# Douglas County

## Stormwater Task Force
## Public Meeting Notice and Agenda

**Thursday, November 12, 2026** **5:30 PM** **Community & Senior Center Dining Room 1329 Waterloo Lane Gardnerville, NV 89410**

The Douglas County Stormwater Task Force ("Task Force") serves as a collaborative forum for reviewing and evaluating the proposed Douglas County Stormwater Utility and its associated funding framework, and for developing recommendations for consideration by the Board of County Commissioners. The Task Force acts solely in an advisory capacity.

Questions regarding the agenda may be directed to the County Manager's Office at 775-782-9821. Agenda items may be taken out of order, combined for consideration, or removed from the agenda at any time.

To ensure that every citizen wishing to speak before the Douglas County Stormwater Task Force has an opportunity to express an opinion, the audience is requested to refrain from making comments, clapping, or making remarks or gestures that may interrupt, interfere with, or prevent a speaker from commenting on any present or future project. Persons wishing to address the Stormwater Task Force who are unable to attend the meeting may submit written public comment by email to **stfpubliccomment@douglasnv.us** at least 24 hours before the meeting.

**Supporting Materials:** Copies of supporting materials may be requested in person from the Douglas County Manager's Office, 1594 Esmeralda Avenue, Minden, Nevada, or by calling 775-782-9821.

A copy of the finalized agenda is posted at the Minden Inn, located at 1594 Esmeralda Avenue, Minden, Nevada.

Electronic copies of the agenda and supporting materials are also available on the following websites:
**State of Nevada Public Notices Website:** https://notice.nv.gov/
**Douglas County Meeting Website:** https://douglascountynv.granicus.com/ViewPublisher.php?view_id=1

**Notice to Persons with Disabilities:** Members of the public who have a disability and require special assistance or accommodations at the meeting are requested to notify the Douglas County Manager's Office in writing at Post Office Box 218, Minden, Nevada 89423, or by calling 775-782-9821 at least 24 hours in advance.

**Stormwater Information:**
**Douglas County Stormwater Task Force Page:**
https://www.douglascountynv.gov/GOVERNMENT/departments/community-development/stormwater-and-flood-management/establishment-of-stormwater-enterprise-utility
**Stormwater Distribution List Sign-Up:** https://lp.constantcontactpages.com/sl/bnuE28T

**DOUGLAS COUNTY STORMWATER TASK FORCE**

**FINAL AGENDA**

**November 12, 2026**

**1. CALL TO ORDER**

**2. PUBLIC COMMENT**

At this time, public comment will be taken on those items that are within the jurisdiction and control of the Stormwater Task Force. Public comment is limited to three minutes per speaker. Public comment will only be taken at the beginning and end of the meeting.

**3. APPROVAL OF AGENDA**

For possible action. Approval of proposed agenda. The Douglas County Stormwater Task Force reserves the right to take items in a different order to accomplish business in the most efficient manner, to combine two or more agenda items for consideration, and to remove items from the agenda or delay discussion relating to items on the agenda.

**4. APPROVAL OF PREVIOUS MINUTES**

4.a For possible action. Discussion to approve the draft minutes of the Stormwater Task Force regular meeting held on October 14, 2026, and workshop meeting held on October 22, 2026.

**5. AGENDA ITEMS**

5.a For presentation only. Presentation by Tom Dallaire, Community Development Director, regarding land use, floodplains, drainage areas, lands identified as critical for conservation, and agricultural water management (including the Alpine Decree, the Water Conveyance Advisory Committee, and agriculture's role in drainage and stormwater management).

5.b For Possible Action. Discussion for Task Force members to provide Task Force-related updates and to identify topics on which they would like additional information. Discussion may include, for example, requests to add topics to the parking lot or requests for presentations or materials that are consistent with the Task Force's objectives.

**6. PUBLIC COMMENT**

At this time, public comment will be taken on those items that are within the jurisdiction and control of the Stormwater Task Force.

**7. ADJOURNMENT**

**AGENDA ITEM NO. 4.a**

**STORMWATER TASK FORCE AGENDA ITEM**
**COVER PAGE**

**MEETING DATE:** November 12, 2026

**TIME REQUIRED:**

**AGENDA:** **APPROVAL OF PREVIOUS MINUTES**

**TITLE:**
For possible action. Discussion to approve the draft minutes of the Stormwater Task Force regular meeting held on October 14, 2026, and workshop meeting held on October 22, 2026.

**RECOMMENDED MOTION:**
Approve the draft minutes of the Stormwater Task Force regular meeting held on October 14, 2026, and workshop meeting held on October 22, 2026.

**FINANCIAL IMPACT:**
None.

**BACKGROUND:**

**ATTACHMENTS:**
DRAFT Minutes 10-14-26.docx
DRAFT Minutes 10-22-26.docx

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The Regular Meeting of the Stormwater Task Force was held on Wednesday, October 14, 2026, beginning at 5:30 PM in meeting room of the Community & Senior Center, Dining Room, 1329 Waterloo Lane, Gardnerville, NV 89410 and via Zoom participation as well as was streamed via Live Stream – Video Link, Douglas County YouTube Channel. **When applicable, the minutes below have been transcribed.**

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**CALL TO ORDER**
The meeting was called to order at 5:30 PM.

**MEMBERS PRESENT:**
Todd Whear
Cameron Mckay
Karin Peternel - *via Zoom*
Chris Garrison
Chad Cox
Joseph "Joe" Ortiz
George Phillips
Steve Walker
Jonathan "Jon" Lang
Donna Tanner
Tod Carlini
Sheila Arnaud
Virginia "Ginger" Starrett
Lawrence "Larry" Werner

**MEMBERS ABSENT:**
Patrick "Pat" Garrahan

**STAFF PRESENT:**
Wendy Lang, Assistant County Manager and Staff Liaison
Doug Ritchie, Chief Deputy District Attorney
Carey Rosser, Esq.
Kathy Lewis, Chief Operating Officer
Courtney Walker, Stormwater Program Manager

## 2. PUBLIC COMMENT

Michael May, 1440 Walker View, Wellington, NV, recapped the previous Stormwater Task Force meeting and noted that he observed a Douglas County resident who appeared upset. He stated that he spoke with the resident after the meeting, and she shared that she lived on Cortez Lane. He explained that he drove out to Cortez Lane and believes the area would be an ideal example for the Stormwater Task Force to consider. He noted examples of preventive landscaping and ditches that need attention, adding that some of these issues have been addressed since the previous meeting. He stated that Community Development and others have affected drainage in the area and asked that this be considered. He also commended the Douglas County Stormwater program for its work and requested that the cost of materials be evaluated to help reduce expenses.

Kim Magary stated that she was the resident Michael May referenced and clarified that she lives on Sheep Camp Road, adding that Cortez Lane was built after she moved to the area. She explained that

reinforcement repairs had been made near the bottom of the area where it connects to the electrical poles, but Cortez Lane has not been fixed. She stated that there is no channel between the top three properties to direct water through culverts and down the back side of the properties, where it reaches the power poles and flows toward the electrical infrastructure and homes. She expressed concern that the repairs have exposed gas and electrical lines because floodwater is not reaching the basin properly. Based on these concerns, she believes Cortez Lane would be an appropriate project for the Stormwater Task Force to address. She also raised concerns about missing recorded easements. She recalled that, at the previous Stormwater Task Force meeting, it was stated that Stormwater staff would investigate private easements if they became a nuisance. However, she said that, based on emails she has received, this has not been the case. She emphasized that she considers the situation a public safety issue because water ponds around her electrical pole and electrical box.

Rachel Christensen expressed support for moving toward a possible resolution that all parties can agree upon. She stated that she is pleased that relief may be provided to homeowners and that their sense of safety and certainty may be restored. She also expressed appreciation for the Stormwater Task Force's attention to this important issue and recognized the benefits that proper stormwater maintenance provides to residents throughout Douglas County. She stated that she wants the Stormwater program to succeed in a way that benefits everyone. She was encouraged that the County is moving quickly to clean out and properly restore Smelter Creek, emphasizing that the issue presents a public safety concern that needs to be resolved before the next weather event. She expressed appreciation for the County's efforts to identify funding for the project but noted that it was unfortunate that the opportunity to secure a Natural Resources Conservation Service (NRCS) grant was lost, as it could have covered 75–90% of eligible project costs. She expressed hope that the County would take advantage of future grant opportunities to assist residents and protect taxpayer dollars. She also urged the Stormwater Task Force to insist on transparency regarding the projects that need to be completed, associated costs, funding sources, steps taken, and the path forward.

Ted Gains stated that the County is directing water onto his property and expressed hope that the Stormwater Task Force is addressing the issue. He explained that he had developed two projects and that the County filled the detention ponds he paid for to protect the public. He stated that the County would now be responsible if flooding occurred and that the District Attorney's Office had written the letter that allowed the County to fill the detention ponds. He recalled a meeting a couple of years ago when the County identified a Johnson Lane program for research but did not address it at that time. He stated that the issue began in 2014 and was addressed in 2023. He also recalled that $125,000 had been allocated at that meeting for an engineer to conduct stormwater research and asked what happened to those funds. While expressing appreciation for the Stormwater Task Force's efforts, he emphasized that the County needs additional funding. He referenced Sharla Hales asking Task Force members to be transparent and questioned how many members had spoken with a County Commissioner since the Task Force began. He stated that he had paid into the system, that money had been wasted, and that the County was now seeking additional funding. He concluded that the Task Force had been placed in a position where it was expected to find more money.

Darlene Wheeler, a resident of Ruhenstroth, stated that she lives at the lower end of the area, where water flows through her property. She explained that some neighbors farther up the road do not maintain their ditches, while she ensures that the ditches on her property remain clear so water can flow freely. She also raised concerns about a neighbor behind her on Pinto who does not maintain the ditch needed to carry water through the area. She stated that the neighbor has a tractor but piles debris along the side of the ditch, causing water to back up onto her property. She expressed uncertainty about how the County addresses these types of issues and stated that, despite speaking with County staff, she has not seen results. She asked what alternatives are available to her, given that water continues to pond on her property.

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## 3. APPROVAL OF AGENDA

**MOTION TO:** Approve the agenda as recommended by staff; carried.

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| **RESULT:** | **APPROVED [UNANIMOUS]** |
| **MOVER:** | Cameron Mckay, |
| **SECONDER:** | Donna Tanner, |
| **AYES:** | Todd Whear, Karin Peternel, Chris Garrison, Chad Cox, Joe Ortiz, George Phillips, Steve Walker, Jon Lang, Tod Carlini, Sheila Arnaud, Ginger Starrett, Larry Werner, Cameron McKay, Donna Tanner |

## 4. APPROVAL OF PREVIOUS MINUTES

### 4.a For possible action. Discussion to approve the draft minutes of the regular meeting on September 9, 2026, of the Stormwater Task Force.

**MOTION TO:** Approve the minutes of the Stormwater Task Force Regular Meeting of September 9, 2026 with corrections; carried.

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| **RESULT:** | **APPROVED [UNANIMOUS]** |
| **MOVER:** | Steve Walker, |
| **SECONDER:** | Todd Whear, |
| **AYES:** | Cameron Mckay, Karin Peternel, Chris Garrison, Chad Cox, Joe Ortiz, George Phillips, Jon Lang, Donna Tanner, Todd Whear, Steve Walker, Tod Carlini, Sheila Arnaud, Ginger Starrett, Larry Werner |

## 5. AGENDA ITEMS

### 5.a For possible action. Discussion to cancel or reschedule the October 21, 2026, and November 11, 2026, Task Force meetings due to scheduling conflicts.

Joe Ortiz stated that the scheduling conflicts were not due to himself or the Task Force, but rather the County's ability to provide facilities and accommodate other needs of that nature.

Joe Ortiz made a motion to change the two dates to October 22nd and November 12th.

Ginger Starrett seconded the motion.

Jon Lang made mention of his motion to address concerns regarding the Task Force Facilitator, Joe Ortiz.

Joe Ortiz stated that Jon Lang could request a future agenda item, but it could not be presented at that time, according to Wendy Lang.

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**MOTION TO:** Approve to change the two dates to October 22nd and November 12th.

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| **RESULT:** | **APPROVED** |
| **MOVER:** | Joe Ortiz, |
| **SECONDER:** | Ginger Starrett, |
| **AYES:** | Todd Whear, Cameron Mckay, Karin Peternel, Chris Garrison<br>Chad Cox, George Phillips, Steve Walker, Jon Lang<br>Tod Carlini, Larry Werner, Joe Ortiz, Ginger Starrett |
| **NAYES:** | Donna Tanner, Sheila Arnaud |

**5.b For possible action. Discussion to establish a roadmap for the Stormwater Task Force's future meetings. The roadmap may include key topics for consideration, information or presentations needed, meeting format options, and opportunities for public feedback.**

Todd Whear commented that the proposed road map by Joe Ortiz was well laid out and asked Joe to clarify whether his road map was for seven months or seven meetings.

Joe Ortiz stated that his proposed road map, in place of the County's proposed road map, was both expedited and curated after speaking with the public. Ortiz clarified that the County's road map was proposed to take seven months, while his proposed road map consisted of seven meetings ending around January. Ortiz noted that there was room for adjustment if more time was deemed necessary.

Tod Carlini expressed his opinion that the Task Force should take a "field trip" at some point. Carlini felt that the Task Force needed to see some of the work that had been done and the areas that had been identified as problems. Carlini stated that the Task Force was there to look at potential funding, but that it was important to be on the ground to understand the situation at hand and the extent of the problem.

Joe Ortiz supported this idea and stated that the option should be looked into.

Karin Peternel felt that the Task Force should adhere to the originally proposed timeline. She stated that this would allow the Task Force to be thorough and avoid the possibility of the public feeling that the Task Force was not transparent or open.

Peternel stated that, with the holidays approaching, many people would be away, making public outreach more difficult over the next few months. Peternel stated that when the County visited different neighborhoods and consulted the public, the process took over a year. She noted that plenty of people who spoke at recent meetings stated that they had never heard about those meetings. Therefore, she felt that the timeline should not be rushed to ensure that this did not happen again.

Jon Lang expressed concerns about the proposed road map provided by Joe Ortiz. He elaborated that it seemed to focus on "almost forensic" budgetary concerns and issues on which only one person at the meeting could comment on fiscal responsibility. Lang agreed that fiscal

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responsibility and budgetary concerns were important components but noted that the time limits devoted to certain topics and individuals caused him to question the timeline.

Jon Lang also stated that he felt the packet was driven for other reasons.

Jon Lang suggested that a motion be made at some point during the meeting to address his concerns regarding Stormwater Task Force Facilitator, Joe Ortiz, and his ability to continue as Facilitator. Lang also suggested making a motion to determine whether the Board of County Commissioners would review its appointment of Joe Ortiz to the Stormwater Task Force.

Chris Garrison stated that, after reviewing emails, he noticed references to Smelter Creek and Buckskin. He wanted to know what the inquiry regarding those locations was and why it was being made.

Joe Ortiz stated that the County Attorney and Wendy Lang had asked him to have that information removed, so he declined to discuss it because of, alleged, pending litigation. He then deferred to Wendy Lang for guidance on the topic.

Chris Garrison clarified that he wanted to know why Joe Ortiz was looking into past matters when he felt the intent of the Task Force was to address Douglas County's problems moving forward.

Joe Ortiz responded that he felt it was important to understand past operations and events. Ortiz again stated that he was unsure whether he could speak specifically about Smelter Creek, but, based on his experience speaking with the community, this proposal was merely a proposal and was 99% driven by the community.

Sheila Arnaud felt it was important to revisit the Johnson Lane settlement. Arnaud stated that the Task Force needed to know what the law was and follow NRS.

Arnaud stated that the Task Force was not intended to ensure that the County was clearing storm drains properly, but rather to find funding. Therefore, when looking at the budget, she was looking for "bumps." Arnaud felt it was important to understand the tolerance of the community. Arnaud stated that Douglas County could not be compared to Carson City and needed to assess the community's needs. She added that the Task Force had to follow the money.

Joe Ortiz returned to explaining that his proposed road map was merely a proposal and that some things were missing, including someone to discuss the budget, which Ortiz stated was necessary. Ortiz stated that the proposed road map was presented with the intent of discussing it, as Open Meeting Law does not allow the Task Force to discuss matters among themselves. Ortiz stated that, as Facilitator, he had been meeting with many people since the last meeting to put something together that could be presented to the Task Force in a concise way.

Joe Ortiz addressed Jon Lang and stated that he felt Lang had a personal issue with him. Ortiz stated that he had never received a phone call, text message, or email from Jon Lang attempting to discuss any problems. Ortiz reiterated that his road map was merely a proposal and was open for discussion.

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Karin Peternel agreed that the road map felt hyper-focused on the budget and the past. She felt that everyone should participate in determining what the road map should look like.

Joe Ortiz agreed with Peternel's comments and stated that this was why he developed the proposed road map for discussion.

Steve Walker felt that if the proposed road map might be used, the Task Force should go through it page by page, making comments as they proceeded, cleaning it up, and evaluating it as a group. Walker felt that the Alpine Decree did not contain anything specific to drainage and also commented on the 20 minutes devoted to it. Walker felt that there was nothing in the Alpine Decree specific to what the Task Force was intended to do. Walker suggested that, after the Task Force incorporated its feedback into the road map proposed by Joe Ortiz, the revised document could be brought back for further consideration.

Joe Ortiz thanked Steve Walker and stated that this was what the Task Force was currently doing: discussing the road map.

Ginger Starrett referenced the "homework" assigned to the Task Force at the end of the road map, which asked members to read the Executive Summary of the Stormwater Master Plan. She felt that if the summary were read, many of the questions being asked would already be answered in it.

Todd Whear stated that he had read the summary and highlighted sections about which he had questions. Whear said his position was that something should not be built without funding for it. Whear felt it was important to look at what had happened in the past without proper funding. Whear expressed frustration that the Task Force was trying to "figure this out for the governing body.". Whear stated that Nevada did not have a stormwater problem, but that other places did. Whear stated that mother nature could not be stopped and that there was nothing wrong with the County being reactive in its responses. Whear stated that the County could be proactive, but that the next storm could not be predicted, nor could it be predicted what would be flooded. Whear stated that Courtney Walker told him she could run her department on $1.1 million. Whear suggested that, in the meantime, efforts should focus on grants and funding, but that taxpayers should not be responsible for the costs. He stated that the community did not need another tax.

Karin Peternel stated that every city, county, and state in the country had a stormwater program exactly like Douglas County's.

Todd Whear stated that this was not true.

Karin Peternel asked Todd Whear to identify where there was no stormwater program and Whear responded that only about 60% of counties in the United States had stormwater programs.

Carey Rosser cautioned Task Force members against discussing substantive information about the stormwater program because of Open Meeting Law. Rosser reminded the Task Force members that the topic under consideration was the road map and that members could discuss topics they would like to present in the future or dates.

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Todd Whear stated that he would rather see the item move forward and felt that the process should not take seven months.

Larry Werner stated that Joe Ortiz's proposed road map made sense and that too many people were focused on solving flooding issues. He felt the focus should instead be on finding a consistent funding method that Courtney Walker could use for maintenance work, as well as finding and obtaining grants. Werner stated that the goal should be to find a consistent source of funding that did not rely on taxes or the General Fund.

Donna Tanner stated that she liked the proposed road map and appreciated the effort made to narrow things down. Tanner explained that "taxes" and "fees" were two different things and questioned whether the proposed funding method was legal. Tanner stated that the issue needed to be examined from the beginning and that what was actually being addressed was flood control, not stormwater.

Sheila Arnaud felt the direction should be to identify what needed to be funded, followed by determining how to fund it. Arnaud stated that keeping the funding within the General Fund should be included as one of the alternatives. Arnaud felt that the Task Force needed to understand the money, how to use it, and what options were available.

Todd Whear stated that he would like to go through the entire road map as a group, as it seemed everyone had details they wanted to address and comments to make. Whear stated that he would like to continue the discussion. He was unsure whether a motion needed to be made or whether the discussion should be postponed.

George Phillips stated that he would like to move on from the item. He was not "big" on the tax option and wanted to prove to the public that the Task Force would help guide the County toward getting this resolved.

Steve Walker asked to begin on page 23 and go through the road map so everyone could comment on it page by page.

Chris Garrison stated that he could tell a lot of work had gone into the proposed road map and questioned whether now was the time to go through it.

Karin Peternel noted that no public outreach was identified at the top of page 23. Peternel also mentioned that public comment was not included in any of the seven proposed meetings and reiterated that ensuring transparency was important.

Joe Ortiz stated that the workshops were designed to create an open-forum-type discussion between Task Force members and the community.

Karin Peternel stated that there should be individual workshops for residents to learn what the Task Force was doing. Ortiz agreed and stated that this was what the upcoming workshops were intended to accomplish. Peternel felt this was not enough. Ortiz explained that he was open to

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discussing additional workshops beyond those already scheduled if the public and/or other Task Force members wanted them.

Karin Peternel continued that she felt more workshops needed to take place. She reiterated that November was Flood Awareness Week across the state and felt this would be a great time to hold the workshops. Peternel stated that the workshops she was referring to should be for the public only, not for Task Force members. She stated that this would allow the Task Force to listen directly to the public.

Joe Ortiz asked Peternel whether she had reviewed the proposal in the meeting packet. Peternel confirmed that she had. Ortiz stated that the workshops included in the proposal were specifically intended to promote public engagement in a public setting.

Wendy Lang attempted to clarify Peternel's statements and said the question might concern how the structure and timing of the workshop proposed by Ortiz would work and how public outreach would be accomplished during that time. Peternel confirmed that Lang had clarified her concern.

Karin Peternel felt that the proposed two hours was not enough. Peternel stated that she felt the public would ultimately have to pay for this, so the public should know what the Task Force was doing.

Chris Garrison stated that, with transparency being a common theme, the Task Force should include a specific component in the road map that directly addressed transparency and community engagement beyond the mentioned workshops.

Joe Ortiz asked whether Garrison had any specific ideas beyond the proposed workshops.

Garrison stated that a plan could be discussed at one of the workshops and that he was not there to come up with ideas for community engagement at that moment. However, he felt that creating a community engagement component would ensure that community engagement was deliberate.

Donna Tanner inquired how community engagement would work in relation to Open Meeting Law and agenda preparation. Tanner stated that she knew the County had spoken with residents but was unsure how that would work for the Task Force.

Doug Ritchie responded that it would depend on the structure of those types of workshops. Ritchie stated that, in the past, the types of workshops Peternel was referring to had been staff-driven and did not involve the commissioners, so there was no quorum. Ritchie stated that less than a quorum of this Task Force could participate. He reiterated that it would be more of an outreach effort to gather information to bring back and place on the agenda for a meeting. Ritchie also stated that informational workshops were generally exempt from Open Meeting Law and that it depended on how the Task Force wanted the workshop to be structured.

Joe Ortiz stated that he would not structure the workshops; instead, the Task Force would structure them as a group. Ortiz stated that one of the frustrations people had was that typical public comment did not allow for interaction, as speakers were limited to three minutes. Ortiz

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stated that the idea was for the Task Force to open the floor to the community and allow time to respond to the public.

Wendy Lang stated that another type of workshop that could be conducted with involvement of public bodies is a round-table-type session. Lang explained that this could involve creating four or five stations, ensuring Task Force members were separated, and allowing members of the public and Task Force members to rotate through the stations. Materials such as sticky notes, conversation topics, and staff experts at the tables could be provided. Lang explained that, from these stations, the Task Force and/or the public would gather information, feedback, and questions.

Karin Peternel expressed her opinion that the Task Force would fail if the public did not know what was going on. Peternel further explained that the two-hour meetings would not be enough, especially given the amount of public comment the Task Force received.

Peternel proposed that public outreach meetings, separate from the workshops, be added to the road map.

Joe Ortiz clarified that the road map was not his alone, but a collaborative effort intended to be discussed by the group.

Karin Peternel countered that, based on what she had read, the road map did not feel collaborative.

Joe Ortiz stated that the document was a summary of meeting notes that he had requested be placed on the record for transparency.

Tod Carlini stated that he felt the presented road map was a good start. Carlini also stated that he had noticed more and more members of the public attending each meeting. Therefore, he felt that the focus of the workshops needed to be on outreach. Carlini added that he felt it was important for Task Force members to have an opportunity to visit the various areas experiencing challenges, understand the potential cost-benefit considerations, and learn about the efforts already undertaken by Stormwater.

Tod Carlini also stated that there was no mandate requiring the Task Force to return to the Commission with a proposed fee. The goal of the Task Force was to return to the Commission with a possible avenue for funding, whether internal or external.

Chad Cox stated that he felt staff had done a lot of great work and that the proposed road map was not significantly different from the road map presented by staff. He felt both road maps provided a good framework. Cox commended Ortiz on his goal of efficiency in the number of meetings proposed but wondered how the Task Force would fit additional meetings into each month if more were necessary. Cox agreed with other Task Force members that a field trip would be beneficial. Cox also stated that he wanted to ensure the Task Force learned about everything that had already been done so they would not recreate discussions that had already taken place regarding funding and could instead address what had not yet been considered. Cox concluded

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by stating that both road maps looked good and that he would be willing to move forward with either the proposed road map or the County's road map.

Joe Ortiz reiterated that his proposed road map had been brought forward because the County's road map had not received a second and therefore died. However, he stated that the County's road map could be brought back for discussion if needed.

Cameron McKay stated that he appreciated everything that had been done but acknowledged that changes might be made based on detours that could arise. McKay reiterated that the Task Force's goal was to develop a funding mechanism, not determine a price. McKay also stated that the Task Force could not examine specific projects because that was not its role.

Chris Garrison asked whether Item 5.b specifically referred to either the proposed road map or the County's road map. He also asked whether the Task Force had the option to adopt one or the other.

Doug Ritchie stated that, based on the agenda title, the Task Force was free to determine which road map they wanted to adopt.

Chris Garrison stated that he liked the simplicity of the County's road map and suggested adopting the County's broad road map, with detailed reference to the road map Ortiz had presented.

Joe Ortiz reminded the group that documentation had been submitted by Ginger Starrett and Sheila Arnaud and reminded the Task Force to consider their submitted documentation as well.

Jon Lang revisited his earlier statements regarding Joe Ortiz and his role as Facilitator. Lang explained that his comments were professional and not based on anything personal. Lang asked for counsel on how to proceed based on the various discussions that had taken place and the questions that had been asked.

Doug Ritchie stated that, based on his understanding of the question, it would be appropriate to go through the proposal line by line and make changes. However, discussions about someone's conduct, personal motivations, competence, or character were not on the agenda and would also require proper notice to that individual under Open Meeting Law.

Jon Lang felt that the road map proposed by Joe Ortiz was not geared toward what the community wanted. Lang also felt that some of the language used throughout the road map was subjective and directly called out individuals, which he did not agree with and would not want to associate his name with. Lang also stated that, in the interest of time, he would not ask Ortiz how many times he specifically mentioned Chairman Gardner, but that he had counted seven mentions. Lang commented that it seemed Ortiz had an "infatuation" with Chairman Gardner. Lang also stated that inviting Chairman Gardner to Task Force meetings to answer questions about prior Board meetings would be inappropriate because it would be difficult to encapsulate those discussions within an agenda item. Lang stated that the proposal suggested Chairman Gardner would be present to answer questions while the other Commissioners could sit in and listen but would not deliberate.

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Joe Ortiz interjected and stated that there was no infatuation with Mark Gardner, but that it seemed prudent to invite him because he would have more oversight than other Board members regarding actions taken concerning stormwater.

Jon Lang stated that, additionally, Ortiz never referred to Chairman Gardner as "Chairman," but instead referred to him as "Mark Gardner". Lang quoted a portion of the proposal that stated something similar to Mark Gardner not participating in Q&A sessions and therefore needing to attend meetings to "discuss" matters. Jon Lang wanted to make clear that those were Ortiz's comments in the record. Lang also raised concerns regarding the Alpine Decree, the NRS involved, and the relationship between those topics. He stated that he would not be comfortable attaching his name to the road map proposed by Ortiz and would instead adopt the County's road map.

Joe Ortiz reiterated that his road map was only a proposal. He also stated that Jon Lang had not proposed an alternative beyond adopting the County's road map, which had not received a second at the previous meeting and therefore died.

Ginger Starrett stated that, when she read the road map, she felt it was far too detailed and had questions preprogrammed that might not reflect where "the road led". She felt it would be better for the general topics in the road map to be broader. Starrett stated that, although she had initially resisted the County's road map, she felt the Task Force needed to build its own road map because Ortiz's proposed road map was too directed. She felt that having a general topic for each meeting would be more effective.

Joe Ortiz countered and stated that the information shared among the Task Force was so compartmentalized that this was why he had used information from the County's proposal and worked from that.

Ginger Starrett stated that the role of the Task Force was not to dictate how the County conducted stormwater maintenance or judge how it had conducted stormwater maintenance in the past. Instead, the Task Force needed to determine whether stormwater maintenance was a responsibility and, if so, what the scope of that responsibility was and how much it would cost. Starrett stated that, after determining those things, the Task Force needed to figure out how to fund it.

Jon Lang made a motion to approve the County's road map that was proposed the previous week.

Karin Peternel seconded the motion.

Donna Tanner commented on why the County's road map had not received a second the first time it was presented. Tanner stated that the Task Force should not give the perception that the County was leading the Task Force through the process and felt hesitant about moving forward with it.

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Karin Peternel stated that the County had held other Task Force meetings and Ortiz had not, so she felt the Task Force should rely on the County to provide the detailed road map that had been presented, which was completely community-oriented.

Sheila Arnaud asked whether Jon Lang and Wendy Lang were related.

Wendy Lang stated that she and Jon Lang were not related and had never met before the formation of the Task Force.

Jon Lang also stated that this information had already been disclosed during the interview process.

**MOTION TO:** Approve the County road map that was presented to all people last week.

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| **RESULT:** | **APPROVED** |
| **MOVER:** | Jon Lang, |
| **SECONDER:** | Karin Peternel, |
| **AYES:** | Cameron Mckay, Karin Peternel, Chris Garrison, Chad Cox, Steve Walker, Jon Lang, Ginger Starrett, Larry Werner |
| **NAYES:** | Todd Whear, Joe Ortiz, George Phillips, Donna Tanner, Tod Carlini, Sheila Arnaud |

**5.c For possible action. Presentation and discussion regarding the Stormwater Program's budget, including historical expenditures and grant applications, and maintenance records. Discussion may include revenues, expenses, and fund accounting, grant applications and grant-funded projects; existing stormwater infrastructure and assets; maintenance activities and records.**

Courtney Walker, Stormwater Program Manager, began her presentation by stating that the work logs included in the packet could also be found under Stormwater Task Force Documents on the Douglas County website. Walker explained that an Excel spreadsheet contained records from 2022 through 2026.

Joe Ortiz asked that, for the sake of time, the presentation be shortened slightly to ensure that public comment could be heard and the meeting could end around 7:30 p.m., as intended.

Courtney Walker acknowledged this and stated that the presentation would be much more brief than the last presentation she gave.

Courtney Walker reminded the group that the $1.1 million budget also needed to cover staff time, equipment, equipment maintenance, and materials used for projects. Walker reviewed the program budget from FY2021 through FY2026, including total expenses and total revenue. Walker explained that, when possible, unspent funds were rolled over into the following year.

Courtney Walker stated that Todd Whear had come to speak with her in her office and wanted to clarify that she had not said the program could operate within the $1.1 million budget. Courtney Walker explained that costs rise, the program was already exceeding that amount, and

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what she had said would be addressed in the last slide of her presentation, which proposed what the program could look like.

Courtney Walker also stated that she believed the County did had a stormwater problem. She explained that the County receives 11 inches of rain annually and that the problem was that, even with smaller storms, infrastructure needed to be maintained. Walker stated that there was also the issue of when three inches of the annual 11 inches of rain fell within one hour.

Courtney Walker agreed that they likely would not be able to solve all of these problems, but there were some things the program could do to make the situation a little better. She felt the program should try if there was a cost-benefit analysis to support it.

Chris Garrison asked whether the slide showing total expenses and revenue by year reflected year-to-date figures, and Walker confirmed that it did.

Courtney Walker further explained that she did not have the actual figures for the current fiscal year because the fiscal year was still underway.

Tod Carlini asked Courtney Walker whether, in the years when expenditures exceeded revenue, any of those expenditures were related to the 2023 flood event.

Courtney Walker deferred to Kathy Lewis, who responded that she did not believe they were because those costs were funded through other funds to keep them separate from the Stormwater Program's operating budget. Lewis explained that the years with higher expenditures likely reflected years when equipment was purchased. Lewis clarified that when expenditures exceeded revenue, this did not mean they exceeded the budget. Because it was a special revenue fund, any money that was not spent rolled over into the following year.

Tod Carlini asked whether the Stormwater budget was responsible for any response, recovery, or mitigation costs.

Kathy Lewis confirmed that the Stormwater budget was not responsible for the costs Carlini had mentioned. Lewis explained that those costs were covered by the stabilization fund, General Fund, and maintenance fund.

Tod Carlini asked whether any of the presented figures included grant funding.

Courtney Walker stated that some of the figures in the presentation came from the General Fund, some came from grant funds, and others were reimbursements.

Tod Carlini then asked what percentage of the budget was spent on Lake Tahoe. Walker explained that she had a slide addressing that as well.

Courtney Walker then reviewed the different categories of expenses and revenues. The expense categories included Salaries and Benefits, Vehicle and Equipment Maintenance, Overhead, Regulatory Fees and Monitoring, Maintenance Supplies and Projects, and Capital Assets. The revenue categories included Transfers In – Operating (General Fund), Transfers In – Other

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(General Fund), Grant Revenue – Federal, Miscellaneous Revenue, and Investment Earnings. Walker also reviewed expenses and revenue by category and year.

Tod Carlini asked about the recurring dollar amount listed under Transfers In – Operating (General Fund) and how that amount was established.

Kathy Lewis explained that the dollar amount was determined by Board direction and had remained at $1.1 million transferred from the General Fund to support stormwater operations.

Tod Carlini asked whether this occurred in any other department.

Kathy Lewis stated that funds were also provided to support other programs, such as the Senior Services program, and to help pay for things such as non-park facilities.

Todd Whear asked for clarification on what "Investment Earnings" meant.

Kathy Lewis explained that Investment Earnings represented the interest earned on the fund balance, meaning the cash balance in each fund. Interest was earned countywide and then allocated to each fund based on its cash balance. Lewis also explained how interest had been earned over the years, the adjustments the County was required to make, and how the interest earned depended on the ending cash balance.

Chad Cox asked what the fund balance was and whether it could be a potential funding source the Task Force could consider using for capital projects.

Kathy Lewis stated that the interest earned in this fund remained in the fund and could be used for operations.

Sheila Arnaud asked whether operations and maintenance consisted of 50% cleaning culverts, clearing swales, street sweeping, and maintaining physical damage.

Courtney Walker used a slide to explain the percentage of expenses allocated to the different categories.

Sheila Arnaud explained information she had found and stated that, under NRS, there would be certain requirements if a utility fee were implemented.

Courtney Walker then reviewed the Daily Work Logs and the information they contained. Walker explained that the logs allowed the program to collect data as efficiently as possible without additional funding.

Chris Garrison asked whether the Daily Work Logs were still maintained on a daily basis, and Courtney Walker confirmed that they were.

Donna Tanner asked whether the presented Enterprise Fund was the only one the County had.

Kathy Lewis answered that it was not, explaining that the Water Fund, Sewer Fund, and Airport Fund were also enterprise funds.

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Courtney Walker then explained commonly used terms and definitions, including assets, BuiltWitt Training, CAMPO, and others.

Courtney Walker then reviewed the Stormwater Program's efforts to track activities conducted within and outside the Tahoe Basin. Walker stated that the work primarily conducted within the Tahoe Basin included TMDL program management, TMDL infrastructure maintenance, stormwater MS4 permit reporting, stormwater MS4 permit infrastructure maintenance, FEMA Community Rating System reporting, and FEMA Community Rating System infrastructure maintenance. Walker explained that the figures presented were approximations because the program did not currently track activities hour by hour. Walker stated that approximately 29% of operating costs were spent within the Tahoe Basin, while the remaining 71% was spent outside the Tahoe Basin.

Tod Carlini asked what would happen if a fee were assigned only to the valley and southern Douglas County and where funding for Lake Tahoe would come from.

Courtney Walker stated that she was not prepared to answer that question but agreed that it needed to be figured out.

Courtney Walker stated that the Stormwater Program had actively applied for $12 million in grants. If awarded, the grants would provide $10 million to $11 million in funding, with a required match of $1.9 million. Walker stated that finding the matching funds was difficult but explained that she felt the match was a good deal for what the program would receive. Walker also explained that one problem with grants was that it could take years for them to be awarded, creating a risk that project costs would increase. She stated that this was something that needed to be considered in the future.

Courtney Walker briefly reviewed current or recent projects underway within Douglas County and the grants that might apply to them.

Courtney Walker presented a slide showing a proposed budget based on the operating budget that was under discussion.

Todd Whear asked what the "Debt Service" line item was.

Courtney Walker explained that the line item could assist with bonding and grant match requirements.

Kathy Lewis stated that when the County approved the increase in the gas tax, it used the initial revenue to issue bonds. Lewis explained that, with a stable revenue source, the County could issue bonds and complete projects sooner rather than having to save enough cash to pay for them.

Jon Lang requested clarification on the dollar amount presented and what it was intended to cover. Courtney Walker explained that it would cover all categories, including anticipated vehicle repairs, maintenance or replacements, bonding for projects, purchasing land in the floodplain for protection, and regular operations.

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Chris Garrison asked what would happen to the money allocated to the Debt Service line item if a grant were not awarded, specifically whether the money would roll over into the following year.

Kathy Lewis confirmed that the funds would remain in the fund and roll over to the next fiscal year.

Cameron McKay asked whether interest was only paid on a bond once money was drawn from it.

Kathy Lewis stated that debt service was paid on those bonds right away. Lewis explained that the County had to spend the money within approximately two years on the purposes it had identified and that the amount shown on the screen included those repayment costs.

Sheila Arnaud asked whether the TIS funds were maxed out.

Kathy Lewis stated that she would research the matter and report back to the group.

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| **RESULT:** | **PRESENTATION HELD** |

## 6. PUBLIC COMMENT

Rachel Christensen stated that she feels it is important for the Task Force to remember why they are there. Christensen stated that they volunteered to help the community, and that comes with the responsibility to act like professional adults. She stated that the personal attacks and hostility shown were not productive, and she does not believe that is what the County wants this process to become. Christensen said that this behavior is not a good use of the Task Force's time or the community's time, and that the Task Force lost members in the audience because of the behavior.

Kim Magary said that, while listening to the Task Force, she got the impression that some of the members do not feel it is important to look back. Magary stated that the Task Force will not be able to come up with a proper fee if they do not know the problem, how the problem started, and how the problems continue. Magary stated that when existing problems are not examined, a fee will not change the roadblocks presented to the community in getting issues fixed, and that the County's answer is always "no." Magary stated that, at a Board meeting in August 2023, the County Commission ordered the County to create the easements and amend the map, but later, the process was shut down. Magary stated that it was not a closed agenda, but the County was not willing "to do the agenda". Magary stated that it was going to cost twelve thousand dollars to dig the channel and that nothing had been done. Magary stated that she and her neighbor both had technical drainage studies showing that they receive a massive amount of water through those channels. Magary stated that the Task Force should ask the County, "Why can we not control our blue line streams?". Magary reiterated that she feels it is important for the Task Force to understand the problems that were created and the steps that were cut, and that a fee will not fix the fact that the County will not maintain the problems she described. Magary also stated that there are problems on Sheep Camp Road that cause water to flow into the County-owned, non-maintained road, which erodes the dirt road and has now left it concaved. Magary feels that the Task Force needs to look at all of this to come up with a fee or program that makes sense and actually fixes the problem.

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Ruth Robertson stated that she looked up information about one of the last speakers from one of the last meetings and stated that it was a subdivision in which the homeowner and the developer were required to record those easements, and their attorney was supposed to write them up. Robertson said it seems to her that the County's legal department would have had to approve the language and make sure it was recorded, and that those steps should have been completed prior to any development. Robertson said she wonders how many other properties out there have easements that have not been recorded.

Ted Gains stated that, based on his understanding, the Task Force was put in place to create a fee to charge the community, and stated, "they know taxes ain't gonna work". Gains stated that the County created the problem and had the rights to make sure the water and drainage were taken care of, and that it was the County's responsibility. Gains stated that it was the County's problem, not the people's problem. Gains stated that people study what they buy and asked why those people have to pay for the people who do not do their research or for the County's mistakes. Gains said that, in his subdivision, the County made him put the drainage on record, and the legal department had to read it and put it on the deeds. He stated that the County overruled it and still filled the detention ponds. Gains said the County does what it wants and that this is a County problem, not the people's problem.

Launa Curtis stated that she thinks the Board of County Commissioners are probably happy with the Task Force passing and following their recommendations for the agenda. Curtis stated that she thinks the Commissioners were unhappy with the 400 people who showed up in the summer and said, "Hey, not okay." Curtis stated that this Task Force should focus on what it can do to mitigate flooding and not just focus on financials. Curtis said to ask Courtney what she wants and to get it all passed, and she felt that is what the Task Force has already been doing by following the money "thing." Curtis said the County does not want fees; they want things taken care of that should be taken care of, and she does not see how giving the County more money would help. Curtis asked what projects will be done, what culverts will be changed, what water studies have been done, etc. Curtis said that the floodwater only lasts a few hours and that, after plowing it, people could drive on it again. She said she does not think they have ever been stopped for more than 6 or 8 hours on East Valley. Curtis said that if the Task Force is going to try to impose fees, what specifically is that money going toward? Curtis also stated that it is the Board of County Commissioners' job, not the Task Force's job, and that the Task Force should focus on what needs to be done in which areas, how much it would cost, and what can be done cheaply. Curtis commended Joe Ortiz for putting that information out there and said she felt he was the only one who seemed to be trying to put something together. Curtis said she does not know how many of the other Task Force members put something together to follow based on what can be done, and she is really excited to see an open meeting. Curtis said the one-way conversations get old. Curtis said that if a fee is going to be imposed, which she feels is the same as a tax, what will it be spent on, what areas will it go toward, who will be in charge of it, who will be in control, etc.

Michael May, Wellington, NV, said that, if he remembered correctly, at the last meeting it was stated that the Task Force's job was to make recommendations to the Board of County Commissioners. He stated that he signed up and is glad that he did not get put on the Task Force. May stated that he was born and raised on the east side of the valley on a ranch, and all the stormwater on the east side of the valley ran into the canal and went into three reservoirs, where it was used for irrigation. He stated that it does not storm much over there now. May stated that the Alpine Decree is a river and that the

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stormwater that occurs on the west side of the valley goes into that river. May said he brought that up because he spent 15 years working with government money from Clinton to keep Lake Tahoe blue, and it involved hand-placing rocks in ditches throughout all the communities before the water reached Lake Tahoe. May said what the Stormwater program is doing is kind of the same thing, but on a broader level. May said he also heard, but is not sure if it is true, that Moana Nursery moved out of Reno and moved to Heyborne on Johnson Lane, and that its buildings were designed to collect rainwater and use it to water plants in its hot houses. May said he was told that Douglas County said they could not do that, and he asked why they could not use stormwater in ways that make money, grow plants, or return water to agriculture. May said the people who used to live in this valley were the commissioners, and every rancher used to be a commissioner. He stated that, as Douglas County grows, the problems get bigger.

Darlene Wheeler asked why property owners who have ditches along their property are not required to maintain them. Wheeler stated that if there were a fire hazard on a person's property, the fire department would reach out and ensure it was dealt with and that the property owner was notified. Wheeler said that people can charge property owners to ensure they keep their ditches clean, like her neighbor, who refuses to keep his clean. Wheeler asked why the responsibility cannot be placed on the property owner instead of the County to keep things clean.

**7. ADJOURNMENT**

The meeting was adjourned at 7:57 PM.

Respectfully submitted:

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Joe Ortiz, Facilitator
Douglas County Stormwater Task Force

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The Stormwater Task Force Workshop was held on Thursday, October 22, 2026, beginning at 5:30 PM in the Community & Senior Center, Dining Room, 1329 Waterloo Lane, Gardnerville, NV 89410 and via Zoom participation. **When applicable, the minutes below have been transcribed.**

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**CALL TO ORDER**
The meeting was called to order at 5:30 PM.

**MEMBERS PRESENT:**
Todd Whear
Cameron Mckay
Karin Peternel
Patrick "Pat" Garrahan
Chad Cox
Joseph "Joe" Ortiz
George Phillips
Steve Walker
Jonathan "Jon" Lang
Donna Tanner
Tod Carlini
Sheila Arnaud
Virginia "Ginger" Starrett
Lawrence "Larry" Werner

**MEMBERS ABSENT:**
Chris Garrison

**STAFF PRESENT:**
Wendy Lang, Assistant County Manager and Staff Liaison
Carey Rosser, Esq.
Kathy Lewis, Chief Operating Officer
Courtney Walker, Stormwater Program Manager
Kathy Kaiser, Comptroller

**2. PUBLIC COMMENT**
Rachel Christensen stated that, following the previous week's meeting, she felt some Task Force members were doing the County's bidding. Christensen urged Task Force members to remember why they were appointed: to ask hard questions, demand transparency, examine the facts, and represent the interests of the public. She stated that when the Task Force fails to do these things, attacks one another, and resists allowing questions to be asked and issues to be explored, it reinforces the public's belief that "this is all a show".

Christensen stated that the Task Force was asked to "sell this to the public", but that members did the opposite at the previous meeting. She stated that they would not be able to sell anything to the public if the process appeared predetermined, discouraged questions, and failed to demonstrate impartiality.

Christensen stated that she wanted to make something clear: she felt residents did not want to attend an outreach meeting if they were going to be lectured to. She stated that people wanted answers supported

by details, facts, and the truth. She felt the public should have the opportunity to ask questions and receive meaningful answers.

Christensen referred to previous stormwater workshops, stating that attendance was low and that she believed this was because residents had little confidence in those meetings. She noted that projected project costs had gone from $69 million to $141 million to $50 million and questioned how the public could have confidence when the numbers continued to fluctuate. Christensen stated, "residents are paying attention", noting that residents see the inconsistencies and are concerned that, without proper scrutiny, residents' tax costs could double or triple.

Christensen reiterated that the Task Force needed to slow the process down when necessary, demand reliable numbers, examine alternatives, ask uncomfortable questions, and ensure the public understood what they were being asked to pay for. She stated that the Task Force had the opportunity to prove residents wrong, but that it would take more than presentations and flyers; it would take independence, transparency, accountability, and a willingness to challenge the County.

Dan St. John stated that he was a resident with a background in "this kind of business" and supported the work of the Task Force. St. John acknowledged that it was a difficult assignment in an area where "we are all sensitive about costs" and "we all want to make sure we get what we pay for". He stated that he believed the County when it said it was not adequately funded and that there was not enough money available to address the work that should have been done.

St. John stated that he attended the meetings and participated in the previous process, where he observed how staff and the Commission responded to public comment. He acknowledged that the process moved quickly but understood that the County was working to meet the annual budget cycle. He described the process as good and stated that the County handled it appropriately and had a strong team, although he did not agree with all of the results.

St. John stated that "you get what you pay for" and that if residents did not want to pay, they would be left dealing with deteriorating roads, flooding whenever it rained, and a lack of water quality. He stated that if someone had a leak in their roof, they would ensure it was repaired, and provided another example to illustrate his point. St. John stated that he believed the community should come together to address stormwater issues and that Task Force members should be congratulated for trying to work through the problem with a "rambunctious" County.

Michael May stated that he reviewed the agenda and understood that the Stormwater Program did not have sufficient funding to operate. May stated that while he agreed the workshop topics were appropriate, he felt the Task Force needed to provide recommendation(s) to the County Commission on how to lower the utility fee to an affordable amount.

May emphasized the importance of the materials used to treat stormwater and stated, "we can't say gravel pit in this community", noting that there was a rock source in the valley that could help support and reduce the costs of treating the areas in need of treatment. May stated that he would not be able to afford $50 per month.

May stated that the community was creating many issues that made it more difficult for the County and the Task Force to address stormwater concerns. He stated that the County needed to keep a record of

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these issues because when the next flood occurred in those areas, residents would reach out for assistance. May stated that it would be their fault.

Ted Gains stated that, at the previous meeting, he questioned how many Task Force members had spoken with the County Commission and noted that only one member appeared to have done so. Gains asked how many people "on this board" were related to County employees, stating that he had noticed a couple of matching last names. He added that if there was no relationship, then there was no issue.

Gains identified a detention pond at 2885 Jackie Lane that he felt the Task Force should examine. He explained that it was the first pond in a series of detention ponds. Gains stated that he had previously brought this to the attention of a Task Force member when he was a County Manager, but no action was taken. He stated that the individual had suggested he should not be part of "that board", to which Gains agreed.

Gains stated that there were individuals on the Task Force who had engaged in or were associated with "wrong doings", but that the matter was overruled because of the individuals it would expose. Gains stated, "The board members need to look at themselves and decide, and you people that are on the board, because I don't trust if a person wipes out inspections that were done and wrote up corrections for favoritism - they don't belong on this board". He added, "I believe in honesty and trans-parity. I have records of that, I can show you the papers for it..".

Gains again referenced the location of the detention pond, stating that it was a County problem. He stated that Courtney Walker had approached him during a house construction project and said, "oh god, you flooded the neighbor next door". Gains stated, "The problem with Courtney Walker is I took pictures of everything. That was the Jobs Peak development out on Foothill that ran all the water out of that development down into Sheridan Acres and flooded all them houses.". He stated that the flooding was not his fault and was the result of the County not completing the necessary work. Gains added, "now you're wantin' us to pay for the County's incompetence." and, "they can buy theaters, they can look at equestrian centers...".

Gains reiterated that he believed the issue was the County's responsibility, not the public's.

Merrill Hanson stated that he owned a ranch in town and that his primary concern was the connection between how stormwater funds would be raised and how they would be spent. Hanson explained that his ranch had a lengthy stormwater ditch that he maintained himself. He stated that he had purchased a tractor to maintain the ditch and incurred ongoing maintenance costs, and that he would now also be paying taxes toward stormwater.

Hanson described this as a "double whammy" and questioned whether there would be a mechanism to identify property owners who were already contributing to stormwater maintenance and whether that meant he should stop maintaining the ditch so the County could address it. Hanson stated that it did not seem right that he would have to pay the tax, fuel costs, and expenses associated with maintaining his tractor.

Alex Peters stated that he had been a resident of the valley for more than 30 years and had recently purchased a home. Peters stated that what attracted "us" to the home was that the entire development was designed to accommodate flooding. He explained that they paid an additional $170 annually for the County to maintain a large drainage area on a weekly basis.

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Peters stated that he learned his neighbors in the Windhaven development did the same and, to his understanding, the amount Windhaven paid had increased to cover draining some of the ditches and clearing debris.

Peters stated that proposing a stormwater tax did not make tax-paying residents happy. He expressed that it was not really a utility fee, but rather a tax, and that it should be put before the voters. He cautioned Task Force members that if they continued with the approach presented by the County Manager, they would be in a lot of trouble.

Peters stated that, for a utility fee to be imposed, similar to trash service where residents receive a service in exchange for payment, residents who would not receive a benefit should not be forced to pay. He provided an example, stating that he counted 500 homes in one development and another 180 homes in the development where he lived, noting that these were just some of the residents who would not benefit.

Peters stated that he believed the Task Force should revisit whether the proposed approach was fair or consider placing each area with a stormwater problem requiring improvements under its own assessment, rather than requiring others to pay for it. He further stated that, based on the previously proposed rates, the costs would make many residents homeless because they would not be able to afford them.

Rich Ostaggi, a resident of the East Valley, asked what the plan was for the funds and how the money would be used. Ostaggi also questioned whether new developments would mitigate flooding given the amount of permeable ground that would be displaced by development. He raised concerns about property ownership in the area and how conditions change as a result of other developments. He stated, "you're putting the cost on people who have already been here".

Ostaggi stated that he would not mind paying his fair share for improvements that would be completed, but noted that he had not yet heard a plan outlining what would be done.

Donald Ryan, a resident of Johnson Lane, stated that he had attended most of the Stormwater Management meetings. He noted that, among the topics discussed at those meetings, Roads and Stormwater had previously been combined into one department in 2017. Ryan stated, "If you want the money to go back into the Roads Department - merge Stormwater Management back in there.".

Ryan stated that his biggest concern with having a separate Stormwater Management Department was that there were certain things Nevada law required the County to do, including maintaining roadside ditches, which he stated was required by code. Ryan stated that he had spoken with Courtney Walker about this and that, "she said, 'well, there's a - there is a report out of Arizona that substantiates that doing that doesn't accomplish anything'.". Ryan stated that, on one hand, there was the law, and on the other, there was a report. He stated that Courtney did not side with the law and had no intention of complying.

Ryan stated that there were countless locations throughout the County where culverts were clogged because the County did not maintain them as required. He stated, "You want us to buy into this whole program, but yet though they won't even do the work they are required to do by law.".

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Ryan referenced the list of $144 million in proposed projects and stated, "that they just love to do". He stated that the County had paid thousands of dollars to a consulting company to "dream up" the list, while failing to complete the work it was supposed to do. Ryan stated that the County wanted to "pony up" even more money, and he did not understand why.

Ryan stated that he had contacted the County multiple times and that a "Jason" eventually came out and cleaned the ditch in front of his home and his neighbors' homes. Ryan identified Jackie Lane as an area where significant flooding had occurred in Johnson Lane. He also stated that residents had filled in the ditch with rock, despite it being a County ditch, and that the County should take action to have the rock removed to allow for proper maintenance. Ryan stated that if flooding occurred in that area again, residents would experience the same situation, with their yards being washed out.

John Rusca stated that he was speaking on behalf of his neighbor in Fish Springs and read aloud a text message from his neighbor stating, "To me, it seems like Tahoe devised a scheme to have Douglas County provide infrastructure improvements for them with the formulary to have the rural areas pay for it.".

Rusca added, "Tahoe paid the consultants who drafted the payment proposals based on hardscape, which is of course, conspicuously absent in Tahoe.". Rusca stated that he would like clarification from the Task Force on whether Tahoe paid for the consultants who developed the hardscape-based pricing.

**3. APPROVAL OF AGENDA**

Joe Ortiz spoke regarding the action taken at the previous meeting concerning the road map. Ortiz stated that he had raised a concern during the meeting and had discussed it with Wendy Lang and Carey Rosser at different times. His concern was that action was being taken on a road map that had previously been discussed at the September meeting but was not specifically included on the agenda for the previous week's meeting or in the meeting packet.

Ortiz stated that Lang and Rosser advised him that the action taken was legal and that the item would be added as a supplement within 24 hours of the meeting. Ortiz stated that, due to his concerns about possible Open Meeting Law violations, he consulted with his attorney and prepared a statement to read into the record. Ortiz clarified that the statement reflected his own views and had no legal bearing on anything.

Joe Ortiz read, "Before we proceed with tonight's schedule agenda, I want to make a formal statement for the record regarding our last meeting on October 14th. During that meeting the Task Force took a vote to adopt the Stormwater Task Force road map provided by the County. Upon subsequent review, the next day I had a conversation with Wendy Lang and Carey Rosser where I brought to them my concern about the Task Force and the County possibly not having followed proper Open Meeting Law procedures because of the specific item was not properly agendized and did not have supporting documentation in the agenda packet. Carey Rosser stated she felt like it was on the agenda properly and agreed they would add the item as a supplement and stated specifically they had at least 24 hours to do so retroactively. I personally have not found under the applicable Nevada Revised Statute regarding Open Meeting Law's anywhere that you can go in with supplemental documentation after an action has been taken. While this item was discussed it was not explicitly noticed for action on our published agenda and corresponding document was not included in the public supporting materials package. Under Open Meeting Law NRS, Chapter 241, public bodies must provide clear and complete advanced

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notice of all action items along with public access to supporting materials. Out of an abundance of caution and strict adherence to the law, I believe the vote taken on October 14 regarding the road map is void and ineffective. I believe no further action should be taken based on that vote. Instead I am asking staff to place the Stormwater proposed road map as presented by myself on behalf of the community and the road map presented by the County to have added to our next scheduled meeting, so they stand on their own merit and as explicit items for possible action. This will ensure the documents are fully integrated in the public agenda packet, allowing the public the three working days to review it for proper discussion and a valid vote.".

Ginger Starrett asked whether other Task Force members could also propose road maps.

Joe Ortiz responded that they absolutely could. Ortiz stated that Task Force members could reach out to him or Wendy Lang at any time to request agenda items, whether related to a road map or any other topic.

**MOTION TO:** Approve the agenda; carried.

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| **RESULT:** | **APPROVED [UNANIMOUS]** |
| **MOVER:** | Larry Werner, |
| **SECONDER:** | Steve Walker, |
| **AYES:** | Todd Whear, Cameron Mckay, Karin Peternel, Chad Cox, Joe Ortiz, George Phillips, Steve Walker, Jon Lang, Donna Tanner, Pat Garrahan, Tod Carlini, Sheila Arnaud, Ginger Starrett, Larry Werner |

**4. AGENDA ITEMS**

**4.a For Presentation Only. Stormwater Workshop. An interactive roundtable workshop for community members and Task Force representatives to rotate through guided discussion stations and explore the General Fund, grant opportunities, and enterprise fund regulations. The Stormwater program is currently funded through an annual $1,105,000 transfer from the County's General Fund. During this item, Task Force members will separate into non-quorum groups and members of the public will have the opportunity to join any or all of the groups to explore the covered topics.**

Wendy Lang explained that the Task Force had previously voted to add a workshop-style meeting each month to the schedule and that this was the first workshop scheduled. She wanted to discuss the plan for conducting the workshop and expressed that she looked forward to having successful dialogue and future workshops in whatever format was determined based on the topics and feedback received.

Lang explained that the formal public meeting would be paused, the video would be stopped, and the microphones would be turned off while small-group discussions took place. She noted that the Task Force was divided among three tables, with approximately four or five members at each table to avoid creating a quorum, and asked Task Force members to remain in their assigned groups.

Lang explained that County staff would be available to address various topics, with the workshop focused on finance based on the questions and comments received thus far. Staff would cover the topics

in three rotating sessions. Kathy Lewis would discuss Enterprise Funds, Courtney Walker would discuss grant funding, and Kathy Kaiser would discuss the General Fund.

Lang stated that members of the public could choose a table based on the topic they wished to hear about. The topics would rotate among the tables, and members of the public could follow the staff members to remain with their preferred topic. Each session would last approximately 20 minutes before rotating.

Carey Rosser emphasized the importance of Task Force members remaining in their assigned groups to avoid an Open Meeting Law violation by creating a walking quorum. Rosser also explained to members of the public that, when rotating tables, each new group should begin the conversation fresh and should not share what had been discussed at the previous table.

Wendy Lang stated that the goal was to provide an opportunity for questions, feedback, ideas, and suggestions for future topics. She explained that, following the three 20-minute breakout sessions, the group would reconvene in a public meeting to summarize the discussions and identify common themes, including any questions or ideas the Task Force may want to consider in future months.

| | |
|---|---|
| **RESULT:** | **PRESENTATION HELD** |

**4.b For Possible Action. Stormwater Workshop Report-Out. Task Force members will report-out on the workshop round-tables to summarize themes, answer recurring questions, and identify topics for future conversations. Discussion may include requests to staff regarding topics or materials for future consideration based on the round-table discussions.**

Wendy Lang stated that the handouts provided at the meeting would be attached to the meeting supplemental materials and posted on the Stormwater webpage.

Lang reported that one question asked what percentage of the County's overall budget comes from the General Fund. She stated that the answer was 60%.

Lang stated that another question concerned the various transfers out of the General Fund and requested a line-by-line explanation of the transfers, including examples such as transfers to the Library and Senior Services. Lang stated that staff would follow up with additional information.

Lang reported that another question concerned where grant match funding comes from. She explained that the source depends on the grant and where the County can identify available funds. As an example, she referenced the most recent Pamela Place grant, for which the match came from the Stormwater Department. The funding may have come from department reserves or a reallocation of maintenance funds. Lang stated that Courtney Walker would have additional information on the matter.

Lang stated that another question concerned the distribution of property tax revenue between the valley and the lake. She said Kathy Kaiser would follow up with a specific percentage or dollar amount showing how much property tax revenue is realized in each area.

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Lang reported that another question asked whether any portion of the General Fund is used to support Enterprise Fund bonding. She noted that this was presented more as an idea for consideration or a suggestion.

Lang stated that there was a question regarding the property tax rate cap. She explained that the annual cap is 3% for residential properties and 8% for commercial properties. Lang also discussed how Douglas County collects property taxes on behalf of other jurisdictions and how the total amount collected is governed by NRS. She stated that several portions of the County were already at the maximum allowable amount. Lang explained that the County cannot increase property taxes in only certain areas and therefore does not have the ability to increase the amount collected in those areas.

Lang stated that another question asked whether General Improvement Districts (GIDs) receive the total amount collected on individual property tax bills. She said staff would follow up with an answer.

Lang reported that another question concerned where DMV fee revenues are expended and how those funds are allocated. She stated that additional information would be brought back to address the question.

Lang stated that there was a request for a presentation on sales tax, which she would add to the list of topics for future discussion.

Lang reported that another question asked why the Roads Department and Stormwater Department were separated. She recalled that the Board of County Commissioners at the time decided to dedicate an annual transfer of more than $1 million specifically to Stormwater. Lang explained that the separation was intended to ensure those funds were spent on Stormwater-related needs and to provide greater transparency so the public could see where the money was going. She gave the example of the public seeing Stormwater equipment, such as trucks, and recognizing that the dedicated funds had been used for that purpose. Lang stated that the separation also helped avoid Stormwater being subject to the limited resources of the combined department. She noted that, at the time of the separation, Stormwater was a high priority for the County.

Lang stated that there was recognition that a large portion of the General Fund is spent on Public Safety, along with the sentiment that the amount spent on Public Safety was still not enough.

Lang reported that there were discussions about developers paying more toward Stormwater. She explained that developers are required to mitigate stormwater impacts to a certain extent, but those requirements address storms of a particular frequency and do not cover all types of storms. Lang added that development requirements do not address the day-to-day maintenance of Stormwater infrastructure or related expenditures.

Lang stated that there was also a request for a presentation on restricted funds and another presentation on a bill draft for the next legislative session concerning the Transient Occupancy Tax and the reallocation of those funds. She explained that the September 1st deadline for local governments to

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submit bill drafts for the upcoming legislative session had already passed. Lang noted that legislative sessions occur every two years, providing another opportunity for submission in the future.

Lang reported an idea to consider collecting stormwater maintenance taxes at the County level on behalf of the various entities that perform stormwater maintenance, with the funds placed into a single "bucket" for distribution. She added that a related idea was to share equipment among jurisdictions.

Lang stated that there were also questions about NDOT, including where its culverts are located and whether NDOT should have additional funding responsibilities.

Steve Walker stated that the State property tax rate is capped at $3.64 per $100 of assessed value, regardless of how many entities participate in the property tax. He asked where Douglas County currently stood relative to the $3.64 cap and whether there was any "wiggle room.".

Kathy Lewis stated that several areas of the County, including Minden, Gardnerville, Indian Hills, Topaz, and Oliver Park, were at the cap. She explained that the County could not increase property tax rates in those areas.

Lewis stated that the group at her table discussed the legality of the Enterprise Fund, how it was established, and potential issues that could arise in the future if the County continued with a utility fee.

Lewis summarized the discussion as reflecting a strong desire to understand what funding possibilities were available and what options existed. She added to the ideas Lang had mentioned, including Transient Occupancy Tax, allocations between Special Revenue Funds and the General Fund, and an overall discussion of available funding options.

Courtney Walker stated that one common question concerned who writes the grants and whether grant writing is contracted out, including any additional costs associated with that work. Walker explained that she would write the Stormwater grant applications, but the County also has an external grant writer who assists with writing and preparing applications.

Walker stated that another question concerned whether grants cover ongoing maintenance costs in addition to project costs. She explained that grants cover only one-time capital costs and do not address ongoing maintenance expenses.

Walker reported that another question concerned which funds could be used for grant matches and whether other departments or the State could provide matching funds. She explained that the requirement is for the match to come from a local, non-federal source. State funds may be used as long as they are non-federal. Walker added that departments can work together to identify funding for a match and have done so in the past when appropriate.

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Walker stated that there were questions about a grant that had previously been referenced as lost. She clarified that the grant was not lost; rather, the NRCS wanted to help fund maintenance for the project in Ruhenstroth.

Walker reported that another question asked where else grants and funding could be pursued. She explained that several other programs are available but that she typically pursues FEMA grants because they are specific to Nevada rather than nationally competitive, making the likelihood of an award higher. Walker noted that if a grant is awarded but the County cannot provide the required match, the County must “walk away” from the grant.

Walker stated that a suggested future topic was a presentation on the Lands Bill, including what it means for Douglas County and how it overlaps with some of the proposed capital projects.

| | |
|---|---|
| **RESULT:** | **WORKSHOP REPORT-OUT HELD** |

**5. PUBLIC COMMENT**

Shawnyne Garren disclosed that she is the Douglas County Recorder and was speaking as a resident in an unofficial capacity. Garren asked whether a summary of the workshop's key takeaways and responses would be provided at a future Stormwater Task Force meeting.

Michael May stated that he felt the workshop was very informative and well conducted. He said the biggest takeaway for him was the discussion about the Enterprise Fund and how revenue is collected through user charges. May explained that he lives in a different watershed and is not a Stormwater user, so fees cannot be collected from him. He stated that he felt the Enterprise "deal" may need to be completely scrapped in favor of finding another way to fund Stormwater because fees can only be collected from those who are affected.

May recalled that, before the Task Force was formed, there had been discussion of a $14 base rate that every community member would be required to pay. He asked how a base rate could be applied if an Enterprise Fund can only collect user charges. May stated that there was an opportunity to identify another way to fund the program rather than relying on the Enterprise Fund.

May stated, "I bless Courtney Walker for coming to these things and taking the abuse that she is taking. It's just a job, but I have a GID board member sitting right here that's telling me 'hey, when you put a culvert in a GID ditch and you drive across it to your house, that's your responsibility to clean it out'.".

May added that he would never ask Courtney Walker to clean his storm drain pipe in TRE because he recognized that it was his responsibility.

Rocky Walling thanked everyone for their efforts and stated, "This is not easy. This is going to be a tough thing. This is going to be hard. Everybody is here taking time away from their families and taking on this task and I just want to say thank you. This is right here what makes Douglas County a great place to live - tackling these issues and going after it.".

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Ruth Robertson stated that she would like to see more community involvement, possibly through weekend events, because, as she stated, "the next month and a half is official Russian tumble weed month". She said it would be nice to bring the community together on a weekend to clear tumbleweeds and address other issues affecting properties, neighborhoods, and surrounding areas.

**6. ADJOURNMENT**

The meeting was adjourned at approximately 7:43 PM.

Respectfully submitted:

_____

Joe Ortiz, Facilitator
Douglas County Stormwater Task Force

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**AGENDA ITEM NO. 5.a**

**STORMWATER TASK FORCE AGENDA ITEM COVER PAGE**

**MEETING DATE:** November 12, 2026

**TIME REQUIRED:**

**AGENDA:** **AGENDA ITEMS**

**TITLE:**
For presentation only. Presentation by Tom Dallaire, Community Development Director, regarding land use, floodplains, drainage areas, lands identified as critical for conservation, and agricultural water management (including the Alpine Decree, the Water Conveyance Advisory Committee, and agriculture's role in drainage and stormwater management).

**RECOMMENDED MOTION:**
Presentation only.

**FINANCIAL IMPACT:**
None

**BACKGROUND:**
A presentation will be given at the meeting discussing the following (please see attached);
Zoning, Title 20, Douglas County Design Standards Division 6, Flood Mapping, and Historical information on the Alpine Decree and the Critical Land Appendix E that was included in the Agenda Packet for the Board of County Commissioners on May 28, 2026 (the Item was pulled from the agenda with the remaining Stormwater Items).

**ATTACHMENTS:**
Stormwater Overview Zoning Title 20 Design Standards.pdf
DEC2108_DCDCIS_Part II division 6.pdf
Douglas County, NV Code of Ordinances 20.50.pdf
CHAPTER_2.56.___WATER_CONVEYANCE_ADVISORY_COMMITTEE.pdf
Douglas County 2020 MasterPlan_Final - implementation only.pdf
Critical Lands - to bocc on MAY 28 2026- ITEM PULLED.pdf

# STORMWATER OVERVIEW

## Zoning
## Title 20
## Design Standards
## Flood Mapping
## Historical

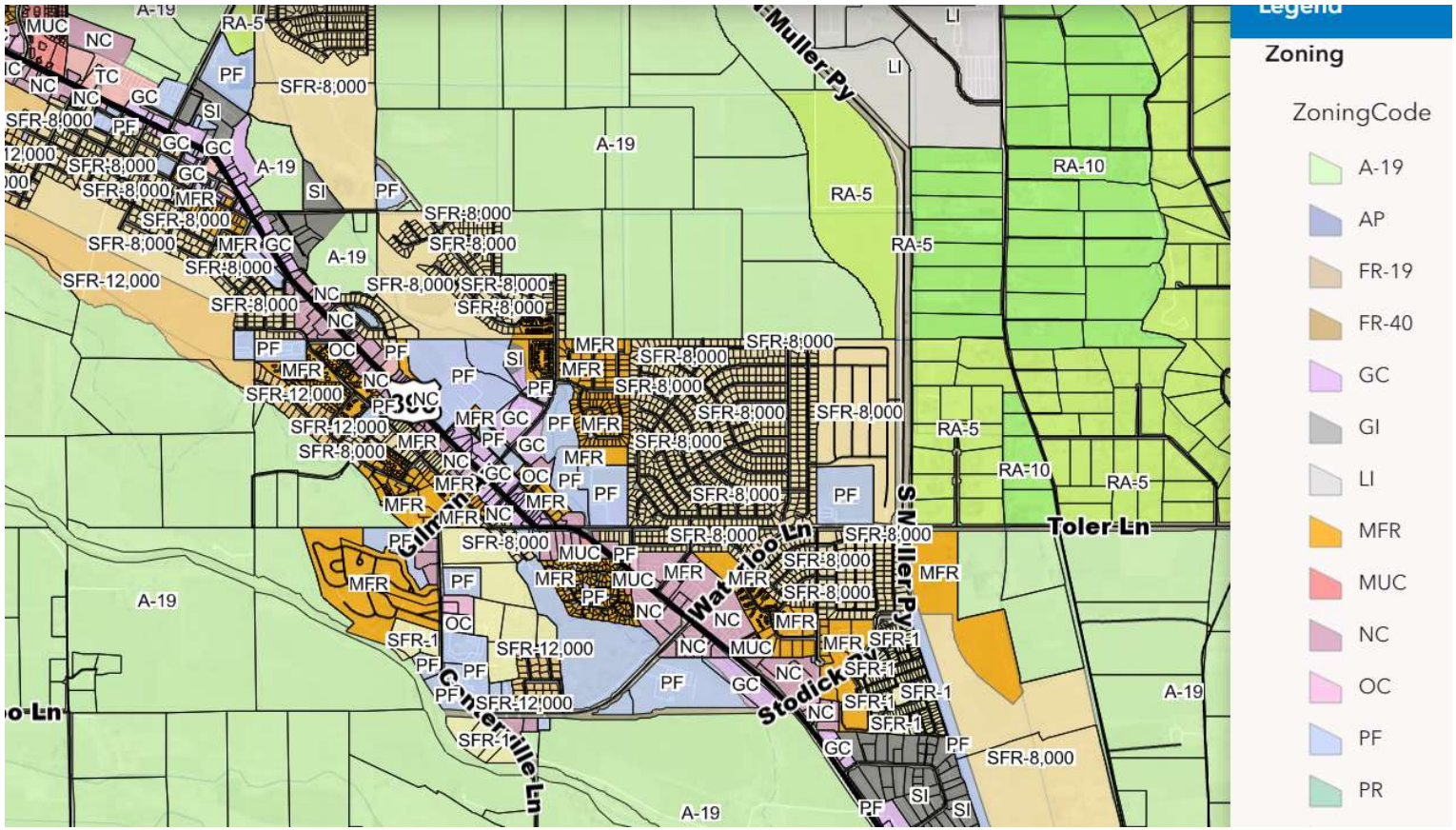
Stormwater Task Force
November 12, 2026

Detailed tables can be found on pages 29 and 30 of the 2020 Douglas County Master Plan

| Land Use | Zoning Districts | Description |
|---|---|---|
| Receiving Area | Allowed in all base zoning districts | Future urban development |
| Commercial | Commercial and Multi-Family Residential | Commercial, mixed use, and multi-family |
| Industrial | Industrial | Various intensities of industrial development |
| Community Facility | Airport and Public Facility | Airport-related industrial and public facilities |
| Recreation | Private Recreation | Private golf courses, tennis clubs, or similar |
| Forest and Range | FR-40: 40 acre minimum<br>FR19: 19 acre minimum | Land managed by USFS, BLM, and BIA or private land for future land use |
| Agriculture | A-19: 19 acre minimum | Private farming and ranching, many located in floodplain |
| Washoe Tribe | Based on Washoe Tribe's 2008 Integrated Resource Management Plan | Under control of Washoe Tribe |
| Rural Residential | RA-5: 5 acre minimum<br>RA-10: 10 acre minimum | Low density residential development outside of towns and GIDs not requiring urban services |
| Single Family Estates | SFR-1: 1 acre minimum<br>SFR-2: 2 acre minimum | Rural medium density residential development, urban services could be provided |
| Single Family Residential | SFR-1/2: 2 dwelling units per acre<br>SFR-12,000: 3.63 dwelling units per acre<br>SFR-8,000: 5.45 dwelling units per acre<br>SFR-T 6,000: 7.26 dwelling units per acre<br>SFR-T 4,000: 10.89 dwelling units per acre<br>SFR-T 3,000: 14.52 dwelling units per acre | Urban and suburban densities, parcels from 3,000 square feet to ½ acre in urban service areas |
| Multi-Family Residential | MFR: 16 dwelling units per acre | Multi-family development in urban service areas |

# Douglas County 2020 Master Plan

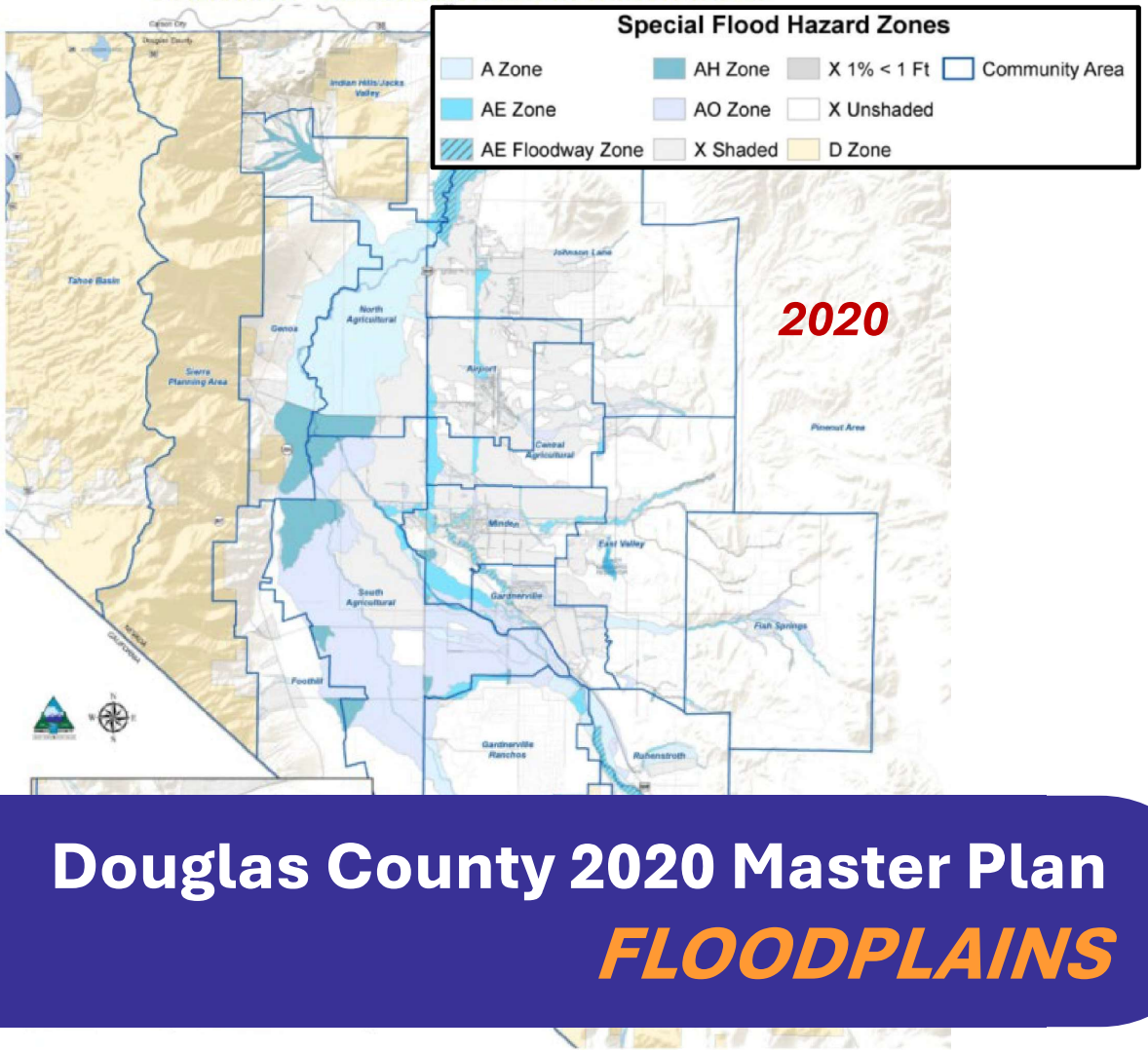
## *LAND USES*

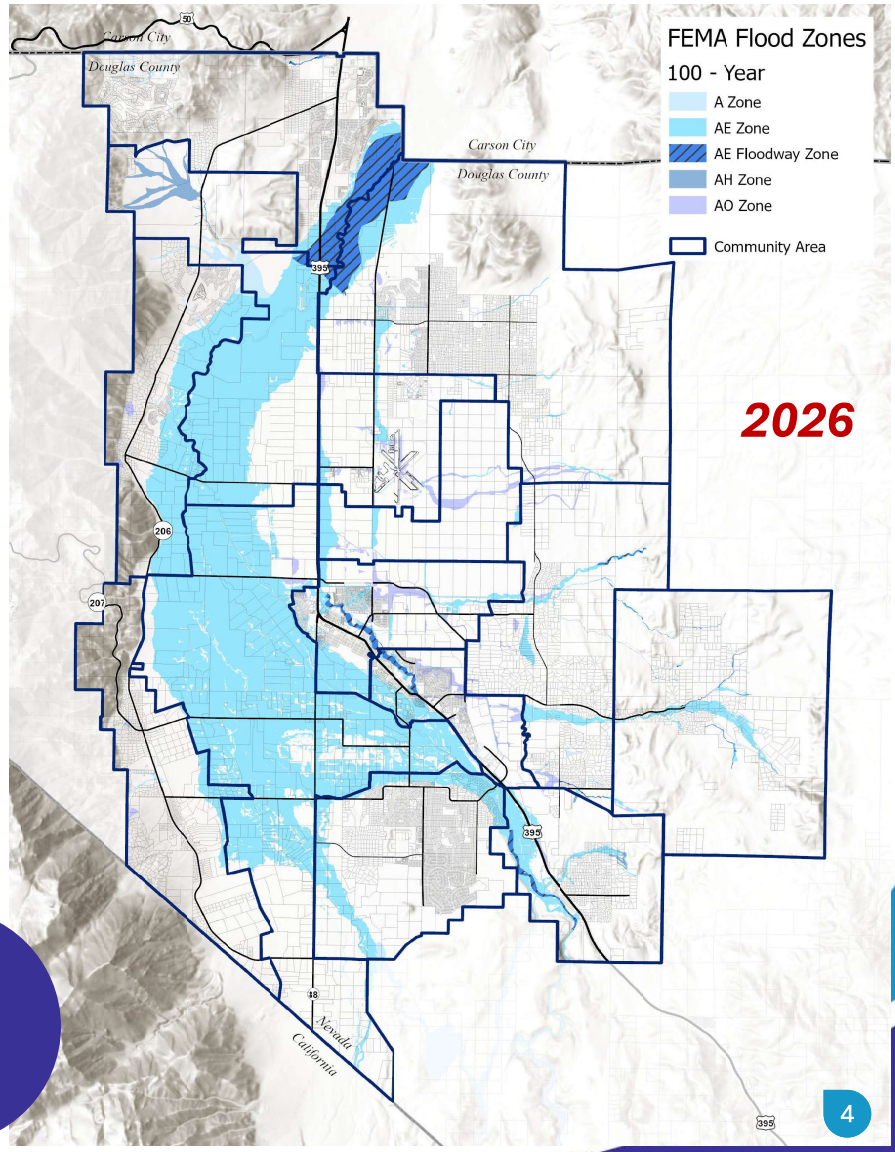



# Douglas County Zoning Map

## *LAND USES*

DIAGRAM A8 - FLOODPLAIN AREAS IN CARSON VALLEY




# Douglas County 2020 Master Plan

## *FLOODPLAINS*

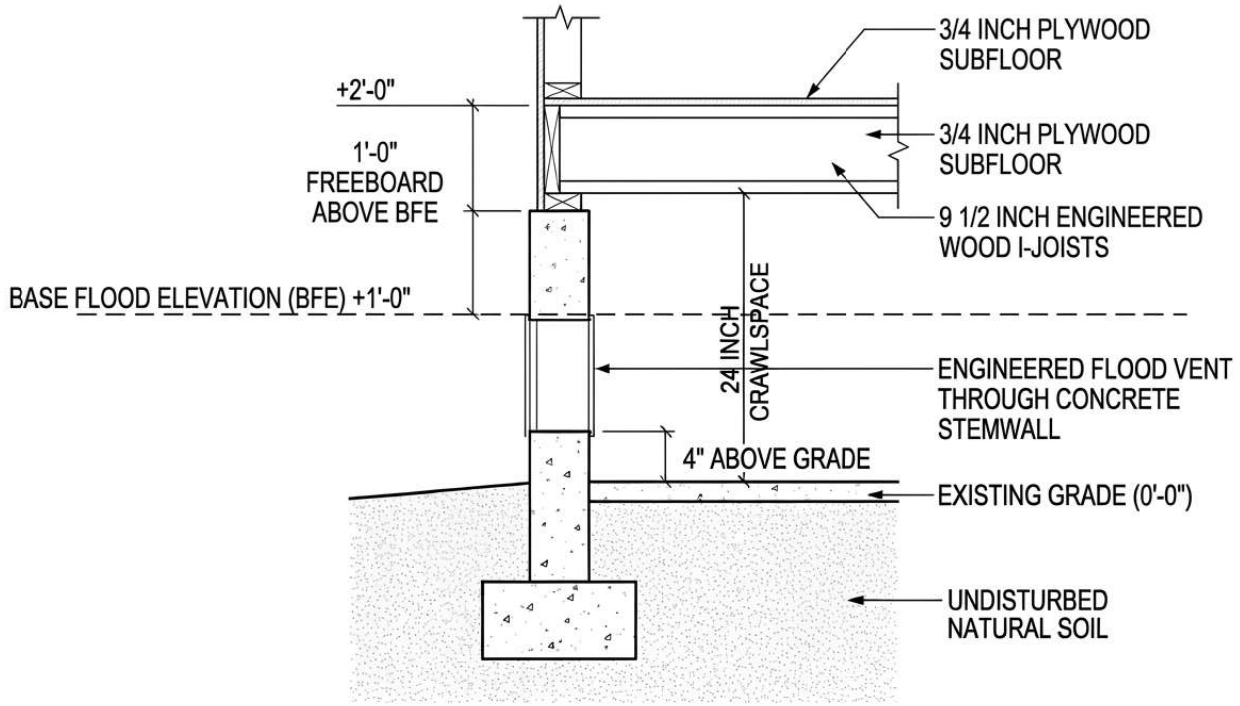
# COMPARISON OF FEMA MINIMUM STANDARDS vs. DOUGLAS COUNTY CODE (TITLE 20.50)

| Regulatory Requirement | Baseline FEMA / NFIP Standard | Douglas County Code (Title 20.50) Standard | Code Section |
|---|---|---|---|
| **Lowest Floor Elevation (Freeboard)** | Requires lowest floor elevated to or above the Base Flood Elevation (BFE) (0 ft freeboard baseline). | Requires **at least 1 foot of freeboard** above BFE for residential construction in Zones A, AH, AE, and Zone AO (1 ft above FIRM depth number). | DCCDC § 20.50.230(C) |
| **Substantial Improvement / Damage Threshold** | 50% market value threshold evaluated on a single, per-project basis. | **49% threshold counted cumulatively over at least 5 years** (for improvements) or cumulative lifetime for repetitive loss structures (for damage). | DCCDC § 20.50.100 |
| **BFE Change Threshold for CLOMR** | Standard community baseline allows up to a 1.0-foot BFE increase outside designated floodways. | Requires a Conditional Letter of Map Revision (**CLOMR**) if a hydrology/hydraulic study shows a BFE change **greater than 0.5 feet**. | DCCDC § 20.50.120(A), § 20.50.170(A)(1) |
| **Minimum Lot Size in SFHA** | No NFIP minimum lot size requirement for dividing land in floodplains. | Prohibits residential land divisions in Special Flood Hazard Areas (SFHA) that create parcels **less than 19 net acres**, with limited exceptions. | DCCDC § 20.50.170(B) |
| **Regulation of Moderate Hazard Zones** | Unshaded/shaded X zones (500-year floodplain) are not regulated under federal NFIP minimums. | Regulates **X-shaded flood zones**, requiring slab/crawlspace elevations at least 1 foot above highest adjacent grade or an engineered drainage plan. | DCCDC § 20.50.050, § 20.50.230(C)(5) |
| **Siting of Critical Facilities** | Executive orders discourage critical facilities in 100-year/500-year floodplains. | **Prohibits** critical structures in SFHA unless all alternative sites in X-unshaded and X-shaded zones are rejected; requires 500-year flood protection if permitted. | DCCDC § 20.50.230(I) |
| **Mechanical & Electrical Equipment** | Equipment must be elevated to or above BFE or floodproofed. | HVAC, electrical, heating, plumbing, and mechanical equipment must be located at least **1 foot above BFE**. | DCCDC § 20.50.230(B)(3), § 20.50.230(H)(5) |
| **Alluvial Fan Map Revisions (LOMR-F)** | LOMR-F applications evaluated based on site-specific fill and protection. | **Prohibits LOMR-F** map revisions based on fill in designated alluvial fan AO zones with velocity. | DCCDC § 20.50.220(D) |

Douglas County participates in the National Flood Insurance Program (NFIP). To protect public safety and reduce flood risks, Title 20.50 (Floodplain Management) of the Douglas County Consolidated Development Code enacts several higher regulatory standards that exceed standard federal FEMA baselines

# Design Standard - No Fill Pad Proposed

## *FLOOD VENTED CRAWLSPACE*




FLOODPLAIN FOUNDATION DETAIL - STEMWALL WITH FLOOD VENT PENETRATION

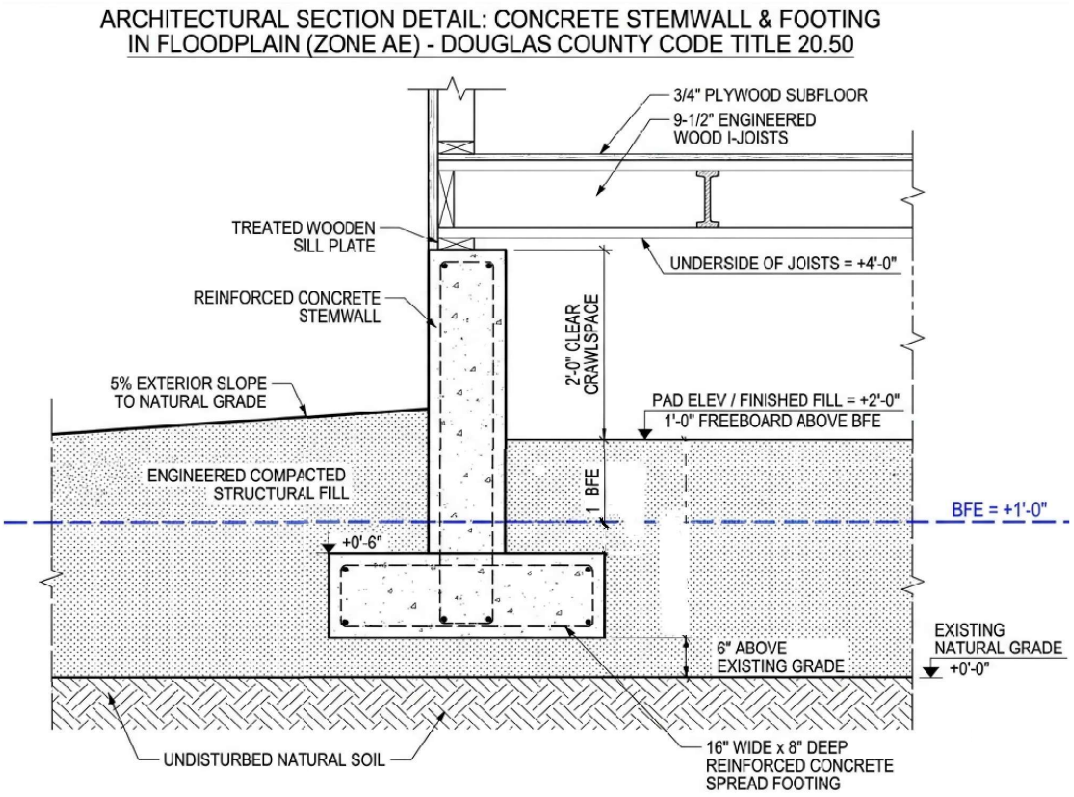
*Note: Flood vents need to be located within 12 inches of finished grade

Gemini Notebook

6

# Design Standard - Elevated Fill Pad Proposed

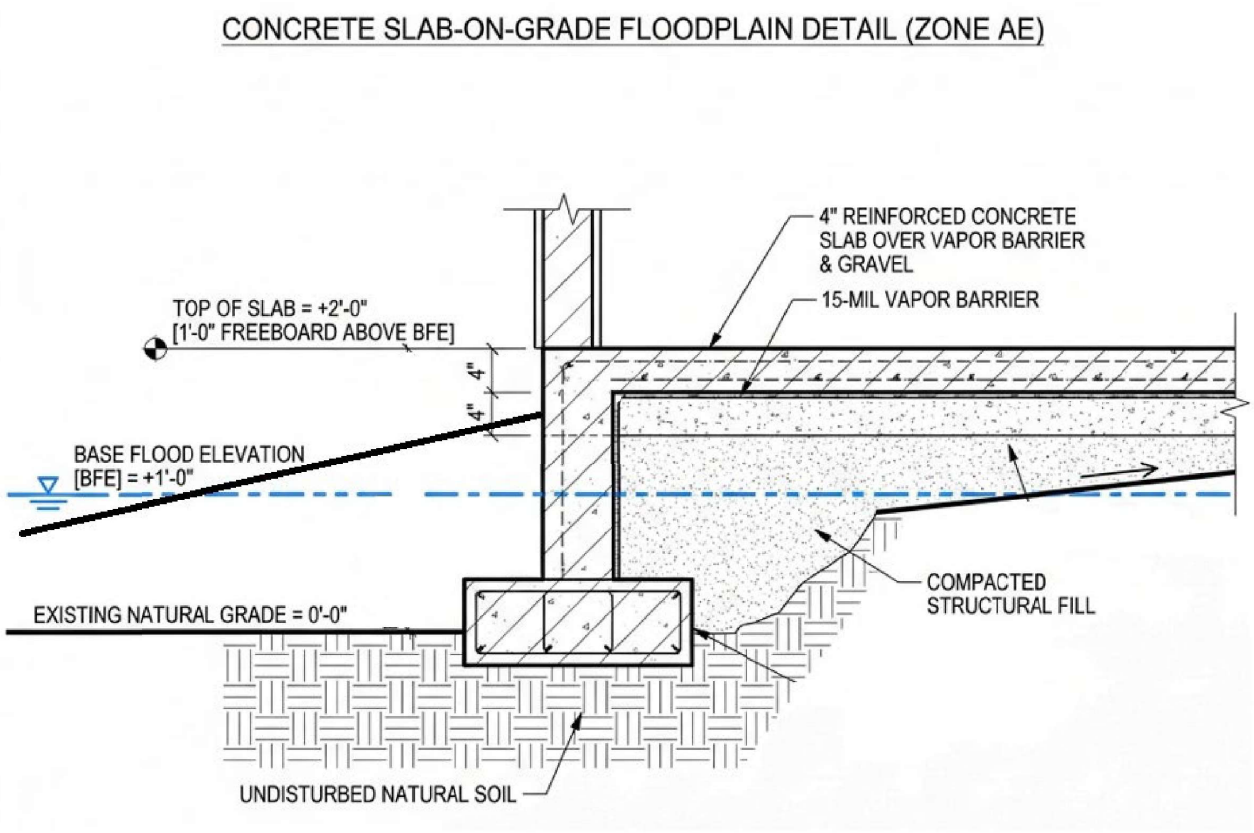
## *CRAWLSPACE ELEVATED ON A PAD*




**Note: Flood vents are required if the elevated pad is not approved by FEMA with LOMR-F.*

# Design Standard - Elevated Fill Pad Proposed

## *CRAWLSPACE ELEVATED ON A PAD*




**Note: Finished floor is 12 inches above the BFE or highest adjacent grade in an X Shaded Flood Zone*

# DESIGN STANDARDS Division 6

| Design Category | Required Parameter / Storm Event | Engineering Standard & Technical Criteria | Manual Section Reference |
|---|---|---|---|
| **Design Storm & Emergency Overflow** | **25-Year & 100-Year (24-Hour)** | Drainage facilities must convey peak runoff for the **25-year storm event**. All developments must provide an emergency flow path following historical drainage paths for the **100-year storm event**. | *Division 6.5.1* |
| **Stormwater Detention (Release Rates)** | **2-Yr, 10-Yr, 25-Yr, & 100-Yr (24-Hour)** | **Mandatory for commercial, industrial, and multi-family projects** (prohibited on-lot on parcels ≤ 1 acre). Post-development peak discharge **must not exceed** pre-development peak discharge for all 4 design storm events. Basin must drain 90% of capacity within **48 hours**. Side slopes must be **4:1 (H:V) or flatter**. | *Division 6.1.4 & 6.5.7.1.1* |
| **Stormwater Retention / Infiltration** | **25-Year (24-Hour)** | Permitted only when no downstream facilities exist, or if proven as the only feasible option. Basin volume must equal **1.5 times** the total 25-year storm volume. Must fully infiltrate within **48 hours**. Minimum soil conductivity is **0.5 in/hr**. | *Division 6.1.5 & 6.5.7.1.1* |
| **Building Protection (100-Year Storm)** | **100-Year (24-Hour)** | Residential, commercial, and industrial buildings **must not be inundated** at the ground line. Finished floor elevations must be at least **1.0 foot above** street flow / base flood elevations. On traveled ways, depth (ft) × velocity (fps) must be **≤ 6**. | *Division 6.5.3 & Table 6.3* |

# DESIGN STANDARDS continued

| Design Category | Required Parameter / Storm Event | Engineering Standard & Technical Criteria | Manual Section Reference |
|---|---|---|---|
| **Culvert Design** | **25-Year Design Storm** | Minimum pipe size is **15 inches** in diameter. Reinforced concrete pipe (**RCP**) is required under roadways (CMP permitted for residential driveways). Headwater limits: HW ≤ 1.5 × pipe height (for pipes > 36") or HW ≤ 5 ft (for pipes ≤ 36"). Minimum cover is **18 inches** with H-20 loading. | *Division 6.5.4* |
| **Open Drainage Channels** | | Sized to convey design storm with minimum **1.0 foot of freeboard**. FEMA channels must be lined **1 foot above** the 100-year flood level. Side slopes: **3:1 (H:V) or flatter** for unlined channels; **2:1 (H:V) or flatter** for lined channels. | *Division 6.5.6* |
| **Storm Drains (Mains & Laterals)** | **25-Year Design Storm** | Minimum main and lateral size is **15 inches**. Slope minimum is **0.25%**. Velocity range is **3 fps minimum** (at half full or greater) to **15 fps maximum**. Hydraulic Grade Line (HGL) must remain **≥ 1.0 foot below** finished grade. Maximum manhole spacing is **400 ft** for pipes < 48". Materials: Rubber Gasket RCP Class III min., or plastic pipe < 48" per NDOT standards. | *Division 6.5.5* |
| **Outlet Velocity Protection** | **Design Outlet Flow** | **< 5 fps:** Recommended mitigation measures per drainage study.<br>**5 to 15 fps:** Rip-rap protection or energy dissipater required.<br>**> 15 fps:** Energy dissipater mandatory. | *Division 6.5.5.18* |

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 0.079 (0.070-0.088) | 0.099 (0.089-0.113) | 0.131 (0.117-0.150) | 0.164 (0.146-0.188) | 0.215 (0.183-0.247) | 0.260 (0.213-0.304) | 0.317 (0.248-0.376) | 0.385 (0.287-0.471) | 0.488 (0.340-0.619) | 0.582 (0.381-0.762) |
| 10-min | 0.120 (0.107-0.135) | 0.150 (0.135-0.172) | 0.199 (0.179-0.228) | 0.250 (0.223-0.286) | 0.327 (0.278-0.376) | 0.395 (0.324-0.463) | 0.482 (0.378-0.572) | 0.585 (0.437-0.717) | 0.743 (0.517-0.943) | 0.886 (0.579-1.16) |
| 15-min | 0.148 (0.133-0.167) | 0.186 (0.167-0.213) | 0.247 (0.221-0.283) | 0.309 (0.276-0.354) | 0.406 (0.345-0.466) | 0.491 (0.402-0.573) | 0.597 (0.468-0.710) | 0.726 (0.541-0.889) | 0.921 (0.640-1.17) | 1.10 (0.718-1.44) |
| 30-min | 0.200 (0.179-0.224) | 0.250 (0.225-0.287) | 0.332 (0.298-0.380) | 0.416 (0.372-0.476) | 0.546 (0.464-0.628) | 0.661 (0.542-0.772) | 0.804 (0.630-0.956) | 0.977 (0.728-1.20) | 1.24 (0.862-1.57) | 1.48 (0.967-1.94) |
| 60-min | 0.247 (0.221-0.278) | 0.310 (0.279-0.355) | 0.411 (0.369-0.471) | 0.515 (0.460-0.590) | 0.676 (0.575-0.777) | 0.818 (0.670-0.956) | 0.995 (0.780-1.18) | 1.21 (0.901-1.48) | 1.54 (1.07-1.95) | 1.83 (1.20-2.40) |
| 2-hr | 0.362 (0.335-0.402) | 0.449 (0.409-0.496) | 0.568 (0.517-0.626) | 0.677 (0.614-0.748) | 0.837 (0.733-0.940) | 0.972 (0.833-1.11) | 1.12 (0.928-1.30) | 1.29 (1.02-1.53) | 1.55 (1.16-1.97) | 1.84 (1.32-2.42) |
| 3-hr | 0.440 (0.404-0.478) | 0.546 (0.506-0.601) | 0.687 (0.627-0.752) | 0.789 (0.717-0.865) | 0.939 (0.836-1.04) | 1.05 (0.912-1.18) | 1.17 (0.998-1.33) | 1.34 (1.11-1.56) | 1.59 (1.27-1.99) | 1.86 (1.43-2.44) |
| 6-hr | 0.614 (0.561-0.670) | 0.763 (0.702-0.837) | 0.948 (0.861-1.03) | 1.08 (0.986-1.18) | 1.26 (1.13-1.38) | 1.40 (1.24-1.55) | 1.53 (1.32-1.73) | 1.67 (1.41-1.92) | 1.85 (1.52-2.17) | 1.99 (1.58-2.47) |
| 12-hr | 0.809 (0.728-0.893) | 1.02 (0.919-1.13) | 1.28 (1.15-1.42) | 1.48 (1.32-1.64) | 1.75 (1.54-1.96) | 1.95 (1.69-2.20) | 2.15 (1.83-2.46) | 2.36 (1.96-2.75) | 2.62 (2.12-3.14) | 2.83 (2.23-3.46) |
| 24-hr | 1.02 (0.933-1.13) | 1.28 (1.17-1.41) | 1.62 (1.48-1.78) | 1.89 (1.71-2.07) | 2.26 (2.04-2.49) | 2.55 (2.29-2.82) | 2.86 (2.55-3.16) | 3.18 (2.80-3.53) | 3.61 (3.14-4.04) | 3.95 (3.40-4.45) |
| 2-day | 1.23 (1.11-1.36) | 1.54 (1.40-1.71) | 1.96 (1.78-2.16) | 2.30 (2.07-2.53) | 2.77 (2.47-3.07) | 3.14 (2.78-3.49) | 3.53 (3.11-3.94) | 3.94 (3.44-4.42) | 4.51 (3.88-5.12) | 4.96 (4.22-5.68) |
| 3-day | 1.34 (1.20-1.49) | 1.68 (1.52-1.88) | 2.15 (1.93-2.39) | 2.52 (2.26-2.80) | 3.06 (2.72-3.40) | 3.48 (3.07-3.88) | 3.92 (3.43-4.39) | 4.39 (3.80-4.95) | 5.04 (4.29-5.74) | 5.56 (4.67-6.38) |
| 4-day | 1.45 (1.30-1.62) | 1.82 (1.63-2.04) | 2.33 (2.09-2.61) | 2.75 (2.46-3.06) | 3.34 (2.96-3.74) | 3.81 (3.35-4.27) | 4.31 (3.75-4.84) | 4.84 (4.15-5.47) | 5.58 (4.71-6.36) | 6.17 (5.12-7.09) |
| 7-day | 1.64 (1.47-1.84) | 2.07 (1.86-2.32) | 2.67 (2.38-2.97) | 3.14 (2.80-3.50) | 3.79 (3.37-4.24) | 4.32 (3.81-4.84) | 4.86 (4.25-5.47) | 5.43 (4.70-6.15) | 6.22 (5.30-7.12) | 6.84 (5.74-7.89) |
| 10-day | 1.82 (1.63-2.02) | 2.31 (2.06-2.57) | 2.97 (2.66-3.30) | 3.49 (3.12-3.87) | 4.20 (3.73-4.68) | 4.74 (4.19-5.30) | 5.31 (4.66-5.95) | 5.89 (5.11-6.65) | 6.68 (5.72-7.62) | 7.29 (6.16-8.37) |
| 20-day | 2.22 (1.99-2.46) | 2.81 (2.52-3.12) | 3.61 (3.24-4.00) | 4.21 (3.77-4.66) | 5.01 (4.46-5.56) | 5.61 (4.97-6.24) | 6.22 (5.49-6.94) | 6.82 (5.96-7.65) | 7.62 (6.59-8.61) | 8.21 (7.02-9.36) |
| 30-day | 2.52 (2.27-2.79) | 3.20 (2.88-3.55) | 4.09 (3.69-4.52) | 4.77 (4.29-5.26) | 5.66 (5.07-6.24) | 6.33 (5.63-7.01) | 7.01 (6.20-7.77) | 7.67 (6.74-8.55) | 8.55 (7.43-9.58) | 9.20 (7.93-10.4) |
| 45-day | 2.89 (2.62-3.20) | 3.67 (3.32-4.05) | 4.69 (4.25-5.16) | 5.44 (4.92-5.98) | 6.40 (5.77-7.04) | 7.10 (6.38-7.82) | 7.79 (6.97-8.59) | 8.43 (7.53-9.35) | 9.24 (8.19-10.3) | 9.80 (8.64-11.1) |
| 60-day | 3.34 (3.01-3.69) | 4.24 (3.83-4.69) | 5.42 (4.90-5.97) | 6.24 (5.64-6.88) | 7.28 (6.57-8.01) | 8.01 (7.22-8.84) | 8.70 (7.82-9.63) | 9.34 (8.37-10.4) | 10.1 (9.02-11.3) | 10.6 (9.45-11.9) |

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

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

Please refer to NOAA Atlas 14 document for more information.

# WHAT DOES THIS MEAN?

## *25 Year – 24 Hour Storm*

**Minden Inn: NOAA point precipitation Frequency Estimates:*

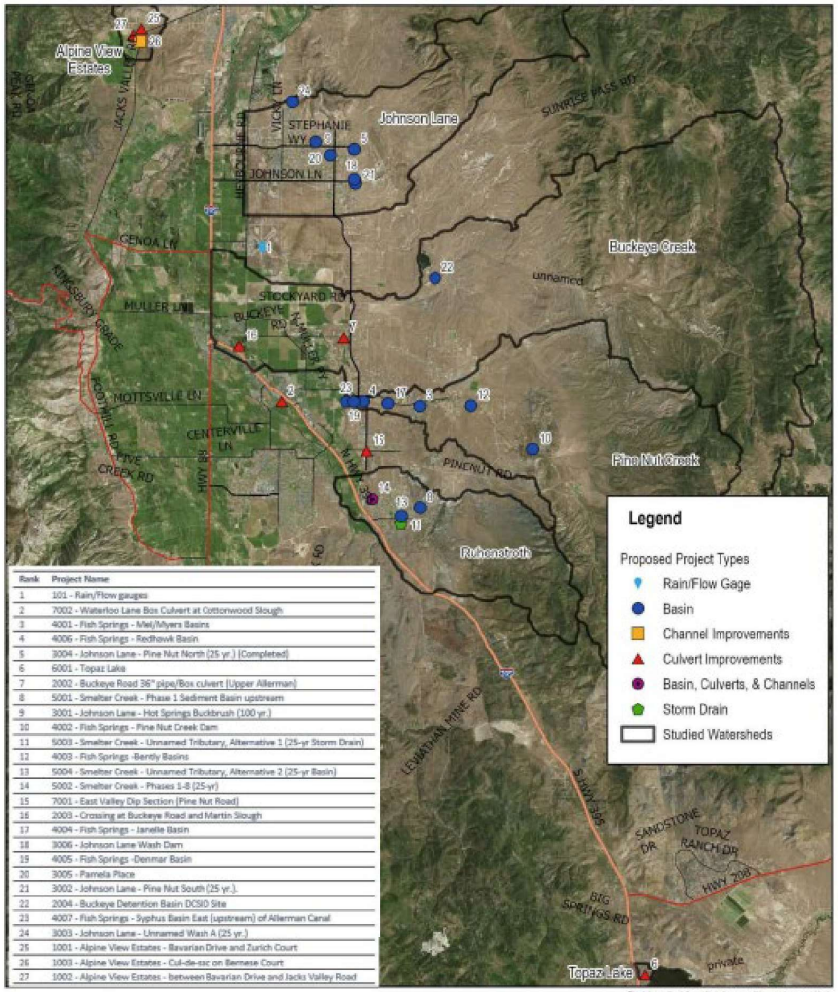
| | |
|---|---|
| *2 Yr – 24 hour:* | *1.28 inches of rain* |
| *10 yr – 24 hour:* | *1.89 inches of rain* |
| *25 yr – 24 hour:* | *2.26 inches of rain* |
| *100 yr – 24 hour:* | *2.86 inches of rain* |

# Stormwater Master Plan

## *PROPOSED PROJECTS*

**Table 11 – Prioritized list of capital improvement projects**

| Rank | Project Name |
|---|---|
| 1 | 101 - Rain/Flow gauges |
| 2 | 7002 - Waterloo Lane Box Culvert at Cottonwood Slough |
| 3 | 4001 - Fish Springs - Mel/Myers Basins |
| 4 | 4006 - Fish Springs - Redhawk Basin |
| 5 | 3004 - Johnson Lane - Pine Nut North (25 yr) (Completed) |
| 6 | 6001 - Topaz Lake |
| 7 | 2002 - Buckeye Road 36" pipe/Box culvert (Upper Allerman) |
| 8 | 5001 - Smelter Creek - Phase 1 Sediment Basin upstream |
| 9 | 3001 - Johnson Lane - Hot Springs Buckbrush (100 yr) |
| 10 | 4002 - Fish Springs - Pine Nut Creek Dam |
| 11 | 5003 - Smelter Creek - Unnamed Tributary, Alternative 1 (25-yr Storm Drain) |
| 12 | 4003 - Fish Springs -Bently Basins |
| 13 | 5004 - Smelter Creek - Unnamed Tributary, Alternative 2 (25-yr Basin) |
| 14 | 5002 - Smelter Creek - Phases 1-8 (25-yr) |
| 15 | 7001 - East Valley Dip Section (Pine Nut Road) |
| 16 | 2003 - Crossing at Buckeye Road and Martin Slough |
| 17 | 4004 - Fish Springs - Janelle Basin |
| 18 | 3006 - Johnson Lane Wash Dam |
| 19 | 4005 - Fish Springs -Denmar Basin |
| 20 | 3005 - Pamela Place |
| 21 | 3002 - Johnson Lane - Pine Nut South (25 yr). |
| 22 | 2004 - Buckeye Detention Basin DCSID Site |
| 23 | 4007 - Fish Springs - Syphus Basin East (upstream) of Allerman Canal |
| 24 | 3003 - Johnson Lane - Unnamed Wash A (25 yr) |
| 25 | 1001 - Alpine View Estates - Bavarian Drive and Zurich Court |
| 26 | 1003 - Alpine View Estates - Cul-de-sac on Bernese Court |
| 27 | 1002 - Alpine View Estates - between Bavarian Drive and Jacks Valley Road |




Douglas County, Nevada
Stormwater Master Plan

0 1 2 3 4 5 Miles

**FIGURE 25**

**PROPOSED CARSON VALLEY STORMWATER CAPITAL IMPROVEMENT PROJECTS**

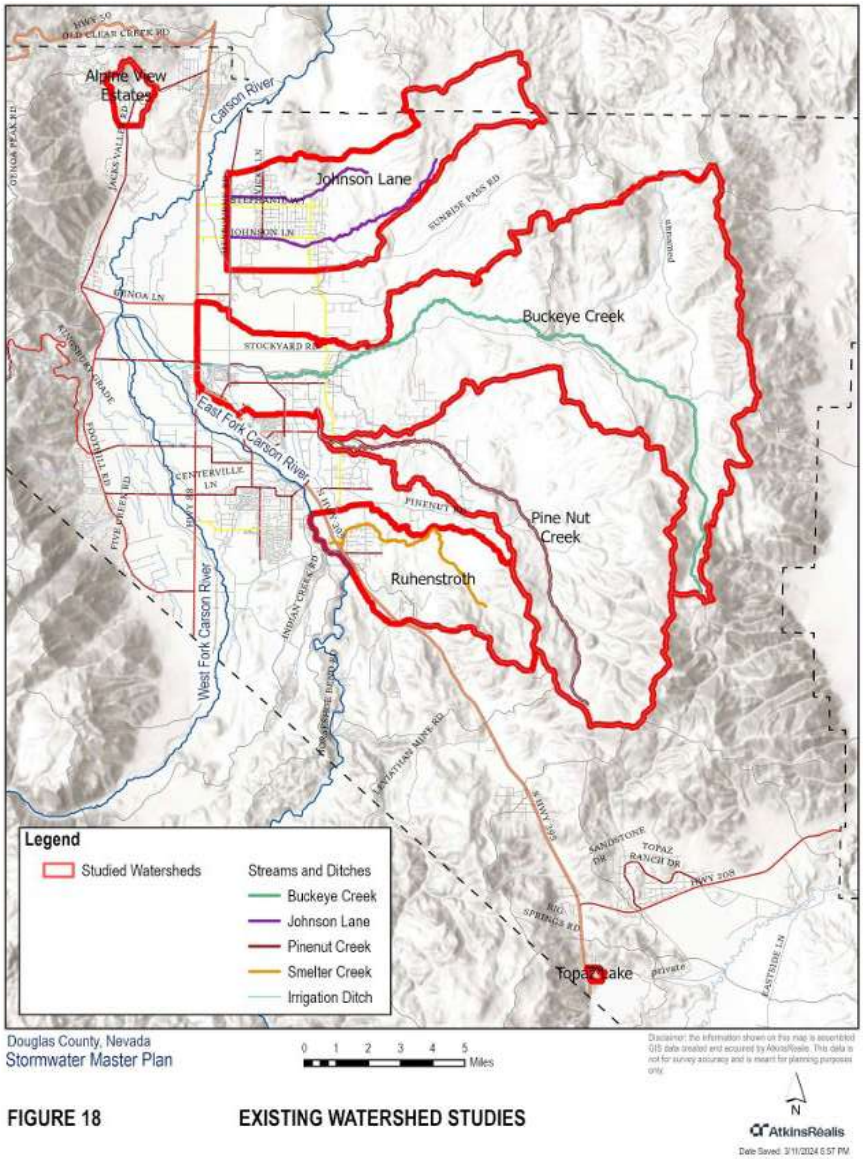



FIGURE 18 EXISTING WATERSHED STUDIES

# County Watersheds
## *EXISTING STUDIES*

Douglas County started having drainage area studies prepared in 2018 starting with the Johnson Lane Area and then Alpine View and Ruhenstroth, Pinenut and Buckeye.

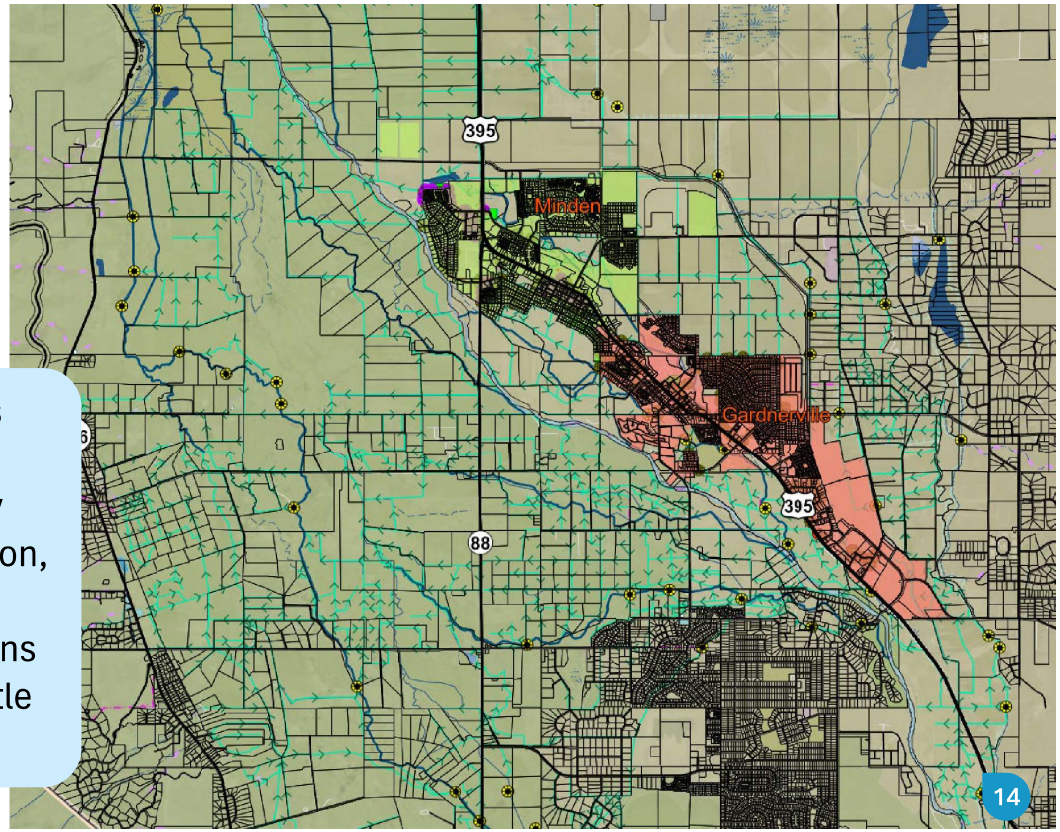
These were in areas where no previous floodplain mapping was available.

The County is a cooperating partner with Carson Water Subconservency Distirct and we have under contract this year Pinenut 2 and Sawmill Wash and next year (2027 application and FEMA funding – if available) if selected will be the Airport Wash

# WATER CONVEYANCE ADVISORY COMMITTEE

- *Governing Code:* *Title 2.56*
- *Membership:* *5 members*
- *Term Length:* *4-year staggered terms*
- *Meetings:* *First Monday of month*
- *Staff Liaison:* *County Engineer*

The committee will advise the commissioners regarding the effects of development on the water conveyance systems in Douglas County and carry out the duties of reviewing subdivision, parcel and land division maps and other land development proposals and improvement plans in accordance with the requirements of the Title 20 code and Design Guidelines.



# IRRIGATION NETWORK

## *East & West Fork Carson River*

Irrigation network drains from East Fork Carson River North and East of river with the Allerman, Virginia Diversions. Ditch flows north and westerly to Heybourne Ditch and Williams Slough, on to the Carson River.

Irrigation Network from West Fork Carson River collects tailwater form east fork and flows westerly to Brockless Slough and conveys irrigation water - west of the Carson River north of Genoa and back into the Caron River.

There are 2 Water Masters (East and West Carson River) and a ditch rider (Allerman) in the Valley Assigned by the state to control irrigation operations.

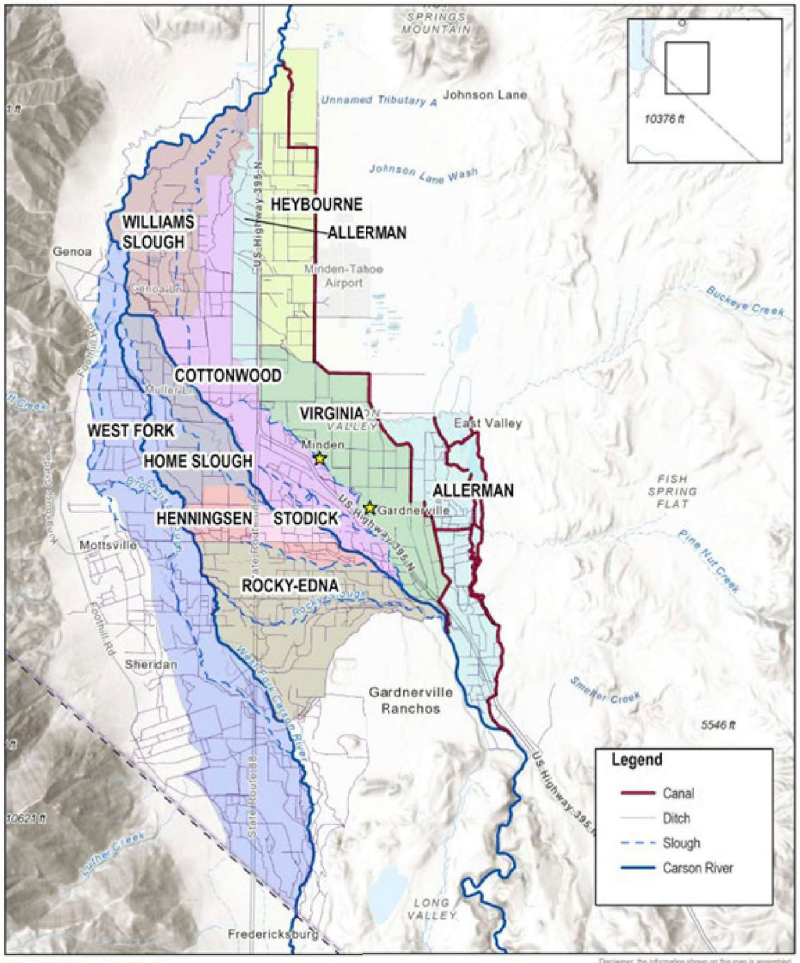
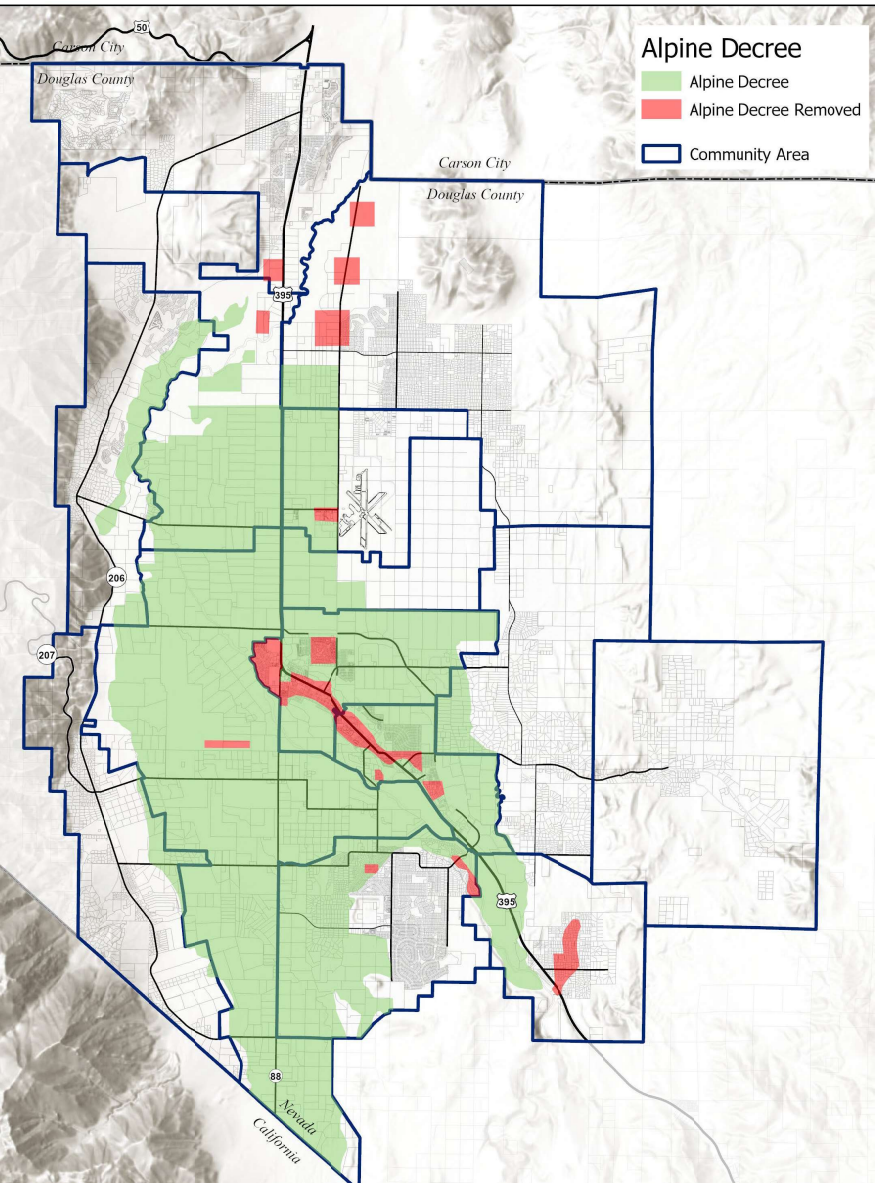



FIGURE 9 IRRIGATION NETWORKS AND OWNERSHIP



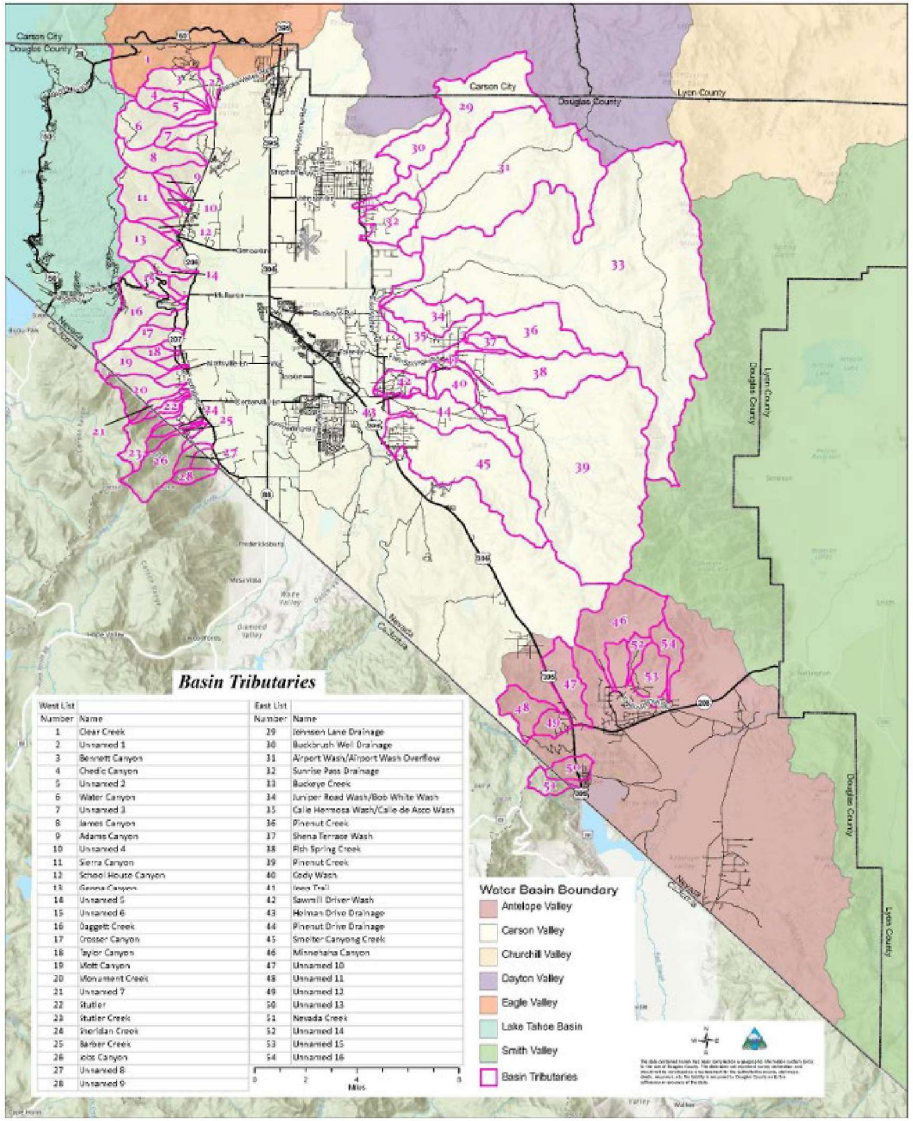

# Alpine Decree
## *IRRIGATION USE AREA*

The Alpine Decree is the federal decree that regulates the appropriation of surface water rights of the Carson River.

It includes the Carson River watershed, spanning portions of Alpine County, Douglas County, Carson City, and Lyon County.

The Alpine Decree establishes formal priorities, quantities (measured in acre-feet and cubic feet per second), and ownership of surface water rights for agricultural, municipal, and other users.

Figure 14 – County Watersheds




# County Watersheds

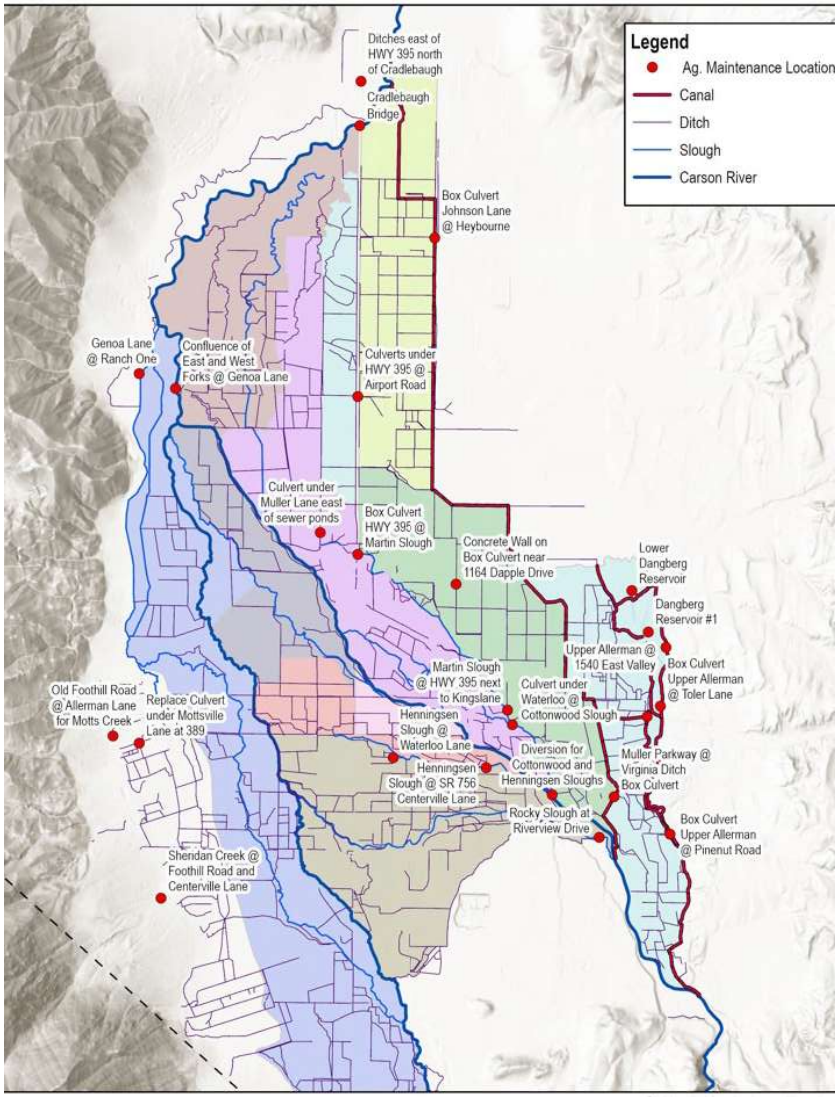
## *NOT ALL IDENTIFIED*

Property damage as a result of floods in Douglas County has been reported since the 1880's, both from riverine flooding (Carson River), and as a result of alluvial fan or debris flows from steep canyons (Pine Nut Mountains, Genoa, Topaz). In an effort to identify projects to mitigate or prevent flooding in these repetitively flooded areas, Douglas County has partnered with Carson Water Subconservancy District (CWSD) to acquire FEMA grant funds to perform flood risk studies in many watersheds. These studies identify the type of flood risk, the area prone to flooding, and proposed mitigation projects.

# IRRIGATION NETWORK

## *East & West Fork Carson River*

Irrigation network and Stormwater opportunities for partnership in Maintenance.



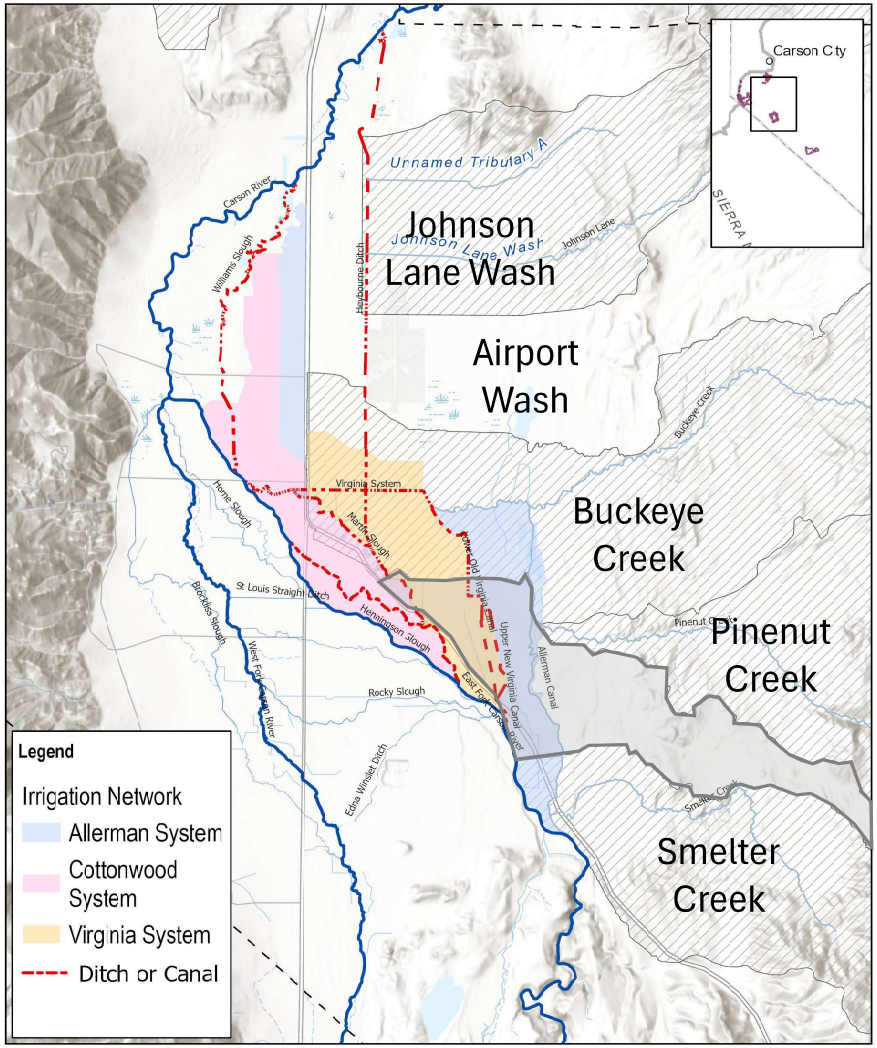



FIGURE 28 DRAINAGE AREAS & IMPACTED IRRIGATION NETWORKS

# Drainage Areas

## *IMPACTED DRAINAGE*

DRAINAGE AREAS flow into the improved irrigation system back to the Carson River.

If the irrigation system exceeds capacity from stormwater the irrigated fields becomes stormwater conveyance to the flooded Carson River.

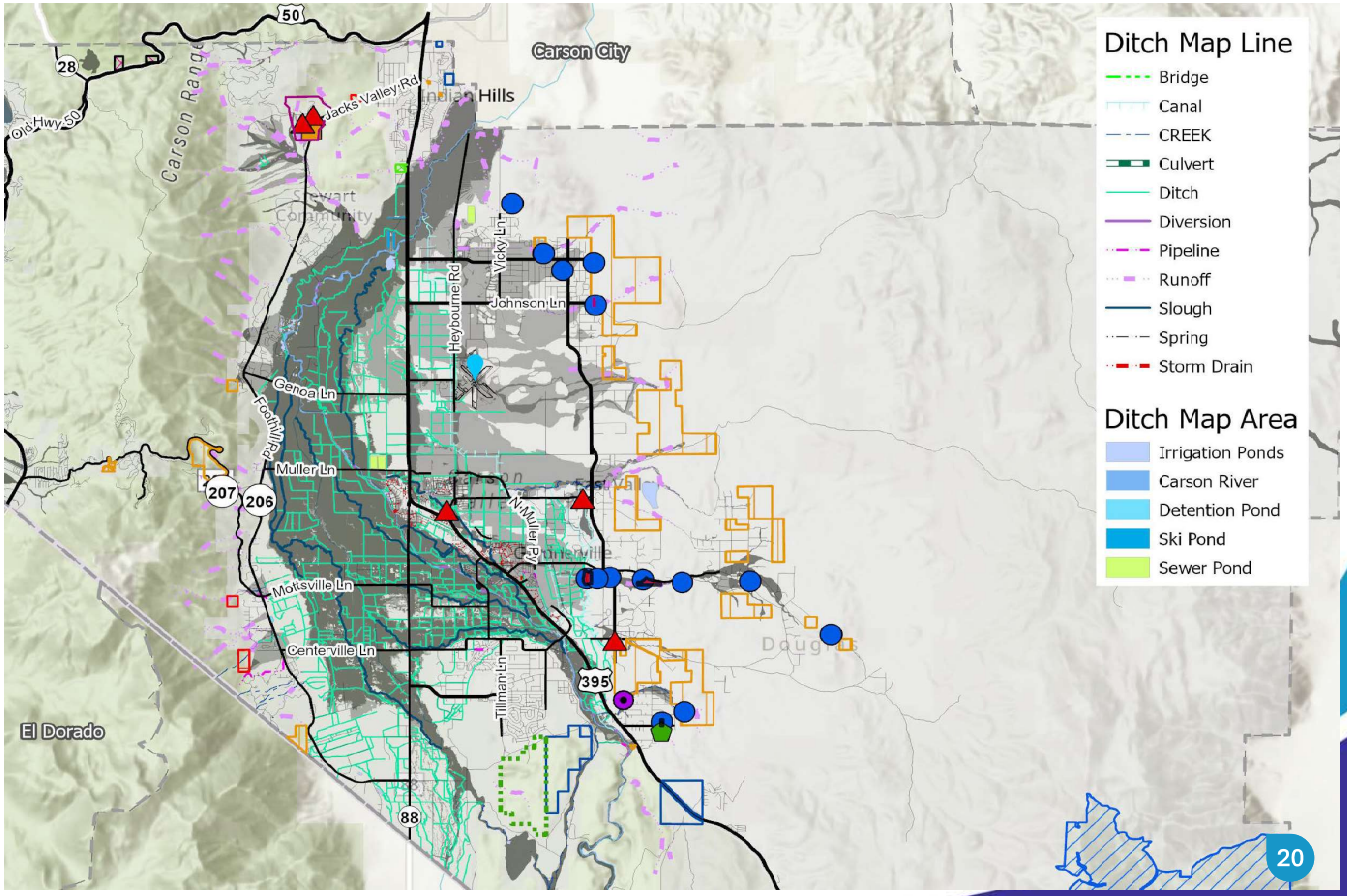
# FEDERAL LANDS BILL & PROPOSED STORMWATER PROJECTS

## Proposed Projects 2025 Stormwater CIP

- Basin
- Basin, Culverts, & Channels
- Channel
- Culvert
- Gage
- Storm Drain
- Proposed Projects Boundary 2025

## Federal Lands Bill

- Directed Special Use Permit Lands
- Douglas County Conveyances
- Lake Tahoe-Nevada State Park
- Lands for Disposal
- Proposed Burbank Canyons Wilderness
- Washoe Tribe Conveyances
- Open Space Recreation Area
- Critical Lands Parcels
- Special Flood Hazard Area
- X – 0.2 Pct Annual Chance Flood Hazard
- X – Area of Minimal Flood Hazard



# 2020 MASTER PLAN
# Goals, Policies, Implementation, Strategic Plan

**Implementation**

| | Priority |
|---|---|
| **A AGRICULTURE & CONSERVATION** | |
| Action 9 Develop and implement a stormwater management plan. | 5–10 |
| Action 10 Implement the Clear Creek and Johnson Lane Stormwater Management Plans as required by the EPA's MS4 National Pollutant Discharge Elimination System (NDPES) Permit. | 1–3 |
| Action 8 Investigate the use of existing irrigation ditches and canals to help alleviate Carson River and stormwater flooding problems and to prevent critical water conveyances from being obstructed or abandoned. | 1–3 |
| Action 22 Implement the Airport, Johnson Lane, Alpine View Estates, and Ruhenstroth Area Drainage Master Plans. | 1–3 |
| Action 2 Evaluate and update development regulations for naturally hazardous areas based on mapping and other relevant data. | 1–3 |

**Link to the full 2020 Master Plan**
https://tinyurl.com/2jsckkvv

## GOALS

The following goals, policies, and actions for the Douglas County Public Safety Element set forth future priorities for the county.

Goal 1 **Provide the community with increased safety from natural hazards through compatible design and development practices that protect ecosystem values and minimize damage to life, property, and fiscal resources.**

**Implementation**

| | Priority |
|---|---|
| **PF PUBLIC FACILITIES, SERVICES, & RECREATION** | |
| Action 9 Evaluate and update the definition of publicly valuable open space to include the provision of active recreation opportunities in less critical habitat in order to relieve recreation pressure in areas of more critical habitat and to manage public lands access. | 1–3 |
| Action 10 Evaluate private land recreation needs and management to relieve the impact on public lands. | 3–5 |
| Action 11 Establish an open space acquisition program that identifies acquisition area priorities based on capital costs, operation and maintenance costs, accessibility, open space needs, resource preservation, ability to complete or enhance the existing open space linkage system, and unique environmental features. Techniques for acquisition may include fee simple acquisition, acquisition of development rights, transfer of development rights, clustering, or other measures. | 1–3 |

# CRITICAL LANDS

## *Prepared for the BOCC May 28, 2026*

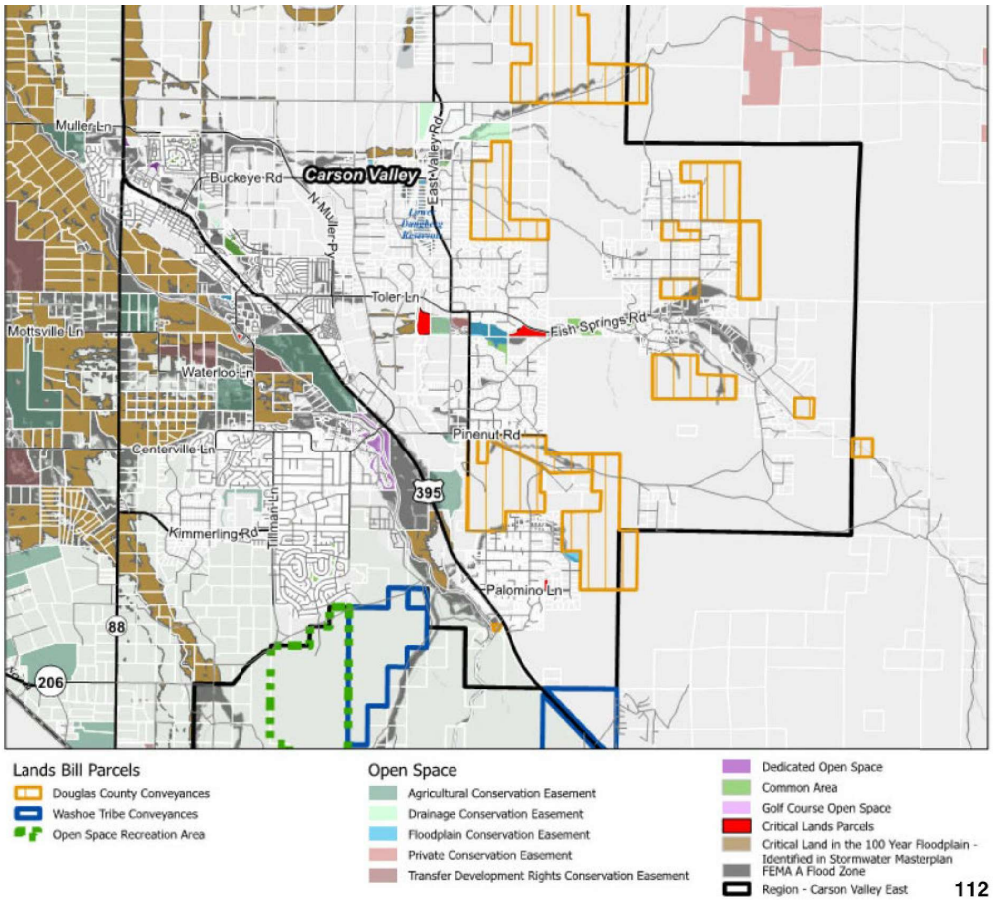
## *Purpose of the Plan:*

- CREATE A FRAMEWORK TO IDENTIFY AND PRIORITIZE CRITICAL LANDS
- REDUCE FLOOD RISKS AND INFRASTRUCTURE LIABILITIES
- PROTECT WATERSHED HEALTH AND WATER QUALITY
- SUPPORT A RESILIENT AND FISCALLY RESPONSIBLE STORMWATER UTILITY

## *Why This Plan Matters:*

- FLOODING THREATENS PUBLIC SAFETY AND STORMWATER UTILITY INFRASTRUCTURE
- NATURAL FLOODPLAINS ALREADY FUNCTION AS STORMWATER INFRASTRUCTURE
- PRESERVING THESE LANDS WILL REDUCE FUTURE INFRASTRUCTURE COSTS FOR THE STORMWATER UTILITY WHICH WILL REDUCE COSTS FOR UTILITY RATEPAYERS
- SUPPORTS LONG-TERM COMMUNITY RESILIENCE AND WATERSHED PROTECTION

# WHAT ARE CRITICAL LANDS?




Critical Lands are properties that provide significant stormwater management, flood mitigation, watershed protection, or drainage infrastructure cost avoidance benefits.

Critical Lands may include:

- FEMA 100-year floodplains;
- FEMA floodways;
- Natural detention areas;
- Riparian corridors;
- Wetlands;
- Flood-prone undeveloped lands;
- Groundwater recharge areas;
- Stream corridors;
- Hydrologically significant, privately owned parcels.

# QUESTIONS & DISCUSSION

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Director, Community Development
tdallaire@douglasnv.us
(775) 782-6201

# Design Criteria
# and
# Improvement Standards




## NEVADA

Resolution No. 2017R-039 Adopted June 15, 2017
Resolution No. 2007 R-014 Adopted June 7, 2007
Resolution No. 2001 R-080 Adopted September 6, 2001
Resolution No. 99R-024 Adopted March 4, 1999
Resolution No. 98R-084A Adopted September 17, 1998

# Part II

# Engineering Design Criteria and Improvement Standards

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# Division 1
# Introduction




# Division 6
# Storm Drainage

# DIVISION 6
# STORM DRAINAGE

## 6.1 Statutory Authority

Title 20.100.060.C of the Douglas County Consolidated Development Code (DCCDC) provides the statutory authority for the use of this manual for drainage design. Drainage policy and development requirements are contained in Title 20.100.060.

### 6.1.1 Stormwater Drainage System

Stormwater drainage systems are an integral part of the development process. The planning of drainage facilities shall be included in the development process and in preparation of improvement plans.

Storm drainage planning for all development shall include the allocation of space for drainage facility construction and maintenance, which may entail the dedication of right-of-way or easements.

### 6.1.2 Water Rights

All drainage systems shall be planned and constructed with consideration given to the existing water rights and applicable water laws.

### 6.1.3 Reasonable Use of Drainage

"Reasonable Use of Drainage" is defined as providing an economically and hydraulically efficient drainage system which is demonstrated not to adversely impact downstream properties. This "Reasonable Use of Drainage" therefore allows development to occur while preserving the rights of adjacent property owners.

Downstream properties shall not be unreasonably burdened with increased flow rates, negative impacts, or unreasonable changes in manner of flow from upstream properties. Drainage problems shall not be diverted from one location to another. In the same manner downstream properties cannot block natural or existing runoff through their site and shall accept runoff from upstream properties.

Storm drainage shall not result in the alteration or relocation of a water course which will reduce the flood-carrying capacity of the water course, nor shall drainage facilities result in the damming, filling, relocating or other interference with the natural flow of surface water along any surface water drainage channel or natural water course, except as may be approved as part of the drainage study.

#### 6.1.3.1 Increase in Rate of Flow

Development typically increases the rate of drainage flow to downstream properties due to increases in impervious area. Mitigation of these increases is generally accomplished through the use of detention and/or retention facilities. The capacity of downstream drainage conveyance systems shall be analyzed to the point of discharge and shall be based on runoff from the development as fully improved. Discharges which exceed the capacity of the conveyance to the point of discharge will not be allowed. An increase in the peak rate of flow from development shall not be allowed. Storms shall be accommodated in accordance with Section 6.1.5 Storm Runoff Detention and Section 6.6 Technical Criteria.

#### 6.1.3.2 Change in Manner of Flow

Development tends to concentrate existing natural sheet flow into point flows at property lines. Examples of these point flows are gutter flow, storm drain outlets, and detention facility outlets. Downstream properties may experience a longer duration of storm flows, and greater flows due to a shortened time of

concentration. Discharge of point flows on downstream property can cause increased erosion at the discharge point and further downstream. Therefore, downstream facilities shall be evaluated for runoff capacity to the point of discharge. A change in manner of flow shall be mitigated to the point of discharge. Point flows shall be discharged to downstream properties at non-erosive velocities and safe depths of flow.

### 6.1.3.3 Diversion of Drainage

The flow of storm runoff shall be maintained within its natural or original drainage course unless reasonable use is demonstrated otherwise.

### 6.1.3.4 Water Quality

Storm drainage improvements shall incorporate water quality and erosion controls in accordance with the Nevada Department of Environmental Protection – Bureau of Water Quality Planning requirements, DCCDC Title 20, and accepted engineering practice. Storm drainage leaving a development may not be of a quality that will adversely affect downstream uses. Construction sites disturbing 1 acre or greater are required to obtain coverage under the NDEP State of Nevada Stormwater General Permit NVR100000. Storm drain improvements in the areas identified in the Nevada NPDES General Permit for discharges to Small Municipal Separate Storm Sewer Systems, specifically the Clear Creek watershed and Johnson Lane area are required to comply with the Douglas County stormwater management plans for these areas.

### 6.1.3.5 Drainage Improvements

All development shall design and construct the drainage improvements as set forth below:

1. Drainage improvements which serve only a single development shall be provided by that development.
2. All drainage related to development or improvements shall be collected and conveyed to the point of discharge.
3. Surface drainage from impervious coverage shall not cross property lines except by way of a natural watercourse, an approved drainage system within a public or private storm drain easement, or a permanent surface drainage easement.
4. Storm drain facilities shall be extended as part of a subdivision or development to adjacent undeveloped properties for future extensions.
5. Existing drainage from adjoining property shall be perpetuated through the development.
6. The outlets of all storm drain pipes that enter ditches or other drainage facilities shall be protected with rip-rap or other protection. Impacts from the 100-year flood flows shall be considered when designing the entering pipe. Channel modifications for erosion control shall be designed so that the receiving channel and entering channel will contain flows without erosion.
7. Drainage improvements shall be designed with consideration of the impacts due to sediment, deposition, scour, and debris on operation and maintenance of the facilities. All drainage improvements shall be designed to allow maintenance of the improvements.

### 6.1.3.6 Floodplain Management

Development within FEMA designated floodplains shall comply with DCCDC Title 20.50, and requirements of the National Flood Insurance Program (NFIP).

#### 6.1.3.7 Low Impact Design

Low impact design practices such as vegetated swales, bioretention and permeable pavements are not required but may be considered on a case by case basis in locations deemed appropriate by the County. Low impact design practices shall be sized to treat the first half-inch of a storm event, and shall be in accordance with the Truckee Meadows Regional Stormwater Quality Management Program "Low Impact Development Handbook." The County Engineer shall have the authority to allow low impact design practices.

### 6.1.4 Storm Runoff Detention

Detention is an acceptable method to reduce increases in storm runoff due to development. Temporarily detaining storm runoff can significantly reduce downstream flood hazards as well as pipe and channel requirements. Storage also provides for sediment and debris collection that reduces maintenance requirements for downstream channels and streams.

Detention storage for land development shall be required when a development increases flows. Onsite detention storage shall be sized so that developed release rates do not exceed pre-developed rates. At a minimum, onsite detention storage shall be sized to detain runoff in order to comply with all of the following release criteria:

| Design Storm | Maximum Allowable Peak Discharge |
|---|---|
| 2 year, 24 hour duration | pre-developed 2 year, 24 hour duration |
| 10 year, 24 hour duration | pre-developed 10 year, 24 hour duration |
| 25 year, 24 hour duration | pre-developed 25 year, 24 hour duration |
| 100 year, 24 hour duration | pre-developed 100 year, 24 hour duration |

Douglas County may grant exemptions to the detention requirement if the project can show it meets one or more of the following criteria:

1. The development is an addition to existing building(s) provided the impervious density of the entire property does not increase by more than 10% and does not exceed a total of 10,000 square feet.
2. The development is located in an area that has a regional detention system installed, and the regional detention system is sized for and has capacity for the additional runoff.
3. The development is upgrading the downstream drainage conveyance system to an approved point of discharge to handle the increase in runoff.
4. The development discharges into a regional conveyance facility that has capacity based on build out of the drainage basin.
5. An engineering analysis demonstrates that detention will adversely impact downstream conveyance or property.

### 6.1.5 Storm Runoff Retention and Infiltration

Storm runoff retention and infiltration has been used to eliminate the need for constructing outlet structures and for ease of construction. Problems with retention basins and infiltration facilities have

included perpetual maintenance requirements, soil expansion, siltation, decreasing infiltration capacity and insect abatement. Retention or infiltration systems are acceptable as a storm drainage mitigation measure only if the system has adequate maintenance provisions and at least one of the following criteria can be met:

1. There are no downstream facilities to convey site runoff.
2. The project is located in the Lake Tahoe Basin and is approved by the Tahoe Regional Planning Agency,
3. The design engineer demonstrates that retention/infiltration is the only feasible option and Douglas County approves the concept.
4. Retention facilities may be equipped to pump to a public storm drain system after the storm has passed if natural infiltration rates are not acceptable. All stormwater flowing under pressure shall convert to gravity flow at the property line before entering the public system.

### 6.1.6 Drainage Facilities Maintenance

All drainage facilities shall be designed to minimize facility maintenance as well as to provide ease of maintenance and include maintenance access to the drainage facility all to the satisfaction of the entity responsible for maintenance and Douglas County. Refer to Section 6.1.8 Drainage Easements for drainage easement requirements.

The individual property owner, homeowner's association or developer shall be responsible for maintenance of all privately owned drainage facilities on their property including, but not limited to, inlets, pipes, channels, and detention/retention basins, unless otherwise required or modified by separate agreement. Should the property owner or developer fail to adequately maintain said facilities, Douglas County or the governing entity shall have the right to enter said property, upon proper notice, for the purposes of maintenance. All such maintenance costs shall be assessed against the owner(s).

If drainage facilities also convey irrigation water, maintenance shall be addressed in accordance with Division 7 and DCCDC Title 20.100.070.

### 6.1.7 Drainage Easements

Easements shall be provided where necessary for access and maintenance of the storm drain system. Drainage easements shall follow the criteria shown in "Division 9-Easements" of this manual.

Improvements which accept runoff from the public right of way or public property shall be dedicated as public drainage easements. Facilities which do not accept runoff from a public roadway or public property or where the drainage in conveyed through private property shall be dedicated as private.

## 6.2 Submittal and Review Process

The purpose of the submittal and review process is to determine whether or not the drainage plan and improvements for a given project meet Douglas County drainage requirements. These requirements include overall facility planning to assure an integrated and coordinated design as well as design standards to assure consistent design and analysis.

Drainage study submittal requirements for all land development in Douglas County are presented in the following section and summarized in Table 6.1. The submittal requirements are intended to provide the necessary information for each development, and to minimize review time. Project applicants are

encouraged to meet with the County Engineering Division and respective Town or GID to discuss drainage requirements prior to the start of the drainage analysis and design. All drainage designs and submittals shall be complete and comprehensive and include drainage reports and analyses in accordance with Section 6.3 Conceptual Drainage Study and 6.4 Technical Drainage Study.

Drainage studies shall be submitted for all development, in accordance with Table 6.1, except for single family residences on lots in a subdivision with master drainage facilities. Individual parcels one acre or greater may require a drainage study if the development of the parcel affects a drainage channel or may alter historic drainage patterns. All submitted reports shall be clearly and cleanly reproduced. Copies of charts, tables, nomographs, calculations, or other referenced material shall be legible.

## 6.3 Conceptual Drainage Study

A Conceptual Drainage Study is a condensed report that conceptually addresses existing and proposed drainage conditions. The conceptual drainage study shall contain sufficient information in order for the Engineering Division to make a recommendation to the appropriate Douglas County hearing body.

Table 6.1. Drainage Study Submittal Requirements.

| **Land Development and/or Land Action Process** | **Required Drainage Submittals** |
|---|---|
| Tentative Parcel Map: | C[1] |
| Subdivision (including planned unit developments): | |
| Tentative Map | C[1] |
| Site Improvement Permit | T[3] |
| Building Permit | T[3] |
| Other: | |
| Special Use Permit | C[1,3] |
| Design Review | C[1] |
| Floodplain Modification Study | |
| Conditional Letter of Map Revision, Letter of Map Amendment, Letter of Map Revision, etc. | T[2] |
| **Drainage Submittal Types:** **C - Conceptual Drainage Study** **T - Technical Drainage Study** | |

Notes:

1. A Technical Drainage Study may be required by the Engineering Division in lieu of, or in addition to a Conceptual Drainage Study.
2. All Floodplain Modification Studies shall be prepared in accordance with FEMA requirements and the Douglas County Development Code.
3. The Engineering Division may waive this requirement.

### 6.3.1 Conceptual Drainage Study Outline

The Conceptual Drainage Study shall contain a brief narrative report, a calculation appendix (if required), and a drainage plan containing the following information:

I. Introduction

- A. Project Name, Type of Study, Study Date
- B Preparer's Name, Seal, and Signature (per NAC 625)
- C. Contact Person and Telephone Number
- D. Description of Project
- E. Existing Site Conditions
- F. General Location Map (8 l/2" x 11" is suggested)

II. Existing and Proposed Hydrology (on-site and off-site)

- A. Discuss existing and proposed drainage basin boundaries
- B. Provide design storm (see Division 6.6.1) and 100-year return period storm flow calculations
- C. Discuss existing drainage problems (if applicable)
- D. Discuss existing floodplain impacts to the proposed project (if applicable)
- E. Discuss impacts to existing irrigation facilities and capacities of existing irrigation facilities

III. Proposed Drainage Facilities (on-site and off-site)

- A. Discuss routing of flow in and/or around site, and location of drainage facilities.
- B. Discuss detention requirements or other proposed runoff mitigation measures per Section 6.1.5 Storm Runoff Detention of this manual.
- C. Discuss floodplain modifications (if applicable)

IV. Conclusions

- A. Compliance with the Douglas County Development Code and the Douglas County Design Criteria and Improvement Standards
- B. Compliance with FEMA (if applicable)

V. Exhibits

- A. Drainage Plan

  An 8 1/2" x 11" or larger legible drainage plan that covers the development area shall be submitted and bound with the Conceptual Drainage Study. The plan shall contain as a minimum the following:

  1. Locate and label development boundary
  2. Show existing and proposed drainage basin boundaries
  3. Show location of existing drainage problems
  4. Locate and label adjacent streets

3. Locate and label known 100-year floodplains
4. Locate and label existing and/or planned local flood control facilities
5. Identify blue-line streams
6. Show flow paths
7. Identify design inflow points and design outflow points and corresponding design storm and 100-year return period storm flow rates
8. Show existing and proposed grades and topography
9. Show time of concentration path for developed and existing conditions
10. Show irrigation facilities

B. Drainage Calculation Summary Sheet (1 or 2 pages)

1. Watershed flow path data including length, slope, time of concentration calculations
2. Watershed area calculations, pervious and impervious area calculations, runoff coefficient calculations
3. Calculation or Model Input and Output Data (pre-developed and developed conditions)
    a. Basin Data and Physical Parameters (length, slope, Manning N, drainage area, etc.)
    b. Channel Data (length, slope, Manning N, area, width, side slope, etc.)
    c. Precipitation Data
    d. Loss Rate Data
    e. Unit Hydrograph Data
    f. Routing Data
    g. Storage Routing Data
    h. Diversion Data
    i. Other Model Input Data
    j. Runoff Summary (peak flow, time of peak, flow routing data, storage information, etc.

C. FEMA Floodplain Map (show on drainage plan also)

## 6.4 Technical Drainage Study

The Technical Drainage Study shall discuss, **at a detailed level**, the existing site hydrologic conditions and the proposed drainage plan to accommodate or modify site drainage conditions in the final development plan for the site. The Technical Drainage Study shall address both on-site and off-site drainage analysis and improvements necessary to mitigate the impact of the proposed development on downstream properties. The technical drainage study shall include detailed calculations and documentation to support all assumptions and conclusions.

### 6.4.1 Technical Drainage Study Contents

The Technical Drainage Study shall be in accordance with the following outline and contain as a minimum the information listed:

I. Title Page

- A. Project Name, Type of Study, Date of Preparation, and Date of Revisions
- B. Preparer's Name, Seal and Signature (per NAC 625)

II. Executive Summary

- A. Short discussion of major findings and summary of pre-developed peak runoff rates and volumes and developed runoff rates and volumes
- B. Drainage Calculation Summary Sheet (1 or 2 pages)
  1. Watershed flow path data including length, slope, time of concentration calculations
  2. Watershed area calculations, pervious and impervious area calculations, runoff coefficient calculations
  3. Calculation or Model Input and Output Data (pre-developed and developed conditions)
     a. Basin Data and Physical Parameters (length, slope, Manning N, drainage area, etc.)
     b. Channel Data (length, slope, Manning N, area, width, side slope, etc.)
     c. Precipitation Data
     d. Loss Rate Data
     e. Unit Hydrograph Data
     f. Routing Data
     g. Storage Routing Data
     h. Diversion Data
     i. Other Model Input Data
     j. Runoff Summary (peak flow, time of peak, flow routing data, storage information, etc.

III. General Location and Development Description

- A. Location of Property
  1. Street Location and Assessor's Parcel Number(s)
  2. City, County, State Highway and local streets within and adjacent to the development
  3. Township, range, section, 1/4 section
  4. Drainage basin(s) encompassing the development
  5. Location of development in relationship to existing drainage facilities
  6. Names of surrounding developments

7. General location map (8 1/2" x 11" is suggested)

B. Description of Property

1. Area in acres
2. Existing site conditions (buildings, drainage structures, floodplains, and other site conditions that may impact the project)
3. General site topography, ground cover, and soil maps
4. Existing irrigation facilities such as ditches, canals and diversion structures
5. Adjacent and downstream developments, drainages and infrastructure

C. Project Description

1. Purpose and nature of land disturbing activity; include estimated amount of grading
2. Critical areas on the site which have the potential for serious erosion and/or sedimentation, or other drainage problems

IV. Drainage Basin Description

A. Off-Site drainage description

1. Discuss and graphically illustrate historic drainage patterns (overland flow, channelized flow, points of discharge ) for off-site flows which enter the project site
2. Discuss and graphically illustrate off-site flows which enter the project site
3. Provide map of drainage basins
4. Discuss and document drainage basin characteristics and assumptions (topography, area, land use, coverage, soil types, erosion potential, etc.)
5. Identify design storm and 100-year return period storm flows for each drainage basin and sub-basin impacting or impacted by the project site
6. Discuss downstream flow paths, rates, and conveyance capacity

B. On-site drainage description

1. Discuss historic on-site drainage patterns and capacity of the property (flow directions through site and at property lines)
2. Discuss historic drainage patterns of upstream runoff
3. Provide map of drainage basins
4. Discuss historic drainage basin characteristics (topography, area, land use, coverage, soil types, erosion potential, etc.)

C. Floodplain Information

1. Identify all FEMA regulated floodplains which impact the subject site. Locate same on drainage plan
2. Note lowest floor and other pertinent elevation(s)

3. Floodplain/Floodway calculations where pertinent

D. Previous Drainage Studies

1. Identify previous drainage studies for the site, and provide a copy if available

2. Identify previous drainage studies or previously approved projects which affect the site, and provide copies of the studies if available

E. Discuss how the development meets the requirements for the Nevada NPDES General Permit for discharges to Small Municipal Separate Storm Sewer Systems, specifically the Clear Creek watershed and the Johnson Lane area.

V. Proposed Drainage Facilities

A. General Description

1. Discuss criteria and methodology

2. Discuss proposed on-site drainage system plan and layout

3. Discuss proposed off-site drainage system plan

B. Compliance with Regulations and Adopted Plans

1. Discuss compliance with FEMA floodplain regulations and Douglas County Development Code, and all proposed modifications to or verifications of the FEMA regulated floodplain through the subject site

2. Discuss compliance with rules and regulations for developments on alluvial fans (if applicable)

3. Discuss compliance with previously approved drainage studies for the subject site

4. Identify individually all requests for variances from the requirements of the drainage criteria

5. Determine base flood elevation if project area is in an A flood zone

C. Hydrologic Criteria

1. Provide and discuss design rainfall computations

2. Provide and discuss design runoff computations

3. Provide and discuss peak flow rates from off-site areas and facilities.

4. Provide and discuss off-site limiting conditions and constraints (see Section 6.1.4.1 Increase in Rate of Flow)

5. Provide schematic of pre- and post-development time of concentration paths and calculations

D. Facility Design Calculation

1. Provide and discuss design calculations for the on-site drainage system (design storm and 100-year storm flows)

a. Street and ditch flow calculations

b. Storm drains, inlets, and ditch flow calculations

c. Channel and culvert flow calculations

d. Other hydraulic structure flow calculations (trash rack, grates, etc.)

e. Detention storage and outlet design calculations and flows

f. Provide detail of control structure device

g. Erosion and sediment deposition and mitigation measures (see Section 6.6.5.19 Outlet Protection, Section 6.6.7 Drainage Channels and Section 2.2.11 Erosion Control Design Criteria)

h. Permanent stabilization description of how site will be stabilized after construction is complete (see Section 2.2.11 Erosion Control Design Criteria)

2. Discuss design calculations for the off-site drainage system that is accepting post-development runoff to the point of discharge, and impacts from same

a. Street flow calculations

b. Storm drain, inlets, and ditch flow calculations, including velocities

c. Channel and culvert flow calculations

d. Other hydraulic structure flow calculations

e. Alluvial fan analysis and calculations (when required)

3. Discuss Floodplain/Floodway calculations as related to FEMA requirements and compliance with Douglas County Title 20.

4. Discuss maintenance access and potential maintenance requirements, and maintenance responsibilities

5. Discuss easement requirements for the proposed drainage facilities

6. Discuss phasing of all drainage facilities

7. Provide energy and hydraulic grade lines and calculations

8. Evaluate sediment transport and deposition and discuss proposed mitigation.

VI. Conclusions

A. Compliance with Drainage Laws

B. Compliance with the Douglas County Development Code

C. Compliance with FEMA requirements

D. Compliance with the Douglas County Design Criteria and Improvement Standards

E. Effectiveness of proposed drainage facilities to control storm runoff

F. Impact of proposed development on off-site property and facilities

G. Mitigation of impacts

VII. Appendices as required by report

### 6.4.2 Technical Drainage Study Plan

A detailed drainage plan(s) for the subject site shall be submitted with the Technical Drainage Study. The plan(s) shall be on a 22" x 34" or 24" x 36" drawing at an appropriate scale (a scale of 1" = 20' to 1" = 200' is recommended). The following information shall be shown on this drawing, except that the off-site drainage basin boundaries may be shown at an appropriate legible scale on an exhibit:

1. Property lines and streets (roads) including right-of-way widths within 100 feet of the development.
2. Street names, grades and widths.
3. Existing contours and proposed elevations sufficient to analyze drainage patterns extending a minimum of 100 feet past property lines of the project limits. If required by the Engineering Division, more extensive off-site topography shall be required.
4. Existing drainage facilities and structures, including ditches, storm drains, channels, street flow direction, and culverts. All pertinent information such as material, size, shape, slope, and location shall also be included.
5. Limits of existing floodplains based on Flood Insurance Rate Maps, and best available information. Provide tie to FEMA datum if all or a portion of the site is within a FEMA regulated floodplain, and base flood elevation information when available. Establish base flood elevations if not determined on FIRMs.
6. Proposed on-site drainage basin boundaries. Include off-site drainage basins if same runoff enters project.
7. Proposed future on-site and off-site flow directions and paths for design storm and 100-year storm flows at pertinent locations.
8. Proposed street and ditch flow paths and slopes. Trace peak flows leaving project site to nearest drainage facility; identify capacity and improvements, if needed.
9. Proposed storm drain locations, type, size, capacities, depth of flow, and slope. Include inlet types, sizes and locations, and manhole locations. Correlate to drainage calculations.
10. Proposed channel alignment with typical cross section. Provide street cross sections showing design storm and 100-year return period storm depth of flow.
11. Proposed culvert locations, type, size, and slope.
12. Miscellaneous proposed drainage facilities (i.e. hydraulic structures, etc.).
13. Easement widths and boundaries (existing and proposed).
14. Ditch and channel sections with lining, if required.
15. Construction details including control structure and identify construction materials.
16. Legend for all symbols used on drawing.
17. Scale, Bar Scale, North Arrow, Date Bench Mark, Title Block, Professional Engineers Signature, Seal.

18. Energy grade lines (EGL's) and hydraulic grade lines (HGL's) for storm drain and channel storm runoff.
19. Show emergency flow paths for 100-year peak storm both onsite and downstream to the point of discharge.
20. Reference cross sections on drainage plans with design calculations.

## 6.5 Technical Criteria

### 6.5.1 Hydrology

Drainage facilities shall be designed to convey the peak runoff for the 25 -year design storm. All development shall provide an emergency flow path, which follows the historical path, for a storm event with a 100-year return period.

1. Storm drain systems shall be designed for the 100-year peak storm for the following situations:
   a. Locations where street flow is collected in a sump with no allowable overflow capacity.
   b. Locations where the street cross-section is such that the allowable depth of flow in the street is limited to the curb height (i.e. elevated streets with negative slopes at the ROW line).
   c. Locations where the desired 100-year return period storm flow direction is not reflected by the street flow direction during a 100-year return period storm (i.e. flow splits at intersections).
   d. Locations where the storm drain system is accepting flows from an upstream storm drain system or branch which is designed for storm capacity which is greater than would otherwise be required. In this case the storm which results in the greatest flow shall be used.
2. Refer to Section 6.1.4.6 for additional requirements for projects located within a floodplain.
3. Where the storm drain or culvert conveys irrigation water and storm water, the storm drain or culvert shall be sized in accordance with the most restrictive of the following criteria:
   a. for culvert or pipe up to and including the capacity if a round 48-inch pipe, 150 percent of the hydraulic capacity of the ditch,
   b. beyond the capacity of a 48-inch round pipe, 100 percent of the hydraulic capacity of the ditch,
   c. for the sum of the irrigation conveyance flow in the steady uniform flow condition (i.e. irrigation gates open) plus the storm runoff for the design storm event.
4. Refer to Section 7.1.2 Irrigation Ditches for sizing criteria for irrigation ditches that convey storm runoff. Elevations required to irrigate fields shall be accounted for in the design.
5. Refer to Tables 6.3 and 6.4 for street capacity limitations for the design storm and 100-year storm events.

### 6.5.2 Storm Runoff Determination

Storm runoff (rates and volumes) shall be determined in accordance with the following methods (other methods may be used if approved by the Engineering Division):

| Contributing Basin Area (A) | Computation Procedure |
|---|---|
| A ≤ 160 Acres | Modified Rational Method, HEC-1 (SCS Unit Hydrograph or Kinematic Wave, HEC-HMS, TR-20 or TR-55 |
| A > 160 Acres | HEC-1 (SCS Unit Hydrograph or Kinematic Wave), HEC-HMS, TR-20 or TR-55 |

**Notes:**

1. **All storm drain pipe systems with a contributing area of ≤ 160 acres may be designed using the Rational Method or other appropriate method.**
2. **The Modified Rational Method may be used to size detention facilities with a contributing area of ≤ 160 acres.**
3. **HEC-RAS shall be used to generate hydraulic profiles for ditches, irrigation ditches, channels and rivers. Two dimensional modeling may also be acceptable.**
4. **If the consultant wishes to use a hydrologic/hydraulic model not listed above submit a request in writing detailing the request to the County Engineer prior to submitting improvement plans.**

A Soil Conservation Service Type II, 24-hour synthetic rainfall distribution shall be used for storm runoff calculations. On a case by case basis, the County may allow the National Oceanic and Atmospheric Association (NOAA) Atlas 14 and other rainfall distributions that are supported by an engineering analysis.

The NOAA Atlas 14 precipitation frequency estimates for defining mean precipitation depth at a specific location shall be utilized for design purposes. Hydrometerological data for Nevada from NOAA can also be found at NOAA's website.

### 6.5.3 Streets

The use of streets to convey stormwater runoff, although naturally occurring, interferes with the primary function of the street for transportation purposes. Streets are, however, an important component in the storm drainage system due to their large stormwater runoff carrying capacity obtained for little or no drainage related costs. In order to balance these two competing street uses, limits on the street carrying capacity are required based on the classification of the street related to emergency use during flood events. Streets may be used for storm drainage with the following specific limitations:

1. The allowable street capacity for different roadway functional classifications shall be determined in accordance with Table 6.2 and Table 6.3.
2. Gutters shall have a minimum slope of 0.50 percent to prevent ponding.
3. The maximum velocity of curb flow shall be 10 feet per second.
4. In a gutter that has a slope greater than 10 percent and a radius of 400 feet or less or where parking is allowed, design flow shall not exceed four inches (4") at the curb.
5. Finished floor elevations shall be a minimum of one (1) foot above the elevation of street flows. If finished floor elevations are not a minimum of one (1) foot above the elevation

of the street flow, or if the finished floor elevation is not shown on the improvement plans, then a technical drainage study shall be required before the County will issue a building permit for the affected lot.

Table 6.2. Longitudinal Street Flow – 25-year Return Storm.

| Roadway Functional Classification | Design Storm Street Capacity Limitations (See Notes) |
|---|---|
| 1) Collector / Arterial | A. No curb overtopping. A minimum 12 foot wide dry lane shall be maintained in each direction. In no case shall the flow of water extend more than half-way onto the lane adjacent to the curb. |
| 2) Urban Commercial / Industrial Local Street, Urban Local Street, Rural Local Street | A. No curb overtopping. In no case shall the flow of water extend more than half-way onto the lane adjacent to the curb. |

Notes:

1. If one or more of the above conditions cannot be met, the maximum depth of flow in the gutter flowline shall be less than or equal to 6 inches, or curb height, whichever is less.
2. Where no curb and gutter exists, encroachment onto adjacent property shall not be allowed.
3. Other criteria such as the Federal Housing Administration regulations may impose standards more restrictive than cited.

Use Modified Manning's equation for gutter or triangular flow to calculate spread of water:

$Q = 0.56 \times z/n \times s^{1/2} \times D^{8/3}$, where

Q = Discharge in cubic feet per second

Z = Reciprocal of cross slope

n = Manning's coefficient for roughness (usually 0.015 or 0.016 for paved streets)

s = Average slope of gutter in feet per feet

D = Depth of water at curb in feet

Table 6.3. Street Capacity Limitations for 100-Year Storm.

| Roadway Functional Classification | 100-Year Return Period Storm Street Capacity Limitations (See Notes) |
|---|---|
| 1. All roads | A. Residential dwellings, public, commercial, and industrial buildings shall not be inundated at the ground line.<br><br>B. The product of the maximum depth (measured in feet) of flow at any point on the traveled way times the average flow velocity (feet per second) shall be less than or equal tosix (6). |

| | |
|---|---|
| | C. On County designated emergency routes a minimum 12 foot wide dry lane shall be maintained, centered on the roadway, or the County may establish an allowable depth of water. |

Notes:

1. For residential construction, the reference level as designated in the FEMA National Flood Insurance Program Elevation Certificate shall be located a minimum of one foot above the base flood elevation.

2. For nonresidential construction, the reference level as designated in the FEMA National Flood Insurance Program Elevation Certificate shall be located a minimum of one foot above the base flood elevation, or the construction shall be flood proofed in accordance with FEMA requirements to or above the base flood level.

3. Other criteria such as the Federal Housing Administration regulations may impose regulations more restrictive than cited.

## 6.5.4 Culvert Design

### 6.5.4.1 Culverts

Culverts shall be installed where natural or man-made drainage channels or ditches are crossed by roads.

### 6.5.4.2 Design Storm Frequency

All culverts shall be designed to pass the flow for the design storm as indicated in Section 6.6.1.

### 6.5.4.3 Minimum Size

The culvert size shall be 15 inch minimum, diameter for round pipe or an equivalent flow area for other pipe shapes.

### 6.5.4.4 Culvert Materials

Culverts shall be reinforced concrete pipe (RCP), except at residential driveways which may be corrugated metal pipe (CMP), in accordance with the Standard Details under roadways, and other traffic areas.

### 6.5.4.5 Driveway Crossing Culverts

The use of dip sections rather than culverts is encouraged where roadside ditches cross rural residential driveways.

### 6.5.4.6 Headwater Criteria

The maximum headwater for the design storm for culverts greater than 36” diameter or a culvert rise of 36” shall be 1.5 times the culvert height. The maximum headwater for culverts with a height of 36” or less shall be 5 feet if adjacent properties are not adversely affected. In all cases a minimum of 12 inches of freeboard at the headwall shall be provided, and the maximum headwater shall be below the bottom of the adjacent road subgrade.

### 6.5.4.7 Tailwater Criteria

When discharging from a pipe to a drainage facility including detention ponds, the outlet hydraulics shall be modeled such that the flow depth in the downstream drainage facility is accounted for when setting the

tailwater depth at the pipe outfall. The depth in the drainage facility may be difficult to determine due to variations in drainage and irrigation flows, and the relative invert elevations. Outlets hydraulics shall be determined based on the receiving drainage facility having a water depth of 50 percent of capacity.

#### 6.5.4.8 Alignment

Whenever possible, culverts should be aligned with the natural channel to reduce inlet and outlet transition problems.

Where the natural channel alignment would result in an exceptionally long culvert, modification to the natural alignment may be necessary. Since such modifications will change the natural stability of the channel, such modifications shall be thoroughly investigated to prevent erosion to adjacent properties or siltation of the culvert.

#### 6.5.4.9 Multiple Barrel Culverts

Multiple culverts may be used if available fill height or headwater constraints limit the size of culvert needed to convey the flood flow.

#### 6.5.4.10 Inlet and Outlet Configuration

Culverts shall be designed with protection at the inlet and outlet areas. The culvert inlet shall include a headwall with wing walls or a flared end-section.

The outlet area shall also include a headwall with wing walls or a flared end-section. Where outlet velocities exceed the limitation set forth in Section 6.6.5.15 Storm Drain Outlet Protection, an energy dissipater shall be required.

#### 6.5.4.11 Structural Design

All culverts shall be designed to withstand, as a minimum, an H-20 loading in accordance with the design procedures of AASHTO "Standard Specifications for Highway Bridges" and with the pipe manufacturer's recommendations. The minimum cover for culverts shall be 18 inches. The design engineer shall provide written certification for cover less than 18 inches.

### 6.5.5 Storm Drains

#### 6.5.5.1 Storm Drain Hydraulic Analysis

A hydraulic analysis of all storm drains shall be performed and submitted to the Engineering Division as part of the Technical Drainage Report. Storm drain hydraulic and capacity analysis shall account for changes in flow conditions (open channel versus pressure flow) in the HGL and EGL calculations. Both the HGL and the EGL for the design flow shall be included in the Technical Drainage Report. Design flows shall be based on build-out conditions.

#### 6.5.5.2 Allowable Storm Drain Capacity

The storm drain capacity calculations shall begin at the storm drain outlet and proceed upstream, accounting for all energy losses. The EGL and HGL shall be calculated to include all hydraulic losses including friction, expansion, constriction, bend, and junction losses. The available energy at all junctions and transitions shall be checked to determine whether or not the flow in the storm drain will be pressurized due to backwater effects even if the design flow is less than the full flow capacity of the storm drain.

If any section of the storm drain is pressurized due to backwater effects, then the storm drain system shall be designed to convey the design storm under surcharged or pressure flow conditions. The storm drain shall be considered surcharged when the depth of flow (HGL) in the storm drain is greater than eighty percent of full flow depth. The maximum level of surcharging for the capacity analysis shall be limited to maintaining the HGL to one foot below the final grade above the storm drain at all locations. Special site conditions that warrant additional surcharging will require locking type manhole covers or grated covers and will be reviewed on a case by case basis by the Engineering Division.

### 6.5.5.3 Allowable Storm Drain Velocity

The maximum velocity in all storm drains and culverts shall not exceed the erosion resisting capabilities of the conduit and storm drain system, and in no case shall exceed 15 feet per second (fps).

The minimum velocity shall not be less than 3 fps with the storm drain at half full or greater conditions.

### 6.5.5.4 Minimum Storm Drain Slope

The minimum storm drain slope is 0.25%. Deposition of sediment shall be evaluated and mitigated on all storm drain designs.

### 6.5.5.5 Manning's Roughness Coefficient

All storm drain system hydraulic calculations shall be performed using Manning's Formula. A Manning's roughness factor, or "n", shall be as defined by the specific pipe manufacturer provided that the coefficient is within the range of accepted engineering standards.

### 6.5.5.6 Minimum Pipe Size

The minimum pipe size for public storm inlet laterals and public storm drain mains shall be 15 inches in diameter for round pipe, or an equivalent flow area for other pipe shapes.

### 6.5.5.7 Minimum Cover

All storm drain pipe shall be designed to withstand, as a minimum, an H-20 loading in accordance with the design procedures of AASHTO "Standard Specifications for Highway Bridges" and with pipe manufacturers recommendations. The minimum allowable cover over the storm drain pipe shall be 18 inches. The design engineer shall provide written certification for cover less than 18 inches.

### 6.5.5.8 Manhole and Junction Spacing

A manholeshall be located at all changes in pipe size, direction, elevation and grade for all pipes. Maximum spacing between manholes on storm drain less than 48 inches in diameter shall be 400 feet. The maximum spacing shall be reduced if required by the entity that will maintain the storm drain. For pipes with a diameter (or rise dimension) of 48 inches and greater, the designer shall consult with the Engineering Division for location of manholes and junctions based on hydraulic and maintenance considerations. Deposition of sediment shall be evaluated and mitigated in all storm drain designs.

Standard manhole details are included in Appendix D. Precast manhole tees are not allowed where there is a change in storm drain slope or alignment or where there are intersecting storm drain mains or laterals. Pipes may be directly cast into the manhole base. Gasketed joints, locking type manhole covers, and/or grated manhole covers for pressure flow conditions may be required.

### 6.5.5.9 Horizontal Alignment

The horizontal alignment of storm drains shall be straight between manholes, catch basins, or curb inlets. All storm drains shall be placed within the right-of-way dedicated for public streets unless the use of easements is approved by the Engineering Division. Manholes shall be located outside of the wheel path on collector and arterial roads where possible.

### 6.5.5.10 Utility Clearances

Storm drains and culverts shall be located to minimize potential contamination and disturbance of water supply and sanitary sewer mains. Refer to Sections 4.5.2 and 5.1.3.4 of this manual for further direction. Additional requirements may be imposed by the local utility companies, or the Nevada Division of Environmental Protection Bureau of Safe Drinking Water. Where requirements differ, the more stringent shall apply.

### 6.5.5.11 Storm Inlet and Catch Basin Types, Locations, and Capacity Factors

Standard plans for approved storm inlets and catch basins are included in Appendix D. The allowable use of these storm inlet and catch basin types is presented in Table 6.4. All catch basins shall have sumps (17 inches minimum, 24 inches maximum).Allowable inlet capacity factors for each of the standard inlets and catch basins are also presented in Table 6.4. These capacity factors shall be applied to the calculated capacity of the inlets and catch basins to account for plugging from debris and sediment which decrease the capacity of the standard inlets.

Table 6.4. Allowable Storm Inlet Types and Capacity Factors.

| Inlet or Catch Basin Type | Standard Detail No. | Permitted Use | Permitted Location Condition | Capacity Factor |
|---|---|---|---|---|
| Type 4RCurb Inlet | D06 | All Streets with Curb and Gutter | Continuous Grade | 0.70 (Grade)<br>0.80 (Curb Opening) |
| | | | Sump | 0.65 |

Notes:

1. Standard Detail Numbers refer to the Standard Details Incorporated in Appendix D.
2. Capacity factor is applied to the calculated inlet capacity to account for factors which reduce actual inlet capacity.

Catch basins or inlets shall be installed at low points of vertical curves, at all street intersections, and at sufficient intervals to intake the design storm peak flow such that flows will not exceed allowable spread widths, interfere with traffic or flood adjoining property in accordance with the requirements of Table 6.2. Catch basins and inlets shall be located immediately upstream of the intersection and immediately upstream of crosswalk locations. Catch basins or inlets shall not be located within crosswalks or pedestrian ramps or in front of driveways. When storm drain pipes are connected to a catch basin, inlet, or manhole with concrete/grout, both the inside and outside of the catch basin, manhole, or inlet shall be grouted at the pipe connection.

The maximum allowable ponding for inlets in a sump condition shall comply with the street capacity requirements indicated in Table 6.2.

### 6.5.5.12 Sand/Oil Interceptor

Sand/oil interceptors shall be installed as set forth below:

1. When required for compliance with this manual.
2. When required by the approving authority.
3. When required by the Water Conveyance Advisory Committee.
4. On all new development in urban service areas prior to discharge to a ditch, detention pond or open water body.

Sand/oil interceptors shall comply with the following:

1. be sized to treat the first half-inch of a storm event,
2. be sized to remove 80 percent of the total suspended solids,
3. have a by-pass for flows that exceed their treatment capacity and
4. include a sampling port to sample water as it leaves the unit.
5. An annual report of the condition of the sand/oil interceptor and any maintenance performed shall be submitted to the Engineering Division annually.

Sand/oil interceptors shall be installed on private property and be maintained by the property owner. A detailed maintenance and sampling plan shall be submitted with the improvement plans. Should the property owner or developer fail to adequately maintain said facilities, Douglas County or the governing entity shall have the right to enter said property, upon proper notice, for the purposes of maintenance. All such maintenance costs shall be assessed against the owner(s). If the sand/oil interceptor is directly discharging to open ditch/slough/water body of U.S. then the applicant shall obtain NDEP and Army Corps of Engineers approval.

### 6.5.5.13 Storm Drain Pipe Material and Shape

The material and shape of the storm drain shall be in accordance with the "Standard Specifications for Public Works Construction." Round, arch, elliptical, square, or rectangular rubber gasket reinforced concrete pipe (RGRCP) in accordance with ASTM C76, C506, C507 or C655C1433 or C850 shall be used for storm drain construction under roadways, other traffic areas. Rubber gaskets shall conform to ASTM C443 and C1619. Reinforced concrete pipe shall be at a minimum Class III or the appropriate class when design requires greater pipe support strength.

For storm drains less than 48-inches in diameter, plastic pipe as specified by the Nevada Department of Transportation (NDOT) Standard Specification for Road and Bridge Construction Section 708 may be used. Water tight joints per ASTM D3212 is required for all plastic pipe applications. Deflection testing per NDOT Section 605 is required for all plastic pipe. All pipe joints, structure joints, and all joints between pipes and structures shall be watertight.

For installations of less than 100-feet where RGRCP is not readily available, the contractor may use non gasketed concrete pipe with each joint wrapped in an external sealing band which meets ASTM C877 and is installed per manufacturer's recommendations.

Other pipe materials as approved for storm drain use are permitted on private property and areas outside of roadway or traffic areas. Corrugated metal pipe within public right-of-way will only be allowed for residential driveway approaches on county roadside ditches.

### 6.5.5.14 Length of Open Trench in Street Areas

No trench shall be left open or uncovered overnight in a developed area. In undeveloped areas, no trench shall be opened more than 300 linear feet in advance of where backfilling and surfacing have been completed. Surfacing shall mean crushed stone trench topping and may mean temporary or permanent asphalt concrete resurfacing, if required. All surfacing requirements shall conform to applicable County requirements. If the work is delayed on the whole, or part of the project, and excavations are left open for more than three (3) consecutive days, then the contractor shall backfill the excavations and temporarily repave over the excavation area, the trench shall not be opened until the contractor is ready to proceed with the work. If the contractor neglects or fails to completely refill excavations and temporarily repave over the excavation within twenty-four (24) hours after notice to do so, then the County shall be authorized to temporarily surface the excavations and the costs shall be charged to the contractor. The contractor shall at all times provide for public access by permitting traffic to pass through the construction area. All driveways are to remain passable between the hours of 4:00 p.m. and 8:00 a.m. throughout construction.

### 6.5.5.15 Dewatering

Dewatering, sufficient to maintain the groundwater level at or below the surface of the trench bottom or base of the bedding course, shall be accomplished prior to pipe laying and jointing of storm drain pipe. The dewatering operation shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe and its foundation.

Water pumped from excavations shall be disposed of by the contractor in such a manner as will not cause injury to public or private property or constitute a nuisance or menace to the public. At all times, the manner employed to discharge and to dispose of water pumped from an excavation shall be subject to the approval of the County and the appropriate permitting agency (i.e. Nevada Division of Environmental Protection - Bureau of Water Pollution Control, U.S. Army Corps of Engineers, Nevada State Lands, Division of Water Resources). All surface waters shall be prevented from entering open ditches or excavations by proper grading of the ground surface in the vicinity of the excavation.

### 6.5.5.16 Pipeline Installation

All storm drain pipe shall be laid true to line and grade as shown on the approved plans. The underground installation of all storm drain pipe shall be in accordance with manufacturer's recommendations and the requirements of Division 6, and the "Standard Specifications for Public Works Construction."

### 6.5.5.17 Location and Alignment

All storm drain pipe shall be placed within right-of-way dedicated for public streets unless the use of easements is approved by the Engineering Division. Horizontal and vertical clearances shall comply with the requirements of Section **6.6.5.10** Utility Clearances. The location of storm drain pipes in public rights of way shall conform to the Standard Details.

When storm drain pipes are to be installed in existing streets, factors such as curbs, gutters, drainage ditches, sidewalks, traffic conditions, pavement conditions, future street improvement plans, and existing utilities shall be considered by the design engineer when selecting the pipe location and alignment.

The minimum width of easements shall be 20 feet. Other factors such as side slopes and structures within the easement may require additional width. If a pipe is installed within an easement, temporary maintenance access with a minimum width of 12 feet may be required in accordance with Section 3.10.14

Improved Maintenance Access. Permanent maintenance access in accordance with the requirements of Section 3.10.14 Improved Maintenance Access may be required by the County or utility purveyor.

#### 6.5.5.18 Storm Drain Outlet Protection

Storm drain outlets shall be designed and constructed with outlet protection for discharges to channels with unlined bottoms. Mitigation measures to protect storm drain outlets shall be included in the technical drainage study and shall be designed by a licensed engineer. The following are minimum requirements for outlet protection, but the existing soil conditions will ultimately dictate the maximum permissible velocity for designing any outlet protection:

| Outlet Velocity (fps) | Minimum Outlet Protection |
|---|---|
| less than 5 | Recommended Mitigation Measures per the Drainage Study |
| between 5 and 15 | Rip-rap Protection or Energy Dissipater (see **Riprap Protection at Outlets section** in "Design and Construction of Urban Stormwater Management Systems" ASCE Manual No. 77) |
| greater than 15 | Energy Dissipater |

For channels with lined bottoms, the outlet discharge velocity shall not exceed the maximum allowable channel velocity without an energy dissipation structure. Specifications and drawings for the outlet protection shall be submitted with the improvement plans.

### 6.5.6 Drainage Channels

When open drainage channels are permitted, the potential for erosion and scour shall be determined, and submitted as part of the drainage report. Drainage channel design shall incorporate recommended mitigation measures to prevent erosion, sediment transport and sediment deposition. Flow velocities in drainage channels shall not exceed the maximum permissible flow velocities for the design storm as recommended in the ASCE Manuals and Reports of Engineering Practice No. 77, "Design and Construction of Urban Stormwater Management Systems." Drainage channels shall be sized to provide a minimum of one foot of freeboard above the water surface elevation for the design storm peak runoff. Drainage channels that convey any FEMA flood flow shall be lined to 1 foot above the 100-year flood level.

Side slopes for unlined channels shall be 3:1 (horizontal to vertical) or flatter. Side slopes for lined channels shall be 2:1 (horizontal to vertical) or flatter. The use of rip rap as a channel lining is discouraged due to maintenance requirements. Channel linings, including blankets, shall have a minimum lifespan of five (5) years.

All drainage channels that are not located within public rights-of-way shall be located in easements dedicated to the County or the appropriate entity, and shall be provided with permanent maintenance access roads in accordance with Section 3.10.14 Improved Maintenance Access to provide access for maintenance.

### 6.5.7 Detention Facilities

The main purpose of a detention basin is to temporarily store runoff and reduce peak discharge by allowing flow to be discharged at a controlled rate. This controlled discharge rate shall be determined so that the rate of post-development runoff will not exceed the rate of pre-development runoff leaving the site.

Detention facilities shall be designed by and constructed by developers or local property owners. The facilities are intended to allow development by protecting a site from existing flooding conditions or to protect downstream property from increased runoff caused by development.

The following developments shall utilize private retention/detention basins to handle stormwater requirements:

- Commercial type developments (i.e. retail, business, etc)
- Industrial type developments
- Multi-family residential (i.e. apartments, condominiums, townhomes)

On lot retention/detention will not be allowed on parcels 1 acre or less in size.

### 6.5.7.1 Detention/Retention Design Guidelines and Standards

The following sections describe guidelines governing detention basin designs.

#### 6.5.7.1.1 Detention Facilities

**Detention** facilities shall comply with the following:

1. Impounding of water for stormwater control purposes shall comply with regulations of the Nevada State Engineer for the construction of dams where pertinent.
2. The top six inches of soil in the basin shall have a maximum particle size of three (3) inches. Basins shall be seeded with a drought tolerant mix of turf grasses. Vegetation shall be established prior to acceptance by the County or local entity. Refer to Section 2.2.11.3 Permanent Erosion Control Standards for landscaping and irrigation requirements. Within the Town of Gardnerville, detention facilities shall be equipped with a fully-automatic permanent below-ground irrigation system approved by the Town of Gardnerville. A low flow concrete valley gutter shall be constructed for publicly maintained facilities.Detention basins shall be below grade unless otherwise approved in writing by the Douglas County Engineer.
3. Impacts from and to groundwater shall be evaluated and mitigated.
4. Basins shall be sited within drainage easements. Basins accepting flows from the public right-of-way will be dedicated to the public. If the basins are to be publicly maintained then they shall be on a separate parcel dedicated to the entity that will be maintaining. The use of multiple small detention/retention basins is prohibited.
5. Detention basin outlet capacity shall not exceed the pre-developed flow rate to the point of discharge. The analysis shall include inflows occurring downstream of the detention basin to the point of discharge and changes in flow conditions and hydraulics due to the use of the upstream detention basin, and shall not exceed the pre-developed flow rate (up to the design storm) for the affected property (see Section 6.1.5 Storm Runoff Detention).
6. All detention basins are required to properly function under all reasonable debris and sedimentation conditions. Sand/oil separators shall be located immediately upstream of the detention basin inlet. Refer to Section 6.6.5.12 for sand/oil separator sizing criteria.
7. In-channel detention basins shall safely pass the 100-year storm event as a minimum.
8. Detention ponds shall be designed to include provisions for security and public safety. Ponds greater than two feet in depth to the spillway elevation, or to the outlet elevation, and with side slopes steeper than 4:1, shall either be fenced or have a 15-foot wide bench

area around the pond perimeter above the freeboard elevation. Ponds that are not fenced shall be signed that the ponds are not to be entered when water is present.

9. Basins shall be drained in not more than 48-hours after the end of the design storm. (Drain time is defined as the time from the end of precipitation until the basin is drained of 90% of design capacity). Properly designed and functional low flow outlets shall be provided in all detention basins.

10. Design of all detention basins shall include emergency spillways which pass the 100-year storm event and are protected against erosive forces.

11. A minimum of one foot of freeboard is required above the emergency spillway design water surface elevation.

12. Basin discharge shall be self-regulating (passive).

13. Inflows shall be based on build-out conditions for the tributary area within the project limit (including all phases) in accordance with the Douglas County Master Plan, and on the existing conditions for the tributary area outside the project limits.

14. Detention basins shall have side slopes no steeper than 4:1 horizontal to vertical. Access to the basin bottom, fore bay, inlet and outlet structures and spillways shall be provided by a 9 inch reinforced concrete ramp with slope no steeper than 6:1 horizontal to vertical with a minimum width of 12 feet. Structural surfaces other than PCC or asphalt concrete may be allowed for the ramp with the approval of the County and entity that will maintain the basin.

15. The outlet for the basin shall be placed at the flow line of the basin and not above it.

Where **retention/infiltration** has been approved, the following shall apply:

1. Infiltration rates shall be based on a minimum of three hydraulic conductivity tests at each proposed infiltration system site. The minimum acceptable hydraulic conductivity for infiltration systems is 0.5 inches per hour. The infiltration rate used in design to size the facilities shall be limited to a maximum of 50 percent of the infiltration rate determined from field tests. The retention/infiltration facility shall have adequate infiltration area to infiltrate all stormwater from the entire 25-year design storm within 48 hours after the end of the storm.

2. Retention/infiltration facilities shall be sized to contain 1.5 times the entire 25-year design storm volume for the project (not the difference between the existing undeveloped runoff volume and developed runoff volume). The infiltration rate shall not be used to reduce the required size of the retention/infiltration facility.

3. Sand/oil separators shall be located immediately upstream of the retention basin inlet. Refer to Section 6.6.5.12 for sand/oil separator sizing criteria.

4. In the case where the capacity of the retention/infiltration facility is exceeded, impacts to downstream properties shall be evaluated and mitigated. Emergency flow paths shall be provided for release of storm volumes in excess of the design storm.

5. A detailed maintenance plan shall be included with the final drainage report.

6. Analysis of soil infiltration capabilities and groundwater issues.

7. Safeguards for public protection.

#### 6.5.7.1.2 Flow Restrictor Outlets

The flow restrictor outlet shall be sized to control discharge from a basin as set forth in Section 6.1.5 Storm Runoff Detention. Outfall from a flow restrictor shall be provided by a culvert or pipe conduit. The types of flow restrictors for parking lot detention may be under-sidewalk drains.

#### 6.5.7.1.3 Minimum Outlet Conduit Size

The minimum conduit size for use in detention facilities is an 18-inch diameter. Orifice plates may be utilized to reduce flows from this minimum pipe size, and shall be designed to prevent floatable debris from blocking the orifice(s), and allow cleaning and maintenance during "worst case" scenarios.

#### 6.5.7.1.4 Emergency Spillways

All detention and infiltrations facilities shall have the ability to pass 100-year return period storm event and flows in excess of the design storm without endangering the structural integrity of the facility or diverting flows from their historic drainage pattern. **Impacts to downstream properties shall be considered when siting and designing the spillway.** Spillways shall flow to historic pattern.

A detention or retention basin may have more than one spillway. If a basin has only one spillway, it shall be able to pass both the design flow and 100-year return period storm event. If the geometry of the basin site does not allow for a single spillway to serve these two flows, two spillways may be provided. The principal spillway will be designed to handle the design storm flow. For flows greater than the design storm flow, the emergency spillway shall allow these greater flows to be passed safely.

#### 6.5.7.1.5 Debris and Sedimentation

Provide for protection of the outlet works from debris and for the control and removal of sedimentation in the basin. Sedimentation effects shall be considered in design and may be reduced by the construction of debris basins upstream of the detention facility or by providing additional storage capacity in the detention facility for storage of sediment. The invert of the emergency spillway shall be set equal to or above the design storm water surface elevation.

#### 6.5.7.1.6 Trash Racks

All outlet and inlet works shall be provided with a trash rack and cut off wall for debris and scour control. The trash rack shall provide a maximum bar spacing of 8 inch from center to center of bar. The total area of the trash rack shall allow for passage of the design outlet flow with 50 percent of the trash rack blocked.

#### 6.5.7.1.7 Embankment Protection

Detention/Retention Pond embankments shall be protected from structural failure from overtopping. Overtopping can be caused by a larger than design inflow, or from obstruction of the low flow outlet. Embankment protection shall be provided by embankment armoring (i.e. rip-rap) or use of slopes of 5:1 (horizontal to vertical) or flatter.

#### 6.5.7.1.8 Maintenance Requirements

All detention facilities shall be designed to minimize maintenance and to allow access by equipment and workers to perform maintenance. Any plan for development requiring the construction of these facilities shall include a plan for maintenance, enforceable against the owners of the property to be served.

#### 6.5.7.1.9 Detention Basin Siting Guidelines

Detention basins shall be located to minimize their impact on the site and to ensure public safety. Basins shall be placed to minimize impact on public facilities (e.g. roadway and sidewalk deterioration).

## 6.6 References

1. American Concrete Pipe Association, "Concrete Pipe Design Manual," American Concrete Pipe Association, 1987.
2. American Iron and Steel Institute, "Modern Sewer Design," 1980.
3. American Society of Civil Engineers, "Design and Construction of Urban Stormwater Management Systems, ASCE Manuals and Reports of Engineering Practice No. 77," 1992.
4. Brater, E.F., and King, H. W., "Handbook of Hydraulics," Sixth Edition, 1982.
5. Chow, V.T., David R. Maidment, Larry W. Mays, "Applied Hydrology," Mc-Graw Hill, Inc., 1988.
6. Clark County Regional Flood Control District, "Hydrologic Criteria and Drainage Design Manual," WRC Engineering, Inc.
7. Federal Highway Administration, "Hydraulic Design of Highway Culverts," Bridge Division, Federal Highway Administration, Washington, D.C., 1985.
8. Federal Highway Administration, "Hydraulic Design Series No. 2, Second Edition, Highway Hydrology," Publication No. FHWA-NHI-02-001, October 2002.
9. Goldman, 1986 - S. J. Goldman, K. Jackson, T. A. Bursztyusky, "Erosion and Sediment Control Handbook," Mc-Graw Hill, 1986.
10. Hydrologic Engineering Center, "HEC-1 Flood Hydrograph Package, User's Manual," U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, California, June 1998.
11. Hydrologic Engineering Center, "HEC-2 Water Surface Profiles, User's Manual," U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, California, September 1990.
12. Hydrologic Engineering Center, "Hydrologic Modeling System, HEC-HMS, User's Manual," U.S. Army Corps of Engineers Hydrologic Engineering Center, Davis, California, April 2006.
13. Hydrologic Engineering Center, "HEC-RAS River Analysis System, User's Manual," U.S. Army Corps of Engineers Hydrologic Engineering Center, Davis, California, November 2002.
14. National Weather Service, 2004, NOAA Atlas 14 Precipitation-Frequency Atlas of the United States: Volume 1 Semi Arid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah). U.S .Department of Commerce, Silver Spring, MD.
15. National Weather Service, 1973, NOAA Atlas 2: Precipitation-Frequency Atlas of the Western United States. U.S. Department of Commerce, Silver Spring, MD.
16. Resource Concepts, Inc., "Douglas County Precipitation Study," Resource Concepts, Inc., Carson City, Nevada, October 1992.
17. Soil Conservation Service, "Technical Release 55 Urban Hydrology for Small Watersheds, 2nd Edition" Technical Information Service, Springfield, Virginia, 1986.
18. Soil Conservation Service, "Win TR-55 User Manual," Natural Resources Conservation Service, April 19, 2002.
19. The Urban Water Resources Research Council of the American Society of Civil Engineers and the Water Environment Federation, "Design and Construction of Urban Stormwater Management Systems," 1992.

20. Truckee Meadows Regional Storm Water Quality Management Program, "Low Impact Development Handbook."




# Division 7
# Irrigation Facilities

# CHAPTER 20.50. - FLOODPLAIN MANAGEMENT

## 20.50.010. - Statutory authority.

Pursuant to Nevada Revised Statutes Chapters 278, 244, and 543, including Sections 278.020, 244A.057, and 543.020 the county adopts the following floodplain management regulations.

(Ord. 1514, 2018; Ord. 763, 1996)

## 20.50.020. - Purpose.

A. It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flooding in specific areas through the implementation of provisions designed to: Protect human life and health, protect the floodplain, and minimize adverse impact;

B. Minimize expenditure of public money for costly flood control projects;

C. Minimize the need for rescue and relief efforts associated with flooding, which are usually at the expense of the general public;

D. Minimize prolonged business interruptions;

E. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, and streets and bridges located in special flood hazard areas;

F. Help maintain a stable tax base by providing for the sound use and development of special flood hazard areas and X-shaded flood zones to minimize property devaluation resulting from flood damage and events;

G. Ensure property owners and potential property owners are notified when property is located in special flood hazard areas;

H. Ensure those who occupy special flood hazard areas assume responsibility for their actions;

I. Coordinate with local partners to implement the Carson River Regional Floodplain Management Plan;

J. Maintain qualifying standards for participation in the National Flood Insurance Program (NFIP); and

K. Comply with applicable Code of Federal Regulations.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008; Ord. 763, 1996; Ord. 472, 1987; Ord. 331, 1980; Ord. 158, 1956)

## 20.50.030. - Statement of fact.

A. Portions of Douglas County are subject to periodic inundation by flood waters which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

B. These flood losses are caused by uses that are inadequately elevated, flood-proofed, or protected from flood damage. The cumulative effect of obstructions in flood-prone areas increases flood heights and velocities, which also contribute to flood losses.

(Ord. 1514, 2018; Ord. 1251, 2008; Ord. 763, 1996)

### 20.50.040. - Intent.

The intent of this chapter is to incorporate development standards that further the purpose as follows:

A. Restrict or prohibit uses that are dangerous to health, safety, and property due to water or erosion hazards, or that result in damaging increases in erosion, flood heights or velocities;

B. Require that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;

C. Control the alteration of natural floodplains, alluvial fans, stream channels, and natural protective barriers, that help accommodate or channel flood waters;

D. Control filling, grading, dredging, and other development that may increase flood damage; and

E. Prevent or regulate the construction of flood barriers that will unnaturally divert flood waters or which may increase flood hazards in other areas.

F. This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and other ordinances, easement, covenant, or deed restriction conflict or overlap, whichever imposed the more stringent restrictions or that imposing the higher standards, shall prevail.

G. This ordinance and the various parts thereof are hereby declared to be severable. Should any section of this ordinance be declared by the courts to be unconstitutional or invalid, such decisions shall not affect the validity of the ordinance as a whole, or any portion thereof other than the section so declared to be unconstitutional or invalid.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008; Ord. 763, 1996)

### 20.50.050. - Applicability.

This ordinance applies to all properties within the county that are located within a Federal Emergency Management Agency (FEMA) designated special flood hazard area and to all construction and development projects within the designated special flood hazard areas and X-shaded flood zone. For the purposes of this chapter, the special flood hazard area and X-shaded flood zone identified by the Federal Insurance Administration (FIA) in the Douglas County, Nevada and Incorporated Areas Flood Insurance Study (FIS) and accompanying Flood Insurance Rate Maps (FIRMs) dated January 20, 2010, and all subsequent amendments and revisions are adopted by reference and declared to be a part of the Chapter. The FIS and attendant mapping is

the minimum area of applicability of this chapter and may be supplemented by studies for other areas that allow implementation of this chapter and that are recommended to the board by the administrator. The FIS and FIRMs are on file with the community development department.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008; Ord. 801, 1997; Ord. 763, 1996; Ord. 472, 1987; Ord. 331, 1980)

### 20.50.060. - Warning and disclaimer of liability.

The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on available information derived from engineering and scientific methods of study. Larger floods can and will occur on occasion. Flood depths or heights may be increased by man-made or natural causes. This chapter does not imply that land outside special flood hazard areas and the X-shaded flood zones or uses permitted within these areas will be free from flooding or flood damages. This chapter does not create liability on the part of the county, any officer or employee, the state, the Federal Insurance Administration, or FEMA, for any flood damages that result from reliance on this ordinance or any lawful administrative decision.

(Ord. 1514, 2018; Ord. 1251, 2008; Ord. 801, 1997; Ord. 763, 1996)

### 20.50.070. - Definitions.

Definitions of many of the words used in this chapter are contained in Appendix A to Title 20. Unless specifically defined in Appendix A to Title 20 or in this ordinance, or as used in Title 20, the words and phrases used in this chapter should be interpreted to give them the meaning they have in common usage and to give this chapter its most reasonable application.

*Start of construction* includes substantial improvement and other proposed new construction development and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days from the issue date of the permit. The actual start means either the first placement of permanent construction of a structure on a site that requires an inspection by the building department, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the state of excavation, or the placement of a foundation of a manufactured home. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

*Violation* means the failure of a structure or other development to be fully compliant with this ordinance. A structure or other development in a special flood hazard area, without an elevation certificate, other certifications or other evidence of compliance required in this ordinance is presumed to be in violation until

such time as that documentation is provided.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

### 20.50.080. - Adverse impact.

For purposes of this chapter "adverse impact" means that no new construction, substantial improvements, or other development, including fill, may be permitted within the special flood hazard areas unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community. Adverse impact does not include a reduction in the base flood elevation or the floodplain on property not owned by the applicant.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

### 20.50.090. - No-rise certification.

For purposes of this chapter, no-rise means no increase in flood heights upstream, downstream or adjacent to the parcel that is located in the vicinity of a regulatory floodway. The no-rise certification shall be supported by technical data and signed by a professional engineer licensed in the State of Nevada. The supporting technical data shall be based on a FEMA approved model used to develop the 100-year floodway shown on the FIRMs and the results tabulated in the Study. In a special flood hazard area, a no-rise certification must be submitted for any construction or other development that is permitted to proceed without a CLOMR on a form approved by the administrator and prepared by a professional engineer licensed in the State of Nevada.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

### 20.50.100. - Substantial improvement and substantial damage definition.

A. For purposes of this chapter, cumulative substantial improvement means improvements, modifications, or additions to existing building are counted cumulatively for at least five years and reconstruction and repairs to damaged buildings are counted cumulatively for a least five years. When the improvements, modifications, additions, reconstruction or repairs equals or exceeds the 49% substantial improvement threshold, the entire structure must be brought up to current floodplain standards.

B. For the purposes of this chapter, cumulative substantial damage means the total cost of all repairs to a repetitive loss structure shall not cumulatively increase the market value of the structure more than 49% of the market value during the life of the structure. When the improvements, modifications, additions, reconstruction or repairs equals or exceeds the 49% substantial damage threshold, the entire structure must be brought up to current floodplain standards. This term does not, however, include either:

1.

Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or

2. Any repair of flood damage to a "historic structure", provided the repair will not preclude the structure's continued designation as a "historic structure."

C. For the purposes of determining substantial improvements and substantial damage, market value pertains only to the structure in question. It does not include the land, landscaping or detached accessory structures on the property.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

### 20.50.110. - Hydrology and hydraulic study requirements.

All hydrology and hydraulic studies (also known as Flood Impact Analysis) referenced in the Chapter must be prepared by a professional engineer licensed in the State of Nevada and meet FEMA standards for hydrology and hydraulic studies submitted for the approval of CLOMRs and LOMRs. Except for areas where FEMA allows the use of the approximate method, the preferred modeling tool to determine changes to the base flood elevation (BFE) and the floodplain boundary shall be the current acceptable version of HEC-RAS, or prior authorized alternative modeling methods.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018)

### 20.50.120. - Conditional letter of map revisions (CLOMRs) and letter of map revisions (LOMRs) requirements.

A. If a hydrology and hydraulic study required under 20.50.170, Special requirements for land division in special flood hazard areas, or 20.50.180, Floodplain development review/permit applications, demonstrates the proposed development will cause greater than 0.5 feet of change to the BFE or injure other property, a CLOMR must be obtained from FEMA.

B. If a hydrology or hydraulic study required under 20.50.170 or 20.50.180 demonstrates the proposed development will expand the floodplain boundary of the effective FIRM utilizing the corrected effective model or the effective model, as recognized by FEMA a LOMR must be obtained from FEMA.

C. When a CLOMR is required, it must be submitted to the county for review in a form acceptable to FEMA. Notebook style format is preferred. Once the application is approved as to form and content, and it meets the requirement of this code, the county will send it to FEMA. The county must complete its initial review within 50 days and the review of a resubmitted application within 30 days.

D. When a CLOMR is required to meet the requirement of 20.50.180, the applicant must send notice, in the form of a letter, to any land owner affected by the project whose property will have any increase in the base flood elevation.

E. A FEMA approved CLOMR is not required for:

1. A residential dwelling unit or accessory structure on an existing A-19 agricultural parcel that meets the construction requirements of section 20.50.230 Standards for Construction, provided the applicant provides an elevation certificate either by the approximate method under FEMA regulations or a hydrology and hydraulics study prepared by a professional engineer licensed in the State of Nevada.
2. Accessory buildings, additions, or similar small projects located in the conveyance shadow within which the applicant demonstrated the addition of a new structure will not impact existing flood flows.
3. Minor projects, such as signposts, telephone poles, barbed wire and other fences that do not block flow, driveways or parking lots at grade.
4. Other construction or development not impacting a watercourse shown by a hydrology and hydraulics study to produce no net change in the base flood elevation.
5. Ranch heritage parcel(s) or agricultural two-acre parcel(s) lawfully created pursuant to chapter 20.714, provided no more than one foot of fill above existing grade is used for the new construction, including driveways or streets serving the parcel(s). The parcel(s) must meet the construction requirements of section 20.50.230.

F. If a CLOMR is required, a LOMR application must be submitted to community development prior to issuance of the notice of completion or certificate of occupancy. The notebook-style format is the preferred submittal for both CLOMR and LOMR by FEMA and Douglas County. Prior to the issuance of any (residential or non-residential) building permit, a FEMA approved LOMR must be submitted to the county if the proposed BFE is less than that shown on the current effective FIRM. If the improvements required of the FEMA approved CLOMR are done under a site improvement permit then a special condition shall be placed on the permit requiring the submittal of the LOMR to the county to be forwarded to FEMA for approval and then approved by FEMA prior to issuance of a certificate of occupancy.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

## 20.50.130. - Conditional letter of map revision and letter of map revisions based on fill procedure (CLOMR-F) and (LOMR-F).

Prior to filing a conditional letter of map revision based on fill (CLOMR-F) or a letter of map revision based on fill (LOMR-F) to FEMA for properties in the special flood hazard area, a property owner must submit the CLOMR-F and/or LOMR-F to Douglas County for review.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018)

## 20.50.140. - Letter of map amendment (LOMA) procedure.

Prior to filing a letter of map amendment (LOMA) to FEMA for properties in the floodway, a property owner must submit the LOMA to Douglas County for review. If the property is not located within the floodway and the owner believes the property has been inadvertently included in the special flood hazard area, the property owner may submit a LOMA to the Federal Insurance Administrator for review. These procedures do not apply when there has been any alteration of topography since the effective date of the first FIRM showing the property within the special flood hazard area.

(Ord. 1514, 2018; Ord. 1251, 2008; Ord. 801, 1998; Ord. 763, 1996; Ord. 472, 1987; Ord. 331, 1980)

### 20.50.150. - Designation of county floodplain administrator.

The director of the community development department is appointed county floodplain administrator and is responsible for administration and implementation of this chapter. For the purposes of this chapter the county floodplain administrator will be referred to as "administrator".

(Ord. 1514, 2018; Ord. 1251, 2008; Ord. 801, 1997; Ord. 763, 1996; Ord. 472, 1987; Ord. 331, 1980)

### 20.50.160. - Duties and responsibilities of the county floodplain administrator.

Duties and responsibilities of the administrator or designee of the administrator include, but are not limited to the following:

A. *Floodplain development permit review application* (see 20.50.180, Floodplain development review/permit applications). A floodplain development review/permit (for residential or non-residential) will not be issued for a parcel or parcels within, or that has construction on a parcel with any portion within, a special flood hazard area until the administrator has confirmed that:
   1. The permit application is complete and consistent with the provisions and standards of this chapter;
   2. All required state and federal permits have been issued; and
   3. Proposed development in a designated special flood hazard area will have no adverse impact to the floodplain.

B. *Alteration of watercourses.* Before a permit may be issued for any alteration or relocation of a watercourse the administrator must:
   1. Confirm the applicant has a conditional letter of map revision (CLOMR).
   2. Verify that the applicant has notified all affected property owners and communities, Nevada's State Floodplain Manager, Nevada Division of Water Resources, and FEMA.
   3. Determine that the permit holder has provided for maintenance within the altered or relocated portion of the watercourse, based on information provided by the applicant, so that the flood carrying capacity is not diminished.

C.

*Inspections.* Periodic inspections throughout the period of construction in order to monitor compliance with the requirements of the floodplain development review/permit application, elevation certificate, FEMA approved CLOMR, or any variance provisions.

D. *Stop work orders.* The administrator may issue, or cause to be issued, a stop work order for any floodplain development not in compliance with the provisions of this chapter, conditions of the development permit, or all development proceeding without a valid development permit.

E. *Retaining floodplain development documentation.* The administrator must obtain, retain for public inspection, and have available for the National Flood Insurance Program and FEMA representative the following:

1. Floodplain development review/permits and certificates of compliance;
2. Certification for lowest floor elevation;
3. Certification for elevation or flood-proofing of nonresidential structures;
4. Certification of elevation required as a part of division of land;
5. Certification for floodway encroachments also referred to as a "no-rise certification by the National Flood Insurance Program (NFIP);
6. Variances issued pursuant to this chapter;
7. Notices required for alteration of watercourses;
8. Any notices required for the addition of fill;
9. Copies of approved elevations, footing details, and site plans; and
10. Copies of approved CLOMRs and LOMRs.

F. *Map determinations.* The administrator may make map interpretations where needed, as to the location of the boundaries of special flood hazard areas and where there appears to be a conflict between a mapped boundary and actual field conditions. The administrator may determine the best information available in making the map determinations. Applicants must provide documentation to assist the administrator in making the determination when requested by the administrator.

G. *Submission of new technical data to FEMA.* When the administrator has received technical or scientific data that the base flood elevation has either increased or decreased resulting from physical changes affecting flooding conditions, the administrator will submit the technical or scientific data to FEMA, as soon as practical, after the date technical information confirming the physical changes becomes available. The technical or scientific data provided to the administrator shall meet the FEMA notebook-style format as preferred.

H. *Appeals.* Appeals of the decision of the administrator must be made in accordance with chapter 20.28 of this code.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008; Ord. 801, 1997; Ord. 763, 1996)

## 20.50.170. - Special requirements for land division in special flood hazard areas.

A. For proposed residential or commercial/industrial land division in a special flood hazard area, or land division affected by revised flood insurance rate map (FIRM) by inclusion into the special flood hazard area (SFHA), the applicant must submit the following information:

1. A floodplain development review/permit application with a hydrology and hydraulics study, prepared by a licensed engineer in the State of Nevada, and that demonstrates that the developed project, or residential subdivision, of all proposals shall be consistent with the need to minimize flood damage and will not cause any adverse impact to the floodplain. If the study shows change in the base flood elevation (BFE) of greater than 0.5 feet, injury to other property or expands the floodplain boundary of the effective FIRM utilizing the Corrected Effective Model or the Effective Model, as recognized by FEMA the applicant must comply with Section 20.50.120. If a CLOMR and LOMR are required under Section 20.50.120, the final map may not be recorded or any work permitted under a site improvement permit until the CLOMR is approved by FEMA. Applicants must notify all impacted property owners and communities, and as applicable: Nevada's State Floodplain Manager, Nevada Division of Water Resources, FEMA, and other regulatory agencies of any proposed changes to the floodplain on a form provided by the County, and provide proof of the notification.
2. Tentative subdivision or serial parcel maps and grading plans that:
   a. Identify the special flood hazard area, X-shaded areas, and the base flood elevation;
   b. Provide the elevation of proposed structures or building pads.

B. Land may not be divided for residential purposes that will result in the creation of a parcel that is less than 19 net acres, unless the applicant shows that:

1. The parcels may be lawfully created pursuant to section 20.664.095 or are Ranch Heritage parcel(s) or Agricultural 2-acre parcel(s) lawfully created pursuant to chapter 20.714; or
2. The portion of the land in the special flood hazard area will be contained on a single parcel; and the land within the special flood hazard areas is retained in a natural state including, without limitation, no solid fencing that impedes the flow of floodwaters or other improvements; and the land within the special flood hazard area is held in common or single ownership with any overlying drainage easement; and
3. A property owner's association or similar entity is legally responsible for maintenance of the land in the special flood hazard area in its natural state.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018)

## 20.50.180. - Floodplain development review/permit applications.

A. A floodplain development review/permit must be obtained before any construction (residential or non-residential), land division, building permit, or site improvement permit, including without limitation, substantial improvements, or other development, is undertaken on a parcel or parcels contained within, or that has construction on a parcel with any portion within, a special flood hazard area. A floodplain permit is not required for certain agricultural activities, including but not limited to, cleaning irrigation ditches, leveling of fields, construction or maintenance of irrigation structures, or storage areas of agricultural products.

B. Floodplain development review/permit application procedures: Application for a floodplain development review/permit must be made on forms furnished by the administrator. The property owner or their authorized representative must tender a completed Floodplain Development Review/Permit application to the Community Development Department. The application must contain the following information:

1. A legal description of the land on which the proposed work is to be done, street address, or similar description that identifies and definitely locates the proposed site.
2. A description of development and site information.
3. Identification of the special flood hazard area, base flood elevation (if known), floodway, elevation of the proposed development site, and elevation/flood-proofing requirements.

C. A Floodplain Development Review/Permit application is required for CLOMRs, LOMRs, LOMAs (only when the property is located in the regulatory floodway AE with cross-hatch on FIRM) CLOMR-Fs, LOMR-Fs and Flood Impact Analyses, or no-rise certifications.

D. When there is no base flood elevation data available for Zone A from any source, the base flood elevation data will be provided by the permit applicant for all proposed development of subdivisions, manufactured homes and recreational vehicle parks in the special flood hazard areas, for all developments.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

## 20.50.190. - Development in special flood hazard areas.

A. When a parcel is partially within a special flood hazard area, any proposed construction, including without limitation, substantial improvements or other development on the parcel not within the special flood hazard area is exempt from the requirements of this subsection when the applicant provides a survey by a licensed engineer delineating the floodplain boundaries on the parcel, an elevation certificate and proof the proposed construction, substantial improvement or other development does not encroach into the special flood hazard area.

B.

Whenever the proposed construction, including without limitation, substantial improvements or other development will be undertaken in a designated special flood hazard area, the applicant must comply with the provisions of 20.50.230 Standards for Construction and provide at minimum the following information, unless inapplicable:

1. Plans drawn to scale in duplicate showing:
    a. Location of all regulatory floodways and special flood hazard areas.
    b. Location, dimension, and elevation of the area in question, existing or proposed structures, and location of materials and equipment stored on the site.
    c. Proposed locations of water supply, sanitary sewer, and other utilities.
    d. Grading information showing existing and proposed contours at intervals of no more than two feet if the general slope of the land is less than ten percent, and five-foot intervals for all other areas; or a more precise interval as necessary to show the grading information, extending 100 feet surrounding the parcel, any proposed fill, and drainage facilities.
    e. The proposed elevation correlated to NAVD 88 vertical datum of the lowest floor of all residential and nonresidential structures whether new or substantially improved to be located in all special flood hazard areas other than Zone AO.
    f. The proposed height of the lowest floor, in relation to the pre-developed highest adjacent grade and depth number specified in feet on the FIRM, of the lowest floor for all residential and non-residential structures whether new or substantially improved to be located in Zone AO.
    g. The proposed elevation based on an assumed local datum or correlated to NAVD 88 vertical datum of the lowest floor, of all residential and non-residential structures whether new or substantially improved to be located in Zone AO if an elevation certificate is being prepared to support a letter of map amendment (LOMA) or letter of map revision based on fill (LOMR-F) or if the administrator requests the information due to unique flooding in an area. All elevations correlated to NAVD 88 vertical datum must be determined by a professional engineer licensed in the State of Nevada.
    h. The proposed elevation correlated to NAVD 88 vertical datum, to which any new or substantially improved nonresidential structure will be flood-proofed.
    i. When base flood elevation data is not available from any source for the parcel upon which the construction or other development is to be undertaken, and the parcel is located in Zone A, base flood elevation data for that parcel performed by a professional engineer licensed in the State of Nevada.
2. A map produced by a professional engineer licensed in the State of Nevada that clearly shows the limits of the special flood hazard area as determined from the adopted FIRM, site topography, base flood elevation, and other best available information.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

## 20.50.200. - Development in and around watercourses.

A. The administrator may not issue a floodplain development review/permit for altering or relocating a watercourse unless, in addition to all of the other information required by this section:
   1. FEMA has approved a CLOMR.
   2. The applicant provides a description of the extent to which the watercourse will be altered or relocated as a result of the proposed development.
   3. The applicant provides computations by a professional engineer licensed in the State of Nevada that demonstrate that the altered or relocated segment will provide equal or more capacity than the original watercourse.
   4. The applicant provides a legally enforceable assurance that the conveyance capacity of the altered or relocated stream segment will be maintained.
   5. For watercourses identified as blue line streams on the USGS topographic maps, a letter of determination for jurisdictional authority must be provided by the US Army Corps of Engineers.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

## 20.50.210. - Development in floodways.

A. The administrator may not issue a floodplain development review/permit for any encroachment in the adopted regulatory floodway, including without limitation, fill, new construction, substantial improvements, storage of equipment or supplies, and any other development unless:
   1. The applicant has demonstrated through a hydrology and hydraulics study and a no-rise certification (see section 20.50.090) that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge, or
   2. FEMA has approved a CLOMR.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

## 20.50.220. - Development in alluvial fan areas.

A. All floodplain development review/permit applications will be reviewed to determine if the proposed development is located within an alluvial fan area and determine its relation to designated flood zones.

B. The review process will determine if the proposed site and improvements, and adjacent or other affected properties, will be reasonably safe from erosion, sediment deposition or flood hazards. Factors to be considered in making this determination include but are not limited to the following:
   1. Type and quality of soils;

2. Evidence of ground water or surface water problems;
3. Depth and quality of any fill;
4. The overall slope of the site;
5. Location and character of conveyance facilities and structures both up and downstream; and
6. Impacts to conveyance capacities of existing drainages and storm water flow routes.

C. When a proposed development is located in an alluvial fan area, the following are the minimum requirements:
1. A site investigation must be made by persons qualified in geology and soils engineering;
2. The proposed grading, excavations, new construction, and substantial improvements must be adequately designed and protected against erosion and flood damages both on-site and off-site;
3. The proposed grading, excavations, new construction and substantial improvements must not aggravate the existing hazard by creating either on-site or off-site disturbances; and drainage, planting, watering, and maintenance must not endanger ground or slope stability.

D. Elevating a parcel of land or a structure by fill or other means will not serve as a basis for removing areas subject to alluvial fan flooding from an area of special flood hazards. Alluvial fan areas are recognized on the FIRM as AO zones with an associated velocity and in these zones a LOMR-F is not permitted.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

## 20.50.230. - Standards for construction.

In all special flood hazard areas, the following standards apply:

A. *Anchoring.* All new construction, substantial improvements, manufactured homes, and portable storage containers must be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.

B. *Construction materials and methods.* All new construction and substantial improvements, including manufactures homes, must be constructed to meet FEMA requirements:
1. With materials, mechanical equipment and utility equipment that satisfy flood-proofing requirements;
2. With design methods and practices that minimize flood damage;
3. To ensure electrical, heating, ventilation, plumbing, air conditioning equipment and other service facilities are designed or located so as to prevent water from entering or accumulating within the components during flooding;
4. Within flood zones AH or AO, with adequate drainage conveyance structures to convey flood waters around and away from proposed structures.

C. *Elevation requirements for lowest floor.* Residential construction, including the placement of manufactured housing units, sunrooms and new or substantial improvements, must have the lowest floor, as follows:

1. In zone AO, elevated above the predeveloped highest adjacent grade to a height at least one foot above the depth number specified in feet on the FIRM. A professional surveyor or engineer licensed in the State of Nevada must complete the elevation certificate.
2. In zone A, elevated at least one foot above the base flood elevation as determined by a professional engineer licensed in the State of Nevada.
3. In zones AH, elevated at least one foot above the base flood elevation as specified on the FIRM and determined by a professional engineer licensed in the State of Nevada.
4. In zone AE, elevated at least one foot above the base flood elevation as specified on the FIRM or determined by a professional engineer licensed in the State of Nevada State.
5. In all the X-shaded flood zones, one of the following minimum criteria must be met:
    a. Slab on grade must be one foot minimum above the pre-developed highest adjacent grade, or;
    b. Bottom of crawlspace must be one foot minimum above pre-developed highest adjacent grade, or;
    c. Flood proofed materials must be one foot above pre-developed highest adjacent grade, or;
    d. The applicant must provide a drainage plan by a professional engineer licensed in the State of Nevada for diverting the base flood stormwater around the proposed structure through the use of berms, swales, or other drainage features.

D. If a residential substantial improvement, entire structure must be flood-proofed to one foot above the base flood elevation or depth if zone AO. Substantial improvements are defined in Section 20.50.100.

E. *Lowest floor certification requirements.* For structures located within a special flood hazard area, the applicant must submit an elevation certificate that certifies the lowest floor meets this chapter's elevation requirements. The administrator may waive the elevation certificate requirement for the following:

1. Non-habitable agriculture structures (barn or shed) in Zone A if the following requirements are met:
    a. The proposed structure has a minimum 24-inch stem-wall of flood-proof material (stone, brick, cement, etc.), is built with pier foundations, or the structure is entirely of metal or other flood-proofed material.
    b.

All mechanical or electrical equipment is located 24 inches above the pre-developed highest adjacent grade or one foot above the base flood elevation whichever is greater.

c. The structure has a minimum of 2 openings having a total net area of not less than 1 square inch of every square foot of enclosed area subject to flooding and the bottom of all such openings, is no higher than one foot above the lowest adjacent finished grade and installed below the base flood elevation.

2. Monument signs located within a special flood hazard area if the bottom of the monument sign is elevated one foot above the base flood elevation, is parallel to flow, does not block flow, and in constructed of flood proofed materials.

F. *Nonresidential flood-proofing requirements.* New nonresidential construction and substantial improvement to existing nonresidential structures must either be elevated to conform with paragraph C, above, or together with attendant utility, mechanical and sanitary facilities as follows:

1. Be flood-proofed below the base flood elevation so that the structure, the utilities, mechanical equipment and sanitary facilities are watertight with walls substantially impermeable to the passage of water;
2. Have the structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
3. Be certified by a professional engineer or architect licensed in the State of Nevada that the standards are satisfied. The certification must be provided to the administrator.

G. *Requirements for areas below the lowest floor.* All new construction and substantial improvements to existing structures within a special flood hazard area with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, must be designed to automatically equalize hydrostatic and hydrodynamic flood forces on exterior walls by allowing for the entry and exit of flood waters. Designs for meeting this requirement must either be certified by a professional engineer or architect licensed in the State of Nevada or meet or exceed the following minimum criteria:

1. Have a minimum of two openings on different sides having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding. Net area may be reduced by manufacturer or engineer certification if engineered flood openings are used. If a structure has more than one enclosed area, each area must have openings on different sides to allow floodwaters to directly enter and exit. Openings must be equipped with FEMA approved louvers and other designated openings that permit the automatic entry and exit of flood waters.
2.

The bottom of all such openings must be no higher than one foot above the exterior lowest adjacent finished grade and be installed below the base flood elevation.

3. Have an adequate drainage system that removes floodwaters from the interior of the crawlspace.

H. *Standards for utilities.*

1. All public utilities and facilities must be located and constructed to minimize flood damage.
2. All new and replacement water supply systems must be designed to prevent infiltration and intermingling of flood waters.
3. All new and replacement sanitary sewage systems must be designed to prevent infiltration and intermingling of flood waters. Sanitary sewer and storm drainage systems for buildings that have openings below the base flood elevation must be provided with automatic back-flow valves or other automatic back-flow devices that are installed in each discharge line passing through a building's exterior wall.
4. On-site individual sewage disposal systems must be designed, constructed and located to avoid impairment to their functioning and to reduce potential contamination during flood events.
5. All heating, venting and air conditioning (HVAC) systems and other aboveground mechanical and electrical equipment must be located at least one foot above the base flood elevation and be located and constructed to minimize flood damage.

I. *Standards for critical structures.* Critical structures, as defined in Appendix A of this title, are not permitted to be constructed within a special flood hazard area, unless:

1. All alternative locations in the X-unshaded flood zone have been considered and rejected.
2. All alternative locations in X-shaded flood zone have been considered and rejected.

If the administrator determines the only practical alternative location for the development of a new or substantially improved critical structure is in a special flood hazard area, the administrator must give public notice of the decision and reasons for the elimination of all alternative locations. Additionally, if a critical structure must be located in a floodplain, then it will be designed to higher protection standards and have flood evacuation plans. The more common standards such as freeboard, elevation the 500-year floodplain, and elevated ramps will be required. (NFIP)

J. *Special standards for manufactured homes.*

1. All manufactured homes that are placed or substantially improved, within zones A, AH, AO and AE as shown on the FIRM must have the lowest floor elevated one foot above the base flood elevation, as determined by a professional engineer licensed in the state of Nevada on a permanent, full perimeter foundation and be securely anchored to a foundation system to

resist flotation, collapse and lateral movement. Methods of anchoring may include, but are not to be limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state and local anchoring requirements for resisting wind forces.

2. All manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within zones A, AH, AO and AE as shown on the community's FIRM are not subject to the provisions of subparagraph 1 above, provided that the following is met:
    a. The lowest point of the floor framing of the manufactured home is at least one-foot (1-foot) above the base flood elevation; and
    b. The manufactured home chassis is supported by reinforced flood-proofed piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and is securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

K. *Recreational vehicles.* All recreational vehicles placed on sites within zones A, AH, AO and AE must either:
    1. Be on the site for fewer than 180 consecutive days;
    2. Meet the permit requirements of this ordinance including the elevation and anchoring requirements for manufactured homes; or
    3. Be fully licensed and ready for highway use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devised and has not permanently attached additions.

L. *Standards for below-grade crawl space construction.* The following requirements must be met for below-grade crawl space construction:
    1. The interior grade of a crawl space if below the base flood elevation, must not be more than two feet below the lowest adjacent exterior grade.
    2. The height of the below-grade crawl space measured from the interior grade of the crawl space to the top of the crawl space foundation wall must not exceed four feet at any point. The height limitation is the maximum allowable unsupported wall height according to the engineering analyses and building code requirement for flood hazard areas.
    3. There must be an adequate drainage system that removes floodwaters from the interior area of the crawl space. A professional engineer licensed in the State of Nevada must verify the drainage system.
    4. The velocity of floodwaters at the site may not exceed five feet per second. A professional engineer licensed in the State of Nevada must verify the velocity of floodwaters.

M.

*Breakaway walls.* A breakaway wall must have a safe design loading resistance of not less than ten and no more than 20 pounds per square foot. Use of breakaway wall must be certified by a professional engineer or architect licensed in the State of Nevada and must meet the following conditions:

1. Breakaway wall collapse must result from a water load less than that which would occur during the base flood; and
2. The elevated portion of the building must not incur any structural damage due to the effects of wind and water loads acting simultaneously in the event of the base flood.

N. *Landscaping and landscaping berms.* The planting of landscaping in the special flood hazard areas shall consider the least resistance to stormwater flow. The construction of landscaping berms within the special flood hazard area shall be designed in consideration of the direction of stormwater flow, and will not be allowed to divert direction of flow. As part of the building permit submittal for any new construction where landscape or landscape berms are proposed, grading plans must show no adverse impact to the floodplain.

O. *Multiple flood zones.* Proposed construction, including without limitation, substantial improvement, and other development, of a parcel within multiple flood zones must be constructed to the standards of the most restrictive flood zone.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008; Ord. 984, 2001; Ord. 801, 1997; Ord. 763, 1996; Ord. 567, 1992; Ord. 472, 1987; Ord. 331, 1980)

## 20.50.240. - Variances.

A. Nature of variances. A variance may be granted for a parcel of property with physical characteristics so unusual that complying with the requirements of this chapter would create an exceptional hardship to the applicant or the surrounding property owners. The characteristics must be unique to the property and not be shared by adjacent parcels. The unique characteristic must pertain to the land itself, not to the structure, its inhabitants, or the property owners.

B. It is the duty of the planning commission and board to help protect its citizens from flooding. This need is so compelling and the implications of the cost of insuring a structure built below flood level are so serious that variances from the flood elevation or from other requirements in the flood ordinance are quite rare. The long-term goal of preventing and reducing flood loss and damage can only be met if variances are strictly limited.

C. The hearing board is the board of county commissioners. In evaluating requests for variances, the board must consider all technical evaluations, all relevant factors, standards specified in other chapters of this title:

1. The danger of materials being swept onto other lands and injuring others;
2. Increased danger to life and property due to flooding or erosion damage;
3.

Increased susceptibility of the proposed facility and its contents of flood damage and the effect of such damage on the existing individual owner and future owners of the property;

4. Reduction of services by the proposed facility to the community;
5. Incompatible uses between existing development and anticipated development;
6. An inconsistency with the master plan and floodplain management program for the county and specific community;
7. Inadequate emergency access to the property in time of flood;
8. An increase in expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site; and
9. Increased cost to the county and other agencies providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water system, and streets and bridges.

D. General provisions.

1. Variances may be issued for new construction, substantial improvements, and other proposed new development to be erected on a lot contiguous to or surrounded by lots with existing structures constructed below the base flood level, provided that the procedures of this chapter have been fully considered and complied with.
2. Variances may be issued for the repair or rehabilitation of "historic structures", upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as an historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.
3. Variances may not be issued within any mapped regulatory floodway if any increase in flood levels during the base flood discharge would result.
4. Variances may only be approved upon a determination that the variance is the minimum necessary considering the flood hazard, to afford relief. "Minimum necessary" means to afford relief with a minimum of deviation from the requirements of this ordinance. For example, in the case of variances to an elevation requirement, this means the board need not grant permission for the applicant to build at grade, or even to the proposed elevation, but only to that elevation which the board believes will provide relief and preserve the integrity of the property.
5. In granting a variance, the board may attach any conditions it deems necessary to further the purposes of this chapter.

E. Required findings. In approving a request for a variance, the board must make findings of fact regarding the following:

1. A showing of good and sufficient cause;
2.

A determination that failure to grant the variance would result in exceptional hardship to the applicant;

3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, creating a nuisance, causing fraud or victimization of the public, or conflict with existing local laws or ordinances; and
4. That the applicant has signed a disclosure statement indicating that he or she understands that:
    a. The issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance; and
    b. Such construction below the base flood level increases risks to life and property; and
    c. A copy the disclosure will be filed and recorded by the county recorder in a manner so that it appears as an exception on the title of the affected parcel of land.

(Ord. 1514, 2018; Ord. 1251, 2008; Ord. 763, 1996)

## 20.50.250. - Violations and penalties.

A. No structure may be constructed, located, extended, converted, or altered, and no land may be altered without full compliance with the terms of this chapter and other applicable regulations. A violation of this ordinance is a criminal misdemeanor.

B. All violations of this ordinance will be addressed pursuant to the provisions of this chapter, including stop work orders, section 20.800.101 or other applicable law. In addition, if a property owner does not remedy a violation, the administrator may submit a report to the board of commissioners and request that the board:
    1. Take any action necessary to affect the abatement of the violation;
    2. Issue a variance to this ordinance in accordance with the provisions of section 20.50.110; or
    3. Submit to the administrator of the Federal Insurance Administration a declaration for denial of insurance, stating that the property owner is in violation of a cited statute or local law, regulation or ordinance, pursuant to section 1316 of the National Flood Insurance Act of 1968 and as amended.

(Ord. No. 2023-1622, § 1, 9-7-2023; Ord. 1514, 2018; Ord. 1251, 2008)

# CHAPTER 2.56. WATER CONVEYANCE ADVISORY COMMITTEE

## 2.56.010 Established—Membership.

There is established the water conveyance advisory committee (committee). The committee will consist of five members.

A. Members of the committee must be current or past water conveyance users or have experience in soil conservation or other related fields.

B. Members will serve without compensation.

C. Members will be selected at large by the board of commissioners (commissioners) at their discretion. Preference will be given to persons who are representatives from the individual irrigation associations or major ditch organizations and preference will be given so that two members to represent the West Fork of the Carson River and three members to represent the East Fork of the Carson River.

D. The commissioners must appoint members for a term of four years, except for the initial term, and may reappoint any member to subsequent terms of four years. Any vacancy occurring during a member's term shall be filled by the commissioners. A person appointed to fill a vacancy occurring during a term shall serve out the unexpired term of the member replaced. On the effective date of the ordinance codified in this chapter, the commissioners must set the initial appointed members' terms to provide for the terms of three of the appointed members to end on December 31, 1992, and for the terms of two of the appointed members terms to end on December 31, 1991.

(Ord. 537, 1991)

(Ord. No. 2024-1644, § I, 12-19-2024)

## 2.56.020 Chairman, election, and duties.

A. The committee must elect from its membership a chairman and vice-chairman.

B. the chairman will preside at meetings and be the signatory of any correspondence necessitated by operation of the committee.

(Ord. 537, 1991)

## 2.56.030 Rules and regulations.

The committee may adopt rules and regulations regarding its meetings and procedures.

(Ord. 537, 1991)

## 2.56.040 Quorum.

Three members of the committee will constitute a quorum. The approval of a majority of all members present to vote is necessary on any action the committee desires to take.

(Ord. 537, 1991)

## 2.56.050 Meetings.

The committee must hold a public meeting on a regular day each month unless a rule changing the meeting is adopted by the committee. At least three working days prior to any meeting, copies of the proposed agenda must be available to the public in the county clerk's office and shall, additionally, be mailed to each member of the committee. Notice of the meetings and the conduct of the meetings of the committee, including the taking of minutes and their transcription and retention, must comply with the provisions of NRS Chapter 241, Nevada Open Meeting Law.

(Ord. 537, 1991)

## 2.56.060 Duties.

The committee will advise the commissioners regarding the effects of development on the water conveyance systems in Douglas County and carry out the duties of reviewing subdivision, parcel and land division maps and other land development proposals in accordance with the requirements of this Code.

A. The committee must meet as soon as practicable following the enactment of this ordinance [chapter] to adopt procedures for reviewing maps.

B. The committee shall hold public meetings with affected water conveyance users if necessary to gather evidence for its determination whether maps comply with the code.

C. The committee may request technical support from the county when necessary to carry out its duties.

D. The committee may also request the commissioners to adopt by resolution additional fees for maps to pay for any necessary expenses of the committee.

(Ord. 537, 1991)

# 8. IMPLEMENTATION




## PURPOSE

The purpose of the Implementation Element is to set forth the Master Plan work program to provide direction to staff from the Board on priorities for future accomplishments.

## MASTER PLAN ACTION MATRIX

The Action Matrix for the 2020 update of the Douglas County Master Plan lists the actions for each Master Plan Element along with the priority for each action item. These priorities are subject to staffing resources and budget constraints identified by the Board. Priority is categorized by a time frame based on four levels: (1) one to three years, (2) three to five years, (3) five to ten years or longer, and (4) ongoing items that may be addressed each year. These actions identify amendments that may need to be added to the Douglas County Development Code and define actions that should be included in the County's five-year Capital Improvement Program. The Matrix will be updated as part of the annual Master Plan reporting process.

**Priority Explanation in Years | 1–3 (High), 3–5 (Medium), 5–10 (Low)**

| | Priority |
|---|---|
| **L LAND USE & HISTORIC PRESERVATION** | |
|   Amend Title 20 to incorporate the Master Plan land use designations and compatible zoning districts. | 1–3 |
|   Amend the Master Plan Land Use Designation Table to allow multi-family residential zoning in the Commercial land use category. | 1–3 |
|   Ensure that Douglas County Community Development works with Douglas County GIS, the Recorder's Office, and affected property owners to eliminate parcels with split land uses, split zoning, and other mapping inconsistencies. | 3–5 |
|   Ensure that Douglas County Community Development periodically amends the Master Plan Future Land Use Map to change the future land use designation for built-out receiving areas. | 1–3 |
|   Support the Towns of Gardnerville and Minden in submitting Historic District nomination packages to the State of Nevada. | 3–5 |
|   Apply for Certified Local Government status with the State of Nevada Historic Preservation Office. | 5–10 |
|   Support efforts to secure state, federal, or other funding directed toward revitalizing historic areas or maintaining historic buildings and sites. | 1–3 |
|   Continue to support proposed Main Street legislation in the Nevada Legislature to provide financial and technical resources. | Ongoing |
|   Evaluate the creation of a county-wide Historic Preservation Board and program. | 1–3 |
|   Examine changes to Title 20 to establish a 10-acre Rural Agriculture zoning district in keeping with the preservation of our rural nature. | 1–3 |

| | Priority |
|---|---|
| **L LAND USE & HISTORIC PRESERVATION** | |
| Action 11 Examine changes to Title 20 to clarify the use of TDRs. | 1–3 |

**Priority Explanation in Years | 1–3 (High), 3–5 (Medium), 5–10 (Low)**

| | Priority |
|---|---|
| **A AGRICULTURE & CONSERVATION** | |
| Action 1 Investigate creating an Open Space Land Trust to facilitate planning and implementation of an Open Space Acquisition Program. | 1–3 |
| Action 2 Update the 2007 Open Space and Agricultural Lands Preservation plan prior to September 29, 2029, and incorporate the development of a River Corridor Open Space plan addressing the branches of the Carson and Walker Rivers. | 3–5 |
| Action 3 Evaluate and update the definition of publicly valuable open space to include the provision of active recreation opportunities in less critical habitat to relieve recreation pressure in areas of more critical habitat and to manage public lands access. | 5–10 |
| Action 4 Establish an open space acquisition program. | 1–3 |
| Action 5 Prepare recommendations for establishment of a TDR bank to encourage conservation of open space areas in the County. | 1–3 |
| Action 6 Prepare a Low-Impact Development Ordinance for all new residential, commercial, and industrial development to reduce pollutants from entering surface waters in Douglas County. | 1–3 |
| Action 7 Work with NDEP and the Carson Water Subconservancy District to remove one or more river segments from the EPA list of 303 (d) impaired waters. | 3–5 |
| Action 8 Develop comprehensive storm drainage design criteria for developed areas in conjunction with the Towns and GIDs. | 3–5 |

| | Priority |
|---|---|
| **A AGRICULTURE & CONSERVATION** | |
| Action 9 Develop and implement a stormwater management plan. | 5–10 |
| Action 10 Implement the Clear Creek and Johnson Lane Stormwater Management Plans as required by the EPA's MS4 National Pollutant Discharge Elimination System (NDPES) Permit. | 1–3 |
| Action 11 Amend the Development Code to include noise standards for noise-generating activities, including limitations on hours of operation during the day. | 3–5 |
| Action 12 Evaluate and update agricultural exemptions and incentives to encourage agricultural conservation of open space and the continuation of agricultural activities. | 3–5 |
| Action 13 Evaluate agricultural zoning districts and property tax structure to support perpetual farming and agricultural uses in specific areas. | 5–10 |
| Action 14 Minimize conversion of agricultural land to non-agricultural uses and ensure that recognized needs for growth are met by infill and contiguous development. | Ongoing |
| Action 15 Provide procedures for the acquisition, dedication, or purchase of agricultural preservation easements, by public or nonprofit entities, as a means to retain land in agriculture. | 1–3 |
| Action 16 Expand and improve drainage facilities on U.S. Highway 395 at Smelter Creek south of Gardnerville and from Minden north to Cradlebaugh Bridge. | 1–3 |
| Action 17 Protect wetlands to provide for groundwater recharge, flood protection, sediment and pollution control, wildlife habitat, and open space. | 1–3 |
| Action 18 Service development occurring at urban densities with a sanitary sewer utility. | 3–5 |
| Action 19 Implement the Agrihood Strategy Framework accepted by the Board of County Commissioners on September 3, 2020. | 1–3 |

| | Priority |
|---|---|
| **A AGRICULTURE & CONSERVATION** | |
| Action 20 Include provisions in the Development Code for the mandatory use of TDRs to increase density associated with a zoning map amendment. | 1–3 |
| Action 21 Create alternatives to the urban development of existing agricultural lands to preserve those agricultural areas. | 1–3 |

**Priority Explanation in Years | 1–3 (High), 3–5 (Medium), 5–10 (Low)**

| | Priority |
|---|---|
| **E ECONOMIC DEVELOPMENT** | |
| Action 1 Consider amendments to the Development Code to allow permanent sidewalk merchandise displays in the downtowns. | 1–3 |
| Action 2 Complete infrastructure projects, such as the Martin-Slough Trail, Muller Parkway, and utilization of Complete Streets vision and plan for U.S. Highway 395. | 1–3 |
| Action 3 Implement the South Shore Area Plan for Stateline. | 1–3 |
| Action 4 Complete the Tahoe Douglas Area Plan. | 1–3 |
| Action 5 Implement the Expanded Kahle Drive Vision Plan. | 3–5 |
| Action 6 Explore the creation of an Improvement District under NRS Chapter 271 for the Stateline area. | 3–5 |
| Action 7 Develop a communication and marketing plan for the Minden-Tahoe Airport. | 3–5 |
| Action 8 Update the Airport Economic Impact Study. | 5–10 |

| | Priority |
|---|---|
| **E ECONOMIC DEVELOPMENT** | |
| Action 9 Plan and develop the east side of the Minden-Tahoe airport to facilitate business development, retention, and expansion. | 5–10 |
| Action 10 Seek funding to improve bicycle, pedestrian, and equestrian infrastructure that supports economic development. | 3–5 |
| Action 11 Continue to work with our network of partners to promote and advocate for outdoor recreation experiences. | Ongoing |
| Action 12 Advocate for trails as part of infrastructure and development opportunities. | Ongoing |
| Action 13 Develop a GIS layer for the public viewer that shows existing trails in Douglas County. | 3–5 |
| Action 14 Explore tools to promote economic development that do not require the investment of local funds. | 3–5 |
| Action 15 Evaluate and update land use regulations to foster a positive atmosphere and attract appropriate types of business to the community. Promote the types of uses that provide middle-income jobs and promote entrepreneurship. | 1–3 |
| Action 16 Explore tools to connect local consumers to local suppliers. | 3–5 |
| Action 17 Support local employees through efforts to make housing, daycare, and other needs more accessible and affordable. | 3–5 |
| Action 18 Maintain locations for light industry and evaluate and update regulations relating to live/work light industry opportunities. | 1–3 |
| Action 19 Develop a strategy to attract and retain independent, contract, and remote workers. | 3–5 |

| | | Priority |
|---|---|---|
| **E** | **ECONOMIC DEVELOPMENT** | |
| Action 20 | Support development of business incubators, innovation centers, and co-working spaces. | 1–3 |
| Action 21 | Conduct a market analysis and develop a marketing strategy for the downtown areas of Minden and Gardnerville. | 5–10 |
| Action 22 | Work with providers to assess availability and reliability of broadband in the County and identify ways to expand access. | 3–5 |
| Action 23 | Work with the Douglas County School District and other agencies to develop career and technical training, apprenticeship programs, and internships to provide a qualified and educated workforce for our local businesses and industries. | 1–3 |
| Action 24 | Consider amendments to the Development Code to create a process for applying to install public art, including separate criteria for murals and sculptures and consideration for temporary, permanent, and rotating displays. | 1–3 |
| Action 25 | Facilitate the creation of a Cultural Commission, which will be an advisory board to the County Commissioners for matters relating to arts and culture for the benefit of all residents and visitors. | 1–3 |
| Action 26 | Continue to work with our network of partners to promote and advocate for arts and cultural programming. | Ongoing |
| Action 27 | Explore incentives for the inclusion of live/workspace in planned developments. | 1–3 |

**Priority Explanation in Years | 1–3 (High), 3–5 (Medium), 5–10 (Low)**

| | | Priority |
|---|---|---|
| **G** | **GROWTH MANAGEMENT & HOUSING** | |

| | | Priority |
|---|---|---|
| **G** | **GROWTH MANAGEMENT & HOUSING** | |
| Action 1 | Develop key indicators to monitor the impacts of growth and the progress toward implementing the County's growth management programs; report annually on their effectiveness and possible improvements. | 1–3 |
| Action 2 | Ensure that the Community Development Department provides input during the preparation of the annual CIP to ensure consistency with the Master Plan and the Growth Management Chapter of the Douglas County Development Code. | Ongoing |
| Action 3 | Analyze the effectiveness of the TDR program before the next update of the Douglas County Master Plan and prepare recommendations on sending and receiving areas and TDR values. | 1–3 |
| Action 4 | Evaluate and update land development regulations in rural areas to better protect wildlife habitat, habitat connections, scenic vistas, and rural character. | 1–3 |
| Action 5 | Evaluate and update design regulations to encourage quality public space. | 3–5 |
| Action 6 | Amend the Douglas County Development Code to include minimum density requirements in the multi-family residential and mixed-use commercial zoning districts. | 1–3 |
| Action 7 | Revise the Master Plan land use designations to permit multi-family zoning within the Commercial land use designation. | 1–3 |
| Action 8 | Review the single-family design standards in the Development Code to determine whether impediments exist for the development of moderately priced entry-level homes, including single-family attached units. | 1–3 |
| Action 9 | Revise the criteria in the Mixed-Use zoning district to reduce the percentage of commercial usage required. | 1–3 |

| | Priority |
|---|---|
| **G GROWTH MANAGEMENT & HOUSING** | |
| Action 10 Prepare recommendations for amending the Development Code to require developers to include a percentage of affordable units in large subdivisions in return for a density bonus. | 1–3 |
| Action 11 Explore the viability of community land trusts to develop and maintain entry-level housing stock for households with incomes below 80 percent of median income. | 3–5 |

**Priority Explanation in Years | 1–3 (High), 3–5 (Medium), 5–10 (Low)**

| | Priority |
|---|---|
| **PF PUBLIC FACILITIES, SERVICES, & RECREATION** | |
| Action 1 Develop a facilities master plan to address space needs for government services. | 3–5 |
| Action 2 Identify critical services and define desired service levels from government service providers that address all policies of this section. | 3–5 |
| Action 3 Define desired service levels and establish clear expectations for service providers to ensure efficient and cost-effective delivery of services. | 3–5 |
| Action 4 Explore the feasibility of connecting communities with high concentrations of private wells, such as Ruhenstroth, Johnson Lane, Topaz Lake and Topaz Ranch Estates, to public water systems. | 1–5 |
| Action 5 Create incentives to encourage existing development to connect to public water and sewerage systems upon public service provider's system expansion, particularly in areas with high concentration of nitrates reaching groundwater, such as Johnson Lane and Ruhenstroth. | 3–5 |

| | | |
|---|---|---|
|  | Evaluate and update development exaction regulations to address capital improvements, intersection impacts, road or turning lane impacts, impacts to water or the sewer system, and other needs. | 1–3 |
|  | Evaluate the feasibility of establishing impact fees in urban service/receiving areas (areas where increased density is proposed) to support expansion of required infrastructure and public facilities. | 1–3 |
|  | Identify appropriate locations for infrastructure before it is needed by projecting the location of future growth. | 1–3 |

| | | Priority |
|---|---|---|
| PF | **PUBLIC FACILITIES, SERVICES, & RECREATION** | |
| Action 9 | Evaluate and update the definition of publicly valuable open space to include the provision of active recreation opportunities in less critical habitat in order to relieve recreation pressure in areas of more critical habitat and to manage public lands access. | 1–3 |
| Action 10 | Evaluate private land recreation needs and management to relieve the impact on public lands. | 3–5 |
| Action 11 | Establish an open space acquisition program that identifies acquisition area priorities based on capital costs, operation and maintenance costs, accessibility, open space needs, resource preservation, ability to complete or enhance the existing open space linkage system, and unique environmental features. Techniques for acquisition may include fee simple acquisition, acquisition of development rights, transfer of development rights, clustering, or other measures. | 1–3 |
| Action 12 | Utilize State of Nevada standards for the evaluation of new septic systems on the basis of the site's susceptibility to groundwater pollution by septic effluent. | 3–5 |
| Action 13 | Continue to monitor areas with high septic system densities for signs of groundwater contamination from nitrates. | Ongoing |
| Action 14 | Prepare amendments to the Development Code to support a Dig Once policy for underground telecommunications and fiber infrastructure. | 1–3 |
| Action 15 | Evaluate database offerings, including Nevada State Library and other database additions/subtraction. | 3–5 |
| Action 16 | Pursue development of a trail concept plan for the upper Kingsbury Grade segment of the Pony Express National Historic Trail. | 3–5 |

| | Priority |
|---|---|
| **PF PUBLIC FACILITIES, SERVICES, & RECREATION** | |
| Action 17 Update the Comprehensive Trails Plan. | 3–5 |
| Action 18 Partner with and support USGS to update the Numerical Groundwater-Flow Model of the Carson Valley, Douglas County, Nevada, and Alpine County, California, in order to develop a complete understanding of the availability and quality of water in the Carson Valley/Carson River Basin. | 1–3 |
| Action 19 Develop a regional water resource plan, pursuant to NRS 278. | 3–5 |
| Action 20 Update the water conservation plan, pursuant to NRS 540. | 3–5 |
| Action 21 Update the Nevada 80th Session's AB240 growth management report, as required. | Ongoing |
| Action 22 Implement the Airport, Johnson Lane, Alpine View Estates, and Ruhenstroth Area Drainage Master Plans. | 1–3 |
| Action 23 Encourage funding for art and cultural facilities and form a public arts coalition between the Towns of Minden and Gardnerville, Main Street Gardnerville, the Carson Valley Arts Council, and other interested parties to enhance cultural and performing arts. | 1–3 |
| Action 24 Investigate the feasibility of a County hospital with mental health facilities, including facilities for special needs children and adults. | Ongoing |
| Action 25 Examine feasibility studies for arts complexes and the development and design of a theater venue for the Carson Valley. | 1–3 |
| Action 26 Assist in the improvement of arts organizations' existing facilities to enhance the quality and quantity of arts offerings. | 1–3 |

**Priority Explanation in Years | 1–3 (High), 3–5 (Medium), 5–10 (Low)**

| | | Priority |
|---|---|---|
| PS | **PUBLIC SAFETY** | |
| Action 1 | Update and refine urban wildland interface and steep slopes maps and consider adopting the International Wildland Urban Interface Code (IWUI) within the East Fork Township. | 1–3 |
| Action 2 | Evaluate and update development regulations for naturally hazardous areas based on mapping and other relevant data. | 1–3 |
| Action 3 | Ensure that the Community Development Department, in coordination with East Fork Fire and the County Sheriff, provides an evaluation of population growth and changing demographics to effectively maintain fire service coverage and police services at an optimal level, as part of each Master Plan update. | 5–10 |
| Action 4 | Respond to and prepare for continued increases in emergency and non-emergency medical responses, with consideration to the aging population, new senior living facilities, and the evolving socio-economics of the Douglas community. | 1–3 |
| Action 5 | Meet the national standards for emergency response times for EMS and fire calls and the department standards for police Priority 1 calls. | Ongoing |
| Action 6 | Evaluate new technological advances and programs to modernize public safety efforts and provide efficient and effective services in the most cost-effective manner. | Ongoing |
| Action 7 | Develop a priority and phasing plan for a detailed watershed analysis and for improvement recommendations by watershed, in relation to the seriousness of the existing and potential flood flow problems. | 3–5 |
| Action 8 | Investigate the use of existing irrigation ditches and canals to help alleviate Carson River and stormwater flooding problems and to prevent critical water conveyances from being obstructed or abandoned. | 1–3 |
| Action 9 | Investigate acquisition of rights-of-way, development of conveyances, and utilization of wetlands southeast of Genoa as possible detention facilities. | 3–5 |

| | Priority |
|---|---|
| **PS PUBLIC SAFETY** | |
| Action 10 Establish and enhance neighborhood programs to involve the community in crime and fire prevention, disaster preparedness, and shelter management. | 3–5 |
| Action 11 Study the areas developed by serial land parceling and verify the current water conveyance capacity of the infrastructure. Note deficiencies and correct, as practicable. Analyze downstream capacities and improve if needed. | 3–5 |
| Action 12 Explore and expand the use of social networks as a communication tool to reach as many residents as possible with public safety matters. | 1–3 |

## MASTER PLAN ANNUAL REPORTS AND ACCOMPLISHMENTS

The Planning Commission is required to submit an annual report to the Board of Commissioners on the implementation status of the Master Plan (NRS 278.190). When the 2011 Master Plan (15-year update) was adopted on March 1, 2012, it contained 95 actions. When the South Shore Area Plan was adopted by the County in 2013, 11 more actions were added, increasing the total to 106 actions.

The Planning Commission has submitted four annual reports (in 2012, 2013, 2014, and 2015) to the Board of Commissioners on the implementation status of each action. The 2015 Annual Report stated that 22 actions had been completed, 33 actions were underway, and 51 had not been started. In 2016, 2017, 2018, 2019, and 2020, data from the report was presented to the Planning Commission and the Board of Commissioners as part of the 20-year Master Plan update.

**AGENDA ITEM NO. 6.3**

**BOARD OF COUNTY COMMISSIONERS AGENDA ITEM COVER PAGE**

**MEETING DATE:** May 28, 2026

**TIME REQUIRED:**

**AGENDA:** **COMMUNITY DEVELOPMENT**

**TITLE:**
For possible action. Discussion to adopt the Douglas County Stormwater Utility Critical Lands Conservation, Acquisition, and Management Plan and direct staff to incorporate the plan into the Douglas County Stormwater Master Plan as Appendix E. (Jenifer Davidson, County Manager)

**RECOMMENDED MOTION:**
Adopt the Douglas County Stormwater Utility Critical Lands Conservation, Acquisition, and Management Plan as presented, and direct staff to incorporate the plan into the Douglas County Stormwater Master Plan as Appendix E.

**FINANCIAL IMPACT:**
This action has no direct financial impact at this time. The Board of County Commissioners will consider adopting a budget and rates for a Stormwater Utility at a special meeting on May 28, 2026. If the budget is approved, the Stormwater Utility will provide approximately $4.5 million annually in funding for activities that preserve or enhance stormwater management functions, including approximately $1 million dollars for conserving and acquiring strategically important floodplain and drainage corridor properties as described in the proposed Plan.

**BACKGROUND:**

The Douglas County Stormwater Master Plan (SMP) adopted by the Board of County Commissioners recognizes the widespread impact of stormwater in Douglas County. The Stormwater Utility will provide stormwater management services to its customer base and use its funding for stormwater management, including, without limitation, flood mitigation, watershed protection, and drainage infrastructure.

The purpose of the Critical Lands Conservation Plan (“Plan”) is to establish a framework for

identifying, prioritizing, conserving, and acquiring strategically important floodplain and drainage corridor properties through voluntary conservation easements, land acquisitions, partnerships, and other land conservation tools.

In response to public comment and discussion by the Board of County Commissioners at the May 21, 2026, meeting, staff made one change to the plan. A redline of the plan is attached for reference.

**ATTACHMENTS:**
Douglas_County_Critical_Lands_Conservation_Acquisition_and Management Plan Amended.pdf

# APPENDIX E

# Douglas County Stormwater Utility Critical Lands Conservation, Acquisition, and Management Plan[1]

## 1. Introduction

The Douglas County Stormwater Master Plan (SMP), adopted by the Board of County Commissioners, recognizes that flooding has widespread impacts throughout the community, including impacts to transportation systems, emergency response, schools, neighborhoods, utilities, and public infrastructure. The Douglas County Stormwater Utility will provide sustainable funding for stormwater management, flood mitigation, watershed protection, and drainage infrastructure throughout the County.

As part of this effort, the County recognizes that certain undeveloped floodplain and drainage corridor lands perform essential stormwater management functions that benefit every developed parcel by naturally storing, conveying, infiltrating, and slowing floodwaters. Preservation of these lands is a key component of the Stormwater Utility system because it provides a direct benefit to every developed parcel because it can reduce flood hazards, protect water quality, maintain natural watershed processes, and may avoid or reduce the need for future publicly funded drainage infrastructure improvements.

Additionally, there are lands located in Douglas County of hydrological importance that have been identified in the County's SMP as locations where stormwater infrastructure could be installed for the benefit of developed parcels. Acquiring these parcels, or purchasing easements from private landowners to install flood-control projects at these locations, is necessary to implement the recommended solutions in the SMP and mitigate hazards in those areas.

These lands, referred to in this Plan as "Critical Lands," conserved or acquired, will function as part of the County's stormwater infrastructure.

The purpose of this Critical Lands Conservation Plan ("Plan") is to establish a framework for identifying, prioritizing, conserving, and acquiring strategically important floodplain and

[1] This plan was adapted from the Douglas County's Master Plan, Stormwater Master Plan, Hazard Mitigation Plan, and Strategic Plan, the Carson City Open Space Master Plan, and a generative artificial intelligence (AI) tool (ChatGPT4) used to generate text which was subsequently edited by the authors of this plan.

drainage corridor properties through voluntary conservation easements, land acquisitions, partnerships, and other land conservation tools.

## 2. Vision Statement

Douglas County will strategically conserve critical floodplain and watershed lands. This effort will directly benefit developed parcels by protecting public safety and preserving natural stormwater functions. The goal of this investment is to support the Stormwater Utility, and its customers, by reducing future infrastructure liabilities.

The County shall prioritize:

- Preservation of natural floodplain functions where feasible;
- Avoidance of future infrastructure costs through conservation, where practical, and
- Acquisition of strategically important lands for stormwater infrastructure where conservation alone is insufficient to address existing or future flood risks.

Through this balanced approach, Douglas County intends to integrate natural watershed preservation with long-term stormwater infrastructure planning in order to support a resilient, fiscally responsible, and sustainable Stormwater Utility.

## 3. Purpose and Need

Flooding is a significant hazard affecting public safety, infrastructure, transportation systems, and private property throughout the County. Development within flood-prone areas, natural drainage corridors, and environmentally constrained lands often requires costly public drainage improvements, flood mitigation infrastructure, channel stabilization, roadway drainage upgrades, detention facilities, and long-term maintenance obligations. Many of these costs and services would ultimately be borne by the Stormwater Utility. Preservation of these lands is often more cost-effective than constructing (and maintaining) engineered infrastructure to replicate the same stormwater management functions.

Douglas County recognizes that 1% (100-year) floodplain conservation and watershed preservation are cost effective components of the Stormwater Utility's long-term stormwater management, hazard mitigation, and resilient infrastructure planning. Where possible, the county will strive to conserve the floodplain with this program. Viable opportunities to acquire lands will be evaluated on a case-by-case basis and presented to the Board for consideration if they align with the goals and objectives of the stormwater program.

The County also acknowledges that conservation alone will not fully address all existing or future drainage deficiencies. In some cases, the acquisition of strategically located lands will be necessary to construct, expand, operate, or maintain regional stormwater infrastructure facilities and flood mitigation improvements. Such facilities may include detention basins, conveyance corridors, channel improvements, flood control facilities, maintenance access

areas, and other stormwater infrastructure projects identified through watershed planning and capital improvement programs.

## 4. Goals and Objectives; Relationship to County Planning Documents

This Plan is intended to implement and support goals, policies, and actions contained within the Douglas County 2020 Master Plan, Douglas County Stormwater Master Plan, Douglas County Hazard Mitigation Plan, and Douglas County FY25–30 Strategic Plan.

The Plan supports County objectives related to:

- Flood hazard mitigation;
- Watershed management;
- Infrastructure resilience;
- Fiscal sustainability;

Once adopted, this Plan will serve as a companion implementation document and future appendix E to the Douglas County Stormwater Master Plan.

The goals and objectives of this plan include:

- Goal 1: Reduce Flood Risk
- Goal 2: Reduce Future Infrastructure Costs
- Goal 3: Protect Watershed Health and Water Quality
- Goal 4: Support Sustainable and Resilient Growth Patterns
- Goal 5: Establish Transparent and Accountable Conservation Practices
- Goal 6: Support Hazard Mitigation and Community Resilience

## 5. Definition of Critical Lands

Critical Lands are properties that provide significant stormwater management, flood mitigation, watershed protection, or drainage infrastructure cost avoidance benefits.

Critical Lands may include:

- FEMA 100-year floodplains;
- FEMA floodways;
- Natural detention areas;
- Riparian corridors;
- Wetlands;
- Flood-prone undeveloped lands;
- Groundwater recharge areas;
- Stream corridors;
- Hydrologically significant, privately owned parcels.

It is important to note that flooding is not always predictable, and that drainage studies and maps are updated in a phased approach. Not all areas of Douglas County will have the most current studies. Flooding may occur in areas that have not been studied, identified, or mapped as flood hazards. Flooding in these areas also threatens private property and existing infrastructure. As additional studies become available and the extent of the flooding hazard is further defined, it is anticipated that proposed projects, conservation priorities, infrastructure needs, and mapped Critical Lands areas may evolve to reflect improved technical information, watershed analysis, and flood risk data.

## 6. Critical Land to be Conserved, Acquired, and Managed

The County identified priority conservation areas and parcels to acquire through mapping and analysis of floodplain data, watershed boundaries, drainage systems, infrastructure deficiencies, development pressure, and strategic stormwater management opportunities.

A Critical Lands Map shall be maintained and periodically updated by the County it is attached to this plan for reference (**Attachment A- Critical Lands Map**). Additionally, the map can be viewed electronically here.

## 7. Governance and Administration

Implementation of this Plan shall occur through the county annual budgeting process, under the direction of the Douglas County Board of County Commissioners, for the Stormwater fund (361) utilizing the Stormwater Utility funds.

The Board of County Commissioners shall retain authority over funding allocations, property acquisitions, conservation easement approvals, and major policy decisions, that will be determined from time to time at standard meetings of the County Commission.

## 8. Critical Land Management Tools

Conservation easements are intended to be the preferred conservation tool where appropriate because they preserve floodplain functions while maintaining private ownership and reducing acquisition and maintenance costs.

Priority shall be given to conservation of natural floodplain functions whenever feasible and cost-effective. These acquisitions come with lower long-term maintenance costs for the Utility. However, where conservation alone is insufficient to address existing or projected flood risks, the County may pursue acquisition strategies necessary to support long-term stormwater infrastructure needs.

The County may consider utilizing conservation easements, Ranch Heritage Parcel provisions, clustered development opportunities, fee title acquisition, and strategic

partnerships with state and federal agencies to support long-term floodplain preservation, hazard mitigation, watershed management, and fiscally sustainable growth patterns.

This program will not involve the Transfer of Development Rights (TDRs) in accordance with Douglas County Code Chapter 20.500, in any way.

**A. Conservation easements**

Conservation easements may serve as a primary implementation tool supporting the objectives of this Plan by permanently preserving floodplains, agricultural lands, open space, riparian corridors, and other lands that provide important stormwater management, flood mitigation, and watershed protection functions.

A conservation easement is a voluntary and permanent legal instrument that restricts certain types of future development or land use in order to preserve identified conservation values. Conservation easements may be donated by a landowner or acquired through purchase by Douglas County, another governmental entity, a land trust, or a nonprofit conservation organization.

Under a conservation easement:

- The landowner retains ownership of the property;
- The land may continue to be used for compatible purposes such as agriculture, ranching, recreation, or open space;
- Development restrictions remain binding on future property owners;
- The terms of the easement may be tailored to the specific conservation objectives of the property; and
- The easement holder is responsible for periodic monitoring and enforcement of the easement terms.

The County recognizes that conservation easements provide a flexible and cost-effective tool for preserving lands that perform important public stormwater and flood mitigation functions while maintaining private ownership and, often, agricultural viability.

Conservation easements may support implementation of this Plan by:

- Preserving natural flood storage and conveyance areas;
- Preventing future development within flood-prone lands;
- Protecting riparian and watershed functions;
- Maintaining agricultural and open space uses;
- Reducing future public infrastructure demands;
- Reducing long-term Operation and Maintenance costs for the Utility;
- Supporting hazard mitigation objectives;
- Providing voluntary conservation opportunities for landowners.

Because conservation easements restrict future development potential, they may also reduce land value and provide financial, tax, or estate planning benefits to participating landowners, subject to applicable law and individual circumstances.

The County intends to prioritize voluntary conservation easements where feasible and appropriate as part of a broader strategy integrating floodplain preservation, watershed management, hazard mitigation, and long-term infrastructure planning.

Use of the conservation easements under this Plan shall remain voluntary and subject to the requirements of Douglas County Code.

*1. Related Conservation Programs*

Consistent with the requirements of Douglas County Code Chapter 20.714, the County may use the following tools to support stormwater management:

a. Ranch Heritage parcels

Ranch Heritage Parcel provisions, established under Douglas County Code Chapter 20.714, may also support implementation of this Plan by encouraging long-term conservation of irrigated agricultural lands, open space, and floodplain areas. The Ranch Heritage Parcel program allows the creation of a limited number of smaller-than-19-acre parcels within the A-19 and FR-19 zoning districts when a landowner voluntarily places a conservation easement over 100 or more acres of irrigated agricultural land.

b. Clustered Development

Douglas County's Clustered Development provisions established under Douglas County Code Chapter 20.714 may support implementation of this Plan by encouraging preservation of agricultural lands, open space, and floodplain areas while directing development toward more suitable locations.

The Clustered Development program allows residential density to be concentrated on a limited portion of a property while permanently preserving the remainder of the property as agricultural land, recreational land, or open space through deed restrictions or conservation easements.

**B. Fee simple title acquisition**

Acquisition of lands for future stormwater infrastructure facilities may also constitute an eligible stormwater utility expenditure where such acquisitions are necessary to implement regional drainage improvements, flood mitigation projects, maintenance access, watershed restoration activities, or capital projects identified in the Stormwater Master Plan.

Cash purchase at fair market value may be made in two ways:

- Annual budgeting—from the annual income of the stormwater utility (pay-as-you-go) as directed and approved by the Board of County Commissioners; and
- Bond issue—from bonds sold to raise a large amount of capital, repaid from the annual income of the Stormwater Utility over multiple years.

The purchase can include a variety of considerations to respond to the financial/tax circumstances of the seller.

1. *Bargain sale*
   A bargain sale is a combination of sale and gift to a government or non-profit entity. It enables the seller to realize income and tax benefits from a charitable gift for the difference between the fair market value and the bargain sale price.

2. *Installment purchase*
   An installment purchase is a purchase in multiple payments, usually over a number of years. This can benefit the seller by placing them in a lower tax bracket and usually benefits the County in allowing the Utility to spread its acquisition efforts over more properties over time. An interest rate is built into each payment.

3. *Rolling option*
   Another means to extend a purchase over a number of years is to purchase it through a series of options. An option is the right, but not an obligation, to purchase property at a specified price before a specified date. It may be used for example, by the County to structure a purchase in a way that meets the budgetary constraints of the Stormwater utility but also would not bind a future Board of County Commissioners.

The County may acquire lands or property interests necessary to:

- Construct regional detention or retention facilities;
- Expand or preserve stormwater conveyance corridors;
- Provide overflow flood storage capacity;
- Support channel stabilization or restoration projects;
- Protect or relocate critical infrastructure;
- Provide maintenance and operational access; or
- Implement capital improvement projects identified in the Stormwater Master Plan or future watershed studies.

Use of the fee simple title acquisition under this Plan will be subject to the Board of County Commissioners' review and approval of each property acquired.

## 9. Landowner Participation

Participation in the programs under this Plan shall be voluntary. The County intends to utilize a willing seller and willing landowner approach whenever possible while respecting private property rights and agricultural operations.

## 10. Funding Strategy

As directed by the Board of County Commissioners through the annual budget process, the Stormwater Utility will provide funding for conserving and acquiring strategically important floodplain and drainage corridor properties as described in this Plan.

Additional funding sources may include:

- FEMA Hazard Mitigation Assistance (HMA) grants;
- FEMA Building Resilient Infrastructure and Communities (BRIC) grants;
- Flood Mitigation Assistance (FMA) grants;
- State Hazard Mitigation and Resilience funding;
- Nevada Division of Environmental Protection 319(h) funding;
- Nevada State Lands Grant; and
- Federal watershed programs.

## 11. Prioritization Criteria

As mentioned in previous sections of this plan, the County shall prioritize preservation of floodplain and watershed lands that provide substantial public stormwater management benefits and reduce long-term exposure to flood hazards and infrastructure costs to the benefit of each developed parcel in the County.

Where feasible and cost effective, priority shall be given to conserving natural floodplain functions in lieu of constructing additional engineered drainage facilities. In areas where conservation measures alone are insufficient to address identified drainage deficiencies, regional flood risks, or critical infrastructure protection needs, the County may pursue acquisition of lands necessary to support future stormwater infrastructure improvements.

The County intends to emphasize projects that provide multiple benefits to the Stormwater Utility, including flood mitigation, infrastructure efficiency, and long-term fiscal sustainability.

Priority may also be given to projects that:

- Preserve lands identified within mapped flood hazard areas;
- Reduce the Utility's future public infrastructure obligations;
- Protect regionally significant drainage corridors;
- Support implementation of the Stormwater Master Plan; or

- Improve long-term watershed resilience.

### A. Prioritization matrix

This prioritization matrix is intended to provide a transparent and consistent framework for evaluating conservation and acquisition opportunities. The matrix shall serve as a planning and decision-support tool and may be adjusted over time as additional technical information, watershed studies, infrastructure analyses, funding opportunities, or County priorities evolve.

**Prioritization Matrix**

| Category | Evaluation Criteria | Points Available |
|---|---|---|
| **Infrastructure Cost Avoidance** | Potential to reduce or avoid future public drainage infrastructure costs | 0-20 |
| **Natural Flood Plain Function** | Ability to preserve natural flood storage, conveyance, infiltration, or watershed functions | 0-20 |
| **Flood Hazard Reduction** | Degree to which the project reduces existing or future flood risk to utility customers, parcels served, or utility infrastructure | 0–15 |
| **Stormwater Infrastructure Benefit** | Ability to support future regional stormwater facilities, detention, conveyance, or maintenance access; consistency with Stormwater Master Plan | 0–15 |
| **Watershed & Water Quality Benefit** | Water quality improvement, erosion reduction, riparian protection, or groundwater recharge benefit | 0–15 |
| **Development Pressure & Urgency** | Likelihood of future development or loss of conservation opportunity | 0–10 |
| **Grant & Partnership Leverage** | Potential to leverage outside funding, partnerships, or grant competitiveness | 0–5 |

## Total Possible Points: 100

# Recommended Priority Tiers

| Score Range | Priority Level |
|---|---|
| 85–100 | Tier 1 – Strategic County Priority |
| 70–84 | Tier 2 – High Priority |
| 50–69 | Tier 3 – Moderate Priority |
| Below 50 | Lower Priority / Future Evaluation |

## 12. Monitoring and Performance Measures

The County may track program performance through metrics, including:

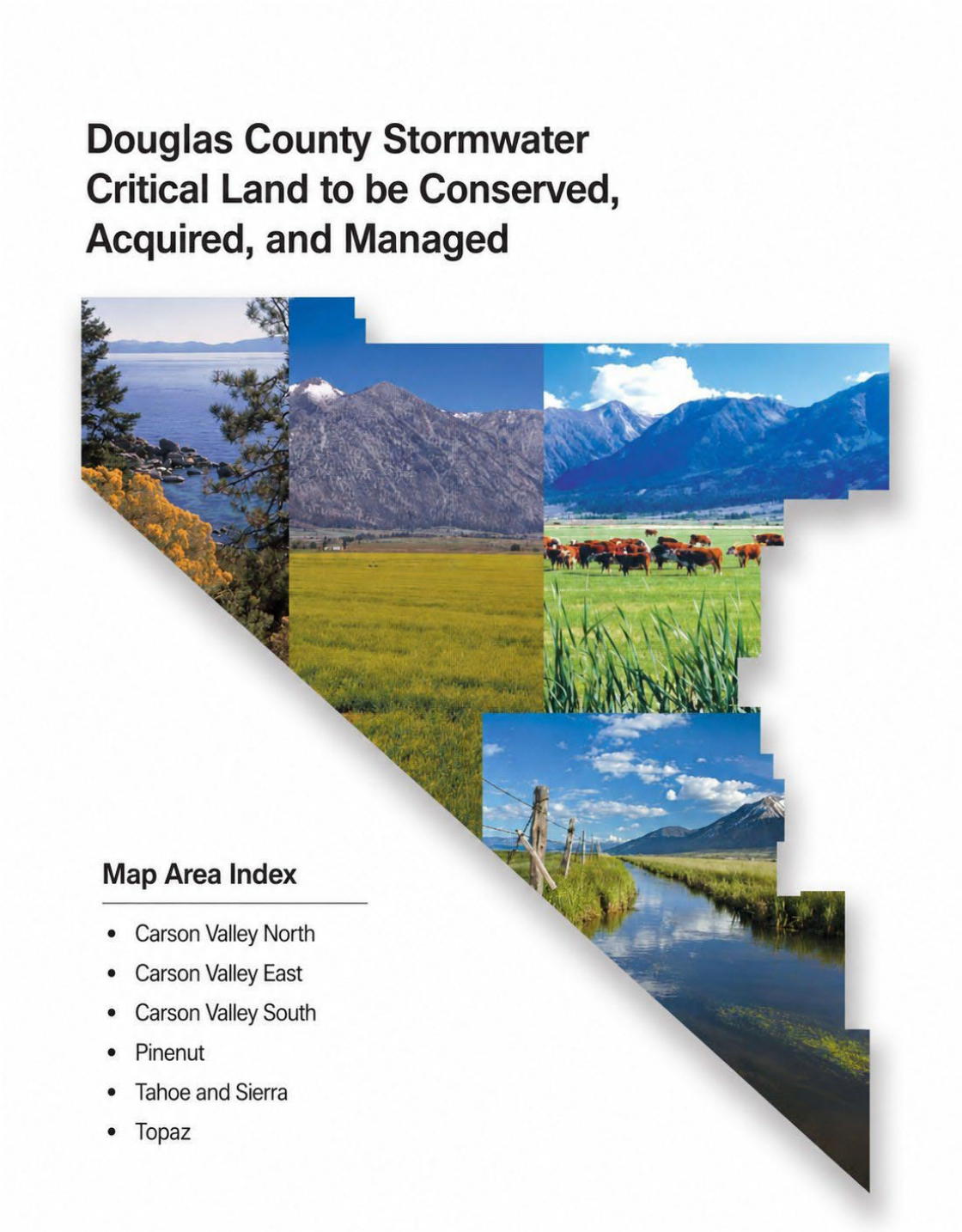
- Estimated infrastructure costs avoided;
- Grant funding leveraged;
- Flood storage preserved; and
- Water quality improvements where applicable.

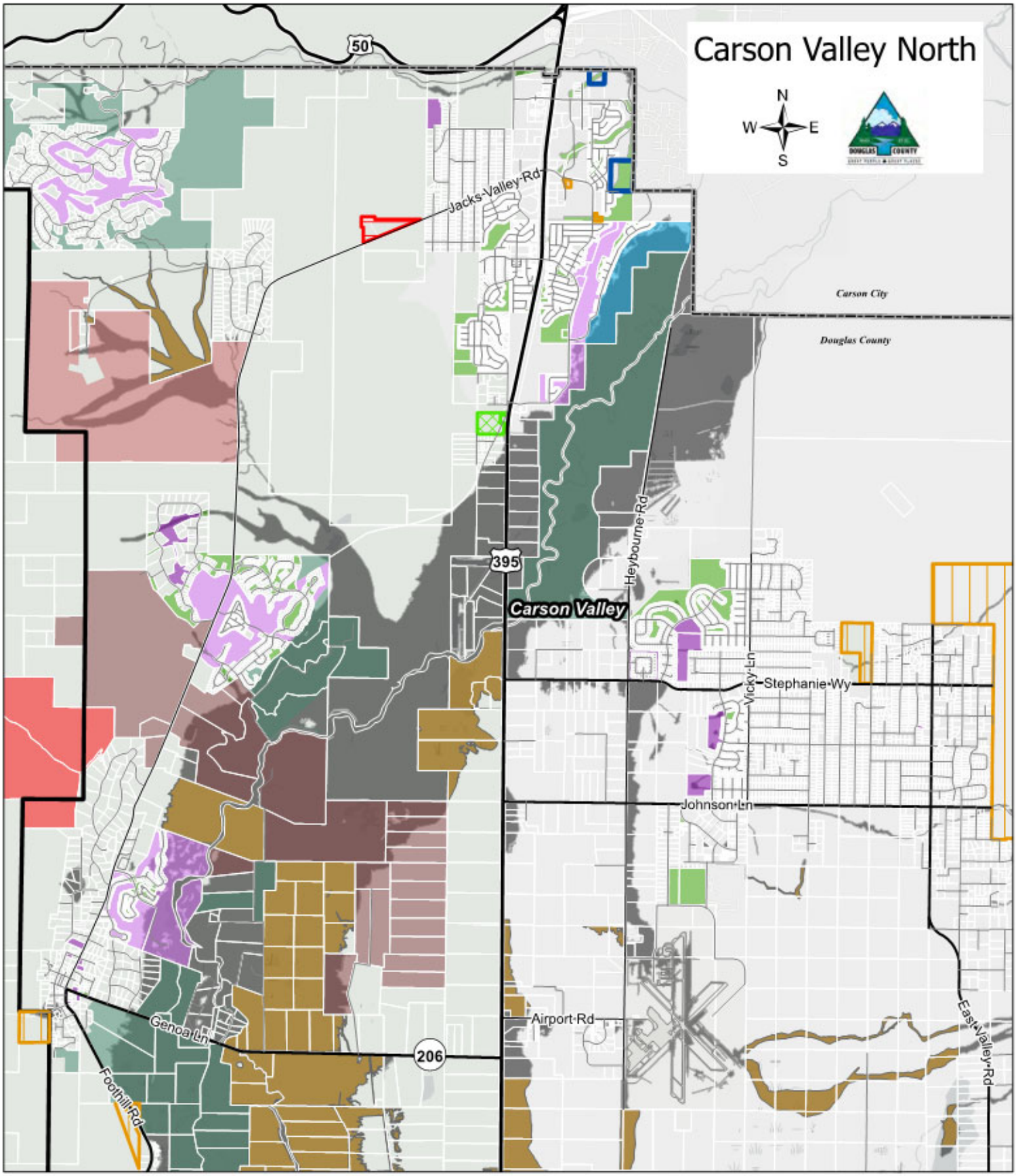
This information will be shared with the Board and the public in an annual report prepared by staff during the annual budget adoption process.

## 13. Implementation

Implementation of this Plan shall occur incrementally as funding opportunities, partnerships, willing landowner participation, and priority conservation opportunities arise.

**ATTACHMENT A- Critical Lands Map**

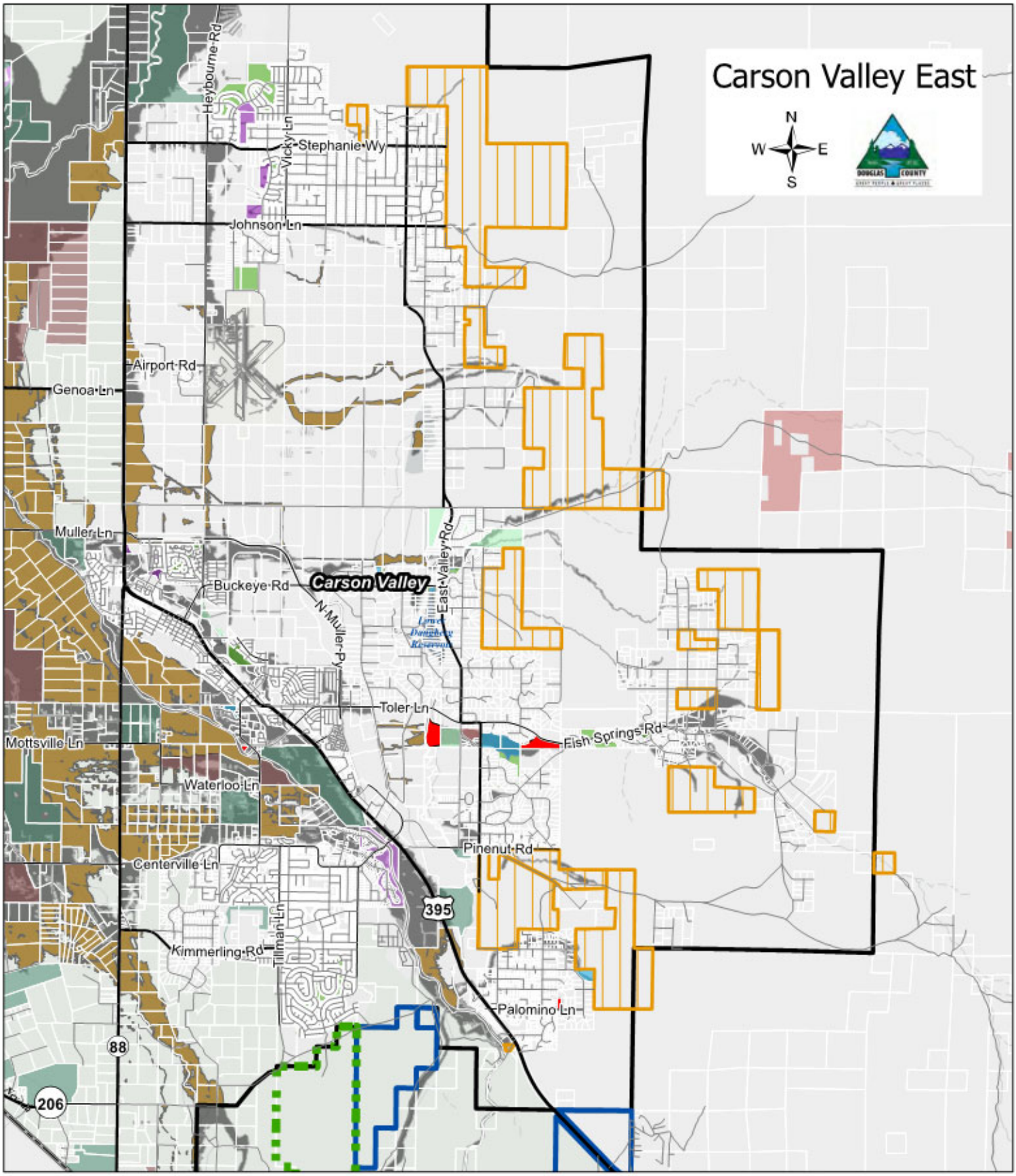





Lands Bill Parcels
- Directed Special Use Permit Lands
- Douglas County Conveyances
- Lands for Disposal
- Washoe Tribe Conveyances

Open Space
- Agricultural Conservation Easement
- Floodplain Conservation Easement
- Private Conservation Easement
- Transfer Development Rights Conservation Easement
- Dedicated Open Space

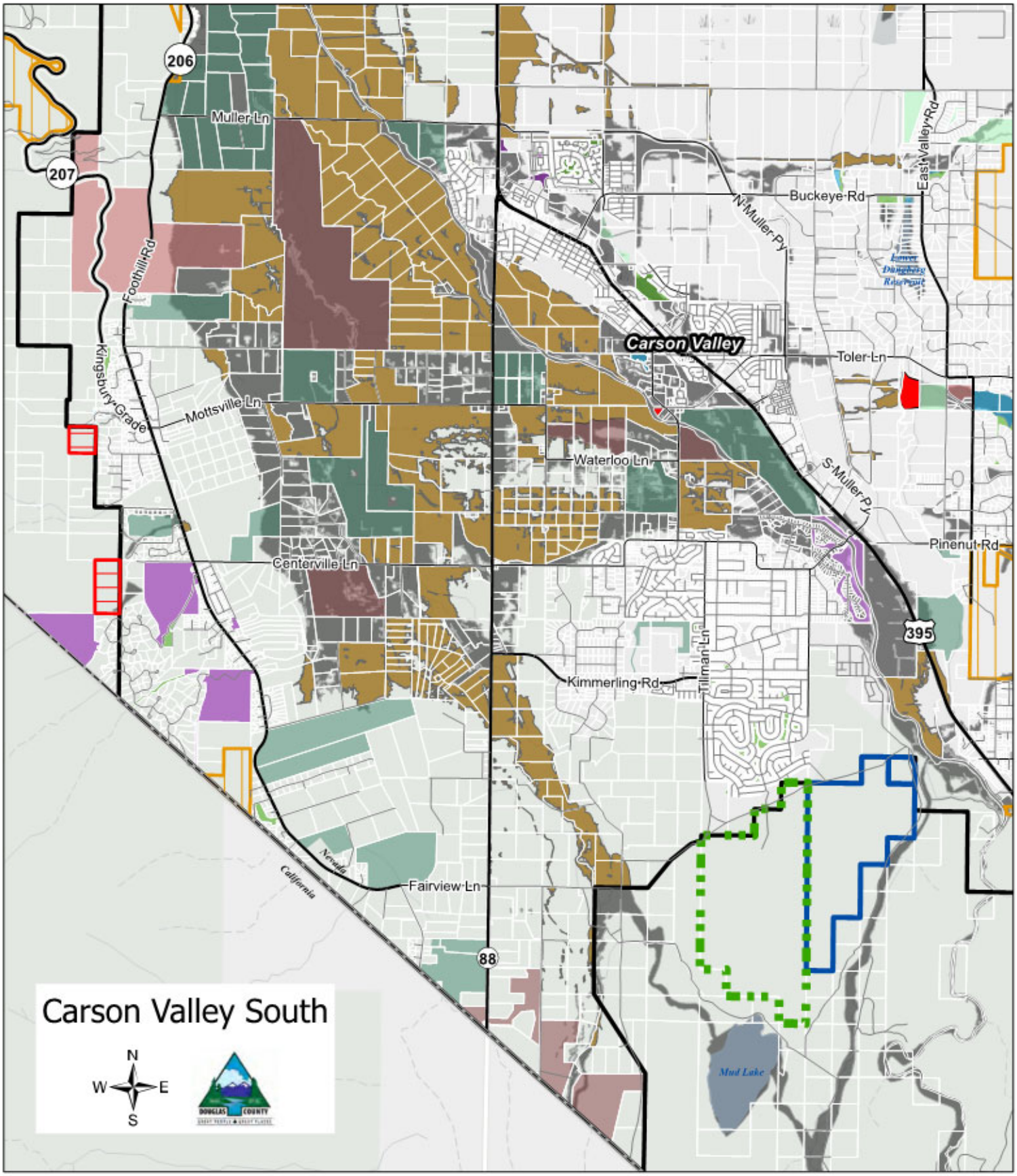
- Common Area
- Golf Course Open Space
- SNPLMA
- Critical Land in the 100 Year Floodplain - Identified in Stormwater Masterplan
- FEMA A Flood Zone
- Region - Carson Valley North

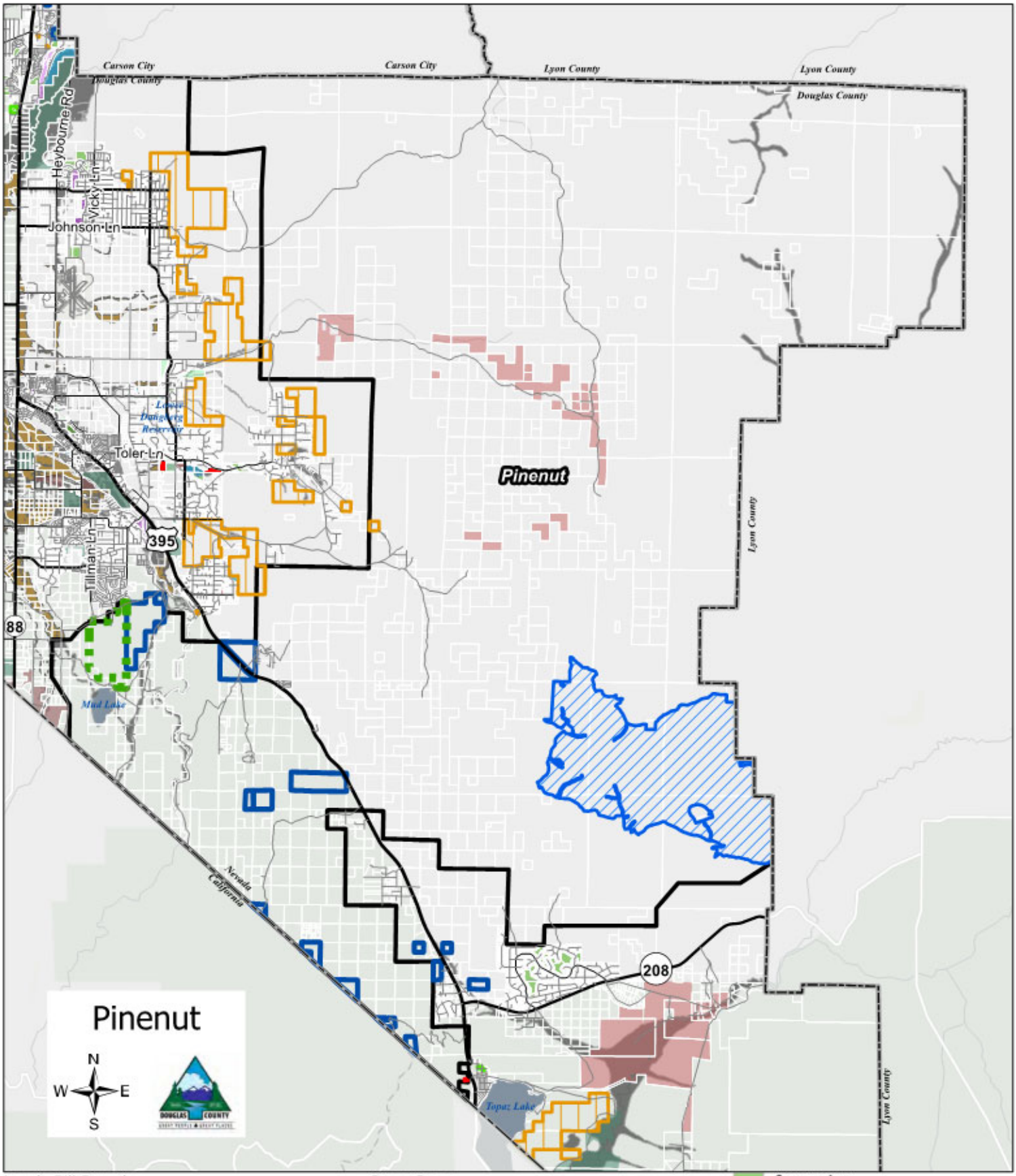



Lands Bill Parcels
- Douglas County Conveyances
- Washoe Tribe Conveyances
- Open Space Recreation Area

Open Space
- Agricultural Conservation Easement
- Drainage Conservation Easement
- Floodplain Conservation Easement
- Private Conservation Easement
- Transfer Development Rights Conservation Easement

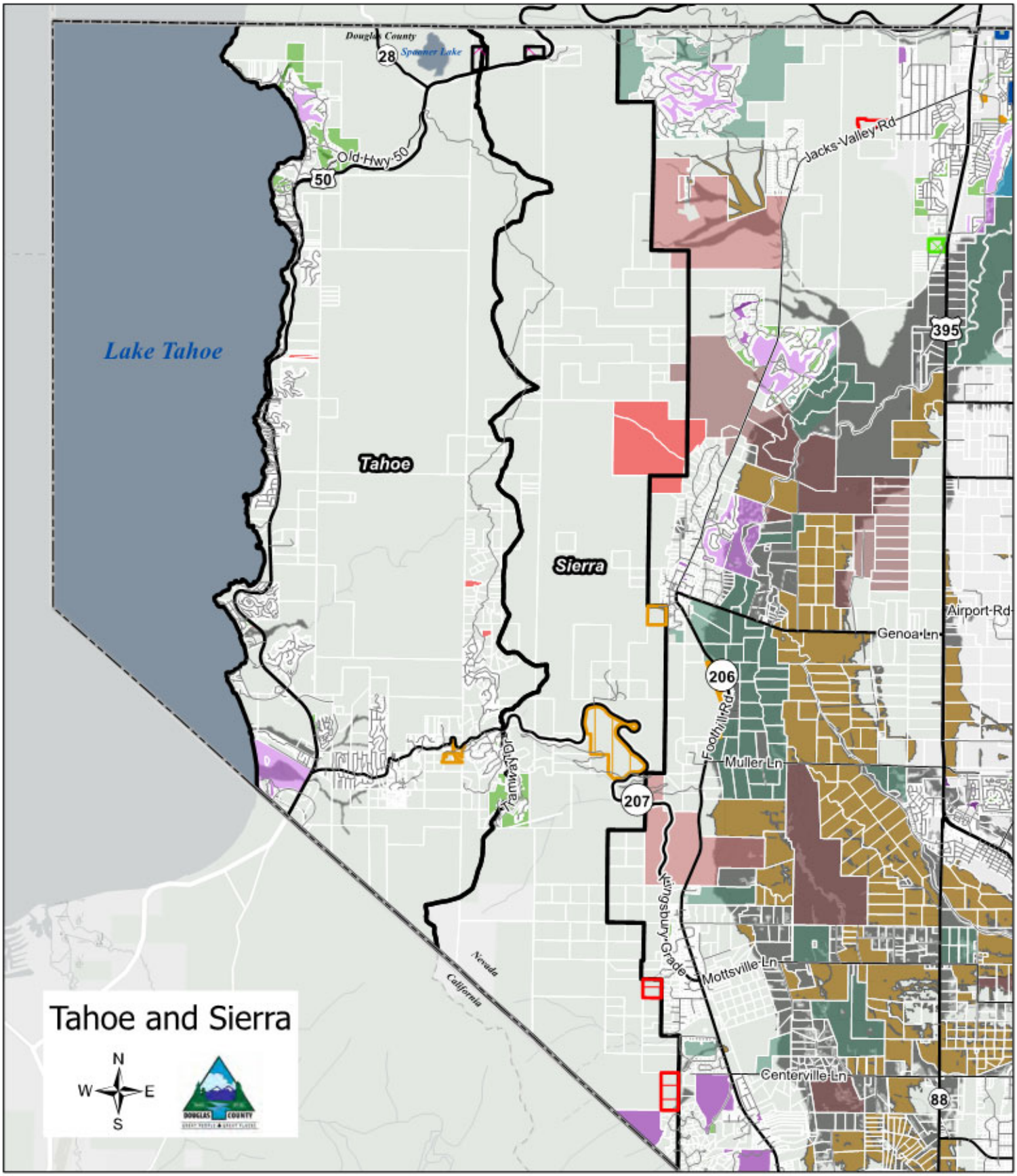
- Dedicated Open Space
- Common Area
- Golf Course Open Space
- Critical Lands Parcels
- Critical Land in the 100 Year Floodplain - Identified in Stormwater Masterplan
- FEMA A Flood Zone
- Region - Carson Valley East


Carson Valley South
N
W
E
S
206
207
395
88
Muller Ln
Foothill Rd
Kingsbury Grade
Mottsville Ln
Centerville Ln
Waterloo Ln
Kimmerling Rd
Tillman Ln
Fairview Ln
Buckeye Rd
N Muller Py
S Muller Py
East Valley Rd
Toler Ln
Pinenut Rd
Carson Valley
Nevada
California
Mud Lake
Lower Diamond Valley Reservoir
Lands Bill Parcels
Directed Special Use Permit Lands
Douglas County Conveyances
Washoe Tribe Conveyances
Open Space Recreation Area
Open Space
Agricultural Conservation Easement
Drainage Conservation Easement
Floodplain Conservation Easement
Private Conservation Easement
Transfer Development Rights Conservation Easement
Dedicated Open Space
Common Area
Golf Course Open Space
Critical Lands Parcels
Critical Land in the 100 Year Floodplain - Identified in Stormwater Masterplan FEMA A Flood Zone
Region - Carson Valley South




Lands Bill Parcels
- Directed Special Use Permit Lands
- Douglas County Conveyances
- Lands for Disposal
- Proposed Burbank Canyons Wilderness
- Washoe Tribe Conveyances
- Open Space Recreation Area

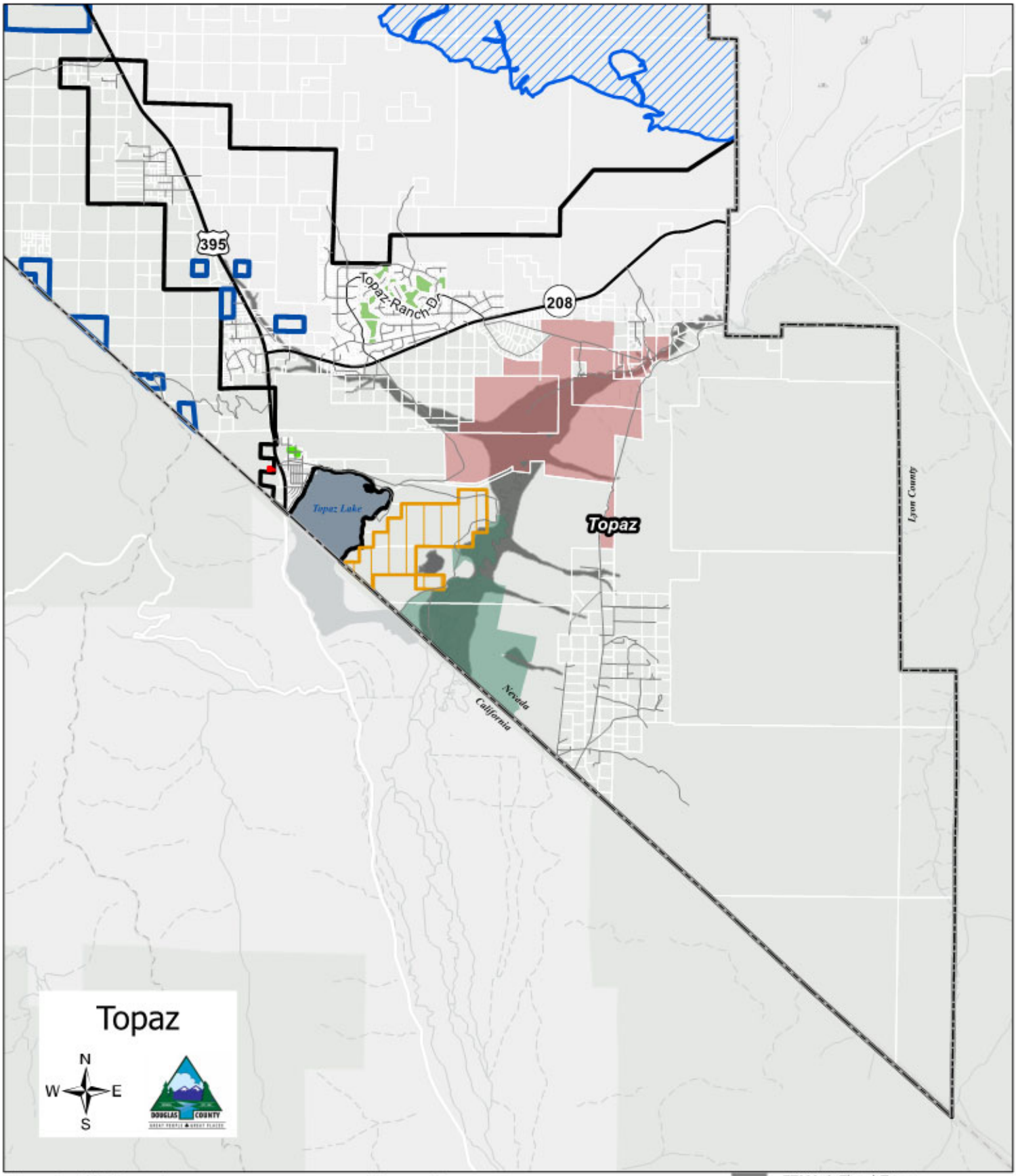
Open Space
- Agricultural Conservation Easement
- Drainage Conservation Easement
- Floodplain Conservation Easement
- Private Conservation Easement
- Transfer Development Rights Conservation Easement
- Dedicated Open Space
- Common Area
- Golf Course Open Space
- Critical Lands Parcels
- Critical Land in the 100 Year Floodplain - Identified in Stormwater Masterplan
- FEMA A Flood Zone
- Region - Pinenut




Lands Bill Parcels
- Directed Special Use Permit Lands
- Douglas County Conveyances
- Lake Tahoe-Nevada State Park
- Lands for Disposal
- Washoe Tribe Conveyances

Open Space
- Agricultural Conservation Easement
- Floodplain Conservation Easement
- Private Conservation Easement
- Transfer Development Rights Conservation Easement
- Dedicated Open Space

- Common Area
- Golf Course Open Space
- SNPLMA
- Critical Land in the 100 Year Floodplain - Identified in Stormwater Masterplan
- FEMA A Flood Zone
- Region - Tahoe & Sierra


Topaz
N
W
E
S
395
208
Topaz Ranch Dr
Topaz Lake
Topaz
Lyon County
Nevada
California
Lands Bill Parcels
Directed Special Use Permit Lands
Douglas County Conveyances
Lands for Disposal
Proposed Burbank Canyons Wilderness
Washoe Tribe Conveyances
Open Space
Agricultural Conservation Easement
Private Conservation Easement
Common Area
FEMA A Flood Zone
Region - Topaz

**AGENDA ITEM NO. 5.b**

**STORMWATER TASK FORCE AGENDA ITEM**
**COVER PAGE**

**MEETING DATE:** November 12, 2026

**TIME REQUIRED:**

**AGENDA:** **AGENDA ITEMS**

**TITLE:**
For Possible Action. Discussion for Task Force members to provide Task Force-related updates and to identify topics on which they would like additional information. Discussion may include, for example, requests to add topics to the parking lot or requests for presentations or materials that are consistent with the Task Force's objectives.

**RECOMMENDED MOTION:**
Request future information or discussion items.

**FINANCIAL IMPACT:**
None.

**BACKGROUND:**
Members of the Task Force may provide updates on topics relevant to the Task Force, and they may request information or discussion topics. This agenda item is an opportunity for any member of the Task Force to request information or future presentation topics.

**ATTACHMENTS:**