

**NORTHERN NEVADA WATER PLANNING COMMISSION
("NNWPC")
AGENDA**

Wednesday, March 2, 2016

1:30 p.m.

Washoe County Commission Chambers
1001 East Ninth Street
Reno, Nevada

Notes:

1. Items on this agenda on which action may be taken are followed by the term "for possible action". Non-action items are followed by an asterisk (*).
2. Public comment is limited to three minutes per speaker and is allowed during the public comment periods, and before action is taken on any action item. Comments are to be directed to the Commission as a whole. Persons may not allocate unused time to other speakers. The public may sign-up to speak during the public comment period or on a specific agenda item by completing a "Request to Speak" card and submitting it to the clerk.
3. Items on this agenda may be taken out of order, combined with other agenda items for consideration, removed from the agenda, or delayed for discussion at any time. Arrive at the meeting at the posted time to hear item(s) of interest.
4. Supporting material provided to the Commission for the items on the agenda is available to members of the public at the NNWPC offices, 1001 E. Ninth St., Reno, NV, from June Davis, Administrative Secretary, (775) 954-4665, and on the NNWPC website at <http://www.nnwpc.us>
5. In accordance with NRS 241.020, this agenda closes three working days prior to the meeting. We are pleased to make reasonable accommodations for persons who are disabled and wish to attend meetings. If you require special arrangements for the meeting, please call 954-4665 no later than 24 hours prior to the meeting.
6. In accordance with NRS 241.020, this agenda has been posted at the following locations: Reno City Hall (1 East First Street), Sparks City Hall (431 Prater Way), Sun Valley GID (5000 Sun Valley Blvd.), Truckee Meadows Water Authority (1355 Capital Blvd.), Washoe County Administration Building (1001 E. Ninth Street), South Valleys Library (15650A Wedge Parkway), the NNWPC website: <http://www.nnwpc.us> and the State of Nevada Website: <https://notice.nv.gov>

1. Roll Call and determination of presence of a quorum. *
2. Public Comments. * (Three-minute time limit per person.)
3. Approval of agenda. **(For Possible Action)**
4. Approval of the minutes from the February 3, 2016, meeting. **(For Possible Action)**
5. Discussion and possible direction to staff to request a statement of qualifications from engineering firms for an investigation of membrane treatment concentrate disposal alternatives and management options for the Truckee Meadows Water Reclamation Facility ("TMWRF") in an amount not to exceed \$100,000 from the Regional Water Management Fund ("RWMF"); and possible additional direction to staff (continued from the December 2, 2015 NNWPC meeting) – Jim Smitherman, NNWPC Water Resources Program Manager. **(For Possible Action)**
6. Discussion and possible recommendation to the Western Regional Water Commission ("WRWC") to approve a request by The Nature Conservancy ("TNC") to revise the budget for the contract for "Optimizing Restoration Investments in the Truckee [River] Watershed", at no additional cost, and possible direction to staff –

Chris Wessel, NNWPC Water Management Planner and Mickey Hazelwood, TNC.
(For Possible Action)

7. Report on the Truckee Meadows Water Authority ("TMWA") fiscal year 2015 – 2016 Water Usage Review Program; discussion and possible recommendation to the WRWC regarding a scope of work and funding request in the amount of \$100,000 from the RWMF to continue the Program for fiscal year 2016 – 2017, and possible direction to staff - Jim Smitherman and Andy Gebhardt, TMWA.
(For Possible Action)
8. Presentation of comments received on the "Policies and Criteria" chapter for the 2016 Regional Water Management Plan ("RWMP") update; discussion and possible direction to staff – Jim Smitherman. **(For Possible Action)**
9. Presentation of comments received on the "Flood Management and Storm Water Drainage" chapter for the 2016 RWMP update; discussion and possible direction to staff – Jim Smitherman. **(For Possible Action)**
10. Discussion and possible direction to staff regarding any chapters of the RWMP previously reviewed by the NNWPC in relation to the 2016 RWMP update – Jim Smitherman. **(For Possible Action)**
11. Program Manager's Report – Jim Smitherman. *
 - a. Report on the Status of Projects and Work Plan Supported by the RWMF;
 - b. Financial Report on the RWMF; and,
 - c. Report on the Truckee Meadows Regional Planning Agency's parcel-based population and employment modeling project.
12. Discussion regarding possible agenda items for the April 6, 2016 NNWPC meeting, and other future meetings, and possible direction to staff – Jim Smitherman. **(For Possible Action)**
13. Commission comments. *
14. Staff comments. *
15. Public Comments. * (Three-minute time limit per person.)
16. Adjournment. **(For Possible Action)**

*Indicates a non-action item

DRAFT - MINUTES
NORTHERN NEVADA WATER PLANNING COMMISSION

Wednesday, February 3, 2016

The regular meeting of the Northern Nevada Water Planning Commission ("NNWPC") was held in the Washoe County Commission Chambers, 1001 East Ninth Street, Reno, Nevada and the following business was conducted:

The meeting was called to order by Vice Chairman Martini at 1:30 p.m.

1. Roll Call and Determination of Presence of a Quorum

Voting Members Present: John Martini, George Ball, Michael DeMartini, Michael Drinkwater, John Erwin, Mickey Hazelwood, Darrin Price, and David Solaro.

Voting Members Absent: John Enloe, Danielle Henderson, and John Flansberg.

Non-Voting Members Present: Cindy Turiczek.

Non-Voting Members Absent: My-Linh Nguyen, Harry Fahnestock, and Thomas Pyeatte.

Staff Members Present: Jim Smitherman; Chris Wessel; June Davis; and John Rhodes, Legal Counsel.

2. Public Comment

Cathy Brandhorst spoke on several topics.

3. Approval of Agenda (For Possible Action)

COMMISSIONER SOLARO

MADE A MOTION TO APPROVE THE AGENDA, SECONDED BY COMMISSIONER ERWIN. THE MOTION CARRIED UNANIMOUSLY WITH EIGHT (8) MEMBERS PRESENT.

4. Approval of Minutes from the December 2, 2015, Meeting (For Possible Action)

COMMISSIONER BALL MADE A MOTION TO APPROVE THE DECEMBER 2, 2015, MINUTES, SECONDED BY COMMISSIONER ERWIN. THE MOTION CARRIED UNANIMOUSLY WITH EIGHT (8) MEMBERS PRESENT.

5. Report on activities of the "Regional Effluent Management Team", and possible direction to staff – Jim Smitherman, NNWPC Water Resources Program Manager. (For Possible Action)

Jim Smitherman presented information included in the staff report regarding the activities of the Regional Effluent Management Team. Mr. Smitherman stated that he presented this report to the Western Regional Water Commission ("WRWC") and advised them that there is a team of top staff engineers from their member entities working on critical wastewater effluent management issues. A more thorough report will be prepared in a couple of months.

No action was taken on this item.

6. Presentation of comments received on the "Policies and Criteria" chapter for the 2016 Regional Water Management Plan ("RWMP") update; discussion and possible direction to staff – Jim Smitherman. (For Possible Action)

Mr. Smitherman discussed revisions that have been made in response to the Truckee Meadows Water Authority ("TMWA") draft Water Resource Plan ("WRP").

Commissioner Erwin asked if wellhead protection plans are required for other water purveyors.

Cynthia Turiczek, PUC Water Engineer, stated that they recommend wellhead protection plans but it is not an official statute requirement.

Public Comment – Cathy Brandhorst discussed water issues.

Commissioner Erwin requested that staff review the language in this chapter to ensure the new process is captured with regard to areas that are outside TMWA's infrastructure but still inside the Truckee Meadows Service Area ("TMSA").

COMMISSIONER ERWIN MADE A MOTION TO ACCEPT THE REPORT, SECONDED BY COMMISSIONER SOLARO. THE MOTION CARRIED UNANIMOUSLY WITH EIGHT (8) MEMBERS PRESENT.

7. Discussion and possible direction to staff regarding any chapters of the RWMP previously reviewed by the NNWPC in relation to the 2016 RWMP update - Jim Smitherman. (For Possible Action)

Mr. Smitherman stated there are no additional chapters to review at this time.

Commissioner Price asked if the draft chapters are on the website yet. Mr. Smitherman stated that they are still looking into getting that done. Staff will email the chapters to the Commissioners this week.

8. Review draft Fiscal Year 2016-2017 Western Regional Water Commission ("WRWC") tentative budget; discussion and possible recommendation to the WRWC to approve the tentative budget - Jim Smitherman. (For Possible Action)

Mr. Smitherman reviewed the draft budget for Fiscal Year 2016-2017 included in the staff report.

Commissioner Drinkwater asked if there is still a need to fund cloud seeding. Mr. Smitherman recommended that as long as TMWA continues to participate in funding cloud seeding, the WRWC should as well.

John Rhodes, Legal Counsel, stated that recommending this draft budget for approval does not automatically recommend approval of a new cloud seeding contract.

COMMISSIONER DRINKWATER MADE A MOTION TO RECOMMEND APPROVAL BY THE WRWC, SECONDED BY COMMISSIONER SOLARO. THE MOTION CARRIED UNANIMOUSLY WITH EIGHT (8) MEMBERS PRESENT.

9. Program Manager's Report – Jim Smitherman.

- a. Report on the Status of Projects and Work Plan supported by the Regional Water Management Fund ("RWMF");
- b. Financial report on the RWMF; and,
- c. Report on the Truckee Meadows Regional Planning Agency's parcel-based population and employment modeling project.

The standard items are included in the Program Manager's Report.

Commissioner Drinkwater asked if the funds for the Highland Canal Water Quality Project will be used. Mr. Smitherman stated that the project would be underway right now if it weren't for slow action by the railroad, which needs to grant a right-of-way.

10. Discussion regarding possible agenda items for the March 2, 2016, NNWPC meeting, and other future meetings, and possible direction to staff – Jim Smitherman. (For Possible Action)

Mr. Smitherman stated the potential future agenda items will include:

- Review chapters of the 2011 RWMP; and any other standing items.

Commissioner Drinkwater stated that another item for the next agenda is a brine disposal study that was continued from the December meeting.

Commissioner Price requested an agenda item to discuss the WRWC direction to staff regarding dissolving the WRWC. Mr. Rhodes recommended waiting to include this item on an agenda until after the WRWC reviews the information they requested.

Mr. Smitherman stated that the WRWC asked staff to bring a report on the steps that would need to be taken to dissolve the WRWC and to describe the duties and responsibilities of the WRWC. They also requested options for other entities that could take on certain responsibilities and duties of the WRWC should they decide to pursue dissolving the WRWC.

No action was taken.

11. Commission Comments

None

12. Staff Comments

None

13. Public Comment

Cathy Brandhorst discussed several topics.

14. Adjournment (For Possible Action)

The meeting was adjourned at 2:30 p.m.

Respectfully submitted by Christine Birmingham.

Approved by:

John Enloe, Chairman

APPROVED BY COMMISSION IN SESSION ON _____, 2016.

Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 25, 2016

TO: Chairman and Members, Northern Nevada Water Planning Commission (“NNWPC”)

FROM: Jim Smitherman, NNWPC Water Resources Program Manager

SUBJECT: Discussion and possible direction to staff to request a statement of qualifications from engineering firms for an investigation of membrane treatment concentrate disposal alternatives and management options for the Truckee Meadows Water Reclamation Facility (“TMWRF”) in an amount not to exceed \$100,000 from the Regional Water Management Fund (“RWMF”); and possible additional direction to staff (continued from the December 2, 2015 NNWPC meeting)

SUMMARY

In 2013, the Western Regional Water Commission, through the Regional Water Management Fund (“RWMF”), paid for the Enhanced Nitrogen Removal Planning Study conducted by Carollo Engineers. The final Technical Memorandum prepared for the City of Reno identified three treatment technologies, one of which may be selected to supplement existing nitrogen treatment at TMWRF: enhanced coagulation; advanced oxidation; and reverse osmosis (“RO”). Evaluation of each of these technologies is ongoing. However, options for the management and disposal of reject concentrate from the RO treatment process has not been investigated. This topic was not within the scope of the Carollo study, which assumed deep-well injection for concentrate disposal.

The NNWPC discussed this item at its December 2, 2015 meeting, and approved a motion to continue it to the March 2016 meeting.

BACKGROUND

TMWRF discharge limitations for nitrogen may present significant compliance challenges as wastewater flows and/or strength increase over time. Of the three enhanced nitrogen removal treatment technologies studied by Carollo in the Enhanced Nitrogen Removal Planning Study, RO has the advantage of removing not only nitrogen, but phosphorus, total dissolved solids and other compounds that may be of concern in the future. Disadvantages include a concentrate (brine) stream generated by RO treatment consisting of approximately 10-15 percent of the feed flow. Water reclamation facilities in coastal locations typically use ocean discharge for concentrate disposal, but inland facilities must develop alternative management strategies

RECOMMENDATION

The effluent management strategy working group recommends that the NNWPC direct staff to work with the Regional Effluent Management Team to draft and release a request for a statement of qualifications from engineering firms for an investigation of membrane treatment concentrate disposal alternatives and management options for TMWRF and present a preferred proposal for the investigation, in an amount not to exceed \$100,000 from the RWMF, at a future NNWPC meeting.

JS:jd

Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 24, 2016

TO: Chairman and Members, Northern Nevada Water Planning Commission

FROM: Chris Wessel, Water Management Planner,
Mickey Hazelwood, The Nature Conservancy

SUBJECT: Discussion and possible recommendation to the Western Regional Water Commission ("WRWC") to approve a request by The Nature Conservancy ("TNC") to revise the budget for the contract for "Optimizing Restoration Investments in the Truckee [River] Watershed", at no additional cost, and possible direction to staff.

SUMMARY

TNC successfully applied through the National Fish and Wildlife Foundation for a \$227,700 Desert Terminal Lakes Restoration Fund grant to fund a study entitled "Optimizing Restoration Investments in the Truckee Watershed" (the "Study"). TNC also received approval from the Truckee River Fund on August 7, 2014, for funds to cover 40 percent of an existing TNC Project Manager position over 2 years. Grants from the Truckee River Fund require matching funds which TNC secured from the Regional Water Management Fund ("RWMF") in the amount of \$57,787, through a contract with the WRWC.

Staff received a letter (attached) from TNC dated February 11, 2016, requesting revisions to the original project budget included in the contract with the WRWC. The requested change would move funding originally slated for *Personnel* and reallocate it to budget categories identified as *Consultants* and *Service and Supplies*. The reallocation shifts budget within the originally proposed budget categories and would not result in any additional cost.

Mickey Hazelwood will be available to provide further information regarding TNC's request.

BACKGROUND

At the March 5, 2014 meeting of the NNWPC, TNC presented its plans to apply through the National Fish and Wildlife Foundation for a \$227,700 Desert Terminal Lakes Restoration Fund grant to fund the Study. In addition, TNC indicated its intent to request funding from the Truckee River Fund and matching funds in the estimated amount of \$58,075 through the WRWC from the RWMF. The NNWPC approved a motion to include the proposed funding for the Study in the WRWC fiscal year 2014-15 budget.

FISCAL IMPACT

There will be no fiscal impact to the RWMF, should this item be approved

RECOMMENDATION

Staff recommends that the NNWPC review TNC's budget revision request, and make a recommendation to the WRWC to approve the request and amend the contract as necessary.

CW:jd

Attachment: Budget Revision Request



THE NATURE CONSERVANCY
Northern Nevada Office Southern Nevada Office
One East First Street, #1007 915 E. Bonneville Avenue
Reno, NV 89501 Las Vegas, NV 89101

Tel 775-322-4990 Tel 702-737-8744
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February 11, 2016

Chris Wessel
Water Management Planner
Western Regional Water Commission
1001 East Ninth Street
Reno, NV 89512

**Budget Revision Request
Agreement WRWC 14-07**

This is a request from The Nature Conservancy to revise the budget in funding agreement WRWC 14-07 ("Agreement") between the Western Regional Water Commission (the "Commission") and The Nature Conservancy ("TNC") effective October 1, 2014. This request is for budget revisions only and does not change the amount requested or the scope of work proposed under the Agreement.

The proposed budget revisions are due to changes in the way the project is being staffed, reducing estimated staff costs, and increases in contractual expenses beyond original estimates. These changes balance and do not affect the overall project budget.

Under the **Personnel** section of the budget, the costs for TNC staff to manage the project were reduced from the original budget. This reduction was due to the need to outsource additional work that we originally intended to manage internally, particularly GIS services. TNC outsourced this work under a contract with University of California at Santa Cruz, and under the **Consultants** section of the budget there is a new line item for GIS Consultant. Also under the **Consultants** section of the contract, the line item for Stakeholder Facilitation was increased due to a change in the scope of work for that contract, which is with the Truckee River Watershed Council. Under the **Supplies and Services** section of the contract, the line item for RIOS Training was deleted, as these services were rolled into the contract for RIOS software and development.

We also corrected an error in the original budget, where a formula was broken in the original spreadsheet. That change affects the total under the **TNC \$** column, but it does not affect the overall budget.

We appreciate your consideration of this request. Please let us know if you have questions.

Sincerely,

Mickey Hazelwood
Truckee River Project Director, The Nature Conservancy

Project Budget
Optimizing Restoration Investments in the Truckee Watershed

BUDGET ITEM DESCRIPTION	Est. Cost	TRF \$	TNC \$	NFWF \$	NNWPC/ WRWC \$	TOTAL \$	MATCH \$
Personnel (2 years)							
Truckee R. Project Dir. 40% FTE	\$83,500		\$44,250	\$39,250		\$83,500	
Project Manager 47.5% FTE	\$106,900		\$18,500	\$88,400		\$106,900	\$50,500
Hydrologist 25% FTE	\$62,500		\$7,400	\$55,100		\$62,500	
Forest Ecologist 10% FTE	\$30,000		\$30,000			\$30,000	
Consultants							
Stakeholder facilitation	\$17,000	\$10,000			\$7,000	\$17,000	
RIOS software develop & training	\$50,000	\$35,000		\$3,000	\$12,000	\$50,000	
GIS consultant	\$56,100			\$30,850	\$25,250	\$56,100	
Supplies & Services							
Stakeholder meetings	\$3,000	\$3,000				\$3,000	
Data acquisition	\$2,500	\$2,500				\$2,500	
Travel	\$5,000				\$5,000	\$5,000	
Printing, postage, telecom	\$1,000				\$1,000	\$1,000	
Total Direct Costs	\$417,500	\$50,500	\$100,150	\$216,600	\$50,250	\$417,500	\$50,500
Indirect Costs*	\$62,625	\$7,575	\$15,023	\$32,490	\$7,538		\$7,575
TOTAL	\$480,125	\$58,075	\$115,173	\$249,090	\$57,788		\$58,075

Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 25, 2016
TO: Chairman and Members, Northern Nevada Water Planning Commission
FROM: Jim Smitherman, Water Resources Program Manager
SUBJECT: Report on the Truckee Meadows Water Authority (“TMWA”) fiscal year 2015 – 2016 Water Usage Review Program; discussion and possible recommendation to the WRWC regarding a scope of work and funding request in the amount of \$100,000 from the Regional Water Management Fund (“RWMF”) to continue the Program for fiscal year 2016 – 2017, and possible direction to staff

SUMMARY

The Truckee Meadows Water Authority (“TMWA”) requests funding from the RWMF in an amount not to exceed \$100,000, for the continuation of the Water Usage Review Program. TMWA staff will provide a brief report on the 2015 program.

In this program, TMWA staff works with customers at their homes and businesses to advise them how to manage indoor and outdoor water use based on their specific site characteristics. TMWA finds this form of customer education to be highly effective and considers the Water Usage Review Program a success.

BACKGROUND

In 2013 the NNWPC recommended, and the WRWC approved, a two-year agreement with TMWA to provide \$65,558 per year, approximately 60 percent funding, for the Water Usage Review Program. In 2015, the agreement was amended for one year in an amount not to exceed \$100,000 to cover approximately 60 percent of TMWA’s expenses for an expanded program to cover the post-consolidation customer base. The NNWPC, and its predecessor entity, the Regional Water Planning Commission, have supported the Water Usage Review Program since the program's inception in 2003.

FISCAL IMPACT

The fiscal impact to the RWMF, should this item be approved, will not exceed a total of \$100,000 from the RWMF in fiscal year 2016-2017. The fiscal year 2016-2017 draft tentative budget recommended by the NNWPC includes \$100,000 for this project. Budget authority is located in Fund Group 766, Fund 7066, Account Number 710100, Professional Services, Cost Object WP310101.

RECOMMENDATION

Staff recommends that the NNWPC consider the report and funding request from TMWA and provide a recommendation for approval to the WRWC regarding the 2016 Water Usage Review Program.

JS:jd

Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 25, 2016

TO: Chairman and Members, Northern Nevada Water Planning Commission (“NNWPC”)

FROM: Jim Smitherman, NNWPC Water Resources Program Manager

SUBJECT: Presentation of comments received and proposed revisions to the “Planning Policies and Criteria” chapter for the 2016 Regional Water Management Plan (“RWMP”) update; discussion and possible direction to staff.

SUMMARY

Since the NNWPC last reviewed proposed revisions to this chapter, staff has reviewed the TMWA draft 2015 Water Resource Plan (“WRP”), Washoe County Development Code, Section 110.422, as revised on November 6, 2015, and notes from the February 3, 2016, NNWPC meeting. Revisions to the policies, criteria or discussion sections listed below are attached and appear in redline-strikeout format, in addition to those made last year resulting from discussions on individual policies with pertinent local government and regional agency staff members. Prior recommended revisions were made based on comments received from the City of Reno Public Works Department, City of Sparks Community Services Department, Sun Valley GID, Washoe County Community Services Department, Truckee Meadows Regional Planning Agency, Truckee Meadows Water Authority, and the Truckee River Flood Management Authority. A brief summary of recommended revisions to date follow.

Goal 1: Plan for the development of sustainable water supplies

Recommended revisions resulting from discussions at the February 3 NNWPC meeting and staff’s review of the references noted above are limited to policies:

- 1.2.a Conjunctive Management of Surface Water and Groundwater Supplies to Withstand a 9-year Drought Cycle; and,
- 1.3.b Wellhead Protection.

Discussions regarding Policy 1.2.g Water Resource Commitments, are ongoing. Revisions to this policy will be presented at a future meeting.

Goal 2: Plan for Regional Wastewater Treatment and Disposal Requirements

Minimal comments have been received on policies under this goal. Staff concludes that the existing wording is adequate for the 2016 RWMP update. No changes have been made since the February 3, 2016 NNWPC meeting.

Goal 3: Plan for the Protection of Human Health, Property, Water Quality and the Environment through Regional Flood Plain and Storm Water Management

Comments and recommended revisions to policies under this goal mostly concern the Truckee River Flood Management Authority and the present status of the Flood Project. References to the “Living River Plan” are deleted and replaced with updated text. No changes have been made since the February 3, 2016 NNWPC meeting.

Goal 4: Support the Implementation of the Truckee Meadows Regional Plan

Recommended revisions under this goal include replacing outdated text on the “Facility Conformance Review” policy with Western Regional Water Commission Resolution 5, Facility Conformance Review Procedures, adopted on April 16, 2014. In addition, a reference to the Consensus Forecast is included in the policy concerning the reinforcement of goals of the Truckee Meadows Regional Plan. No changes have been made since the February 3, 2016 NNWPC meeting.

RECOMMENDATION

Staff recommends that the NNWPC accept the report on review comments and proposed revisions to the “Planning Policies and Criteria” chapter for the 2016 RWMP update, and provide direction to staff as appropriate concerning future reviews of this and other RWMP chapters as part of the development of the 2016 RWMP.

JS:jd

Attachment: Chapter 1 showing redline-strikeout revisions

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Chapter 1 - Regional Water Planning Policies and Criteria

Background

Chapter 531, Statutes of Nevada 2007, the Western Regional Water Commission Act (the “Act”) includes among the required contents of the *Regional Water Plan*, appropriate goals and policies to deal with current and future problems affecting the Planning Area as a whole with respect to the subjects of the Plan. This Plan identifies the Planning Area’s needs for water, wastewater, flood control and drainage capabilities over a 20-year timeframe, the constraints on meeting those needs and background information on these subjects. To adequately evaluate alternatives for meeting the Planning Area’s needs and to evaluate future projects for conformance with this Plan, the following goals, policies and criteria shall apply for supply of municipal and industrial water, sanitary sewerage, treatment of sewage, drainage of storm waters, and control of floods. These policies should also guide the evaluation of future projects, and identify possible changes necessary to implement the *Regional Water Plan*.

The following policies and criteria are organized according to the subjects of the Plan as stated by the four goals shown below. Each policy correlates with one of eight specific objectives arranged under the goals.

- Goal 1: Plan for the development of sustainable water supplies
 - Objective 1.1 Promote efficient use of resources
 - Objective 1.2 Provide for a sustainable water supply and an acceptable level of service to the community
 - Objective 1.3 Implement measures to protect and enhance water quality forensure a sustainable water supply
- Goal 2: Plan for regional wastewater treatment and disposal requirements
 - Objective 2.1 Promote efficient use of resources
 - Objective 2.2 Manage wastewater for protection and enhancement of water quality
- Goal 3: Plan for the protection of human health, property, water quality, and the environment through regional flood plain and storm water management
 - Objective 3.1 Effective and integrated watershed management
- Goal 4: Support the implementation of the Truckee Meadows Regional Plan
 - Objective 4.1 Coordinated infrastructure planning
 - Objective 4.2 Clarification of the Role of the Western Regional Water Commission (“WRWC”) and the Northern Nevada Water Planning Commission (“NNWPC”)

Policies and Criteria

Goal 1: Plan for the Development of Sustainable Water Supplies

Objective 1.1 Promote Efficient Use of Resources

Policy 1.1.a: Geographic Use of Truckee River Water

Use of Truckee River water rights in additional hydrographic basins shall conform to the Regional Water Plan if such uses are an efficient use of water resources; meet or satisfy all regulatory requirements and operating agreements; maintain or improve water quality for

downstream users and maintain a healthy river environment, recreational opportunities, and economic development.

Criteria to implement policy: Local governments and water purveyors shall apply the following criteria to identify approved areas for the use of Truckee River resources:

- In reviewing requests for use of Truckee River water, TMWA water purveyors and local government agencies shall determine that export of the Truckee River water resource to additional areas does not impair the ability to meet the demands associated with fulfilling the reasonable development potential of properties identified under Regional Plan Policies 1.2.1 and 1.2.2, as calculated in the Water Resource Baseline (see Table 2-1) and demand projections in this Plan.
- To the extent possible and practicable, use proposed area of Truckee River water will coincide use is within the Truckee Meadows Service Area (“TMSA”) boundary, as it may be amended.
- Local governments and TMWA water purveyors have determined that the resource costs are found to be economically acceptable.
- Expanded use is consistent with water quality, wastewater disposal, environmental and flood control policies or regulations.

Discussion: The hydrographic basins where Truckee River water has historically been diverted for agriculture pursuant to the Orr Ditch Decree include: Truckee Meadows hydrographic basin 87, Spanish Springs basin 85, Truckee Canyon segment basin 91, and Tracy segment basin 83. In addition, areas where Truckee River water has been delivered for municipal and industrial use include Sun Valley basin 86 and Lemmon Valley basin 92.

It is in the best interest of the community to optimize the use of Truckee River water resources, both within and by export of water from the Truckee River basin. Use of limited Truckee River water supplies within the Planning Area is recognized as an ongoing and necessary practice that provides water supplies to areas that independently do not have sufficient water resources to accommodate existing and planned uses.

Policy 1.1.b: Water Demand Side Management (“DSM”) Conservation

Water demand management conservation measures that promote smart and efficient use management of the Planning Area’s water resources will be implemented for the benefit of the community. Additionally, the community will be expected to reduce conserve more water use during low precipitation years when upstream reserves are needed to release water prior to September 1 drought.

Criteria to implement policy: Local governments and water purveyors shall enforce existing ordinances, comply with state law and work towards implementation of Base Case demand-side management conservation programs (“DMPs”) measures.

Discussion: In many communities, demand-side management DSM water conservation is is viewed as an alternative to developing new water resources. However, due to existing agreements concerning the Truckee River, most DSMP measures water conservation programs in the Truckee Meadows do not result in new water resources for future use. Notwithstanding the limitations on water resource benefits resulting from DSMPs conservation, valuable benefits can be realized, including:

- stretching drought or emergency water supplies

- delaying construction of new water and wastewater treatment facilities

- reducing cost of water system operations
- reducing energy costs
- enhancing indownstream water quality
- improving environmental conditions
- enhancing access to water supply projects, including the Negotiated Settlement

Measures that may be used to achieve the region's demand-side managementDSMconservation goals include, but are not limited to, the following:

- water meters
- enforcement of existing ordinances
- water saving indoor fixtures
- individual evapotranspiration irrigation controller system requirement
- minimum of 65 percent efficient irrigation for residential and commercial landscapes
- seasonal changes in irrigation timing
- functional turf areas
- proper soil preparation
- pressure reducing devices
- individual customer water budgets
- tieredincreasing block-tier pricing
- water audits
- landscape irrigation using reclaimed water

NRS 540.131 through NRS 540.151 requires all purveyors of water for municipal, industrial, or domestic purposes, with the exception of certain smaller purveyors, to submit water conservation plans with the Department of Conservation and Natural Resources for review and approval for compliance. 2005 Amendments to NRS 540.131 require conservation plans to be updated every five years.

The state has also imposed minimum standards for plumbing fixtures in new construction and expansions in residential, industrial, commercial and public buildings, mobile homes, and manufactured homes and buildings. These standards include maximum acceptable water use by toilets, urinals, and showers; ban timing devices that cause fixtures to flush periodically, irrespective of demand; limit the flow rate of faucets in kitchens and lavatories; and prohibit multiple faucets activated from a single point.

Policy 1.1.c: *Reduction in the use of Management of Conserved Truckee River Water resulting from DMPs*

Truckee River water saved as a result of DMPs ~~Conserved water originating from the Truckee River~~ shall be managed consistent with agreements among local entities and parties of interest to the Truckee River.

Discussion: During drought conditions, low river flows occur between the Glendale Water Treatment Plant and the Steamboat Creek confluence. During extreme drought periods flow is sometimes reduced to zero. The above policy is designed to generate a source of water that can be managed in the best possible way, depending on drought conditions, to achieve instream flows and habitat enhancement to the greatest degree possible. Storage of conserved

water in upstream reservoirs will have requirements pursuant to *Truckee River Operating Agreement* (“TROA”) operations that provide drought protection and fish credit water. Water stored under TROA operations can be released for fish purposes thereby providing undiverted flow to the benefit of Pyramid Lake as well as Truckee River habitat. Implementation of the Water Quality Agreement and TROA are expected to enhance flows during critical low-flow periods.

Policy 1.1.d: Evaluation of the Unexercised Portion of Committed Water Supplies

The feasibility of alternative uses and management of the unexercised portion of committed water supplies shall be evaluated. This appropriated but unused water could possibly be dedicated to a variety of beneficial uses.

Discussion: Conversion of agricultural water rights to municipal and industrial uses and the various conversion ratios accepted (e.g. 1.12 acre-feet (“af”) for one single-family home) have committed water resources that are not currently being used due to a variety of reasons, including water use reduction conservation. This appropriated but unused water could possibly be dedicated to a variety of uses such as including in-stream water quality, environmental, upstream storage, ~~or~~ a reduced water right dedication policy or it could be added to existing water supply. Any one of these options has political or institutional barriers and could be hydrographic basin specific.

~~**Policy 1.1.e: Water Meters**~~

~~*Water purveyors within the Planning Area shall meter to the extent practicable, all uses or sales of water within their respective service areas.*~~

~~**Discussion:** The results of water conservation measures are only quantifiable with a metered system. Truckee Meadows Water Authority (“TMWA”)’s evolution toward a metered system began in 1979. At that time, meters were installed at commercial services and meters began to be installed at irrigation services. A formal program to retrofit all TMWA’s remaining flat-rate residential services began in June 1995 and has achieved metering of over 96 percent of its service connections. Washoe County Department of Water Resources (“WCDWR”), Sun Valley General Improvement District (“SVGID”) and South Truckee Meadows General Improvement District (“STMGID”) are all fully metered systems.~~

~~State Water Law does not require domestic wells to have water meters; however, in 2007 the Nevada Legislature took steps to require the owner of a domestic well to install a meter if an accessory dwelling unit of a single family dwelling is to be served by the domestic well (Nevada Revised Statute 534.180.4).~~

Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community

Policy 1.2.a: Conjunctive Management of Surface Water and Groundwater Supplies to Withstand a 9-year Drought Cycle

For planning purposes, the conjunctive management of TROA-reliant surface water and ground water supplies for municipal and industrial use in the greater Truckee Meadows area shall be designed to withstand the worst drought cycle of record, that being the drought of 1987-1994, plus one dry year (1987) added to the cycle.

Discussion: The TMWA 2035 WRP found that the region is in its fourth consecutive, low-precipitation year. The meteorologic drought, begun in 2012, created hydrologic drought impacts in 2014 and 2015 which required TMWA to release some of its upstream drought reserves for the first time since 1992. As defined in TROA, the region has been in a Drought Situation (i.e., the level of Lake Tahoe is projected to be below elevation 6223.5 feet on November 15 of a given year) since 2014. Unfortunately, it cannot be known with certainty the duration of the current drought. In addition, analysis has shown that under TROA operations water supplies and drought reserves accumulate to TMWA's benefit under the 1987 to 1994 drought hydrology.

The TMWA 2035 WRP reports that analyses of California blue oak tree-ring data concluded that drought periods of 8-, 9- or 10-years are rare occurrences with frequencies of 1 in 230 years, 1 in 375 years, and 1 in 650 years, respectively. While there has not been any new tree ring data collected since the 2003 study, a preliminary dendrochronological reconstruction of water-year streamflow was performed using as predictors the western U.S. tree-ring chronologies available from the public-domain International Tree-Ring Data Bank ("ITRDB") dataset and stream flows from the Carson River. The Carson River does not have reservoirs compared to the Truckee River and is therefore a more natural flowing river providing better correlation with select tree-ring cores. This reconstruction of the Carson River extended from 1500 to 2001, a period five times longer than the instrumental record. The reconstruction of the Carson River had 211 wet and dry spells with an average duration of 2.4 years, with the longest episodes being a 9-year wet period (1978 to 1986), and two 8-year droughts in 1841-1848 and 1924-1931. These three episodes were also the strongest found in the 502 year history in the reconstruction dataset.

To test the robustness of the region's water supply, in particular the back-up water supply, TMWA developed a hypothetical, 9-year worse-than-worst-case hydrologic scenario and processed it through the RiverWare operations model. Starting with actual 2012 to 2015 hydrology for the first four years, 5 years of 2015 hydrology were added on to complete the dataset for years 2016-2020. This hydrology was simulated under both TROA and non-TROA operating conditions. The 9-year simulation used for this analysis is over two times more severe than the drought of record (1987-1994) plus the additional dry year (1987) currently used for planning purposes. The simulation used projected 2015 demands of 70,000 AF.

Without TROA, upstream-drought reserves would run out in year seven of the modeled worse-than-worst-case drought; in other words, reserves are exhausted if 2015 hydrology is repeated three more years after actual 2015 hydrology. However with TROA, the results show that at current demands the region can withstand a hypothetical drought more than 2 times as severe as the drought of record and by the end of the 9-year simulation, TMWA would not only be able to meet demand at current levels, but actually continue to build up and accumulate additional drought storage. By the summer of 2020, the model predicts more than 46,000 AF of additional drought reserves would be available for use; reserve water supplies that would not be there if not for TROA. Supplies would be more than sufficient to meet summer water demand throughout the hypothetical hydrology.

To further stress-test TMWA's upstream drought reserves under TROA operations to the next level, two additional hydrologic scenarios or simulations were performed to test the robustness of the region's back-up water supply. Two twenty (20) year hypothetical worse-than-worse-case scenarios were used. The first 20-year simulation ("Repeat1987") was a repeat of the 1987-1994 drought of record plus the 1988 hydrology, starting at the same initial point as the first scenario (the 9-year simulation referenced above). That starting point was October 1, 2016 (start of Water Year) after the four driest back to back years in recorded history (115 years record keeping). The second scenario ("Repeat2015") repeated actual 2015 hydrological conditions for an additional 20 years starting from October 1, 2016. Both model runs used forecasted customer demands and assumed increases to groundwater pumping capacity of 15 MGD over the 20-year planning

horizon.

The results of the Repeat1987 model using RiverWare validate the work that was done for the TROA EIS using TROM. The 1987-1994 Drought is considered to be the drought-of-record is the standard for TROA and TMWA planning. It was the worst drought this region has experienced. The results of the model run suggest that not only can this region withstand a repeat of the 1987-1994 drought over the course of the next 20 years under TROA, but that combined upstream drought reserves would continue to grow and reach over 70,000 acre-feet. During the 20-year run more or less reserves were used to meet demand depending on the available river flows. Figure 3-10 shows TMWA's cumulative combined upstream storage over the 20 year simulation period.

The results show very clearly that under TROA the region's water supply is extremely resilient. When drought reserves are needed to supplement natural river flows during the peak summer demand months, storage is used during that period, but is quickly refilled over the course of the next winter and spring. By the time reserves may be for the following summer's demands, upstream reserves have been refilled and upstream reserves are in most years identical to the previous year's reserves, or in some cases, many times better.

Despite a repeat of 2015 hydrological conditions for 20 years following the four (4) driest years in recorded history (a statistically impossible scenario), TMWA's upstream reserves in the Repeat2015 scenario are not only sufficient, but actually increase throughout the planning horizon. The results once again illustrate the importance of the Truckee River Operating Agreement to this community. Figure 3-11 shows TMWA's projected cumulative reserves over the simulation period.

The 2035 WRP therefore recommends that TMWA continue to monitor its ability to meet current and future demands through the 1987 to 1994 drought period, the worst drought period of record, and based on factors such as demand growth, conservation improvements, hydrologic cycles, climate changes, etc., update its Board when future conditions change that require changes to the planning criteria or supply operation.

~~As part of its 2005-2025 Water Resource Plan, TMWA used historical Truckee River data to examine the likelihood of occurrence of droughts of various lengths and found that drought-year cycles are relatively rare events, similar to flood events. A TMWA / University of Nevada, Reno ("UNR") modeling effort to analyze drought frequencies estimated that the likelihood of a 8-, 9-, or 10-year event occurring is extremely rare with frequencies of one in 230 years, one in 375 years and one in 650 years, respectively.~~

~~TMWA's 2005-2025 Water Resource Plan found that: 1) a ten-year drought design imposes an unrealistic burden on the region's resources, and 2) planning for the nine-year drought event with today's resources is more than adequate to meet expected drought frequencies. TMWA concludes that its customers will have water available for all uses, provided there is increased conservation during the critical year, to withstand a nine-year drought. During the 1987 to 1994 drought, use per connection decreased by almost 25 percent from the previous years' average usage, demonstrating significant consumer response to drought measures.~~

~~TMWA, in its 2030 Water Resource Plan re-evaluated its drought planning criteria and reaffirmed its prior findings and conclusions regarding drought planning. The historic drought from 1987 to 1994 is the most severe record of repetitive low precipitation and snow-pack run-off years in the one hundred plus years of keeping record. Use of a more stringent drought cycle design, without data to support it, ultimately reduces the use of available resources and burdens the region with the cost requirement to replace the lost resource. Using the 9-year drought design (1987-1994 plus a repeat of 1987 hydrology) preserves the opportunity for the local community to continue to develop in an orderly fashion without necessitating unreasonable~~

~~and unnecessary interruptions during the next few years before TROA is implemented, which is projected to meet demands of 119,000 acre-feet annually.~~

~~The TMWA Board's adopted position is that until TROA is implemented and recognizing that although demands could expand through the continued conversion of irrigation water rights, TMWA will base its planning on a 9-year drought period and continue review of the performance of and possibly change its planning standard based on changes in future conditions such as demand growth, conservation improvements, hydrologic cycles, climate changes, etc.~~

~~The NNWPC intends to review this policy, and revise it if necessary, during the next 5-year update of this Plan. Factors to consider in reviewing the performance of this policy might include updated demand projections; more hydrologic/climatologic data and analyses; increased conjunctive use and other measures that provide flexibility in managing water resources; new sources of water supply; or other appropriate factors.~~

No change

Policy 1.2.b: Water Resource Investigations

Where a water supply deficiency exists or a potential water supply deficiency may occur as a result of master plan, zoning or land use changes or changes to the Truckee Meadows Service Area boundary, or there is a need for additional water resources to meet other regional objectives, the NNWPC may investigate alternatives to meet the potential water requirement.

Criteria to implement policy: The NNWPC may initiate water resource investigations when any of the following criteria are met:

- The investigation has been identified as a required element of the NNWPC's regular updates to the *Regional Water Plan*, per the Act.

- When the Western Regional Water Commission finds that the Washoe County Consensus Population Forecast (“Consensus Forecast”) is greater than the estimated population that can be supported by the sustainable water resources.
- When there is an identified need for additional water resources not associated with land use changes (examples: water for return flow requirements, *Water Quality Settlement Agreement* requirements, effluent reuse, domestic well conversion or augmentation).

Discussion: A method of accounting for potential water requirements and available water resources has been developed in the form of the Water Resources Baseline and water demand projections based on the Consensus Forecast. It may take up to ten years to implement a new water resource option from the time a need for additional resources has been identified to the commencement of delivery of that resource. The NNWPC will use the Water Resources Baseline and water demand projections as tools to identify the need to investigate additional water resource options.

Policy 1.2.c: Emergency Water Supply Standard

Water service providers using Truckee River water rights supplemented with other water resources shall design and manage their supplies to meet all indoor water uses, and withstand a short-term contamination event (1-2 days) with no interruption in service, and a seven-day event through the use of mandatory conservation.

Discussion:

~~The Truckee River and its tributaries may be subject to both natural and human-induced contamination events. Natural events may include turbidity caused by flooding, thunderstorms, and/or landslides in the watershed. Human-induced events may include leaks or spills associated with the transport of materials that would pollute water if released. This policy acknowledges emergency management plans required by state statute.~~

The purpose of this standard is to provide emergency water to the community during a potential contamination event that could render Truckee River water untreatable for an extended period. The minimum seven-day supply is intended to allow the contaminant to flush by the treatment plant intakes, and to provide sufficient response time to plan, implement and communicate temporary treatment or other extraordinary measures to restore the water supply to the community. Depending on the severity of the emergency, water supplies would be managed to provide basic community needs while assuming that mandatory water conservation is implemented. This policy acknowledges emergency management plans required by state statute.

While there is a risk to surface water reliability from turbidity and toxic spill events, research conducted in 1996 and again in 2007 by UNR on behalf of TMWA has shown no recorded river contamination event from rail or highway transportation. The recent study also suggests that the area of highest risk is downstream of TMWA’s treatment facilities in the City of Sparks where there is a rail yard and a large number of warehouses and shipping companies that load/unload trucks and rail cars. TMWA’s Source Water Protection Program (including its Wellhead Protection Plan (“WHPP”)) is designed to preserve and enhance available water supplies and to address known and potential threats to water quality. TMWA has sufficient well capacity and distribution system storage to meet reduced customer demands during a water quality emergency, and has emergency plans in place in the event of extended off-river emergencies. With the merger of WCDWR and STMGID water systems into TMWA, system integration improvements will be implemented that are beneficial in terms of increasing the supply and/or quality of water supplies at minimum economic costs to ensure the delivery of

water through the 20-year planning horizon and beyond.

The 2035 WRP therefore recommends that TMWA continue to: (1) implement its source water protection strategies in cooperation with local entities; (2) maintain, as a minimum, the ability to meet daily indoor water use with its wells; and (3), for river outages lasting up to 7 days during the summer, maintain the ability to meet average daily water demands using its wells, treated water storage, and enhanced conservation measures.

~~An evaluation by the RWPC as to whether the region's existing facilities met this standard was conducted in 2002. This analysis recommended five projects, described in *Recommended Projects to Provide an Emergency Water Supply to the Truckee Meadows* (ECO:LOGIC, 2002), for detailed evaluation to meet the standard. As discussed in Section 2.2.4, and TMWA's 2030 *Water Resources Plan*, the combination of TMWA's well production and the ability to treat Truckee River water at its treatment facilities during possible events of elevated turbidity contribute to meeting this standard.~~

~~Both the Chalk Bluff Treatment Plant ("CTP") and the Glendale Treatment Plant ("GTP") are designed to operate during intermittent elevated turbidity events lasting five to ten days, but it is more practical to shut the plants down and let the turbid water pass to avoid significant cleanup efforts and costs at the treatment plants. Should a turbidity event exceed TMWA's ability to treat the water to required standards, the current indoor demands (based on winter daily demand) of approximately 35 million gallons per day ("MGD") can be accommodated using~~

~~TMWA's 32 production wells (63 MGD capacity), and it should be possible under conditions of mandatory conservation especially during summertime operations to use TMWA's wells and storage (131 million gallons ["MG"]) to accommodate a reduced demand to meet this policy.~~

While a toxic spill into the Truckee River is clearly a concern, such an event would be extremely rare, and in fact has never occurred. However, depending on the time of year, TMWA is able to operate without the river for a period of hours to days using system distribution storage and production wells ~~while the location, size, and type of spill; time of year; levels of reservoirs and streams; customer demands; and other factors are assessed in order to develop a response plan. A detailed plan cannot be developed for a major emergency on the Truckee River that would anticipate all possible combinations of circumstances requiring emergency actions. Variables include location, size, and type of spill; time of year; levels of reservoirs and streams; customer demands; and other factors. The supply of water available from TMWA's production wells enables TMWA to meet demands for average indoor water use throughout the year. The merger and integration of WCDWR and STMGID water systems into TMWA has resulted in additional interconnections with adjacent water systems. These water systems, located within South Truckee Meadows, Hidden Valley, Spanish Springs and Lemmon Valley, rely on groundwater wells and provide an increased source of off-river supply during an extreme event and/or extended river outage. The merger and integration of the WCDWR water systems also brings additional off-river resources and facilities to TMWA, including Thomas, Whites and Galena Creek water resources, the Longley Lane groundwater treatment plant, and the North Valleys Importation Project ("NVIP"). In addition to relying on its wells, other steps to reduce water use during an extreme event and/or extended river outage are specified in the 2035 WRP.~~

~~Though it cannot be predicted when a river interruption event will occur or what the nature of an event will be, TMWA plans for and practices scenarios to manage through emergency events. The more extraordinary measures that can be engaged are believed to only apply in an extreme, worse-than-historic event that would occur in the peak of summertime irrigation with contamination occurring between Boca and the diversion point of the Steamboat Ditch. Most combinations of scenarios as to time, place, and nature of the event are manageable with existing production facilities and management options without taking drastic measures. It must be emphasized that these are broad guidelines only. They are not intended as a definitive instruction list as to the response which should be taken in any given emergency situation. An event, if it occurs, must be evaluated on its specific conditions, and a response plan devised accordingly.~~

~~Although it cannot be predicted when a river interruption event will occur or what the nature of an event will be, most combinations of scenarios as to time, place, and nature of event are manageable with existing production facilities and management options without taking drastic measures. The implementation of extensive demand reduction measures during an event is considered rare and believed to only apply in extreme, "worse-than-historical" events during the peak of the summertime irrigation season. An event, should one occur, must be evaluated on its specific conditions, and a response plan devised accordingly.~~

Moved from 1.3

Policy 1.2.d: Protection and Enhancement of Groundwater Recharge

Natural recharge areas shall be defined and protected for aquifer recharge. Applicants for proposed projects and proposed land use changes in areas with good recharge potential shall be encouraged to include project features or adequate land for passive recharge.

Criteria to implement policy:

Natural recharge in drainage ways:

- Local governments enforce existing ordinances referenced below. Local governments will protect the natural recharge and flood protection functions of the drainage ways shown on United States Geological Survey (“USGS”) 7.5 Minute Quad maps.

Undeveloped areas with recharge potential:

- Local governments perform a review of lands within proposed project or proposed land use change area and rank suitability for passive recharge based on site evaluation criteria: see *Southern Washoe County Groundwater Recharge Analysis* (Kennedy/Jenks, January 2001). Sites with a Hydrology/Geology matrix score of 2.2 or higher are considered to be sites with “good recharge potential”. Figure 2-7 shows areas of good recharge potential compiled from data presented in the report referenced above.
 - If a site is determined to have “good recharge potential”, local governments shall, to the extent practicable, work with the project developer or land use change

proponent to explore development features or configurations that maximize recharge while meeting other obligations regarding storm water quality and flood control needs.

- o Passive recharge elements shall be designed such that they are consistent with water quality, environmental, storm water and flood control policies or regulations.

Discussion:

Incidental recharge in drainage ways:

When combined, the requirements of the City of Reno Major Drainage Ways Ordinance and the Washoe County Development Code Article 418 “Significant Hydrologic Resources” provide for the protection of groundwater recharge in most natural drainage ways. There are additional drainage ways not identified in the two ordinances that are shown on USGS 7.5 Minute Quad maps as blue solid or dot-dash lines that represent perennial and ephemeral drainage ways. The intent of this policy is to protect the natural recharge and flood protection functions of these additional drainage ways.

Incidental recharge through unlined irrigation ditches:

Irrigation ditches provide invaluable benefits to the public, including conveyance of storm water and incidental ground water recharge.

Areas with recharge potential:

The NNWPC strongly encourages incorporation of passive groundwater recharge and/or storm water infiltration project components (such as infiltration basins or swales, porous paving, open space, meandering stream channels, or other low impact development [“LID”] practices) when proposed projects or land use changes are considered on sites that have good recharge potential and the water to be recharged will not degrade groundwater quality.

Moved from 1.3

Policy 1.2.e: New Water Resources / Importation

New water resources, including imported water or potable reuse supply, may be developed provided they further the goals of the Regional Plan and the Regional Water Plan.

Criteria to implement policy: Development of new water resources, including an importation water supply, may be pursued if the following criteria are met:

- The water is to be used within the Truckee Meadows Service Area (“TMSA”) boundary, as may be amended from time to time.
- There is a need for additional water resources to help meet the demands associated with fulfilling the reasonable development potential of properties identified under Regional Plan Policies 1.2.1 and 1.2.2, subject to a comparison between the Consensus Forecast and the estimated population that can be supported by the sustainable water resources.
- Local governments or water purveyors have determined that the new water resource or importation of water is economically feasible and consistent with water quality, wastewater disposal, environmental and flood control policies or regulations.

Acknowledge indirect potable reuse as a possible “new” resource option subject to State and local regulatory processes

Discussion: Water importation provides water supplies to areas that independently do not have sufficient water resources to accommodate existing and planned uses. Water importation is a component of the existing water supply for the region. This policy acknowledges that the State Engineer considers additional criteria for water importation according to NRS 533.370(4).

Moved from 1.3

Policy 1.2.f: Water Resources and Land Use

Land use designations or zoning designations do not guarantee an allocation of future water resources. This applies to both surface water and groundwater, including groundwater for domestic wells. While a potential water supply deficiency may exist based on approved land uses, water supply commitments may only be approved pursuant to Policy 1.3.e.

Criteria to implement policy: Local governments shall consider the following criteria in reviewing proposed projects or in reviewing changes to land use or proposing changes to the Truckee Meadows Service Area:

- The potential resource requirement;
- The availability of uncommitted water resources in the hydrographic basin, as identified in the Water Resource Baseline;
- Whether a potential water supply deficiency is created and its timing, magnitude and regional water resource impacts;
- Whether the Consensus Forecast is less than or greater than the estimated population that can be supported by the sustainable water resources;
- Existing water resource investigations that have been performed in accordance with Policy 1.2.b; or
- Timing and availability of potential new water resources developed in accordance with Policy 1.3.c and/or potential mitigation measures.

Discussion: Water resource options will be identified to help meet the potential water resource requirements associated with fulfilling the reasonable development potential of properties identified under Regional Plan Policies 1.2.1 and 1.2.2, as presented in the preliminary 2003 Water Resource Baseline and subsequent Water Resource Budgets. The NNWPC recognizes that proposed projects, master plan, zoning or land use changes may create a situation where there are insufficient water resources identified to supply the build-out of all approved land uses within the TMSA.

Moved from 1.3

Policy 1.2.g: Water Resource Commitments

Issuance of new commitments against a water resource or combination of resources shall be made in conformance with existing State Engineer permits, certificates or orders; water purveyor rules or policies; and/or local government policies. The local governments, water purveyors, and State Engineer will seek to achieve a balance between commitments and the sustainable yield of the resources in the region.

Criteria to implement policy: The following criteria will be applied:

- The Water Resource Baseline (Table 2-1) will be used by local governments and water purveyors as the basis for evaluating the availability of resources to serve proposed

commitments. Not all basins within the Baseline have an estimate of the sustainable yield. In such cases where sustainable yield information is lacking, the local government or water purveyor shall use the best available information and may require or conduct additional studies, as it may deem necessary to make a decision.

- In areas where the approval of commitments through the parcel map, division of land into large parcel map or subdivision process would tend to create or exacerbate a deficit in the Water Resource Baseline balance between sustainable yield and commitments, the local governments and water purveyors will limit such approvals or take affirmative actions to mitigate the deficits through mechanisms such as artificial recharge and recovery of groundwater, conjunctive use of available resources, or the use of alternative water resources.
- In specific basins, resources have been regulated by the State Engineer (such as in the Lemmon Valley hydrographic basin) or by water purveyors through the development of a management plan or discount factor that has been approved by the State Engineer, NNWPC, or local government (such as the County-approved discount factor in the Warm Springs Valley hydrographic basin). Such management plans may include short-term reliance upon the use of groundwater in excess of the sustainable yield, provided that such use is temporary and part of an overall management plan to bring the basin back into a condition of sustainability. In addition, certain orders have been issued by the State Engineer on specific resources (such as certain rights in the Cold Springs Valley hydrographic basin) detailing and regulating the amount of the resource available for municipal use while protecting the basin of origin. These resources shall be considered available sustainable yield and shall be managed in a manner consistent with such State Engineer order or regulation or an approved management plan or discount factor as described herein.

Discussion: While a potential water supply deficit may exist as described in Policy 1.3.d, it represents a hypothetical (or potential future) demand on water resources that might occur if the land is ultimately subdivided or developed in a manner that fully implements the land use plan. A commitment represents an obligation of a water purveyor to provide water to an approved project and therefore should be allowed up to the sustainable yield of the available resources or combination of resources. Properties with existing domestic wells and properties entitled to construct domestic wells constitute a form of commitment of water resources made by a local government when the parcels or lots are created; however, there is no guarantee that well drilling will be successful. Maintaining a balance between commitments and the sustainable yield of the resources in the region is of great importance in the implementation of this Plan. In areas where existing commitments exceed the sustainable yield, the market place will play a significant role in the reallocation of the existing water resource commitments.

No change

~~Policy 1.2.d: Water Supplies to Meet Safe Drinking Water Act Requirements~~

~~*All drinking water supplies provided by public water systems shall meet or exceed the requirements of the Safe Drinking Water Act.*~~

~~**Discussion:** The region depends on both surface water and groundwater for its municipal drinking water supplies. Compliance with the Federal Safe Drinking Water Act will ensure a healthful water supply for the regional population.~~

Objective 1.3 Implement Measures to Protect and Enhance Water Quality for Ensure a Sustainable Water Supply

Policy 1.3.a: Water Supplies to Meet Safe Drinking Water Act Requirements

All drinking water supplies provided by public water systems shall meet or exceed the requirements of the Safe Drinking Water Act.

Discussion: The region depends on both surface water and groundwater for its municipal drinking water supplies. Compliance with the Federal Safe Drinking Water Act will ensure a healthful water supply for the regional population.

Policy 1.3.ab: Wellhead Protection

To protect public health and to ensure the availability of safe drinking water, the Washoe County Health District ~~Health Department~~ (for domestic wells) or local governments with input from the water purveyors with groundwater production facilities in the vicinity of a proposed project shall review any proposed project that may cause possible groundwater contaminating activities. Water purveyors are encouraged to develop wellhead protection programs that can be integrated with local government review processes for new business or development.

Criteria to implement policy: Local governments shall solicit comments from the water purveyor and/or the Washoe County Health District ~~Health Department~~ (“WCDHD”) and consider such comments prior to taking action on a proposed project if there is the potential that a proposed project could result in development with possible contaminating activities within a Wellhead Protection Area.

A list of possible contaminating activities includes, but is not limited to:

- Septic tanks
- Solid waste transfer or storage facilities
- Tank farms
- Service stations

- Laundries and dry cleaning plants
- Auto repair services
- Batch plants
- Storage yards
- Electronic circuit manufacture or assembly plants
- Chemical storage, processing or manufacturing plants
- Industrial liquid waste storage areas
- Paint products manufacturing
- Printing and publishing establishments
- Wood preserving
- Plating plants
- Livestock yards
- Storm water infiltration systems

Discussion: A number of potential contaminating activities have been identified as risks for groundwater contamination. Wellhead protection programs are being implemented nationwide to provide assurance that inadvertent discharge of pollutants into the groundwater supply will not occur, since groundwater cleanup is often prohibitively expensive. In considering comments from the WCDHD or water purveyors, local governments may choose to apply conditions to the approval of a proposed project in order to reduce the risk of possible groundwater contamination.

Groundwater protection has received significant emphasis at TMWA with the 2015 WRP update and integration of the previously-endorsed TMWA WHPP and the former WCDWR and STMGID WHPPs into one unified groundwater protection plan. TMWA's 2015 WHPP incorporates USEPA and NDEP suggested elements resulting in a comprehensive action plan to protect aquifers and TMWA's production wells from further sources of contamination. TMWA's recently completed 2015 WHPP is available for review in Appendix 2-8 of the 2015 WRP and will be submitted to the State for endorsement.

NDEP does not have WHPPs on file for any privately-owned purveyors in the Planning Area. NDEP staff has indicated that wellhead protection planning has transitioned to the Integrated Source Water Protection Planning Program, which includes traditional wellhead protection and surface water protection in addition to involvement by local and regional planning agencies.

NNWPC coordinate review with TMWA

Policy 1.3.b: Protection and Enhancement of Groundwater Recharge

Natural recharge areas shall be defined and protected for aquifer recharge. Applicants for proposed projects and proposed land-use changes in areas with good recharge potential shall be encouraged to include project features or adequate land for passive recharge.

Criteria to implement policy:

Natural recharge in drainage ways:

- ~~Local governments shall enforce existing ordinances referenced below. Local governments will protect the natural recharge and flood protection functions of the drainage ways shown on United States Geological Survey ("USGS") 7.5 Minute Quad maps.~~

~~Undeveloped areas with recharge potential:~~

- ~~• Local governments shall perform a review of lands within proposed project or proposed land use change area and rank suitability for passive recharge based on site evaluation criteria: see *Southern Washoe County Groundwater Recharge Analysis* (Kennedy/Jenks, January 2001). Sites with a Hydrology/Geology matrix score of 2.2 or higher are considered to be sites with “good recharge potential”. Figure 2-7 shows areas of good recharge potential compiled from data presented in the report referenced above.~~
 - ~~○ If a site is determined to have “good recharge potential”, local governments shall, to the extent practicable, work with the project developer or land use change~~

~~proponent to explore development features or configurations that maximize recharge while meeting other obligations regarding storm water quality and flood control needs.~~

- ~~○ Passive recharge elements shall be designed such that they are consistent with water quality, environmental, storm water and flood control policies or regulations.~~

Discussion:

Natural recharge in drainage ways:

~~When combined, the requirements of the City of Reno Major Drainage Ways Ordinance and the Washoe County Development Code Article 418 “Significant Hydrologic Resources” provide for the protection of groundwater recharge in most natural drainage ways. There are additional drainage ways not identified in the two ordinances that are shown on USGS 7.5 Minute Quad maps as blue solid or dot-dash lines that represent perennial and ephemeral drainage ways. The intent of this policy is to protect the natural recharge and flood protection functions of these additional drainage ways.~~

Natural recharge through unlined irrigation ditches:

~~Insufficient information is available to develop policies at this~~

Areas with recharge potential:

~~The NNWPC strongly encourages incorporation of passive groundwater recharge and/or storm water infiltration project components (such as infiltration basins or swales, porous paving, open space, meandering stream channels, or other low impact development [“LID”] practices) when proposed projects or land use changes are considered on sites that have good recharge potential and the water to be recharged will not degrade groundwater quality.~~

NNWPC coordinate review with TMWA

Policy 1.3.c: New Water Resources / Importation

New water resources, including imported water, may be developed provided they further the goals of the Regional Plan and the Regional Water Plan.

Criteria to implement policy: ~~Development of new water resources, including an importation water supply, may be pursued if the following criteria are met:~~

- ~~● The water is to be used within the Truckee Meadows Service Area (“TMSA”) boundary, as may be amended from time to time.~~
- ~~● There is a need for additional water resources to help meet the demands associated with fulfilling the reasonable development potential of properties identified under Regional Plan Policies 1.2.1 and 1.2.2, subject to a comparison between the Consensus Forecast and the estimated population that can be supported by the sustainable water resources.~~
- ~~● Local governments or water purveyors have determined that the new water resource or importation of water is economically feasible and consistent with water quality, wastewater disposal, environmental and flood control policies or regulations.~~

Discussion: ~~Water importation provides water supplies to areas that independently do not have sufficient water resources to accommodate existing and planned uses. Water importation is a component of the existing water supply for the region. This policy acknowledges that the~~

~~State Engineer considers additional criteria for water importation according to NRS 533.370(4).~~

~~*NNWPC coordinate review with TMWA*~~

~~**Policy 1.3.d: Water Resources and Land Use**~~

~~*Land use designations or zoning designations do not guarantee an allocation of future water resources. This applies to both surface water and groundwater, including groundwater for domestic wells. While a potential water supply deficiency may exist based on approved land uses, water supply commitments may only be approved pursuant to Policy 1.3.e.*~~

~~**Criteria to implement policy:** Local governments shall consider the following criteria in reviewing proposed projects or in reviewing changes to land use or proposing changes to the Truckee Meadows Service Area:~~

- ~~• The potential resource requirement;~~
- ~~• The availability of uncommitted water resources in the hydrographic basin, as identified in the Water Resource Baseline;~~
- ~~• Whether a potential water supply deficiency is created and its timing, magnitude and regional water resource impacts;~~
- ~~• Whether the Consensus Forecast is less than or greater than the estimated population that can be supported by the sustainable water resources;~~
- ~~• Existing water resource investigations that have been performed in accordance with Policy 1.2.b; or~~
- ~~• Timing and availability of potential new water resources developed in accordance with Policy 1.3.c and/or potential mitigation measures.~~

~~**Discussion:** Water resource options will be identified to help meet the potential water resource requirements associated with fulfilling the reasonable development potential of properties identified under Regional Plan Policies 1.2.1 and 1.2.2, as presented in the preliminary 2003 Water Resource Baseline and subsequent Water Resource Budgets. The NNWPC recognizes that proposed projects, master plan, zoning or land use changes may create a situation where there are insufficient water resources identified to supply the build-out of all approved land uses within the TMSA.~~

~~*No change*~~

~~**Policy 1.3.e: Water Resource Commitments**~~

~~*Issuance of new commitments against a water resource or combination of resources shall be made in conformance with existing State Engineer permits, certificates or orders; water purveyor rules or policies; and/or local government policies. The local governments, water purveyors, and State Engineer will seek to achieve a balance between commitments and the sustainable yield of the resources in the region.*~~

~~**Criteria to implement policy:** The following criteria will be applied:~~

- ~~• The Water Resource Baseline (Table 2-1) will be used by local governments and water purveyors as the basis for evaluating the availability of resources to serve proposed commitments. Not all basins within the Baseline have an estimate of the sustainable yield. In such cases where sustainable yield information is lacking, the local government~~

~~or water purveyor shall use the best available information and may require or conduct additional studies, as it may deem necessary to make a decision.~~

- ~~• In areas where the approval of commitments through the parcel map, division of land into large parcel map or subdivision process would tend to create or exacerbate a deficit in the Water Resource Baseline balance between sustainable yield and commitments, the local governments and water purveyors will limit such approvals or take affirmative actions to mitigate the deficits through mechanisms such as artificial recharge and recovery of groundwater, conjunctive use of available resources, or the use of alternative water resources.~~
- ~~• In specific basins, resources have been regulated by the State Engineer (such as in the Lemmon Valley hydrographic basin) or by water purveyors through the development of a management plan or discount factor that has been approved by the State Engineer, NNWPC, or local government (such as the County-approved discount factor in the Warm Springs Valley hydrographic basin). Such management plans may include short-term reliance upon the use of groundwater in excess of the sustainable yield, provided that such use is temporary and part of an overall management plan to bring the basin back into a condition of sustainability. In addition, certain orders have been issued by the State Engineer on specific resources (such as certain rights in the Cold Springs Valley hydrographic basin) detailing and regulating the amount of the resource available for municipal use while protecting the basin of origin. These resources shall be considered available sustainable yield and shall be managed in a manner consistent with such State Engineer order or regulation or an approved management plan or discount factor as described herein.~~

~~**Discussion:** While a potential water supply deficit may exist as described in Policy 1.3.d, it represents a hypothetical (or potential future) demand on water resources that might occur if the land is ultimately subdivided or developed in a manner that fully implements the land use plan. A commitment represents an obligation of a water purveyor to provide water to an approved project and therefore should be allowed up to the sustainable yield of the available resources or combination of resources. Properties with existing domestic wells and properties entitled to construct domestic wells constitute a form of commitment of water resources made by a local government when the parcels or lots are created; however, there is no guarantee that well drilling will be successful. Maintaining a balance between commitments and the sustainable yield of the resources in the region is of great importance in the implementation of this Plan. In areas where existing commitments exceed the sustainable yield, the market place will play a significant role in the reallocation of the existing water resource commitments.~~

No change

Policy 1.3.f: Groundwater Resource Development and *Management of Water Quality*

Existing and proposed municipal and industrial well sitings must be evaluated for their influence on the potential for contaminated groundwater migration to areas of potable groundwater. Also, development of groundwater resources shall not result in deterioration of groundwater quality through migration of contaminants.

Criteria to implement policy: Long-term monitoring of groundwater quality by water service providers and participating domestic well owners shall be performed to identify potential deterioration in groundwater quality.

Discussion: The region's groundwater supplies are limited in part due to the influence of geothermal areas, most notably the Moana Hot Springs and Steamboat Springs systems. Smaller geothermal systems also exist in Spanish Springs Valley, Washoe Valley near New

Washoe City, and Warm Springs Valley. While these areas are fairly well known, it must be understood that large centers of municipal pumping peripheral to geothermal areas can induce geothermal water migration toward the production wells. Consequently, consideration must be given to the prevention of geothermal water migration as a result of well placement or groundwater pumping.

Similar to the above discussion on the influence of geothermal systems, the region's groundwater supplies are also limited because of the presence of other naturally-occurring and man-caused contamination. Occurrences of nitrates, perchloroethylene ("PCE"), arsenic and total dissolved solids ("TDS") are documented in one or more locations within the region. Municipal groundwater providers and other entities as required by law must take measures to prevent further contamination of potable groundwater supplies.

Policy 1.3.g: Corrective Action for Remediation of Groundwater

The corrective action taken for remediation of groundwater contamination is typically driven by public health and environmental concerns, and applicable local, state and federal regulations. Realizing this, the affected community shall consider the cost and level of cleanup for groundwater remediation.

Discussion: Groundwater contamination by solvents and fuels from various sources occurs beneath the central Truckee Meadows, Sparks Tank Farm and near the Stead Airport. Currently, these sites are in various stages of study and corrective action. Until these areas of contamination have been "corrected", nearby groundwater production may be limited. Various levels of corrective action are available depending on several factors including whether contamination is a result of historic disposal practices or recent releases and whether a responsible party has been identified. Public health concerns, as included in various state and federal environmental laws and regulations, may require or constrain certain corrective action alternatives. The affected community, in evaluating alternatives for remedial action, will participate in the development of a plan for should consider the level of cleanup, assignment of benefit and cost recovery of corrective action ~~in evaluating alternatives for remedial action.~~

Goal 2: Plan for Regional Wastewater Treatment and Disposal Requirements

Objective 2.1 Promote Efficient Use of Resources

Policy 2.1.a: Effluent Reuse - Efficient Use of Water Resources and Water Rights

The use of reclaimed water for irrigation, recharge or other permitted uses should be pursued where such use is an efficient use of water resources and water rights.

Criteria to implement policy: Local governments, reclaimed water providers, or water purveyors shall apply the following criteria to identify approved uses or areas for reclaimed water:

- Where it is an efficient use of water resources and water rights; local governments, reclaimed water providers, or water purveyors may require the use of reclaimed water, including the necessary facility improvements.
- The use of reclaimed water will be included in the Regional Water Balance as both a supply and as a satisfied demand. To the extent that there may be requirements for make-up water associated with certain uses of reclaimed water, those shall also be included in the Regional Water Balance.

- Where such effluent reuse is consistent with water quality, wastewater disposal, public health, vector, environmental and flood control permits, policies or regulations.

Discussion: It is in the best interest of the community to optimize the use of available water resources, including treated wastewater effluent. Effluent reuse is a treated wastewater effluent disposal practice that provides multiple benefits to the region, including nutrient and TDS discharge permit compliance for the Truckee Meadows Water Reclamation Facility (“TMWRF”), drought benefits to the receiving user, water quality benefits to the Truckee River, and wetland habitat. It is the only present disposal option for the South Truckee Meadows Water Reclamation Facility (“STMWRF”). The expanded use of reclaimed water may also extend potable water supplies by augmenting groundwater recharge, replacing existing water resources that could otherwise be used for municipal and industrial purposes, or by providing new, non-potable water supplies to existing and/or developing areas. Reclaimed water will be included in the Regional Water Plan as a water resource and its use will be further evaluated over time.

Policy 2.1.b: Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit

Options for centralized wastewater treatment with surface water discharge shall include alternatives for reducing non-point source pollution, which may be more environmentally sensitive, and where appropriate should be pursued as pollutant credits for TMWRF.

Discussion: Various options exist for wastewater treatment and disposal of treated effluent, including location of treatment facilities and disposal by way of river discharge, reclaimed water use, land application and infiltration. Chapters 3 and 4 discuss this complex subject in greater detail.

Discharge of treated wastewater effluent to the Truckee River is constrained by permit limitations and total maximum daily loads (“TMDLs”) for TDS, nitrogen and phosphorus. Water quality trading is a relatively recent option being evaluated and implemented around the country by communities facing the high cost of building treatment facilities to meet water quality standards. Water quality trading between a point source, such as TMWRF, and non-point sources, allows for a community to invest in measures to reduce non-point source pollution and receive credit toward its point source discharge rather than constructing additional wastewater unit processes to comply with water quality standards. This approach promotes economical and efficient water quality improvements. Water quality trading opportunities may include agricultural return flow reduction, best management practices, storm water treatment, livestock management, conversion of septic systems to sanitary sewer, and river restoration.

It is acknowledged that in addition to TMWRF investments, parties other than the owners of TMWRF may expend considerable resources on capital improvements that will reduce non-point source pollution and should provide water quality trading credits that may benefit TMWRF.

Objective 2.2 Manage Wastewater for Protection and Enhancement of Water Quality

No change

Policy 2.2.a: Septic Tank Density and Groundwater Pollution

Future development using septic systems should not be allowed in densities that would risk groundwater or surface water quality degradation such that applicable water quality standards are threatened. When adverse surface water or groundwater impacts occur as a result of existing or proposed increases to the concentration of septic systems in an area,

alternative sewage disposal, groundwater treatment, or other mitigation measures must be implemented based on cost, longevity of the solution, and existence of a credible entity to be responsible for the continuing performance of the selected system.

Discussion: In areas where there is little recharge, effluent from septic systems can recycle through the groundwater system, increasing pollutants to unacceptable levels. Individual septic systems are generally used in areas where centralized wastewater treatment is not provided. Areas with septic-caused groundwater pollution include portions of Warm Springs Valley, Washoe Valley, Golden Valley, Lemmon Valley, Cold Springs Valley, and Spanish Springs Valley. In 2000, Nevada Division of Environmental Protection (“NDEP”) issued a directive to Washoe County to plan for sewerage existing lots with septic systems in the Spanish Springs area due to elevated nitrate concentrations detected in public drinking water wells. In 2001, the Washoe County District Board of Health approved a regulation that limits the minimum lot or parcel size to five acres for new subdivisions, and second and subsequent parcel maps proposing to use septic systems. The regulation allows for exceptions, but indicates that approvals will not be granted if the density of septic tanks will exceed the standard established by NDEP. This policy is intended to complement, and not conflict with, Truckee Meadows Regional Plan Policy 3.1.3 regarding requirements for the use of on-site sewage disposal systems.

Goal 3: Plan for the Protection of Human Health, Property, Water Quality and the Environment through Regional Flood Plain and Storm Water Management

Objective 3.1 Effective and Integrated Watershed Management

Policy 3.1.a: Regional Flood Plain Management Plan for the Truckee River

The NNWPC will review the regional Flood Plain Management Plan for the Truckee River watershed, and forward its recommendations to local governments.

Criteria to implement policy: Until such time that a regional Flood Plain Management Plan for the Truckee River watershed is adopted and implemented by local governments, proposed projects and proposed land use changes will follow the Criteria for Policy Implementation in Policy 3.1.b.

Discussion: The Truckee River Flood Project (“Flood Project”) was designed based on the assumption that future conditions in the region would not cause a net loss of flood plain storage volumes and would not cause an adverse change to the water surface elevation in the Flood Project’s hydrology. The Army Corps of Engineers (“ACOE”) will require that the local sponsors agree to maintain the protection level provided by the Flood Project. This protection level will be maintained by implementation of a Flood Plain Management Plan that will address future buildout of the watershed.

The Flood Project and local governments are pursuing flood damage reduction planning efforts that will work together to: 1) protect the flood damage reduction benefits that will be provided by the Flood Project, and 2) plan for full development of the urbanizing watersheds in southern Washoe County to maintain the protection level planned for the Flood Project.

Areas outside of the Truckee River watershed will be covered by Policy 3.1.c, local government development codes, ordinances, master plans and other documents concerning flood plain management.

Policy 3.1.b: Flood Plain Storage Within the Truckee River Watershed

*Until such time as Reno, Sparks, and Washoe County adopt and begin to implement a Flood Plain Management Plan for the Truckee River, the local flood management staff⁴, using the best technical information available and applicable local ordinances, will work with a proposed project applicant or a proposed land use change applicant to determine the appropriate level of analysis required in order to evaluate and mitigate the impacts experienced during the 1997 flood. ~~On an annual basis, all three local flood management agencies and the Flood Project shall jointly agree on and adopt the “best technical information” available for use in implementation of this policy.~~ **Recommend replacement with language consistent with TRFMA JPA, defer to TRFMA.***

Criteria to implement policy: The local flood management staff shall evaluate impacts using qualitative or quantitative analysis and the evaluation may be uncomplicated and brief. If a more in-depth analysis is appropriate, the following approach and criteria shall be used unless otherwise required by local codes or ordinances.

- Current development codes require that a project not increase the 100-year peak flow at the boundary of the property. If the project can also demonstrate no adverse impact to the upstream, downstream and surrounding properties, the analysis is complete.
- If there is any increase to the 100-year runoff volume at the boundary of the property, the project may demonstrate either:
 - The increase in volume of runoff will have no adverse impact to downstream properties and no adverse impact⁵ to hydrologically connected properties, or
 - The increase in volume of runoff will be mitigated in a regional project without adverse impact to hydrologically connected and downstream properties. (Until a storage mitigation plan is in place with respect to this paragraph, flood plain storage mitigation will be required as per existing codes and ordinances.)
- Impacts of a proposed project will be evaluated by comparing conditions, using the flood project design criteria, before project construction and simulated conditions after construction.
- Impacts of a proposed land use change will be evaluated by comparing conditions, using the flood project design criteria, before the land use change and simulated conditions after the change (assuming full utilization of the proposed land use).
- Impacts to drainageways and hydrologically sensitive areas as defined by local governments must be included in the evaluation.

The watershed is divided into four zones with different project size thresholds for the purposes of review (See Figure 5-2):

Zone 1: Critical flood pool – all proposed land use changes and proposed projects will be reviewed for their impact on hydrologically connected and downstream properties

Zone 2: Existing flood pool that will be removed from the flood pool through construction of the Truckee River Flood Project – proposed land use changes and proposed projects will be reviewed

⁴ Each local government has assigned one or more staff members the responsibility of designing and reviewing flood management projects. These staff members are also responsible for reviewing certain proposed projects to address concerns of drainage and flooding.

⁵ See Glossary for definition of “no adverse impact”.

- Zone 3: Adjacent sheet flow areas not part of the flood pool – proposed land use changes and proposed projects will be reviewed
- Zone 4: Remainder of the Truckee River Watershed – proposed land use changes and proposed projects will be reviewed

Currently all projects being reviewed are approximately five acres or greater in size. The five acre minimum size limitation is expected to be reviewed by the local jurisdictions in the future.

Policy 3.1.c: Flood Plain Storage Outside of the Truckee River Watershed

As appropriate, the local flood management staff will work with proposed project applicants or proposed land use applicants to identify the best approach to mitigate the impacts of changes to 100-year flood peaks and flood plain storage volume that are a result of proposed land use changes or proposed projects.

Criteria to implement policy: The local flood management staff shall evaluate impacts using qualitative or quantitative analysis according to applicable local codes and ordinances. A more in-depth analysis will be required when significant impacts must be mitigated. Local flood management staff will develop guidelines for evaluation and mitigation of impacts in specific closed basins. In multi-jurisdictional basins such guidelines will be developed with the concurrence of all responsible agencies.

Policy 3.1.d: Truckee River Restoration

In review of proposed projects and proposed land use changes within the areas identified for restoration in Figures 5-3, 5-4, 5-5 and 5-6, the local governments shall make findings supporting the implementation of potential restoration projects as identified in the Lower Truckee River Restoration Plan ~~and~~ the TRFMA-approved Local Rate Plan Truckee River Flood Project being developed in conjunction with the AGOE.

Discussion: There is a regional collaborative effort to restore the lower Truckee River below Vista. The three local governments and the Pyramid Lake Paiute Tribe (“PLPT”) have signed a Memorandum of Understanding (“MOU”) supporting the multiple goals to be achieved through river restoration. ~~In addition, the Truckee River Flood Project’s community-preferred “Living River Plan” includes a number of ecosystem restoration areas (see Section 5.6.5).~~

The MOU generally describes the benefits, goals and management principles that the major stakeholders agree are necessary to develop a comprehensive program to restore the lower Truckee River. The lower river, running from the Truckee Meadows metropolitan area to Pyramid Lake, is a vital natural resource that serves multiple public and private purposes. An unprecedented opportunity exists for interagency collaboration to achieve multiple public goals. The lower river falls under the jurisdiction of multiple local, state, and federal agencies and units of government, and involves multiple private landowners. To successfully take advantage of this opportunity, public agencies and private landowners need to cooperate and coordinate their river restoration activities. This statement of public benefits, goals, and management principles agreed upon by key lower river stakeholders, represents a common understanding and foundation from which more detailed work programs may be pursued with a high likelihood of success.

Public Benefits

- Water quality and related wastewater treatment capacity of the region, which is fundamental to economic growth
- Accommodation of increased flood flows
- Parks, open space, fishing, canoeing and activities that are fundamental to the region's quality of life
- Habitat and wildlife benefits for fish, birds, mammals and plant communities that are part and parcel of our region's natural heritage

Public Goals

- Cost-effective wastewater treatment via a natural process
- A stable and energy-dissipating channel, achieved through re-establishment of river meanders and reconnection of river to flood plain, to accommodate increased flood flows
- Enhancement of parks system, preservation of open space, enhancement of public recreation opportunities that are high quality, easy to access and ample in number
- Preservation and restoration of aquatic and terrestrial habitat in the river corridor
- ~~Environmental enhancement of the river will favorably affect adjoining properties~~

~~The Living River Plan includes the following ecosystem restoration project goals:~~

- ~~Restore 50 miles of the Truckee River's ecosystem (Sparks to Pyramid Lake)~~
- ~~Restore fisheries, including the threatened Lahontan Cutthroat Trout and endangered Cui-ui~~
- ~~Enhance deer, mountain lion, duck, and song-bird habitat~~
- ~~Enhance water quality~~
- ~~Provide enhanced recreation opportunities, river access, and open space~~

~~Eleven lower river ecosystem restoration project locations are identified in the Living River Plan. Section 5.6.6 briefly discusses each project. Restoration outcomes common to each project include:~~

- ~~Increasing river sinuosity~~
- ~~Reconnecting the flood plain to the river~~
- ~~Mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream~~
- ~~Correct damage done to the river from previous channelization projects~~

No change

Policy 3.1.e: Watershed Protection

Watershed protection programs shall be implemented for the Truckee River, its tributaries, and other perennial streams in the region.

Discussion: Surface water and groundwater quality can be affected by a variety of pollutant sources, such as urban and agricultural activities, erosion, septic systems and other forms of

pollution, such as hydrologic modification and excess temperature, in watershed drainages. Programs are being developed that identify existing and potential sources of pollutants, propose alternatives to the control of these pollutants, and make recommendations for the management of these watersheds. These programs are prudent investments toward water quality concerns for the regional community.

No change

Policy 3.1.f: Adoption of Storm Water Quality Programs

A storm water quality program shall be implemented region-wide, including the continuation and/or enhancement of existing programs in Reno/Sparks/Washoe County, such as the Truckee Meadows Regional Storm Water Quality Management Program, to address not only urban runoff but also other non-point sources.

Criteria to implement policy: Local government management strategies should ensure that:

- Activities comply with the terms of the storm water National Pollutant Discharge Elimination System (“NPDES”) permits.
- Ordinances are enforced with respect to erosion control and runoff.

Discussion: A uniform or regional storm water quality framework is beneficial from the standpoint of implementation and compliance by the regulated community. It is recognized that each of the entities has unique conditions and/or ordinances that may conflict with the adoption of a uniform program. However, to the extent that each entity is able, the goal is to adopt consistent storm water quality programs.

No change

Policy 3.1.g: Management Strategies for Slopes Greater than 15 Percent

Local government management strategies for hillsides with natural slopes greater than 15 percent and less than 30 percent shall be submitted to the NNWPC for review, comment, and recommendations prior to incorporation into local government master plans.

Criteria to implement policy: Local government management strategies should ensure that:

- Activities comply with the terms of the storm water NPDES permits.
- Development on such slopes incorporates on-site and/or off-site mitigation measures for impacts to stream zone habitat and water quality.
- Local code and ordinances are enforced with respect to erosion control and runoff.
- An analysis is performed to identify flood and erosion hazard areas and potential mitigation measures.
- Natural recharge areas are identified and protected.
- Local governments and entities with responsibility for the provision of utilities such as water, wastewater, and flood control services identify the costs of infrastructure, operations, and maintenance associated with development in these areas, and said costs are economically feasible.

Discussion: Regional Plan Policy 2.2.1 requires local governments to develop management strategies for areas with slopes greater than 15 percent but less than 30 percent within one year of adoption of the Regional Plan. Proposals for watershed changes in areas with slopes greater

than 15 percent are of concern as they relate to areas under the jurisdiction of the NNWPC. Therefore, the management strategies that are developed as a requirement of Regional Plan Policy 2.2.1 shall be submitted to the NNWPC for review, comment and recommendation. NNWPC staff shall limit the review of management strategies to the above criteria and provide comments and/or recommendations to the submitting entity.

No change

Policy 3.1.h: Adoption of Storm Water Drainage Guidelines

Regional guidelines for storm water hydrologic criteria and drainage design shall be pursued to address, to the extent practicable, inconsistencies between local governments' existing criteria and design standards.

Discussion: Consistent hydrologic criteria and drainage design guidelines for storm water facilities are beneficial to the community, especially at jurisdictional boundaries where storm drainage systems join. Reno, Sparks and Washoe County jointly conducted a detailed review and revision of the 1996 draft *Hydrologic Criteria and Drainage Design Manual* and released it in April 2009 as the *Truckee Meadows Regional Drainage Manual* ("TMRDM"). It is recognized, however, that each of the entities has unique conditions and/or ordinances that may be inconsistent with the adoption of regional hydrologic criteria and drainage designs and those inconsistencies have been identified in the 2009 TMRDM. It is also recognized that (to the extent each entity is able) the goal of adopting and maintaining a manual containing regionally consistent storm water hydrologic criteria and drainage design guidelines should be pursued.

No change

Policy 3.1.i: Flood Plain Management / Flood Control Projects Subject to NNWPC Review

Facility plans and infrastructure studies for flood control projects developed by local governments will be reviewed by the NNWPC according to Policy 4.1.a to ensure coordination of local projects with regional water management objectives, including but not limited to, regionally coordinated flood damage reduction, preservation or enhancement of recharge, preservation of natural drainage ways, preservation of riparian habitat, protection or enhancement of surface and groundwater quality.

Goal 4: Support the Implementation of the Truckee Meadows Regional Plan

Objective 4.1 Coordinated Infrastructure Planning

Policy 4.1.a: Facility Plans – Conformance with Regional Water Plan

Pursuant to Section 51 of the Act, facilities of a kind or size that affect the working of the Regional Water Plan as distinct from providing normal service to customers, including water supply and storage, wastewater collection and treatment, storm water, and flood control, shall be reviewed by the NNWPC for conformance with the Regional Water Plan, and recommendation to the WRWC.

Criteria to implement policy:

1. Western Regional Water Commission ("WRWC") / Northern Nevada Water Planning Commission ("NNWPC") Staff will review local and regional development applications on a regular basis to identify proposals to construct a facility that may affect the working of the Comprehensive Regional Water Management Plan (the "Plan"), and make a determination as to whether the facility in issue is included in the Plan, or proposed for construction in order to meet

an emergency as defined in the Plan. If so, no conformance review is required, and Staff shall so notify the NNWPC at its next meeting.

2. If the facility is not included in the Plan, or is not proposed to meet an emergency, Staff will request the applicant to submit the proposal for review, conduct an analysis, and make an initial determination as to whether the facility may be of such a kind or size as to affect the working of the Plan as distinct from providing normal service to customers. Examples of facilities that may affect the working of the Plan include, but are not limited to:

a. Facility increasing existing capacity by more than 625 acre feet of water supply per year or sewage processing of 187,500 gallons per day

b. New resource, e.g. importation, creeks, poor quality groundwater

c. New or expanded water reclamation facility

d. New sewer interceptor greater than 30 inches diameter

e. New reclaimed water transmission main greater than 24 inches diameter

f. New water transmission main greater than 30 inches diameter

g. Regional water storage facility

h. Flood control facility

i. Hydrologic or hydraulic modification of stream or river

j. New or expanded water treatment facility

k. Facility having impact on the potential consolidation of public purveyors

3. If the facility, in Staff's analysis, is not of such a kind or size as to affect the working of the Plan as distinct from providing normal service to customers, Staff will prepare a recommendation to the NNWPC for review and a decision as to whether a conformance review by the NNWPC is required.

4. If the facility, in Staff's analysis, may be of such a kind or size as to affect the working of the Plan as distinct from providing normal service to customers, Staff will prepare an analysis/report and set a meeting date for conformance review by the NNWPC.

~~The NNWPC shall review facility plans and infrastructure studies of such a kind or size that affect the working of the *Regional Water Plan* to make a determination that the facility conforms to the substance and content of the *Regional Water Plan*, including policies and criteria; the review shall include an evaluation of stranded costs, the need for the facility, and the impact that its construction will have on any potential consolidation of public purveyors.~~

~~• Proposed facilities shall:~~

- ~~○ be consistent or coordinate with existing facility plans or master plans, or demonstrate how they will address any differences with or changes to existing facility plans or master plans, and~~
- ~~○ coordinate to avoid unnecessary duplication of facilities.~~

~~• An evaluation may be provided of the project's impacts on other water-related issues (e.g. a proposed water project must indicate the potential impacts it would have on wastewater treatment).~~

~~• Any facility plan that is funded in whole or in part by the Regional Water Management Fund shall be subject to conformance review.~~

Discussion: The NNWPC and local governments provide ongoing planning for the community's water, wastewater, storm water and flood control needs. Identification and review of potential impacts to existing or planned infrastructure, and needs for new or improved facilities, should provide for integrated planning and management of the region's water resources and cost-effective infrastructure development and improvements.

Facilities are designed and constructed by water purveyors, wastewater treatment providers, and local governments as part of their respective Capital Improvement Programs ("CIPs"). CIPs

are updated annually, at a minimum. When entities update and approve their CIPs to the extent that they affect the working of the *Regional Water Plan*, the NNWPC shall review them and recommend that pertinent facilities be found in conformance with the *Regional Water Plan* pursuant to the Act and this policy. Any facility plan that is funded in whole or in part by the Regional Water Management Fund is subject to conformance review.

As the NNWPC, local governments, wastewater treatment providers, and water purveyors update their respective facility plans, they analyze alternatives for financing and funding proposed facilities, sources of water or other requirements, and the effects of the funding alternatives on other facilities included in the *Regional Water Plan*. These plans are then presented to the NNWPC for either conformance review or informational purposes, as appropriate according to the Act, this policy, and NNWPC Administrative Policies and Procedures. Presentation of these plans to the NNWPC provides Commissioners with the opportunity to raise questions regarding linkages and comprehensive regional planning for water resources, with the result that overall resource issues can be addressed or additional work can be undertaken, as needed. Source plans and other source documents that are referenced in the *Regional Water Plan* are contained at the end of various chapters, and again at Appendix C. These source plans and documents are included in the *Regional Water Plan*, and do not require further conformance review except to the extent that they are amended, or otherwise revised, so as to affect the workings of the *Regional Water Plan*. These plans also contain detailed alternatives for financing and funding the respective facilities or sources and should be consulted for such detail.

The Act excludes certain facility plans from conformance review, including plans for facilities intended to be constructed in order to meet an emergency, those included in the adopted *Regional Water Plan*, and those intended to provide normal service to customers. A facility included in the *Regional Water Plan* is considered to be in conformance and a review is not necessary. Review criteria are applied to determine whether a facility not included in the *Regional Water Plan* is of such a kind or size that would affect the working of the Plan, which would require a conformance review, as distinct from facilities providing normal service to customers, which would not.

The NNWPC recognizes that all facilities required to implement the *Regional Water Plan* may not be included in the Plan. Consequently, the NNWPC will review, as appropriate, such facilities that are of such a kind or size as to affect the working of the *Regional Water Plan*.

No change

Policy 4.1.b: Timing and Sizing of Facilities

To the extent allowed by state statutes, codes and local ordinances, planning for facilities (defined in the Act) shall be based on existing data and forecasts of future trends, including conservation, to ensure that facilities will be built pursuant to local entities' CIPs with sufficient lead-time to ensure public demands are met.

Discussion: In order to provide cost-efficient infrastructure, it is important that facilities be constructed at the appropriate time and at the appropriate size to meet regional needs. A balance must be struck between allowing sufficient lead time to construct facilities for projected demands, allowing time for conservation efforts to be realized, and minimizing customer costs from too-soon or too-large facility construction. The NNWPC shall take the lead in avoiding rigid rules for sizing and/or timing of facilities in order to allow case-by-case optimization to occur.

Policy 4.1.c: NNWPC Programs and Policies to Reinforce Goals of the Regional Plan

All the policies and criteria for facility plan review adopted by the NNWPC shall be consistent with and carry out the provisions of the Regional Plan.

Discussion: The Regional Plan sets the long-term vision of the Truckee Meadows region in relation to regional form and pattern, natural resource management, and public services and facilities through a variety of goals and policies with which the *Regional Water Plan* must promote and not conflict. Generally, the goals and policies of the Regional Plan aim to limit the spread of the urban footprint while directing increasing amounts of development towards the traditional urban cores of the region in order to facilitate efficient service provision and reduce infrastructure costs. Additionally, for planning efforts in the region, the goals and policies of the Regional Plan set forth that the Consensus Forecast be utilized to ensure entities across the area use consistent population estimates.

No change

Policy 4.1.d: Inclusion of Non-Economic Criteria in Evaluation of Alternatives

Non-economic criteria including, but not limited to, environmental impact, public impact, and archeological impact will be evaluated during the program or project alternative selection process.

Discussion: The primary purpose of developing fiscal and economic standards is to equally evaluate program and facility alternatives. It is also recognized, however, that cost-based evaluation is not the only important criterion to apply to projects.

No change

Policy 4.1.e: Economic Decision-Making Criteria

NNWPC recommendations regarding economic decisions shall be to the extent possible based on minimizing the costs to the entire community for providing adequate services as defined by the policies and criteria of this Plan.

No change

Policy 4.1.f: Examination of Long-Term Impact on Availability of Water Resources

In considering water, wastewater, and flood control projects or management options, the long-term impact on the availability of water resources shall be examined.

Discussion: Water resources within the Truckee River drainage area are finite. Since the river is a closed system, terminating in a desert lake with no outlet, all water uses must be accommodated within the total quantity available. Since water, wastewater, and flood control options may impact the total quantity and quality of water available, actions proposed by entities in the Planning Area affected by this Plan should be reviewed for their potential impacts on the ultimate limit of the resource.

Objective 4.2 Clarification of the Role of the WRWC and the NNWPC

In 1995, Washoe County, Reno and Sparks developed legislation to address regional water issues. This legislation, Nevada Revised Statute (“NRS”) 540A, provided the basis and direction for the Regional Water Planning Commission (“RWPC”) and the *Washoe County Comprehensive Regional Water Management Plan* (“*Regional Water Plan*”).

The RWPC developed, approved and recommended the *1995–2015 Regional Water Plan* to the Washoe County Board of Commissioners (“BCC”), which adopted the Plan in January 1997. The RWPC prepared the *2004–2025 Regional Water Plan* as a result of the required five-year review, which was adopted in January 2005 and amended in 2006 and 2009.

In June 2007, the Legislature approved Senate Bill 487, a special Act, authorizing the creation of the Western Regional Water Commission (“WRWC”) and the Northern Nevada Water Planning Commission (“NNWPC”). The Act repealed the sections of NRS 540A dealing with the RWPC, but provided that “the provisions of the comprehensive plan developed and revised pursuant to the former provisions of NRS 540A.130 before April 1, 2008, remain in effect” until the WRWC adopts the initial comprehensive plan required by the Act, on or before January 1, 2011.

No change

Policy 4.2.a: Role of NNWPC in Water Related Issues

The NNWPC shall address a water-related matter, consistent with its responsibilities as described in the Act.

Discussion: The purposes and role of the NNWPC are described in certain sections of the Act, as follows:

Sec. 41. 1. *The Water Planning Commission shall develop, and as necessary recommend revisions to, a Comprehensive Plan for the planning area covering the supply of municipal and industrial water, quality of water, sanitary sewerage, treatment of sewage, drainage of storm waters and control of floods. The initial Comprehensive Plan must be developed on or before January 1, 2011. The provisions of the comprehensive plan developed and revised pursuant to the former provisions of NRS 540A.130 before April 1, 2008, remain in effect until the Board adopts the initial Comprehensive Plan.*

Sec. 44. *In developing the Comprehensive Plan, the Water Planning Commission shall:*

- 1. Receive and consider information from public purveyors, public utilities and other entities supplying municipal and industrial water within the planning area;*
- 2. Receive and consider information from entities providing sanitary sewerage, treatment of sewage, drainage of storm water and control of floods within the planning area;*

3. Receive and consider information from entities concerned with water quality within the planning area;
4. Review and consider any plan or recommendation of the State Engineer concerning the development, conservation and use of water resources, existing water conservation plans, the regional plan and any master plan that has been adopted pursuant to the provisions of chapter 278 of NRS and any similar plan of a local government which applies to any area in the planning area, and may seek and consider the advice of each local planning commission and any other affected entity;
5. Coordinate and make consistent the elements of the Comprehensive Plan set forth in section 42 of this Act;
6. Consider existing applicable laws;
7. Recognize and coordinate the needs of the incorporated areas of the planning area with the needs of the unincorporated areas of the planning area; and
8. Receive and consider information from other interested persons.

Sec. 45. 1. Before submitting the Comprehensive Plan to the Board, the Water Planning Commission shall hold at least one public hearing on the Comprehensive Plan within the planning area.

2. Before acting on a proposed amendment to the adopted Comprehensive Plan, the Water Planning Commission shall hold at least one public hearing on the proposed amendment at a location in the planning area relevant to the proposed amendment.

3. Notice of the time and place of each hearing must be given by publication in a newspaper of general circulation in the planning area at least 10 days before the day of the hearing. If there is more than one newspaper of general circulation in the planning area, notice must be given by publication in at least two such newspapers.

4. The decision to submit the proposed Comprehensive Plan or any amendment to the adopted Comprehensive Plan to the Board must be made by resolution of the Commission carried by the affirmative votes of a majority of the total voting members of the Water Planning Commission. The resolution must refer expressly to the text, maps and descriptive or other matter intended by the Water Planning Commission to constitute the Comprehensive Plan or an amendment thereto.

Sec. 46. 1. An attested copy of the proposed Comprehensive Plan or an amendment thereto must be submitted by the Water Planning Commission to the Board.

Sec. 51. 1. Except as otherwise provided in subsection 2, on and after the date the initial Comprehensive Plan is finally approved, no facility intended to provide a service relating to a subject of the Comprehensive Plan within the planning area may be constructed, if the facility is of such a kind or size as to affect the working of the Comprehensive Plan as distinct from providing normal service to customers, unless it is included in the Comprehensive Plan or has been reviewed and approved as provided in subsection 3.

2. The Comprehensive Plan may allow for the construction of facilities not included within the Comprehensive Plan in order to meet an emergency as defined in the Comprehensive Plan.

3. A proposal to construct a facility described in subsection 1 within the planning area must be submitted to the Water Planning Commission for review and recommendation to the Board concerning the conformance of the proposal with the Comprehensive Plan. The review must include an evaluation of stranded costs, the need for the facility within the planning area and the impact that construction of the facility will have on any potential consolidation of public purveyors. If the Water Planning Commission fails to make such a recommendation within 30 days after the proposal is submitted to it, the Water Planning Commission shall be deemed to have made a recommendation that the proposal conforms to the Comprehensive Plan. The Board shall consider the recommendation of the Water Planning Commission and approve or disapprove the proposal as conforming to the Comprehensive Plan. Any disapproval must be accompanied by recommended actions to be taken to make the proposal conform to the Comprehensive Plan. The Water Planning Commission and the Board shall limit their review to the substance and content of the Comprehensive Plan and shall not consider the merits or deficiencies of a proposal in a manner other than is necessary to enable them to make a determination concerning conformance with the Comprehensive Plan.

4. The Board shall provide, by resolution after holding a hearing, for the Water Planning Commission or its staff to make final decisions concerning the conformance of classes of proposed facilities to the

Comprehensive Plan. A resolution adopted pursuant to this section must provide an opportunity for the applicant or a protestant to appeal from a decision of the Water Planning Commission or its staff to the Board.

The purpose and role of the NNWPC is to develop, and as necessary recommend to the WRWC, revisions to the *Regional Water Plan* covering the supply of municipal and industrial water, quality of water, sanitary sewerage, treatment of sewage, drainage of storm waters and control of floods. In addition, the NNWPC reviews proposals to construct certain facilities, as described in Policy 4.1.a, for recommendation to the WRWC concerning the conformance of the proposal with the *Regional Water Plan*.

Beyond the purpose and role described above, there are many issues surrounding water, wastewater, and flood control that are local in nature and may not require involvement by the NNWPC. A balance must be struck as to the NNWPC providing cohesive leadership on all water-related issues in the Planning Area without addressing every small item that could divert its energies from the larger regional issues. This policy shall provide guidance as to when it is appropriate for the NNWPC to become involved in the resolution of a water-related issue.

No change

Policy 4.2.b: Role of WRWC in Water Related Issues

The WRWC shall address a water-related matter, consistent with its purposes, powers and responsibilities as described in the Act.

Discussion: The purposes and role of the WRWC are described in certain sections of the Act, as follows:

Sec. 4.2. *It is hereby declared as a matter of legislative determination that:*

(a) The organization of the Western Regional Water Commission having the purposes, powers, rights, privileges and immunities provided in this Act will serve a public use and will promote the general welfare by facilitating unified and cooperative efforts to secure and develop additional water supplies, maintain and cooperatively establish policies for managing existing water resources and water supplies, provide for integrated regional water resources and management of water supplies, provide for integration of efforts to manage storm water, provide for protection of watersheds and provide for regional conservation efforts, subject to and in accordance with the Truckee River Operating Agreement.

(b) The planning for the acquisition, development, management and conservation of regional water supplies and any associated facilities by the Regional Water Commission is for a public and governmental purpose and a matter of public necessity.

(c) The geographical boundaries of the Regional Water Commission are within the area described in section 22 of this Act.

(d) The Regional Water Commission shall, in carrying out the provisions of this Act:

(1) Make full use of any available resources for sustainability, economic viability and maintenance of environmental values;

(2) Communicate the decisions and policies of the Regional Water Commission in an effective manner;

(3) Provide for a centralized system of decision making;

(4) Facilitate the effective coordination of land use and resource planning;

(5) Facilitate the effective and efficient planning, management and operation of facilities; and

(6) Plan for the effective stewardship of water resources, including, without limitation, ensuring the quantity and quality of surface water and groundwater and the control point and nonpoint sources of pollution.

(e) For the accomplishment of the purposes stated in this subsection, the provisions of this Act shall be broadly construed.

Sec. 30. *The Regional Water Commission may do all things necessary to accomplish the purposes of this Act. The Regional Water Commission has perpetual succession and, except as otherwise provided in sections 33 of this Act, has the following powers to:*

1. *Sue and be sued.*
2. *Enter into agreements with Washoe County, the Cities of Reno and Sparks, and any public purveyor.*
3. *Prepare, adopt, update and oversee the implementation of the Comprehensive Plan pursuant to sections 34 to 52, inclusive, of this Act.*
4. *Plan for the implementation of a mechanism for:*
 - (a) *Scheduling the delivery of water supplies held by public purveyors to maximize the yield of regional water supplies and facilitate the cooperative administration of regional water conveyance and treatment facilities for the benefit of the public purveyors.*
 - (b) *Maximizing conjunctive use by the public purveyors. As used in this paragraph, "conjunctive use" means the combined use of surface water and groundwater systems to optimize resource use.*
5. *Prepare, adopt and update a water conservation plan for the use of municipal, industrial and domestic water supplies within the planning area, and make recommendations for water conservation agreements among water purveyors and local governmental entities.*
6. *Study and recommend to the Board of County Commissioners of Washoe County, the City Council of the City of Reno and the City Council of the City of Sparks ordinances for the implementation of a water conservation plan adopted pursuant to subsection 5 and the Comprehensive Plan.*
7. *Contract with public purveyors or any other public entity for the provision of services to or by the Regional Water Commission and, in the performance of its functions, use the officers, agents, employees, services, facilities, records and equipment of any public purveyor, Washoe County, the City of Reno or the City of Sparks, with the consent of the respective public purveyor or governmental entity, and subject to such terms and conditions as may be agreed upon.*
8. *Employ or contract with such persons as it deems necessary and hire and retain officers, agents and employees, including fiscal advisers, engineers, attorneys or other professional or specialized personnel.*
9. *Seek, apply for and otherwise solicit and receive from any source, public or private, such contributions, gifts, grants, devises and bequests of money and personal property, or any combination thereof, as the Regional Water Commission determines is necessary or convenient for the exercise of any of its powers.*
10. *Participate with relevant agencies of the United States, the State of Nevada and other entities on issues concerning the supply of water.*
11. *Adopt such rules and regulations for the conduct of the affairs of the Regional Water Commission or of the Board as the Board may deem necessary or desirable.*
12. *Perform such other functions conferred on the Regional Water Commission by the provisions of this Act.*

Sec. 31. *The Board may develop a plan for the establishment of service territories within the planning area in which the public purveyors and all systems for the supply of water which are controlled or operated by the public purveyors may, on and after April 1, 2008, provide new retail or wholesale water services to new customers. A plan developed pursuant to this section does not apply to any public purveyor unless each public purveyor agrees to the provisions of the plan. The provisions of this section do not affect the ability of public purveyors to continue to provide retail and wholesale water services to customers who received that type of service before April 1, 2008, or pursuant to agreements for water service existing before April 1, 2008. In developing the plan, the Board shall:*

1. *Seek to ensure the coordination of the delivery of water at the lowest reasonable cost, considering all the facilities, improvement and operations required to provide that water as measured by the net present value of those facilities, improvements and operations existing at the time of the determination, generally using current dollars;*
2. *Seek to ensure that existing or future customers are not affected inequitably;*
3. *Seek to provide for the most effective management, development and integration of systems for the efficient use of water supplies and associated facilities; and*
4. *Consider:*
 - (a) *Any specific planning conducted by public purveyors before April 1, 2008, for existing or new customers;*

(b) The topography of the service territories and the readiness and ability of public purveyors to serve customers with existing facilities;

(c) Any policies for land use that affect the service territories; and

(d) The rate of growth within the service territories projected over a reasonable period.

Sec. 32. *The Board has and may exercise all rights and powers necessary or incidental to or implied from the specific powers granted in this Act. Such specific powers are not a limitation upon any power necessary or appropriate to carry out the purposes and intent of this Act.*

Sec. 33. *Notwithstanding the provisions of this Act, the Truckee Meadows Water Authority or its successor is and shall remain the entity with the sole and exclusive power and authority to negotiate and execute and to implement its obligations under that Agreement, as the successor in interest to Sierra Pacific Power Company. All water supplies provided or available to the Truckee Meadows Water Authority or its successor pursuant to the Truckee River Operating Agreement must be considered as acquired before April 1, 2008, and must be managed, scheduled and operated in accordance with that Agreement. Nothing in this Act alters the rights and obligations of the Water Quality Settlement Agreement, and all water supplies must be managed, scheduled and operated in accordance with the Water Quality Settlement Agreement.*

Sec. 34. *The Board may, upon the recommendation of the Water Planning Commission:*

1. Adopt and revise the Comprehensive Plan;

2. Make recommendations concerning methods for conserving existing water supplies which are consistent with any other plans required by law;

3. Make recommendations concerning methods of collecting and treating sewage to protect and conserve water supplies;

4. Provide information to members of the public regarding present and potential uses of water; and

5. Make recommendations concerning the management and use of water within the planning area to:

(a) The governing body and the Planning Commission of Washoe County and the Cities of Reno and Sparks;

(b) The Governing Board for Regional Planning and the Regional Planning Commission established in Washoe County pursuant to NRS 278.0264 and 278.0262, respectively;

(c) The State Engineer;

(d) The Federal Government; and

(e) Such other entities as the Board deems appropriate.

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Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 25, 2016
TO: Chairman and Members, Northern Nevada Water Planning Commission (“NNWPC”)
FROM: Jim Smitherman, NNWPC Water Resources Program Manager
SUBJECT: Presentation of comments received and proposed revisions to the “Flood Management and Storm Water Drainage” chapter for the 2016 Regional Water Management Plan (“RWMP”) update; discussion and possible direction to staff.

SUMMARY

Since the NNWPC last reviewed proposed revisions to this chapter, staff has received new text from the Truckee River Flood Management Authority to replace existing Section 5.6 Truckee River Flood Project. Staff has yet to discuss with TRFMA staff, topics including the updated hydraulic model, the regional hydrologic model, and floodplain storage and critical flood pools. Once discussions have taken place, staff will make further revisions to the appropriate sections and present for review at a future NNWPC meeting.

Staff has also made minor revisions to Section 5.7 Local Government Storm Water Drainage Programs, and Section 5.8 Flood Control and Drainage Overview by Hydrologic Basin. Revisions appear in the attached document in redline-strikeout format, in addition to those made last year resulting from discussions with pertinent local government and regional agency staff members. Prior recommended revisions were made based on comments received from the City of Reno Public Works Department, City of Sparks Community Services Department, Washoe County Community Services Department, and the Truckee River Flood Management Authority.

RECOMMENDATION

Staff recommends that the NNWPC accept the report on review comments and proposed revisions to the “Flood Management and Storm Water Drainage” chapter for the 2016 RWMP update, and provide direction to staff as appropriate concerning future reviews of this and other RWMP chapters as part of the development of the 2016 RWMP.

JS:jd

Attachment: Chapter 5 showing redline-strikeout revisions

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Chapter 5 – Flood Management and Storm Water Drainage

Purpose and Scope

This chapter describes the various entities that provide flood management or storm water drainage services within the Planning Area including the Truckee River Flood Project (“Flood Project”), its governing body and plans, City of Reno (“Reno”), the City of Sparks (“Sparks”), and Washoe County. Subjects covered include flooding history, types of floods, federal programs, federal state and local laws, progress on the Flood Project, structural and nonstructural alternatives for flood control, local drainage programs, flood control and drainage facility design standards, regional facilities and facilities for single drainage basins.

Summary and Findings

The property at risk from a 100-year flood in the Truckee Meadows was valued by Washoe County in 2004 at approximately \$5 billion using a geographic information system (“GIS”) compilation of the 1997 flood boundary and the assessed value for parcels within the boundary. A 2007 analysis by the Nevada Bureau of Mines and Geology (“NBMG”) using a Federal Emergency Management Agency (“FEMA”) loss estimation model to estimate 100-year flood risk in Washoe County estimated building exposure, a measure of the economic wealth of the county, at \$25 billion and building-related economic losses at \$980 million (NBMG, 2007).

Physical damages and economic impacts resulting from the 1997 Truckee River flood (the largest flood of record) totaled about \$700 million¹ in Washoe County and \$1 billion in the six county area hit by the flood in northern Nevada.

Nevada ranks #1 in flood loss payments from the National Flood Insurance Program (“NFIP”) for western, non-coastal states for the last 30 years (January 1, 1978 through November 30, 2009 including Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming).

Over the last 30 years, Sparks, Reno, and Washoe County rank #1, #2, and #3, respectively, for the total amount of flood insurance payments in Nevada from the NFIP. Together, the three areas account for 74 percent of the total flood loss payments in Nevada or almost three times more than all other areas in Nevada combined for the last 30 years (\$27,651,343 vs. the statewide total of \$37,370,575).

Riverine flooding and alluvial fan flooding are both common in northern Nevada. Riverine flooding occurs when flows in rivers and streams rise over a period of hours or days and overtop stream banks inundating nearby flood plains and low-lying areas. Alluvial fan flooding occurs when floodwaters emerge from canyons flowing out of the upper mountains onto an alluvial fan, typically with little or no warning, and travel downstream at very high velocities carrying significant loads of sediment and debris.

Incorporation of hydrologic data since the mid-1980s has resulted in estimated peak flow for specific frequency events higher than originally thought. The 100-year flood event (or one-

¹ In 1997 dollars. The Army Corps of Engineers (“ACOE”) estimated physical National Economic Development (“NED”) Plan damage at approximately \$500M. The Truckee River Water Management Council did an economic impact study that concluded total damage to be \$780M.

percent risk flood) at Reno is now estimated to be 20,700 cubic feet per second (“cfs”). Peak flows for certain frequency events are shown in Table 5-1.

These flows can change direction and realign the existing channel through the alluvial fan as the energy of the water erodes small channels, water is diverted over un-channeled ground, and new channels are established.

Table 5-1 Estimated Peak Flows - Truckee River at Reno

Exceedance (i.e., chance of occurrence in any single year)	Peak Flow (cfs)
1/20	9,200
1/50	14,800
1/100*	20,700
1/500	63,000

Source: ACOE

* Flooding that has a one-percent chance of being equaled or exceeded in any given year, also referred to as a 1 in 100 year flood event or a 100-year flood. Note: The USGS, using a different analysis technique to account for upstream reservoirs estimates the 1/100 peak flow to be approximately 26,000 cfs.

In the 1985 feasibility report for the Truckee River Flood Project, the estimated discharge for the 100-year event at Reno was computed at approximately 18,500 cfs. This flow has been used by FEMA to identify areas subject to flooding for flood insurance purposes.

The peak water surface elevation for the January 1997 flood, considered to be slightly greater than the 100-year flood event, was approximately 1.6 feet higher than the existing FEMA base flood elevation at the Vista gage. Therefore the actual 100-year flood levels are higher than those shown on FEMA flood maps especially in the area east of U.S. Highway 395, with the greatest difference occurring east of McCarran Boulevard. Structures built to current FEMA standards within the area approximately bounded by Rock Boulevard, Interstate 80, and Mira Loma Boulevard are not necessarily protected during a 100-year flood event despite the depictions on the FEMA flood maps.

Information prepared for the Regional Water Planning Commission (“RWPC”) through a study by WRC Nevada in 2003 indicates that loss of flood storage volumes due to development of existing approved land uses within the flood plain on the north and south sides of the Truckee River could result in an increase of 0.4 to 0.6 feet in the base flood elevation. Since this study looked only at development that might occur outside of the floodway and in areas zoned for development at that time, placing fill in the flood plain would result in even higher flood levels than predicted if there were changes in zoning and acceptable land uses.

As land uses change in the Truckee River watershed, both runoff volumes and velocity of flows typically increase. This is reflected in changes in the shape and size of the hydrographs of flows entering the Truckee River at places such as the North Truckee Drain, Boynton Slough, Dry Creek, Evans Creek, and Steamboat Creek. Without mitigation, these changes could affect the functioning of the Flood Project by causing higher peak flood elevations, thus reducing the effectiveness of the project and reducing the level of protection.

In 1997, approximately 120 to 150 homes were inundated above the first floors. Information prepared by participants in the Flood Project Working Group indicates that an increase in the base flood elevation of as little as two or three inches over the 1997 flood event could result in the inundation of approximately 1,800 additional homes in the Steamboat Creek area under the same flooding conditions. Other properties throughout the region would likely be subject to additional damages (Flood Project staff, personal communication).

FEMA maps were adopted for the region in 1984. Local ordinances were adopted shortly thereafter requiring the first floor of structures to be elevated either one or two feet above the FEMA base flood elevation. Structures constructed after 1984 were generally built in compliance with these ordinances and are at less risk of flooding, while structures constructed prior to 1984 are at higher risk. However, many of the current FEMA flood maps are off by 0.5 to 1 foot as demonstrated in the 1997 flood, during which some homes experienced flooding unexpectedly.

Introduction

Two key points must be recognized when planning for the management of flood events:

1. Flooding is a regional phenomenon; floodwater does not respect municipal or property boundaries.
2. Every area has a flood and storm water drainage conveyance system, whether planned or not.

Definition of Terms

In general, *storm water drainage* refers to the conveyance of flows during storm events that do not result in streams and rivers overflowing their banks or cause the design capacity of storm drain facilities to be exceeded. In contrast, *flooding* occurs when streams or rivers overflow their banks or flows exceed storm drain capacities causing floodwater to inundate nearby lands.

Much of this chapter is focused on the Truckee River Flood Project. Floodplain management services in the Truckee River basin, and in drainages not tributary to the Truckee River are the responsibility of shared by the local jurisdictions' departments that handle of public works and community development, in conjunction with storm water drainage activities. Local governments defer to the Truckee River Flood Management Authority for planning and construction of the Truckee River Flood Project. Local government storm water drainage and flood management activities outside the Truckee River watershed are covered in Section 5.7 Local Storm Water Drainage Programs and Section 5.8 Flood Control and Drainage Overview by Hydrographic Basin.

5.1 Flood Damage

Major flooding in an urban environment has many adverse consequences, including monetary damages and loss of real property. Monetary loss is the primary method of depicting flood damages and assessing the effectiveness of flood protection alternatives. Floods also have non-monetary effects, such as impacts on public health and safety, damages from toxic and hazardous waste contamination, and loss of environmental resources in the flood plain. Monetary loss can come from physical damage and also reduced economic activity due to disruption in the local economy during and after a flood event.

5.1.1 Consequences of Flooding

Following are brief descriptions of potential monetary and non-monetary consequences of flooding in the Truckee Meadows area.

Public Health and Safety

The State Demographer estimates that more than 416,000 people live in the Planning Area. The effect of flood structure failure and resultant flooding on human life depends on the magnitude of a flood, population at risk, flood warning time and evacuation routes. In addition to loss of life, major flooding could result in life-threatening injury and the spread of communicable diseases. Evacuating the flood plain in anticipation of a major flood could have its own consequences, including traffic accidents and other injuries associated with the rapid displacement of thousands of people. There was one fatality during the 1997 flood. In addition, there is the potential for loss of life and property damage associated with flooding on alluvial fans, which is not accounted for in the damage statistics listed for Truckee River flooding.

Contamination from Toxic, Hazardous, and Related Waste

Flooding may result in significant releases of toxic and hazardous substances from above-ground tanks and drums containing heating oil, fuel oil, liquid propane, and kerosene; agricultural chemicals such as herbicides, pesticides, solvents, and fertilizers; many commercial and industrial chemicals; and untreated wastewater. Widespread flooding could also result in groundwater contamination.

Flood Cleanup and Resources Consumption

Major flooding generates large quantities of flood-related debris, most of which is hauled to local landfills. Rebuilding or relocating homes, businesses, and related infrastructure requires additional natural and financial resources.

Property and Businesses

Damageable property in the Truckee Meadows flood plain consisting of commercial, industrial, residential, and public buildings was valued at approximately \$5 billion in 2004 using a GIS compilation of the 1997 flood boundary and the assessed value for parcels within the boundary. In a 2007 analysis, the NBMG used the FEMA loss estimation model, HAZUS MR2, to estimate 100-year flood risk in Washoe County. Building exposure, a measure of the economic wealth of the county, was estimated at \$25 billion and building-related economic losses were estimated at \$980 million (NBMG, 2007). In addition to property and building losses, the effects on the day-to-day business of the Reno-Sparks metropolitan area are significant. During a large flood, many businesses are forced to close, at least temporarily, both during flooding and cleanup afterward, resulting in lost revenues and wages. Additional economic impacts may affect other businesses, even if they do not flood, such as those that rely on materials or products coming from flooded businesses. People not living in flooded areas can suffer lost wages if their businesses flood or are impacted because other businesses flood.

Physical damages caused by inundation losses or flood response preparation costs are the main types of flood damages within the flood plain. Physical damages include damage to, or loss of, buildings and their contents, raw materials, goods in process, and finished products awaiting distribution. Other physical damages include damage to infrastructure such as roads,

utilities, bridges, water and wastewater treatment facilities, and flood structures and floodwalls, as well as cleanup costs. Additional costs are incurred during flood emergencies for evacuation and re-occupation, flood fighting, and disaster relief. Loss of life or impairment of health and living conditions are intangible damages that cannot be evaluated in monetary terms.

Average annual equivalent damages are the expected value of damages for a given economic condition and point in time. They are determined by weighing the estimated damages from varying degrees of flooding by their probability of occurrence. Average annual equivalent flood damages were estimated by the Army Corps of Engineers ("ACOE") at \$32 million for existing development conditions in 2004.

Types of Floods

Flood hazards in Nevada are typically underestimated because of the state's arid climate, highly variable precipitation patterns due to the mountain ranges and the valleys between them, the existence of few perennial streams, and the lowest precipitation in the country. Lack of data and a sparse stream-gauging network also contribute to underestimation of flood hazards. Different types of flood hazards in the Planning Area require different kinds of management strategies. Truckee River flooding has been of primary concern to the Reno/Sparks metropolitan area for decades, emphasized by the 1997 flood event, however flooding on Truckee River tributaries, alluvial fans and playas are also concerns.

Riverine flooding and alluvial fan flooding are common in Nevada. Riverine flooding occurs when water levels in rivers and streams rise with increasing discharge volumes over a period of hours or days. Floodwaters overtop stream banks and inundate nearby low-lying areas. In northern Nevada, riverine flooding typically occurs during the winter or spring runoff periods.

Alluvial fans are common landforms in arid areas and are found throughout Nevada. An alluvial fan is a fan-shaped deposit of sediment created where a stream flows out of mountainous or hilly terrain onto the valley floor. The stream may be perennial, intermittent or ephemeral. Alluvial fans are the cumulative result of successive flood events over hundreds or thousands of years. Alluvial fan flooding occurs when floodwaters emerge from a canyon mouth and travel downstream at very high velocities carrying significant loads of sediment and debris. This type of flooding can occur with little warning and as such would be considered a form of flash flooding.

Steep slopes and high stream flow velocities in mountainous terrain allow floodwaters to erode and transport huge amounts of sediment ranging in size from fine silt and clay to house-sized boulders. As these floodwaters exit the mountains onto an alluvial fan, they spread out and slow down causing deposition of the sediment load. This deposition sometimes plugs the active stream channel at the canyon mouth causing the stream to change course and flow down the fan in a new channel. Alluvial fan flooding is potentially more dangerous than riverine flooding because it is less predictable and the threat is not apparent; therefore it is not often considered during land development. Additionally, the influence of minor grading, roads, and structures can greatly impact and exaggerate damage from this kind of flood. The hazards associated with alluvial fan flooding are compounded by the potential for migration of floodwaters across the width of the fan. Alluvial fan flooding impacts are especially severe on fans where development has occurred without the installation of adequate mitigation measures.

Alluvial fan floods are a type of flash flood; however, flash floods can occur in other kinds of drainages, generally in response to high intensity rainfall concentrated over a relatively small

area. Heavy rain collects in a stream or gully, instantly turning the normally calm drainage way into a rushing current. Flash flood waters move rapidly downstream and can have the power to move boulders, tear out trees, and destroy buildings and bridges. Mountainous terrain, thunderstorms and development on alluvial fans are all common in the Planning Area. Flash flooding on streams and washes emerging from steep canyons is another significant flood hazard in Nevada.

Playa flooding occurs when storm waters drain into a closed, dry-lake basin causing water levels to rise. Unlike other types of floods, however, water levels don't recede immediately after the rain event. Water levels can continue to rise after a rain event due to the time it takes for runoff to reach the playa through natural channels, streets, storm sewers and infiltration and transmission as groundwater to the playa. This happens over time as water leaves the playa through infiltration into the ground and/or evaporation. Lake flooding is similar to playa flooding if the lake doesn't have an outlet. Lakes with outlets also flood if the volume of water flowing in is greater than the amount leaving the lake.

5.2 Flood History and Regional Setting

The Truckee Meadows area has a long history of floods. Melting snow, cloudbursts, and heavy rains have all caused floods in the Planning Area. Rain-caused floods, normally occurring from October through March and characterized by high peak flows and short durations, have caused the major flood problems in the area. Flood records indicate that significant damaging flood events have occurred almost every decade since the 1860s. In the 1960s, flood control works consisting of reservoirs and channel modifications, have reduced the magnitude and frequency of flooding in the area. In addition to floods on the Truckee River, a small number of damaging flash floods have occurred in recent history.

Regarding the effect of upstream dams, the ACOE used Truckee River flow records since the early 1900s and, accounting for the effects of the dams, calculated an "unregulated record of flow". Analysis on the unregulated flows produced flow rates for the various flood frequencies, including the 100-year event. The effects of the upstream dams were then added to generate "regulated flow rates" for the various flood frequencies. The 100-year event is 20,700 cfs. To show the impact of the upstream dams on the flow rates through Reno, the ACOE modeled the flood of 1997 as if the dams were not in place. With no upstream dams, except the Tahoe City dam at the Lake Tahoe outlet, the peak flow rate at the Reno gage would have been nearly 50,000 cfs rather than the estimated 23,000 cfs.

The cost of recovery from flood events is rising. Prior to the January 1997 flood event in northern Nevada, damages due to flooding on the Truckee and Carson Rivers totaled more than \$31.5 million. The damage caused by flooding on the Truckee River during the January 1997 event exceeded \$700 million if indirect damages such as lost revenue, wages, and sales taxes are included.

5.2.1 History of Flooding in the Planning Area

The Truckee Meadows area experiences major flooding caused generally by two types of precipitation events: 1) warm winter storms in which rain is widespread throughout the watershed, and 2) local convective thunderstorms that generally produce isolated sub watershed flooding in the summer months. The 100-year flood event has been based on winter rain-on-snow events. Major Truckee River flood events have been recorded in 1861-1862, 1867-1868, 1907, 1950, 1955, 1963, 1986, 1997 and 2005. Two storms in 2006 (February 12

and March 20) came close to overtopping the banks of the Truckee River, and heavy rains again in 2008 caused Truckee tributaries, including Steamboat Creek to rise significantly, but did not overtop the channel banks and cause significant flood damage.

5.2.2 The Flood of January 1, 1997

Detailed accounts of the January 1997 flood on the Truckee River have been published by the Nevada Division of Water Planning (1997) and the NBMG (1998). The following description draws from these publications and from personal communication with Flood Project staff.

December 1996 was an unusually wet month in northern Nevada. An above-average snow pack had accumulated in the Truckee River drainage basin. A warming trend ensued in late December, followed by the worst possible scenario: heavy rain on a melting snow pack. The frontal storm, which led to flooding in western Nevada, began on December 31, 1996 with rainfall in the foothills west of Reno. During the next three days rain, sleet and some snow was continuous in the Reno/Sparks area, but the overall accumulated rainfall was not extensive in the urban area (1.47 inches at the Reno Airport). In the foothills to the southwest; however, National Weather Service Doppler Radar ("Nexrad") data indicated that in two areas more than five inches of rain fell on the heavy snow pack. Three to five inches of rainfall were estimated at higher elevations. The resulting discharge in the Truckee River continued to increase and the flood stage ultimately crested in Reno at 10:15 a.m. on January 2, 1997. After the flood, the ACOE estimated that a 100-year flood event would result in flood flows of 20,700 cfs. The ACOE also determined that the 23,000 cfs peak flow at the Reno gage, estimated using high water marks in downtown Reno and HEC-RAS modeling, represents a 117-year event.

Early in the flood event, Reno bridges began accumulating debris reducing their conveyance capacity. Video footage shows construction equipment (logging tractors) on one bridge attempting to clear the debris off the upstream side of the bridge piers. Removal of the debris resulted in a decrease of one foot in the surging flood stage in the downstream Reno streets.

The Truckee River has a varying channel conveyance capacity through Reno and Sparks. Overbank flooding in the Sparks area started at discharges as low as 11,000 cfs. Channel capacity in this area is only 6,000 cfs so significant flooding occurred in the Sparks industrial area. Flooding also inundated and closed the Reno -Tahoe International Airport. Figure 5-1 shows the total area inundated relative to the FEMA 100-year flood zone. Damages recognized by the ACOE that can be used to justify federal expenditures on a flood control project were calculated to be in the range of \$450 to \$500 million. Local damage estimates, however, exceeded \$680 million in a study conducted by the Truckee River Water Management Council – a group of flood impacted business mostly caused by inundation (Truckee River Water Management Council, 1997).

Historically, the greatest flood damages in the Planning Area have resulted from Truckee River flooding. There are a number of approaches that have been considered to reduce these flood damages over the past 50 years. The flood of 1997 re-energized efforts to implement measures to reduce the impact of flooding on the community.

5.2.3 Alluvial Fan Flooding in the Planning Area

Alluvial fan and flash flooding, while not as present in the community's recent memory, have been even more catastrophic than Truckee River flooding in terms of loss of life. In 1956, Galena Creek flooding resulted in four fatalities versus one fatality due to Truckee River flooding

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Figure 5-1 1997 Flood Area Inundated Relative to the FEMA 100-Year Flood Zone

in 1997. In some cases, development is progressing on alluvial fans without the benefit of adequate upstream protective measures. This development also changes the hydrology of the developed fan area which changes how runoff leaves the developed fan area. This could change impacts downstream depending on what has been done to stabilize channels. Stabilized downstream channels designed before development may not be in the needed location after development, especially if there are directional changes in flows that were not anticipated by the development design. In general, fan development decreases infiltration into the fan and increases runoff volume and velocities downstream.

An alluvial fan flood occurred during June of 2002 in west Spanish Springs Valley when a localized thunderstorm caused a significant amount of sediment to be eroded from Hungry Ridge and deposited in the new Eagle Canyon subdivision immediately to the east. Water and sediment also caused about \$500,000 in damage to Spanish Springs High School. Sediment deposition filled detention ponds above the subdivision, decreasing the available storage for floodwater. Water flowed over the emergency spillways of the detention basins and down a channel toward the subdivision. This outflow caused severe erosion in the channels just downstream of the detention dams. When the sediment-laden floodwater met a berm along the edge of the subdivision, sediment deposition occurred again. Some storm water and sediment spilled into the subdivision where it plugged drainage culverts, storm inlets, storm sewers and streets. Water flowed into most yards in the subdivision and caused erosion of landscaping material and the deposition of sediment, which had to be cleaned from storm sewers, drainage structures and channels, streets, and many yards in the weeks after the storm.

5.2.4 Flooding from December 31, 2005 through March 2006

Truckee River flooding that occurred on December 31, 2005 and continued during two additional events through March 2006, was caused by heavy rainfall on the east side of the Carson Range divide, not by rain-on-snow events. This caused larger than normal flows in Truckee River tributaries. Increasing floodwater elevations were somewhat mitigated as rain changed to snow in the upper elevations. Even so, Steamboat Creek flows approached a 100-year event. Flood damages were significant in downtown Reno and in the east Sparks industrial area. Nine hundred businesses flooded, but at lesser depths than in 1997. Flood waters flowed from a small number of low spots along the north banks of the Truckee River and backed up behind the existing levee-like structures ("flood structures") east of McCarran Boulevard. Floodwater started to overflow the Truckee River banks at the Grand Sierra Resort campground, similar to the 1997 Flood.

In response, Reno installed concrete K-railing and kept flows in the river. This prevented floodwaters from reaching the airport. A month later the same precipitation situation re-occurred and the Emergency Operations Center ("EOC") was opened. Fortunately flows did not overtop the flood structures along the river; however, some flooding occurred at low areas adjacent to the banks. A month later the same precipitation scenario occurred a third time, although this time the amount was less and forecasts were for about a 10-year event flow. Less physical damage resulted from the third event, but there were three response instances, activity to control flooding during the event and clean up after the event. These costs are usually not reflected in flood insurance claims. Additionally, flood insurance claims don't include damage to uninsured property, contents of buildings, truck trailers or other storage areas within the flood plain.

5.3 Federal Legislation and Programs to Address Flood Issues

5.3.1 National Flood Insurance Act / Flood Disaster Protection Act

Flood protection for the Reno/Sparks metropolitan area and surrounding Washoe County is provided by two mechanisms: (1) flood plain regulations and (2) flood control projects. Both of these mechanisms are influenced by federal regulations.

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 offer subsidized flood insurance and flood disaster protection in return for participating communities' implementation of flood plain management regulations as set forth in the NFIP.

5.3.2 National Flood Insurance Program

The NFIP was established in 1968 with the passage of the National Flood Insurance Act. The purpose of the act is to encourage local communities to mitigate future flood damage by adopting and enforcing minimum flood plain management ordinances, thus making the community eligible for the program and allowing property owners to purchase federally subsidized flood insurance.

Nevada ranks first among western, non-coastal states (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming) in NFIP flood loss payments from 1978 through 2009. Over the last 30-plus years, Sparks, Reno, and Washoe County rank first, second, and third, respectively, for the total amount of NFIP flood insurance payments in Nevada. Flood loss payments to these three jurisdictions total \$27,651,343, or 74 percent of the statewide total of \$37,370,575.

The NFIP provides Flood Insurance Studies ("FIS") and Flood Insurance Rate Maps ("FIRM") prepared by FEMA for participating communities. A FIRM designates Special Flood Hazard Areas ("SFHA") within a community that is subject to a 100-year flood.

Adoption of the minimum standards for flood plain management identified in the Code of Federal Regulations ("CFR") Title 44, section 60.3, is the primary requirement for participation in the NFIP. The minimum NFIP requirements are flood plain management standards, which are generally applicable nationwide, but that do not take into account unique regional and local conditions.

Participation in the NFIP ensures the availability of federally subsidized flood insurance and flood disaster relief to property owners within the communities. As part of the program, communities are required to adopt ordinances that regulate development within the 100-year flood plain by elevating structures in the floodway fringe and preventing construction in the floodway.

Washoe County, Reno and Sparks are all participants in the NFIP. Studies in the 1970s led to the adoption of local ordinances in the early 1980s. Each jurisdiction has adopted Flood Hazard Reduction Ordinances that established guidelines and requirements for the development of property within areas determined to be subject to flood damage. The NFIP also establishes criteria for construction in Special Flood Hazard Areas.

Counties and communities that do more than the minimum required by the NFIP are eligible for participation in the Community Rating System ("CRS"), which provides credits in the form of

reduced insurance costs for property owners holding flood insurance. Washoe County is a CRS participant and, by meeting certain program requirements, has secured a 15 percent reduction in insurance premiums for un-incorporated Washoe County property owners.

Reno, Sparks and Washoe County each has its own flood plain manager and flood plain codes, however the region is mapped as one area. Separate maps and studies are not done simply because a flood plain crosses a local jurisdictional boundary. Separate tributary watersheds studies are done, but the information is reflected on the regional flood maps.

Prior to the adoption of flood hazard reduction ordinances and participation in the NFIP, development within the 100-year flood plain was not regulated to prevent flood damage. The only requirements adopted by the communities at that time were setbacks from stream banks and construction of storm drains to contain and convey away from properties storm water flows from much lower frequency events (5- to 10-year events).

Detailed scientific and engineering studies are performed by FEMA consultants or by the jurisdictions. FEMA reviews the studies to identify the flood hazard areas and limited flooding areas. These studies are used by FEMA to prepare FIRMs that are adopted and incorporated by reference into the flood hazard reduction ordinances administered by each jurisdiction.

The initial FIRMs for Washoe County were completed in 1984. Annually, the community meets with FEMA to discuss the need for new studies or restudies. When complete, the new studies or restudies are used to revise the 1984 maps. Some of the current FEMA maps have been updated as of September 1994 as a result of restudies, however others, including most of the areas along the Truckee River, have not been changed since the original mapping was done, except for a small number of maps updated in 2009⁴.

Following Hurricane Katrina in 2005 and the significant impact of flooding in the New Orleans region, FEMA accelerated its program to update and digitize the existing FIRMS nationwide. The countywide FIRM's for Washoe County were updated on March 16, 2008, but these updates reflect few substantive revisions based on a limited amount of improved data or analysis. The 2008 update was primarily focused on the transition to digital mapping as well as updates to reflect changes in the status of levees and levee-like structures. Although the conversion to digital maps did not substantially change the data, it did highlight areas of incongruity and conflicts. FEMA has been revising the maps for these areas to more accurately portray flood risk. This process has resulted in more homes and businesses in the Truckee Meadows that are located in the 100-year flood plain than were previously identified using non-digital maps, and corresponding flood insurance premium increases.

The Public Works Departments of Reno and Sparks, and the Community Development Department of Washoe County, maintain on file the current FIRMs.

5.3.3 Federal Emergency Management Agency

FEMA – Project Impact

Project Impact is FEMA's program for developing disaster resistant communities. This program was initiated in 1998 and the City of Sparks was named as the first Project Impact Community in Nevada. Project Impact was developed to help communities take responsibility for mitigating the impact of disasters of all types.

Several federal agencies have programs that support flood plain management at the state level by providing funding and technical assistance, and facilitating coordination with local communities. FEMA provides technical assistance on flood plain management issues and oversees the NFIP. In addition, FEMA offers flood mitigation programs and technical assistance in updating the State Hazard Mitigation Plan, and funds mitigation projects through grants such as the Hazard Mitigation Grant Program and the Flood Mitigation Assistance Program.

5.3.4 US Army Corps of Engineers

The ACOE offers both emergency and long-term services for pre- and post-disaster mitigation and response. The agency performs general investigation studies for flood control, and provides flood plain management planning services, in addition to its role in design and construction of flood retention structures. The ACOE recently introduced a Flood Hazard Mitigation and Riverine Restoration program, entitled Challenge 21, intended to focus on non-structural solutions to restore river channels that were modified for flood control. Two programs in which this region has participated are briefly described below.

General Investigation Program

One of the most common ways the ACOE helps communities solve water resource problems is through individually authorized studies and projects. These studies are undertaken in response to a Congressional Resolution from the House Committee on Public Works and Transportation, the Senate Committee on the Environment and Public Works, or a Public Law. In the General Investigation program, the ACOE jointly conducts a study with a non-federal sponsor and, if shown by the study to be feasible, moves forward with the project. This approach requires that Congress provide the ACOE with authority and funds to first accomplish a feasibility study and secondly, to construct the project. Local sponsors share the study and construction costs with the ACOE, and usually pay for all operation and maintenance costs. The program may be used to address any one of a variety of water resource problems, including navigation, flood damage reduction, and ecosystem restoration. The major stages of a project are:

- Reconnaissance Phase
- Feasibility Phase
- Pre-construction Engineering & Design (“PED”)
- Construction
- Operations/Maintenance, repair replacement and rehabilitation

Section 595 Rural Program

Section 595 of the Water Resources Development Act (“WRDA”) of 1999, as amended, authorizes the ACOE to provide design and construction assistance to non-federal interests in rural Nevada, Idaho and Montana for water-related environmental infrastructure and resources protection and development projects. Design and construction assistance may be provided only for projects that are owned by public entities. Section 595 refers specifically to, among other Nevada Counties, “the portions of Washoe County, Nevada, that are located outside the Cities of Reno and Sparks”, and authorizes \$25 million for rural Nevada.

5.3.5 Natural Resources Conservation Service

The US Department of Agriculture, Natural Resources Conservation Service (“NRCS”) provides services related to measuring and reducing flood hazards and emergency response following a flood event. The agency conducts flood plain management studies in which ecological resources are cataloged and opportunities for restoring and preserving flood plains are identified. Under the Emergency Watershed Protection program, NRCS provides technical and financial assistance when a natural disaster causes damage in a watershed. Emergency response actions are related to assessing damages and identifying actions.

5.4 State Legislation

Senate Bill (“SB”) 218, the Disaster Relief Bill, was passed during the 1997 Legislative session. Nevada Revised Statutes (“NRS”) 353.2735, the resulting statute, established a state disaster relief account of \$4 million to help communities recover from damages sustained in the event of a disaster. The fund is administered by the Interim Finance Committee, and has been used to provide financial relief following river and flash flooding events in communities throughout the state.

SB 175, approved during the 2009 Legislative session, authorizes Washoe County to acquire and maintain a flood management project in the same manner as any other project authorized under existing law, and provides similar provisions for a municipality within the County. The bill also provides for the creation of a flood management authority by cooperative agreement and authorizes the issuance of bonds similar to the authority of other municipalities.

Assembly Bill 54, also approved during the 2009 session, authorizes the implementation of a flood-proofing and home elevation program in Washoe County including the ability to authorize grants and loans from flood project funds.

5.5 History of Truckee River Flood Control Efforts

Federal flood control projects are generally proposed and constructed under Congressional authority and assigned for implementation to various federal agencies. The NRCS, under the authority of the Watershed Protection and Flood Prevention Act, designed and constructed four flood detention facilities in Northwest Reno. The City of Reno’s responsibility was to provide lands, easements, right-of-way, and operation and maintenance of the facilities.

The US Department of the Interior, Bureau of Reclamation (under authorization of the Truckee River Storage Project Act and the Washoe Project Act) completed construction of Boca Reservoir in 1938, Prosser Creek Reservoir in 1963, and Stampede Reservoir in 1969. The ACOE, under authorization of the Flood Control Act of 1954, improved the bankfull capacity of the Truckee River channel to 7,000 cfs from the Glendale Bridge to Vista, including removal of the Vista Reefs and obstructions downstream from the Truckee Meadows to Pyramid Lake. Unfortunately this work, completed in 1963, resulted in flooding, bank erosion, and loss of fisheries and wildlife habitat downstream of Vista.

Under the Flood Control Act of 1962, the ACOE designed and constructed the Martis Creek Reservoir. This reservoir was completed in 1972 along with Truckee River channel improvements through Reno to improve the capacities to 14,000 cfs. Reno, Sparks, Washoe County, and the Carson-Truckee Water Conservancy District (“CTWCD”) are responsible for maintaining these 1972 channel capacities and the river gages that monitor the flood flows. The

CTWCD is responsible for the Truckee River from the state line to the Glendale Bridge in Reno. From the Glendale Bridge to the highway bridge in Wadsworth, the river is maintained by the State of Nevada. The Pyramid Lake Paiute Tribe (“PLPT”) is responsible for the Truckee River between Wadsworth and Pyramid Lake.

In 1971, the ACOE completed a flood control management plan for the Truckee River reservoirs. Stampede, Boca, Prosser Creek, and Martis Creek Reservoirs have 65,000 acre feet (“af”) of flood control space reserved from November to April each year. The operation of the reservoirs for flood control is to be coordinated to limit the flow in the Truckee River at Reno to a maximum of 6,000 cfs. The ACOE estimates that the flood control facilities mentioned above have reduced the 100-year flood flows through Reno from approximately 48,000 cfs to about 23,000 cfs, which still exceeds the Reno channel capacity of 14,000 cfs and the Sparks channel capacity of 7,000 cfs.

In July 1977, the ACOE, at the request of Reno, Sparks, and Washoe County, resumed investigation of alternatives for providing flood protection from the Truckee River through the Truckee Meadows. This investigation resulted in an adopted plan in 1985 consisting of channel improvements, levees, and detention facilities. This plan received Congressional authorization in 1988 and design proceeded.

An economic re-evaluation office report on the project completed in 1991 indicated that the project had an un-fundable benefit to cost ratio. This was due mainly to changes in the WRDA of 1986, which required the market value of public land already acquired to be included in the benefit-cost ratio even though project funds would not be required to purchase the land. As a result of that report the project was re-classified to a deferred status. In 1996, Washoe County asked the ACOE to activate the project and conduct a re-evaluation, which the ACOE initiated in fiscal year 1996-97. The ACOE completed a Reconnaissance Report in March 1998 and started work on a General Reevaluation Report, which is presently ongoing.

5.6 Truckee River Flood Management Project

The Truckee River Flood Management Project (“Flood Project”) represents a long-standing collaborative effort by Washoe County, City of Reno, City of Sparks, the U.S. Army Corps of Engineers (“ACOE”), and numerous other stakeholders to reduce the devastating impacts of flooding in the Truckee Meadows.

~~In April 2000, Reno, Sparks and Washoe County created a community-based group known as the Community Coalition for Truckee River Flood Management. Diverse members of the community came together to develop flood management alternatives for Reno, Sparks and neighboring residents on the Truckee River. In 2003, the Coalition reached consensus on a locally preferred flood plan (“LPP”) and submitted it to the ACOE. In March 2006 the Flood Project Coordinating Committee adopted the LPP with additional details on downstream restoration and flood reduction elements. The LPP, also known as the Living River Plan, includes a variety of flood protection measures described below. The Living River Plan was presented to the ACOE with the intent that it will ultimately be authorized and funded by Congress. The ACOE is currently evaluating the LPP and is also re-evaluating an alternative plan called the National Economic Development (“NED”) plan.~~

5.6.1 Flood Project Oversight Goals

Implementation of the Flood Project is currently overseen by the Truckee River Flood Management Authority (“TRFMA”), a joint powers authority created in 2011 by an Interlocal Cooperative Agreement executed among Washoe County, the City of Reno, and the City of Sparks. Nevada Senate Bill 175, approved in June 2009, served as the basis for the new flood authority (refer to Chapter 477 of the Nevada Revised Statutes for more information).

The agency’s primary mission is to plan, design, build, operate and maintain infrastructure to reduce flood damages, safeguard public health, and create a more resilient community. TRFMA serves as the official Local (Non-Federal) Sponsor working with the ACOE to evaluate flood risk management alternatives and secure federal funding (via Congressional authorization and appropriations) to construct the Flood Project. In coordination with various federal agencies and local emergency managers, TRFMA also operates and maintains a network of stream gages that monitor river stage as part of a regional Flood Warning System (see Section 5.6.6 for more information).

The policies, business, and affairs of TRFMA are conducted and governed by a six-member Board of Directors consisting of two elected officials appointed by each of the TRFMA members. Each Director has one vote; actions of the board are decided by unanimous consent of the Directors present at the meeting.

The TRFMA Technical Advisory Committee (“TAC”) is a nine-member public body consisting of appointees from Washoe County, the City of Reno, the City of Sparks, Storey County, the Pyramid Lake Paiute Tribe, and the Nevada Division of Environmental Protection. The TAC reviews and advises the Board on matters relating to the design, implementation, construction, ownership, operation, monitoring, and maintenance of capital projects included in the Flood Project; as well as proposed legislation, plans, planning recommendations, regulations, and policy statements to be made by the Board.

The TRFMA Working Group represents a diversity of public stakeholders, including businesses, homeowners, environmental groups, technical experts, activists and interested citizens. Membership in the Working Group is open to the community at large. The Working Group provides a public forum for exchanging ideas and sharing information on the Flood Project. Concerns and issues raised by this community coalition are forwarded to TRFMA staff for consideration by the TRFMA Board of Directors.

An Executive Director and Legal Counsel serve the TRFMA Board of Directors. The Executive Director oversees a small staff to carry out technical, financial, and administrative operations and board directives to move the Flood Project forward. The Flood Project has three primary goals:

- 1) Reduce flood damages and deaths from a 1997-type flood (117-year event);
- 2) Restore 50 miles of the Truckee River between Reno and Pyramid Lake, and
- 3) Provide enhanced recreational opportunities and open space in the region.

5.6.2 Flood Project GoalsPartners

The Flood Project is designed to provide a variety of public safety, economic, recreational and environmental benefits to the Truckee Meadows region. Its primary goal is to create a more resilient community by reducing flood damages and deaths resulting from a 1997-type flood event (117-year event). Additionally, the Flood Project incorporates certain recreational and ecosystem restoration features within the footprint of the flood protection infrastructure.

TRFMA hopes to achieve these goals by:

- building levees and floodwalls to protect businesses and homes;
- acquiring and protecting flood-prone lands from development;
- relocating businesses and elevating homes out of the floodplain;
- replacing bridges to increase river channel capacity;
- excavating floodplain terraces to improve floodwater storage;
- restoring ecosystem functions and creating habitat for native species; and
- enhancing recreational access and amenities along the river.

The flood project is sponsored by a consortium of local partners, including the City of Reno, the City of Sparks, the Community Coalition, Washoe County, Storey County, the Reno-Tahoe Airport Authority, PLPT, Reno-Sparks Indian Colony, and The Nature Conservancy. Washoe County is the managing partner, collecting the 1/8-cent sales tax authorized in 1999 to help fund the project, selling the bonds, holding title to the lands, and supporting the staff. The State of Nevada has become an important partner, contributing significant funding starting in 2005. State agencies involved in the project include the Department of Conservation and Natural Resources, Department of Wildlife, Division of Environmental Protection, Division of State Lands, and Division of Emergency Management. The Flood Project is being designed and built in cooperation with the ACOE. Other federal funding partners include the US Fish & Wildlife Service, US Bureau of Land Management ("BLM"), US Bureau of Reclamation ("BOR") and FEMA.

Flood Project Coordinating Committee

The Flood Project is overseen by the 23-member Flood Project Coordinating Committee ("FPCC"). The FPCC meets monthly to provide overarching policy direction to the project staff and approve expenditures of funds. The FPCC was created through a Cooperative Agreement among Reno, Sparks, Washoe County, and the University of Nevada, Reno ("UNR") in 2005. Eight voting members represent those four primary partner organizations. The 15 nonvoting members are composed of managerial, technical and financial staff representing the primary partners, along with representatives of Storey County, the PLPT, the Community Coalition, the Working Group and the Reno-Tahoe Airport Authority.

5.6.3 Flood Project ElementsCost and Funding

The current Flood Project plan (also known as the Local Rate Plan) represents many years of planning and stakeholder coordination. It is based on the "Living River Plan," originally conceived by the Flood Project Community Coalition. Over a period of six years, the agency now known as TRFMA organized hundreds of meetings with

community stakeholders in order to develop and build consensus for a regional flood management plan.

The Living River Plan emphasized the community's vision of incorporating environmentally-friendly elements into the flood protection infrastructure in order to reconnect the river to its floodplain, restore habitat for native species, and enhance recreational opportunities along the river. The current Flood Project plan retains some of the elements from the original Living River Plan and incorporates results from TRFMA's updated hydraulic models.

The proposed Flood Project footprint extends approximately 33 miles along the Truckee River, from downtown Reno (near Jones Street) to the town of Wadsworth, Nevada (near Pyramid Lake). Major elements of the Flood Project Plan (Local Rate Plan) are described below in **Table 5-X**, grouped according to project reach (upstream to downstream). The three project reaches are: Downtown Reno (Jones Street to US Highway 395/I-580); Truckee Meadows (US Highway 395/I-580 to Vista Boulevard); and Lower Truckee River (Vista Boulevard to Wadsworth).

Table 5-X. Description of Flood Project Plan (Local Rate Plan) Elements

<u>Element</u>	<u>Element Description</u>
<p><u>DOWNTOWN RENO REACH (DR)</u></p> <p><u>Proposed flood protection infrastructure elements in the Downtown Reno Reach are designed, at a minimum, to pass the 100-year flood flow (20,700 cubic feet per second). No additional freeboard is included except in the case of bridge replacements (designs assume 2-foot freeboard). Where feasible, the Flood Project incorporates certain recreational and ecosystem restoration features within the footprint of the flood protection infrastructure. Elements in this reach are not included as part of the Truckee Meadows Flood Control Project authorized by Congress (Section 7002(2) of the Water Resources Reform and Development Act of 2014); and therefore are not eligible to receive federal funding from the ACOE.</u></p>	
<u>DR-1</u>	<u>Jones Street to Arlington Avenue Floodwall Construction:</u> <u>Construct a floodwall along the north bank of the Truckee River (Riverside Drive) from Booth Street to Arlington Avenue; partially bury it with an earthen berm to minimize visual impact to existing landscape. Floodwall height should be equal to the 100-year water surface elevation (no freeboard).</u>
<u>DR-2</u>	<u>Jones Street to Arlington Avenue Floodwall Drainage:</u> <u>Per recommendations from the Final Geotechnical Report (W91238-10-D-003, released by ACOE Sacramento District on December 6, 2011); construct a drainage trench along portions of the new floodwalls.</u>
<u>DR-3</u>	<u>Jones Street and Keystone Avenue Intersection Improvements:</u> <u>Replace existing 4-way stop sign controlled intersection with a signalized intersection at same location.</u>

<u>Element</u>	<u>Element Description</u>
<u>DR-4</u>	<u>Booth Street Bridge Removal: Remove existing Booth Street Bridge and construct new pedestrian/bicycle bridge at same location.</u>
<u>DR-5</u>	<u>Pumping Station: Install a stormwater pumping station along Riverside Drive.</u>
<u>DR-6</u>	<u>Pedestrian Safety Closure Structures: Install pedestrian gates along floodwall to maintain pedestrian access under normal conditions. For public safety, gates would be closed during flood events. Utilize a product such as FloodBreak Automatic Floodgates or Federal Emergency Management Agency (FEMA) approved equivalent.</u>
<u>DR-7</u>	<u>Pedestrian Bridge Improvements (Arlington Avenue): Raise existing pedestrian bridges (two total); one located upstream and another downstream of Arlington Avenue.</u>
<u>DR-8</u>	<u>Floodproofing: Implement a combination of structural and non-structural measures to reduce/eliminate flood damage to various existing downtown Reno buildings.</u>
<u>DR-9</u>	<u>Arlington Avenue Bridge Protection: Install bridge abutment and pier scour protection measures at Arlington Avenue Bridge.</u>
<u>DR-10</u>	<u>Arlington Avenue to Lake Street Floodwall Replacement: Replace existing old, inadequate floodwalls located on both (north and south) banks of the Truckee River from Arlington Avenue to Lake Street.</u>
<u>DR-11</u>	<u>Sierra Street Bridge Replacement: Remove existing bridge located at Sierra Street and, at the same location, construct a new, hydraulically efficient bridge capable of passing the 100-year flood flow (2' freeboard).</u>
<u>DR-12</u>	<u>Virginia Street Bridge Replacement: Remove existing bridge located at Virginia Street and at the same location, construct a new, hydraulically efficient bridge capable of passing the 100-year flood flow (2' freeboard). <u>PROJECT COMPLETE</u></u>
<u>DR-13</u>	<u>Center Street Bridge Replacement: Remove existing bridge located at Center Street and at the same location, construct a new, hydraulically efficient bridge capable of passing the 100-year flood flow (2' freeboard).</u>
<u>DR-14</u>	<u>Lake Street Bridge Replacement: Remove existing bridge located at Lake Street and at the same location, construct a new, hydraulically efficient bridge capable of passing the 100-year flood flow (2' freeboard).</u>

<u>Element</u>	<u>Element Description</u>
<u>DR-15</u>	<u>Wells Avenue Pedestrian Bridge Improvements: Remove existing pedestrian bridge located at Wells Avenue and construct new pedestrian bridge just upstream of Wells Avenue.</u>
<u>DR-16</u>	<u>Wells Avenue Bank Stabilization and Bridge Protection: Stabilize stream banks/slopes around the Wells Avenue Bridge. Install bridge pier scour protection measures at Wells Avenue Bridge.</u>
<p><u>TRUCKEE MEADOWS REACH (TM)</u></p> <p><u>Proposed flood protection infrastructure elements in the Truckee Meadows Reach are designed in accordance with FEMA mapping standards. Where feasible, the Flood Project incorporates certain recreational and ecosystem restoration features within the footprint of the flood protection infrastructure. Elements in this reach (including certain recreational features) have been included as part of the Truckee Meadows Flood Control Project authorized by Congress (Section 7002(2) of the Water Resources Reform and Development Act of 2014); and therefore are eligible to receive federal funding from the ACOE.</u></p>	
<u>TM-1</u>	<u>Reno-Sparks Indian Colony Levee and Floodwall Construction: Construct a levee and floodwall system (approximately 2,300 feet) at the Reno-Sparks Indian Colony property located along the south bank of the Truckee River, from US Highway 395/I-580 to Glendale Avenue. PROJECT COMPLETE</u>
<u>TM-2</u>	<u>Grand Sierra Resort Floodwall Construction: Construct a floodwall on the south bank of the Truckee River from Glendale Avenue to Greg Street (approximately 6' high and 3,000 feet in length). Utilize drainage blankets for seepage mitigation.</u>
<u>TM-3</u>	<u>Glendale Avenue to Greg Street Levee Replacement: Replace existing levee located on the north bank of the Truckee River from Glendale Avenue to Greg Street with an on-bank floodwall at same location. Utilize drainage blankets for seepage mitigation.</u>
<u>TM-4</u>	<u>Greg Street to Rock Boulevard Levee Construction: Construct set-back levee on the south bank of the Truckee River from Greg Street to Rock Boulevard.</u>
<u>TM-5</u>	<u>Greg Street to Rock Boulevard Terracing: Excavate terrace on the south bank of the Truckee River from Greg Street to Rock Boulevard in order to increase flood flow channel capacity and reconnect river to its floodplain. Establish native riparian vegetation on terrace surface. <i>Note: Overall extent (width) of terracing has been reduced from previous Flood Project designs in order to reduce excavation costs and minimize impacts to Pioneer Ditch.</i></u>

<u>Element</u>	<u>Element Description</u>
<u>TM-6</u>	<u>Rock Boulevard Bridge Protection: If necessary, install bridge abutment and pier scour protection measures at Rock Boulevard Bridge. <i>Note: No bridge modifications are planned here as part of the Flood Project; levees/floodwalls and terracing elements should confine flood flows to existing bridge opening.</i></u>
<u>TM-7</u>	<u>Rock Boulevard to McCarran Boulevard Levee Construction (South Bank): Construct set-back levee on the south bank of the Truckee River from Rock Boulevard to McCarran Boulevard. Property located on the “dry” side of the levee (between the levee and Mill Street) may be used as a disposal site for excess fill; this property has been reserved for future recreational use (possibly including flat fields, trails, picnic areas, and other amenities). <i>Note: As part of this revised design, the levee alignment has been moved closer to the river channel in order to reduce construction costs. In this section of the Flood Project, Pioneer Ditch will be enclosed via piping to facilitate use of a portion of the property as a fill disposal site/recreation area.</i></u>
<u>TM-8</u>	<u>Rock Boulevard to McCarran Boulevard Terracing: Excavate terraces on the south bank (and a small portion of the north bank) of the Truckee River from Rock Boulevard to McCarran Boulevard in order to increase flood flow channel capacity and reconnect river to its floodplain. Establish native riparian vegetation on terrace surfaces. <i>Note: Overall extent (width) of terracing has been reduced from previous Flood Project designs in order to reduce excavation costs and minimize impacts to Pioneer Ditch.</i></u>
<u>TM-9</u>	<u>Rock Boulevard to McCarran Boulevard Levee and Floodwall Construction (North Bank): Replace existing levee on the north bank of the Truckee River from Rock Boulevard to McCarran Boulevard with a system of levees and on-bank floodwalls to minimize impacts to adjacent properties and the railroad. Fill localized low-lying areas on the “dry” side of the levees/floodwalls.</u>
<u>TM-10</u>	<u>Pumping Station: Install a stormwater pumping station on the north side of the Truckee River near East McCarran Bridge.</u>
<u>TM-11</u>	<u>East McCarran Bridge Protection: If necessary, install bridge abutment and pier scour protection measures at East McCarran Boulevard Bridge. <i>Note: No bridge modifications are planned here as part of the Flood Project; levees/floodwalls and terracing elements should confine flood flows to existing bridge opening.</i></u>

<u>Element</u>	<u>Element Description</u>
<u>TM-12</u>	<u>UNR Main Station Farm Facilities Protection: Implement a combination of structural and non-structural measures to reduce/eliminate flood damage to selected existing buildings located at the University of Nevada, Reno Agricultural Experiment Station (UNR Main Station Farm). Elevate existing pads under hay storage barns to keep hay dry (above flood waters). <i>Note: Existing main building (meat processing facility) is located above 100-year flood level; no additional protection measures for this building are proposed as part of the Flood Project.</i></u>
<u>TM-13</u>	<u>McCarran Boulevard to Vista Boulevard Levee and Floodwall Construction: Replace existing levee on the north bank of the Truckee River from McCarran Boulevard to Vista Boulevard with a system of levees and on-bank floodwalls to minimize impacts to adjacent properties. Construct an on-bank floodwall in the Larkin Circle vicinity to avoid impacts to the roadway.</u>
<u>TM-14</u>	<u>Steamboat Creek Terracing: Excavate small terrace on along Steamboat Creek in order to increase flood flow channel capacity and maintain existing water surface elevations. Establish native riparian vegetation on terrace surface.</u>
<u>TM-15</u>	<u>North Truckee Drain Relocation: Relocate the existing North Truckee Drain (mostly via buried concrete box culverts) to move its confluence with the Truckee River to a location downstream of the Steamboat Creek confluence. When completed, storm water will be delivered east of Vista Boulevard, thereby reducing flooding in the Sparks Industrial area. PROJECT PHASE 1 and 2 COMPLETE; FINAL PHASE 3 FINANCING IN PROGRESS</u>
<u>TM-16</u>	<u>Vista Narrows Terracing: Excavate terraces on the south bank (and a small portion of the north bank) of the Truckee River from Steamboat Creek to the second railroad bridge over the Truckee River (downstream of the Vista Narrows) in order to increase flood flow channel capacity and reconnect river to its floodplain. Establish native riparian vegetation on terrace surfaces. <i>Note: Terraces would be excavated to an elevation above the existing low flow river channel to avoid environmental impacts to the river channel (e.g., channel incision).</i></u>
<u>TM-17</u>	<u>Hidden Valley Voluntary Home Elevation Program: Establish and manage a program to provide financial assistance to eligible homeowners in Hidden Valley wishing to raise their homes to the 100-year flood elevation (minimum). <i>Note: This Flood Project element is not eligible to receive federal funding from the US Army Corps of Engineers.</i> PROGRAM INITIATED</u>

<u>Element</u>	<u>Element Description</u>
<u>TM-18</u>	<u>Eastside Subdivision and Rosewood Lakes Voluntary Home Elevation Program: Establish and manage a program to provide financial assistance to eligible homeowners in the Eastside Subdivision and Rosewood Lakes area wishing to raise their homes to the 100-year flood elevation (minimum). <i>Note: This Flood Project element is not eligible to receive federal funding from the US Army Corps of Engineers.</i> PROGRAM INITIATED</u>
<u>TM-19</u>	<u>Mandatory Home Elevation Program: <i>Only if necessary; requires additional analysis.</i></u>
<p><u>LOWER TRUCKEE RIVER REACH (LT)</u></p> <p><u>It is likely that construction of the Flood Project will significantly impact the environment and therefore require mitigation. Ecosystem restoration serves multiple purposes and may be used to satisfy at least a portion of required mitigation measures (e.g., related to hydraulic and habitat impacts).</u></p> <p><u>Ecosystem Restoration Goals:</u></p> <ul style="list-style-type: none"> <u>• Attenuate flood waters — help mitigate the effects of increased peak flows due to upstream flood control measures</u> <u>• Restore the structure and function of the river ecosystem</u> <u>• Establish habitat for native wildlife species (including federally-listed threatened and endangered fish species)</u> <u>• Reduce existing infestations and control the spread of invasive weeds</u> <u>• Improve water quality</u> <u>• Enhance recreational access and amenities along the river</u> 	
<u>LT-1</u>	<u>Lockwood Ecosystem Restoration and Recreational Trailhead: Restore approximately 0.6 miles of river channel; create approximately 37 acres of native habitat. Construct a recreational trailhead and improve recreational access along the Truckee River. PROJECT COMPLETE</u>
<u>LT-2</u>	<u>Rainbow Bend Mitigation: Explore various structural/non-structural measures that may be required to mitigate potential downstream hydraulic impacts caused by construction of the Flood Project. Measures may include establishment of a non-voluntary home elevation program. <i>Note: Additional analysis required.</i></u>
<u>LT-3</u>	<u>Lower Mustang Ranch Ecosystem Restoration: Restore approximately 2.5 miles of river channel; create approximately 187 acres of native habitat. PROJECT COMPLETE</u>

<u>Element</u>	<u>Element Description</u>
<u>LT-4</u>	<u>Tracy Power Plant Ecosystem Restoration: Restore approximately 2.5 miles of river channel; create approximately 115 acres of native habitat. PROJECT COMPLETE</u>
<u>LT-5</u>	<u>102 Ranch Ecosystem Restoration: Restore approximately 2.0 miles of river channel; create approximately 114 acres of native habitat. PROJECT COMPLETE</u>
<u>LT-6</u>	<u>Wadsworth Mitigation: Explore various structural/non-structural measures that may be required to mitigate potential downstream hydraulic impacts caused by construction of the Flood Project. Measures may include establishment of a mandatory home elevation program. Note: Additional analysis required.</u>

At an estimated cost of \$1.2 billion to \$1.6 billion, the Flood Project is the largest public works project ever undertaken in northern Nevada, combining ecosystem restoration, recreation and flood control together in one visionary, integrated effort. The ACOE is expected to contribute more than half of the project cost. The Flood Project is seeking funding in the President's Budget to complete the General Re-evaluation Report ("GRR") and the Environmental Impact Statement ("EIS"), and initiate design work for the project in FY 2011.

Although the Flood Project is currently funded by a 1/8-cent sales tax, additional funds will be required to meet the local sponsor's required funding contribution. It is expected that one or more "Flood Funding Areas" will be established over time to meet the funding need.

A Flood Funding Study is underway to address the need for additional revenues to meet the local sponsor's required funding contribution. Alternatives developed as part of the study were presented to the Reno and Sparks City Councils and the Washoe County Board of Commissioners and each elected body agreed with a recommendation to have the Flood Project staff focus on the development of a Joint Powers Authority or a Regional Flood Control District. The 2009 Nevada Legislature amended state statutes to enable the implementation of the selected governance model.

Local sponsors are also discussing which of the proposed flood project elements could be built with local funds only and what level of protection that would provide.

5.6.4 Flood Project Cost and Funding Project Timing

TRFMA is committed to building a cost-effective flood project to benefit the community. In response to local concerns regarding the overall cost and scope of the Living River Plan (which was estimated to cost \$1.6 billion), TRFMA worked with its consultants and numerous stakeholders to revise the plan, significantly reducing the cost while still providing a 100-year level of flood protection for the Truckee Meadows (thereby maintaining compliance with the National Flood Insurance Program).

Through a series of meetings in 2012 and 2013—including an in-depth “value engineering” exercise, the overall cost was reduced to just \$446 million. This represents roughly 72% in cost savings to the communities of Reno, Sparks and Washoe County. The Flood Project and TRFMA are currently funded by a 1/8-cent infrastructure sales tax authorized by NRS Chapter 377B (Tax for Infrastructure) and imposed by Washoe County in December 1998 under Ordinance 1048 (Washoe County Code 20.914). The initial Infrastructure Tax Plan was adopted by the Washoe County Commission in 1998 for the financing of a regional emergency dispatch facility, a public safety training facility, and the Flood Project.

The TRFMA members (Washoe County, City of Reno, and City of Sparks) have determined that the Flood Project provides significant benefits to the community by:

- preventing the loss of life and property;
- avoiding adverse economic impacts due to the disruption of commerce, transportation, communication and other essential services;
- safeguarding the public health;
- improving water quality; and
- providing opportunities to create habitat for native species and enhance recreational access and amenities along the Truckee River.

Additional funds are required to construct the Flood Project (total cost of approximately \$466 million). Presently, TRMFA is exploring a variety of funding options to raise additional revenues, including (but not limited to):

- fees collected from property owners (commercial and residential) who directly benefit from decreased flood risk as a result of Flood Project implementation;
- taxes (e.g., sales taxes, property taxes, excise taxes) collected in Washoe County to support the Flood Project, which has regional significance; and
- flood impact fees for new development in order to mitigate related impacts on Flood Project facilities.

Ecosystem Restoration

TRFMA has partnered with The Nature Conservancy and numerous other local, state, and federal agencies and non-profit organizations to restore the lower Truckee River ecosystem (from Vista to Pyramid Lake). To date, the partners have invested more than \$28 million to create more than 450 acres of habitat and restore more than 8 miles of the lower Truckee River. An estimated 216 jobs were created as a result of this work (full-time equivalents).

The agency has contributed about \$2.1 million in sales tax funds for land acquisition, planning, and construction—less than 8% of the overall cost of restoration project implementation. In addition, TRFMA contributed \$4.775 million in grant funds to implement ecosystem restoration projects via Assembly Bill No. 5 (AB-5), passed by the Nevada State Legislature in 2007.

This relatively small investment may result in significant returns for TRFMA. The ecosystem restoration work could potentially satisfy a portion of the environmental mitigation required to obtain permits and construct the Flood Project.

The flood project is currently in feasibility design to determine the NED plan, expected to be completed in December 2010. The draft EIS will be available for public review in April 2012. Authorization by Congress is anticipated in the fall of 2012 with a possible construction start by the ACOE in 2013. Local construction of the project began in August 2008 using local or non-ACOE funding.

5.6.5 Plan Alternatives

Two alternate versions of the Flood Project are being designed by the project team, the NED Plan and the LPP. The LPP is also known as the Living River Plan, the plan supported by the community. The project elements of the two plans are very similar, although each provides a slightly different level of flood protection.

Living River Plan

The following objectives have provided guidance for the development of the Living River Plan:

- Achieve flood damage protection from at least a 100-year flood event on the Truckee River.
- To the extent possible, the final design of the Flood Project should enhance and work with the river's dynamic natural functions as reflected in the living river approach developed by the Community Coalition.
- Minimize floodwalls and flood structures where possible. Set floodwalls and flood structures back from the river to protect access and visibility.
- Evaluate redesign of all irrigation ditch intakes and diversion structures to reduce floodwall heights and minimize localized flooding. Where possible enhance and restore the river's natural ecosystem.
- Where possible enhance recreational opportunities and support the economic vitality of the region.
- Develop a flood protection management plan to ensure that the flood project is not rendered obsolete in the future, or have land use changes lower the level of protection.
- Regarding the UNR Main Station Farm ("the Farm") (in implementing the Flood Project) work with UNR to:
 - Maintain UNR's maximum use of the land at the Farm to implement its agricultural mission
 - Protect the regional investment in the reclaimed water system at the Farm to maintain and enhance Truckee River water quality improvements. UNR budget cuts in 2010 have prompted discussion concerning the fate of the Farm. Reduced operations are expected as UNR evaluates the incorporation of agricultural programs into other UNR colleges and how the Farm will serve future programs. Plans for the Southeast Connector and Mill Street extension also create demands for UNR Farm land. The FPCC has discussed how to balance the land requirement of the Flood Project with the needs of UNR, and how UNR should be represented on the Flood Project governing body in the future.

- ~~The design for the downtown Reno features shall maintain and enhance the Truckee River as an aesthetic attribute to downtown Reno and the community. The design shall maintain public access to the river.~~

~~The following sections describe the project elements of the Living River Plan that have been approved by the FPCC as of October 2009. Project elements are described briefly and locations are shown on one of four maps (Figures 5-2 through 5-5). For more complete descriptions, go to the Flood Project website: www.truckeeflood.us.~~

~~The Living River Plan was initially approved by the FPCC in 2006. The plan in previous forms was also approved by resolution of the three entities two times between 2000 and 2005. Since that time, the FPCC has approved plan amendments to increase flood protection in the Truckee Meadows from a 100-year event to a 117-year event, replace (instead of rehabilitate) the bridges at Virginia Street and Center Street, include fish passage, flood plain acquisition, non-structural project elements, such as floodproofing, home elevation, buyout, financial assistance and model development, and to include bank stabilization and bridge improvements.~~

~~Some Flood Project elements are still under development, including interior drainage (moving water from behind flood structures and floodwalls), and the open space and recreation plan. It is expected that some or all of these elements will be added into the Living River Plan over time. Project elements will also continue to be updated and improved as more technical information is obtained.~~

~~5.6.6 Structural Elements~~

~~Downtown Reno Reach~~

- ~~1. New Floodwalls: Flood structures or floodwalls along the north bank of the Truckee River from upstream of Booth Street to Arlington Street, as space permits;~~
- ~~2. Replace Floodwalls: Replacement of the old and inadequate floodwalls from Arlington Street to Lake Street;~~
- ~~3. Virginia Street Bridge: Replace Virginia Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood;~~
- ~~4. Sierra Street Bridge: Replace Sierra Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood;~~
- ~~5. Center Street Bridge: Replace Center Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood;~~
- ~~6. Lake Street Bridge: Replace Lake Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood;~~
- ~~7. On-Bank Floodwalls: Construction of "on-bank" floodwalls set back from the channel banks to fit existing conditions and features to contain flood flows in areas where replacing the existing floodwall is not feasible;~~
- ~~8. Temporary closure structures at bridges to prevent floodwater from leaving the river channel and flowing down the streets;~~

- ~~9. Flood structures and floodwalls, as needed, to contain flood flows from Lake Street to US 395.~~

Meadows Reach

- ~~10. Sparks Floodwalls and Flood Structures: Glendale to Greg: Replacement and/or enhancement of the flood structures along the north side of the Truckee River from Glendale to Greg in such a manner that the flood structures blend into the park areas along the river, and floodwalls are constructed to a minimum height and combined with flood structures or berms wherever possible, to reduce the height of the wall and the footprint of the flood structure and hide the view of the floodwall as much as possible from the riverside. This project element would also involve the evaluation of areas that do not have enough room for flood structures as to whether it is better to construct a floodwall in that location or purchase additional rights-of-way to allow construction of a lower flood structure.~~
- ~~11. Sparks Flood structures and Floodwalls: Rock to McCarran: Replacement and/or enhancement of the flood structures along the north side of the Truckee River from Rock to McCarran in such a manner that the flood structures blend into the park areas along the river, and floodwalls are constructed to a minimum height and combined with flood structures or berms wherever possible, to reduce the height of the wall and the footprint of the flood structure and hide the view of the floodwall as much as possible from the riverside. This project element would also involve the evaluation of areas that do not have enough room for flood structures as to whether it is better to construct a floodwall in that location or purchase additional rights-of-way to allow construction of a lower flood structure.~~
- ~~12. Sparks Flood structures and Floodwalls: McCarran to Vista: Replacement and/or enhancement of the flood structures along the north side of the Truckee River from McCarran to Vista in such a manner that the flood structures blend into the park areas along the river, and floodwalls are constructed to a minimum height and combined with flood structures or berms wherever possible, to reduce the height of the wall and the footprint of the flood structure and hide the view of the floodwall as much as possible from the riverside. This project element would also involve the evaluation of areas that do not have enough room for flood structures as to whether it is better to construct a floodwall in that location or purchase additional rights-of-way to allow construction of a lower flood structure.~~
- ~~13. Reno Sparks Indian Colony Levee: Levee is located about 30 feet from the top of the bank along the south side of the river from Highway 395 to Glendale Avenue.~~
- ~~14. Grand Sierra Flood structure: Construction of a short floodwall along the Grand Sierra property line from Glendale Avenue to Greg Street, and, if the wall is higher than four feet, consideration shall be given to providing containment in this section by raising the Hilton's internal parking lot road. The parking areas between this road and the river would then be allowed to flood.~~
- ~~15. Mill Street Flood structure: Greg to Rock: Construction of set-back flood structures on the south side of the river starting from the abutment of the Greg Street Bridge, roughly following the alignment of the existing Pioneer irrigation ditch to the north side of Mill Street near its intersection with Rock Boulevard, in such a manner so that the flood structure ties into the Rock Boulevard embankment where the top elevation of the flood structure matches the road shoulder.~~

- ~~16. Mill Street flood structure: Rock to McCarran: Construction of set-back flood structures from the tie into Rock Boulevard, following the north side of Mill Street to McCarran Boulevard, at which point the flood structure would tie into the McCarran Boulevard embankment, where the elevation of the top of the flood structure matches the road shoulder. Depending on the ultimate use of the Excel Building, at Edison Way the flood structure could become a floodwall along the south side of the building and return to a flood structure east of the building. The building could also be flood-proofed.~~
- ~~17. Main Station Farm Protection Flood structure: Construction of a flood structure around the UNR's Main Station Farm's buildings near the intersection of Clean Water Way and McCarran Boulevard~~
- ~~18. Eastside Subdivision: (see nonstructural elements below)~~
- ~~19. Hidden Valley Flood structure/Floodwall: Construction of a flood structure or floodwall along the east bank of Steamboat Creek from Pembroke Lane north until it ties into natural ground so as to protect the low houses in the "Pebble Beach" area. It has been determined that elevating these houses will be less costly than constructing a flood structure/floodwall.~~
- ~~20. Crossing Improvements: Improvements as may be needed where Dry Creek and Boynton Slough cross South McCarran, Peckham Lane, Longley Lane and McCarran Boulevard.~~
- ~~21. Rock Boulevard Bridge: Lengthen Rock Boulevard Bridge to reduce the flood levels caused by the existing bridge.~~
- ~~22. East McCarran Boulevard Bridge: Lengthen McCarran Boulevard Bridge to reduce the flood levels caused by the existing bridge.~~
- ~~23. Terracing: Greg to Rock: Construction of terraces along the south side of the channel from Greg Street to Rock Boulevard (which would vary in width) to provide additional flow conveyance and ecosystem restoration. They will have two levels, so that the lower level shall be at the elevation of a normal year's high flow and the higher bench shall be about four feet higher.~~
- ~~24. Terracing: Rock to McCarran: Construction of terraces along the south side of the channel from Rock Boulevard to McCarran Boulevard that vary in width to provide additional flow conveyance and ecosystem restoration. They will have two levels, so that the lower level shall be at the elevation of a normal year's high flow and the higher bench shall be about four feet higher.~~
- ~~25. Terracing: McCarran to Steamboat: Construction of terraces along the south side of the channel from McCarran Boulevard to Steamboat Creek that vary in width to provide additional flow conveyance and ecosystem restoration. They will have two levels, so that the lower level shall be at the elevation of a normal year's high flow and the higher bench shall be about four feet higher.~~
- ~~26. North Benching along Living River Parkway: Possible excavation of the "point" on the north side of the river to provide additional flow capacity to compensate for the reduced flow area if the Mill Street Flood structure is constructed north of the Excel, Cooperative Extension, and some Edison Way buildings (may not be necessary if flood structure is constructed south of these buildings as currently proposed by Flood Project). The current LPP calls for the Mill Street Flood structure to be on the south side of the Edison Way buildings.~~
- ~~27. Vista Narrows Widening: Construction of terraces in the channel from the confluence with Steamboat Creek to the first railroad bridge east of Sparks to control flows leaving~~

the Truckee Meadows and achieve the required flood elevations in the Truckee Meadows.

28. North Truckee Drain: Relocation of the terminus of the North Truckee Drain to a point near where the river is adjacent to the railroad tracks and enters the East Truckee Canyon on the east side of the East Sparks Industrial Park, consisting mostly of an underground box culvert.
29. Tributary Protection (if still needed): Construction of flood structures and floodwalls to extend up the tributaries to the Truckee River far enough so flooding from Truckee River backwater does not occur behind them. These flood structures shall extend further upstream if their presence causes the 100-year flood event from an individual tributary to spill over behind the flood structure or floodwall.
30. Huffaker Detention Facility (Withdrawn): Construction of a detention facility at Huffaker Narrows, incorporating the function of the detention basin for Double Diamond into the final design so that the maximum water level in the detention facility for a 100-year flood event on the Truckee River and/or Steamboat Creek occurs at elevation 4,435. This detention basin would be bounded on the south side along the alignment of the proposed South Meadows Parkway extension.

Lower Truckee River Reach

31. Ecosystem Restoration: Lockwood Restoration of the Truckee River downstream of Vista at Lockwood where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
32. Ecosystem Restoration: Mustang/Peri Ranch Restoration of the Truckee River downstream of Vista at Mustang Ranch where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
33. Granite Pit: This site is being analyzed for a potential disposal area replacement site for excess materials which will be excavated in the benching process upstream.
34. Ecosystem Restoration: Tracy Power Plant Restoration of the Truckee River downstream of Vista at the Tracy Power Plant where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
35. Ecosystem Restoration: 102 Ranch Restoration of the Truckee River downstream of Vista at 102 Ranch where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
36. Ecosystem Restoration: Eagle Pitcher Restoration of the Truckee River downstream of Vista at Eagle Pitcher where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
37. Ecosystem Restoration: Ferretto Ranch Restoration of the Truckee River downstream of Vista at Ferretto Ranch where restoration is feasible to increase sinuosity, connect the

river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.

38. Ecosystem Restoration: Railroad Cut Restoration of the Truckee River downstream of Vista at Railroad Cut where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
39. Ecosystem Restoration: I-80 Rest Stop Restoration of the Truckee River downstream of Vista near the I-80 rest stop by Wadsworth where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
40. Ecosystem Restoration: Above the I-80 Bridge Restoration of the Truckee River (downstream of Vista and upstream of the I-80 bridge) where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
41. Ecosystem Restoration: Wadsworth Restoration of the Truckee River downstream of Vista at Wadsworth where restoration is feasible to increase sinuosity, connect the river to the flood plain, mitigate for loss of flood plain storage due to construction of floodwalls and flood structures upstream, and correct the damage done to the river from previous channelization projects.
42. Rainbow Bend Benching: Construction of three excavated benches along the Truckee River, one at the Canyon Way Bridge, one on the north side of the River across from the Canyon General Improvement District ("GID") Wastewater Treatment Plant, and one on the south side of the river just east of the Canyon GID Wastewater Treatment Plant ("WTP") to protect the WTP abutment from flood scour; protect the Rainbow Bend community from increased flood flows due to construction of project elements upstream; and provide additional capacity for flood flows in the river especially near the Canyon Way Bridge.
43. Rainbow Bend Walkway: Construction of a low-elevated walkway (approximately 1/2 mile long) along the south side of the river by Rainbow Bend to protect the Rainbow Bend community from increased flood flows due to construction of project elements upstream.
44. Painted Rock Railroad Bridge: Elevation of the Trestle Bridge at Painted Rock to elevate it above 117-year flood waters.
45. Wadsworth Flood structure: Construction of a flood structure at Wadsworth to protect the community from flooding due to the 117-year flood.

Fish Passage and Recreation Elements

Fish Passage: Construct features along the Truckee River that improve fish passage including bypass channels, intake pumps, fish screens, and the modification, relocation, or removal of barriers (such as dams and diversions).

Recreation: Construct, on property acquired for flood damage reduction or ecosystem restoration, recreational features such as multi-use trails, fishing and boating access sites, picnic areas and playing fields.

INSERT

~~Figure 5-2 Flood Project Locations: Truckee Meadows (A)~~

~~Figure 5-3 Flood Project Locations: Truckee Meadows (B)~~

~~Figure 5-4 Flood Project Locations: Lower Truckee River (A)~~

~~Figure 5-5 Flood Project Locations: Lower Truckee River (B)~~

5.6.7—Non-Structural Elements

Downtown Reno Reach

~~Non-structural Commercial and Residential Floodproofing—Four structures would require non-structural floodproofing with this alternative. Three are located on the south bank (two are residential condominiums near Barbara Bennett Park) and one is a single family residence. There is also a commercial building near Brick Park on the north bank. Structures at the 525 Court Street location, including the Promenade senior resort living center and Heritage Bank of Nevada, as well as the structures along the 200 block of Island Avenue between Arlington Avenue and Rainbow Street would undergo flood-proofing measures that would further protect these buildings from overbank flows under the Living River Plan. Further downstream, the historic Post Office building on the south bank between Virginia Street and Center Street may also undergo flood-proofing.~~

Meadows Reach

~~Non-structural Residential Floodproofing—An alternative may include flood-proofing for certain residences in Hidden Valley and buildings in the Eastside Subdivision south of the UNR Main Station Farm. The channel benching plan requires flood-proofing of 59 residences in the Boynton Slough and Pembroke Drive areas. The method of flood-proofing would probably vary from structure to structure, but all would be raised to at least the 100-year flood elevation. Assembly Bill 54, approved in May 2009, authorizes the implementation of a flood-proofing and home elevation program in Washoe County including the ability to authorize grants and loans from Flood Project funds.~~

5.6.58 Federal Support for the Flood Project*Other Measures*

Over the years, TRFMA has worked diligently with the ACOE to implement the Flood Project. During the latest planning effort iteration, the Living River Plan was presented to the ACOE as the Locally Preferred Plan (“LPP”) alternative for flood risk management. Unfortunately, due to recent federal budgetary constraints, the Living River Plan was not recommended by the ACOE for Congressional authorization. However, as part of the Water Resources Reform and Development Act of 2014 (“WRRDA 2014”), Congress authorized and pledged almost \$200 million in federal funds to construct the ACOE National Economic Development (“NED”) Plan, which is designed to provide 50-year flood protection for the Truckee Meadows.

With the help of its lobbyists and delegates, TRFMA was able to draft a special piece of legislation to benefit the Truckee Meadows. Section 1036 of WRRDA 2014 directs the ACOE to build a LPP that provides a higher level of flood protection than the authorized NED Plan as long as the LPP meets certain ACOE requirements.

Per Section 1036, the Flood Project Plan—which provides cost-effective 100-year flood protection for the Truckee Meadows—can be constructed with federal support, including funds authorized for the NED Plan (federal cost-share of \$181,652,000).

TRFMA continues to work with its lobbyists and delegates to secure federal funding appropriations for project construction.

5.6.6 Flood Warning System and Emergency Management

TRFMA is responsible for operating and maintaining a portion of the regional Flood Warning System's network of stream gages and meteorological stations. This regional hydrologic data network includes a total of 157 gages, 30 of which are directly maintained by TRFMA employees. TRFMA cooperates with the US Geological Survey and other agencies to fund, operate and maintain the network; and to transform the collected data into useable information for regional emergency flood response efforts. TRFMA is the lead agency for implementing the Truckee River Flood Warning Plan, which is designed to notify emergency managers of potentially significant flooding approximately 5-7 days in advance of an event. These notifications assist regional responders with emergency preparations, including activation of the Washoe County Regional Emergency Operations Center ("REOC"). Technical staff from TRFMA also provide support to the Washoe County REOC during heavy rain events. TRFMA is a participating agency in a cooperative local effort among Washoe County, City of Reno and City of Sparks to develop a Regional Hazard Mitigation Plan; which identifies natural hazards and potential mitigation measures to increase regional disaster resiliency and meet FEMA requirements for future disaster assistance. Technical personnel from TRFMA also participate in regional exercises designed to train agencies how best to respond to a variety of emergencies and natural disasters, including earthquakes and catastrophic floods events.

5.6.5 Other Measures

Joint Powers Authority

~~Reno, Sparks and Washoe County are discussing the development of an interlocal cooperative agreement that would create a Joint Powers Authority ("JPA") to govern the flood project consistent with the provisions of recent state legislation. SB 175, approved in June 2009, authorizes Washoe County to acquire and maintain a flood management project in the same manner as any other project authorized under existing law, and provides similar provisions for a municipality within the County. The bill also provides for the creation of a flood management authority by cooperative agreement and authorizes the issuance of bonds similar to the authority of other municipalities. A summary of key provisions being contemplated includes the authority to plan and construct, own, operate and maintain the project. In addition, certain emergency, regulatory and revenue powers are also contemplated. The summary of possible provisions can be viewed at www.truckeeflood.us.~~

Planning and Regulatory Functions

It is contemplated that the JPA may propose plans and regulatory measures, consistent with existing development codes, to protect the flood management facilities and mitigate the adverse impact that new development may have on flooding and on the level of protection the facilities are designed to provide. The plans and regulatory measures would be developed in collaboration with the JPA member's planning staffs and proposed, as appropriate, for approval

and inclusion in the local government development codes. Regulatory functions may also include establishing a flood impact analysis procedure and process to measure the possible impact of land uses and development projects on the flood management facilities. This process may utilize a regional hydrologic modeling tool.

Updated hydraulic model (2-D HEC-RAS)

Regional Hydrologic Model

The Flood Project has ~~completed~~initiated the development of a regional hydrologic model ~~with Manhard Engineering. The first phase includes analysis of various regional hydrologic model approaches and techniques with the ultimate goal of developing a model for the Truckee River Watershed. During Phase I, various model options would be tested on a much smaller watershed, the Sun Valley watershed, for which highly reliable data is available as a calibration tool. The results of the first phase effort would then be applied to the entire Truckee River watershed in a later phase of the project.~~

~~A regional hydrologic model is being built. Phase 1 looked at four potential software packages that could be used for this effort to determine which would provide the best results at predicting increased flood risk and impact due to land use changes in the watershed. This software and the modeling process learned from the pilot project (Sun Valley Dam watershed) would then be used for developing the rest of the model across the Truckee River Watershed above the Vista Gage.~~ This model will be run when land use changes are being considered so the potential adverse flood impacts can be estimated. The Flood Project would then pass this information on to the project reviewing entities (for those that would result in land use changes). The process will enable the entity to provide adequate and proper conditions when reviewing permit applications to assure the safety of the public and to ensure that flood protection is not adversely impacted or decreased. This Regional Hydrologic Model could also be used to study watershed impacts due to land use changes and develop recommendations for design criteria for development projects. The Flood Project will be required by the ACOE to monitor the watershed, evaluate changes to the watershed and annually report to the public on the project's level of protection.

Flood Plain Storage and Critical Flood Pools

Flood plain storage is a critical component of flood protection. Many properties that were built in compliance with FEMA standards for the NFIP may be at risk because of loss of flood plain storage. Reno, Sparks, Washoe County and Flood Project staff members involved in flood plain storage volume mitigation seek to ensure that the Flood Project remains feasible and future flood impacts are minimized.

The Flood Project staff is working with local government agencies to take the following action steps:

- Develop flood plain storage mitigation options or plans to ensure that flood elevations are not increased, placing an undue burden on property owners and existing development in the Truckee Meadows and downstream.
- Work in a cooperative manner to implement the Flood Project and the *Regional Flood Plain Management Strategy* (RWPC, 2003). Special attention is directed to land acquisition and early implementation of Flood Project elements that are critical to the preservation of flood storage and/or the feasibility of any of the project alternatives.

- Jointly develop and formally adopt the best available technical data on the hydrology and hydraulics of flooding as used by the Flood Project (being developed in coordination with the ACOE).
- Complete the regional hydraulic modeling tool needed to quantify cumulative flooding impacts in the watershed.
- Use best efforts and good faith to jointly develop flood plain storage mitigation guidelines that will be incorporated into local ordinances and development codes. This will facilitate the ability of property owners to develop their properties and/or participate in regional solutions for mitigation of increased volume of runoff or loss of flood plain storage volume if appropriate. Local ordinances will also provide a mechanism for monitoring and enforcement.
- Provide background information and public outreach to ensure support from the community and from elected officials for the region's interconnected flood policies and projects.

Ultimately, flood plain storage mitigation will need to address the following:

- Ensure that current flood impacts and flood conditions are “locked into place” in order to maintain post-construction levels of protection. Mitigation measures should be designed to minimize current flood impacts to existing residents and businesses and also to prevent flood impacts from getting worse over time.
- Properties in Zone 1, as described in Policy 3.1.b, will be under the most stringent development constraints because they are in the most critical flood plain storage volume areas. (See Figure 5-2.)
- Properties in Zone 2, as described in Policy 3.1.b, are in a unique situation because displacement of flood plain storage may cause increased flood impacts to nearby properties under current conditions. Once the Flood Project is implemented, the flood plain storage volume associated with these properties will no longer need to be maintained.
- Properties in Zone 3, as described in Policy 3.1.b, are important areas in terms of flood conveyance under current conditions. Once the Flood Project is implemented, the flood plain storage volume and conveyance associated with those properties in Zone 3 will no longer need to be maintained. However, current conditions of water volume and peak discharge must be maintained after the project is implemented or the local interior drainage design may be undersized and in need of improvements. Displacement and reduction in floodplain storage volume in Zone 3 will tend to increase flood elevations from the present time to the time the flood project is completed.
- Properties in Zone 4, as described in Policy 3.1.b, may impact the hydrology of the Flood Project if there is a significant change to the flow rates, timing, duration or volume of runoff from the property.
- Larger projects will be expected to provide a higher level of analysis and may be required to contribute to a possible future regional solution that provides mitigation for the loss of flood plain storage volume in Zone 1 or hydrologic changes in Zones 3 and 4.
- Smaller projects will not be expected to provide undue levels of analysis, but may also be expected to contribute to a possible future regional solution that provides mitigation for the loss of flood plain storage volume or increases in flow rate, velocity and volume due to land use changes.

Where appropriate, maximize the opportunity to receive credits under FEMA's Community Rating System for protection of properties, which may result in flood insurance premium price reductions under the NFIP.

Mitigation options will be identified which may include any or all of the following:

- Local government purchase of existing excess storage volume to be reserved for offsetting the impacts caused by developments
- Local government implementation of storage mitigation projects to be reserved for offsetting the impacts caused by developments
- Private developer creation of storage mitigation projects to mitigate the impacts caused by larger developments and/or to sell additional storage for offsetting the impacts caused by developments
- Creation of a framework to allow local governments to buy and sell storage to offset impacts caused by developments
- Generally, mitigation should be provided in an area hydrologically or hydraulically connected to the project requiring mitigation in a way that will not increase flood levels by any amount.
- Early implementation of flood project elements is an option for providing mitigation.

In March 2004, Reno amended its Land Development Code (Section 18.12.605 - Critical Flood Pools) to be consistent with Policy 3.1.b, below, initially adopted by the RWPC earlier that year to address the need to mitigate losses of flood plain storage in critical flood pools. Similarly, Washoe County amended its Development Code (Section 110.416.18 Critical Flood Storage Areas) in February 2005.

In October 2008, the FPCC adopted "Resolution number 2008-1, A Resolution Proposing Principles and Guidelines to be used as a Basis for Adoption of Local Ordinances for Floodplain Storage Mitigation within Critical Flood Zone 1." The resolution, developed in coordination with Reno, Sparks and Washoe County flood management staff, strongly recommends mitigation requirements for all projects proposing to displace any volume of flood water in Zone 1. Specifically, storm water discharges should be limited to pre-development peak flows and flood storage volume mitigation should achieve no adverse impact. This would be achieved by providing mitigation in a volume equal to the volume of flood storage displaced, in the same flood storage area, at the same elevation and at the same time or prior to displacement. If volume mitigation is proposed in a different flood storage area or at a different elevation, the Flood Project Mitigation Model would be used to show no adverse impact. The resolution also includes definitions for key terms, such as "no adverse impact" and "flood storage area" and a reference map.

In September 2010, Reno initiated amendments to Section 18.12.605 of its Land Development Code that are consistent with the resolution. The Reno City Council approved the ordinance in October 2010. Washoe County has developed proposed amendments to its Development Code (Section 110.416.18 Critical Flood Storage Areas), also to be consistent with the resolution.

Policy 3.1.b: Flood Plain Storage within the Truckee River Watershed

Until such time as Reno, Sparks, and Washoe County adopt and begin to implement a Flood Plain Management Plan for the Truckee River, the local flood management staff², using the best technical information available and applicable local ordinances, will work with a proposed project applicant or a proposed land use change applicant to determine the appropriate level of analysis required in order to evaluate and mitigate the impacts experienced during the 1997 flood. On an annual basis, all three local flood management agencies and the Flood Project shall jointly agree on and adopt the “best technical information” available for use in implementation of this policy.

Criteria to implement policy: The local flood management staff shall evaluate impacts using qualitative or quantitative analysis and the evaluation may be uncomplicated and brief. If a more in-depth analysis is appropriate, the following “tiered” approach and criteria shall be used unless otherwise required by local ordinance:

- Current development codes require that a project not increase the 100-year peak flow at the boundary of the property. If the project can also demonstrate no increase in volume of 100-year runoff at the boundary of the property, the analysis is complete.
- If there is an increase in 100-year volume of runoff at the boundary of the property, the project may demonstrate either:
 - The increase in volume of runoff will have no adverse impact to downstream properties and no adverse impact to hydrologically connected properties, or
 - The increase in volume of runoff will be mitigated in a regional project without adverse impact to hydrologically connected and downstream properties. (Until a storage mitigation plan is in place with respect to this paragraph, no flood plain storage mitigation will be required.)
- Impacts of a proposed project will be evaluated by comparing conditions without the proposed project (current conditions) and conditions with the proposed project.
- Impacts of a proposed land use change will be evaluated by comparing conditions without the proposed land use change (current conditions) and conditions with the buildout of the reasonable development potential of the proposed land use change.

The watershed is divided into four zones with different project size thresholds for the purposes of review (See Figure 5-~~26~~):

Zone 1: Critical flood pool – all proposed land use changes and proposed projects will be reviewed for their impact on hydrologically connected and downstream properties

Zone 2: Existing flood pool that will be removed from the flood pool by the proposed Truckee River Flood Project – proposed land use changes and proposed projects five acres and larger will be reviewed

Zone 3: Adjacent sheet flow areas not part of the flood pool – proposed land use changes and proposed projects five acres and larger will be reviewed

Zone 4: Remainder of the Truckee River Watershed – proposed land use changes and proposed projects five acres and larger will be reviewed

² Each local government has assigned one or more staff members the responsibility of designing and reviewing flood management projects. These staff members are also responsible for reviewing certain proposed projects to address concerns of drainage and flooding.

INSERT

Figure 5-26 Critical Flood Zone Areas

Flood Monitoring

Early Warning Program

~~The Flood Early Warning System consists of gages and associated equipment intended to provide critical storm and weather information to various agencies within northern Nevada for the purposes of supporting emergency preparations in advance of devastating floods. The system includes 54 local and United States Geological Survey ("USGS") sponsored stream and precipitation gages, transmission equipment, computer data collection and distribution system, and equipment and software to transform the data into useable information for regional emergency flood response. In addition to stream and precipitation gage data, staff relies on data from 121 additional gages paid for and managed by other organizations. In total, there are 175 gages in the regional hydrologic data network.~~

Flood Plain Management Plan

Flood plain management generally consists of planning and implementing programs designed to alleviate the impact of flooding on people and communities. It includes activities such as instituting land use policies and regulations for development in flood prone areas, and restoring and preserving natural resources and functions of flood plains and contributing watersheds. The Flood Project, in order to receive federal cost share funds through the ACOE is required to have in place and ready to implement, a flood plain management plan that deals with the impacts to the Flood Project caused by changes in the watershed. Such changes could reduce the Flood Project's level of protection and therefore reduce the benefit coming from federal funds spent on the project.

Flood plain management can include both structural and non-structural measures for mitigating flood impacts. Structural approaches include measures that reduce the amount of floodwater in a stream or contain floodwater in a channel so that it does not inundate nearby areas. Such measures may include detention facilities, flood structures or dikes and floodwalls. Structural measures built with public money have been used historically to manage existing flood impacts with varying degrees of success. Structural flood controls may require the use of valuable land and natural resources. A structural approach to flood control in existing urban areas can provide a cost-effective benefit to the public. In southern Nevada, the Clark County Regional Flood Control District uses structural controls very effectively to manage flash flooding impacts in developing areas.

Non-structural approaches to flood plain management are being used increasingly as the limitations of flood control become apparent. The most cost-effective approach to flood hazard protection can be achieved using land use planning and sound flood plain management regulations in flood prone areas. Non-structural approaches to flood plain management include:

- Development of tools to monitor changes in the watershed and better understand changes to the hydrologic response of the watershed due to land use changes and transmittal of recommendations to local government
- Development of regional master plans for flood management
- Mapping and study of historic flood prone areas
- Implementation of flood plain regulations, including zoning ordinances, subdivision regulations, and building codes that guide development in flood plains and flood prone areas
- Implementation of a development review process at the local or regional level

- Acquisition and removal, or relocation of structures which experience repetitive losses
- Flood proofing existing structures by elevating a building's structure or infrastructure, or sealing and reinforcing walls, doors and windows
- Flood forecasting and warning systems
- Disaster preparedness plans
- Rehabilitation of disturbed watersheds, wetlands, and riparian zones
- Designation of green belts
- Providing education and information to the local communities

Although flood plain management most effectively occurs at the local or regional level, the state plays an important role. The state's primary functions include coordination between federal and local agencies, education and information dissemination, and management of grant funds passed through from the federal government or the state to the local communities.

Watershed Effects on the Project

Changes in land use cause changes in the volume, flow rate, timing and velocity of storm water runoff, which usually increases flood risk and flood damages in the watershed. Such changes can also increase damages (due to erosion and sedimentation caused by flooding), which can have an adverse impact on the capacity of conveyance features, in addition to water quality; the condition of stream channels and banks; other public or private facilities that extend across (or are located in the flood plains of streams or flood/drainage conveyance channels); basins or other facilities.

Linkages

Water Quality / Total Maximum Daily Load ("TMDL")

In addition to a properly functioning river channel and floodplain, ecosystem restoration on the lower Truckee River enhances nutrient assimilative capacity, which helps control undesirable algae growth, dissolved oxygen problems and other water quality issues.

Upstream (California) Dam Operations / *Truckee River Operating Agreement* ("TROA") releases from Lake Tahoe at the Tahoe City Dam according to TROA will have an effect on flood flows in the Truckee Meadows.

Local Government Flood Control and Drainage Programs may use modeling tools developed by the Flood Project to perform planning and regulatory functions.

Recreation Flood Project Plans provide numerous recreational opportunities including the River Parkway concept.

5.7 Local Government Storm Water Drainage Programs

Reno, Sparks and Washoe County must each provide for adequate drainage systems to convey storm water in order to preserve and promote public health, safety, welfare, and economic well being. The need for adequate drainage affects all governmental jurisdictions and all parcels of

property and therefore requires coordination among the jurisdictions and the Flood Project, and cooperation from both the public and private sectors.

Flood plain management and drainage facilities are two main components of each jurisdiction’s storm water drainage program. In addition, drainage program staff members actively participate in planning and engineering for the Flood Project.

5.7.1 Drainage Facilities

Local storm water drainage facilities typically include curb and gutter, inlets and storm sewers, culverts, bridges, swales, ditches, channels, detention facilities, or other drainage infrastructure required to convey storm runoff to its ultimate drainage way. ~~The~~ Reno, Sparks and Washoe County ~~Public Works Departments~~ are involved primarily in drainage improvements funded, designed or constructed by the local governments, or where these functions are performed in cooperation with other groups or partners. Many other public drainage facilities are constructed and paid for by developers, with oversight provided by the local government having jurisdiction for the project~~Community Development Departments~~. Once constructed and dedicated to the local government, maintenance of drainage facilities becomes the responsibility of the local government~~Public Works Departments~~ or an ~~entity~~ies such as a homeowner’s associations. The local governments administer drainage programs within their respective jurisdictions as set forth in the drainage code sections shown in Table 5-2.

Table 5-2 Drainage Code References for Reno, Sparks and Washoe County

Jurisdiction	Reference	Entitled	Description
City of Reno	12.04.010 Article IV Reno Administrative Code, Title 12, Public Works and Utilities <u>(repealed by ord. 6343, 9-10-2014)</u>	Standard Specifications for Public Works Construction	Adopts "Standard Specifications for Public Works Construction" published by RTC ("Orange Book")
	12.16 Article IV Reno Administrative Code, Title 12, Public Works and Utilities	Storm Water Management and Discharge Control	Regulates storm water discharge procedures
	18.12.701 Article VII Reno Administrative Code, Title 18, Annexation and Land Development ("Land Development Code")	Streets	Adopts "City of Reno Public Works Design Manual" which contains current storm drainage policies and technical design criteria in Chapter 2
	18.12.1701 Article XVII of Land Development Code	Flood Hazard Areas	FEMA Flood Requirements
	18.12.1801 Article XVIII of Land	Wetlands and Stream Environment	Establishes regulations pertaining to wetlands and

	Development Code	Protection Standards	stream environments
	18.12.1901 Article XIX of Land Development Code	Drainage Way Protection Standards	Establishes setbacks from select waterways and regulates the uses in those setbacks
City of Sparks	Sparks Municipal Code, Title 15, Chapter 15.11	Flood Plain Management	FEMA Flood Requirements
	Sparks Municipal Code, Title 17, Chapter 17.16, Section 17.16.140	Drainage	Subdivision drainage requirements

Table 5-2 Drainage Code References for Reno, Sparks and Washoe County - Continued

Jurisdiction	Reference	Entitled	Description
Unincorporated Washoe County	Chapter 110 Development Code, Article 416	Flood Hazards	FEMA flood requirements
	Chapter 110 Development Code, Article 418	Significant Hydrologic Resources	Establishes setbacks from select waterways and regulates uses in setbacks
	Chapter 110 Development Code, Article 420	Storm Drainage Standards	Current policies and technical design criteria
	Ordinance 1223 (<u>expect codification in Article 421</u>)	Storm Water Discharge Ordinance	Regulates storm water discharge procedures

The Reno flood and drainage staff operates within the Sanitary/Environmental Engineering Section of the Public Works Department. Staffing and a limited number of projects are paid through a portion of the sewer fees dedicated to drainage projects, as described on the City's sewer bills. Other Reno storm water improvements have historically been paid for by the general fund. ~~The City of Reno is exploring the possibility of a storm water utility district to fund capital improvements.—The City of~~ Sparks maintains a storm drain utility supported by user and connection fees, bond proceeds, grants and participation from other agencies.

Washoe County's storm water management program is administered by its Public Works Department of Community Services ("CSD"), including maintenance of the storm drainage system which is provided by the Roads Division and funded through the general fund. Capital improvements are also funded through the general fund. ~~The Department of Public Works is also exploring the possibility of establishing a storm water utility district to serve the unincorporated County.~~

For private development within Reno, Sparks or the unincorporated County, citizens, developers, engineers and planners typically interact with the Community Development Departments, which are responsible for plan review, permitting, development code enforcement and requests for FEMA flood map revisions.

5.7.2 Flood Plain Management

A community's agreement to adopt and enforce flood plain management ordinances, particularly with respect to new construction, is an important element in making flood insurance available through the NFIP to home and business owners. See Section 5.3.2 above.

Local government storm water drainage programs manage local and regional components of drainage planning and drainage issues; interact with FEMA for flood map updates; design and construct publicly-funded projects; and serve as repositories for FEMA flood map information. Each jurisdiction has designated a person as flood plain management administrator for FEMA purposes.

In 2003, the RWPC approved as a working document, the draft *Regional Flood Plain Management Strategy* (“RFMS”), which may serve as the basis for a flood plain management plan required by the ACOE before entering into a project cost agreement. Some elements of the RFMS have been included in the County’s *All Hazard Mitigation Plan*, required of all communities under the Disaster Mitigation act of 2000, while others have been used by the County to qualify for participation in the FEMA CRS.

5.7.3 Truckee Meadows Regional Drainage Manual

In an effort to provide consistent guidance for developers, planners and engineers, key staff members of Reno, Sparks and County Public Works Departments and the Flood Project collaborated on the development of the *Truckee Meadows Regional Drainage Manual* (2009) (“TMRDM”). The purpose of the manual is to provide minimum standards for (and to ensure consistency with) analysis, planning and design of projects with flood control and drainage components within Reno, Sparks and the unincorporated County.

The manual is a common reference for policies and criteria relating to drainage design and hydrology for the three jurisdictions. The manual supports the jurisdictions’ regulation of future development and regional flood plain management, providing an integrated system which acts to protect public health, safety, comfort, convenience, welfare, property and commerce. The manual was reviewed by development community stakeholders and revised accordingly before being submitted for approval. Reno, Sparks and Washoe County Public Works Departments have provided endorsements and the manual is in use by all three jurisdictions. Reno references the manual in Chapter II of its Public Works Design Manual and Washoe County has adopted the manual by reference in Washoe County Code Chapter 110, Article 420.

The TMRDM updates and supersedes the 1996 draft *Washoe County Hydrologic Criteria and Drainage Design Manual* by using current state-of-the-art technology and procedures, and including updated technical references, charts and graphics. The new manual includes criteria that are more representative of Reno, Sparks and Washoe County programs, either by use of the same standards, or by specific identification of subjects in which criteria differ, such as rainfall criteria for Reno, unincorporated Washoe County and Sparks. The manual also updates chapters on open channels, including a new section on natural channel design and storm sewer systems, particularly with respect to capacity and design criteria.

5.7.4 Draft Washoe County Regional Flood Control Master Plan

The draft *Washoe County Regional Flood Control Master Plan* (WRC, 2005) was prepared to update the *Washoe County Flood Control Master Plan, Concept Level Report* (KJC, 1991). The purpose of the 2005 update was to evaluate existing and projected drainage and flooding conditions and to recommend regional drainage facilities that can effectively reduce future flood damages within the region. This plan is separate from, and does not include, the Flood Project. The draft Plan serves as general guidance for the local governments as watershed- and project-specific master plans are developed. It also provides planning-level cost estimates for recommended flood and drainage facilities.

5.7.5 Flood Plain Storage Outside the Truckee River Watershed

Flood plain storage mitigation outside the Truckee River watershed is addressed by the following policy:

Policy 3.1.c: Flood Plain Storage outside of the Truckee River Watershed

As appropriate, the local flood management staff will work with proposed project applicants or proposed land use applicants to identify the best approach to mitigate the impacts of changes to 100-year flood peaks and flood plain storage volume that are a result of proposed land use changes or proposed projects.

Criteria to implement policy: The local flood management staff shall evaluate impacts using qualitative or quantitative analysis according to applicable local codes and ordinances. A more in-depth analysis will be required when significant impacts must be mitigated. Local flood management staff will develop guidelines for evaluation and mitigation of impacts in specific closed basins. In multi-jurisdictional basins such guidelines will be developed with the concurrence of all responsible agencies.

5.8 Flood Control and Drainage Overview by Hydrographic Basin

This section provides overviews of potential flood control and drainage issues relative to the Truckee Meadows Service Areas (“TMSA”) in hydrographic basins outside of the Truckee Meadows. Two comprehensive reports, one prepared for Sparks (Stantec, 2008) and the other for Reno and Washoe County (ECO:LOGIC, 2007), provide more detail on certain areas. Some of the following sections summarize information presented in the two reports referenced above, while others rely on other information sources or describe recently completed or ongoing work.

5.8.1 Spanish Springs Valley Hydrographic Basin

A basin-wide master plan and hydrologic / hydraulic model has been developed for Spanish Springs. When new projects are proposed within the Sparks Sphere of Influence area, project proponents must demonstrate that proposed new facilities are adequate both for existing and build-out conditions. ~~Management strategies in the unincorporated area are moving towards the same methodology.~~ The Regional Hydrologic Model will greatly improve the ability to monitor watershed impacts due to land use change and develop appropriate design criteria for development.

Key components of the master-planned facilities are planned for construction within the unincorporated area. Construction of these facilities is critical to ensure that the capacity of the Spanish Springs Detention Facility in Sparks is not exceeded during flood events.

A funding mechanism for flood control facilities in the unincorporated area is essential. Proposals for new development in the unincorporated area need to be evaluated from a regional perspective to ensure that the effects of increased runoff are manageable within existing facility constraints downstream. The tools used for evaluation should be agreeable to both Washoe County and Sparks.

[The North Spanish Springs Flood Control Project was completed by Washoe County in 2007 to capture storm water from the Griffith Canyon area and safely convey flows to an 80-acre basin](#)

where the water is metered out at a manageable rate so as not to overwhelm the North Truckee Drain or other downstream storm water conveyance systems. The project was designed and constructed to accommodate storm water flows generated from events up to a 100-year, 24-hour event. Project infrastructure consists of channels, settling basins and a concrete dam.

In 2002, 2005 and 201305, severe thunderstorm events caused significant flooding along the east and/or west foothill areas of Spanish Springs Valley. In the unincorporated area of west Spanish Springs, residential structures and property, Spanish Springs High School, private drainage systems owned and maintained by homeowner associations, and public roadways and drainage systems were significantly affected by large quantities of sediment-laden runoff. Culverts and ditches at many locations were either overtopped due to excessive flow or the capacity was compromised due to sediment clogging. Roadways located at the lowest point of the watershed were flooded to depths of up to three feet.

A 2008 hydrologic study of the area prepared for Washoe County by Gray and Associates identified a suite of proposed drainage improvements ranging from sediment and detention basin upgrades located along the west boundary of the residential subdivisions both north and south of Eagle Canyon Boulevard and culvert upgrades at several road crossings. The analysis assumes a 100-year design storm; however, the final analysis will determine the appropriate design storm to optimize the cost versus benefit of the project.

5.8.2 Truckee Canyon Hydrographic Basin (Verdi)

A comprehensive flood control master plan for this hydrographic basin has not been developed. Significant changes to land use would require the development of such a plan and an evaluation of the possible impacts to the Truckee River flood plain in the Truckee Meadows. The *Somerset Development Storm Drainage Master Plan*, prepared in 2004 for Reno by Manhard Consulting, is being implemented as development progresses. The Regional Hydrologic Model will greatly improve the ability to monitor watershed impacts due to land use change, support the development of flood control master plans, and develop appropriate design criteria for development.

5.8.3 Lemmon Valley Hydrographic Basins

Lemmon Valley consists of two topographically closed hydrographic basins. Runoff in the West Lemmon Valley basin drains to the Silver Lake playa and the Swan Lake playa receives drainage from the east-East Lemmon Valley basin. Playas have no outlet; therefore, runoff that drains to these lakes must either infiltrate or evaporate. Hydrologic studies have been prepared for the Silver Lake and Swan Lake drainage basins. A drainage master plan for Stead, Nevada (Stantec Consulting, 2002) has been prepared for Reno to provide a comprehensive drainage document specifically for the Lemmon Valley hydrographic basin to identify present condition flooding and problem areas so that capital flood improvements could be scheduled.

In 2007, Quad Knopf Consulting Engineers prepared a report for Reno entitled *North Valleys Flood Control Hydrologic Analysis and Mitigation Options*. The purpose of the report was to evaluate the impact of development in the Silver Lake and Swan Lake watersheds since 1987, and the effect of updated precipitation data on the projected water surface elevations in these playa lakes. The existing computed water surface elevation in the Swan Lake basin is below the existing FEMA 100-year base flood elevation ("BFE"); however, existing conditions in the Silver Lake basin are reported to be approximately three feet above the existing BFE. The study recommends as the preferred mitigation option, the submittal of an application for a Letter

of Map Revision (“LOMR”) to raise the FEMA BFE in Silver Lake to reflect current conditions. ~~The preferred option also included a public outreach program, which was completed in December 2008.~~ The formal application process for a LOMR request ~~with~~ was approved by FEMA ~~was started~~ in ~~February~~ July 2009.

The Marlin Channel (located in Golden Valley, an east Lemmon Valley sub-basin) and Lemmon Drive Channel (“Lemmon Channel”) have a history of flooding during significant flood events, most recently in December 2005. Drainage from the Marlin Channel combines with runoff from other tributary areas and flows to the Lemmon Channel. The total contributory watershed to the Lemmon Channel is estimated at 10.9 square miles, which is about 25 percent of the approximately 40 square mile total watershed draining to Swan Lake. The *Marlin and Lemmon Channels, Flood Plain Analysis and Improvement Alternatives* report, prepared for Washoe County ~~Public Works Department in 2010~~ by Manhard Consulting, Ltd., concluded that a flood detention project on the Marlin Channel would provide significant flood hazard risk reduction for a small number of properties, however, the cost of a complete solution for the Lemmon Channel would likely outweigh the avoided damages. Further flood control planning is not anticipated unless there are significant changes to approved land uses.

5.8.4 Pleasant Valley Basin

Alternatives to address flood problems at the Toll Road – Bailey Creek crossing were developed for Washoe County by Wood Rogers (2007). Sediment basins, channel improvements and a conveyance channel are among the recommended alternatives. ~~Washoe County has initiated the right of way application process with the BLM for the sediment basin locations.~~ The Regional Transportation Commission has plans to realign the South Virginia Street – Highway 341 intersection that will include flood control improvements ~~required to address the need for the recommended channel improvements and a conveyance channel.~~

5.8.5 Warm Springs Valley Hydrographic Basin

The Spring Mountain planned unit development was added to the TMSA in 2006 and the Spring Mountain east development area is located in the Warm Springs basin. The development handbook on file with the City of Reno states that Spring Mountain will be responsible for flood management facilities, which will be designed and maintained in accordance with applicable ordinances and regulations in effect at the time of permit application. The Sage and Warm Springs portions of the TMSA are also in the Warm Springs basin. Washoe County’s Warm Springs Specific Plan includes a development standards framework covering drainage and large lot flood protection. The limited development potential within this hydrographic basin minimizes flood control issues. Flood control requirements for the Specific Plan Area will be incorporated into project development plans. When single-family homes are constructed on large lots, consideration should be given to the potential of flood hazards that may not have been mapped by FEMA. Otherwise, the limited development potential within this hydrographic basin, but outside the TMSA, minimizes flood control issues.

5.8.6 Sun Valley Hydrographic Basin

A storm water master plan was completed for Sun Valley in the late 1990s that includes the identification of drainage improvements required to route flows from a 10-year recurrence interval storm event, and an evaluation of the possible impacts to the Wildcreek Golf Course dam that could result from a 100-year, 6-hour storm event. Further flood control planning is not

anticipated to be required in this hydrographic basin unless there are significant changes to approved land uses.

5.8.7 Washoe Valley Hydrographic Basin

There are a number of flood hazards within this hydrographic basin, including alluvial fan flooding, lake flooding during wet years, and riverine flooding of creeks and landslides. A comprehensive flood control master plan for this hydrographic basin has not been developed; however, an east Washoe Valley flood control master plan has been developed by Washoe County. To date, funding has not been available to implement the plan recommendations.

5.8.8 Antelope Valley Hydrographic Basin

The limited development potential of this hydrographic basin has not justified significant planning for flood control. An analysis of the potential for flood hazards that might not have been mapped by FEMA should be performed when projects for development are proposed.

5.8.9 Bedell Flat Hydrographic Basin

The limited development potential of this hydrographic basin has not justified significant planning for flood control. An analysis of the potential for flood hazards that might not have been mapped by FEMA should be performed when projects for development are proposed.

5.8.10 Dry Valley Hydrographic Basin

The Spring Mountain planned unit development was added to the TMSA in 2006 and the Spring Mountain west and central development areas are located in the Dry Valley basin. The development handbook on file with the City of Reno states that Spring Mountain will be responsible for flood management facilities, which will be designed and maintained in accordance with applicable ordinances and regulations in effect at the time of permit application. Otherwise, the limited development potential of this hydrographic basin has not justified significant planning for flood control. An analysis of the potential for flood hazards that might not have been mapped by FEMA should be performed when projects for development are proposed.

5.8.11 Red Rock Valley Hydrographic Basin

The limited development potential of this hydrographic basin has not justified significant planning for flood control. An analysis of the potential for flood hazards that might not have been mapped by FEMA should be performed when additional projects for development are proposed.

5.8.12 Cold Springs Valley Hydrographic Basin

Cold Springs Valley is a topographically closed basin. Imported water and precipitation that falls within the basin generally stays within the basin. Hydrologic studies have been prepared for the White Lake drainage basin. Future changes to flood peaks and flood plain storage volume will need to be evaluated to ensure that the effects of increased volumes of runoff are manageable. A Letter of Map Revision for White Lake effective August 11, 2010 establishes a 100-year water surface elevation. In addition, Reno has identified a future condition flood advisory area for the White Lake Playa, available on www.reno.gov.

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Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 25, 2016

TO: Chairman and Members, Northern Nevada Water Planning Commission
("NNWPC")

FROM: Jim Smitherman, NNWPC Water Resources Program Manager

SUBJECT: Discussion and possible direction to staff regarding any chapters of the Regional Water Management Plan ("RWMP") previously reviewed by the NNWPC in relation to the 2016 RWMP update.

SUMMARY

This agenda item is intended to be one in a series of standing items, ending upon the NNWPC's final recommendation to the Western Regional Water Commission concerning the 2016 RWMP update. Under this item, NNWPC members may discuss, and the NNWPC may direct staff on the subjects of any of the RWMP chapters reviewed, since the December 2014 meeting, in relation to the 2016 update.

Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 25 2016
TO: Chairman and Members, Northern Nevada Water Planning Commission
FROM: Jim Smitherman, Water Resources Program Manager
SUBJECT: Program Manager's Report

Attached are updated reports for items (a) and (b) for your review. A verbal report will be given for item (c).

- a) Report on the status of Projects and Work Plan supported by the RWMF;
- b) Financial Report on the RWMF; and
- c) Report on the TMRPA's parcel-based population and employment modeling project.

**Status Report of Projects and Work Plan
Supported by the Regional Water Management Fund**

	Project Name	Contractor / Provider	Amount	Balance Remaining	Percent Complete	Target Completion Date	Notes
1	Financial Audit Fiscal Year 2016	Schettler Macy LLC	8,700	8,700	0%	10/1/16	Work will commence at end of Fiscal Year 2016
2	<u>Certified Landscape Technician Program 2014-2016 FY</u>	Nevada Landscape Association (NLA)	25,000	12,500	50%	6/30/16	Work is in progress
3	<u>Cloud Seeding - Additional Precip Monitoring Equipment Original ILA \$25,000; Amendment \$50,000</u>	(DRI) Desert Research Institute	75,000	51,074	32%	6/30/17	Work is in progress
4	<u>Cloud Seeding Program for Water Year 2016</u>	(DRI) Desert Research Institute	100,000	72,934	27%	9/30/16	Work is in progress
5	<u>Effluent Management Strategy</u>	Stantec	25,000	11,063	56%	12/31/16	Work is in progress
6	<u>Effluent Management - Linear Programming Original Contract \$40,292; Addendum to Joinder \$22,500</u>	(DRI) Desert Research Institute	62,792	21,571	66%	6/30/16	Work is in progress; awaiting return of executed Amendment to Addendum
7	<u>Envision Videographers of WRWC meetings</u>	Envision	2,000	1,660	17%	9/30/16	Work is in progress
8	Highland Canal Improvements	City of Reno	250,000	250,000	0%	1 yr from Effective Date	Awaiting signatures from Reno on Interlocal
9	<u>Optimizing Investments in the Truckee River Watershed</u>	The Nature Conservancy	57,787	18,335	68%	12/31/16	Work is in progress
10	<u>Regional Data Development and Analytical Program (FY 2011-2012)</u>	Truckee Meadows Regional Planning Agency	486,000	314,666	35%	6/30/16	Work is in progress
11	<u>Regional Storm Water Quality Management Program (Third Amendment)</u>	City of Reno	262,500	204,986	22%	6/30/16	Work is in progress

**Status Report of Projects and Work Plan
Supported by the Regional Water Management Fund**

	Project Name	Contractor / Provider	Amount	Balance Remaining	Percent Complete	Target Completion Date	Notes
12	<u>RWMP 2016 Cost & Finance Chapter Update including First</u>	Hansford Economic Consultant	24,999	5,669	77%	12/31/16	Work is in progress
13	<u>RWMP 2016 Update - Water Balance Update</u>	Stantec	25,000	15,596	38%	6/30/16	Work is in progress
14	<u>Septic - Phase II</u>	County - CSD	150,000	128,795	14%	6/30/16	Work is in progress
15	<u>Sosu TV Videographers of NNWPC meetings FY 2015-2016</u>	Sosu TV	3,000	2,448	18%	6/30/16	Work is in progress
16	<u>TMDL Phase 1 Sixth Amendment</u>	City of Reno (LimnoTech)	75,000	44,363	41%	6/30/16	Work is in progress
17	<u>TRIG Website Support FY 2015-2016</u>	City of Reno	7,500	7,500	0%	6/30/16	Work is in progress
18	<u>TROA - 6,700 AF water rights purchase</u>	TMWA	2,700,000	151,381	94%	Open Ended	Work is in progress
19	<u>Washoe ET Project Maintenance; Original ILA \$10,000; Amendment \$10,000</u>	DRI (Desert Research Institute)	20,000	13,150	34%	6/30/16	Work is in progress
20	<u>Washoe ET weather station upgrades</u>	(DRI) Desert Research Institute	29,050	25,000	14%	6/30/16	Work is in progress
21	<u>Water Usage Review Program 2015-16 First Amendment</u>	TMWA	100,000	100,000	0%	6/30/16	Work is in progress

2/25/2016
 Fund 766
 Report 400/ZF15
 Fiscal Year 2016; Period 1 through 8

**Financial Report on the
 Regional Water Management Fund**

Accounts	Plan Budget	Actual (Revenue & Expenses)	PO Commit (Remaining PO Balance)	Actual + PO	Available (Budget Minus Actual + PO)	Avail%	PreCommit (PO's Requested)	Available (Budget Minus PO Requisitions)	Avail%
State Grants	40,000.00-				40,000.00-	100-		40,000.00-	100-
* INTERGOVERNMENTAL	40,000.00-				40,000.00-	100-		40,000.00-	100-
Interest-Pooled Inv.	58,028.00-	9,203.13-		9,203.13-	48,824.87-	84-		48,824.87-	84-
RGL Pooled Inv.		33.79-		33.79-	33.79			33.79	
URGL Pooled Inv.		2,405.12-		2,405.12-	2,405.12			2,405.12	
Water Surcharge 1.5%	1,475,479.00-	1,176,176.83-		1,176,176.83-	299,302.17-	20-		299,302.17-	20-
* MISCELLANEOUS	1,533,507.00-	1,187,818.87-		1,187,818.87-	345,688.13-	23-		345,688.13-	23-
** REVENUE	1,573,507.00-	1,187,818.87-		1,187,818.87-	385,688.13-	25-		385,688.13-	25-
Professional Services	1,774,050.00	168,506.60	1,015,721.06	1,184,227.66	589,822.34	33		589,822.34	33
WRWC Staff & Legal	472,000.00	277,889.22	54,000.00	331,889.22	140,110.78	40.92		140,110.78	40.92
Fin Consult Services	10,000.00	8,500.00	8,700.00	17,200.00	7,200.00-	72-		7,200.00-	72-
Invest Pool Alloc Ex		554.76		554.76	554.76-			554.76-	
Pmts to O Agencies		113,736.47	153,411.53	267,148.00	267,148.00-			267,148.00-	
Seminars and Meetings	1,000.00				1,000.00	100		1,000.00	100
Advertising	4,000.00	280.00		280.00	3,720.00	93		3,720.00	93
Undesignated Budget	20,000.00				20,000.00	100		20,000.00	100
Insurance Premium		3,286.00		3,286.00	3,286.00-			3,286.00-	
Travel	1,000.00	44.00		44.00	956.00	96		956.00	96
Overhead	130,905.00	68,519.89		68,519.89	62,385.11	271.61		62,385.11	271.61
** EXPENDITURES	2,412,955.00	641,316.94	1,231,832.59	1,873,149.53	539,805.47	22		539,805.47	22
*** Total	839,448.00	546,501.93-	1,231,832.59	685,330.66	154,117.34	18-		154,117.34	18-

Northern Nevada Water Planning Commission

STAFF REPORT

DATE: February 25, 2016

TO: Chairman and Members, Northern Nevada Water Planning Commission

FROM: Jim Smitherman, Water Resources Program Manager

SUBJECT: Report on the Truckee Meadows Regional Planning Agency (“TMRPA”) parcel-based population and employment modeling project

Jim Smitherman, NNWPC Water Resources Program Manager, will provide a brief verbal report concerning the status of the TMRPA parcel-based population and employment modeling project.

JS:jd