

*South Town Sub-basin 5* – ST Sub-basin 5 is 6.5-acres and discharges to highway culverts

near the Cemetery Road Bridge at a very small rate, less than 5-cfs for the 100-year storm event. Flooding of the basin overtops basin divides and the highway centerline. Property damage is possible from flooding due to low elevations adjacent to the highway. Improved collection and safe conveyance of the runoff up to the major storm is recommended for the basin due to the small flow rate.

*South Town Sub-basin 6* – ST Sub-basin 6 is 257-acres and is the majority of the South Town Basin. The sub-basin discharges to the national forest access area, follows the toe of the hill to the northwest and discharges to a highway culvert at the north end of the basin. The inlet condition of the culvert is not conducive to collecting the major storm event. It appears that flooding of this basin would inundate buildings along the toe of the hill surface depression in the national forest access area is expected to reduce the developed peak runoff rate from the basin but it is unclear to what extent. Ultimately safe passage of runoff at a rate of 35-cfs to the discharge point should be planned.

*Highway Runoff* – Runoff from the highway discharges to both sides of the road but is generally not heavily concentrated. No roadside ditches or conveyances of any sort have been constructed and much of the drainage discharges directly to buildings adjacent to the road. Installation of a roadside ditches or curb and gutter on both sides of the road is advisable.

### 3.4.4 Existing Storm Drainage Facility Evaluation

There are generally no existing storm drainage facilities other than highway culverts in the South Town Basin. Ultimately curb and gutter or roadside ditches should be installed to convey developed runoff from the impervious area in the basin. Lowering the elevation of the road would improve some of the roadside condition and perhaps make installation of roadside ditches easier.

Conveyance of basin runoff around properties to the south of the highway was never provided and options are limited to resolve the issue while current uses exist. A swale at the toe of the hill would be beneficial for intercepting offsite flows but is limited by the development proximity to the national forest access land. With redevelopment of the property along the northwest of the basin, a storm system may be installed to pass flows through the basin and to the river.

## 4.0 Developed Conditions Plan

The master drainage plan for Minturn evaluates the drainage condition for the town to determine sizing of major storm system and structures that should be installed with the redevelopment of Town. The following are incorporated into the plan:

1. Evaluation of small basins through the study area for peak runoff during the 10-yr minor and 100-year major storm events.

2. Storm sewer layout planning showing suggested improvements to routing and inlet layout.
3. Sizing for major storm systems
4. Suggested surface improvements layout including swales, curb & gutter, paving and pans.

This plan is fairly comprehensive and includes improvements of varying importance for drainage conveyance and protects property in all of the developed part of Town. Implementation of all improvements will be very expensive and thus will need to be scheduled as resources become available and re-development occurs. A list and hierarchy of the most important improvements is included below. The Town may choose to handle the remainder of the issues by focusing on areas affecting the most residents or by ranking them according to the Town's desires.

### 4.0.1 Developed Catchment Hydrology Evaluation

The Old Town sub-basins were divided into developed catchments for hydrological evaluation using the rational method. The results are presented in appendix C and have been used for sizing of storm sewer mains, inlets and hydraulic structures. Altogether, 38 developed catchments have been evaluated.

### 4.0.2 Storm Sewer Layout

Generally the layout of the storm system is good for the existing layout and grading of the Town. Some minor improvements are suggested as shown on the proposed drainage improvements exhibit. Inlet location prohibits the functionality of the storm system and needs to be addressed as soon as practical.

The more important storm layout improvements are those that address the routing of the major storm through town. These include swales intercepting runoff from the hillside and the meadow basin along with extension of storm within Toledo, Harrison and Bayer Avenues.

### 4.0.3 Storm Sewer Sizing

Measuring the size of some of the existing storm system was not practical at this time due to the deteriorated nature of the system. Inlets were not necessarily accessible and connections of the storm pipes within the inlets were not clear. As the town implements this plan, existing storm sizes should be verified, the condition of the sewers evaluated for remaining useful life and the existing capacities should be compared to that calculated with this study for replacement planning.

Storm sewers were sized through each of the existing east/west corridors to convey the 100-year storm event. In most cases, only modest increases to pipe sizes from what was observed were required to provide this level of protection.

*Nelson Corridor:*

The Nelson Corridor extends from the north end of Eagle Street, through the Williams Street complex and up Nelson Avenue toward the north town tank access road. To pass the major storm at a rate of 24-cfs through the storm sewer, the capacity would need to be that of a 24" sewer from the river to the intersection of Williams St and Nelson Ave. The remaining laterals would be 18" for the main line or that required for private roof and landscape drains in the area. Trench drains would be a beneficial addition for property protection toward the top of the residential area to intercept runoff prior to the hill.

*Toledo Corridor:*

The Toledo Corridor conveys runoff from portions of the Old Town Sub-Basin 4 after it reaches the base of the hill. The major storm passes through this storm system at a rate of 33-cfs. The capacity would need to be that of a 24" sewer from the fire station to Main Street and a 36" sewer to the river. In lieu of upsizing the sewer, a surface conveyance could be provided but would need to pass down Main Street and be accommodated near the bridge. Additional inlets would also be beneficial to prevent erosion of the roadside from Main Street down to the River.

*Norman Corridor:*

The Norman Corridor contains some very modern infrastructure due to the construction of the Post Office/Town Hall complex. The system surrounding this building functions fairly well as-is but some inlets should be installed for drainage along the opposite sides of the streets. The capacity of an 18" sewer is sufficient to convey the 17.5-cfs flow until Main Street where it should be upsized to a 24". This may require use of the public tract at the south end of North Eagle Street as shown on the proposed improvements exhibit. This is due to the location of the original corridor being through yards and in very close proximity to buildings.

*Harrison Corridor:*

The Harrison Corridor generally is sufficient as an 18" storm system with a load of 16.5-cfs however relocation of inlets from Meadow Lane to Main Street and accommodations for Eagle Street should be provided.

*Bayer Corridor:*

The Bayer Corridor is the main conveyance and overflow from any runoff originating in the Meadow Sub-Basin. It would be beneficial to provide the capacity of a 30" storm sewer within Bayer Avenue to convey the Meadow Sub-basin runoff. The corridor must convey 59-cfs in the major storm event and could be passed through a system of this size. Inlet layout must be addressed in this basin as there are inlets that currently do not intercept runoff near Pine Street.

Meadow Lane (Two-Track) should be re-graded to convey the 56-cfs runoff through town. This would include a 2' roadside ditch to a FES inlet or lowering of the road and installing a center pan with drop inlets. The later would require accommodations down Bayer Avenue and

sufficient inlet capacity on Pine Street to control overflows. The ultimate improvement selection would be based upon the right-of-way that could be acquired along Meadow Lane.

*Meek Corridor:*

The Meek Avenue storm system is sufficient as an 18” sewer with 18.8-cfs until Main Street where it should be upsized to 24”. Inlet location is very important in this corridor due to property damage that has occurred and improvised asphalt drainage structures used to convey flows.

*Mann Corridor:*

The Mann Corridor currently has very little storm system. Runoff from the above basins is fairly minor but concentrate at a rate of 25-cfs as they reach Main Street. A 24” sewer has sufficient capacity but inlet locations and an improved tie-in at the Enclave is needed.

*Martin Creek Corridor:*

The Martin Creek highway culvert should be upsized to have the capacity of 2-36” culverts at 6% grade to pass 132-cfs.

*South Town Corridor:*

A future 36” storm sewer should be installed with the redevelopment of South Town. The sewer would convey runoff at a rate of 35-cfs from the National Forest Access Land to the river. If 4.5 ac-ft of detention could be provided at the base of the access land, the sewer could be reduced to a 24” with 16.5-cfs capacity.

*Other Storm Sewer:*

Multiple culverts and storm sewers exist along the highway. These are sufficient as 18” sewers as currently configured. With the design of curb and gutter for the highway, these capacities should be evaluated with the creation of new developed catchments.

4.0.4 Suggested Surface Improvements

The drainage improvements suggested as part of the redevelopment throughout town are shown on the proposed improvement plan. The improvements are summarized in the following list:

1. Install swales near the tank to intercept run-on from off-site.
2. Reconfigure pans within the Wilson St Complex.
3. Pave Nelson Avenue up the residential portion of the hill.
4. Install a swale at Meadow Lane to intercept the Meadow Sub-basin runoff
5. Install curb & gutter and cross-pans where flows concentrate along the majority of the

streets throughout town where not existing.

6. Lower the elevation of roads as curb & gutter is installed to improve runoff from private property and gutter conveyance.
7. Install center pans with lower road elevations along parts of Meek Ave., Bayer Ave., Boulder St. and Eagle Street.
8. Adjust inlet locations and road grades. Locate all inlets in sumps or at the flow-line of conveyances in on-grade locations.
9. Provide interception of run-on from the South Town Basin and confine the conveyance of runoff to drainage structures as it passes to vacant land (National Forest Access).

## 4.1 Other Considerations

Other drainage considerations are street capacities, inlet capacities, erosion control and water quality. Most of these cannot be adequately evaluated until specific design elements are considered for a re-development project. These items are however discussed below.

### 4.1.1 Street Capacity

The developed catchments within town are generally very small with low runoff rates. Street capacities should not be an issue except in very limited situations such as where typical 6” curb & gutter cannot be installed. Capacity along the highway should be considered with final design, as catchments are conceptualized.

### 4.1.2 Inlet Design

The capacity of inlets at the intersection of Main and Mann, the back of the fire station and at the west end of Bayer Ave. should be carefully considered in final design to accommodate larger flows. Elsewhere, standard inlets are expected to be sufficient in typical on-grade and sump street capture applications. Locations and elevations are critical but cannot be determine in this format.

### 4.1.3 Swale Design

Swales have been sized base upon Manning’s equation calculations using Flowmaster software by Haested Methods. Considerations for permanent erosion control should be made for interception swales below the north tank and tank access road. Armoring will be necessary due to the high calculated velocities and grades.

Swales along Meadow Lane and through the South Town basin are sufficient as 2’ deep V-channels with slopes around 2%.

#### 4.1.4 Erosion and Sediment Control

Erosion is a serious consideration along very steep/un-armored slopes. The majority of the erosion in drainage conveyances through the town is occurring at steep roadsides where no curb & gutter is provided. Most should be addressed with the above mentioned improvements. Other areas of concern are in the proposed tank channels and at any rundowns needed prior to collection of runoff in storm sewers.

#### 4.1.5 Water Quality

The storm interceptors located at the end of North Eagle Street, Toledo Avenue and Meek Avenue are a great start for protection of the Eagle River from pollution within the Town. Since no on-surface detention can be provided, the rate of runoff cannot be addressed and interceptors are one of the best options to address water quality. As it becomes practical, structures should be installed at all storm systems prior to outfall to the river.

### 4.2 Priority List

The following is a list and ranking of priority items that should be addressed as soon as possible. This list is based on our opinion of the importance of the improvements and the possible impact and repercussions of not being addressed. This list is therefore subjective and rankings should be weighed along with the perceived importance by the Town Council and residents.

DRAFT

A. Martin Creek Culvert Expansion
    a. Due to possible road washout and safety issues during flooding
B. Meadow Lane Interception Swale & Bayer Avenue Conveyance
    a. To protect the Town from large storm events that could damage property
    b. Provide overflow from Meadow area
    c. Improve surface drainage through the highly visible heart of Old Town including the Church and car wash
C. North Town Tank Rehabilitation – Interception swales
    a. Undermining of the tank is creating an ever increasing danger of structural failure
    b. Runoff to the back of the Fire Station and private residences should be controlled to protect the property investments
D. Williams Street Complex – Nelson Avenue Improvements
    a. This area contains most of the commercial property of the town and should be protected as common area.
    b. Nelson Avenue needs to be reconstructed due to failure of the gravel road. This

will be recurring until permanent control is in place.

E. Toledo Avenue Elevation and Curb & Gutter

   a. This road is heavily shaded and becomes icy. Runoff pours into the commercial area to the north causing property damage

   b. Fire hydrant flushing is uncontrolled and pours into neighboring properties instead of storm sewers.

F. South Town/Main Street On-Street Drainage Improvements

   a. Property is potentially re-developable into commercial. Drainage improvements could be combined with pedestrian improvements to help revitalize the area.

G. Main Street Curb & Gutter Repair/Installation

   a. Lowering Main Street and installing Curb & Gutter through Old Town will be important as the backbone for future improvements.

H. Boulder Street Elevation/Curb & Gutter East of Town Gardens

   a. Pine Street Runoff in the major storm passes into the gardens and collects around residential buildings. Drainage should be provided to the road.

I. Curb & Gutter/Street Elevations and Inlet Locations

   a. Lower street elevations will improve drainage and protect property.

J. South Town Interception Swale/National Forest Access Detention/Storm Outlet

   a. Allow for redevelopment/property protection of South Town to the west of the highway

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## 6.0 Conclusion

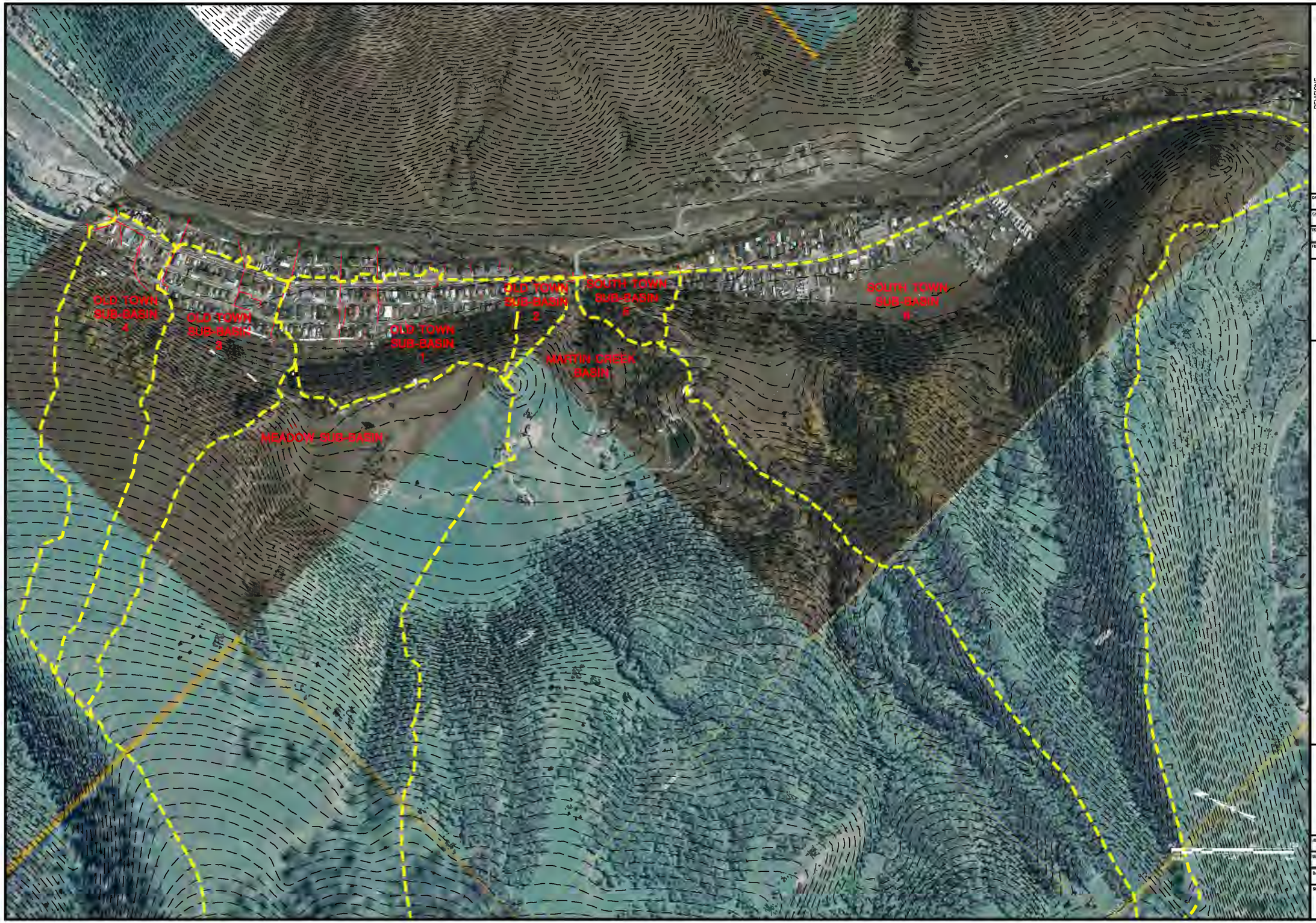
The storm drainage systems through the Town of Minturn are antiquated, failing and insufficient for protection of property in most cases. This Master Drainage Plan investigates the existing conditions within the Town and determines improvements that should be undertaken to rehabilitate the systems. This plan is intended to be a blueprint for drainage protection implemented in the redevelopment of the town. A priority list for these improvements has been provided with a brief explanation of the reasoning for each ranking.

Three major basins pass through the town, with the major portions of runoff making its way to Martin Creek at the center of town. The crossing of the highway by this runoff should be safe for the protection of the resident's livelihood. Conveyance of runoff from the other basins is also important but more-so for protection of property, both public and private. Additional improvements near the north tank area are important for the safety of the tank area and residents below.

Generally, the storm systems of the Town should be rehabilitated by installing storm sewer with sizing as calculated for this report. Inlets should be relocated to sumps and gutter/conveyance flow lines. Streets elevations should be reduced as redevelopment occurs and curb & gutter installed to provide conveyance of runoff.

## 5.0 References


1. Urban Drainage and Flood Control District, 2001, Urban Storm Drainage Criteria Manual.
2. Capesius, J.P., and Stephens, V.C., 2009, Regional regression equations for estimation of natural streamflow statistics in Colorado: U.S. Geological Survey Scientific Investigations Report 2009-5136, 46p.
3. Natural Resources Conservation Service, Conservation Engineering Division, June 1986, Urban Hydrology for Small Watersheds: U.S. Department of Agriculture Technical Release 55.

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DESIGNED R.O.B.

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# MINTURN MASTER DRAINAGE PLAN

## OVERALL DRAINAGE PLAN

TST

TST, INC.
CONSULTING ENGINEERS
760 Whalers Way
Building C, Suite 200
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JOB NO. 0879.0004.00

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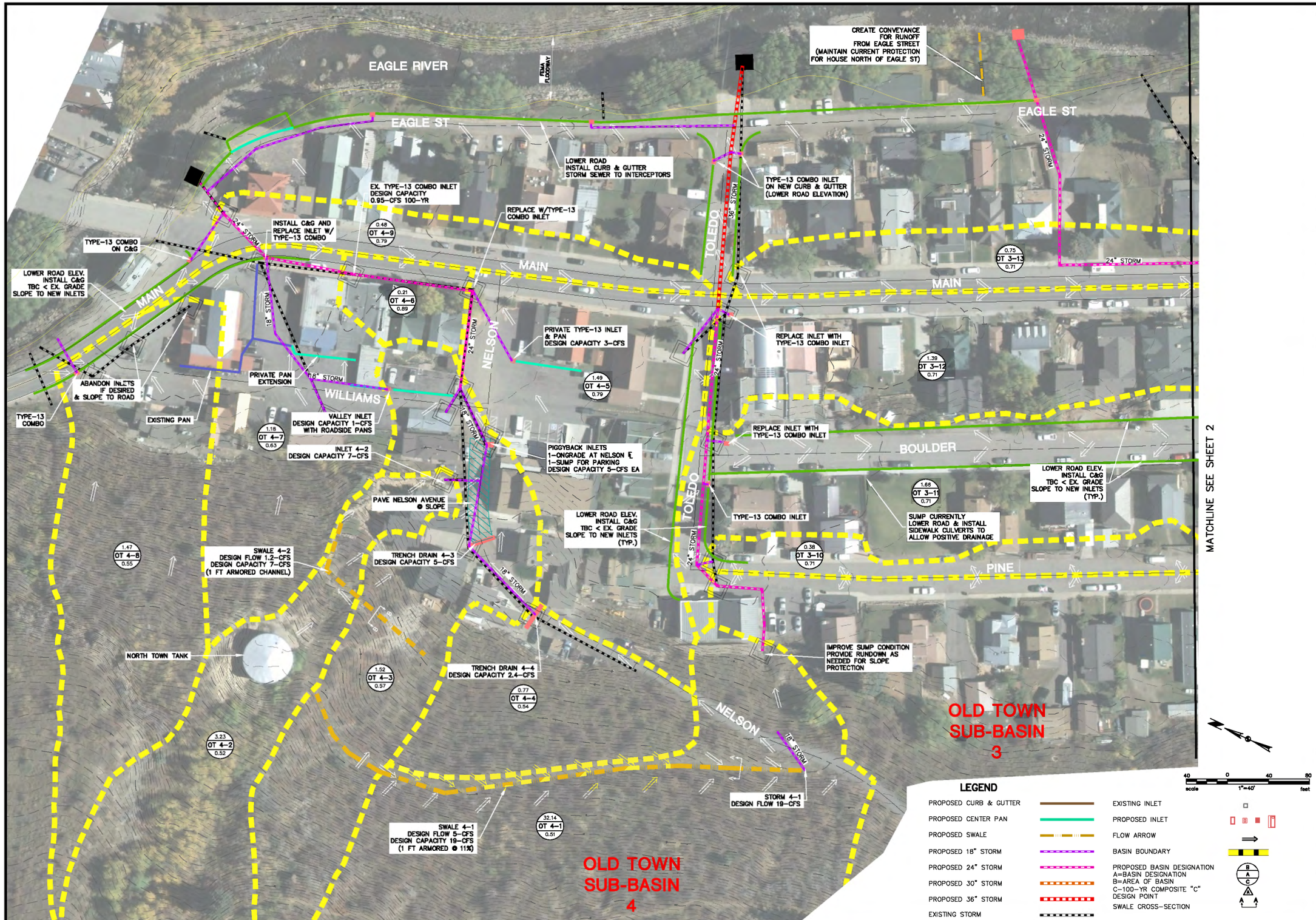
DATE FEBRUARY, 2013

SHEET 1 of 1

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JOB NO. 0879.0004.00
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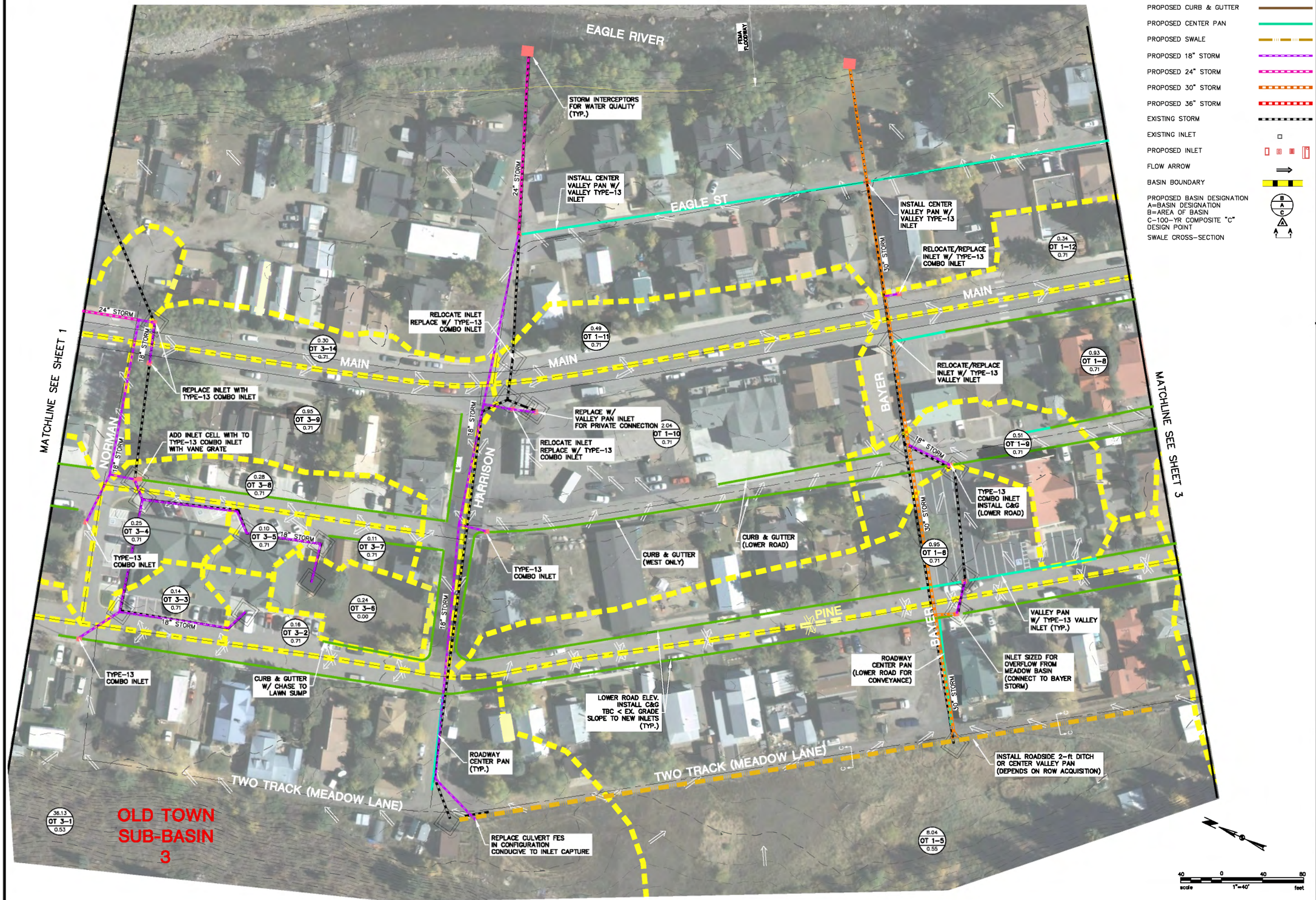
SHEET 1 of 8




## LEGEND

- PROPOSED CURB & GUTTER
- PROPOSED CENTER PAN
- PROPOSED SWALE
- PROPOSED 18" STORM
- PROPOSED 24" STORM
- PROPOSED 30" STORM
- PROPOSED 36" STORM
- EXISTING STORM
- EXISTING INLET
- PROPOSED INLET
- FLOW ARROW
- BASIN BOUNDARY
- PROPOSED BASIN DESIGNATION
  A=BASIN DESIGNATION
  B=AREA OF BASIN
  C-100-YR COMPOSITE "C"
  DESIGN POINT
- SWALE CROSS-SECTION

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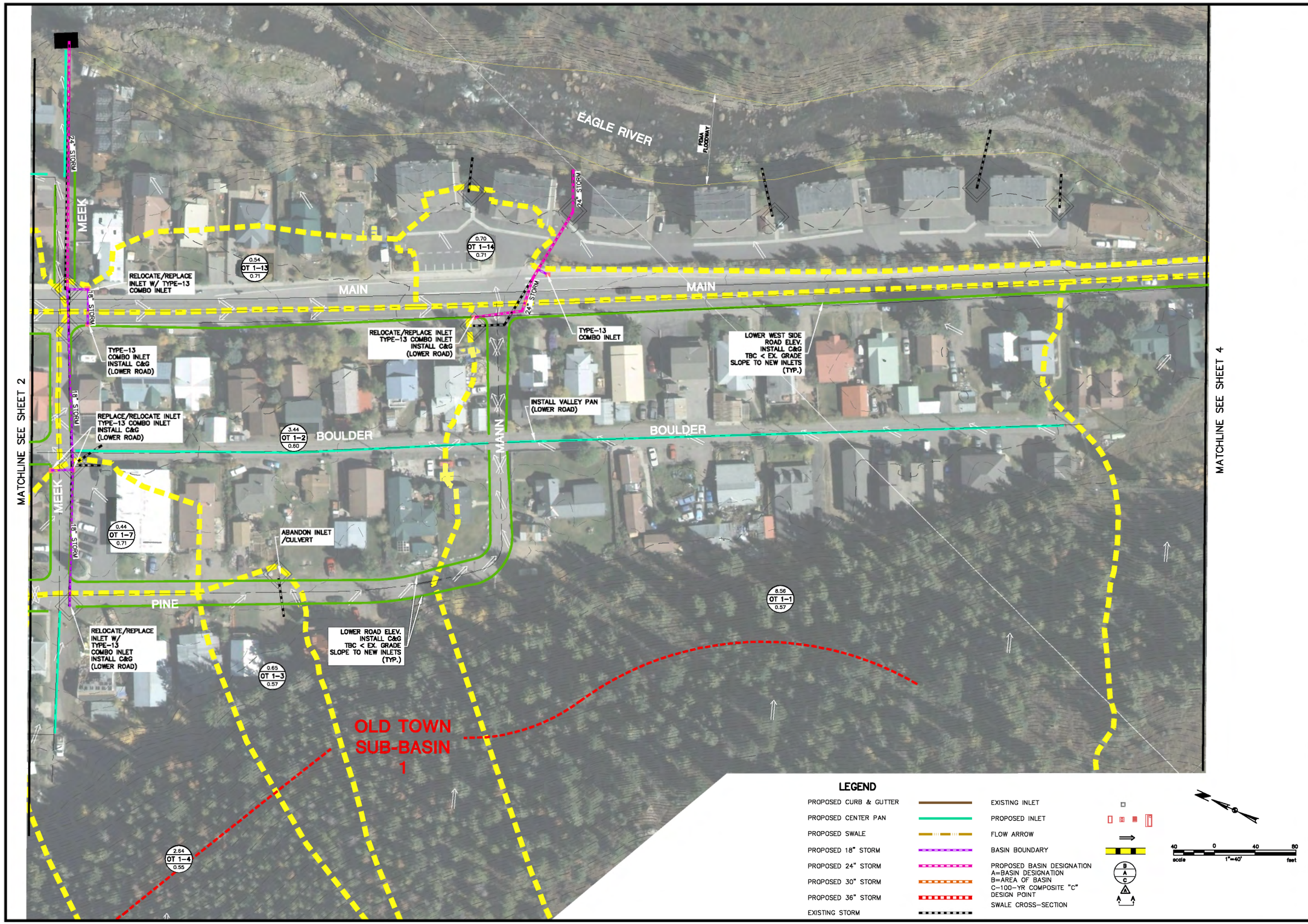


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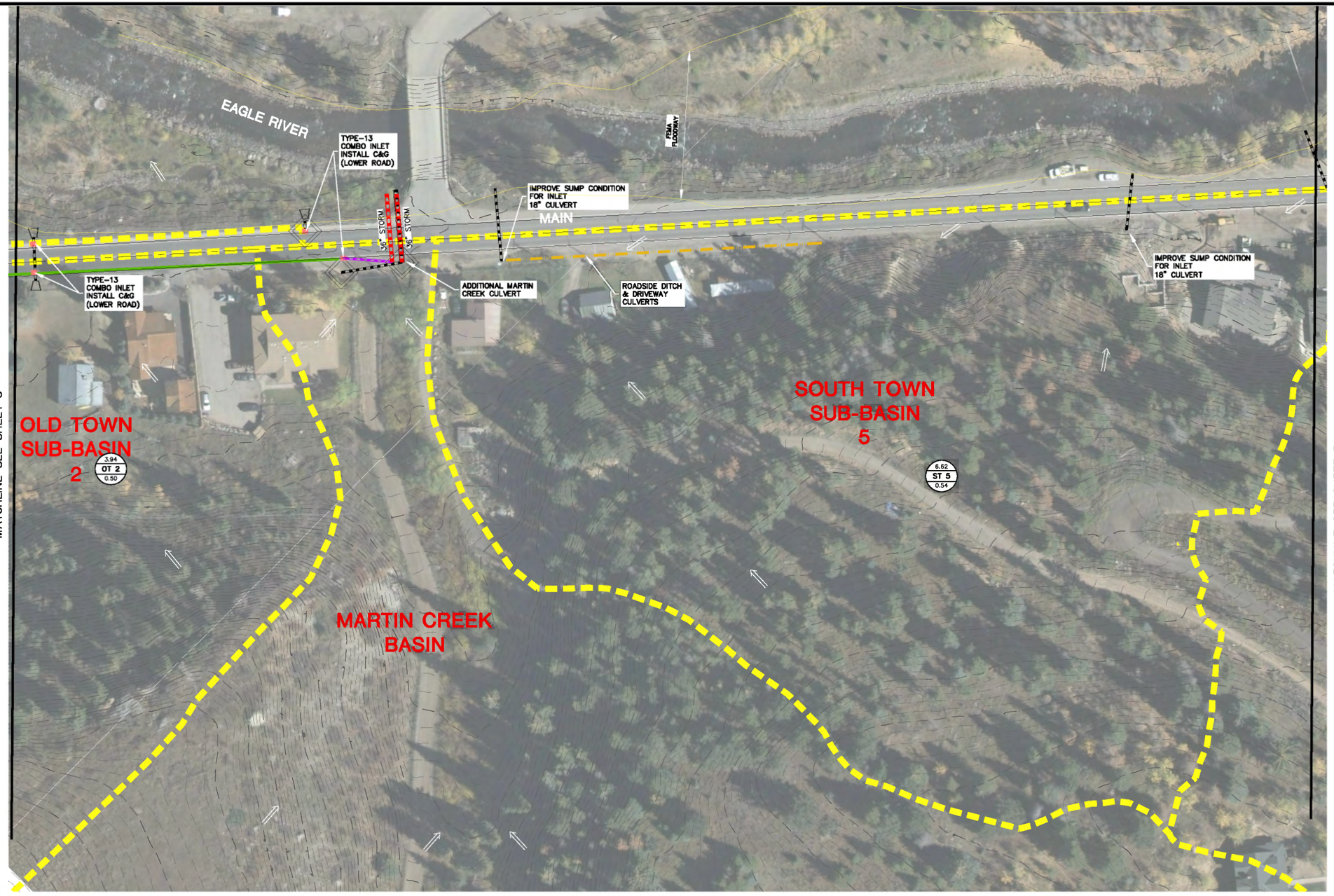


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- PROPOSED INLET
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- BASIN BOUNDARY
- PROPOSED BASIN DESIGNATION
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  B=AREA OF BASIN
  C=100-YR COMPOSITE "C"
- DESIGN POINT
- SWALE CROSS-SECTION

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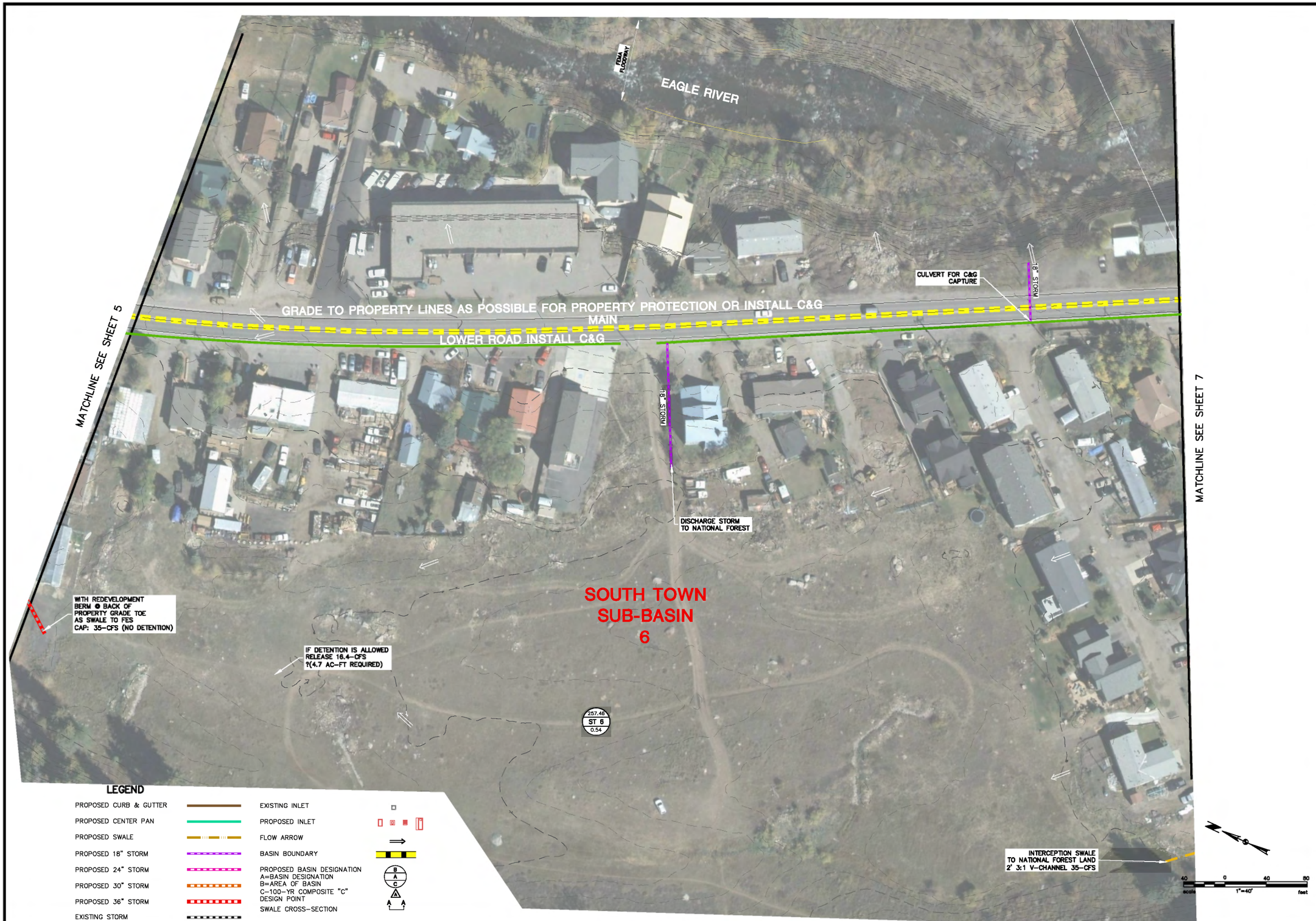


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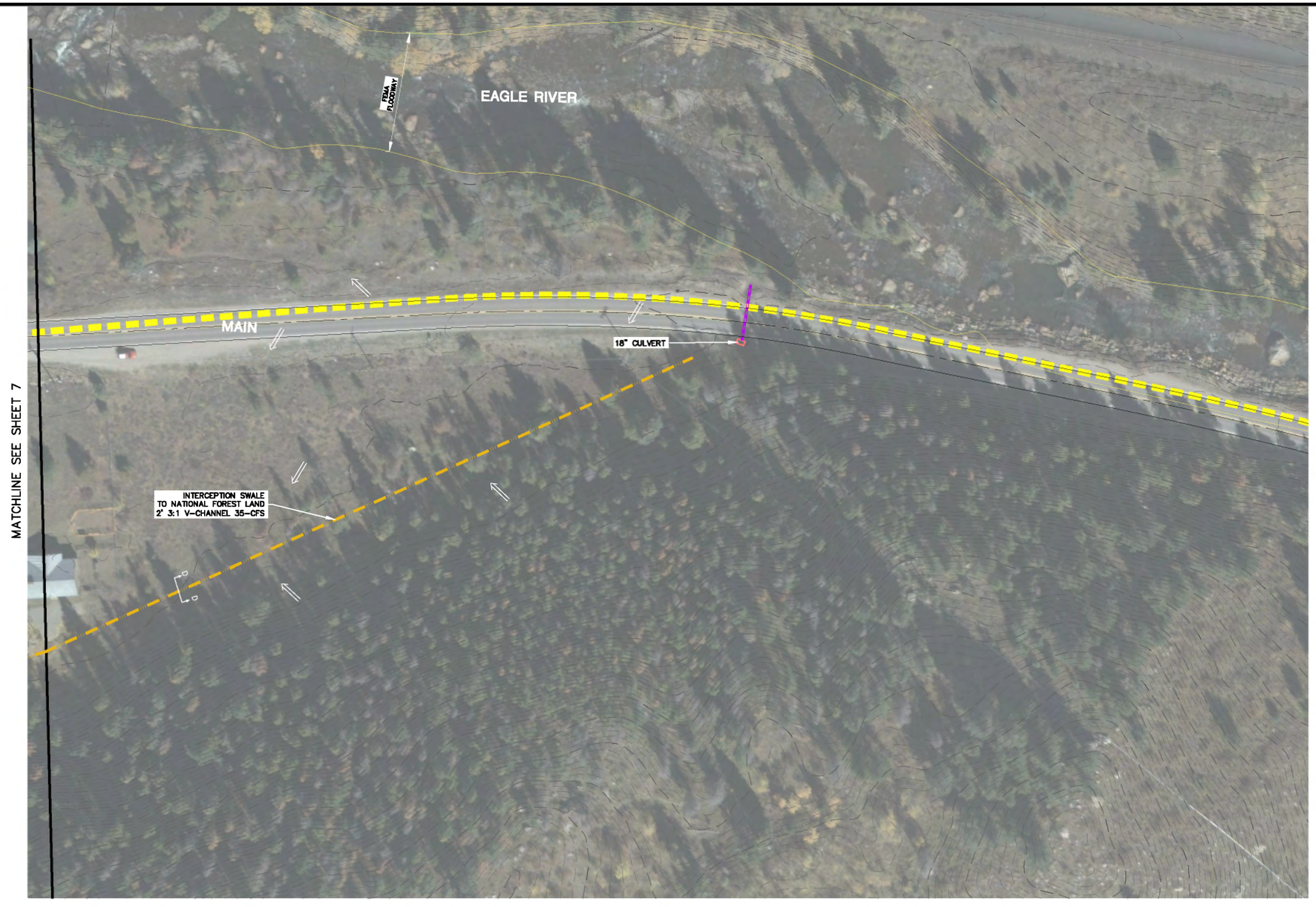


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| PROPOSED 24" STORM | PROPOSED BASIN DESIGNATION<br>A=BASIN DESIGNATION<br>B=AREA OF BASIN<br>C=100-YR COMPOSITE "C"<br>DESIGN POINT |
| PROPOSED 30" STORM | |
| PROPOSED 36" STORM | SWALE CROSS-SECTION |
| EXISTING STORM | |

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DATE JANUARY, 2013
SHEET 8 of 8

Dear Minturn Resident,

Active Energies is writing to inform you that we are asking the Minturn Town Council to consider a proposal for the installation of a 100 kW photovoltaic Solar Garden near your property. The proposed location of the Solar Garden is 810 Cemetery Rd, adjacent to the current LaFarge concrete plant. If approved, Active Energies, Inc., a local Minturn-based business, would design and install solar panels on the site.

A Solar Garden is a solar generation facility that is located in or near a community served by the qualifying retail utility, which in this instance is Xcel Energy. The beneficial use of the electricity generated by the facility belongs to subscribers to the Solar Garden, who are community members or entities who can purchase shares of the facility. *Solar*Rewards Community* is the solar gardens program offered by Xcel Energy in Colorado. Additional information about Xcel's Solar*Rewards Community program can be found at:
http://www.xcelenergy.com/Save_Money_&_Energy/For_Your_Home/Renewable_Energy_Programs/Solar*Rewards_Community_-_CO

Participating in Xcel's Solar*Rewards Community would provide a beneficial use for a currently unutilized parcel of land and would align with the Town of Minturn's 2009 Community Plan. If the Minturn Town Council approves the proposal, Minturn would be home to the first Solar Garden in Eagle County, allowing residents, businesses, and the Town of Minturn to subscribe to the Solar Garden and purchase solar energy for cheaper than utility rates.

The Solar Garden requires at least ten different subscribers. Each subscriber would receive monetary credits from Xcel Energy each month for the power produced, and in return, pay a lease payment to Active Energies at a fixed rate for the solar energy. This lease payment would be lower than the credit received from Xcel, allowing subscribers to save money on their energy bills. The proposed Solar Garden would provide an estimated savings to subscribers of over $117,000 over the course of 20 years.

The solar installation work itself would last approximately four weeks and would not include the use of heavy equipment, resulting in no noticeable increase to noise or dust. Installation and operation would not require access by any large vehicles or increased traffic. The solar array is a stationary, silent energy generation facility.

To minimize any aesthetic impact for any properties with a view of the site, the proposed Solar Garden will consist of black, non-reflective panels and the hillside location allows for reduced height of the solar panels. Active Energies has erected a storyboard at the site displaying the projected height of the solar array.

We request your feedback regarding the proposed system and location. If you have any input or additional questions or concerns about the proposed Solar Garden, please contact Jason Weingast or Megan Gilman at Active Energies, Inc. at (970) 306-4235 or Jason@ActiveEnergies.com.

Thank you,

ACTIVE ENERGIES, INC.
Energy Audits | Solar Design | Energy Consulting
T: 970.306.4233 | F: 866.403.3485
W: www.activeenergies.com

3/13/2013

System Size:
140’ wide x 90’ front
to back x 12’ high
.29 acres

3/13/2013

**Photovoltaic Proposal**

# Town of Minturn Solar Garden

810 Cemetery Rd.
Minturn, CO 81645

ACTIVE ENERGIES SOLAR, LLC

A chance to help our tomorrow, today!

PO Box 7627
Avon, CO 81620
Phone: (970) 306-4233
Fax: (866) 403-3485
info@activeenergies.com
www.activeenergies.com

# Company Profile

Town of Minturn,

With a mission to help promote energy efficiency and sustainable building within our communities, Active Energies' team of professionals offers energy and green building consulting, energy auditing and solar design and installation services. Our diverse team works to bring sustainability to the forefront of any project, while integrating these techniques seamlessly into design and construction. With expertise across multiple disciplines including mechanical design, insulation techniques and installation, performance testing, site design, water usage, sustainable materials, waste reduction, and renewable energy, Active Energies is proud to make our clients leaders in energy efficiency.

## Solar Design and Installation:

Active Energies Solar, LLC is dedicated to promoting energy efficiency in our communities. We provide complete, turnkey solar solutions with all aspects of system design, installation, project management, permitting, rebate assistance and warranty management included. Active Energies is committed to serving you and our installation experts will be there every step of the way to provide you one-on-one service and answer all of your questions.

## The Team:

**Megan Gilman, President**: Megan is the President and co-founder of Active Energies Solar LLC and Active Energies, Inc. Megan studied at the School of Photovoltaics and Renewable Energy Engineering at UNSW before earning a BS in Mechanical Engineering at Penn State University. Megan attended a full course in Photovoltaic System Design and Installation at Solar Energy International and has actively overseen numerous installations throughout Colorado. Megan provides expert-level consulting on energy efficiency and renewable energy, as well as professional trainings for building professionals, businesses and homeowners. Megan serves as the Chair of the Board of the Eagle Valley Alliance for Sustainability, a member of the Eagle County EcoBuild steering committee, a LEED Accredited Professional, LEED for Homes AP+, RESNET certified HERS rater, RESNET certified green rater, and adjunct faculty member at Colorado Mountain College.

**Jason Weingast, Vice President**: As a founding member of Active Energies, Inc., Jason completed RESNET Rater training and has been certified as a Home Energy Rater (HERS). His drive to create a greener world inspired Jason to co-found Active Energies Solar, LLC. It is here that Jason received his NABCEP certification and continues to demonstrate his expertise in design and installation of Renewable Energy System. Under his supervision, all AES projects have finished on time and within budget.

**Charles Pratt, Project Manager**: Charles is a PV Project Manager and lead installer. He has completed training to become a Certified Home Energy Rater giving him experience in energy consulting and efficiency through the use of in-depth energy audits. He brings a wealth of building knowledge to PV System installations. By bringing clean renewable energy to his home state, Chuck hopes that future generations of outdoor lovers will be able to enjoy the skiing, biking, and hiking that take up the entirety of his free time. While with AES, Charles has been a key project team member in over 250kW of installed solar power and all solar thermal projects.

The following is for the design and installation of a ground mounted, grid-tied, photovoltaic (PV) system to be located at 810 Cemetery Rd. in Minturn.

**System Size:** 100kW

**Estimated Production:** 129Megawatt Hours per Year

**System Layout:** Single Panel = 5.4ft tall X 3.25ft wide
System Size = 140ft wide x 90ft front to back x 12ft high avg. (.29 acres)
Panel Arrangement: 4 groups of 2 rows of 40 panels oriented in the portrait position facing south

**Equipment:** Panels: 400 Phono Solar PS250P-20/U black solar panels @ 250watts (or equivalent)
Inverter: 2 Fronius CL 44.4 Delta (240v) or similar
Mounting Equipment: S-Flex Custom Ground Mounting System
Monitoring: eGauge Online Monitoring System & Production Monitoring by Xcel Energy

20kW Ground Mount System Example

**Included in Photovoltaic System Design:**

- Design and full installation of functional, code compliant system, including all required equipment and labor
- Full system documentation including permitting, invoices, instructions and warranty information provided during system installation
- All AC electrical connections, including system interconnection by a Colorado Certified Master Electrician
- All DC electrical work overseen by NABCEP certified staff
- All applicable local, county and state taxes
- Permit procurement and payment
- Facilitation of applicable rebate processes
- References available upon request

**Net Metering:** For Solar Gardens, Xcel Energy will offer *Virtual net metering*; when a customer purchases solar power from the Minturn Solar Garden that solar power will be credited on their monthly Xcel power bill.

**Solar Non-Financial Benefits:**

A 100kW PV system each year (www.solarenergy.org):

- prevents 90 tons of coal from being mined
- prevents 180 tons of $CO_2$ from entering the atmosphere
- keeps 126,000 gallons of water from being consumed
- offsets 265,300 miles from being driven
- is equivalent to planting 600 trees
- keeps NO and $SO_2$ from being released into the environment
- Knowing that you are taking another step in protecting the environment!
- Help free yourself from the utility company by limiting your exposure to increasing energy costs. Own your electricity instead of renting it.

Thank you again for choosing Active Energies Solar LLC. Our goal is to save you money on your utility bills, while lessening impacts on our fragile environment. With this in mind, please let us know if there is any way we can better serve you.

Best Regards,

Jason Weingast

Vice President
Active Energies Solar, LLC
Jason@activeenergies.com

## ABOUT PHONO SOLAR

Phono Solar Technology Co., Ltd. is one of the world's leading renewable energy product manufacturers and a well trusted brand provider. The Phono Solar brand has become synonymous with high performing, top quality photovoltaic panels that are ideal for use in large scale power plants, commercial and residential installations.

# ONYX Series 235-265

## All black module, aesthetically pleasing

HIGH PERFORMANCE SOLAR MODULES

Phono® Solar
SHARE THE SUN, POWER THE FUTURE!

### RELIABLY HIGH YIELDS

- High efficiency solar cells together with high transmission textured glass deliver module efficiency of over 16.0%, leading to minimized installation costs and maximized system output.
- High output due to excellent performance in weak-light conditions.
- Higher specific yields due to positive power sorting.
- Product quality is assured through the use of branded components.

### QUALITY ASSURANCE

- Durability assured in even the harshest environments with AMMONIA CORROSION, SALT MIST CORROSION, and FIRE TEST certifications.
- Certified to withstand increased snow and wind loads of up to 5400Pa.
- Manufacturing facility certified by ISO 9001, ISO 14001 and OHSAS 18001.
- Internal quality control with standards higher than both IEC and UL.

### WARRANTIES

- 10-year product warranty*
- 25-year performance warranty*
- Free module recycling through PV Cycle Association membership**

CEC

Clean Energy Council

PV CYCLE

* IN COMPLIANCE WITH OUR WARRANTY TERMS AND CONDITIONS.

** IN PV CYCLE MEMBER COUNTRIES ONLY, SEE: WWW.PVCYCLE.COM

# ONYX Series 235-265

Phono® Solar

## MECHANICAL CHARACTERISTICS

| | |
|---|---|
| Solar Cells | Polycrystalline 156mm x 156mm square, 6 x 10 pieces in series |
| Dimension | Length: 1640mm (64.6 inch) |
| | Width: 992mm (39.1 inch) |
| | Height: 45mm (1.8 inch) |
| Weight | 20kg (44.1lbs) |
| Front Glass | 3.2mm toughened glass |
| Frame | Anodized aluminium alloy |
| Cable | 0.90m wire (ø4mm$^2$) |
| Diodes | 6 pieces Schottky by-pass diodes |
| Junction Box | IP 65 rated |

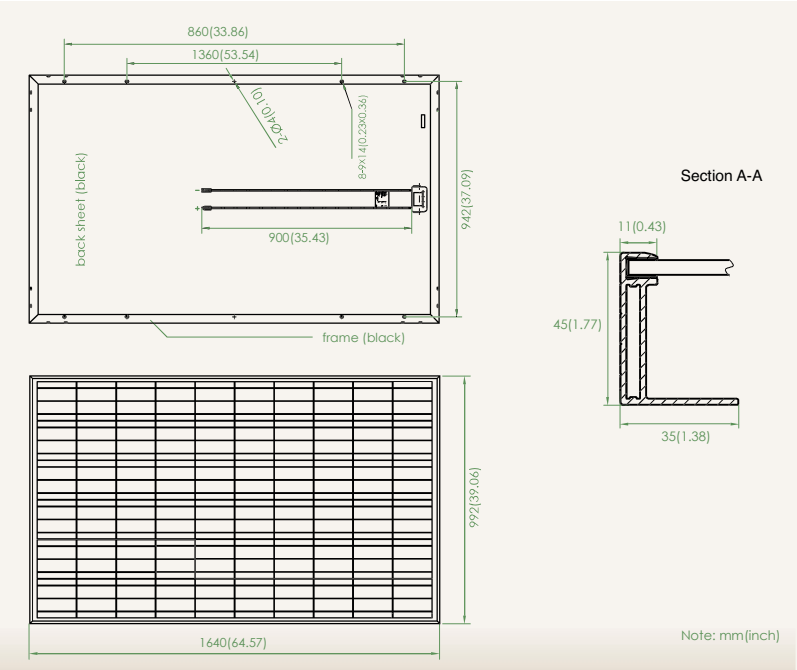
## ABSOLUTE MAXIMUM RATING

| Parameter | Values |
|---|---|
| Operating Temperature | From -40 to +85℃ |
| Typical Application | 20V DC |
| Hail Diameter @ 80km/h | Up to 25mm |
| Surface Maximum Load Capacity | Up to 5400Pa |
| Maximum Series Fuse Rating | 15A |
| IEC Application Class (IEC 61215) | A |
| Fire Rating (UL 1703) | C |
| Maximum System Voltage | 1000V DC (IFC 61215) |
| | 1000V DC (UL 1703) |

## ELECTRICAL TYPICAL VALUES[1,2]

| Model | Rated Power ($P_{mpp}$) | Tolerance | Rated Current ($I_{mpp}$) | Rated Voltage ($V_{mpp}$) | Short Circuit Current ($I_{sc}$) | Open Circuit Voltage ($V_{oc}$) | Module Efficiency (%) |
|---|---|---|---|---|---|---|---|
| PS235P-20/U | 235W | 0~+5W | 7.94A | 29.6V | 8.40A | 37.3V | 14.44 |
| PS240P-20/U | 240W | 0~+5W | 8.06A | 29.8V | 8.50A | 37.5V | 14.75 |
| PS245P-20/U | 245W | 0~+5W | 8.18A | 30.0V | 8.60A | 37.7V | 15.06 |
| PS250P-20/U | 250W | 0~+5W | 8.30A | 30.2V | 8.70A | 37.8V | 15.37 |
| PS255P-20/U | 255W | 0~+5W | 8.42A | 30.4V | 8.80A | 37.9V | 15.67 |
| PS260P-20/U | 260W | 0~+5W | 8.53A | 30.6V | 8.90A | 38.0V | 15.98 |
| PS265P-20/U | 265W | 0~+5W | 8.61A | 30.8V | 9.00A | 38.1V | 16.29 |

## DIMENSIONS




## TEMPERATURE CHARACTERISTICS

| | |
|---|---|
| NOCT (Nominal Operation Cell Temperature) | 45℃ ± 2℃ |
| Voltage Temperature Coefficient | -0.31%/K |
| Current Temperature Coefficient | +0.07%/K |
| Power Temperature Coefficient | -0.40%/K |

## WEAK LIGHT PERFORMANCE

| Intensity [W/m$^2$] | $I_{mpp}$ | $V_{mpp}$ |
|---|---|---|
| 1000 | 1 | 1 |
| 800 | 0.8 | 0.996 |
| 600 | 0.6 | 0.99 |
| 400 | 0.4 | 0.983 |
| 200 | 0.2 | 0.952 |
| 100 | 0.1 | 0.921 |

## PACKING CONFIGURATION

| | |
|---|---|
| Container | 40' HQ |
| Pieces per pallet | 22 |
| Pallets per container | 28 |
| Pieces per container | 616 |

## PARTNER INFORMATION

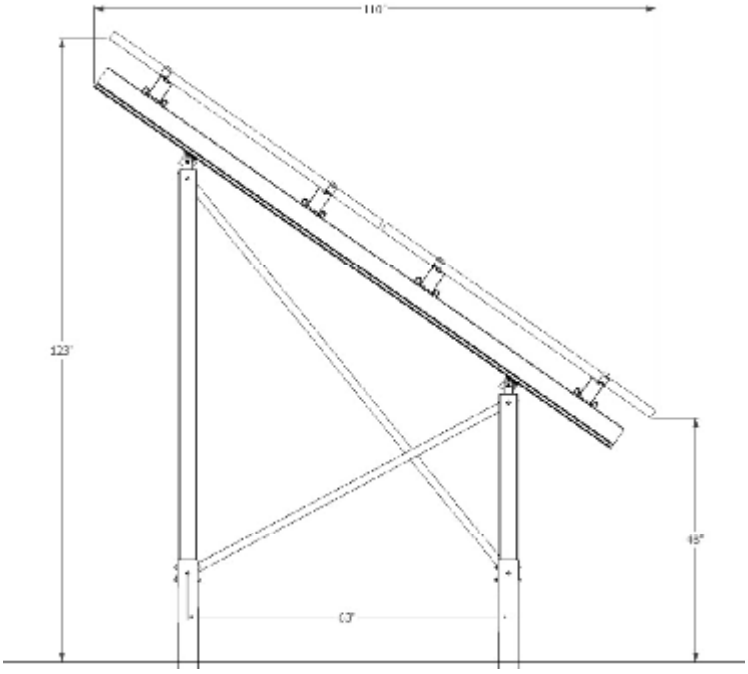
Note: This datasheet summarises product warranty and specifications, which are subject to change without notice. The exact module specification will be subject to the description in the sales contract. Further information can be found on our website: www.phonosolar.com

1. Defined as standard deviation of thousands measurements. Absolute power values depend on the measuring system. They can differ by +/-5% from one measuring system to another.

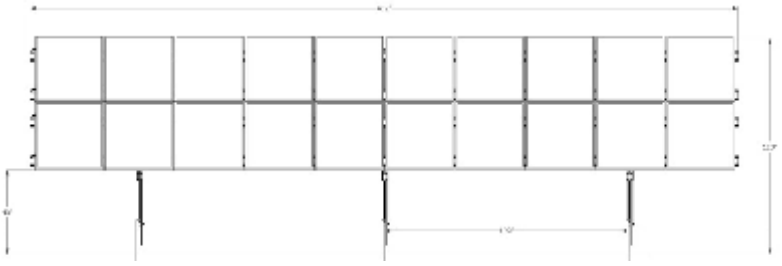
2. Measurement conditions under irradiance level of Standard Test Conditions(STC): 1000W/m$^2$, Air mass 1.5 Spectrum, cell temperature of 25℃.

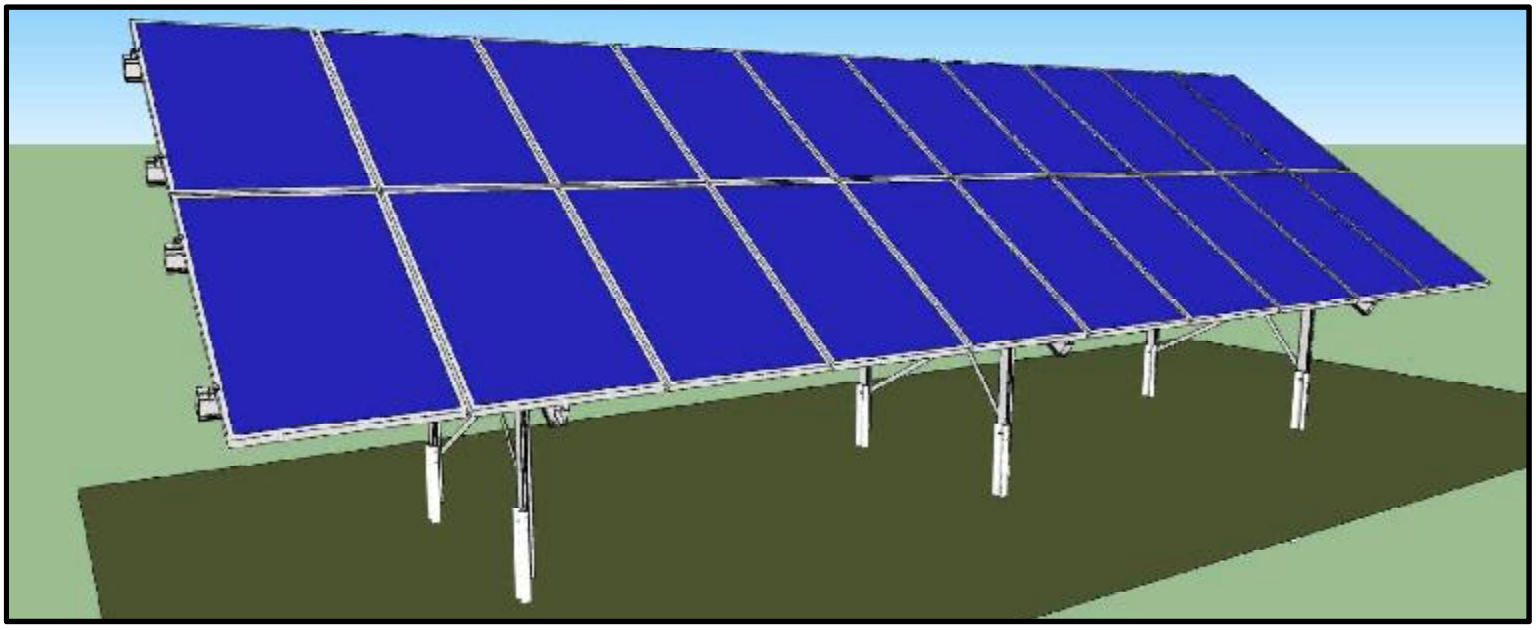
**Technical Data**

# Active Energies Solar
# Minturn Community Solar Garden 2013



2 x 10 Ground Mount Table
Portrait at a 35° Tilt Angle
48inch Ground Clearance





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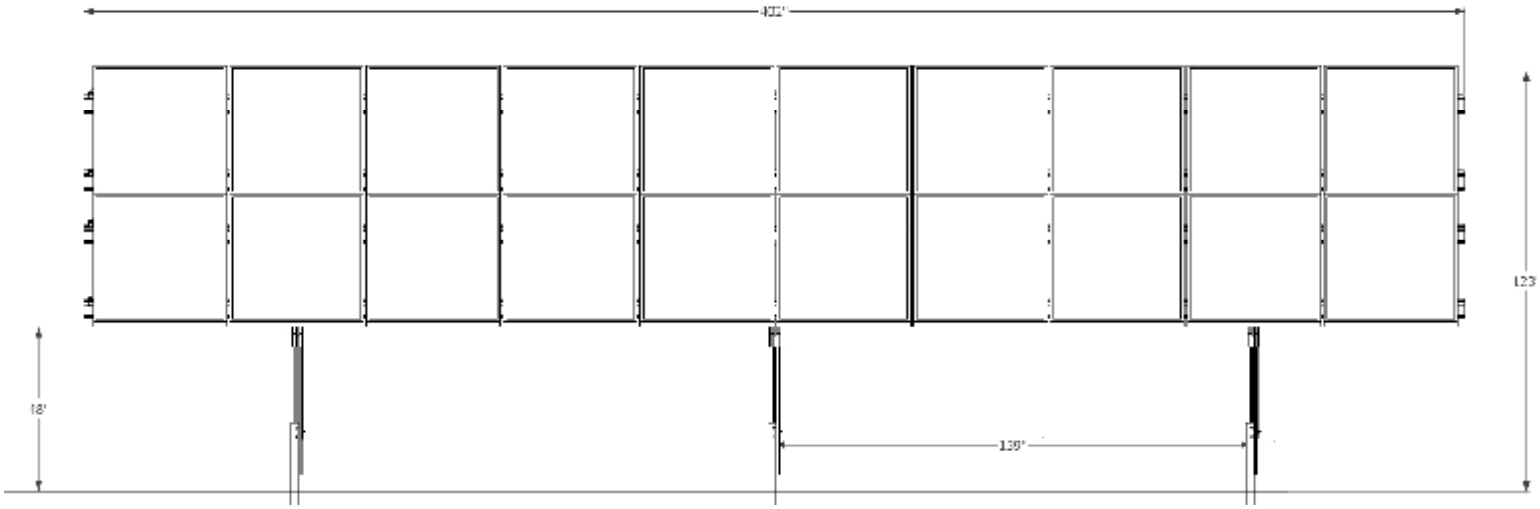
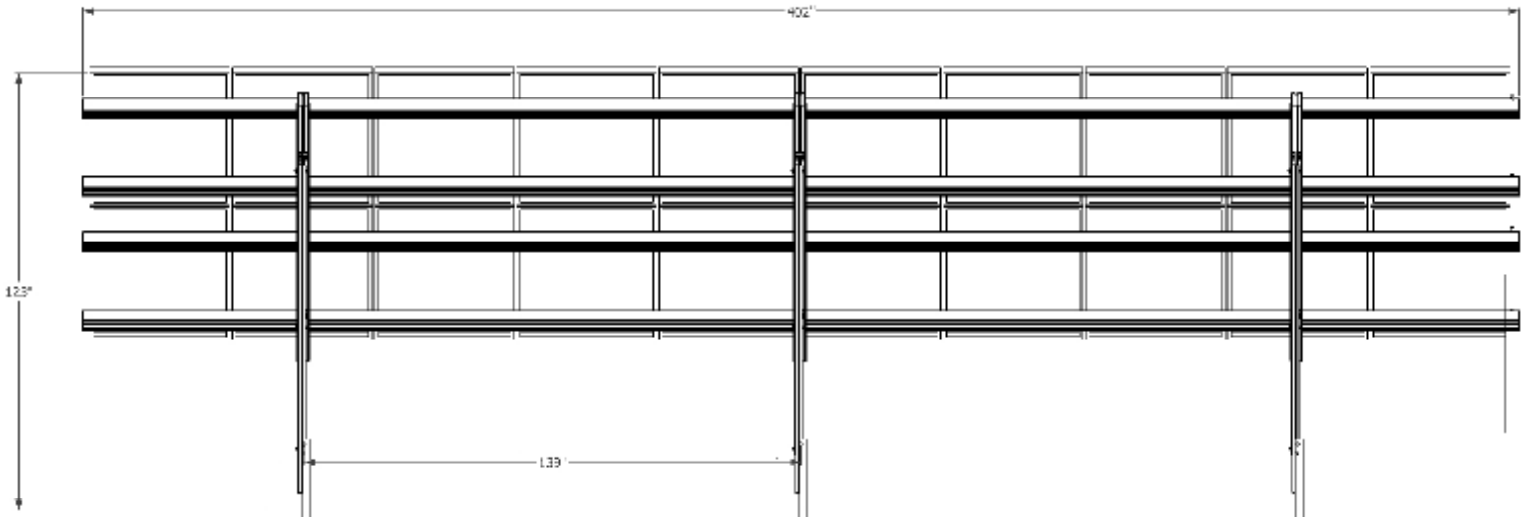
**Technical Data**

# Active Energies Solar
# Minturn Community Solar Garden 2013




Front




Back

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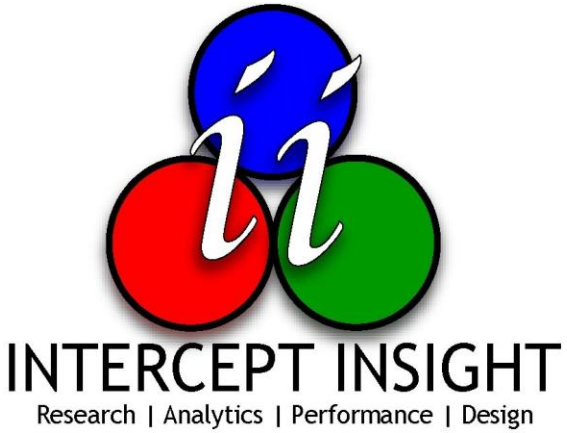
# Minturn Skijoring

## February 2013

Prepared for:
*Town of Minturn*




Prepared by:
*Intercept Insight, LLC*
PO Box 2078
Avon, CO 81620
970.331.1086
www.interceptinsight.com

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## Table of Contents


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End of Report

# Objectives

The Town of Minturn invested in a third party research company, Intercept Insight, LLC, to conduct in-person intercepts during the Skijoring event to help quantify decisions, and increase performance related to the event. With this insight, the Town of Minturn will be able to develop objectives to increase the overall performance, market effectively, provide sponsors with valuable data regarding the event, and evaluate the revenue generation and spending habits of the attendees.

Objectives:

- Attendee details (e.g. reason for visiting Minturn, prior attendance, loyalty)
- Intent to return to the event
- Quantify recommendations
- Evaluate event performance
- Estimate spending habits
- Estimate revenue generation
- Understand media effectiveness/awareness
- Obtain demographical and geographical data
- Determine accommodations, nights stayed, town stayed in, etc.
- Favorite winter-time activities

# Methodology

The Town of Minturn and Intercept Insight determined that in-person intercepts were the best method fit for collecting data from attendees of the Skijoring event. The Town of Minturn and Intercept Insight designed a core set of questions intended to meet the objectives of the study, including event specific questions. Once the survey was approved, the questions were programmed into a survey design tool, and downloaded onto handheld survey devices (PDA's).

Skijoring was held from February 23rd – 24th, 2013. Surveyors were hired and trained to conduct the intercepts in a way so that a random representative sample of the population was being collected. Those surveyed must have been 18 years of age or older.

After the completion of the event, the data collected was downloaded to a survey design tool, exported into an analytical software, and prepared for analysis and reporting.

# Overview and Summary

It is important to remember that this is a tool for gathering opinions and feedback. Many of the results are presented in terms of percentages. Intercept Insight, LLC encourages readers to consider the overall direction that is suggested rather than *only* the statistics. Note that the margin of error is different for every single question response on the survey depending on the sample sizes, proportion of responses, and number of answer categories for each question. As a general comment, it is sometimes more appropriate to focus attention on the general trends and patterns in the data rather than on the individual percentages.

The Town of Minturn engaged Intercept Insight, LLC for research services/in-person intercepts during the 2013 Skijoring event. The services included strategy and execution, survey development, programming, analysis, reporting, and staffing. Surveyors using handheld data collection tools (PDA's) conducted in-person intercepts throughout the event. The estimated attendance was based on counting the attendees during the peak time of the event each day. Approximately 800 patrons attended over the course of the two day event. 110 attendees responded to in-person intercepts over the course of the event. This results in an overall margin for error of 9.2% at a 95% confidence interval.

85% of the respondents came to Minturn specifically for the event, and 78% of the respondents are "Very" or "Extremely likely" to return in the future. The Skijoring event achieved a Net Promoter Score of 59, with 70% of the respondents classified as "Promoters". Overall satisfaction with the Skijoring event earned a mean satisfaction rating of 4.0 on a scale of 1 to 5, where 1=Not at all satisfied and 5=Extremely satisfied. When respondents were asked if there was one thing we can do to enhance their experience during this event in the future, most of those who responded requested easier access to the venue, and for the event to start on time.

Of those who came to Minturn for the Skijoring event, 87% were local visitors and 8% were overnight guests. Overall, 83% of the attendees were from Colorado. Respondent households spent an average of $39 on dining/drinks, and an average of $13 on retail within the Town of Minturn over the course of the event. There was no recordable "lodging" nor "other activities" revenue from this sample set for the Town of Minturn driven by the Skijoring event. The Skijoring event was responsible for generating approximately $12K (+/- 20%) for the Town of Minturn in 2013.

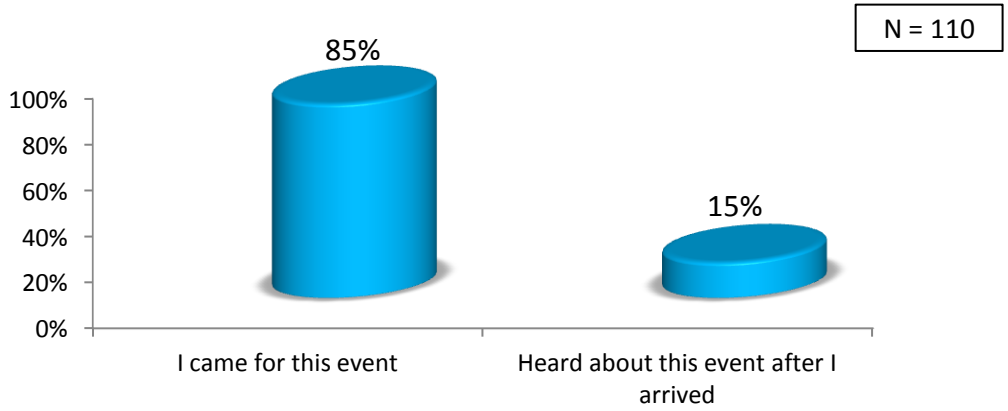
Newspaper, word-of-mouth, and posters were the most effective channels of communication. 26% attended with a group, and 20% attended with friends only. The average age of the respondents was 43, and the average age of the children under 18 in attendance was 7.5. 31% earn a household income of over $100K. 64% have at least a four year degree, and 75% own their home. Aside from skiing/riding; snowshoeing, snowmobiling, and Nordic skiing were the most mentioned favorite winter-time activities.

# Highlights

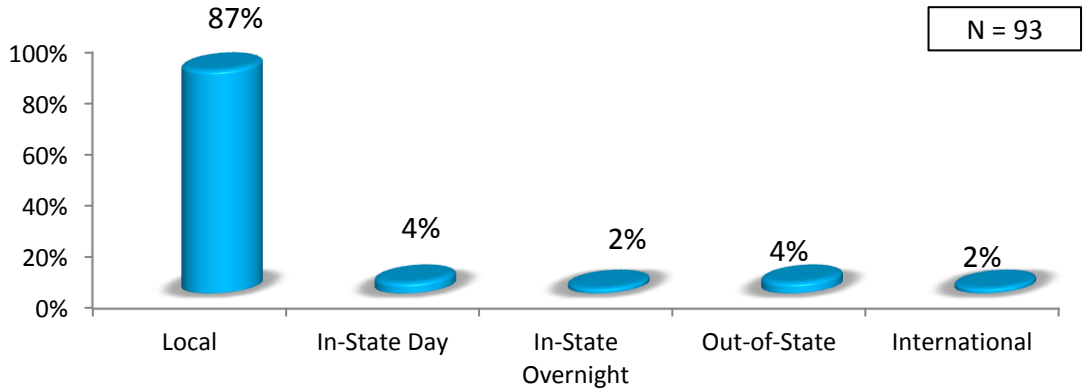
- Estimated attendance – 800
- Sample size: 110 in-person intercepts
- 85% of the respondents came to Minturn specifically for the event
- Intent to Return – 78% rated “Very” or Extremely Likely” to return in the future
- Overall Satisfaction – 4.0 (using a scale of 1 to 5, where 1=Not at all satisfied and 5=Extremely satisfied)
- One Change – Easier access (e.g. walking paths, pack down snow, signage/directions) and start event on time
- “Newspaper” (73%) was selected most when asked “How did you hear about, and/or where did you see advertising for this event?”
- Average household spend on dining/drinks in Minturn - $39
- Average household spend on retail in Minturn - $13
- Revenue generation for the Town of Minturn - $12K (+/- 20%)
- 74% were locals, and 23% were overnight visitors
- Average group size – 3.7
- Average age of respondents – 43 | Average age of children<18 – 7.5
- Favorite winter-time activities aside from skiing/riding – Snowshoeing, snowmobiling, and Nordic skiing

# Attendance

## 2013 Skijoring - Reason for Visiting Minturn



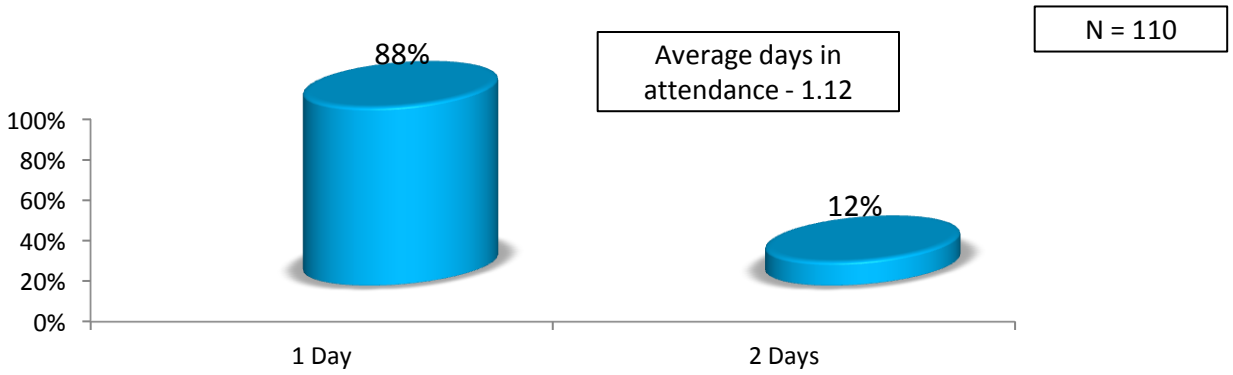

## 2013 Skijoring – Came for Event by Market Segment




- 85% of the respondents planned their trip to Minturn in whole, or part for the event.
- 87% of the respondents who planned their trip specifically for this event were local visitors.
- 8% of those who planned their trip specifically for this event were overnight guests.

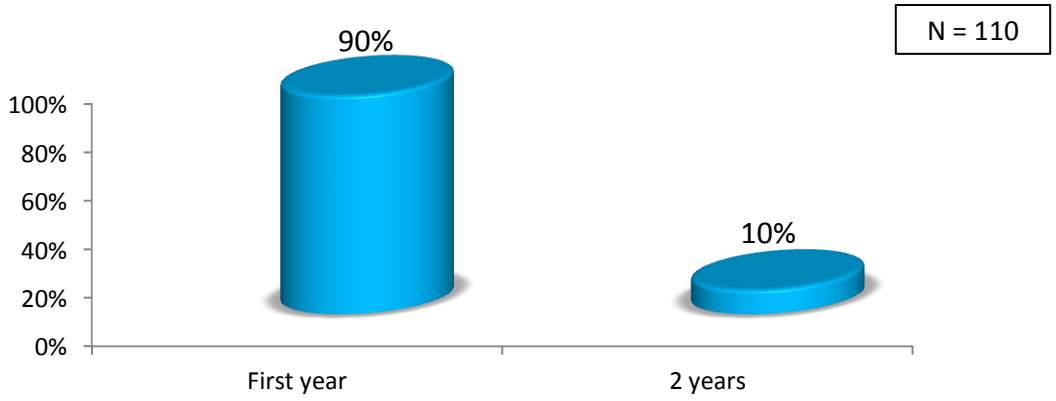
# Attendance

## 2013 Skijoring - Days in Attendance




## 2013 Skijoring - Prior Attendance

- On average, respondents attended 1.12 days of the event.
- 90% were first-year attendees.
- 10% were returning guests.



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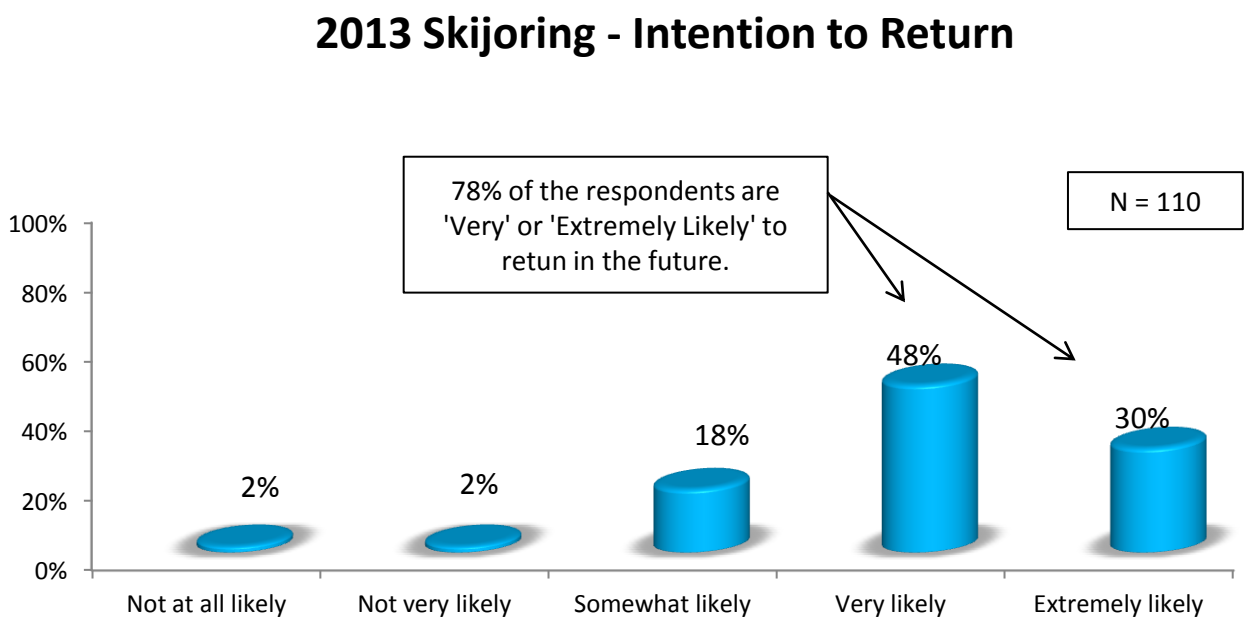
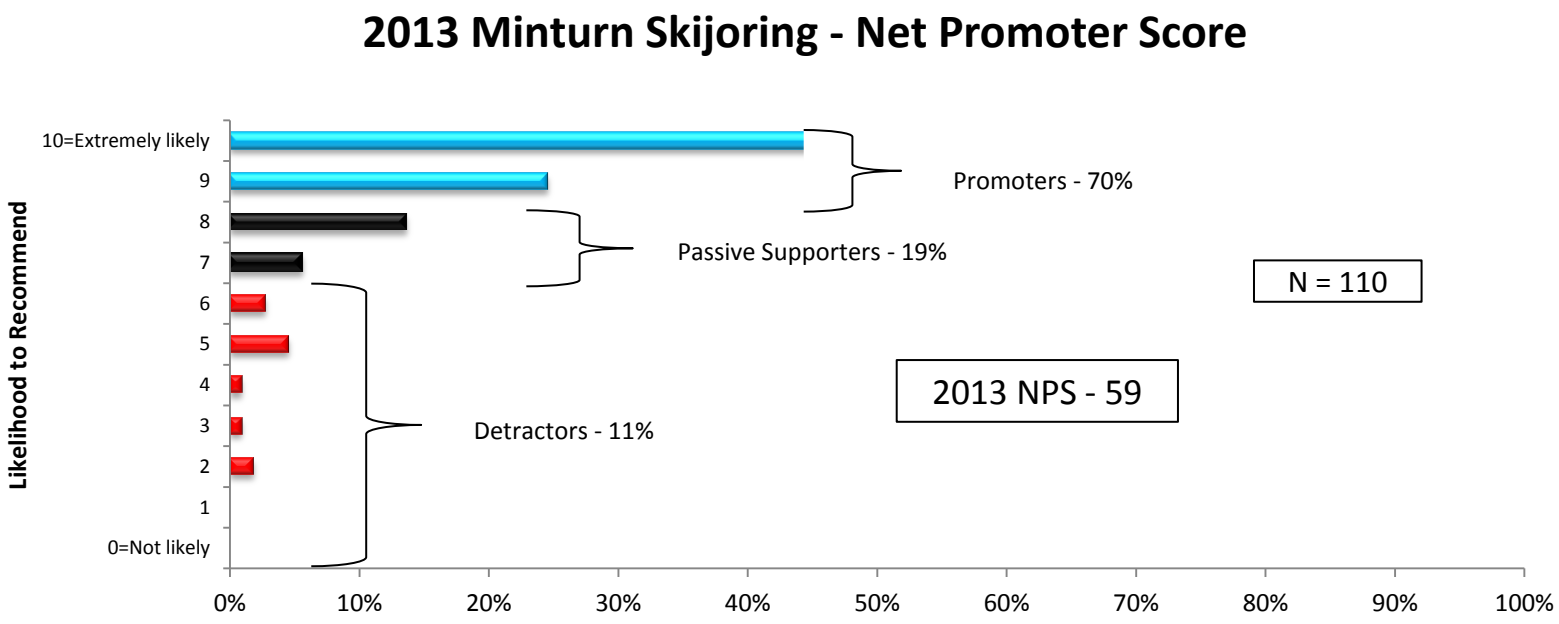
# Attendance


2013 Skijoring - Intention to Return
78% of the respondents are 'Very' or 'Extremely Likely' to retun in the future.
N = 110
100%
80%
60%
40%
20%
0%
2%
2%
18%
48%
30%
Not at all likely
Not very likely
Somewhat likely
Very likely
Extremely likely

# Recommendation

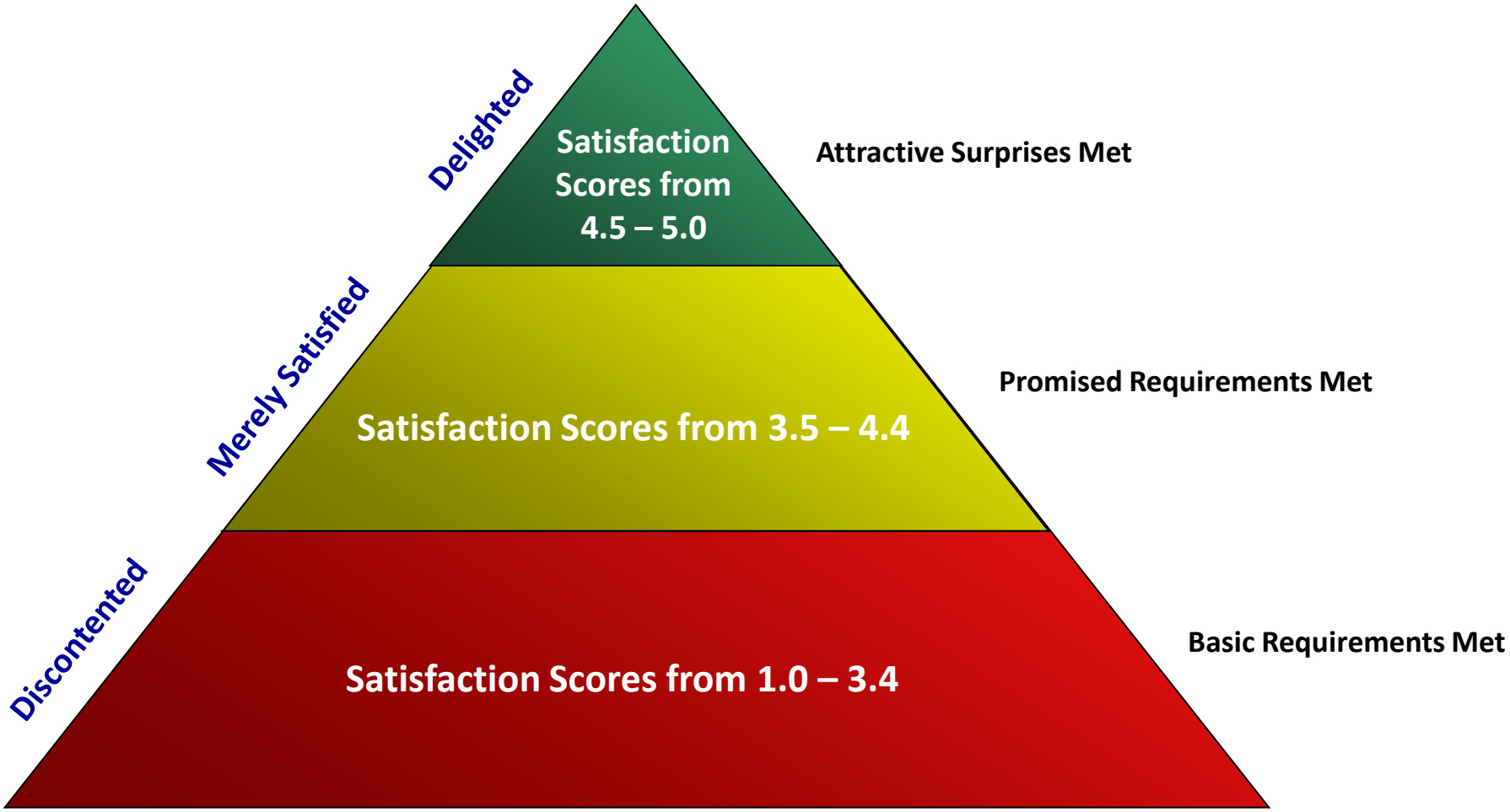



- The Net Promoter Score is calculated using data collected from the following question: "On a scale of 0 to 10, where 0=Not at all likely and 10=Extremely likely, how likely are you to recommend Minturn's Skijoring event to a friend or family member?

- Those who rate a '9' or '10' are called "Promoters". Those who rate a '7' or '8' are called "Passive Supporters", and those who rate '0' to '6' are called "Detractors".

- The Net Promoter Score (NPS) is calculated by subtracting the percentage of "Detractors" from the percentage of "Promoters".

# Hierarchy of Customer Satisfaction Needs

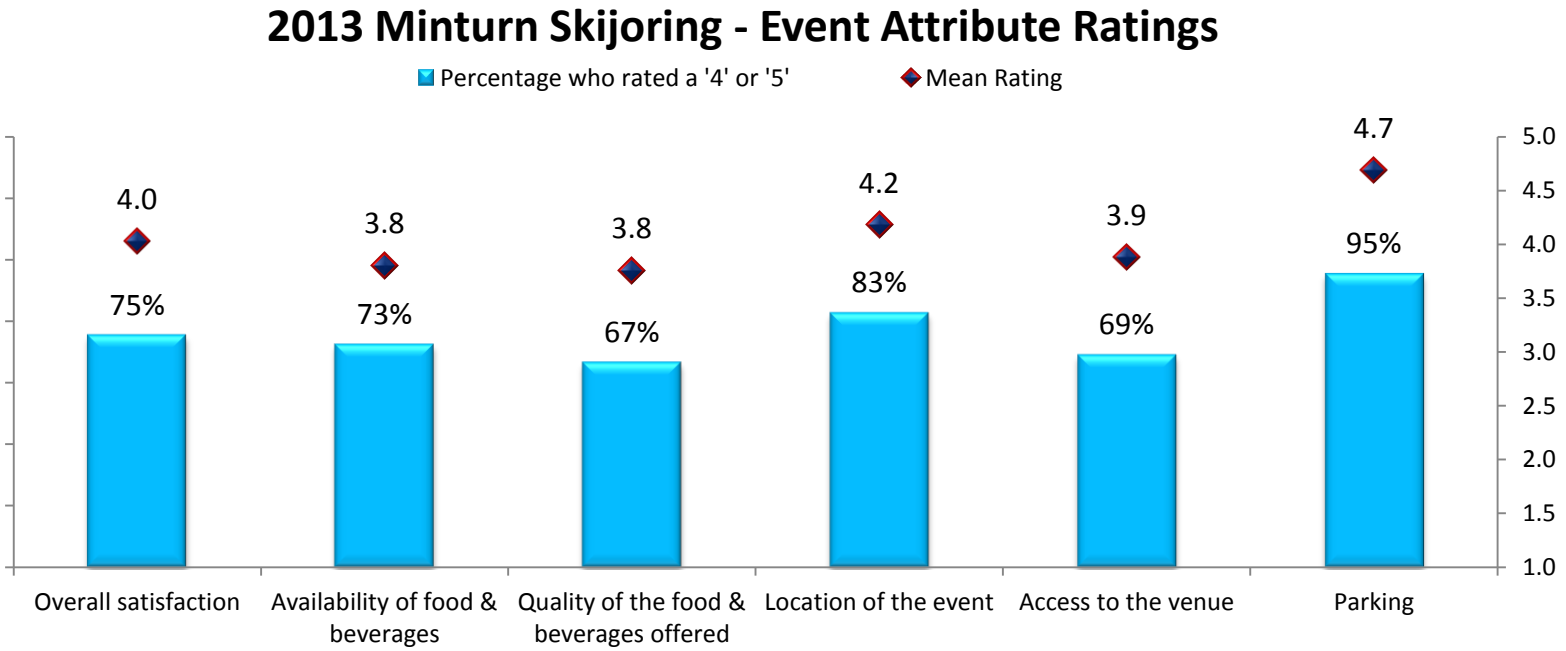



The Customer Delight Principle was designed to identify shortcomings within a business and to improve satisfaction. Satisfaction can be measured along a continuum and can be broken out into three major points:

- Discontentment – customers needs are simply not being met.
- Merely Satisfied – meeting customers needs, but not doing enough to distinguish among competition.
- Delighted – meeting and exceeding the customers needs and expectations

Terry Keiningham and Terry Varva, 2001,The Customer Delight Principle, Google Book Search, viewed 6/23/2008, http://books.google.com/books?id=ot8oD9B2Ck8C&dq=customer+Delight+Prinicple&pg=PP1&ots=VOXp3xEU0J&sig=9VbRewC5X8MN3xs2vDpmuS9muNk&hl=en&sa=X&oi=book_result&resnum=1&ct=result

# Event Performance

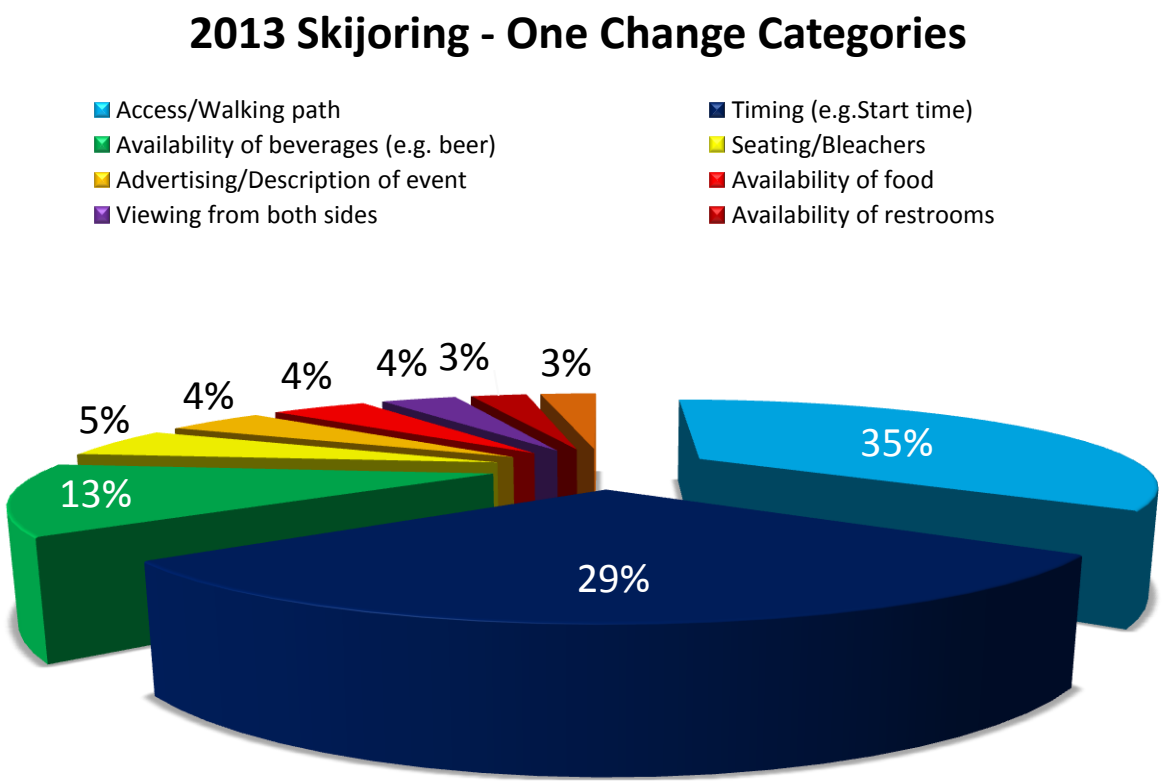



- Each respondent was asked to rate their satisfaction level with several attributes of Skijoring on a scale of 1 to 5, where 1=Not at all satisfied and 5=Extremely satisfied. This graph displays the percentages of those who rated a '4' or '5', as well as the mean satisfaction ratings of each attribute.

- According to the Hierarchy of Customer Satisfaction Needs, the Town of Minturn has "Delighted" the respondents with the "Parking" attribute. The respondents were "Merely Satisfied" overall, and with all other attributes measured.

- The "Quality of Food & Beverages" and the "Availability of Food & Beverages" attribute satisfaction ratings had the highest correlation with the overall satisfaction rating. Increasing or decreasing the mean satisfaction rating of these attributes is likely to increase or decrease the mean rating of the "Overall Satisfaction", thus guest experience.

# Event Performance



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# Event Performance

| 2013 Town of Minturn Skijoring - One Change Comments |
|---|
| Access |
| Better walkway |
| Easier access |
| Pack snow |
| Packing down snow |
| Packing down snow |
| Packing down snow |
| Path in snow |
| Put mats down |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk |
| Walk too far! |
| Walkway |
| Walkway |
| Walkway |
| Walkway |

| 2013 Town of Minturn Skijoring - One Change Comments |
|---|
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Walkway |
| Allow beverages |
| Beer |
| Beer |
| Beer |
| Beer |
| Beer |
| Beer tent |
| Beer tent |
| Beer tent |
| Free beer |
| Liquor |
| Liquor |
| Liquor |
| Liquor |
| Bathrooms |
| Bathrooms |
| Port-a-Potty |

| 2013 Town of Minturn Skijoring - One Change Comments |
|---|
| Better schedule |
| Brochure |
| Description of event |
| Bleachers |
| Bleachers |
| View |
| View |
| Viewing |
| Viewing both sides |
| Food |
| More food |
| More Food |
| More food & beverages |
| More vendors |
| More Advertising |
| More advertising |
| Seating |
| Seating |
| Seating |
| Seating |
| Start on time |
| Start on time |
| Start on time |
| Start on time |
| Start on time |
| Start on time |
| Start on time |

| 2013 Town of Minturn Skijoring - One Change Comments |
|---|
| Start on time |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
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| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Timing |
| Vendors |
| Bigger jump |
| Location of event |
| Warming tent |



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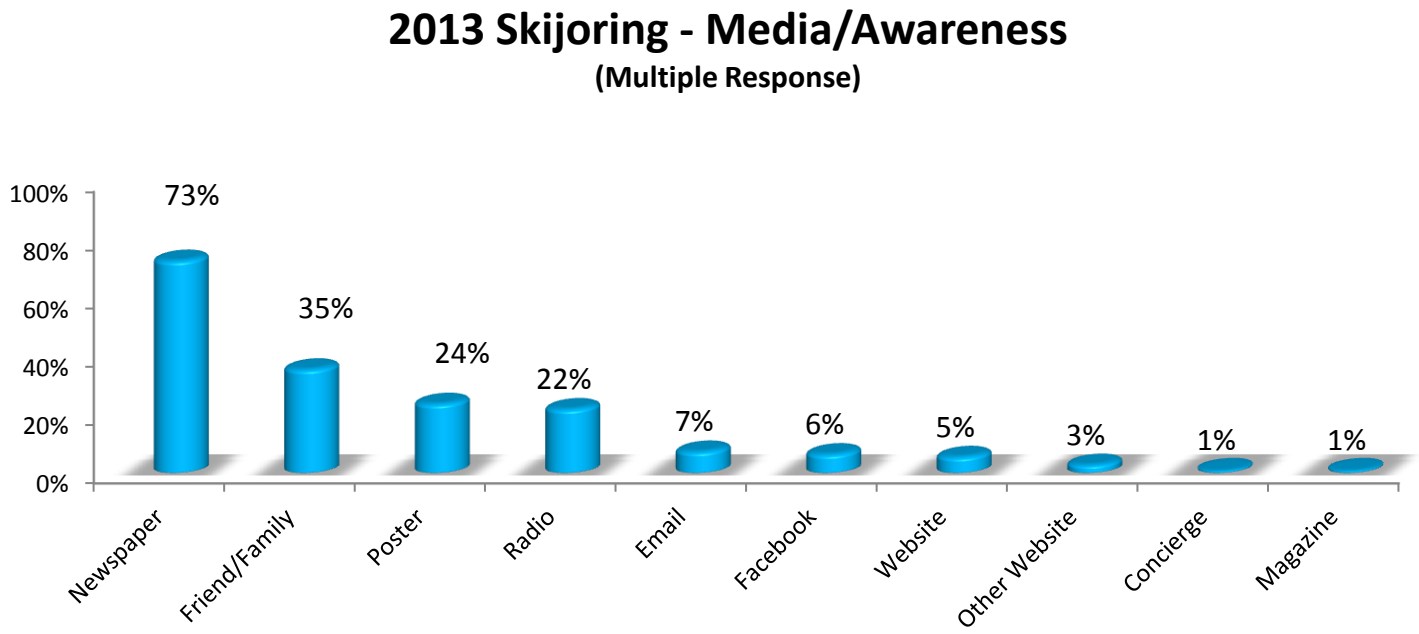
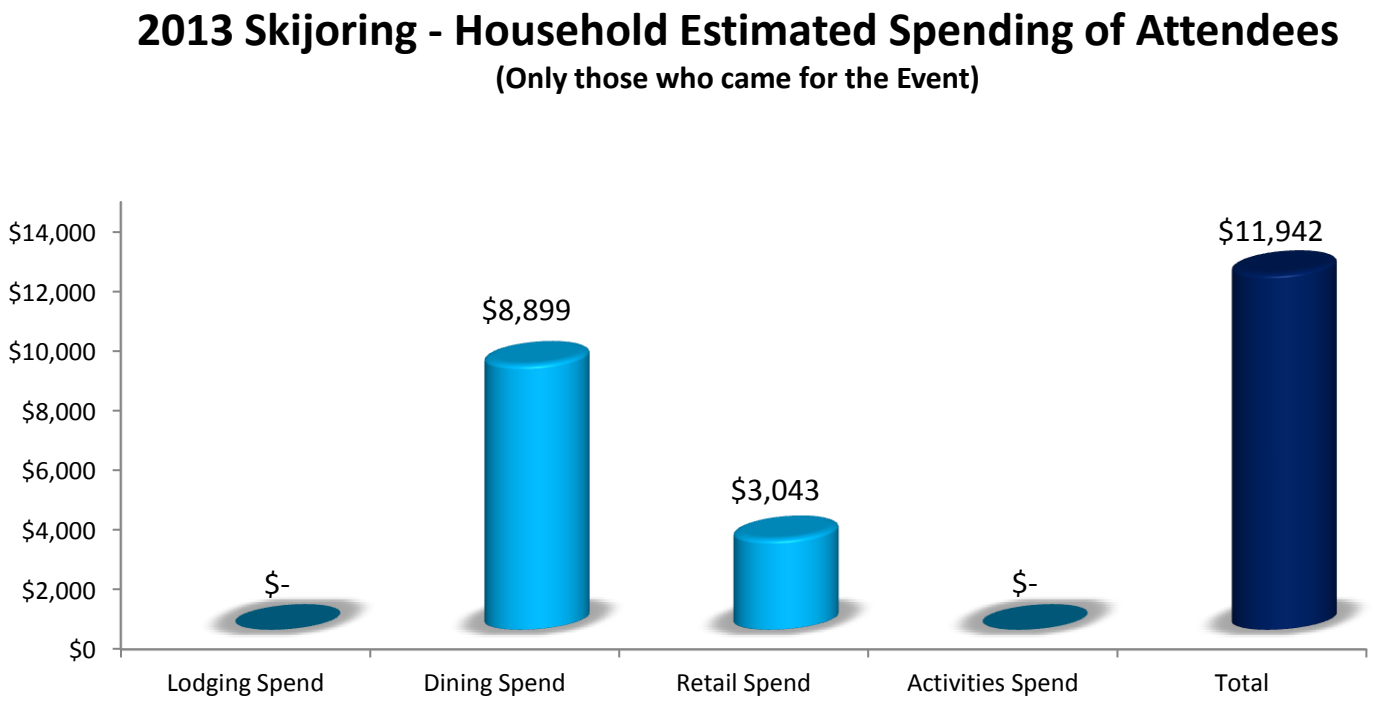
# Media/Awareness




- When asked, "How did you hear about and/or where did you see advertising for this event this year?", 73% of the responses were newspaper, followed by word-of-mouth (35%), and posters (24%).

# Spending Habits



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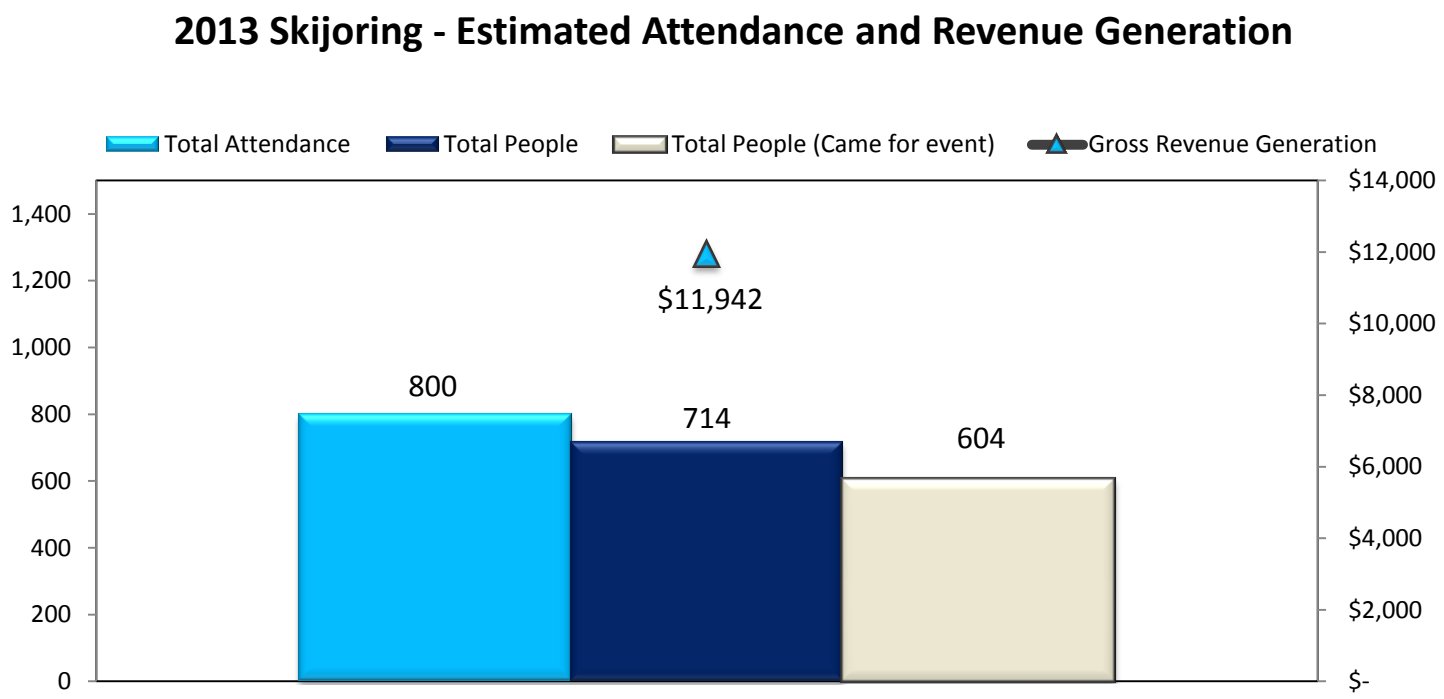
# Estimated Attendance and Revenue Generation

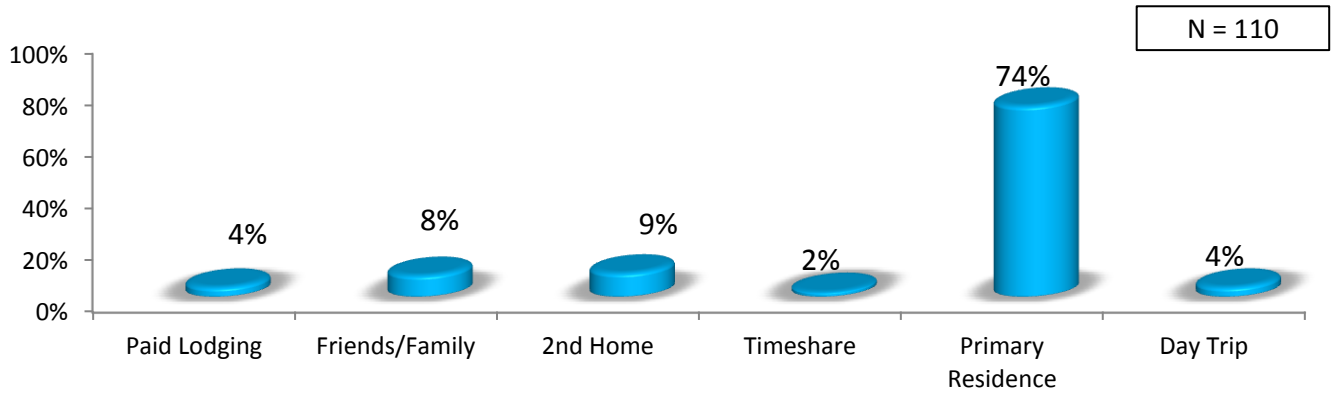



- This graph represents the estimated Total Attendance, Total People, Total People (Came for event), and Gross Revenue Generation for the Town of Minturn. "Total Attendance" is the estimated number of people that attended over the course of the event. "Total People" accounts for the average number of days in attendance. "Total People (Came for event)" accounts for the percentage of those who planned their trip to Minturn for the event, and is the sample set used for the estimated Gross Revenue Generation.

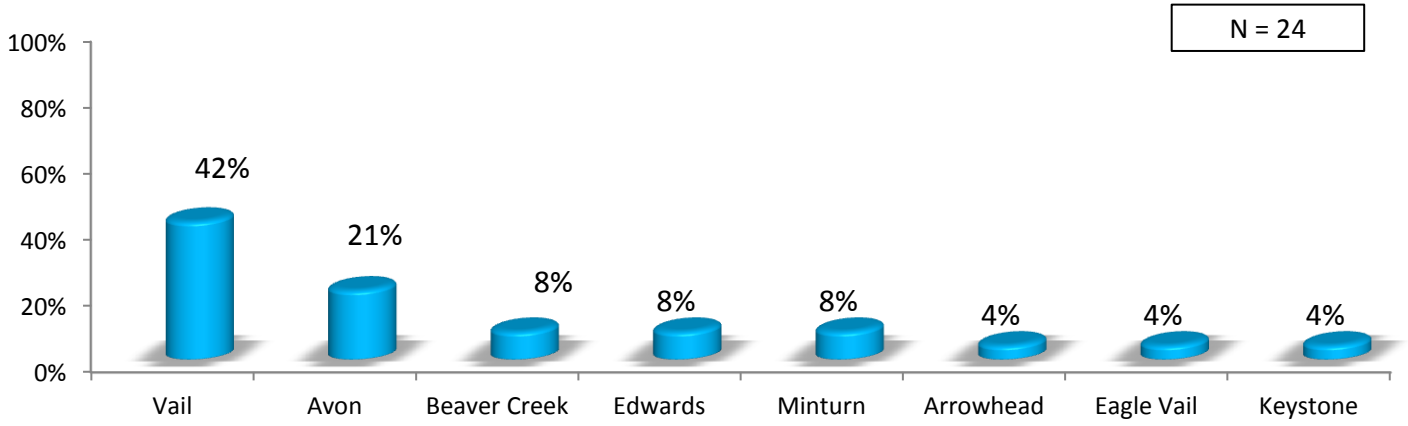
- 2013 Skijoring event estimated revenue generation for Town of Minturn: $12K (+/- 20%).

# Accommodations

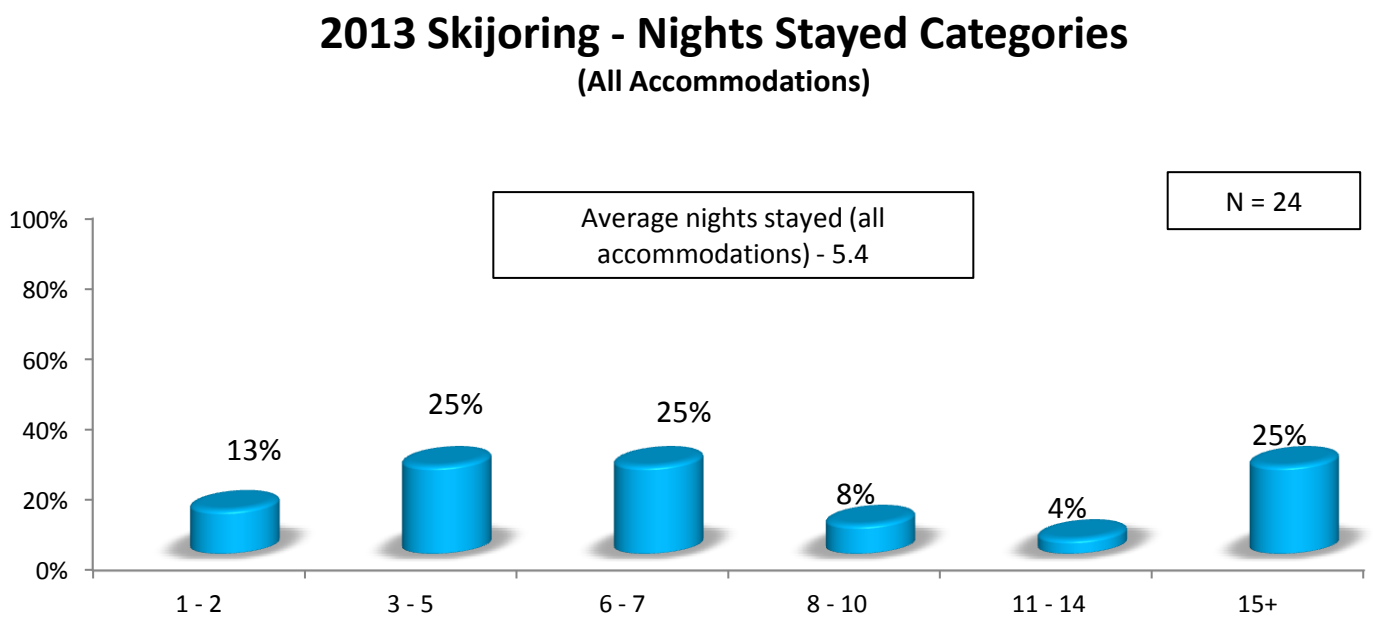
## 2013 Skijoring - Accommodations




## 2013 Skijoring - Town Stayed In
**(All Accommodations)**

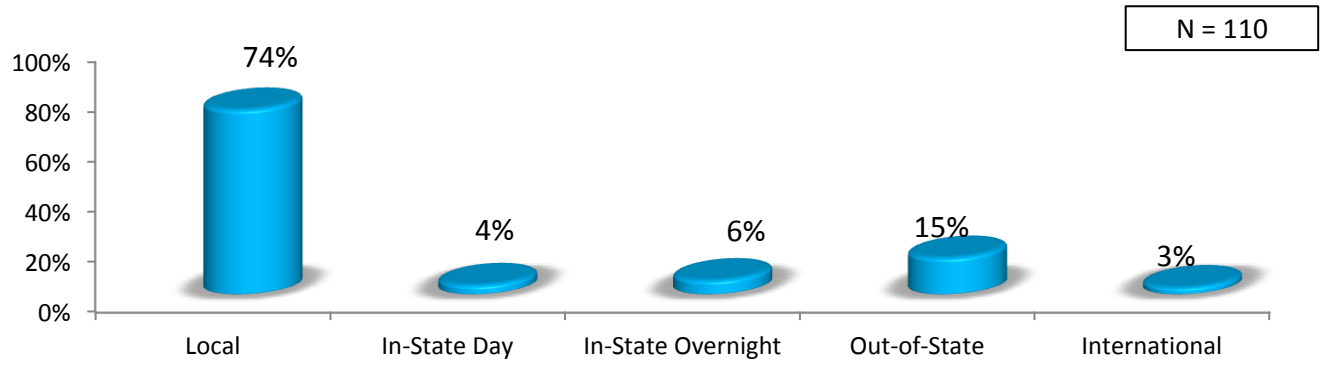


# Accommodations

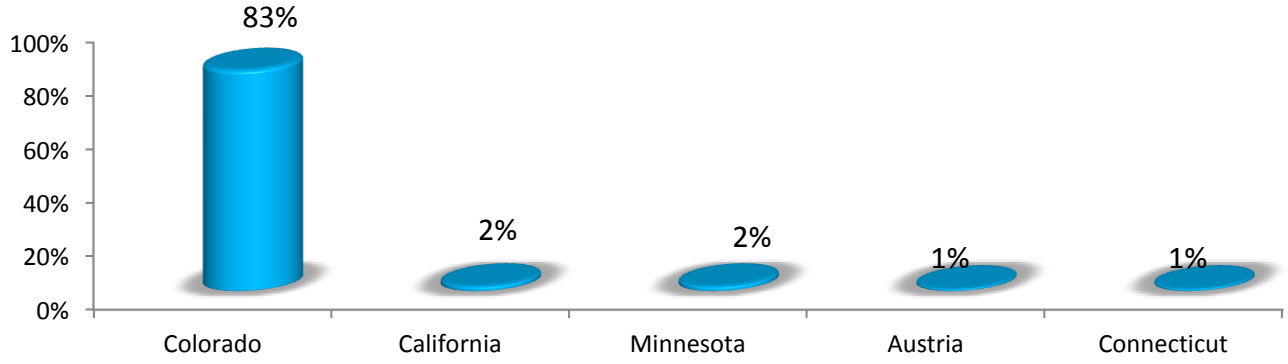


# Geographics

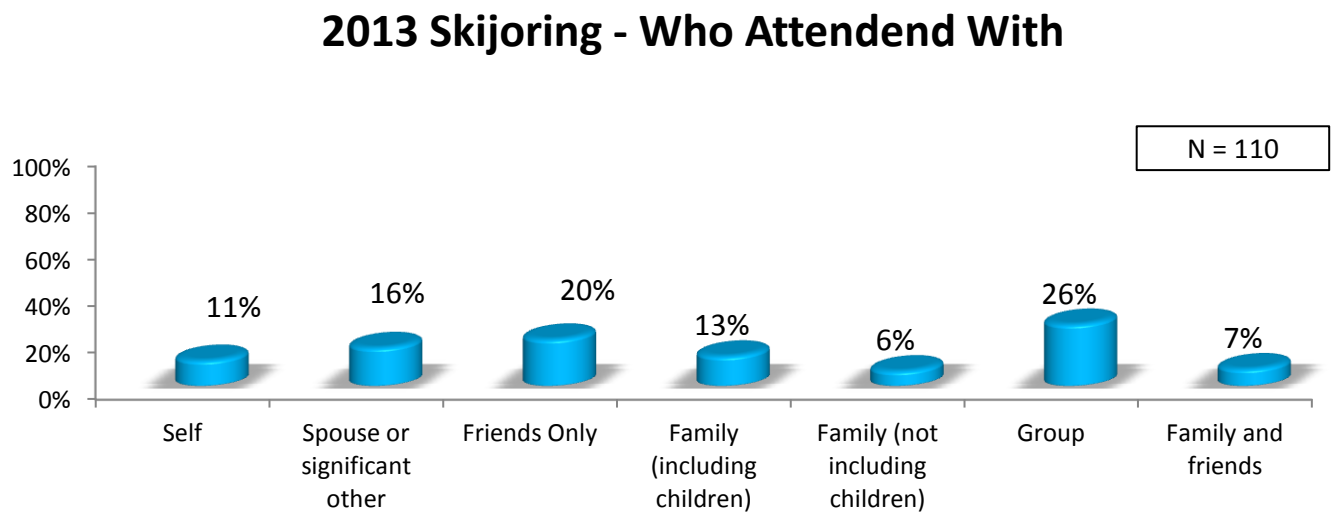
## 2013 Skijoring - Market Segment



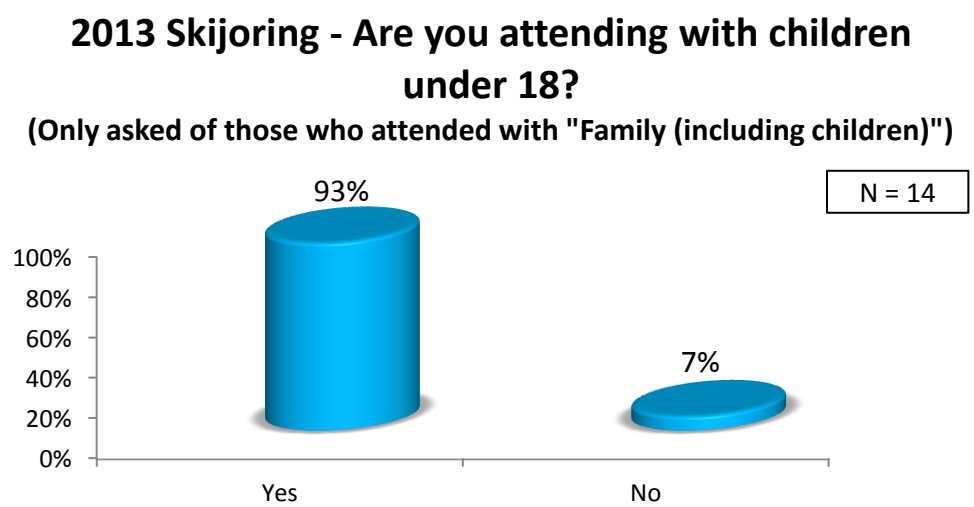

## 2013 Skijoring - Top Five States of Origin



# Demographics

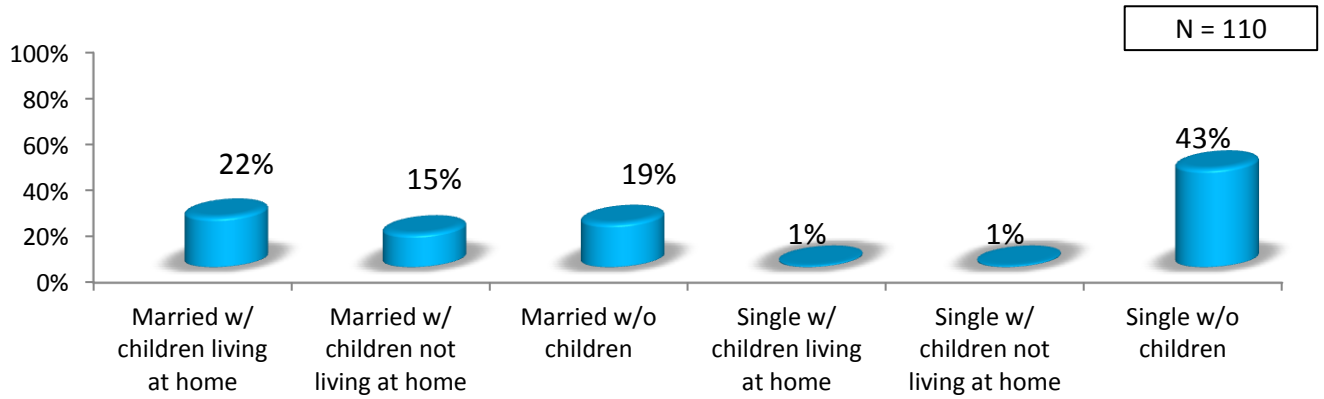



- 13% attended with family (including children).
- 93% of those attending with their family (including children) were with children under 18 years of age.
- The average family (including children) attended with 1.7 children.
- The average age of children under the age of 18 in attendance was 7.5 years of age.

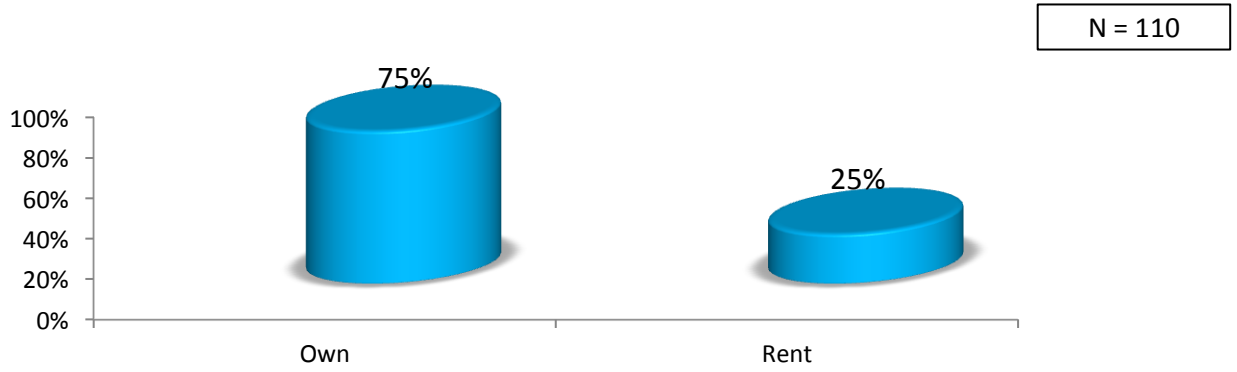


# Demographics

## 2013 Skijoring - Family Status

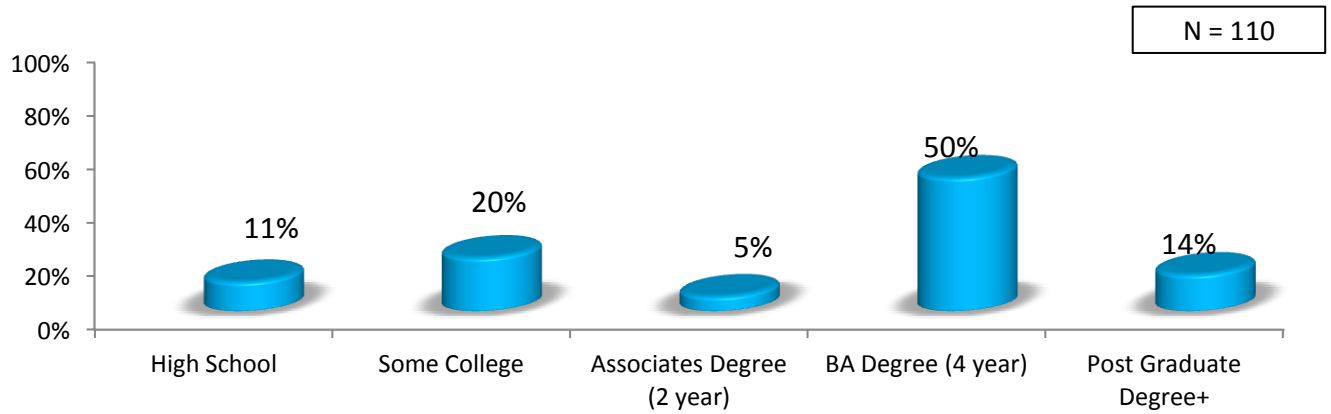



## 2013 Skijoring - Own vs. Rent

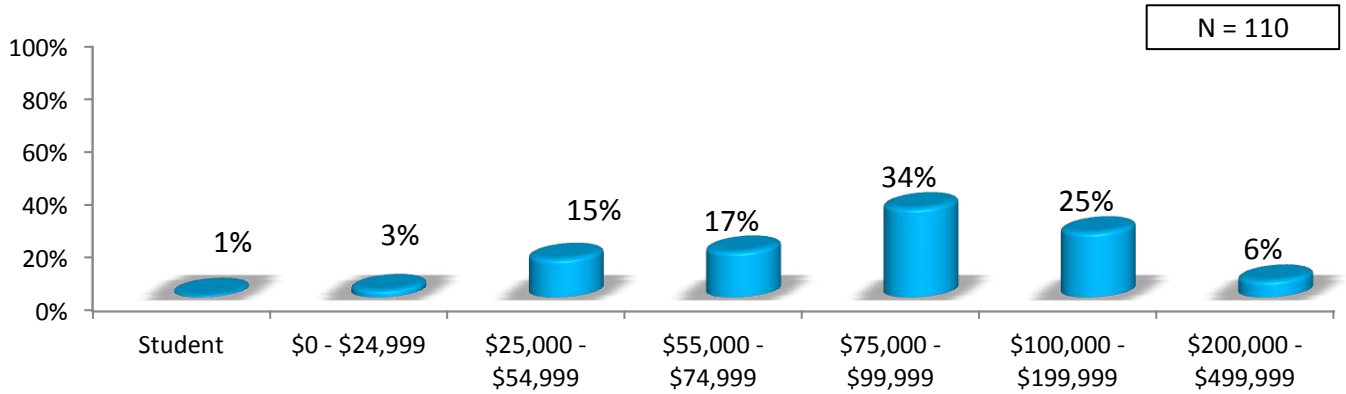


# Demographics

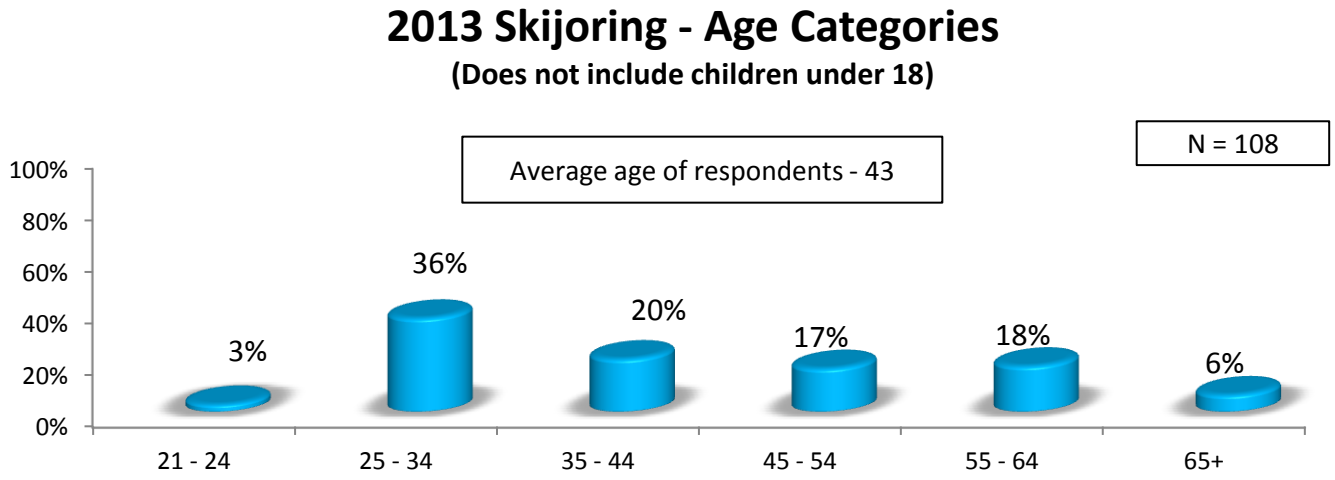
## 2013 Skijoring - Education Level

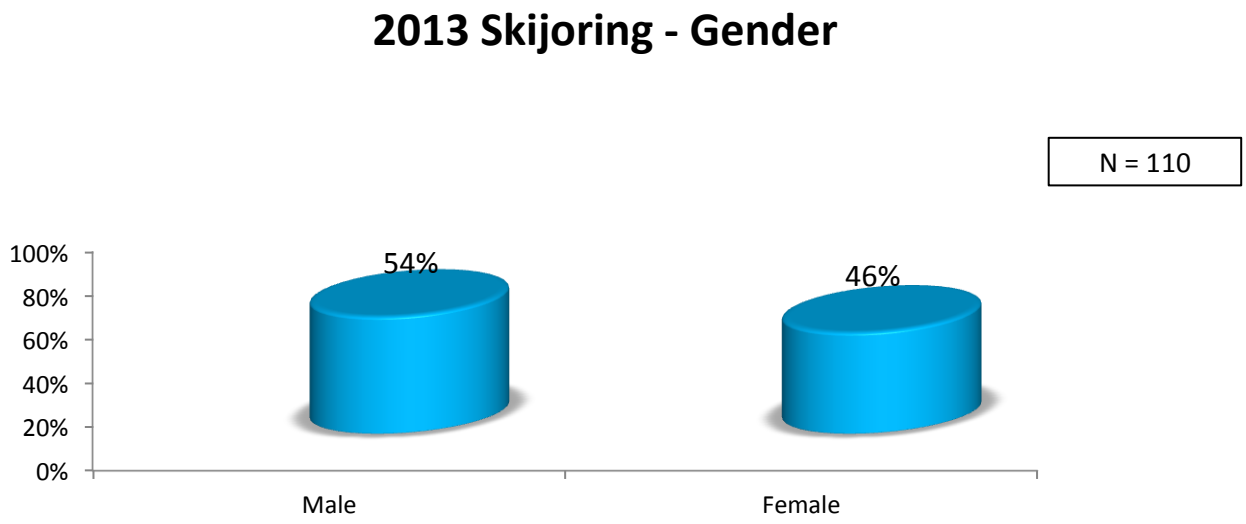



## 2013 Skijoring - Income Categories

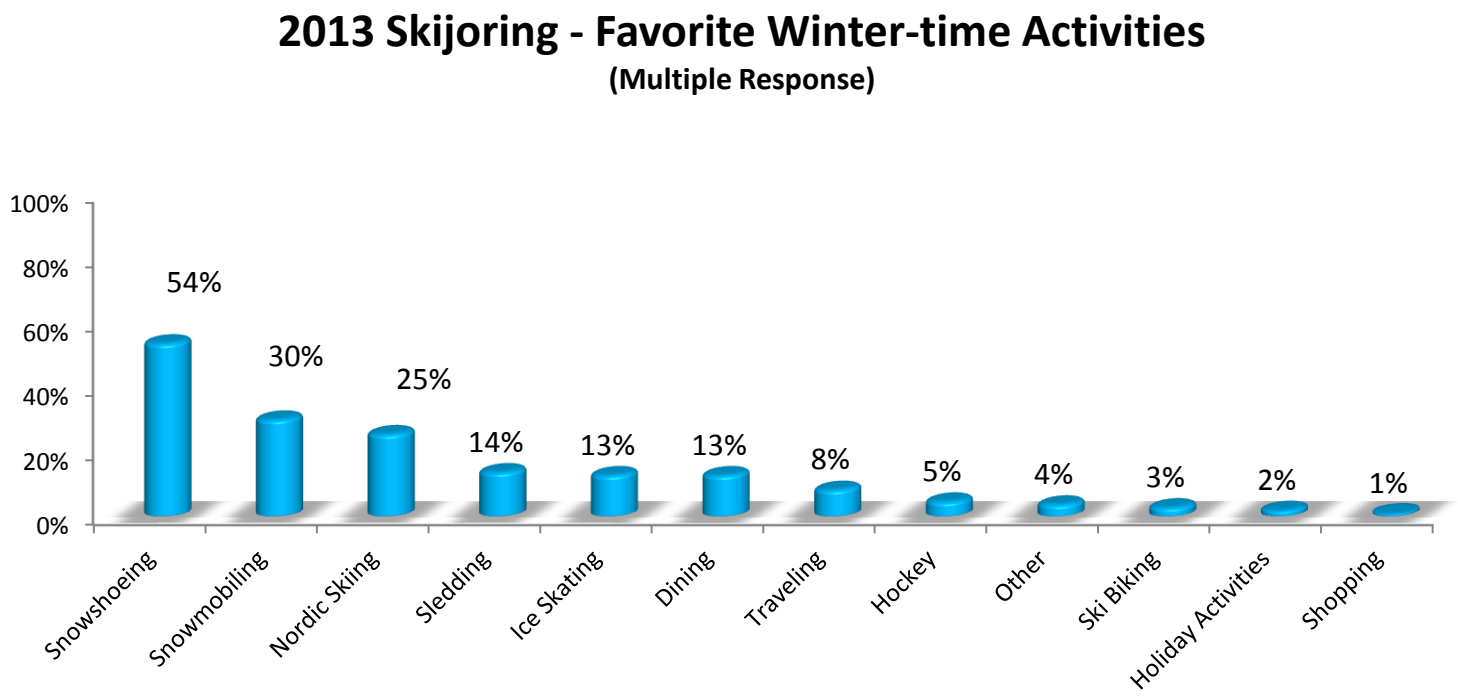


# Demographics



# Favorite Winter-time Activities



P.O. Box 309 ♦ 302 Pine Street
Minturn, CO 81645
Phone: 970-827-5645
Fax: 970-827-5545
Jay Brunvand, Treasurer/Clerk
Email: treasurer@minturn.org

TOWN COUNCIL
Mayor – Gordon "Hawkeye" Flaherty
Mayor Pro Tem – George Brodin
Councilwoman – Shelley Bellm
Councilman – Earle Bidez
Councilman – Jerry Bumgarner
Councilman – Aggie Martinez
Councilman – John Rosenfeld

## AGENDA ITEM COVER SHEET

| |
|---|
| **AGENDA TITLE:** Resolution 4 – Series 2013 a Resolution concerning Banking Practices for the Town of Minturn. |
| **MEETING DATE:** March 20, 2013 |
| **PRESENTER:** Brunvand |
| **BACKGROUND:** This Resolution removes former Police Chief Lorenzo Martinez as a check signer and access to the Safety Deposit Box and adds current Town Planner Chris Cerimele as a check signer. It is the practice of the Town to have signers who do not have direct access to the funds as signers. With the recent change in staff this Resolution will complete the cycle. Staff is recommending approval of this Resolution. |
| **CORE ISSUES:** |
| **STAFF RECOMMENDATION/MOTION:** Motion to approve Resolution 4 – Series 2013 a Resolution concerning Banking Practices for the Town of Minturn as presented. |

TOWN OF MINTURN

RESOLUTION NO. 4 – SERIES 2013

A RESOLUTION CONCERNING BANKING PRACTICES FOR THE TOWN OF MINTURN

**WHEREAS,** Pursuant to the Town of Minturn's banking institutions policies and practices it is requested and required that Town Council make certain authorizations during the first regularly scheduled meeting after a municipal election or when a change of positions on the Council or in Staff warrant.

**NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF MINTURN, COLORADO THAT THE FOLLOWING FOUR INDIVIDUALS ARE HEREBY AUTHORIZED TO SIGN CHECKS WITHDRAWN ON FUNDS FROM THE TOWN'S CHECKING ACCOUNT(S) AND SAVING ACCOUNT(S) AND INVESTMENT ACCOUNT(S):**

| | |
|---|---|
| James J. White | Town Administrator |
| Chris Cerimele | Town Planner |
| Gordon "Hawkeye" Flaherty | Mayor |
| George Brodin | Mayor Pro Tem |

**INTRODUCED, READ, APPROVED AND ADOPTED this 20th day of March 2013.**

_____

MAYOR

ATTESTS:

_____

JAY BRUNVAND, TOWN CLERK

**Jim White**
**Town Manager**
**P.O. Box 309 ♦ 302 Pine Street**
**Minturn, CO 81645**
**Phone: 970-827-5645**
**Fax: 970-827-5545**
**Email: manager@minturn.org**

TOWN COUNCIL
**Mayor – Gordon "Hawkeye" Flaherty**
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**Councilmember – Earle Bidez**
**Councilmember – Jerry Bumgarner**
**Councilmember – Aggie Martinez**
**Councilmember – John Rosenfeld**

---

**To:** **Mayor Flaherty and Minturn Town Council**
**From:** **Jim White, Town Manager**
**Date:** **March 15, 2013**
**Re:** **Manager's Report for the March 20, 2013 Town Council Meeting**

**Bone Yard Property**

We did it!!! We completed the wire transfers in conjunction with the Eagle County staff and County Commissioners in an effort to secure the purchase of the Bone Yard property in Minturn. The closing date with the USFS was March 14, 2013. We submitted our final payment amount ($27,000) just prior to the closing date. A draft IGA plan between the Town of Minturn and Eagle County regarding the management plan for the Bone Yard property will hopefully be finalized at the March 20, 2013 meeting.

**Ski Joring Report**

The Town of Minturn secured the services of Intercept Insight, Avon, CO to conduct surveys during our Ski Joring event on February 23rd and February 24, 2013. The firm does research, analytics, performance, and design related to events. A review of the findings will be presented at the March 20, 2013 Town Council meeting.

**Human Performance Center/Fitness Center at Maloit Park**

The subcommittee met on February 28, 2013 to continue discussions now moving toward planning and future construction of Phase 1 of the Human Performance Center/Fitness Center facility. A May 1, 2013 groundbreaking remains targeted. We have pushed communication of our professional consultants, Craig Bouck and Frank Buono of Barker, Rinker, Seacat (BRS) with Jack Snow of RDK Architects. We are working on parking issues and supporting SSCV in its efforts with the School District. We also continue to work with Kelly Lyle, CPA, to determine the correct IRS entity to create to oversee the facility.

**School District Parking Issue/Fitness Center**

The School District held a meeting with its land development committee the first week of March to address parking requirements related to Phase 1 at the Minturn Fitness Center site. The Town participated; the next meeting will be held on April 3, 2013.

**Weed Mitigation Grant Submitted**

On Thursday, February 21, 2013, I completed and submitted an application to the State of Colorado Department of Agriculture a weed mitigation grant proposal. It was in the amount of $3000 in tandem with Eagle County. Scott Griffin, Eagle County Noxious Weed Control Program Manager, assisted with the grant. We received the grant in the amount of $3,000; our share is a 2:1 match, or $6,000, much of it attributed to labor and training and equipment.

**Little Beach Park Improvements Planned**
We are now working on land issues related to the project. We plan to submit a GOCO grant by the August, 2013 cycle for park improvements.

**Police Chief Search**
The applications are under review and the screening process is underway. A more complete plan, timetable and schedule is being prepared.

**Scholarship Committee**
Our scholarship committee is working to formally complete the documents and register with the State of Colorado as the Minturn Education Foundation as a formal 501 (c) entity. We have submitted the payments for the short and long term annuities as our investment options through 1st and Main Advisors, on behalf of the Town. Town Council has also discussed a scholarship endowment fund ($40,000) to be considered with Colorado Mountain College here in Eagle County. Two options, one with a partner, and one with the Town supporting the endowment independently, are under consideration. Additionally, we have secured the services of Kelly Lyle, CPA, to assist with the financial aspects of our preparation and planning. The committee met on the afternoon of March 5, 2013 and awarded three scholarships to Minturn residents: Jessica Guthrie, Rodney Cordova, and Ashley Atencio.

**EPA Meeting**
Town Councilman, Earle Bidez and the Town Manager attended a meeting on Thursday, February 28, 2013 in Denver at the EPA along with representatives from Battle Mountain and its consultants, CDPHE, and EPA reps. The meeting focused on bringing new EPA staff up to speed on the Superfund site issues, wetlands, and Bolts Lake. A subsequent subcommittee meeting was held on Tuesday, March 12, 2013 with Dave Kleinkopf, Battle Mountain representative and Town subcommittee members.

**Colorado Association of Ski Towns (CAST)**
I attended the CAST meeting in Denver, CO on Thursday, March 14, 2013 at the CML offices. Presentations were made by Governor Hickenlooper; CDOT director Don Hunt; Al White with the Office of Economic Development and Tourism; Kevin Bommer of CML, and Steven Dawes of the law firm Light, Harrington, and Dawes regarding Governmental Immunity issues.

**CDOT Meeting**
Chris and I met with Martha Miller and other CDOT representatives in Eagle CO on Friday March 15, 2013 to review ROW issues, Minturn plans for infrastructure repairs, CDOT"s RAMP program, and other topics.

**Upcoming Events**:
**Easter, March 31, 2013**

Respectfully submitted,
Jim White
Town Manager

TOWN OF MINTURN
P.O. Box 309 (302 Pine Street)
Minturn, Colorado 81645-0309
970-827-5645 Fax: 970-827-5545
treasurer@minturn.org

# FROM THE DESK OF
# JAY BRUNVAND, TREASURER/FINANCE

*MEMORANDUM*

TO: Minturn Town Council
FROM: Jay Brunvand, Treasurer/Clerk
CC:
DATE: Friday, March 15, 2013
RE: Executive Session

At the Council meeting, Council will need to convene in Executive Session with the Attorney to discuss and direct Staff regarding the negotiation update of the property at 64 Harrison Ave. The following motion is recommended:

*"Recommended motion: "I move To convene in Executive Session Pursuant to CRS 24-6-402(4)(a) for the purposes of discussing the property at 64 Harrison Ave – White/Christensen*

The Mayor will announce for the record if any direction is to be given as a result of the Executive Session once the Regular Session meeting reconvenes.

Please contact me in the event you have any questions.

Thank You, Jay