

Board of Adjustment Agenda

**November 16, 2016
City Hall, Council Chambers
749 Main Street
6:30 PM**

- I. Call to Order
- II. Roll Call
- III. Approval of Agenda
- IV. Approval of Minutes
 - October 19, 2016
- V. Public Comments on Items Not on the Agenda
- VI. Regular :
 - **826 Coal Creek Circle – Floodplain Development Permit – Request for a Floodplain Development Permit to Construct a 40,000 Square-Foot Building Addition in the Flood Regulatory District **Case #16-033-FL – Public Hearing****
 - Applicant: Davis Partnership Architects
 - Case Manager: Robert Zuccaro, AICP
 - ✓ Open Public Hearing
 - ✓ Opening Statement by Chair
 - ✓ Public Notice and Application Certification
 - ✓ Disclosures
 - ✓ Staff Presentation and Questions of staff
 - ✓ Applicant Presentation and Questions of applicant
 - ✓ Public Comment
 - ✓ Applicant discussion of public comment, if any
 - ✓ Closing statement by staff and applicant and Final questions by board
 - ✓ Close public hearing and Board discussion and action
- VII. Business Items tentatively scheduled for December 21, 2016
- VIII. Staff Comments
- IX. Board Comments
- X. Discussion Items for Next Meeting December 21, 2016
- XI. Adjourn

***Board of Adjustment
Meeting Minutes***
October 19, 2016
City Hall, Council Chambers
749 Main Street
6:30 PM

Call to Order: **Meseck** called the meeting to order at 6:35 PM.

Roll Call was taken and the following members were present:

Board Members Present:

Andrew Meseck, Chair
James Stuart
Gunnar Malmquist
Leslie Ewy

Thomas DeJong
Lowell Campbell

Board Members Absent:

Alison Gorsevski

Staff Members Present:

Scott Robinson, Senior Planner
Susie Bye, Planning Clerk

Approval of Agenda:

Ewy moved and **Dejong** seconded a motion to approve the October 19, 2016 agenda as prepared by staff. Motion passed by voice vote.

Approval of Minutes:

Malmquist made a motion to approve and **Ewy** seconded the motion to approve the September 21, 2016 minutes. Motion passed by voice vote.

Public Comments on Items not on the Agenda: None

Regular Business:

Meseck reviewed the procedures for the meeting; opened the public hearing; and stated there are six criteria which must be met for the board to approve a variance request. **Meseck** then stated copies of the criteria are located on the table next to entryway.

Meseck stated that for the requested variance to be approved, five (5) of the six (6) votes would need to be affirmative.

Meseck asked if anyone at the hearing had any objections to the hearing procedures he had described and asked if there were any other preliminary matters that needed to be taken care of. None were heard.

- **749 Wildrose Way – Variance Request** – An after-the-fact variance from Section 17.16.030 of the Louisville Municipal Code (LMC) for relief from rear accessory setback requirements to permit a previously constructed pergola. **Case #16-027-VA**
 - Applicant & Owner: Greg Godec, 749 Wildrose Way
 - Case Manager: Scott Robinson, Senior Planner

Meseck asked for verification of proper public notice.

Public Notice Certification:

Posted in City Hall, Public Library, Recreation Center, and the Courts and Police Building and mailed to surrounding property owners on July 29, 2016, published in the Boulder Daily Camera on July 31, 2016, and property posted on July 29, 2106. This matter was continued at the August and September BOA meetings to tonight.

Malmquist moved and **DeJong** seconded a motion that all requirements have been satisfied and the application submitted by the applicants has been properly filed. Motion passed by unanimous voice vote.

Meseck asked for disclosures from the board members for any site visits, ex parte communications, and any conflicts of interest or required disclosures on the application.

Campbell did a site visit, had no ex parte communications, and has no conflicts of interest for the application.

Malmquist did a site visit, had no ex parte communications, and has no conflicts of interest for the application.

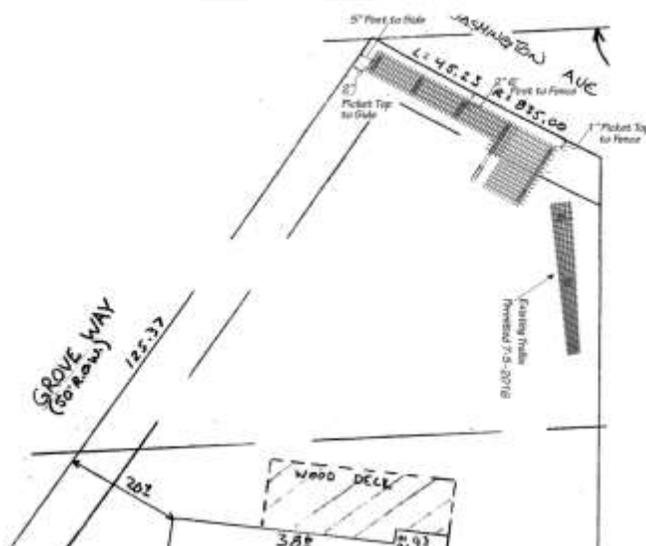
DeJong did no site visit, had no ex parte communications, and has no conflicts of interest for the application.

Meseck did a site visit, had no ex parte communications, and has no conflicts of interest for the application.

Stuart did a site visit, had no ex parte communications, and has no conflicts of interest for the application.

Ewy did a site visit, had no ex parte communications, and has no conflicts of interest for the application.

Meseck asked the applicants if they were ready to proceed with the hearing. The applicants indicated they were ready to proceed.



Staff Report of Facts and Issues:

Robinson presented from Power Point:

- There are additional items in this month's packet that were not included in the September packet. There is an additional letter from the applicant as well as some supporting materials provided by the applicant. There are additional public comments that were not received previous to the prior meetings.
- Property located in the Centennial 4 subdivision and governed by the Centennial 4 PUD
- Residential Estate (RE) zone district
- Rear accessory setback: 10 feet

LOCATION

- Property at the corner of Washington Avenue and Grove Drive and fronts on Wildrose Way
- Pergola is constructed at the back of the lot at the corner of Washington and Grove
- Complies with side setback requirements which are 5 feet
- Does not comply with the 10 feet rear accessory setback requirement
- Posts for pergola sit at 2.5 feet from the rear lot line
- Eaves extend to within 1 foot of the rear lot line
- LMC allows for eaves up extend up to 3 feet into required setback
- To comply, the pergola posts would have to sit 10 feet from rear lot line and eaves could extend 3 feet into that, or within 7 feet of the rear lot line

REQUEST

- 7.5 foot setback to allow the posts to sit at 2.5 feet from the rear lot line

CRITERIA

17.48.110 B.1

That there are unique physical circumstances or conditions such as irregularity, narrowness or shallowness of lot, or exceptional topographical or other physical conditions peculiar to the affected property.

*Staff –Property is subject to Xcel easement, but not a physical condition. **Criterion is not met.***

17.48.110 B.2

That the unusual circumstances or conditions do not exist throughout the neighborhood or district in which the property is located.

*Staff –The easement affects few properties, but staff does not consider it a physical condition. **Criterion is not met.***

17.48.110 B.3

That because of such physical circumstances or conditions, the property cannot reasonably be developed in conformity with the provisions of Title 17 of the Louisville Municipal Code.

*Staff –Pergola could be built in compliance with setbacks. **Criterion is not met.***

17.48.110 B.4

That such unnecessary hardship has not been created by the applicant.

*Staff –The property was platted and the house built in 1989 subject to the easement. **Criterion is met.***

17.48.110 B.5

That the variance, if granted, will not alter the essential character of the neighborhood or district in which the property is located, nor substantially or permanently impair the appropriate use or development of adjacent property.

*Staff –Pergola is not near other properties and is unlikely to have adverse impact on the sidewalk. **Criterion is met.***

17.48.110 B.6

That the variance, if granted, is the minimum variance that will afford relief and is the least modification possible of the provisions of Title 17 of the Louisville Municipal Code that is in question. *Staff –Pergola could be built to comply with setbacks. **Criterion is not met.***

Staff Recommendations:

Staff finds criteria 1, 2, 3, and 6 in Section 17.48.110 of the LMC have not been met and therefore recommends denial of the variance request.

Commission Questions of Staff:

Malmquist says if the Board agrees with the Staff's determination that no unusual condition exists, then this criterion would not be met.

Robinson says because Staff finds that the first criterion is not met, then Staff finds that the second criterion is not met. Staff has not identified a unique physical circumstance.

Campbell asks what is an "after-the-fact" variance?

Robinson says in this situation as seen from the photos, the pergola has been built and constructed without a permit. The applicant received a stop-work order from the City's Building Safety division and the applicant came in to apply for a permit. The City determined that the pergola did not comply with the setback requirements. The applicant then applied for a variance to allow for permitting of the already constructed pergola structure after-the-fact.

Malmquist says after doing the site visit a while ago, I am trying to remember what the structure on the left is. It looks separate from the pergola.

Robinson says it is another pergola that does comply with the setback requirements. It is permitted.

Malmquist clarifies that the pergola is currently 2.5' from the fence and it needs to be 10'. The BOA is looking at a 7' variance.

Applicant Presentation:

Greg Godec, 749 Wildrose Way, Louisville, CO

I am able to provide the requested information that the BOA asked for at the last meeting, showing Xcel Energy's current policy in regard to vegetation directly under the power lines. In the space directly under, they are limiting property owners to low growing shrubs. The power lines there when I moved into the house were a different size. Xcel has upgraded the power lines since I moved in, and since the property was built.

Regarding criterion 1, the physical circumstances are defined as anything relating to the boundaries or physical attributes of the property. In my research regarding the space above the property, not only do I own the property but I own or have a right to do things in the space above the property. The limitation that exists is created by the easement and one that prevents me from using the full property. That is my argument. I believe that Staff has taken a very narrow view of the policy and that in this circumstance, clearly we have a physical limitation on what can be done at the back of this property.

If that is the case, I think that criterion 1 and criterion 2 should be clearly yes, and I do meet both of them. I think the BOA should see the wisdom in that and vote to say yes.

The second part is regarding the setback itself of 10'. If you look at the property, the back of my property line is already 10' plus from the sidewalk and the curb. In essence, you are asking me to build a structure to protect my yard from the street almost 20' away from the street. This is another situation unique to this property. There are other circumstances that are like this, but I have a situation where I believe the limitation of 10' back from that property line is not reasonable. To put the pergola into the middle of my yard is not a reasonable request and does not solve the problem that has been created by the situation. I wrote this up in another letter to Staff and I hope everyone has had a chance to read it.

I hope that criteria 1 and 2 are clear. The location of the pergola as built will clearly be a benefit to the neighborhood once it has vines and plants on it. It will enhance the look of the

neighborhood. This is a well planted corner. There are a lot of trees and greenery and it is well manicured. Having this corner be bare in the back of my property or having it built 20' from the corner detracts significantly from what is a premium neighborhood in Louisville.

Commission Questions of Applicant:

Ewy says one of the letters mentions that your neighborhood is allowed to have a 6' fence, but you have a 4' fence. Did you consider any kind of hedgerow or screening?

Godec says I did consider it. My concern is that Xcel might come back in and cut it down. I could plant a 6' or 8' hedge. I am not prevented at all from planting back at the property line. I am prevented from putting a structure that I can grow grapes or vines on. I thought this was a more esthetically pleasing structure and one that would not require maintenance in the future. It will limit how high things can grow and where they can grow. A hedge would take a substantial amount of time to grow up and fill the space. This is also being expeditious and trying to build a structure that could resume some of the quality of the neighborhood corner. There are dozens of similar structures and plants and trellises not only in this neighborhood but throughout Louisville. It is a very common and this is why I didn't permit it.

Ewy says if you had come in for a permit and found out that the setback would be required, would you have built this structure in compliance. **Godec** says no.

Ewy says would you have sought a variance?

Godec says I'm not sure what I would have done. The structure has no value to me 10' into my yard. That is half my yard. I have a deck and a waterfall and big trees and it is a nice space. I have a structure that is a barrier between my entire property and the back 10' of it. This was originally meant to be a trellis, which is a freestanding flat structure that plants grow on. I added the square of the pergola, which is more of a gazebo-type structure in the design, to break up the long flat structure. In my mind, the minimum request would have been a variance for a trellis and not a gazebo look.

Malmquist says I was not here for the first presentation. The intent of this pergola is to have visual noise separation, not a place to sit. Is your intent to have the space above the fence to the top of the pergola to be covered in growth?

Godec says this is just to grow vines on. There is one section that is deep and wide that comes into the yard. I was going to put a little patio table and chair, but not for function.

DeJong says in your application or letter, you stated that the electric utility wire was upgraded to 230 kilovolts.

Godec says 230 to 250 kilovolts. They swapped out wooden poles and double wire for the giant aluminum poles. The wires are now closer to the ground than they were before.

DeJong asks what is the height from the wires to the ground; 20'?

Godec says probably 20' to 30'.

DeJong says what was the notice you given from Xcel prior to them having their contractor remove the trees.

Godec says we got a hang tag similar to the one shown in the packet. The tag said Wright Tree Service will be in to cut the trees down to the ground.

DeJong says did you contact Xcel after you received the notice.

Godec says I did contact Xcel and had an arborist come out. The trees were apple trees which had maxed out in height. They were not going to get significantly higher. The arborist came out, did a site survey and said, "these trees have to go". Right under the power lines, there is a limit. You can have a tree 10-15' away from the power lines, so I was able to keep a little bit of a locust tree in the back corner. I understood it is an easement and understood I was limited. I was trying to work within the scope of that when I built this pergola.

DeJong says the arborist was an Xcel employee. Did they give you any written documentation that this tree was within the limits.

Godec says I did talk to them on the phone but I did not get anything written.

DeJong says can you estimate the distance between the existing trees and the new wires. Was it 10' or 5'? There is a specific clearance distance derivation by the Gallet equation. There are specific rules that Xcel is supposed to follow.

Godec says Xcel cleared a whole path around the state, not just in Louisville. They had warned me two years ago that a couple of the trees needed to be cut off at the base. It didn't surprise me and I was not interested in litigation. I didn't threaten Xcel that I would sue them. My intention here was to do what I could do with what I thought were my rights under the law, without undue burden on myself or Xcel.

DeJong says did you speak to Xcel about any other vegetation that could be appropriate replacement.

Godec says I asked them about the trellis or grapevines. They said that was fine. But I know full well that if something happens, and they have to service the lines, they can come through and dig up the entire corridor in Louisville. They don't have to ask our permission. This seemed to me to be the most expeditious and the situation that would change the least. The pergola is a fixed height. Grapevines don't grow higher. I could have considered planting additional trees but I wasn't interested in putting myself or any future owner of the property at risk for having this happen again.

DeJong says under Xcel Energy's vegetation management transmission right-of-way, tree clearing, and maintenance, they specifically state that we may allow compatible low-growing species to remain in the right-of-way. We do attempt to work with landowners to determine if trees or other vegetation deems compatible with the safe operation of the line may remain.

Godec says Xcel did and they made it clear that the apple trees and the ash I had in the back absolutely could not stay. I didn't ask about alternative smaller trees under the assumption this was the simplest and quickest way to go and solve the problem. I would not run into this issue in the future if I have vines or low growing plants on a structure.

DeJong says from my understanding of looking at the North American Energy Specifications with regard to 230 kilovolts, over 5000 to 6000 feet in elevation, there necessitates a clearance of approximately 4' for vegetation; 4' from the lines.

Godec says in looking all the way down the neighborhood, they cut every tree underneath the power lines to the ground.

Meseck says I know Xcel cut down most plants underneath the transmission lines down to the ground that were not on private property. The lines by Fireside Elementary and out to Dillon and Cherry have been cleared out. The lines cross a number of properties to the north of your property where they cut trees in half.

Godec says I talked to the arborist and he made it clear that this was what they were going to do. As I went around the neighborhood and talked to people, it did turn out that two or three of the houses not far from me threatened to sue Xcel. They got lawyers and wrote something up. In my opinion, they got a stay of execution. I didn't think that was the way to go and thought this property should be in compliance.

Malmquist asks **Godec** to point out the power lines on the drawing. The power lines are now closer to the ground, is that correct?

Robinson says the power lines run through the easement lines on the drawing.

Godec says the lines are now closer so Xcel got more aggressive in clearing underneath the lines. The Xcel communication says they have been more aggressive in the right-of-ways since some of the fires in the mountain areas. They were not amendable to a reasonable conversation about being able to keep my trees.

Malmquist asks if the power lines are between your house and the pergola.

Godec says the power lines are on top of the pergola. In summary, it appears that criteria 1 and 2 need to be met. There needs to be a unique physical circumstance. My contention is that the unique physical circumstance is my lack of ability to have a tree there.

Meseck says based on the drawings, did you have a contractor or architect design the structure.

Godec says my roommate and I built it. We did the drawings after the fact.

Campbell asks if **Godec** is the original owner. When did you become the owner?

Godec says I am the second owner of the property. I bought it in 2000. The trees were already planted. Xcel had been through three times, once before I owned the property and twice before this to top the trees. It was my assumption that this was a normal process.

Campbell says I am often surprised by people planting trees under power lines.

Public Comment in Favor:

Steve Castillo, 902 Grove Drive, Louisville, CO

I live across the street from the side of Greg's house. We are the original owners of our house and have lived in it for 26 years. Regarding the height question about the wires, I have no idea how tall they are but my guess would be more like 75' off the ground. In the time we have been in the house, they have replaced those poles. It seemed to me that the poles got much higher. Whatever the distance is, it is significant from the top of the pergola. I think it is important to note that Greg is a victim of location in two ways. The City approved a PUD that included this right-of-way and, at least in our neighborhood, his is the only house where the wires directly go over the house. There is a house behind our backyard where it splits between a couple of yards. Xcel came in and leveled trees that were there as well. Further to the north, they cut trees down to the ground that were probably 20' tall that were along the sidewalk. It was a rather startling denuding of the sidewalk to see them go. I would note there is a small irony in the presentation package. The aerial photo taken at any earlier date shows the trees. One of the reasons the trees were there was to provide shade as well as noise abatement. The trees aren't subject to the same kind of setbacks. Throughout our neighborhood, people have planted trees near their fence but the branches go beyond the fence. I am speaking in favor of Greg's motion. I believe that items 1 and 2 are met which then sets up a cascade for the rest of them. Greg made reference to the house that is nearby. Two doors up, there are two structures within 12" of the fence line. Why are they not being called before you? Probably because they are old, they are weathered to be the same color as the fence which makes them invisible, and the vegetation planted has grown up them. They are barely noticeable. My guess is that in time, it will happen to Greg's as well. Halfway down Tyler between Washington and Via Appia, there is a backyard where someone put in 20-30' tall poles within a few feet of the fence so that they can string a tarp from their back deck to these poles and create a shaded area. As far as I know, they are not before you. There is a little inconsistency in how we are dealing with this. I think we do need to have a little respect for how Greg's property has been the victim, not only to a changing rule from Xcel, but a rule that was designed for fire prevention in the high country. We are not in the high country. I think what happened here is Xcel got tired of sending a crew in every couple of years to top the trees. It was more cost efficient in the long run to simply mow them down. I think Greg should not be suffering for that.

Campbell asks about noise abatement. Can you explain to me how the trees would solve that problem?

Castillo says trees just do that. A thick branch with lots of leaves will muffle the sound of traffic. Greg backs up to an intersection. There are three or four school buses every morning, nine months of the year. It is a corridor for people going between McCaslin and South Boulder Road. If there is thick vegetation, it blocks sound. We lost a cherry tree on our property one year ago. For 25 years, it provided a fair amount of noise abatement because of the thickness of the vegetation.

Public Comment in Opposition: None.

Summary and request by Staff and Applicant:

Staff recommends for denial.

Ewy asks about the dash line we see just inboard of the pergola. Is that the actual setback line for scale, in terms of what we're looking at? There is a 20' dimension along the side yard for a house location.

Malmquist says I have the same question. I assume the dash line just in front of the pergola is the 10' setback. It is not on the other side.

Godec says this drawing was placed over the top of a plat I had when I bought the house. That line is left over from that. I have no idea why it is on the drawing.

Ewy asks if you found any underground utilities. **Godec** says no.

Godec says in regard to positioning of the pergola and in terms of the traffic, this is a bus stop corner. There are three buses every morning at 7 am. The kids congregate out on the corner. They are also there after school. There is traffic on Washington. On Grove on the other side of this road is a STOP sign that is higher than my house. When people are stopped at night across the intersection from my house, their headlights are coming in my windows now that my trees are gone. I have people park there, then turn, and then come back. The same is true coming down Washington because it curves so headlights hit my back fence and are above it. Now they shine on the back of my house. I am trying to protect everything from traffic and other situations that are really unique to that corner because of the way it is situated.

Ewy says I have answered my own question. That actually is an 8' utility easement which complicates things a little further. Is the City in ownership of these easements on this plat? We would have to vacate the easement to allow a permanent structure to exist in the easement.

Robinson says if it is a City-owned easement, we can grant a waiver without vacating the easement.

Closed Public Hearing and discussion by Commission:

Meseck says should we discuss each criterion or discuss them as a whole.

Ewy says if only one criterion does not comply, the decision is made.

Meseck reads criterion 1 which is "That there are unique physical circumstances or conditions such as irregularity, narrowness or shallowness of lot, or exceptional topographical or other physical conditions peculiar to the affected property". I think the claim is that the easement in and of itself is what is causing criterion 1 to not be met.

Stuart says I think criterion 1 and 2 are a pair and they are unique and do not exist throughout the neighborhood. The idea that you can't build up and that there is a constraint on the use of your property is unique. It is a physical constraint as if you had a hill or valley. While it is not exactly the definition we are used to, but having that easement is a limitation that he did not cause and it constrains what he can do his property.

Ewy says I feel when these properties were platted, the neighbors affected by the power lines and easement had their lots made physically deeper. If you look at the whole plat, the lots are shallower with minimal backyards. I feel this pergola could have been inset to meet the setback and other vegetative means could have happened to provide the noise abatement. While it is a unique lot and the easement is there, when the lot was created, they made it deeper.

Malmquist says I will pair 1 and 2 together. I think the lot has some unique features to it; it is not a square lot due to the nature of the corner; and the corner is diagonal for car sight lines. Where some corners are more traditional, this one is cut off.

Campbell says I agree with Staff on criterion 1.

Meseck read criterion 2 which is "That the unusual circumstances or conditions do not exist throughout the neighborhood or district in which the property is located". What troubles me most on this is we have discussed a variance for a corner lot in the past. The applicant wanted to build an addition into the setback. We denied it primarily because of the precedent it would set and our inability to set code. This worries me about this application. Is this so unique that other homes might come back and request to build a 7-10' privacy fence because of past approvals?

DeJong says you are correct. I believe it was in Dutch Creek, it was a corner lot, but within that neighborhood, there were multiple corner lots with similar structures, so there was no "uniqueness" within the neighborhood.

Stuart says because of the location of this lot and where the pergola is, because the trees were taken down and the street is busy with bus stops, having some barrier to noise and light would be useful. It is exposed in a different way than other proposals.

Campbell says the bus stop issue is over blown. It is not a City bus stop but a school bus stop. The kids get there 10-15 minutes before the bus and then it is gone.

Stuart says the applicant's comments about the headlights are compelling. This is uniquely situated so that the location of the pergola defends from this.

Meseck says this issue may be better addressed with criterion 3 and 6 because of other alternatives that could eliminate it. Criterion 3 is "That because of such physical circumstances or conditions, the property cannot reasonably be developed in conformity with the provisions of Title 17 of the Louisville Municipal Code". This applies directly to the setback itself and whether the proposed design is the only primary response.

Malmquist says I agree with Stuart on 1 and 2, but 3 is where I have a hard time. Trees would have met the requirements and are not subject to the 10' setback. Landscaping is not subject to the setback. The old apples trees were 2' from the fence.

Meseck says if Xcel had an issue with the pergola itself, they could remove it. That height is already at risk if they choose to do so.

Ewy says the Xcel requirements do mention shrubs are allowed, such as an 8' shrub.

Godec says the arborist said that the apple trees, because they continued to grow, had to be cut down. I am of the opinion that it was cheaper to cut them to the ground instead of coming back every three years to trim them. If I had any belief that I could have planted trees in this space, I would have planted them. I believe if I plant 6' high trees in this space, they could come next spring and cut them down to the ground.

Stuart says there is a right place for the pergola and it is not in the middle of his yard. It is against the fence. As a result, that is the minimum variance. Otherwise, he would lose that part of his yard.

Malmquist says I agree if the answer is that no greenery can meet the intent of criterion 3. I agree with **Stuart** that the pergola would be silly in the middle of the yard, and that up against the fence is not that offensive because of the way the yard is cut for sight lines of that corner. It has a natural setback already from the street.

Meseck says the perspective is from the house and the deck. Moving it in 10', your perspective would be somewhat similar. I am struggling with the design and why 10' is restrictive. The yard is quite deep and 10' with some allowable overhang towards the fence.

Ewy says if the pergola was placed per setback, how would that adversely impact the yard?

DeJong says that Staff's analysis is thorough and complete and well-reasoned. I believe that their conclusions are correct for all of the criteria.

Ewy says I also agree with Staff's recommendations.

Meseck says I could have been persuaded on 1 and 2, but 3 and 6 in this situation show that there could be viable alternatives. I agree with Staff.

Stuart says I think 1, 2, 3, and 6 are all met. **Malmquist** says I think 1, 2, 3, and 6 are met.

Motion made by **DeJong** to approve **Case #16-027-VA, 749 Wildrose Way – Variance Request** – An after-the-fact variance from Section 17.16.030 of the Louisville Municipal Code (LMC) for relief from rear accessory setback requirements to permit a previously constructed pergola, seconded by **Ewy**. Roll call vote.

Name	Vote
Andrew Meseck	No
James Stuart	Yes
Leslie Ewy	No
Gunnar Malmquist	Yes
Thomas DeJong	No
Lowell Campbell	No
Alison Gorsevski	n/a
Motion passed/failed:	Fail

Motion denied 4-2.

Motion made by **DeJong** to deny **Case #16-027-VA, 749 Wildrose Way – Variance Request –** An after-the-fact variance from Section 17.16.030 of the Louisville Municipal Code (LMC) for relief from rear accessory setback requirements to permit a previously constructed pergola, seconded by **Campbell**. Roll call vote.

Name	Vote
Andrew Meseck	Yes
James Stuart	No
Leslie Ewy	Yes
Gunnar Malmquist	No
Thomas DeJong	Yes
Lowell Campbell	Yes
Alison Gorsevski	n/a
Motion passed/failed:	Fail

Motion approved 4-2.

Meeting breaks at 7:45 pm, reconvenes at 7:50 pm.

- **2214 W Hecla Drive – Variance Request –** A request for a variance from the Takoda General Development Plan for relief from side setback requirements to allow a new pergola. **Case #16-038-VA**
 - Applicant & Owner: Keith & Mary Beth Rensberger, 2214 W Hecla Drive
 - Case Manager: Scott Robinson, Senior Planner

Public Notice Certification:

Posted in City Hall, Public Library, Recreation Center, and the Courts and Police Building and mailed to surrounding property owners on September 30, 2016, published in the Boulder Daily Camera on October 2, 2016, and the property was posted on September 30, 2016.

DeJong moved and **Ewy** seconded a motion that all requirements have been satisfied and the application submitted by the applicants has been properly filed. Motion passed by unanimous voice vote.

Meseck asked for disclosures from the board members for any site visits, ex parte communications, and any conflicts of interest or required disclosures on the application.

Campbell did a site visit, had no ex parte communications, and has no conflicts of interest for the application.

Malmquist did no site visit but is familiar with the property and neighborhood, had no ex parte communications, and has no conflicts of interest for the application.

DeJong did no site visit but is familiar with the neighborhood, had no ex parte communications, and has no conflicts of interest for the application.

Meseck did no site visit, had no ex parte communications, and has no conflicts of interest for the application.

Stuart did a site visit, had no ex parte communications, and has no conflicts of interest for the application.

Ewy did no site visit but am familiar with the neighborhood and this property, had no ex parte communications, and has no conflicts of interest for the application.

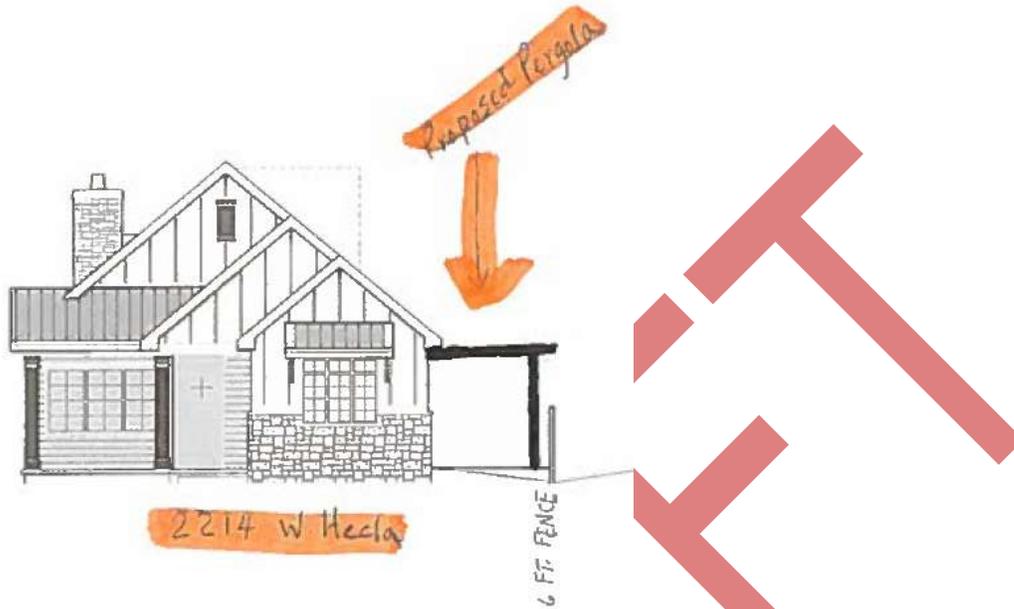
Meseck asked the applicants if they were ready to proceed with the hearing. The applicants indicated they were ready to proceed.

Staff Report of Facts and Issues:

Robinson presented from Power Point:

LOCATION

- Takoda (Steel Ranch) General Development Plan
- Required side setback: 5 feet
- Request is to construct a pergola on the south side of the property which abuts the Lanterns development which is currently under construction of duplex units



REQUEST

- The house is currently set 10' from the south property line
- The request is for the posts to go to within 1' of the lot line and the eaves would extend to the lot line
- The eaves are allowed to extend up to 3' into a required setback, but the posts have to comply with a setback requirement
- The posts would need to be at the 5' line to be in compliance, with the eaves extending 3' beyond that, or within 2' of the south lot line

CRITERIA

17.48.110 B.1

That there are unique physical circumstances or conditions such as irregularity, narrowness or shallowness of lot, or exceptional topographical or other physical conditions peculiar to the affected property.

Staff – Side yard abuts the rear of the adjacent property, which is not standard but not uncommon. *Criterion is not met.*

17.48.110 B.2

That the unusual circumstances or conditions do not exist throughout the neighborhood or district in which the property is located.

Staff – This is the only property for which the side abuts the rear of the Lanterns, but staff finds no unusual circumstance. *Criterion is not met.*

17.48.110 B.3

That because of such physical circumstances or conditions, the property cannot reasonably be developed in conformity with the provisions of Title 17 of the Louisville Municipal Code.

Staff – Pergola could be built in compliance with setbacks. *Criterion is not met.*

17.48.110 B.4

That such unnecessary hardship has not been created by the applicant.

*Staff – The property was platted in 2010 and the house built in 2012. The Lanterns was approved in 2014 and is currently under construction. **Criterion is met.***

17.48.110 B.5

That the variance, if granted, will not alter the essential character of the neighborhood or district in which the property is located, nor substantially or permanently impair the appropriate use or development of adjacent property.

*Staff – Pergola would be immediately abutting adjacent property. **Criterion is not met.***

17.48.110 B.6

That the variance, if granted, is the minimum variance that will afford relief and is the least modification possible of the provisions of Title 17 of the Louisville Municipal Code that is in question.

*Staff – Pergola could be built to comply with setbacks. **Criterion is not met.***

Staff Recommendations:

Staff finds Criteria 1, 2, 3, 5, and 6 in Section 17.48.110 of the LMC have not been met and therefore recommends denial of the variance request.

Commission Questions of Staff:

Ewy says this applicant could overhang the setback by 3' and be cantilevered out. Can they get the top of their pergola within 2' of the lot given it's a 5' setback?

Robinson says the posts for the setback have to be at the 5' line.

Meseck asks what would be the width of the pergola in this situation. Would it be 7'?

Robinson says the house sits about 9.5' from the south lot line. The posts would sit about 4.5' from the house and the eaves could extend another 3'. It would be about a 7.5' of pergola and 2.5' of uncovered space.

DeJong says in regard to the existing patio, does it stop 3' from the lot line also?

Robinson says flatwork or anything less than 30" above grade does not have to comply with setback requirements. The patio is allowed to go to the lot line and have no impact on zoning requirements.

Applicant Presentation:

Keith Rensberger, 2214 W Hecla Drive, Louisville, CO

Mary Beth Rensberger, 2214 W Hecla Drive, Louisville, CO

Thank you for considering our variance application and for a chance to comment at this meeting. I appreciate the time your Staff has given in working with us, and in their efforts in looking at our application. The Staff review has provided a detailed and literal interpretation of the setback requirement which is their charter and which puts that view into the record. I could argue a similarly detailed interpretation of the same points, reaching a different conclusion. For example, in criterion 1, it is mentioned in the review that the setback requirements are the same for all of the lots in this portion of Steel Ranch. While that is accurate in the strict sense, that indirectly acknowledges that all of the other lots in this portion of Steel Ranch are alike in their separation from the Lanterns, all of the other lots, except ours. That fact puts our lot in unique physical circumstances and therefore, this meets criterion 1 and by extension, criterion 2. Similarly, I could argue in criterion 3 that the 6' fence does not provide a buffer from the only outdoor living area in the Lanterns property, mainly their rear patio deck which is completely exposed to our deck due to its relative vertical elevation. But there is another dimension to this case, and that is livability, an attribute for which Louisville has been nationally recognized as a desirable place to live and raise a family. That consideration is being ignored by strict interpretation of lot shapes. We moved into this patio home four years ago. At that time, the property adjacent to us was vacant. We now find ourselves in a unique situation since the Lanterns development has created a significant and unforeseen loss of privacy for us, both for our family and for our future neighbors in the Lanterns. Ours is the only patio home in the Steel Ranch area which directly borders the new homes. The Lanterns duplexes are oriented in such

a way that the adjacent home is one-half story higher than ours due to lot elevation change and is quite imposing from our perspective. It literally looms over us. There is a direct line of site from their deck into our entire outside area, all along the south side of our house and into our interior living and dining area. The loss of privacy goes both ways as we too will be looking up our neighbors' figurative skirts when they try to enjoy their deck view. Other patio homes in Steel Ranch have a similar 10' side yard; however, their outdoor spaces adjoin the garages of their neighbors. They are designed in a way that protects each resident's privacy. This consideration goes to criterion 5. We are asking for relief from the 5' setback rule so that we can build a simple wooden pergola which will help to mitigate the line of sight issue for both parties. While we understand the need for some standards and rules to be set when a new development is in the planning stages, we do believe that our situation warrants another look.

Commission Questions of Applicant:

Ewy says I want to make sure I understand entirely that it is loss of privacy because you have a sight line from another living space into your living space. **Rensberger** says yes.

Ewy asks did you explore fully covered decks that would give you more covered space. Are you married to the pergola? Are you working with an architect? Did they look at ways to create a structure that would comply with setbacks but still give you that privacy you are seeking?

Mary Beth Rensburger says that would give us a 4' extension to our home which isn't reasonable.

Ewy says you can extend within 2' of your property line.

Mary Beth says we did not explore that. I was surprised when I came to apply for a building permit and was told we needed to have our support posts right down the middle of our patio, which is 9.5' deep. Our contractor suggested for a 30' run, we would have three to four posts at the very least. You can't get a table in there and you'd bump into it if you pulled your grill away from the wall. The final post would be centered in the middle of stairs that lead to the other part of our side yard which is a lower level. It's not so much the coverage out from the house as it is the support posts which would make it infeasible.

Ewy asks if the contractor discussed any other structural options or shortening the covered span.

Mary Beth says we talked to him before we applied for the permit. He has not been involved with us except to say, you must get an answer.

Rensberger says that cantilevering would work on the ends, but what about the middle. Can we reasonably do this?

Meseck says the 6' fence cannot be raised without another variance, is that correct?

Rensberger says yes.

DeJong says if you were to adhere to the 5' setback, have you looked at metal options. Has there been any discussion with the Lanterns HOA with regard to the planting of strategic trees?

Mary Beth says we have talked to the Lanterns HOA and they are not doing landscaping yet, so there has been no firm commitment that it will look any different than it does now with the existing properties that have been landscaped. The trees currently are 30' apart.

DeJong says the cost of a couple of trees versus the cost of a pergola, whether the offer of a couple of trees in that location once they filled out, might provide you with adequate screening.

Meseck says regarding the patio itself, is it already built?

Rensberger says it is 9.5' out from the house and 30' long. It was built before the fence and before the Lanterns was rezoned. We did not know if there would be a fence or whether we would install a fence. We did not want to take any chances and have to adjust the patio.

Mary Beth says we are the only property that abuts there. There is an alley way that separates another line of houses and a tree landscaped area that gives them about a 55' buffer. To us, this seems unique.

DeJong says with regard to the actual pergola construction, the only materials you looked at were wood.

Mary Beth says wood is in keeping with the rest of the neighborhood. The Lanterns and the Steel Ranch patio homes are rough cedar.

Rensberger says we would duplicate the same look and method of fixed construction.

DeJong says I am trying to consider a combination of materials where you get the strength, durability, and the look but not the weight and structural size requirements of wood.

Mary Beth says we presented our design to the HOA and it was in keeping within that jurisdiction.

Malmquist asks if the HOA is okay with your plan.

Mary Beth says the HOA approved it before we came here.

Meseck asks what is typically done between homes on the Steel Ranch side. Are there areas where pergolas backing to homes?

Rensberger says each one has a patio, typically on the rear of the home. Most of the patios have pergolas. They are situated in such a way that adjacent to the patio is the neighbor's garage.

DeJong says if we go four structures north and due east across the street, we have a pocket park. What is there? Do they have a patio on the side and a 6' fence?

Mary Beth says there is a walking path. They have a patio on the side and an alternating 4' to 6' fence, and a pergola.

Public Comment: None.

Summary and request by Staff and Applicant:

Robinson recommends denial.

Meseck asks why did Staff not think criterion 1 and 2 were unique properties.

Robinson says in regard to criterion 1, there is a physical unique circumstance of the lot. In Staff's opinion, that is looking specifically at the lot itself. The lot is a standard rectangular lot similar to the other lots in this portion of Steel Ranch. In Staff's opinion, there is nothing specific about the lot itself that is unique. There is an adjacent lot and its relationship to that lot is unique, but that is not, in Staff's opinion, not a physical circumstance of the lot in question.

Closed Public Hearing and discussion by Commission:

Stuart says I generally think that the way the lot is situated is one of those physical things. It doesn't say situation in there, but I have always felt that what is around it and the way it's pointed is important. I tend to be a little broader in my interpretation.

Rensberger says the first half of that criterion says, "Narrowness or shallowness of lot or exceptional, topographical, or other physical conditions peculiar to the affected property". That is what we think.

Malmquist says I agree with Stuart. When you look at the photo, it is the only property at the end of the line that is in that unique situation.

Ewy says we had a similar situation in this neighborhood where it was the last home on the row and while there was a street separating them from the other lot, the lot was zoned commercial. They had the same situation of a patio and the only living space they had. They did not have that blank wall to give them some sense of privacy. Boulder Creek Builders builds with higher windows and does a lot to create a sense of privacy in a space. They don't have a situation where you have another home hulking over them. While there is a 20' buffer, it would nice to have that heavily vegetated, but it is not on their property. I argue that criterion 1 is met. There is a narrow width to the lot, while they have a little more of a setback because they have a consistent 10' of separation, it is the orientation of that Lanterns development. If the Lanterns had built along the same orientation, it wouldn't be as detrimental to their living space.

Meseck says in this situation, the property itself given what it aligns to and even though it was unknown at the time, there are no other lots oriented in such a way. I can let 1 and 2 slide.

DeJong says I agree with Staff with the strict interpretation of the physical lot. It is when we get to the other physical conditions peculiar is the location of the lot. It is the only one.

Malmquist agrees. **Ewy** agrees.

Meseck states criterion 3 which is “That because of such physical circumstances or conditions, the property cannot reasonably be developed in conformity with the provisions of Title 17 of the Louisville Municipal Code”.

Malmquist says I am okay with 3 because I think if the pergola is built in compliance, the patio is no longer usable.

Stuart says 3 and 6 go together. Is this the minimum you can do and is it reasonable to do it?

Ewy says in the other case we heard, the screening was in a horizontal direction. I think we granted a variance up to an 8’ fence, just one little pop-up where their dining area was. This case is a view corridor from a duplex. No reasonably high fence will fix this problem.

Meseck says if there was continued control of the property across the property line and a path to getting a clear agreement to plant something, I would go that way. But since there is no control by Steel Ranch over the Lanterns, in looking at options, what else can be done? At any given time, the Lanterns could say, “No, we are not going to do that” or they could take their trees down at any given time. Could it be done on the Steel Ranch side?

Malmquist says I think their best option is the proposal they have, and it is approved by the HOA, which are traditionally very strict. It is in keeping with the same design structure of the neighborhood and the same material.

Meseck says I can see all of those arguments. Does approving this open any other doors? I think this one is different or peculiar enough.

Malmquist says I am okay with criterion 6 because given the narrowness of that patio, the relief you are looking for is the line of sight the duplex has which is 6-8’ above you and directly down into your patio home.

DeJong says is the view directly down or is there some skew.

Mary Beth says their sliding door aligns with our sliding door almost exactly. The duplex on the other side has the same effect on our back patio, but this patio is the one we use the most.

DeJong says the pergola as proposed doesn’t give you exceptional privacy.

Mary Beth says I think it will break it up. The HOA has given blanket permission to do pull down sun shades on your property, so that is another possibility while we are out there.

Meseck says if the pergola is extended out to the fence line, you could pull down a shade without it coming down onto a table.

Campbell says I agree with Staff’s report.

Motion made by **Malmquist** to approve **Case #16-038-VA , 2214 W Hecla Drive – Variance Request** – A request for a variance from the Takoda General Development Plan for relief from side setback requirements to allow a new pergola, seconded by **Ewy**. Roll call vote.

Name	Vote
Andrew Meseck	Yes
James Stuart	Yes
Leslie Ewy	Yes
Gunnar Malmquist	Yes
Thomas DeJong	Yes
Lowell Campbell	No
Alison Gorsevski	n/a
Motion passed/failed:	Pass

Motion passes 5-1.

- **826 Coal Creek Circle – Floodplain Development Permit Request** – A request for a floodplain development permit to allow a 40,000 SF addition to the existing building.

Case #16-033-FL – Continue to November 16, 2016 meeting

- Applicant: Davis Partnership Architects, Kevin Gzym
- Owner: TFG Coal Creek Property, LLC
- Case Manager: Scott Robinson, Senior Planner

Motion made by **DeJong** to continue **Case #16-033-FL, 826 Coal Creek Circle – Floodplain Development Permit Request** – A request for a floodplain development permit to allow a 40,000 SF addition to the existing building to the November 16, 2016 meeting, seconded by **Malmquist**. Roll call vote. Motion passes by voice vote.

Business Items tentatively scheduled for November 16, 2016:

Robinson says the 826 Coal Creek Circle floodplain development permit request is the only item at the next meeting. There are no other items at this time.

Staff Comments: None.

Board Comments:

Meseck says that the newest member, **Alison Gorsevski**, thinks that only six members can sit up on the dais at a meeting. Is that correct?

Robinson says only six members can sit at a time. When I send out the packet one week before, I send it to all seven members and ask who can attend.

Meseck asks all members to respond as quickly as possible, so Alison will know if she is needed.

Malmquist says my BOA tenure is up in January. I may not pursue renewing it.

Stuart says my tenure is up, but I am open to serving again.

Robinson says the application process is open now. All BOA members can reapply if you are interested. It sounds like there may be one open seat. Council can promote Alison to a permanent seat if she decides to reapply.

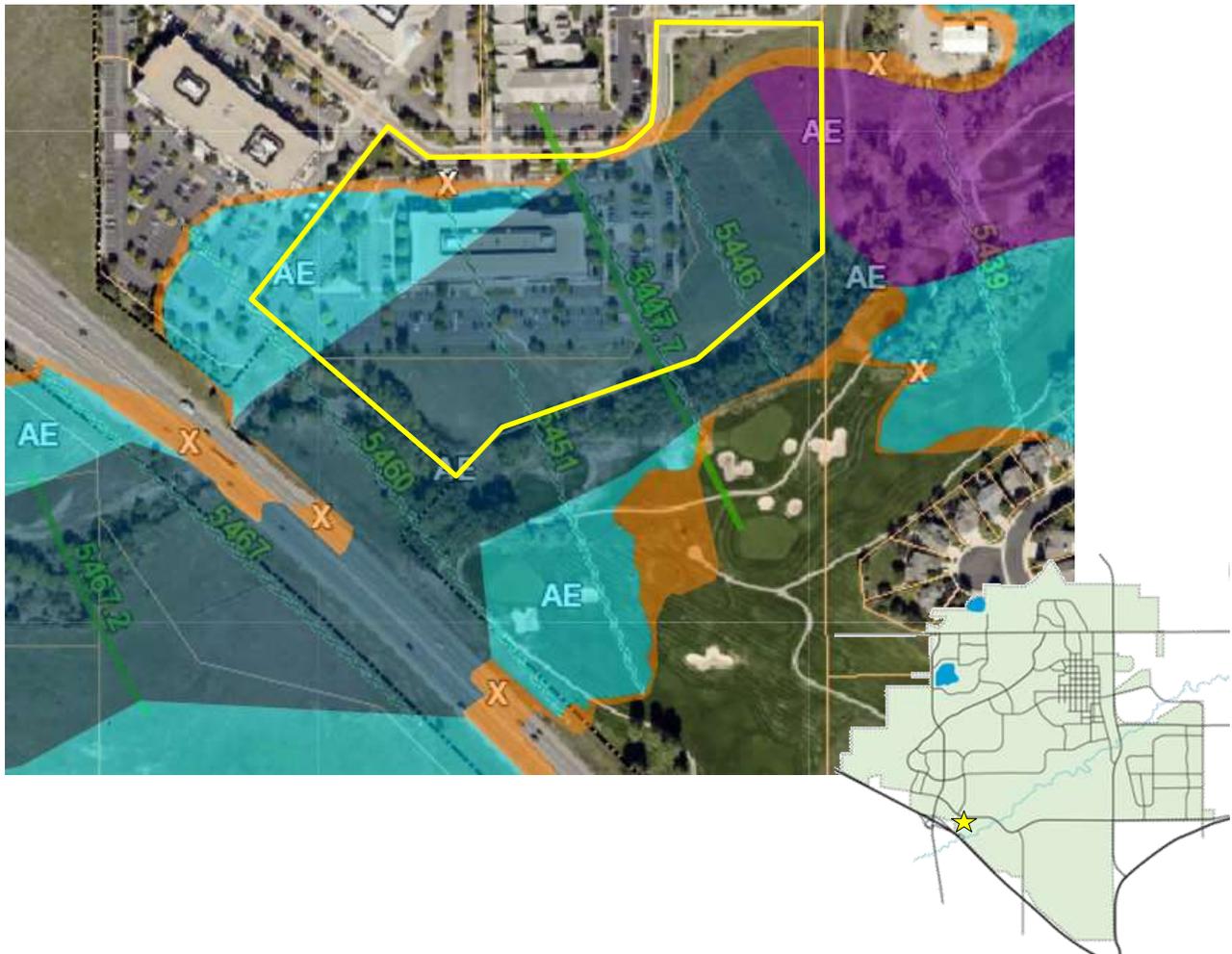
Adjourn:

Motion made by **Malmquist** to adjourn, seconded by **Stuart**. Motion passes by voice vote. Meeting adjourned at 8:35 pm.

**CITY OF LOUISVILLE
BOARD OF ADJUSTMENT
STAFF REPORT
November 16, 2016**

APPLICANT: Davis Partnership Architects
OWNER: TFG Goal Creek Property
PLANNER: Robert Zuccaro, AICP
LOCATION: 826 Coal Creek Circle (Lot 2, Coal Creek Business Park)
ZONING: Community Business (CB)
REQUEST: **Case #16-033-FL** Request for a Floodplain Development Permit to Construct a 40,000 Square-Foot Building Addition in the Flood Regulatory District

VICINITY MAP:



BACKGROUND:

The City approved the Coal Creek Business Park PUD for the business park campus in 1997, followed by approval of a site development PUD for the subject property in 1998. Construction of the original building took place in 1999. Staff has not been able to locate any previous Floodplain Development Permits for the property. The Coal Creek Business Park campus includes five developed lots with a mix of commercial and office uses totaling over 300,000 square feet of developed area. The US 36 right of way, Coal Creek and the Coal Creek Golf Course border the property to the south and east. The other Coal Creek Business Park lots border the property to the north and west.

The current regulatory map covering the property is the December 18, 2012 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM). Local Boulder County jurisdictions, including Louisville, recently completed a 2014 Flood Hazard Area Delineation Study (FHAD) for Coal Creek. The FHAD covers this property and staff anticipates that the FHAD will result in updated FEMA maps in the near future. For this reason, staff requested that the applicant analyze the floodplain based on both the currently adopted FIRM and the FHAD.

ANALYSIS:

Chapter 17.56 of the Louisville Municipal Code (LMC) provides procedures, regulations and requirements for Floodplain Development Permits. The Board of Adjustment is to review Floodplain Development Permit requests at a public hearing and may grant or deny a request based on compliance of the application with the applicable regulations and review criteria in the Code. The following contains staff's analysis and recommended findings on the applicable regulations and criteria for this request.

LMC Sec. 17.56.160 – Flood Regulatory District Regulations

According to LMC Sec. 17.56160, the cumulative effects of any proposed development may not cause a rise in the base flood elevations by more than one-half foot at any point. A registered professional engineer must make certification that such increase in flood levels will not occur. The applicant's engineer has provided a floodplain study with hydraulic analysis of the proposed development showing there will be no rise in the base flood elevations using both the FIRM and FHAD data (see pp. 6-9 of attached Floodplain Study, Revision Date Oct. 26, 2016). Staff finds that the proposal is in compliance this requirement.

In addition, LMC Sec. 17.56160 require anchoring of structures in the Flood Regulatory District be and either the finished floor of the building is a least one-foot above the base flood elevation or the structure must incorporate floodproofing for any portion of the structure below the base flood elevation in compliance with the LMC. The proposed finished floor elevation of 5456.10 is slightly below the base flood elevation of 5456.83. Therefore, the structure must include floodproofing. The Floodplain Study states that the applicant will provide floodproofing measures for all portions of the building below the base flood elevation (see p. 10 of attached Floodplain Study, Revision Date Oct. 26, 2016). The Study states that this may include use of waterproof coatings, impermeable membranes or supplemental use of masonry to create waterproof walls, use of flood gates for doors, windows or other openings and backflow valves for sewer lines and drains. The Study further states that the floodproofing must be designed to resist hydrostatic and hydrodynamic forces applicable to the floodplain adjacent to the structure. If this project received Floodplain Development Permit and PUD approval, the application will be required to provide detailed construction drawings demonstrating the floodproofing methods at the time of building permit review.

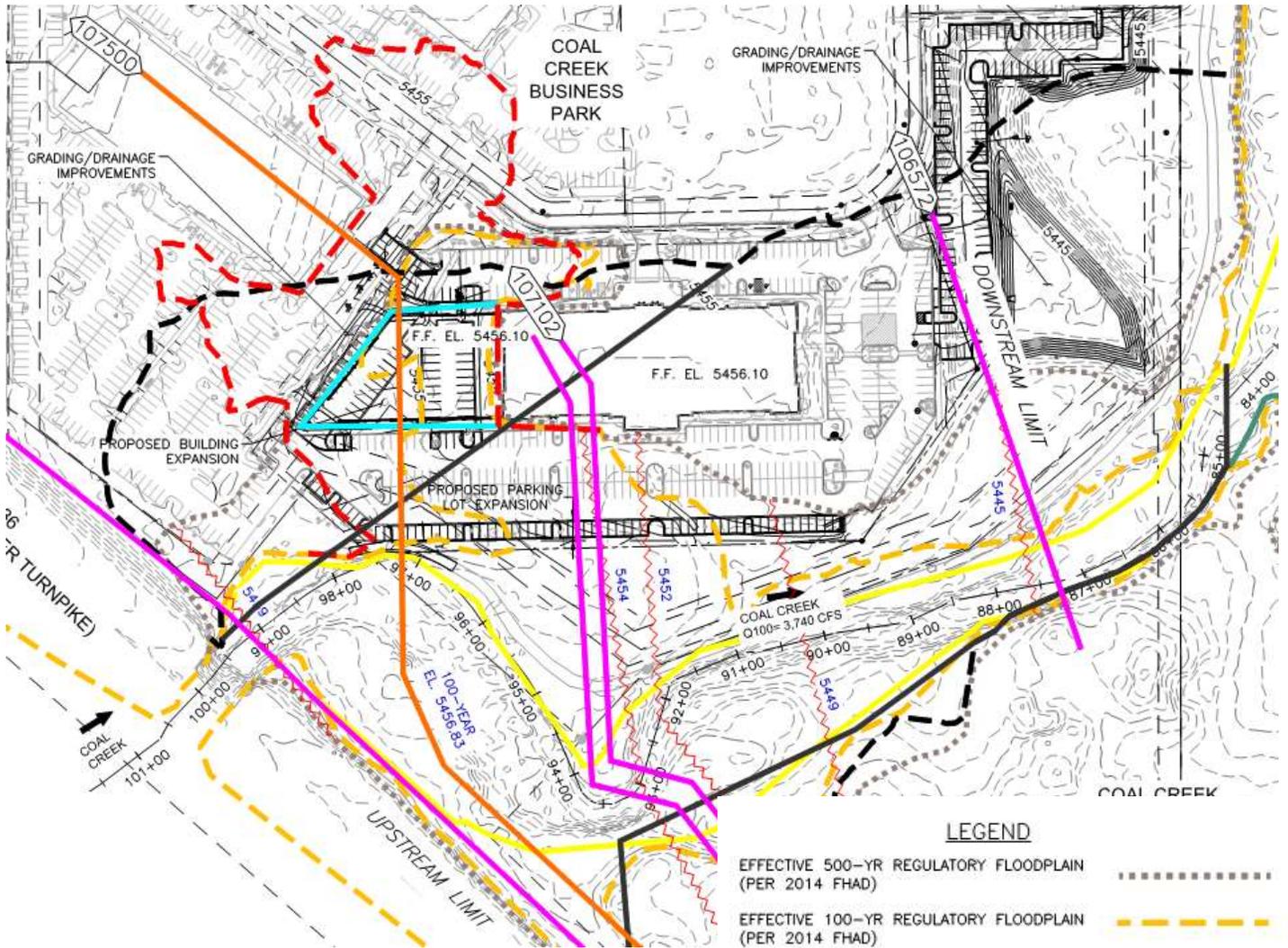


Figure 3: Effective and Regulatory Floodplain for FIRM and FHAD

LMC Sec. 17.56.210 – Floodplain Development Permit Procedure

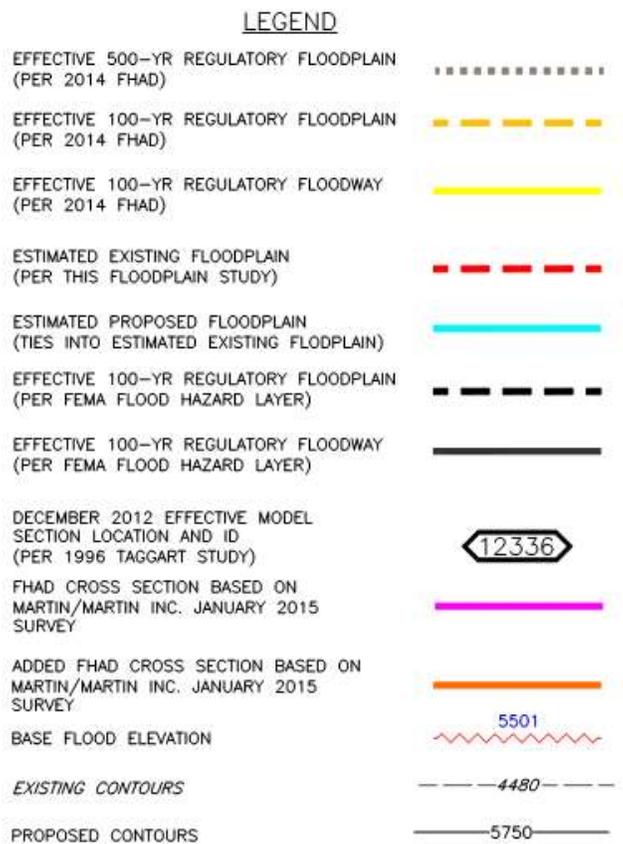
The LMC requires the following information submitted for all Floodplain Development Permits:

1. Elevation in relation to mean sea level of the lowest floor (including basement) of all structures;

The proposed finished floor elevation is 5456.10 feet, below the base flood elevation of 5456.83 feet.

2. Elevation in relation to mean sea level to which any nonresidential structure has been floodproofed;

The application does not provide the specific elevation proposed for floodproofing. However, the Floodplain Study provides that any areas below the base flood elevation will



be floodproofed and identifies the base flood elevation for the addition. Staff finds the information provided meets the intent of this submittal requirement.

3. Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing standards and practices specified in section 17.56.250; and

Since the finished floor of the addition is below the based flood elevation, the Floodplain Study includes certification that the final building design will include floodproofing conforming to LMC requirements. Staff will verify that the specific design meets requirements as part of the building permit review.

4. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

The proposal does not result in an altered or relocated watercourse.

STAFF RECOMMENDATION:

Staff finds the proposal complies with the applicable procedures, regulations and requirements for Floodplain Development Permits and recommends approval.

BOARD ACTION:

The Board needs to find that the application meets all criteria, insofar as applicable, in order to grant the Floodplain Development Permit. The Board should adopt a motion for the request, and establish findings for said decisions in the public record, either through reference to the applicant's or staff's findings in the existing written record or through additional Board findings, as expressed during the public hearing.

ATTACHMENTS:

1. Application
2. August 25, 2016 Request Letter
3. October 26, 2016 Revised Floodplain Study
4. Proposed PUD

LAND USE APPLICATION

CASE NO. _____

APPLICANT INFORMATION

Firm: Davis Partnership Architects

Contact: Kevin Gzym

Address: 2901 Blake Street, Suite 100
Denver, CO 80205

Mailing Address: Same as above

Telephone: 303.861.8555

Fax: 303.861.3027

Email: kevin.gzym@davispartnership.com

OWNER INFORMATION

Firm: TFG Coal Creek Property, LLC

Contact: Todd Twombly

Address: 60 State Street, 22nd Floor
Boston, Massachusetts 02109

Mailing Address: Same as above

Telephone: 781.222.5931

Fax: -

Email: ttwombly@tritowerfinancial.com

REPRESENTATIVE INFORMATION

Firm: Davis Partnership Architects

Contact: Kevin Gzym

Address: 2901 Blake Street, Suite 100
Denver, CO 80205

Mailing Address: Same as above

Telephone: 303.861.8555

Fax: 303.861.3027

Email: kevin.gzym@davispartnership.com

PROPERTY INFORMATION

Common Address: 826 Coal Creek Circle

Legal Description: Lot 2, Parcel 1 Blk _____
 Subdivision Coal Creek Business Park

Area: 253,955 +/- (existing) Sq. Ft.

TYPE (S) OF APPLICATION

- Annexation
- Zoning
- Preliminary Subdivision Plat
- Final Subdivision Plat submitted 8/4
- Minor Subdivision Plat
- Preliminary Planned Unit Development (PUD)
- Final PUD
- Amended PUD submitted 8/4
- Administrative PUD Amendment
- Special Review Use (SRU)
- SRU Amendment
- SRU Administrative Review
- Temporary Use Permit: _____
- CMRS Facility: _____
- Other: (easement / right-of-way; **floodplain** variance; vested right; 1041 permit; oil / gas production permit) submitted 8/26

PROJECT INFORMATION

Summary: The project is an addition of approx. 40k sq. ft. to the existing building located at 826 Coal Creek Circle. The addition will retain the same design and character of the existing structure as well as 2 stories and a similar height. The addition increases the parking requirements which are satisfied by adding parking to the south edge of the property and to the east-northeast. The additional parking requires lot line adjustments, re-grading of the drainage pond and modifications to the landscaping.

Current zoning: CB Proposed zoning: CB

SIGNATURES & DATE

Applicant: TFG Coal Creek Property LLC

Print: Todd Twombly

Owner: [Signature]

Print: _____

Representative: _____

Print: _____

CITY STAFF USE ONLY

Fee paid: _____

Check number: _____

Date Received: 2016 2 6 2016

RECEIVED

CITY OF LOUISVILLE
 DEPARTMENT OF PLANNING & BUILDING SAFETY



FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOODPLAIN DEVELOPMENT PERMIT
CITY OF LOUISVILLE, COLORADO

APPLICATION INFORMATION

Permit: Floodplain Development Permit Date: 08.26.2016
Owner: TFG Coal Creek Property, LLC Phone: 781.222.5931
Address: 60 State Street, 22nd Floor Boston, MA 02109 Email: Todd Twombly; ttwombly@tritowerfinancial.com
Contractor: N/A Phone: N/A
Address: N/A Email: N/A
Project Address: 826 Coal Creek Circle, Louisville, CO 80027 Project Legal Description: See below
Coal Creek Business Park, Parcel 1, Lot 2. A parcel of land being a part of the northwest quarter of Section 19, Township 1 South, Range 69 West of the Sixth Principal Meridian, County of Boulder, State of Colorado.

PROJECT DESCRIPTION

- | | | |
|--|--|--|
| <input type="checkbox"/> Single Family Residential | <input type="checkbox"/> New Construction | <input type="checkbox"/> Channelization |
| <input type="checkbox"/> Multifamily Residential | <input type="checkbox"/> Substantial Improvement
(>50%) | <input checked="" type="checkbox"/> Fill |
| <input type="checkbox"/> Mobile Home | <input checked="" type="checkbox"/> Improvement (<50%) | <input type="checkbox"/> Bridge/Culvert |
| <input checked="" type="checkbox"/> Nonresidential | <input type="checkbox"/> Rehabilitation | <input type="checkbox"/> Levee |
-

FLOOD HAZARD DATA

Watercourse Name: Coal Creek

This project is proposed in the Floodway Floodway fringe

Base (100-year) flood elevation(s) at project site: See attached floodplain study

Elevation required for Lowest Floor: _____ NAVD / Floodproofing _____ NAVD

Source Documents – Reports/Maps: See attached Floodplain Study

PROPOSAL REVIEW CHECKLIST

- Site development plans are complete and depict flood hazard data.
 - Engineering data is/are provided for proposed map and floodway revisions.
 - Floodway Certificate and data documents no increase in flood heights.
 - Subdivision proposals minimize flood damage and protect utilities.
 - Lowest floor elevations are above the base (100-year) flood level.
 - Mobile homes address elevation and anchoring requirements.
 - A Floodproofing Certificate certifies floodproofing designs.
 - Other: _____
-

APPLICANT: REVIEW ONLY. DO NOT WRITE IN THIS AREA.

PERMIT ACTION

- PERMIT APPROVED. The information submitted for the proposed project was reviewed and is in compliance with approved floodplain management standards (site development plans are on file with the City).
- PERMIT DENIED. The proposed project does not meet approved floodplain management standards (explanation is on file with the City).
- VARIANCE GRANTED. A variance was granted from the base (100-year) flood elevations established by FEMA consistent with variance requirements of NFIP regulations Part 60.6 and Louisville Municipal Code § 17.56.240 (variance action is on file with the City).

Floodplain Administrator's Signature

Date

Comments: _____

COMPLIANCE DOCUMENTATION

- MAP REVISION DATA. Certified documentation by a registered professional engineer of as-built conditions for floodplain alterations were received and submitted to FEMA for a flood insurance map revision.
 - FILL CERTIFICATE. A community official certified the elevation, compaction, slope and slope protection for all fill placed in the floodplain consistent with NFIP regulations Part 65.5 for map revisions.
 - ELEVATION & FLOODPROOFING CERTIFICATES. The as-built elevation of the building's lowest floor was certified as _____ NGVD; *OR* the building's floodproofing level was certified as _____ NGVD; by a registered professional engineer or licensed surveyor and is on file with the City.
 - CERTIFICATE OF OCCUPANCY OR COMPLIANCE ISSUED ON _____
Date
-

August 25, 2016

City of Louisville
Planning and Building Safety
City Hall
749 Main Street
Louisville, CO 80027



DAVIS
PARTNERSHIP
ARCHITECTS

Re: Floodplain Development Permit – Coal Creek Business Park – Floodplain Study

Dear Planning and Building Safety Staff:

Please see the following packet for a Floodplain Development Permit Application for the proposed Coal Creek Corporate Center I Expansion project. As the Applicant and Representative on behalf of the Owner, TFG Coal Creek Property, LLC, please accept this Application Submittal as discussed at the Pre-Application Conference on May 18. The proposed building is planned to be located on Lot 2 of the Coal Creek Business Park and be used for expansion of Coal Creek Corporate Center I at 826 Coal Creek Circle. The proposed addition will extend from the existing structure towards the west interior property line separating Lot 2 from Lot 1 of the Coal Creek Business Park. The property to be developed is approximately 5.83 acres (253,955 sf +/-) and is zoned CB – Commercial Business, which also carries into the surrounding properties. Due to this building expansion, surface parking will encroach into the existing detention pond and floodplain along Lot 2 and Tract B.

DENVER OFFICE

2901 Blake Street, Suite 100
Denver, CO 80205-2303
T 303 861.8555
F 303.861.3027

Existing Site Condition:

The address is 826 Coal Creek Circle. The current site consists of one two story building surrounded by surface parking and landscaping areas. The Site slopes consistently and drops approximately 5' from the northwest to the southeast. The site and surrounding properties border Coal Creek and across the creek is the Coal Creek Golf Course. The existing building and a majority of the surface parking will remain as is. The central surface parking on the west side of Lot 2 will be removed with the expansion. The existing lot has a surplus of parking which in combination with the surplus of parking of neighboring properties will be utilized to meet City zoning guidelines. The character of the existing building and PUD are that of a traditional office building within a larger overall business park. The materials are brick and stucco with a main point of entry. The facades are broken down in scale with accented columns and material breaks with window mullions.

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Proposed Site Condition:

The proposed site condition will include an expansion of the existing building towards the west interior property line. A new parking connection will be created connecting Lot 2 to Lot 1 on the northwest corner of the property and the existing connection on the southwest corner will remain. The parking expansion will take place in two phases; the first will include 59 new spaces along the southern drive of the property creating a double parked aisle instead of a single lane of parking. The second phase will be constructed on an as needed basis based on tenant use of the existing and phase 1 parking. If required the second phase will consist of 91 new spaces being developed along the edge of the drainage pond to the northeast of the building within the adjusted

lot lines between Lot 2 and Tract B. The intent of parking in phases is to avoid construction of unnecessary parking. The current campus has abundant parking for the tenants and often spaces are vacant. The intent of this submittal is to construct what we think is realistically needed in the first phase, but to demonstrate how we can meet the parking requirements per the zoning code if necessary. The architectural character of the addition will continue the materials, building height and building proportions of the existing structure as well as the concepts illustrated in the Coal Creek Business Park PUD.

FLOODPLAIN STUDY SUMMARY

A floodplain study has been prepared in support of a floodplain development permit, to analyze the impacts of the proposed improvements on the 1.0%-annual-chance (100-year) flood, also known as the base flood. The existing property is located within a FEMA regulated Special Flood Hazard Area (SFHA) and regulatory 1.0-foot rise Floodway. Hydraulic analysis has been prepared to document that the proposed placement of fill within the floodway does not cause any rise to the Base Flood Elevation (BFE). A baseline pre-project hydraulic model was prepared using the effective 1.0%-annual-chance flood discharge per the effective HEC-2 model obtained through a FEMA Engineering Library Flood Insurance Study (FIS) request. The pre-project model is based on existing survey data and Denver Regional Council of Governments (DRCOG) post 2013 flood LiDAR topography. The baseline pre-project hydraulic model was then compared to a post-project hydraulic model, based on the proposed site grading plan, to determine if there is a rise in BFEs. The modeling indicates that the improvements have no impacts on BFEs, and a no-rise certification has been issued.

SCHEDULE

The expected schedule for this project will follow typical timelines and dates as laid out by the City of Louisville and the Development Review Schedules provided within the Land Use Application packet. This application is following a submittal of an amendment to the Coal Creek Business Park PUD, the Coal Creek Corporate Center I PUD, a re-plat of Lot 2 and Tract B. This application to the Board of Adjustments for a floodplain permit will be completed in parallel with the prior submitted applications. At the earliest construction is expected to commence in the 4th quarter of 2017. As the process progresses the timeline will become more defined.

OWNERSHIP AND LEGAL DESCRIPTION

The Lot is currently owned by TFG Coal Creek Property, LLC.

The PUD amendment is also being accompanied by a re-plat that includes adjustments to the lot lines for Lot and Tract B, the new Legal Description for Lot 2 and Tract B are as follows:

DEDICATION:

KNOW ALL MEN BY THESE PRESENTS, THAT THE UNDERSIGNED BEING THE OWNERS OF
LEGAL DESCRIPTION PARCEL 1, LOT 2

A PARCEL OF LAND BEING A PART OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 1 SOUTH,
RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF BOULDER, STATE OF COLORADO AND BEING
MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 18 THENCE ALONG THE WESTERLY SECTION
LINE OF SECTION 18 500'08'10" A DISTANCE OF 140.02 FEET; THENCE ALONG THE NORTHERLY LINE OF
TRACT B 588'39'10"W A DISTANCE OF 52.42 FEET TO THE POINT OF BEGINNING THENCE DEPARTING SAID
NORTHERLY LINE 500'46'48"E A DISTANCE OF 61.26 FEET; THENCE 544'13'12"W A DISTANCE OF 35.15
FEET; THENCE 589'13'12"W A DISTANCE OF 129.14 FEET; THENCE 501'45'07"E 206.22 FEET; THENCE
501'10'19"E A DISTANCE OF 82.63 FEET; THENCE S35'55'01"W A DISTANCE OF 272.02 FEET; THENCE
588'39'06"W A DISTANCE OF 553.31 FEET TO A POINT ON SOUTHWESTERLY LINE OF PARCEL 1; THENCE
ALONG SAID SOUTHWESTERLY LINE N48'56'44"W A DISTANCE OF 172.32 FEET TO THE SOUTHWESTERLY
CORNER OF LOT 2; THENCE ALONG THE NORTHWESTERLY LOT LINE OF LOT 2 N37'32'27"E A DISTANCE OF
406.06 FEET TO THE NORTHWESTERLY CORNER OF LOT 2; THENCE ALONG THE NORTHERLY LINE OF LOT 2
THE FOLLOWING (3) COURSES; (1) S52'27'41"E A DISTANCE OF 84.56 FEET; (2) THENCE 18.33 FEET ALONG
THE ARC OF A TANGENT CURVE TO THE LEFT HAVING A RADIUS OF 27.00 FEET, A CENTRAL ANGLE OF
38'53'39" AND A CHORD WHICH BEARS S71'54'24"E A DISTANCE OF 17.98 FEET; (3) THENCE N88'38'47"E
A DISTANCE OF 302.60 FEET TO A POINT OF CURVATURE; THENCE 164.73 FEET ALONG THE ARC A TANGENT
CURVE TO THE LEFT HAVING A RADIUS OF 105.00 FEET, A CENTRAL ANGLE OF 89'53'15" AND A CHORD
WHICH BEARS N43'42'10"E A DISTANCE OF 148.35 FEET; THENCE N01'29'25"W A DISTANCE OF 111.89 FEET
TO THE NORTHERLY CORNER OF LOT 2; THENCE ALONG THE NORTHERLY LOT LINE N88'39'10"E A DISTANCE
OF 306.32 FEET TO THE POINT OF BEGINNING.

THIS PARCEL CONTAINS 6.977 ACRES (303,906 SQUARE FEET), MORE OR LESS.

LEGAL DESCRIPTION PARCEL 1, TRACT B

A PARCEL OF LAND BEING A PART OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 1 SOUTH,
RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF BOULDER, STATE OF COLORADO AND BEING
MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 18 THENCE ALONG THE WESTERLY SECTION
LINE OF SECTION 18 500'08'10" A DISTANCE OF 140.02 FEET TO THE NORTHERLY CORNER OF TRACT B
ALSO BEING THE POINT OF BEGINNING THENCE ALONG THE EASTERLY LINE OF TRACT B 500'03'57"E A
DISTANCE OF 409.05 FEET TO THE SOUTHERLY CORNER OF TRACT B; THENCE ALONG THE SOUTHEASTERLY
LINES OF TRACT B THE FOLLOWING (3) COURSES (1) S50'07'26"W A DISTANCE OF 309.15 FEET; (2)
THENCE 589'31'47"W A DISTANCE OF 384.74 FEET; (3) S43'03'14"W A DISTANCE OF 107.19 FEET TO THE
SOUTHWESTERLY CORNER OF TRACT B; THENCE ALONG THE SOUTHWESTERLY LINE OF TRACT B N48'56'44"W
A DISTANCE OF 317.67 FEET; THENCE N88'39'06"E A DISTANCE OF 553.31 FEET; THENCE N35'55'01"E A
DISTANCE OF 272.02 FEET; THENCE N01'10'19"W A DISTANCE OF 82.63 FEET; THENCE N01'45'07"W A
DISTANCE OF 206.22 FEET; THENCE N89'13'12"E A DISTANCE OF 129.14 FEET; THENCE N44'13'12"E A
DISTANCE OF 35.15 FEET; THENCE N00'46'48"W A DISTANCE OF 61.26 FEET TO A POINT ON THE
NORTHERLY LINE OF TRACT B; THENCE ALONG SAID NORTHERLY LINE N88'39'10"E, A DISTANCE OF 52.42
FEET TO THE POINT OF BEGINNING

THIS PARCEL CONTAINS 3.860 ACRES (168,146 SQUARE FEET), MORE OR LESS.

BASIS OF BEARINGS: BEARINGS ARE BASED ON THE SOUTH LINE OF THE SOUTHEAST QUARTER OF
SOUTHWEST QUARTER OF SECTION 18 BEING 589'39'10"W BETWEEN EXISTING MONUMENTS SHOW HEREIN.

NEIGHBORING PROPERTY OWNERS WITHIN 500 FEET:

A list of property owners has been attached to this application. We have also included
stamped and addressed envelopes for the property owners.

In the attached documents, you will find copies of the Land Use Application, Fee, Public
Notice required items, survey and plat, architectural elevations, a floodplain study,
floodplain development permit form, Title Commitment and the written statement
above.

Sincerely,



Julie M. Meenan Eck, ASLA
Davis Partnership Architects. PC

COAL CREEK BUSINESS PARK FLOODPLAIN STUDY LOUISVILLE, COLORADO

August 26, 2016
Revised October 26, 2016

PREPARED FOR: DAVIS PARTNERSHIP, PC
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M.M. JOB #16.0450



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Appendix A FIRM (08013C0583J, December 18, 2012)
 FIRM (08013C9584J, December 18, 2012)
 Boulder County Effective FIS (Relevant Portions)
 2014 FHAD Coal Creek and Rock Creek (Relevant Portions)

Appendix B Effective HEC-2 Output
 FHAD HEC-RAS Output
 Existing Conditions HEC-RAS Output
 Proposed Conditions HEC-RAS Output

Appendix C FEMA Effective Topographic Workmap
 2014 FHAD Comparison Topographic Workmap
 Electronic Files (HEC-RAS Models)

A. Introduction

The following Floodplain Study is in support of a Floodplain Development Permit for proposed improvements associated with Lot 2 in the Coal Creek Business Park (hereon referred to as “PROJECT”). This study outlines impacts to the Coal Creek floodplain as a result of the proposed placement of fill as part of the PROJECT within the effective Special Flood Hazard Area (SFHA) and Floodway.

1. Site Location

The Proposed improvements associated with Lot 2 in the Coal Creek Business Park are located in the Northwest Quarter of Section 19, Township 1 South, Range 69 West of the Sixth Principal Meridian in the City of Louisville, Colorado. Lot 2 is located in the south portion of the development adjacent to Coal Creek. The PROJECT is bounded on the north by Coal Creek Circle, on the east by Coal Creek, on the south by US Highway 36, and on the west by additional Coal Creek Business Park Development. This report serves as the backup for a Floodplain Development Permit to be issued with the amendment to the Planned Urban Development (PUD) packages submitted to the City of Louisville.



Figure 1 – Vicinity Map

2. Existing Site Description

Lot 2 is approximately 6.977 acres and is currently developed with an 80,000 square foot office building with associated parking. The left bank of Coal Creek south of the existing parking lot consists of native grasses and shrubs, with dense wetland vegetation within the defined section of the drainageway.

3. Scope of Work

The proposed improvements within Lot 2 include a 40,400 sq. ft. addition on the west side of the existing building and the addition of required parking. The proposed parking will be added to the south side of the site as well along the east side of the site. The parking on the east side of the site will as require a revision in the property line to encompass these additional spaces. A Subdivision Plat Amendment is being submitted through the City of Louisville. The additional parking spaces require the placement of fill within the effective SFHA and Floodway. Additionally, the proposed parking spaces affect an existing detention pond (Pond A). Re-grading of Pond A and underground detention will be required to accommodate the necessary volumes for regional detention and water quality.

Phasing alternatives for the proposed building addition include a 20,000 sq. ft. and a 40,000 sq. ft. option. The 20,000 sq. ft. alternative would be two stories with 10,000 square feet within each story, and an outdoor patio within the remaining 40,000 sq. ft. footprint. The 40,000 sq. ft. alternative would begin with a 20,000 sq. ft. single story addition and a future 20,000 sq. ft. second story addition. Both phasing alternatives utilize the full 40,000 sq. ft. building footprint and are considered equal from a hydraulic perspective.

The hydraulic comparisons made in this study are between pre-project conditions (current conditions) and post-project conditions based on the proposed improvements. The hydraulic analysis is not intended to show, nor does it imply, that the overall existing Coal Creek Business Park development has no impact on the FEMA effective SFHA or BFEs.

B. Floodplain

1. Effective Mapping

The effective SFHA is shown on the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM), Map Numbers 08013C0583J and 08013C0584J, effective date December 8, 2012. The floodplain is designated Zone AE. A Zone AE floodplain is defined as the base floodplain (1.0%-annual-chance/100-year) where base flood elevations (BFEs) are provided. A regulatory 1.0-foot rise floodway has been delineated for this reach of Coal Creek. The floodway is defined as the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1.0%-annual-chance (100-year) flood can be conveyed without substantial increases in flood depths. See Appendix A for FIRM maps.

2. Previous Studies

The effective hydrology and hydraulics for Coal Creek are documented in the *Flood Insurance Study Boulder County, Colorado and Incorporated Areas*, Federal Emergency Management Agency, Flood Insurance Study Number 08013CV001B, revised December 18, 2012. The FIS includes Summary of Discharges, Floodway Data Tables, and Flood Profiles for the reach of Coal Creek adjacent to the PROJECT. Hydrology and hydraulics for the study reach of Coal Creek were updated by Taggart Engineering Associates, Inc. in 1996. The hydraulic analysis was prepared using HEC-2 and was obtained through a FEMA Engineering Library FIS request in August 2016. It should be noted that the effective modeling was prepared prior to the development of Coal Creek Business Park and does not appear to accurately reflect the existing 1.0%-annual-chance floodplain limits. Martin/Martin, Inc. was not able to determine if any modeling was prepared as part of the original Coal Creek Business Park development.

Subsequent hydrologic and hydraulic analysis of the study reach was prepared with the *Flood Hazard Area Delineation (FHAD) Coal Creek and Rock Creek*, prepared by RESPEC Consulting & Services, dated November 2014. The FHAD study includes hydrologic and hydraulic analysis for Coal Creek and Rock Creek from Boulder Creek to Highway 128 (West 120th Avenue). The FHAD study shows revisions to both the SFHA and BFEs, which are not reflected in the effective mapping. It is Martin/Martin's understanding that FEMA is currently adopting the FHAD study as the effective mapping for Coal Creek through the Physical Map Revision (PMR) process. According to the Urban Drainage and Flood Control District, both the State of Colorado and

UDFCD have adopted the FHAD, and the City of Louisville can regulate to it as the best information available. Relevant portions of the FHAD have been included in Appendix A.

3. Floodplain Zoning Regulations

The construction of the business park improvements will need to meet the provisions outlined in *Chapter 17.56 – Floodplain Zoning* of the Louisville, CO Municipal Code, adopted November 20, 2012. General development standards are outlined below;

17.56.160 – Flood Regulatory District – Regulations

- A. *Flood District Encroachments - The cumulative effect of any proposed development, when combined with all other existing and anticipated development, shall not increase the water surface elevation of the base flood more than one-half foot at any point. Certification by a registered professional engineer stating that any encroachment shall not result in such an increase in flood levels during the occurrence of a 100-year flood shall be required.*
- F. *Specific Standards*
2. *Nonresidential construction.*
 - a. *With the exception of critical facilities, outlined in section 17.56.168, new construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated at least one foot above the base flood elevation; or, together with attendant utility and sanitary facilities, shall:*
 - (1) *Be floodproofed so that portions of the structure that are below one foot above the base flood elevation are watertight with walls substantially impermeable to the passage of water;*
 - (2) *Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and*
 - (3) *Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions of subsection F.2 of this section. Such certifications provided to the director as set forth in Section 17.56.180*

17.56.162 – Floodways

Floodways are administrative limits and tools used to regulate existing and future floodplain development. The state has adopted floodway standards that are more stringent than the FEMA minimum standard. Located within special flood hazard area established in Section 17.56.070, are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles and erosion potential, the following provisions shall apply:

- A. Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed by a licensed state professional engineer and in accordance with standard engineering practice that the proposed encroachment would not result in any increase (requires a no-rise certification) in flood levels within the community during the occurrence of the base flood discharge.*
- B. If subsection A of this section is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provision of Section 17.56.160.*
- C. Under the provisions of 44 CFR Chapter 1, Section 65.12, of the national flood insurance regulations, a community may permit encroachments within the adopted floodway that would result in an increase in base flood elevations, provided that the community first applies for a CLOMR and floodway revision through FEMA.*

17.56.250 – Floodproofing

- A. Nonresidential. Pursuant to subsection 17.56.160.F.2, the floodproofing of a nonresidential structure or use may be permitted as an alternative to elevating to the required base flood elevation. Prior to issuance of a floodplain development permit a registered professional engineer or architect shall develop structural designs, specifications, and plans for the construction which include floodproofing methods, subject to accepted standards and practices of the Uniform Building Code, as adopted, and the FEMA requirements. Prior to the issuance of a certificate of occupancy a floodproofing certificate shall be completed and submitted to the director.*

C. Hydrology

The Boulder County FIS (08013CV001B, December 18, 2012) shows that the reach of Coal Creek downstream of Highway 36 (Denver-Boulder turnpike) has a 100-year discharge of 3,820 cfs. The corresponding May 1991 HEC-2 model received from a FEMA FIS data request shows the 100-year discharge at the same location to be 3,434 cfs. In order to replicate and compare the effective HEC-2 models received from FEMA the HEC-2 100-year discharge of 3,434 cfs was used to generate the Pre- and Post-Project conditions models. See Appendix A for relevant portions of the current FIS.

The 2014 FHAD study shows that the reach of Coal Creek downstream of Highway 36 (Denver-Boulder turnpike) has a 100-year discharge of 3,740 cfs. This flow was used to make pre-project and post-project hydraulic comparisons to the 2014 FHAD model. See Appendix A for relevant portions of the 2014 FHAD.

D. Hydraulics

FEMA Effective Hydraulic Analysis

Pre-project (current conditions), and post-project conditions (based on the proposed improvements) were hydraulically modeling using the U.S. Army Corps of Engineers, River Analysis System (HEC-RAS), version 5.0. A topographic survey was performed by HKS, on May 12, 2016. The survey provided detailed topography for the existing development, within the property boundary. Supplemental topography was obtained from the Denver Regional Council of Government (DRCOG) 2014 Colorado Flood LiDAR project, which was used for areas outside of the property boundary to generate pre-project hydraulic cross sections. Proposed grading was modeled using Autocad Civil 3D, which was used to generate post-project hydraulic cross sections. Manning's "n" values were duplicated from the effective HEC-2 model, which were taken from data generated in a Soil Conservation Service (SCS) report. On Coal Creek, roughness values for the main channel ranged from 0.09 to 0.11. Overbank roughness values ranged from 0.07 to 0.09. According to the FIS, these roughness values appear high. However, these values should be used for all future map changes in order to be consistent with the SCS hydrology calculations. The effective HEC-2 100-year peak discharge value of 3,434 cfs was used for the entire study reach for both existing and proposed conditions. Detailed hydraulic calculations are included in Appendix B.

The pre- and post-project base flood elevations were compared at each cross section. Table 1 below, shows comparisons between the FEMA effective, pre-project, and post-project 1.0%-annual-chance flood BFEs. Results indicate a no-rise condition between pre- and post-project conditions. It should be noted that when comparing effective BFEs to pre-project conditions, there is a considerable rise. This rise appears to be a result of the existing Coal Creek Business Park development. As previously discussed, the 2014 FHAD shows similar increases to BFEs for this reach of Coal Creek.

EFFECTIVE FLOODPLAIN MAPPING					
Cross Section	Effective Conditions Q ₁₀₀	Effective Conditions BFE	Pre-Project Conditions BFE	Post-Project Conditions BFE	Reference
8426	3434	5442.0	5442.4	5442.4	Downstream Limit of study
8646	3434	5445.0	5447.5	5447.4	
8865	3434	5447.0	5449.5	5449.5	
9100	3434	-	5452.0	5452.0	
9720		-	5457.5	5457.4	XS through building extension FF EL. 5456.10
9815	3434	5460.1	5458.1	5458.0	
9909	3434	5461.4	5462.1	5462.1	
9940	3434	5462.5	5462.7	5462.7	
9954	3434	5462.6	5462.5	5462.5	Downstream of HWY 36

Table 1 – FEMA Effective BFE Comparison

The hydraulic analysis, and comparisons to the FEMA effective floodplain, prepared in this study are intended to show the impacts of the proposed site improvements compared to existing conditions at the time this study was completed. The hydraulic analysis is not intended to show, nor does it imply, that the overall existing Coal Creek Business Park development has no impact on the FEMA effective SFHA or BFEs. The existing and proposed structures will remain in the effective floodplain until a LOMR or the 2014 FHAD study is adopted by FEMA. It is recommended that finished floor elevations be constructed or floodproofed a minimum of 1-foot above post-project BFEs, in accordance with City of Louisville and FEMA regulations.

FHAD Hydraulic Analysis

According to UDFCD, the 2014 FHAD study is currently being adopted by FEMA through the Physical Map Revision (PMR) process. Both the State of Colorado and UDFCD have officially adopted the 2014 FHAD study, which can be regulated to as the best information available. Additional hydraulic analysis has been prepared to document the impacts of the proposed improvements related to the 2014 FHAD study.

The 2014 FHAD study hydraulic model was obtained through UDFCD and the relevant output has been included in Appendix B. The model was used to create pre-project (current conditions), and post-project (based on the proposed improvements) conditions hydraulic models for comparison to the 2014 FHAD study. The upstream model boundary was set at FHAD cross-section 107741 just downstream of U.S. Highway 36. The downstream model boundary was set at FHAD cross-section 106572. The downstream boundary water surface was set to the FHAD water surface elevation at cross-section 106572. The portions of the cross-sections outside of the 2016 detailed topographic survey boundary were duplicated from the FHAD model and an additional cross-section was added where the proposed building addition is located. The FHAD peak 100-year discharge through the study reach is 3,740 cfs. Manning's n values were duplicated from the FHAD study. The following table shows the comparison between the 2014 FHAD, pre-project, and post-project hydraulic models.

FHAD FLOODPLAIN MAPPING					
Cross Section	FHAD Effective Conditions Q ₁₀₀	FHAD Effective Conditions BFE	Pre-Project Conditions BFE	Post-Project Conditions BFE	Reference
106572	3740	5444.8	5444.8	5444.8	Downstream Limit
107102	3740	5452.8	5452.8	5452.8	
107132	3740	5454.2	5454.2	5454.2	
107500*	3740	5457.1	5456.3	5456.3	XS through building extension FF EL. 5456.10
107741	3740	5459.1	5459.1	5459.1	Downstream of HWY 36

*Additional cross section at building addition

**BFE interpolated from 2014 FHAD study (regulatory BFE)

Table 2 – 2014 FHAD BFE Comparison

Comparing the post-project to pre-project models at the proposed building addition shows a no rise condition. The proposed building addition has no impact on the 2014 FHAD flood elevations due to the hydraulically disconnected backwater condition that exists within Lots 1 and 2 of Coal Creek Business Park.

Both the pre-project and post-project flood extents were delineated as the estimated existing and proposed 100-year floodplain extents and have been shown on the FHAD comparison workmap in Appendix C. Although there is no impact to the flood elevations, the redelineation illustrates an increase in the estimated floodplain extents compared to the 2014 FHAD study. The 2014 FHAD delineation shows the floodplain contained within Lot 2 around the west end of the existing building. The estimated existing and proposed 100-year floodplain delineation demonstrates that the floodplain extends into Lot 1, between the Corporate Center I and Corporate Center II office buildings, and continues north to Coal Creek Cir. It should be noted that the intent of this floodplain study is to show the impacts of the proposed improvements as they relate to the local zoning regulations, and is not intended to remap the FEMA effective or 2014 FHAD floodplain boundaries.

Based on the hydraulic analysis performed and in accordance with City of Louisville Zoning Regulation 17.56.160.A, the cumulative effect of the proposed improvements, when combined with all other existing and anticipated development, do not increase the water surface elevation of the base flood more than one-half foot at any point. The proposed building addition shall be elevated or flood proofed a minimum of 1-foot above the regulatory Base Flood Elevation (2014 FHAD BFEs). If the existing structure has not been elevated or flood proofed a minimum of 1-foot above the regulatory Base Flood Elevation, and the proposed addition is a substantial improvement, then both the existing and proposed structures will be required to be brought into compliance.

E. Summary

1. Compliance with Standards

In accordance with *Chapter 17.56* of the Louisville Municipal Code, the placement of fill within the effective floodway requires hydraulic modeling in support of a no-rise certification. Comparison between the pre- (current conditions), and post-project (based on the proposed improvements)

conditions hydraulic models indicate that the proposed improvements have a no-rise impact on BFEs. This no-rise certification is not intended to show, nor does it imply, that the overall Coal Creek Business Park development, at the time of this study, has no impact on the effective SFHA or BFEs. The 2014 FHAD study is currently being adopted by FEMA through the Physical Map Revision (PMR) process and comparisons have been made to this study showing a no-rise impact. All proposed improvements shall be designed and constructed to meet the provisions outlined in *Chapter 17.56* of the Louisville Municipal code, as well as meet all other local, state, and federal floodplain regulations.

Pursuant to Sec. 17.56 of the City of Louisville Municipal Code the addition to 826 Coal Creek Circle will be provided with flood proofing measures for all portions of the building that are below one foot above the base flood elevation. The building will be made watertight with walls that are substantially impermeable to the passage of water by utilizing waterproof coatings, impermeable membranes, or supplemental layers of masonry or concrete. Also, doors, windows, and other openings below the FPE will be equipped with permanent or removable shields or flood gates, and backflow valves will be installed in sewer lines and drains. The flood proofing measures that will be implemented will be designed to resist hydrostatic and hydrodynamic forces specific to the regulatory floodplain adjacent to the structure.

2. Summary of Analysis

This floodplain study has been prepared in support of a floodplain development permit, to analyze the impacts of the proposed improvements on the 1.0%-annual-chance (100-year) flood, also known as the base flood. The existing property is located within a FEMA effective regulated Special Flood Hazard Area (SFHA) and regulatory 1.0-foot rise Floodway. A subsequent FHAD study was completed in 2014, which has been adopted at the state and local level, and can be regulated to as the best information available. Hydraulic analysis has been prepared to document that the proposed placement of fill within the FEMA effective floodway does not cause a rise to the Base Flood Elevation (BFE). Additionally, hydraulic analysis was prepared in comparison to the 2014 FHAD study to show that the cumulative effect of the proposed improvements does not increase the water surface elevation of the base flood more than one-half foot at any point. A baseline pre-project hydraulic model was prepared using the effective 1.0%-annual-chance flood discharge for both the effective HEC-2 model obtained through a FEMA Engineering Library Flood Insurance Study (FIS) request, and the 2014 FHAD HEC-RAS model obtained through UDFCD. The pre-project models are based on 2016 survey data, Denver Regional Council of Governments

(DRCOG) 2014 Colorado Flood LiDAR project, and 2014 FHAD cross-sections. The baseline pre-project hydraulic model was then compared to post-project hydraulic models, based on the proposed site grading plan, to determine the effects on BFEs. The modeling indicates that the improvements have no impacts on BFEs, and a no-rise certification has been issued.

As discussed, the pre- and post-project comparison is based solely on the proposed improvements and does not take into account the impacts that the overall Coal Creek Business Park development has on effective BFEs. The FEMA effective SFHA and BFEs are based on the topography prior to development of Coal Creek Business Park. Modeling done as part of this study, as well as a 2014 FHAD study, indicate a rise when comparing the pre-project conditions to FEMA effective BFEs. The existing and proposed structures will remain in the effective floodplain, until a LOMR or the 2014 FHAD study is adopted by FEMA. The proposed building addition shall be elevated or flood proofed a minimum of 1-foot above the regulatory Base Flood Elevation (2014 FHAD BFEs). If the existing structure has not been elevated or flood proofed a minimum of 1-foot above the regulatory Base Flood Elevation, and the proposed addition is considered a substantial improvement, then both the existing and proposed structures will be required to be brought into compliance.

F. References

1. *Louisville Municipal Code Chapter 17.56*, adopted November 20, 2012.
2. *Flood Insurance Study, Boulder County, Colorado and Incorporated Areas*, Federal Emergency Management Agency, FIS #08013CV001B, December 18, 2012.
3. *Flood Hazard Area Delineation Coal Creek and Rock Creek*, prepared by RESPEC Consulting & Services, November 2014.

Appendix A

FIRM (08013C0583J, December 18, 2012)

FIRM (08013C9584J, December 18, 2012)

Boulder County Effective FIS (Relevant Portions)

2014 FHAD Coal Creek and Rock Creek (Relevant Portions)

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of great size. The community map preparator should be consulted for further details on additional flood hazard information.

To obtain more detailed information on areas where **Base Flood Elevations (BFEs)** and/or **Special Flood Hazard Areas** have been designated, users are encouraged to consult the Flood Insurance Rate Study (FIRS) Report and/or the Summary of Special Flood Hazard Areas contained within the Flood Insurance Study (FIS) Report that accompanies the FIRS. Users should be aware that BFEs shown on the FIRS represent indicated average flood elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accurate flood elevation data presented in the FIS Report should be obtained in conjunction with the FIS for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only to areas of 1/2 mile or more from the coast of 1000 feet or more. Users of the FIS should be aware that coastal flood elevations are also provided in the Summary of Special Flood Hazard Areas in the FIS Report. Users of the FIS should be aware that coastal flood elevations are also provided in the Summary of Special Flood Hazard Areas in the FIS Report. Users of the FIS should be aware that coastal flood elevations are also provided in the Summary of Special Flood Hazard Areas in the FIS Report.

Boundaries of the **Special Flood Hazard Areas** are shown on this map. Boundaries of the **Special Flood Hazard Areas** are shown on this map. Boundaries of the **Special Flood Hazard Areas** are shown on this map.

Coastal areas not in Special Flood Hazard Areas may be protected by **Beach Control Structures**. Refer to Section 2 of "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 12. The horizontal datum was NAD 83. Users should be aware that differences in datum, projection, or UTM zone used in the preparation of FISs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIS.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information on the conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, see the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NCEM, 462013
National Geodetic Survey
2121 Rte. 1, Stop 2
Silver Spring, Maryland 20910-0282
(301) 713-3242

To obtain current elevation, description, and location information for **beach control structures** on this map, please contact the jurisdiction authority of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIS was provided by the FEMA Map Service Center (MSC) under a license from the U.S. Army Corps of Engineers. Additional map data provided to the Town of Erie and the City of Longmont, CO, are shown as of date.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIS for this jurisdiction. The **Topographic and Hydrographic Data** were transferred from the previous FIS. They may have been adjusted to conform to more recent stream channel configurations as a result of the Flood Insurance Study Report. Users should be aware that the Flood Insurance Study Report (FIS) contains administrative information that may affect stream channel boundaries and other data shown on this map.

Corporate labels shown on this map are based on the best data available at the time of publication. Because changes due to amendments or discontinuance may have occurred after this map was published, map users should contact appropriate community officials to verify current addresses and locations.

Please refer to the separately printed **Map Index** for an outline map of the county showing the layout of map panels, community map preparator addresses, and a listing of Communities with National Flood Insurance Program status for each community as well as a listing of the special use flood zones, if any.

The information on available products associated with this FIS is provided in the **Map Service Center (MSC)** website at <http://www.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Users of these products can be interested in obtaining details from FEMA at <http://www.fema.gov>.

If you have questions about this study, how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information Exchange (MIE)** at 1-877-FEMA-8287 (1-877-368-2877) or visit the FEMA website at <http://www.fema.gov>.

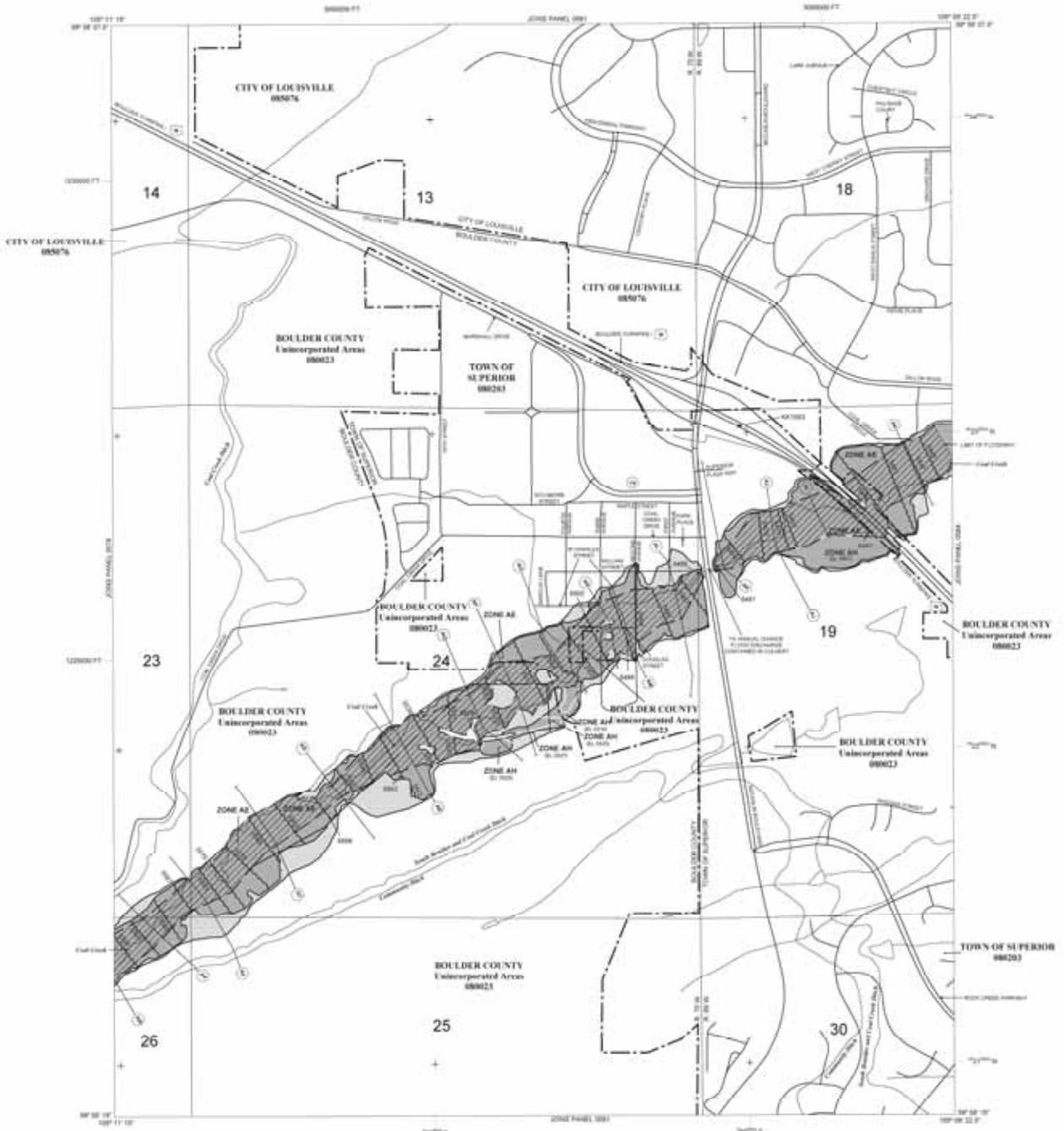
Boulder County Vertical Datum Offset Table

Planning District	Vertical Datum	Offset	Vertical Datum
010000	NAVD 83	0.0	NAVD 83

Example: To convert the elevation in NAVD 83 to the elevation in the 010000 planning district, subtract 0.0 from the elevation in NAVD 83.

Flood Location Map

The **Map Index** shows the location of this map panel and provides a listing of communities included in the FIS. The **Map Index** also provides a listing of communities included in the FIS. The **Map Index** also provides a listing of communities included in the FIS.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD)

ZONE AO - 1% Annual Chance Flood (1% Annual Chance Flood)

ZONE AE - 1% Annual Chance Flood (1% Annual Chance Flood)

ZONE AH - 1% Annual Chance Flood (1% Annual Chance Flood)

OTHER FLOOD AREAS

ZONE A - Areas of 1% Annual Chance Flood (1% Annual Chance Flood)

ZONE B - Areas of 1% Annual Chance Flood (1% Annual Chance Flood)

OTHER AREAS

ZONE C - Areas of 1% Annual Chance Flood (1% Annual Chance Flood)

ZONE D - Areas of 1% Annual Chance Flood (1% Annual Chance Flood)

UNINCORPORATED AREAS

BOUNDARIES

PLANNING DISTRICT

COMMUNITY

ROAD

RAILROAD

WATERWAY

UTILITY

SPRING

WELL

WATER TOWER

WATER TREATMENT PLANT

WATER PUMP STATION

WATER RESERVOIR

WATER CONDUIT

WATER MAIN

WATER SERVICE LINE

WATER METER

WATER VALVE

WATER METER BOX

WATER METER ENCLOSURE

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WATER METER REPLACEMENT

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WATER METER INSPECTIONS

WATER

FLOOD INSURANCE STUDY

VOLUME 1 OF 4



BOULDER COUNTY, COLORADO AND INCORPORATED AREAS

<i>Community Name</i>	<i>Community Number</i>
BOULDER, CITY OF	080024
BOULDER COUNTY (UNINCORPORATED AREAS)	080023
ERIE, TOWN OF	080181
JAMESTOWN, TOWN OF	080216
LAFAYETTE, CITY OF	080026
LONGMONT, CITY OF	080027
LOUISVILLE, CITY OF	085076
LYONS, TOWN OF	080029
NEDERLAND, TOWN OF	080255
SUPERIOR, TOWN OF	080203
*WARD, TOWN OF	080292

Boulder County



* No Special Flood Hazard Areas Identified

Revised: December 18, 2012



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
08013CV001B

Table 4 – Summary of Discharges (Continued)

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharges (cfs)</u>			
		<u>10-Percent Annual Chance</u>	<u>2-Percent Annual Chance</u>	<u>1-Percent Annual Chance</u>	<u>0.2-Percent Annual Chance</u>
Bullhead Gulch (continued)					
Just Downstream of Confluence of Prince Tributary	8.16	1,474	3,581	4,772	6,275
Just Upstream of Confluence of Prince Tributary	5.61	683	1,935	2,639	3,474
Just Downstream of Confluence of Indian Peaks	2.14	374	970	1,333	1,811
Just Upstream of Confluence of Indian Peaks	1.59	190	532	760	1,251
At Upstream Limit of Detailed Study	0.64	294	575	774	1,041
Clover Basin Tributary	-- ¹	178	400	495	854
At 75th Street					
Coal Creek					
Near Erie Municipal Airport	68.61	5,970	9,670	11,850	17,860
At Union Pacific Railroad near Erie	76.86	6,160	10,020	12,250	18,340
At Briggs Street	77.48	6,160	10,040	12,280	18,380
At Confluence of Rock Creek	59.3	5,120	8,740	10,640	15,920
At a Point 65,250 feet above Mouth	37.6	2,860	3,620	4,250	6,260
At Burlington Northern and Santa Fe Railway	36.3	2,330	3,490	4,120	6,170
At U.S. Highway 287	35.6	2,370	3,480	4,110	6,160
At a Point 70,350 feet above Mouth	33.7	2,230	3,420	4,040	6,060
At Denver-Boulder Turnpike	27.9	1,740	3,070	3,820	6,030
At McCaslin Boulevard	26.7	1,400	2,980	3,770	5,990
Dry Creek					
At Confluence with Dry Creek No. 2 Ditch	-- ¹	-- ¹	-- ¹	4,030	-- ¹
Split Flow					
At Downstream Limit of Detailed Study	-- ¹	-- ¹	-- ¹	6,630	-- ¹
Dry Creek No. 1					
Just Upstream of Steele Lakes Tributary	-- ¹	271	674	987	1,812
Just Upstream of the Confluence of Clover Basin Tributary	-- ¹	568	1,268	1,726	3,112
Just Upstream of State Highway 119	-- ¹	340	845	1,170	2,127

¹ Data Not Available

The cross sections were digitized from aerial photography. All major culverts and bridges were field inspected and measured.

Manning's "n" values for Bullhead Gulch and Prince Tributary (East and West Branches) ranged from 0.035 to 0.045 in the channel areas and 0.04 to 0.45 in the overbank areas.

Town of Jamestown

The results obtained from the HEC-2 computer model for James Creek, Little James Creek, and Balarat Creek were verified by comparing them to ground photographs of the 1969 flood through Jamestown.

Cross sections were obtained by field measurements. Bridges in this study were analyzed using a blockage criteria dependent upon bridge construction and water depth. Concrete and steel bridges were assumed unobstructed until the upstream WSEL reached the bridge "low steel" elevation, at which time the bridge was assumed fully obstructed. Wooden bridge decks were assumed destroyed due to debris. This type of bridge was assumed unobstructed at all discharges with wingwalls and abutments in place but the deck removed. Head losses at fully obstructed bridges were determined by weir computations. Unobstructed bridge losses were computed by using the normal bridge routine in HEC-2.

Manning's "n" values were estimated by field investigation using a paper by V.V. Golubstov (Reference 47). The roughness values for the main channels ranged from 0.030 to 0.750, and for the overbanks from 0.060 to 0.100. WSELs for James Creek were started at normal depth. WSELs for Little James Creek and Balarat Creek were started at their respective confluence elevations resulting from coincident discharges.

City of Lafayette and Town of Superior

The water surface elevations for the selected recurrence intervals on Coal Creek and Rock Creek were computed using HEC-2 (Reference 45). The starting WSELs for Coal Creek were obtained from the report by Hurst and Associates, Inc. (Reference 90). The starting WSELs for Rock Creek were obtained using a rating curve generated with the Federal Highway Administration (FHA) HY-8 hydraulic computer program for culvert analysis that was adjusted for bend losses.

The hydraulic analysis for Coal Creek is complicated by three flow splits that occur at the Community and Coal Creek Ditch crossings and at the abandoned railroad embankment upstream of Second Avenue. No Coal Creek flow is assumed to be conveyed in the ditches. However, the diversion structures in the creek, and the ditch banks, cause portions of the Coal Creek flow to leave the creek, follow the ditch banks, and overtop the ditch banks further downstream to return to the creek. The ditches potentially divert and spill flows along their length, but other than the impact of the ditch banks described above, ditch spilling and flooding is not modeled or shown on the FIRM. The flow splits for the ditches and the railroad are modeled using the HEC-2 split flow routine.

Manning's "n" values used in the hydraulic computations for the detailed study of Coal Creek were taken from the data generated in the SCS report (Reference 18). On Coal Creek, roughness values for the main channel ranged from 0.09 to 0.11. Overbank

roughness values ranged from 0.07 to 0.09. The roughness values appear high. However, they should be used for all future LOMRs in order to be consistent with the SCS hydrology calculations. Roughness factors used in the hydraulic computation for the detailed study of Rock Creek were chosen by engineering judgment and based on field observations (Reference 85). On Rock Creek, roughness values for the main channel ranged from 0.035 to 0.08. Overbank roughness values ranged from 0.03 to 0.085. Manning's roughness values at structures ranged from 0.013 to 0.03.

Cross section data for Coal Creek and Rock Creek were taken from photography and mapping of the study area. Base mapping for Rock and Coal Creeks was compiled by CH2M Hill, for ASI and TEA, at a scale of 1:2,400 from December 1994 aerial photography. Modifications to the base mapping were made by Taggart Engineering Associates, Inc. (TEA) to incorporate structures to be built by April 1997 (Reference 89). Information for the modification was obtained from design drawings prepared by individual consulting firms. All existing bridges and culverts were field surveyed to obtain elevation data and structural geometry.

City of Longmont

WSELs of floods of the selected recurrence intervals were computed through the use of the USACE HEC-2 water-surface profiles computer program (Reference 45). Starting WSELs for Lefthand Creek and Spring Gulch correspond to the computed WSELs for the St. Vrain Creek at the confluence of the two streams.

The flooding in Loomiller Basin is in the form of sheet runoff, in which velocities are low, in depths less than 1.0 foot.

Detailed cross section data for St. Vrain Creek were obtained from the USACE and supplemented with additional cross sections taken from maps at a scale of 1:4,800, with a contour interval of 2 feet, also prepared by the USACE (Reference 6). Detailed cross sections for Lefthand Creek, and Spring Gulch were field surveyed in September 1975. The cross sections were located at close intervals above and below bridges and culverts in order to accurately compute backwater effects at these structures. USGS topographic mapping enlarged to a scale of 1:6,000, with a contour interval of 10 feet, was used to supplement field-survey data (Reference 48).

Manning's "n" values for these computations were assigned on the basis of field inspection of the floodplain areas and engineering judgment. Bridge geometry and elevation information was obtained from the Colorado State Highway Department and Longmont, when available, and measured in the field.

The hydraulic analyses for Dry Creek No. 1, Dry Creek No. 1 (Old Channel), Clover Basin Tributary, and Steele Lakes Tributary were taken from the Floodplain Information and Flood Control and Drainage Plan for Dry Creek No. 1 (Reference 3). The WSELs for the 10-, 2-, 1-, and 0.2-percent annual chance floods were computed using the USACE HEC-2 step backwater computer program (Reference 45). Starting WSELs for Dry Creek No. 1 correspond to the computed WSELs for the St. Vrain Creek at the confluence.

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COAL CREEK (cont.)								
W	44,170	811	3,889	3.0	5,092.4	5,092.4	5,093.4	1.0
X	46,360	135	1,700	6.8	5,096.1	5,096.1	5,096.6	0.5
Y	65,300	211	14,756	2.9	5,145.8	5,145.8	5,146.8	1.0
Z	66,210	540	2,545	1.6	5,148.6	5,148.6	5,149.6	1.0
AA	66,600	349	1,691	2.4	5,151.2	5,151.2	5,152.2	1.0
AB	67,210	230	913	4.5	5,155.9	5,155.9	5,156.9	1.0
AC	71,760	1,650	3,048	1.4	5,190.7	5,190.7	5,191.7	1.0
AD	72,960	196	1,047	4.1	5,197.9	5,197.9	5,198.9	1.0
AE	76,870	113	664	6.1	5,236.2	5,236.2	5,237.2	1.0
AF	78,140	151	883	4.6	5,248.9	5,248.9	5,249.9	1.0
AG	79,990	194	903	4.5	5,260.8	5,260.8	5,261.8	1.0
AH	98,059	223	706	4.9	5,447.7	5,447.7	5,448.3	0.6
AI	99,540	430	2,326	1.6	5,467.2	5,467.2	5,467.3	0.1
AJ	100,297	440	1,610	2.3	5,471.3	5,471.3	5,472.0	0.7
AK	100,924	196	794	4.8	5,479.1	5,479.1	5,479.1	0.0
AL	101,526	290	1,145	3.3	5,488.0	5,488.0	5,488.4	0.4
AM	102,160	150/130 ²	763	5.0	5,494.3	5,494.3	5,495.3	1.0
AN	102,352	627	813	4.6	5,500.5	5,500.5	5,500.6	0.1
AO	103,127	324	1,345	2.8	5,507.9	5,507.9	5,508.3	0.4
AP	103,944	506	825	4.4	5,519.7	5,519.7	5,520.3	0.6
AQ	104,489	457	1,262	2.9	5,526.4	5,526.4	5,526.5	0.0
AR	105,919	482	1,099	3.4	5,539.9	5,539.9	5,540.4	0.5

¹Feet above confluence with Boulder Creek

²Left channel/right channel

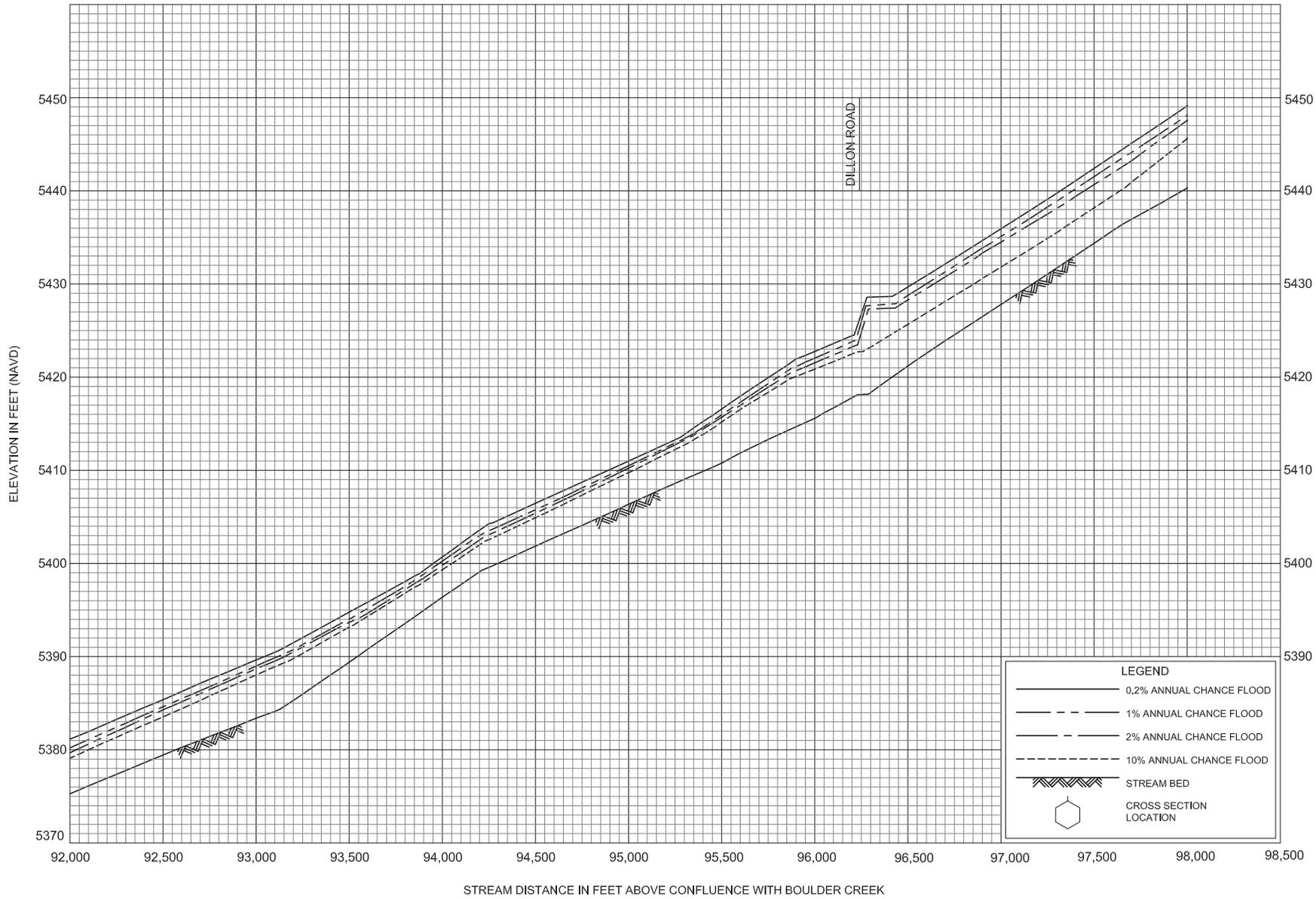
TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BOULDER COUNTY, CO
AND INCORPORATED AREAS**

FLOODWAY DATA

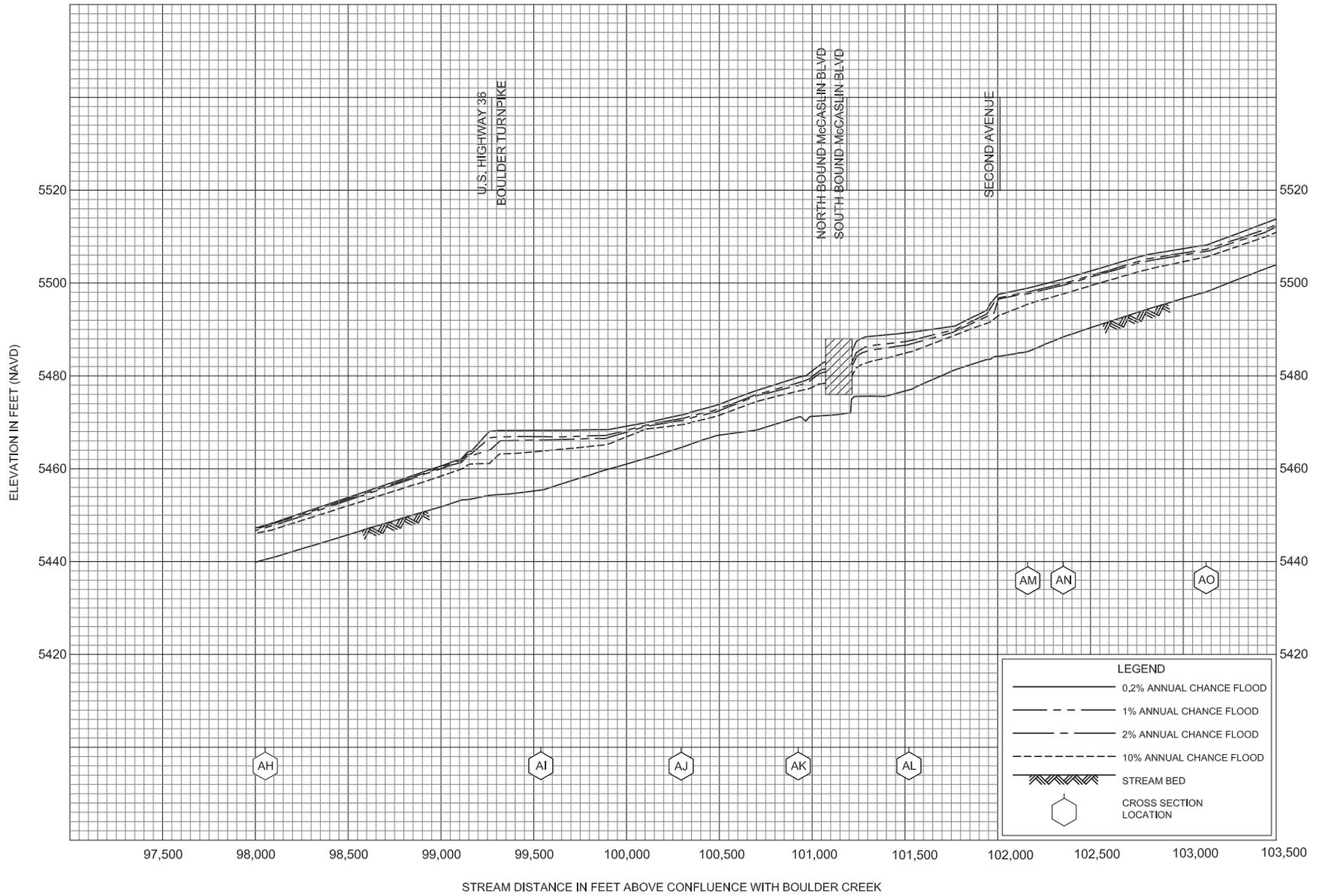
COAL CREEK



FLOOD PROFILES

COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
BOULDER COUNTY, CO
 AND INCORPORATED AREAS

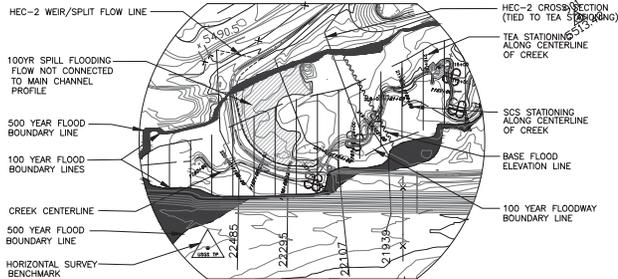


FLOOD PROFILES

COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOULDER COUNTY, CO
AND INCORPORATED AREAS



LEGEND

Second Ave. bridge details from field survey and abutment modification plans Sept. '95.
 Bridge width = 30.0'.
 Deck elevation = 5494.2
 Low chord = 5492.58
 100 year over road = 1970 cfs.
 100 year through bridge = 1800 cfs.

McCaslin Blvd. bridge details from EMK and MWE drawings.
 Single span bridge width = 71'.
 Deck elevation = 5486.60
 Low chord = 5483.56
 MWE cross section used in HEC-2. Bridge complete as of January '97.

NOTE: DETAIL FOR THESE AREAS OUT OF 100YR FLOODPLAIN TAKEN FROM HEC-2 SECTION 13158. HEC-2 SECTIONS WERE TAKEN DIRECTLY FROM AERIAL PHOTOGRAPHY AND ARE MORE ACCURATE THAN TOPO.

AREAS OUT OF 100YR FLOOD BUT IN 500YR

Note: TEA data and mapping is based on 1988/93 NAVD. Conversion to SCS datum on Coal Creek is SCS Tool Creek elevation +2.56 = 1988/93 NAVD.

TEA section 8426 is at a similar location to SCS section 91. SCS WSEL (Based on Hurst & Assoc. HEC-2) is below critical depth for the TEA section. (TEA modeling based on mapping from aerial photography, Hurst & Assoc. modeling based on combination of mapping and design grading. Therefore, TEA Hec-2 begins at critical WSEL, which is 0.3' above SCS WSEL.)

100 year flow over Highway 36 = 185 cfs
 Length of overflow "weir" = 300' per HEC-2

Highway 36 (2.7 ft. high) concrete barrier (surveyed in field) added to cross section taken from aerial photography and used as control in HEC-2. Low Point in barrier = 5465.8

HYDRAULIC NOTE:
 Floodway only modeled through culvert. Significant flow occurs over roadway, therefore, this area should be considered within the floodway.

HYDRAULIC NOTE:
 Floodway only modeled through culvert. Significant flow occurs over roadway, therefore, this area should be considered within the floodway.

FLOOD COMBINATION OF BACKWATER OF TERRY CREEK AND INFLOW OF SHALLOW SPILLAGE. APPROX. ELEV. 5509 TO 5510.

Map base on 1"=200' topographic mapping prepared by CH2M Hill from photographs taken December, 1984. Adjustments made by Taggart Engineering Associates, Inc. per drawings by McLaughlin Water Engineers, Inc., for structures to be built by April, 1997.
 Elevations are based on a closed level loop beginning and ending on USGS Bench Mark 1-ROB 1962, by Arrow Engineering and Surveying, Inc. Elevations based on the 1988/1983 National Vertical Datum. Coordinates are Modified State Plane 1988.

TAGGART
 ENGINEERING ASSOCIATES
 600 N. 2ND ST., SUITE 100
 COAL CREEK, WY 82401
 PHONE: 307-326-1100
 FAX: 307-326-1101

FLOOD INSURANCE STUDY WORK MAP COAL CREEK

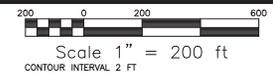
BENCHMARK DESCRIPTIONS

NAME	ELEVATION
103/26	5499.63 1988/93 NAVD OR 5496.37 1929 NGVD
100/43A	5465.88 1988/93 NAVD OR 5462.62 1929 NGVD

DESCRIPTION
 600 NAIL ON WEST P.P. AT N.E. CORNER OF 2ND AVE. AND COAL CREEK DRIVE
 CHISELED SQUARE N.W.R.I. CORNER OF HEAD WALL OF THE BRIDGE OVER COAL CREEK AT BEGIN WING WALL



SHEET LAYOUT



SHEET NO.

1



FLOOD HAZARD AREA DELINEATION COAL CREEK AND ROCK CREEK

Project Sponsors



URBAN DRAINAGE AND
FLOOD CONTROL DISTRICT



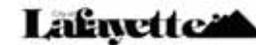
BOULDER COUNTY



CITY AND COUNTY OF
BROOMFIELD



TOWN OF ERIE



CITY OF
LAFAYETTE



CITY OF
LOUISVILLE



TOWN OF
SUPERIOR

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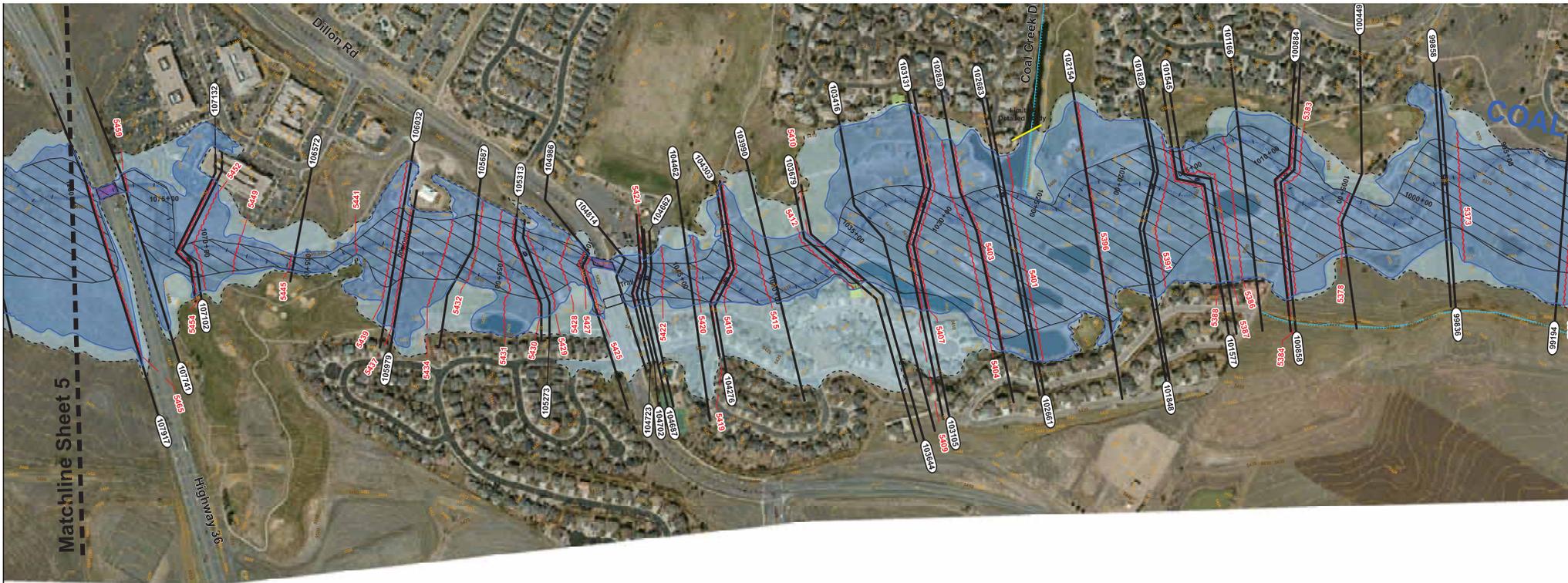
November 2014

Station	Design Point	Location	Drainage Area		100-Year	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year		500-Year	
			Runoff Volume FuLU (ac-ft)	Existing (cfs)	Future (cfs)														
	2110		352	0.6	0.5	20	260	41	410	80	520	200	770	260	920	340	1,100	500	1,460
	2150		238	0.4	0.3	19	69	52	130	120	220	260	390	330	500	430	620	620	870
	2210		1,397	2.2	1.7	180	350	370	640	620	970	1,170	1,670	1,490	2,080	1,900	2,580	2,660	3,570
	2220		779	1.2	1.0	160	290	290	490	470	710	820	1,160	1,030	1,430	1,290	1,750	1,800	2,390
	2250		167	0.3	0.2	1	66	3	110	20	150	79	260	110	320	150	400	220	550
	2260		296	0.5	0.3	2	33	5	61	29	99	110	210	150	270	210	350	310	490
	2300		1,173	1.8	1.6	210	540	400	910	640	1,290	1,180	2,070	1,480	2,520	1,870	3,080	2,620	4,190
	2310		937	1.5	1.2	170	450	310	750	500	1,060	920	1,680	1,160	2,060	1,460	2,500	2,040	3,400
	2320		345	0.5	0.4	34	170	71	280	140	400	290	650	380	810	480	980	690	1,360
	2350		579	0.9	0.7	61	140	120	240	200	350	420	630	540	780	700	980	1,000	1,360
	2360		318	0.5	0.4	57	160	100	250	160	350	310	560	390	680	490	820	700	1,120
	2370		353	0.6	0.4	79	120	140	210	220	300	380	490	470	600	590	740	810	1,000
	2390		206	0.3	0.3	84	90	140	150	190	200	320	330	390	400	480	490	650	680
	2410		1,484	2.3	1.6	81	160	200	340	450	620	1,000	1,230	1,310	1,580	1,730	2,040	2,500	2,910
	2420		837	1.3	0.9	84	110	170	200	320	360	650	700	830	900	1,070	1,140	1,520	1,620
	2430		363	0.6	0.3	11	14	29	35	83	90	200	210	260	270	350	360	510	520
	2440		385	0.6	0.4	73	84	140	150	220	240	410	440	520	550	650	690	910	950
	2450		195	0.3	0.2	20	22	43	46	80	84	160	170	200	210	260	270	370	380
	2460		369	0.6	0.4	10	39	36	83	97	150	230	310	300	390	400	500	570	710
	2510		297	0.5	0.4	110	110	190	190	260	260	440	440	540	540	660	660	910	910
	2519		297	0.5	0.4	110	110	190	190	260	260	440	440	540	540	660	660	910	910
	2600		193	0.3	0.2	51	74	91	130	180	180	260	320	330	400	410	500	590	700
	2610		322	0.5	0.4	140	140	220	230	310	320	500	500	610	610	740	740	1,000	1,000
	2710		130	0.2	0.2	32	61	55	100	84	140	160	230	200	290	250	360	360	490
	2720		1,070	1.7	1.2	200	220	350	380	540	590	1,040	1,100	1,300	1,370	1,640	1,730	2,310	2,420
	2730		687	1.1	0.8	160	170	280	280	420	430	770	770	950	950	1,190	1,190	1,660	1,660
	2740		589	0.9	0.7	130	130	230	230	350	350	630	630	780	790	980	980	1,370	1,370
	2760		178	0.3	0.2	59	60	99	100	140	140	240	250	300	310	370	380	520	530
	2800	Coal Creek-Cherry St	861	1.3	1.0	170	270	300	450	470	640	900	1,090	1,130	1,350	1,430	1,680	2,010	2,340
	2810		381	0.6	0.4	49	59	89	110	150	170	300	340	380	430	490	550	710	780
	2812		663	1.0	0.8	130	220	230	370	350	510	680	870	850	1,070	1,080	1,330	1,530	1,850
	2820		274	0.4	0.3	22	32	42	58	79	100	180	210	230	270	300	350	430	490
	2830		282	0.4	0.4	100	220	180	340	260	450	450	680	550	820	690	990	960	1,340
	2900		436	0.7	0.5	44	67	83	120	140	190	300	370	390	470	500	610	720	860
	3000	Coal Creek-Denver Boulder Turnpike (Hwy 36)	16,886	26.4	10.2	92	100	150	170	190	220	800	800	1,720	1,740	3,660	3,680	7,350	7,370
	3020	Coal Creek-McCaslin Boulevard	16,446	25.7	9.8	7	7	25	30	91	98	770	770	1,710	1,730	3,640	3,670	7,300	7,340
	3040		15,513	24.2	9.1	2	3	28	32	96	100	790	810	1,750	1,770	3,690	3,720	7,340	7,370
	3050		15,310	23.9	8.9	3	3	28	33	97	110	800	820	1,760	1,790	3,710	3,740	7,350	7,390
	3060		15,200	23.8	8.9	3	3	28	33	97	110	800	820	1,760	1,790	3,710	3,740	7,350	7,390
	3070		14,310	22.4	8.3	2	3	28	33	95	100	800	820	1,760	1,780	3,670	3,700	7,200	7,240
	3072		15,200	23.8	8.9	3	3	28	33	98	110	800	820	1,760	1,790	3,710	3,740	7,350	7,390
	3080		13,780	21.5	8.0	3	3	28	33	92	100	790	810	1,740	1,760	3,620	3,650	7,090	7,120
	3110		12,653	19.8	7.4	2	4	29	34	98	110	820	840	1,750	1,770	3,580	3,610	6,940	6,980
	3200	Coal Creek-CO 93	12,026	18.8	7.0	2	4	31	36	100	110	830	850	1,750	1,780	3,560	3,590	6,860	6,900
	3210		11,590	18.1	6.7	2	4	31	36	95	100	820	840	1,730	1,750	3,500	3,530	6,720	6,760
	3220		11,278	17.6	6.5	3	5	33	38	110	120	830	860	1,730	1,760	3,510	3,540	6,710	6,750
	3230		10,601	16.6	6.0	3	4	33	38	69	74	830	850	1,700	1,730	3,410	3,440	6,490	6,520
	3240		10,242	16.0	5.7	3	4	33	38	63	68	830	850	1,690	1,720	3,370	3,400	6,380	6,420
	3250		9,980	15.6	5.5	3	4	34	39	60	70	820	840	1,670	1,700	3,320	3,350	6,300	6,340
	3260	Coal Creek-CO 72 - Easternmost crossing pt.	9,530	14.9	5.2	4	4	38	44	67	78	840	870	1,690	1,720	3,340	3,370	6,260	6,290

**Floodplain and Floodway Data Table
Upper Coal Creek (Page 4 of 5)**

REFERENCE LOCATION	RIVER STATION	CROSS SECTION	THALWEG ELEVATION (FT)	PEAK DISCHARGE				WATER SURFACE ELEVATION				100-YEAR FLOODPLAIN		100-YEAR FLOODWAY (0.5' EGL)				NOTE #	COMMENT	
				10-YR FLOW (CFS)	50-YR FLOW (CFS)	100-YR FLOW (CFS)	500-YR FLOW (CFS)	10-YR WSEL (FT)	50-YR WSEL (FT)	100-YR WSEL (FT)	500-YR WSEL (FT)	WIDTH (FT)	EGL (FT)	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)			SURCHARGE (FT)
Reach: Upper Coal Creek																				
DS of Golf Course Bridge	1059+79	105979	5431.0	220	1780	3740	7390	5434.4	5436.1	5436.9	5437.7	581	5437.3	5437.2	300	649	5.8	0.3	1	
US of Golf Course Bridge	1060+32	106032	5430.3	220	1780	3740	7390	5434.8	5437.6	5438.7	5439.7	793	5439.0	5439.0	374	1167	3.2	0.3	1	
	1065+72	106572	5436.8	220	1780	3740	7390	5440.3	5442.9	5444.9	5447.7	76	5446.9	5444.9	60	299	12.5	0.2	2	
DS of Golf Course Bridge	1071+02	107102	5443.2	220	1780	3740	7390	5447.5	5451.5	5452.8	5453.8	596	5453.2	5453.1	187	655	5.7	0.4	1	
US of Golf Course Bridge	1071+32	107132	5443.2	220	1780	3740	7390	5447.6	5452.7	5454.2	5456.5	642	5454.9	5454.3	163	800	4.7	0.0	1	
DS of Highway 36	1077+41	107741	5452.2	220	1780	3740	7390	5454.4	5457.4	5459.1	5461.4	787	5461.1	5459.1	350	506	11.4	0.0	1 & 2	
US of Highway 36	1079+17	107917	5452.6	220	1780	3740	7390	5456.5	5460.7	5465.2	5466.9	1069	5465.3	5465.2	530	3454	2.7	0.0	1 & 2	
	1084+45	108445	5460.0	110	1780	3740	7390	5461.3	5464.3	5466.0	5467.6	759	5466.2	5466.0	559	867	4.3	0.0	1	
	1089+45	108945	5465.0	110	1780	3740	7390	5467.5	5470.4	5470.4	5471.4	343	5471.3	5470.9	180	515	7.3	0.4	1	
	1092+82	109282	5469.2	110	1780	3740	7390	5471.0	5473.9	5475.4	5476.4	390	5475.8	5475.6	194	655	5.7	0.2		
DS of McCaslin Blvd	1096+43	109643	5471.5	110	1780	3740	7390	5474.4	5478.3	5479.0	5481.5	220	5481.1	5479.5	80	361	10.4	0.5	1 & 2	
US of McCaslin Blvd	1098+79	109879	5471.8	110	1780	3740	7390	5475.6	5481.8	5484.5	5489.2	496	5485.0	5484.5	115	618	6.1	0.0	1 & 2	
	1101+87	110187	5478.4	110	1780	3740	7390	5479.8	5484.9	5486.5	5489.8	281	5487.2	5486.5	167	516	7.3	0.0	1	
DS of 2nd Avenue	1105+69	110569	5483.6	110	1780	3740	7390	5486.0	5490.8	5491.8	5495.1	152	5495.0	5492.1 ^a	152	496	13.7	0.3	1 & 2	
US of 2nd Avenue	1106+31	110631	5483.5	110	1780	3740	7390	5486.5	5492.7	5496.1	5496.9	844	5496.4	5496.6	715	1437	2.6	0.5	1	
	1109+82	110982	5488.9	110	1780	3740	7390	5490.9	5497.1	5498.7	5500.1	447	5499.8	5498.9	346	426	8.8	0.2	1	
	1114+66	111466	5495.6	110	1780	3740	7390	5497.6	5502.5	5503.9	5505.2	517	5504.1	5504.2	185	806	4.6	0.3	1 & 4	
	1118+58	111858	5500.2	110	1780	3740	7390	5502.2	5506.2	5507.3	5508.5	212	5508.2	5507.4	158	445	8.4	0.1	1 & 4	
	1124+79	112479	5508.0	110	1780	3740	7390	5510.7	5515.0	5516.9	5518.4	265	5517.6	5517.1	107	555	6.7	0.2	1 & 4	
	1129+12	112912	5514.6	110	1780	3740	7390	5516.5	5520.1	5521.7	5523.4	126	5522.4	5521.8	115	526	7.1	0.1	4	
	1131+45	113145	5518.2	110	1780	3740	7390	5521.0	5523.3	5524.9	5526.7	219	5525.4	5525.0	160	608	6.2	0.1	4	
DS of Coal Creek Trail Crossing	1133+28	113328	5521.4	110	1780	3740	7390	5523.4	5526.7	5529.1	5530.5	350	5530.4	5529.2	289	500	10.2	0.1	1, 2 & 4	
US of Coal Creek Trail Crossing	1133+53	113353	5519.6	110	1780	3740	7390	5523.5	5529.2	5532.6	5534.7	408	5532.8	5532.7	300	1173	4.1	0.1	1, 2 & 4	
	1136+98	113698	5523.8	110	1780	3740	7390	5525.3	5530.9	5533.3	5535.5	263	5533.5	5533.4	161	785	4.8	0.1		
	1140+31	114031	5528.0	110	1780	3740	7390	5530.0	5532.5	5533.9	5536.0	727	5534.1	5534.2	370	966	3.9	0.3		
	1141+87	114187	5528.9	110	1780	3740	7390	5530.2	5532.9	5534.1	5536.0	544	5534.4	5534.5	406	958	3.9	0.4		
	1148+57	114857	5537.2	110	1780	3740	7390	5538.4	5540.4	5541.1	5541.9	764	5541.7	5541.5	629	567	6.6	0.4	1	
	1156+32	115632	5545.6	110	1780	3740	7390	5548.2	5551.4	5552.4	5553.3	313	5552.9	5552.6	155	576	6.5	0.2	1	
	1163+08	116308	5555.6	110	1780	3740	7390	5556.7	5558.8	5559.8	5561.0	434	5560.4	5560.0	340	598	6.3	0.1	1	
	1171+69	117169	5565.0	110	1780	3740	7390	5566.9	5570.5	5570.9	5571.6	749	5571.5	5571.4	556	632	5.9	0.4	1	
	1180+75	118075	5574.4	110	1780	3740	7390	5576.4	5578.7	5579.4	5580.1	705	5579.7	5579.9	525	940	4.0	0.5	1	
	1186+89	118689	5580.7	110	1780	3740	7390	5582.8	5586.2	5587.1	5588.7	155	5588.3	5587.1 ^a	155	432	8.7	0.1	1	
	1192+27	119227	5587.0	110	1780	3740	7390	5589.5	5593.0	5595.3	5596.3	464	5595.8	5595.5	236	643	5.8	0.2		
	1198+37	119837	5593.1	110	1780	3740	7390	5596.5	5600.6	5601.6	5602.5	513	5602.2	5602.0	228	554	6.8	0.4		
	1203+85	120385	5599.1	110	1780	3740	7390	5602.5	5606.6	5607.5	5608.2	446	5607.8	5607.9	317	710	5.3	0.4		
	1208+28	120828	5604.0	110	1780	3740	7390	5606.6	5611.7	5612.7	5614.2	354	5613.5	5613.1	181	495	7.6	0.4		
	1212+18	121218	5609.6	110	1780	3740	7390	5611.8	5616.7	5617.7	5618.7	420	5618.1	5618.0	316	690	5.4	0.3	1	
	1215+15	121515	5613.7	110	1780	3740	7390	5615.8	5619.8	5621.6	5622.9	402	5622.7	5622.0	287	659	7.7	0.4	1 & 2	

^a Floodway is equal to floodplain. Notes: 1. Floodplain and/or Floodway top width include high ground or obstruction 4. 500-year event includes shallow flooding in overbank(s)
2. Floodplain and/or Floodway top width include ineffective flow area
3. Adjacent Detention

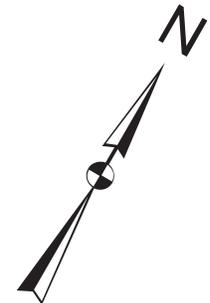


Instructions to print an area smaller than the full page to scale:

1. Using the "Snapshot" tool, select the desired area to print.
2. Click File>Print...
3. Select your printer from the printer dropdown menu.
4. Set the desired paper size using the printer "Properties" menu.
5. Choose the "Selected Graphic" option under "Print Range".
6. Select "None" from the "Page Scaling" dropdown menu.
7. Unselect "Choose Paper Source by PDF Page Size".
8. Click "OK" to print selection.

Map Legend

	HEC-RAS Cross Section		100-Year Floodplain (1% Annual Exceedance Probability)
	Base Flood Elevation		500-Year Floodplain (0.2% Annual Exceedance Probability)
	Channel Alignment		Shallow Flooding Zone
	Matchline		Floodway (0.5 Foot Rise)
	Major (10 Foot)		Road
	Minor (2 Foot)		Railroad
	Separation of Flooding Source		Recreation Path/Trail
	Bridge		Canal/Ditch
	Culvert		Structures in Floodplain
	Irrigation		



Appendix B

Effective HEC-2 Output

Pre-Project Conditions HEC-RAS Output

Post-Project Conditions HEC-RAS Output

**COAL CREEK HEC-2 INFORMATION FROM FEMA FIS
REQUEST**

Coal Creek		Floodway			Base Flood Water Surface Elevation										
Cross Section	Distance [feet]	Width [feet]	Section Area [square feet]	Mean Velocity [feet per second]	Regulatory	Without Floodway	With Floodway	Increase							
					[feet NGVD]				ALOB	ACH	AROB	VLOB	VCH	VROB	
J	97676	460	1455	2.36	5442.0	5442.0	5443.0	1.0	8426	338.1	582.5	534.5	1.54	2.84	2.35
K	100532	477	957	3.94	5472.5	5472.5	5472.5	0.0	11282	333.9	526.7	96.1	2.85	4.64	3.89
L	104000	606	562	6.49	5518.9	5518.9	5519.0	0.0	14750	0	562.4	0	0	6.49	0
M	106459	317	781	4.83	5545.3	5545.3	5545.3	0.0	17209	291.4	489.3	0	4.81	4.84	0
N	109559	322	1168	3.23	5583.5	5583.5	5584.0	0.5	20309	0	917	251.3	0	3.41	2.58
O	110258	280	928	4.07	5590.5	5590.5	5590.9	0.5	21008	113.2	471.5	343.1	2.41	4.68	3.77
P	113531	364	1699	2.22	5631.9	5631.9	5631.9	0.1	24281	0	1699.4	0	0	2.22	0
Q	116284	203	672	5.61	5667.5	5667.5	5667.8	0.3	27034	244.1	427.6	0	4.29	6.37	0
R	118051	333	1048	3.60	5691.4	5691.4	5692.4	1.0	28801	411.6	455.6	181.2	3.05	3.93	4.01

¹feet above confluence with Boulder Creek

**MARTIN/MARTIN HAS SHOWN THE HEC-2
INFORMATION THAT IS RELEVANT TO THE
COAL CREEK BUSINESS PARK FLOODPLAIN
STUDY**

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1*****
* HEC-2 WATER SURFACE PROFILES *
* * *
* Version 4.6.2; May 1991 *
* * *
* RUN DATE 05JAN98 TIME 14:43:35 *
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616-4687 *
* (916) 756-1104 *
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PAGE 1

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*****
HEC-2 WATER SURFACE PROFILES
Version 4.6.2; May 1991
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T1 TAGGART ENGINEERING ASSOCIATES, INC
T2 "COALFEW3.DAT" 01/3/98 FLOODWAY NO SPLIT-Q'S REFLECT SPLITS FROM "coalnew6
T3 COAL CREEK - INCLUDES FLOODWAY ENCROACHMENTS (X3 CARDS)
T4 START AT SCS/HURST/MWE CROSS SECTION LOCATION 91
T5 HURST WATER SURFACE 5439.1 + 2.6 DATUM CONVERSION
T6 MWE MCCASLIN BRIDGE MODEL GOLFEFF.HE2 CROSS SECTIONS + 3.3 DATUM CONVERSION
T7 MANNING'S N FROM HURST HEC2 MODEL COAL3A DATED 4/17/90 DOWN STREAM OF HWY. 36
T8 MANNING'S N FROM SCS WSP2 MODELS DATED 1975 UPSTREAM OF HWY. 36
T9 NOTE!!! Q'S DOWNSTREAM OF 36 ARE FOR FLOW THROUGH BRIDGE ONLY!! - 100 YR FLOW

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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL
	0	2	0	0	0	0	0	0	5443.02
J2	NPROF	IPLT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM
	1	0	-1				-1		

COAL CREEK FLOODWAY MODEL

- X3 CARDS USED IN PLACE OF ET CARDS FOR FLOODWAY MODELING (X3.4 AND X3.6 ARE LEFT AND RT FLOODWAY STATIONS)
- TOPWID REPORTED IN OUTPUT TABLES REPRESENTS EFFECTIVE TOPWIDTH. INEFFECTIVE TOPWIDTH MUST BE ADDED TO DETERMINE MAPPED OR TOTAL TOPWIDTH FOR SOME CROSS SECTIONS

MODEL STATION = FIS STATION - 89250
 8426 = 97676 - 89250

QT 3 3434 3434 3434

NC	.07	.07	.09	.1	.3						
HURST 91 CROSS SECTION LOCATION Q100,Q500 REDUCED TO FLOW THROUGH BRIDGE											
X1	8426	54	1715.5	1866.6	0	0	0				
X3	10			1102.5	5448.5						
GR	5444.0	1000.0	5442.0	1032.2	5440.0	1040.8	5439.0	1044.0	5440.0	1044.0	
GR	5442.0	1051.7	5444.0	1060.8	5446.0	1067.6	5448.0	1086.1	5448.5	1102.5	
GR	5448.0	1115.2	5447.9	1117.9	5448.0	1123.4	5448.3	1140.8	5448.0	1165.7	
GR	5446.0	1280.7	5444.0	1359.0	5442.0	1412.8	5441.7	1451.3	5442.0	1515.2	
GR	5442.0	1545.3	5442.0	1705.7	5442.0	1715.5	5440.0	1786.3	5438.0	1795.1	
GR	5436.0	1814.9	5435.4	1819.6	5436.0	1825.4	5438.0	1852.0	5440.0	1861.2	
GR	5442.0	1866.6	5442.7	1909.1	5442.0	1942.3	5440.0	1978.3	5439.1	1997.5	
GR	5440.0	2019.1	5442.0	2027.9	5441.3	2034.4	5442.0	2061.6	5440.6	2121.5	
GR	5442.0	2169.6	5444.0	2245.8	5446.0	2255.0	5448.0	2289.4	5448.4	2324.9	
GR	5448.0	2330.9	5446.0	2362.9	5448.0	2475.6	5450.0	2575.4	5452.0	2622.2	
GR	5454.0	2646.5	5456.0	2668.5	5458.0	2690.9	5460.0	2712.1			

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X1	8646	0	0	0	219.5	219.5	219.5	0	2.25	0
X3	10			1102.5	5448.5					

HURST 912 CROSS SECTION LOCATION										
X1	8865	53	2066.6	2114.8	219.5	219.5	219.5			
X3	10			1157.7	5456.1					
GR	5449.0	1000.0	5448.0	1023.5	5446.0	1031.4	5444.0	1048.1	5442.0	1053.7
GR	5442.0	1061.3	5444.0	1068.2	5446.0	1076.4	5448.0	1084.6	5450.0	1093.5
GR	5452.0	1101.7	5454.0	1109.6	5456.0	1117.1	5456.1	1157.7	5456.0	1198.1
GR	5454.0	1340.4	5452.0	1378.7	5450.0	1425.3	5448.0	1622.2	5446.0	1950.9
GR	5444.0	1987.9	5444.0	1995.4	5444.0	2066.6	5442.0	2073.6	5440.0	2083.7
GR	5439.9	2084.7	5440.0	2086.8	5442.0	2111.8	5444.0	2114.8	5446.0	2117.0
GR	5448.0	2207.2	5450.0	2249.9	5452.0	2284.0	5452.0	2335.0	5451.7	2359.7
GR	5452.0	2395.9	5454.0	2412.6	5454.0	2432.6	5454.0	2480.9	5456.0	2494.8
GR	5456.4	2520.2	5456.0	2560.2	5455.0	2580.2	5456.0	2584.2	5456.9	2639.2
GR	5456.0	2646.2	5455.8	2656.2	5456.0	2669.2	5456.0	2714.8	5455.4	2740.8
GR	5456.0	2785.2	5458.1	2859.9	5460.0	2892.7				

BRIDGE ENCROACHMENTS USED ON LEFT AND RIGHT FOR 10,50,100,500 YR FLOWS

HURST 92 CROSS SECTION LOCATION										
X1	9815	30	1527.9	1636.2	950	950	950			
X3	10			1527.9	5466	5466	5466			
GR	5466.0	1000.0	5464.0	1108.0	5462.0	1144.0	5460.0	1246.0	5458.0	1392.0
GR	5458.0	1453.0	5458.0	1469.0	5456.0	1512.0	5455.7	1518.9	5456.0	1524.0
GR	5456.9	1527.9	5456.0	1531.0	5454.0	1537.0	5452.0	1544.0	5451.6	1546.5
GR	5452.0	1549.0	5454.0	1588.0	5456.0	1594.2	5457.0	1636.2	5456.0	1662.0
GR	5454.0	1768.4	5454.0	1819.9	5452.3	1863.2	5454.0	1930.4	5456.0	2013.7

GR	5458.0	2051.0	5458.9	2127.0	5458.0	2162.0	5458.0	2213.0	5460.0	2318.0
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HURST 93 CROSS SECTION LOCATION

X1	9909	20	1440.0	1507.0	94	94	94	5466.0	5466.0	
X3	10			1440.0		1507.0		1210.0	5458.0	1440.0
GR	5466.0	1000.0	5464.0	1044.0	5462.0	1118.0	5460.0	1481.0	5456.0	1492.0
GR	5456.0	1451.0	5454.0	1458.0	5452.7	1462.3	5454.0	1549.0	5458.0	1593.0
GR	5458.0	1497.0	5460.0	1507.0	5460.7	1522.2	5460.0	2182.0	5462.0	2242.0
GR	5456.0	1796.0	5456.0	1970.0	5458.0	2132.0	5460.0			

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DOWNSTREAM OF HWY 36

X1	9940	50	1972.6	2065.7	31	31	31	5487.0	5487.0	
X3	10			1972.6		2065.7		1256.8	5477.0	1261.5
GR	5487.8	1000.0	5481.0	1157.8	5477.2	1253.1	5475.4	1550.9	5468.6	1620.9
GR	5475.7	1296.4	5472.9	1368.7	5472.1	1431.1	5469.6	1930.2	5466.5	1938.6
GR	5467.7	1697.8	5466.8	1819.1	5465.6	1907.4	5465.7	1988.5	5455.3	1999.6
GR	5465.1	1958.6	5464.4	1972.6	5459.9	1978.2	5459.0	2024.8	5457.9	2041.6
GR	5452.8	2004.4	5452.8	2013.2	5452.8	2021.9	5452.9	2095.5	5464.2	2147.9
GR	5460.1	2045.5	5462.8	2052.0	5464.4	2065.7	5464.7	2361.0	5459.8	2491.6
GR	5464.2	2181.0	5464.2	2228.1	5463.1	2269.4	5462.0	2651.1	5459.5	2677.2
GR	5458.8	2532.7	5458.9	2585.4	5458.8	2608.0	5459.4	2831.7	5464.1	2892.1
GR	5459.1	2697.2	5459.4	2715.2	5460.6	2756.3	5462.6	3035.1	5466.5	3045.4
GR	5464.9	2948.7	5465.3	3006.0	5465.8	3014.3	5466.4			

DOWNSTREAM EDGE OF HWY 36

X1	9954	50	1988.5	2041.6	14	14	14	5469.51	5469.51	
X3	10			1988.5		2041.6		1256.8	5479.0	1261.5
GR	5489.8	1000.0	5483.0	1157.8	5479.2	1253.1	5477.4	1550.9	5470.6	1620.9
GR	5477.7	1296.4	5474.9	1368.7	5474.1	1431.1	5471.6	1930.2	5468.5	1938.6
GR	5469.7	1697.8	5468.8	1819.1	5467.6	1907.4	5467.7	1988.5	5455.4	1999.6
GR	5467.1	1958.6	5466.4	1972.6	5461.9	1978.2	5461.0	2024.8	5459.9	2041.6
GR	5452.9	2004.4	5452.9	2013.2	5452.9	2021.9	5453.0	2095.5	5466.2	2147.9
GR	5462.1	2045.5	5464.8	2052.0	5466.4	2065.7	5466.7	2361.0	5461.8	2491.6
GR	5466.2	2181.0	5466.2	2228.1	5465.1	2269.4	5464.0	2651.1	5461.5	2677.2
GR	5460.8	2532.7	5460.9	2585.4	5460.8	2608.0	5461.4	2831.7	5466.1	2892.1
GR	5461.1	2697.2	5461.4	2715.2	5462.6	2756.3	5464.6	3035.1	5468.5	3045.4
GR	5466.9	2948.7	5467.3	3006.0	5467.8	3014.3	5468.4			

QT	3	3820	3820	3820								
SB	0.90	2.1	2.5	0	47.7	0.00001	338.67	0	0	0		

A of opening = (47.7 ft. wide X 7.1 ft. high)
 BRT&GR Cards are set at the top of the higher Jersey Barrier (2.7 ft. h
 Cards set above the deck railing due to minimal flow through the railing

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 05JAN98 14:43:35

PAGE 4

UPSTREAM EDGE OF HWY 36 Q100,Q500 ACTUAL VALUES										
X1	10054	28	2006	2053.70	100	100				
X2			1	5460.27	5465.8					
X3	10			2006.0	2053.7		5469.51	5465.8		
BT	-22	1000.0	5483.1	5483.1	1125.0	5480.7	5480.7	1265.3	5479.2	5479.2
BT		1388.2	5477.4	5477.4	1555.6	5475.5	5475.5	1621.3	5474.4	5474.4
BT		1777.2	5472.7	5472.7	1856.5	5471.4	5471.4	1955.7	5470.3	5470.3
BT		1999.0	5469.3	5469.3	2005.99	5469.51	5469.51	2006.0	5469.51	5460.27
BT		2053.7	5468.79	5459.62	2053.71	5468.79	5468.79	2123.2	5468.1	5468.1
BT		2209.8	5466.9	5466.9	2356.8	5465.8	5465.8	2497.8	5465.8	5465.8
BT		2648.1	5466.7	5466.7	2790.8	5468.5	5468.5	2931.7	5471.5	5471.5
BT		3039.0	5474.7	5474.7						
GR	5483.1	1000.0	5480.7	1125.0	5479.2	1265.3	5477.4	1388.2	5475.5	1555.6
GR	5474.4	1621.3	5472.7	1777.2	5471.4	1856.5	5470.3	1955.7	5469.3	1999.0
GR	5469.5	2005.99	5455.5	2006.0	5454.8	2011.3	5453.7	2013.2	5453.7	2017.5
GR	5454.9	2020.2	5455.0	2020.3	5458.3	2038.0	5459.3	2053.7	5468.79	2053.71
GR	5468.1	2123.2	5466.9	2209.8	5465.8	2356.8	5465.8	2497.8	5466.7	2648.1
GR	5468.5	2790.8	5471.5	2931.7	5474.7	3039.0				

NC .3 .5

UPSTREAM OF HWY 36										
X1	10110	51	1530.0	1722.5	56	65	56			
X3	10			1530.0		1722.5		5465.8	5465.8	
GR	5474.5	1000.0	5473.0	1035.2	5471.5	1065.4	5471.2	1099.3	5471.1	1128.5
GR	5470.3	1158.4	5469.1	1216.5	5469.0	1251.3	5468.0	1292.3	5466.8	1328.3
GR	5465.6	1393.3	5465.1	1436.5	5464.3	1468.7	5463.1	1479.9	5461.4	1493.0
GR	5462.2	1503.4	5462.0	1530.0	5460.7	1552.4	5460.0	1588.5	5459.5	1599.1
GR	5459.1	1618.7	5456.9	1640.4	5455.1	1647.8	5454.8	1651.3	5453.9	1653.2
GR	5453.9	1657.5	5454.9	1660.2	5455.0	1664.3	5458.3	1678.0	5459.3	1690.3
GR	5458.7	1705.5	5458.3	1719.6	5458.7	1722.5	5458.6	1772.1	5459.2	1836.2
GR	5459.0	1867.6	5458.8	1879.1	5458.0	1953.8	5457.4	1992.0	5458.4	2076.7
GR	5458.3	2080.9	5458.5	2087.5	5458.0	2109.4	5458.4	2174.4	5460.5	2264.7
GR	5463.7	2361.4	5462.7	2369.3	5464.0	2375.3	5465.7	2429.6	5468.4	2505.3
GR	5468.3	2520.9								

NC 0.09 0.09 0.11 .1 .3

X1	10142	38	1217.3	1476.7	30	50	32			
X3	10			1240.0		1470.0				
GR	5470.4	1000.0	5468.8	1022.5	5466.5	1034.3	5466.1	1040.3	5464.4	1144.7

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* HEC-2 WATER SURFACE PROFILES *
* *
* Version 4.6.2; May 1991 *
* *
* RUN DATE 16JAN97 TIME 09:57:52 *
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616-4687 *
* (916) 756-1104 *
*****

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X X XXXXXXX XXXXX XXXXX
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XXXXXXXX XXXX X XXXXX
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X X X X X X
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PAGE 1

THIS RUN EXECUTED 16JAN97 09:57:52

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HEC-2 WATER SURFACE PROFILES
Version 4.6.2; May 1991
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SPLIT FLOW BEING PERFORMED

SF COAL CREEK SPLIT FLOW

JC SPLIT FLOWS AT RAILROAD, EAST DIVERSION, WEST DIVERSION
 JP 1 0 50 0 0

TW WEIR 1: OVERFLOW ALONG SOUTH SIDE OF RR EMBANKMENT
 WS 12 15540 15585 14506 2.6
 WC 1000 5532.1 1010 5530 1016 5528 1023 5526 1030 5525
 WC 1035 5526 1052 5528 1068 5528.2 1077 5528 1095 5527.8
 WC 1125 5528 1180 5530

TW WEIR 2: EAST SECT OF RR EMBANKMENT
 WS 8 15585 16110 15295 2.6
 WC2000.0 5533.1 2022.7 5533.4 2077.6 5534.6 2107.7 5535.3 2115.0 5534.6
 WC2164.5 5536.2 2217.8 5538.7 2432.9 5538.0

HURST 912 CROSS SECTION LOCATION										
X1	8865	53	2066.6	2114.8	219.5	219.5	219.5			
X3				1157.7	5456.1					
GR	5449.0	1000.0	5448.0	1023.5	5446.0	1031.4	5444.0	1048.1	5442.0	1053.7
GR	5442.0	1061.3	5444.0	1068.2	5446.0	1076.4	5448.0	1084.6	5450.0	1093.5
GR	5452.0	1101.7	5454.0	1109.6	5456.0	1117.1	5456.1	1157.7	5456.0	1198.1
GR	5454.0	1340.4	5452.0	1378.7	5450.0	1425.3	5448.0	1622.2	5446.0	1950.9
GR	5444.0	1987.9	5444.0	1995.4	5444.0	2066.6	5442.0	2073.6	5440.0	2083.7
GR	5439.9	2084.7	5440.0	2086.8	5442.0	2111.8	5444.0	2114.8	5446.0	2117.0
GR	5448.0	2207.2	5450.0	2249.9	5452.0	2284.0	5452.0	2335.0	5451.7	2359.7
GR	5452.0	2395.9	5454.0	2412.6	5454.0	2432.6	5454.0	2480.9	5456.0	2494.8
GR	5456.4	2520.2	5456.0	2560.2	5455.0	2580.2	5456.0	2584.2	5456.9	2639.2
GR	5456.0	2646.2	5455.8	2656.2	5456.0	2669.2	5456.0	2714.8	5455.4	2740.8
GR	5456.0	2785.2	5458.1	2859.9	5460.0	2892.7				

BRIDGE ENCROACHMENTS USED ON LEFT AND RIGHT FOR 10,50,100,500 YR FLOWS										
HURST 92 CROSS SECTION LOCATION										
X1	9815	30	1527.9	1636.2	950	950	950			
X3	10							5466.0	5466.0	
GR	5466.0	1000.0	5464.0	1108.0	5462.0	1144.0	5460.0	1246.0	5458.0	1392.0
GR	5458.0	1453.0	5458.0	1469.0	5456.0	1512.0	5455.7	1518.9	5456.0	1524.0
GR	5456.9	1527.9	5456.0	1531.0	5454.0	1537.0	5452.0	1544.0	5451.6	1546.5
GR	5452.0	1549.0	5454.0	1588.0	5456.0	1594.2	5457.0	1636.2	5456.0	1662.0
GR	5454.0	1768.4	5454.0	1819.9	5452.3	1863.2	5454.0	1930.4	5456.0	2013.7
GR	5458.0	2051.0	5458.9	2127.0	5458.0	2162.0	5458.0	2213.0	5460.0	2318.0

NC .09 .09 .09

HURST 93 CROSS SECTION LOCATION										
X1	9909	20	1440.0	1507.0	94	94	94			
X3	10							5466.0	5466.0	
GR	5466.0	1000.0	5464.0	1044.0	5462.0	1118.0	5460.0	1210.0	5458.0	1440.0
GR	5456.0	1451.0	5454.0	1458.0	5452.7	1462.3	5454.0	1481.0	5456.0	1492.0
GR	5458.0	1497.0	5460.0	1507.0	5460.7	1522.2	5460.0	1549.0	5458.0	1593.0
GR	5456.0	1796.0	5456.0	1970.0	5458.0	2132.0	5460.0	2182.0	5462.0	2242.0

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NC 0.09 0.09 0.09 .3 .5

DOWNSTREAM OF HWY 36										
X1	9940	50	1972.6	2065.7	31	31	31			
X3	10							5487.0	5487.0	
GR	5487.8	1000.0	5481.0	1157.8	5477.2	1253.1	5475.4	1256.8	5477.0	1261.5
GR	5475.7	1296.4	5472.9	1368.7	5472.1	1431.1	5469.6	1550.9	5468.6	1620.9
GR	5467.7	1697.8	5466.8	1819.1	5465.6	1907.4	5465.7	1930.2	5466.5	1938.6
GR	5465.1	1958.6	5464.4	1972.6	5459.9	1978.2	5459.0	1988.5	5455.3	1999.6

GR	5452.8	2004.4	5452.8	2013.2	5452.8	2021.9	5452.9	2024.8	5457.9	2041.6
GR	5460.1	2045.5	5462.8	2052.0	5464.4	2065.7	5464.7	2095.5	5464.2	2147.9
GR	5464.2	2181.0	5464.2	2228.1	5463.1	2269.4	5462.0	2361.0	5459.8	2491.6
GR	5458.8	2532.7	5458.9	2585.4	5458.8	2608.0	5459.4	2651.1	5459.5	2677.2
GR	5459.1	2697.2	5459.4	2715.2	5460.6	2756.3	5462.6	2831.7	5464.1	2892.1
GR	5464.9	2948.7	5465.3	3006.0	5465.8	3014.3	5466.4	3035.1	5466.5	3045.4

DOWNSTREAM EDGE OF HWY 36										
X1	9954	50	1988.5	2041.6	14	14	14			
X3	10							5469.51	5469.51	
GR	5489.8	1000.0	5483.0	1157.8	5479.2	1253.1	5477.4	1256.8	5479.0	1261.5
GR	5477.7	1296.4	5474.9	1368.7	5474.1	1431.1	5471.6	1550.9	5470.6	1620.9
GR	5469.7	1697.8	5468.8	1819.1	5467.6	1907.4	5467.7	1930.2	5468.5	1938.6
GR	5467.1	1958.6	5466.4	1972.6	5461.9	1978.2	5461.0	1988.5	5455.4	1999.6
GR	5452.9	2004.4	5452.9	2013.2	5452.9	2021.9	5453.0	2024.8	5459.9	2041.6
GR	5462.1	2045.5	5464.8	2052.0	5466.4	2065.7	5466.7	2095.5	5466.2	2147.9
GR	5466.2	2181.0	5466.2	2228.1	5465.1	2269.4	5464.0	2361.0	5461.8	2491.6
GR	5460.8	2532.7	5460.9	2585.4	5460.8	2608.0	5461.4	2651.1	5461.5	2677.2
GR	5461.1	2697.2	5461.4	2715.2	5462.6	2756.3	5464.6	2831.7	5466.1	2892.1
GR	5466.9	2948.7	5467.3	3006.0	5467.8	3014.3	5468.4	3035.1	5468.5	3045.4

QT	4	1740	3070	3820	6032					
SB	0.90	2.1	2.5	0	47.7	0.00001	338.67	0	0	0

A of opening = (47.7 ft. wide X 7.1 ft. high)
 BRT&GR Cards are set at the top of the higher Jersey Barrier (2.7 ft. h
 Cards set above the deck railing due to minimal flow through the railin

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PAGE 6

UPSTREAM EDGE OF HWY 36 Q100,Q500 ACTUAL VALUES										
X1	10054	28	2006	2053.70	100	100	100			
X2			1	5460.27	5465.8					
X3	10							5469.51	5465.8	
BT	-22	1000.0	5483.1	5483.1	1125.0	5480.7	5480.7	1265.3	5479.2	5479.2
BT		1388.2	5477.4	5477.4	1555.6	5475.5	5475.5	1621.3	5474.4	5474.4
BT		1777.2	5472.7	5472.7	1856.5	5471.4	5471.4	1955.7	5470.3	5470.3
BT		1999.0	5469.3	5469.3	2005.99	5469.51	5469.5	2006.0	5469.51	5460.27
BT		2053.7	5468.79	5459.62	2053.71	5468.79	5468.79	2123.2	5468.1	5468.1
BT		2209.8	5466.9	5466.9	2356.8	5465.8	5465.8	2497.8	5465.8	5465.8
BT		2648.1	5466.7	5466.7	2790.8	5468.5	5468.5	2931.7	5471.5	5471.5
BT		3039.0	5474.7	5474.7						
GR	5483.1	1000.0	5480.7	1125.0	5479.2	1265.3	5477.4	1388.2	5475.5	1555.6
GR	5474.4	1621.3	5472.7	1777.2	5471.4	1856.5	5470.3	1955.7	5469.3	1999.0
GR	5469.5	2005.99	5455.5	2006.0	5454.8	2011.3	5453.7	2013.2	5453.7	2017.5
GR	5454.9	2020.2	5455.0	2020.3	5458.3	2038.0	5459.3	2053.7	5468.79	2053.71
GR	5468.1	2123.2	5466.9	2209.8	5465.8	2356.8	5465.8	2497.8	5466.7	2648.1

1440.21 1440.08 .01 8508.60 8518.96 .12 11 5616.663 5617.074 23131.000 23156.000

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TW WEIR 21: WEST DIVERSION

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
3485.61	3485.55	.00	11994.21	12004.50	.09	11	5626.645	5626.930	23754.000	23755.000

TW WEIR 22: NORTH SIDE OF WEST DIVERSION

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
3.09	3.09	.04	11997.31	12007.60	.09	11	5626.930	5628.006	23755.000	23803.000

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THIS RUN EXECUTED 16JAN97 09:58:31

 HEC-2 WATER SURFACE PROFILES
 Version 4.6.2; May 1991

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

COAL CREEK

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRWS	EG	10*KS	VCH	AREA	.01K
	8426.000	.00	.00	.00	5435.40	1740.00	5441.60	5439.83	5441.94	213.50	4.69	370.97	119.08
*	8426.000	.00	.00	.00	5435.40	3070.00	5442.03	5442.03	5442.36	215.93	4.87	695.54	208.92
*	8426.000	.00	.00	.00	5435.40	3434.00	5442.02	5442.02	5442.44	272.00	5.46	692.87	208.22
	8426.000	.00	.00	.00	5435.40	4005.00	5442.73	5442.03	5442.92	106.96	3.97	1219.12	387.25
*	8646.000	219.50	.00	.00	5437.65	1740.00	5444.28	5442.08	5444.37	66.63	2.70	713.18	213.16
*	8646.000	219.50	.00	.00	5437.65	3070.00	5444.84	5444.27	5444.97	74.26	3.22	1149.49	356.26
*	8646.000	219.50	.00	.00	5437.65	3434.00	5445.02	5444.25	5445.14	68.93	3.21	1296.40	413.63
	8646.000	219.50	.00	.00	5437.65	4005.00	5444.99	5444.55	5445.17	97.80	3.80	1275.04	404.98
	8865.000	219.50	.00	.00	5439.90	1740.00	5446.01	5445.02	5446.30	112.90	4.82	422.49	163.76
	8865.000	219.50	.00	.00	5439.90	3070.00	5446.82	5445.86	5447.24	141.07	6.00	629.23	258.48
*	8865.000	219.50	.00	.00	5439.90	3434.00	5446.95	5446.00	5447.41	153.16	6.35	674.13	277.47
	8865.000	219.50	.00	.00	5439.90	4005.00	5447.34	5446.42	5447.76	136.26	6.25	829.22	343.09
	9815.000	950.00	.00	.00	5451.60	1740.00	5458.13	5456.32	5458.46	145.98	4.58	380.26	144.01
	9815.000	950.00	.00	.00	5451.60	3070.00	5459.72	5457.50	5460.20	131.53	5.57	551.60	267.69

9815.000	950.00	.00	.00	5451.60	3434.00	5460.13	5457.73	5460.65	126.97	5.76	596.23	304.75
9815.000	950.00	.00	.00	5451.60	4005.00	5460.45	5458.07	5461.08	142.95	6.35	631.03	334.97
9909.000	94.00	.00	.00	5452.70	1740.00	5459.60	5457.94	5460.22	222.15	6.34	274.52	116.74
* 9909.000	94.00	.00	.00	5452.70	3070.00	5461.01	5459.44	5462.09	268.90	8.32	368.90	187.22
* 9909.000	94.00	.00	.00	5452.70	3434.00	5461.35	5459.80	5462.55	276.01	8.77	391.47	206.70
* 9909.000	94.00	.00	.00	5452.70	4005.00	5461.78	5460.26	5463.19	296.97	9.54	420.00	232.41
9940.000	31.00	.00	.00	5452.80	1740.00	5460.37	5457.71	5460.83	148.60	5.46	318.62	142.74
9940.000	31.00	.00	.00	5452.80	3070.00	5462.11	5459.52	5462.85	175.05	6.92	443.46	232.04
9940.000	31.00	.00	.00	5452.80	3434.00	5462.53	5459.92	5463.34	179.06	7.22	475.30	256.63
9940.000	31.00	.00	.00	5452.80	4005.00	5463.16	5460.42	5464.07	189.47	7.64	524.51	290.96
9954.000	14.00	.00	.00	5452.90	1740.00	5460.52	5457.97	5461.12	163.01	6.21	280.01	136.28
9954.000	14.00	.00	.00	5452.90	3070.00	5462.21	5459.83	5463.28	206.21	8.30	369.70	213.79
9954.000	14.00	.00	.00	5452.90	3434.00	5462.61	5460.22	5463.81	212.91	8.77	391.63	235.34
9954.000	14.00	.00	.00	5452.90	4005.00	5463.20	5460.82	5464.60	224.82	9.48	422.54	267.11

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SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRWS	EG	10*KS	VCH	AREA	.01K
* 10054.000	100.00	5465.80	5460.27	5453.70	1740.00	5460.52	.00	5461.93	573.97	9.54	182.35	72.63
10054.000	100.00	5465.80	5460.27	5453.70	3070.00	5463.51	.00	5464.89	259.28	9.44	325.38	190.66
10054.000	100.00	5465.80	5460.27	5453.70	3820.00	5464.81	.00	5466.32	224.81	9.87	387.19	254.77
* 10054.000	100.00	5465.80	5460.27	5453.70	6032.00	5467.20	5464.55	5468.48	162.15	9.95	977.00	473.70
* 10110.000	56.00	.00	.00	5453.90	1740.00	5462.71	5459.61	5462.79	31.24	2.29	758.85	311.33
* 10110.000	56.00	.00	.00	5453.90	3070.00	5465.43	5460.55	5465.52	16.87	2.39	1283.43	747.45
* 10110.000	56.00	.00	.00	5453.90	3820.00	5466.78	5460.90	5466.79	.74	.57	7068.44	4443.19
* 10110.000	56.00	.00	.00	5453.90	6032.00	5468.87	5461.81	5468.88	.78	.68	9564.66	6847.89
10142.000	32.00	.00	.00	5454.00	1740.00	5462.84	5459.02	5462.88	24.07	1.67	1042.26	354.67
10142.000	32.00	.00	.00	5454.00	3070.00	5465.52	5460.05	5465.57	13.56	1.76	1740.53	833.69
10142.000	32.00	.00	.00	5454.00	3820.00	5466.79	5460.36	5466.79	1.28	.61	6157.99	3375.23
10142.000	32.00	.00	.00	5454.00	6032.00	5468.87	5461.25	5468.88	1.23	.70	8480.69	5431.47
10346.000	204.00	.00	.00	5455.00	1400.00	5463.31	5459.79	5463.33	20.47	1.32	1216.74	309.43
* 10346.000	204.00	.00	.00	5455.00	2980.00	5465.74	5461.53	5465.75	5.96	1.03	3161.65	1220.65
* 10346.000	204.00	.00	.00	5455.00	3770.00	5466.83	5461.78	5466.84	4.07	.96	4241.58	1869.76
* 10346.000	204.00	.00	.00	5455.00	5990.00	5468.91	5462.70	5468.92	2.85	.96	6574.66	3546.24
* 10687.000	341.00	.00	.00	5459.30	1400.00	5464.84	5463.70	5465.06	293.22	3.82	372.45	81.76
* 10687.000	341.00	.00	.00	5459.30	2980.00	5466.16	5464.89	5466.30	167.59	3.29	1039.07	230.19
* 10687.000	341.00	.00	.00	5459.30	3770.00	5467.09	5465.49	5467.17	67.03	2.30	1716.03	460.49
* 10687.000	341.00	.00	.00	5459.30	5990.00	5469.06	5469.09	5469.11	22.56	1.77	3265.66	1261.04
* 10895.000	208.00	.00	.00	5461.80	1400.00	5468.08	5466.27	5468.15	92.77	2.40	687.38	145.35
10895.000	208.00	.00	.00	5461.80	2980.00	5468.85	5467.67	5468.96	124.64	2.81	1179.48	266.92
* 10895.000	208.00	.00	.00	5461.80	3770.00	5468.91	5468.08	5469.07	186.14	3.42	1213.54	276.33
* 10895.000	208.00	.00	.00	5461.80	5990.00	5469.76	5468.55	5469.93	133.71	3.37	1847.86	518.02
11103.000	208.00	.00	.00	5464.30	1400.00	5469.21	5467.60	5469.26	49.04	1.82	771.58	199.92
* 11103.000	208.00	.00	.00	5464.30	2980.00	5470.20	5468.32	5470.30	62.25	2.52	1171.26	377.71
* 11103.000	208.00	.00	.00	5464.30	3770.00	5470.58	5468.57	5470.70	67.15	2.79	1334.31	460.06
11103.000	208.00	.00	.00	5464.30	5990.00	5471.33	5469.11	5471.53	84.86	3.51	1694.20	650.23

	8426.000	1740.00	5441.60	.00	.00	.00	135.86	.00
*	8426.000	3070.00	5442.03	.43	.00	.33	686.09	.00
*	8426.000	3434.00	5442.02	.00	.00	.32	685.41	.00
	8426.000	4005.00	5442.73	.71	.00	.00	804.25	.00
*	8646.000	1740.00	5444.28	.00	2.68	.00	704.20	219.50
*	8646.000	3070.00	5444.84	.56	2.81	.00	815.46	219.50
*	8646.000	3434.00	5445.02	.18	2.99	.00	842.21	219.50
	8646.000	4005.00	5444.99	-.02	2.26	.00	840.04	219.50
	8865.000	1740.00	5446.01	.00	1.74	.00	168.15	219.50
	8865.000	3070.00	5446.82	.81	1.99	.00	338.94	219.50
*	8865.000	3434.00	5446.95	.13	1.93	.00	365.63	219.50
	8865.000	4005.00	5447.34	.39	2.34	.00	445.71	219.50
	9815.000	1740.00	5458.13	.00	12.12	.00	108.30	950.00
	9815.000	3070.00	5459.72	1.58	12.89	.00	108.30	950.00
	9815.000	3434.00	5460.13	.41	13.18	.00	108.30	950.00
	9815.000	4005.00	5460.45	.32	13.12	.00	108.30	950.00
	9909.000	1740.00	5459.60	.00	1.46	.00	65.00	94.00
*	9909.000	3070.00	5461.01	1.41	1.30	.00	67.00	94.00
*	9909.000	3434.00	5461.35	.34	1.22	.00	67.00	94.00
*	9909.000	4005.00	5461.78	.43	1.32	.00	67.00	94.00
	9940.000	1740.00	5460.37	.00	.77	.00	68.52	31.00
	9940.000	3070.00	5462.11	1.74	1.10	.00	74.88	31.00
	9940.000	3434.00	5462.53	.42	1.18	.00	76.42	31.00
	9940.000	4005.00	5463.16	.63	1.38	.00	80.91	31.00
	9954.000	1740.00	5460.52	.00	.15	.00	52.14	14.00
	9954.000	3070.00	5462.21	1.70	.10	.00	53.10	14.00
	9954.000	3434.00	5462.61	.40	.08	.00	53.10	14.00
	9954.000	4005.00	5463.20	.59	.04	.00	53.10	14.00
*	10054.000	1740.00	5460.52	.00	.00	.00	47.70	100.00
	10054.000	3070.00	5463.51	2.99	1.30	.00	47.70	100.00
	10054.000	3820.00	5464.81	1.30	2.20	.00	47.70	100.00
*	10054.000	6032.00	5467.20	2.39	3.99	.00	546.58	100.00
*	10110.000	1740.00	5462.71	.00	2.19	.00	192.50	56.00
*	10110.000	3070.00	5465.43	2.72	1.92	.00	192.50	56.00
*	10110.000	3820.00	5466.78	1.35	1.97	.00	1130.77	56.00
*	10110.000	6032.00	5468.87	2.09	1.68	.00	1264.27	56.00

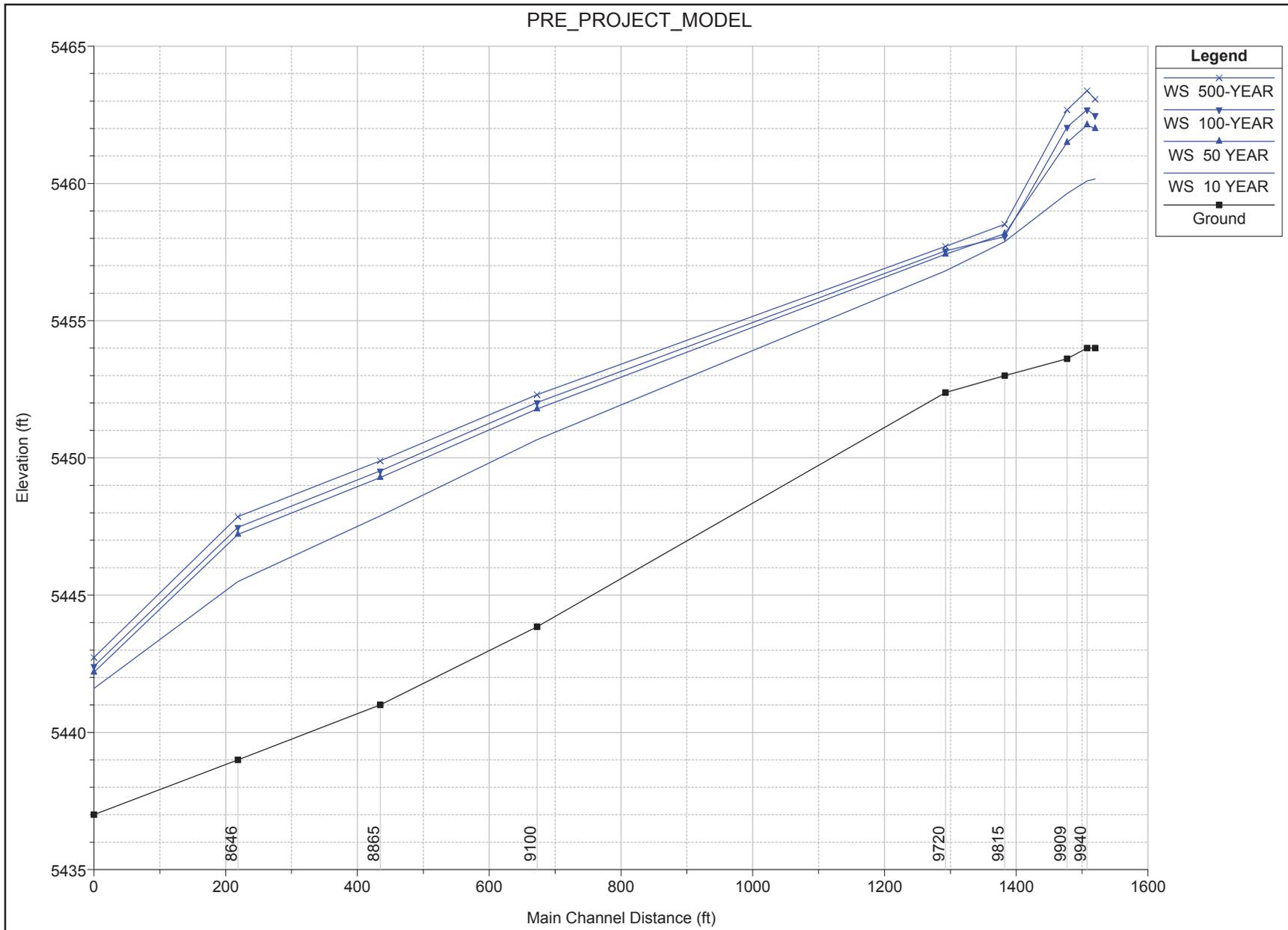
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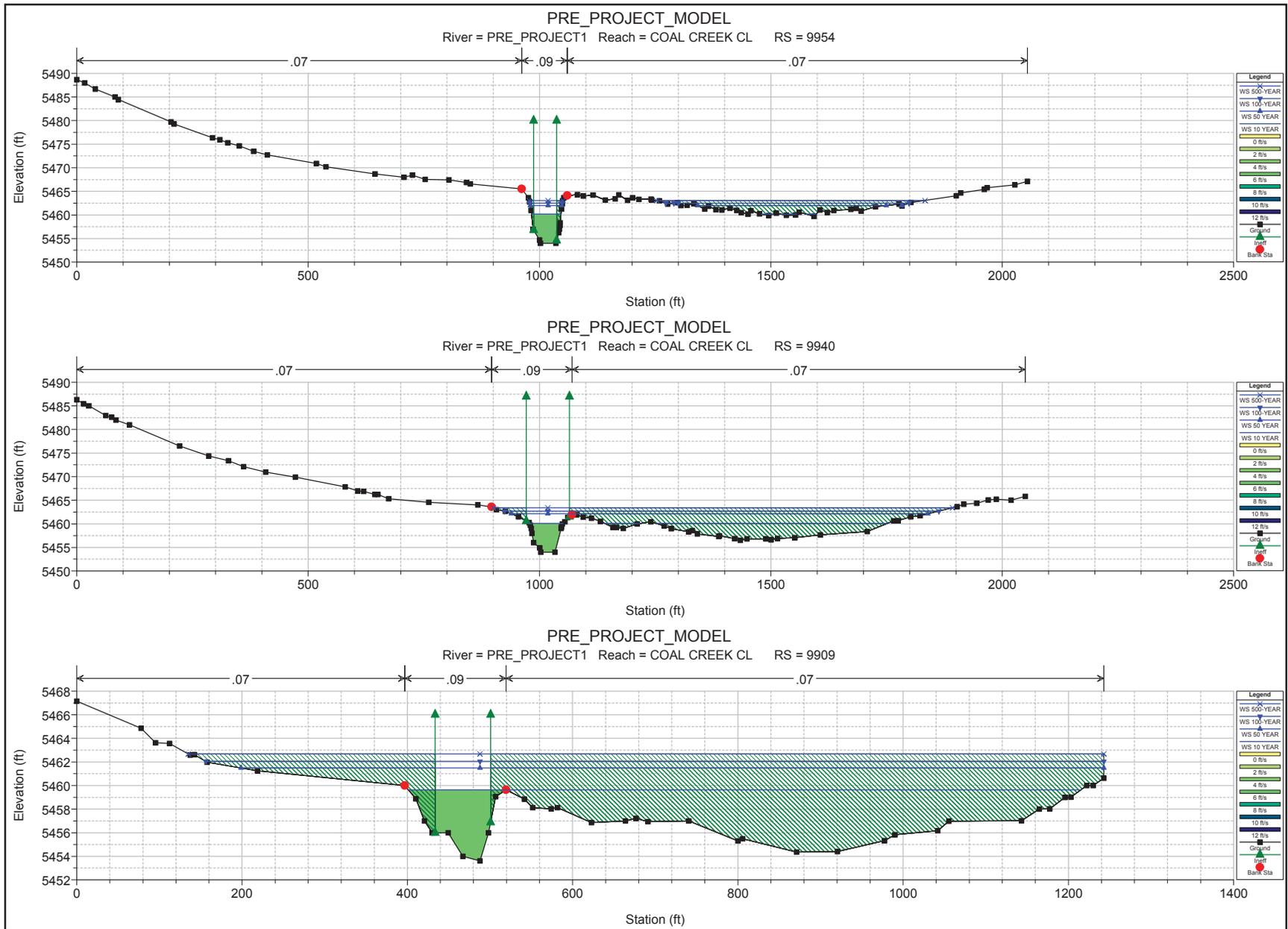
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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
10142.000	1740.00	5462.84	.00	.13	.00	259.40	32.00
10142.000	3070.00	5465.52	2.69	.09	.00	259.40	32.00
10142.000	3820.00	5466.79	1.26	.00	.00	1070.08	32.00
10142.000	6032.00	5468.87	2.09	.00	.00	1162.56	32.00
10346.000	1400.00	5463.31	.00	.47	.00	669.47	204.00
*	10346.000	2980.00	2.43	.21	.00	939.40	204.00
*	10346.000	3770.00	1.09	.04	.00	1035.31	204.00

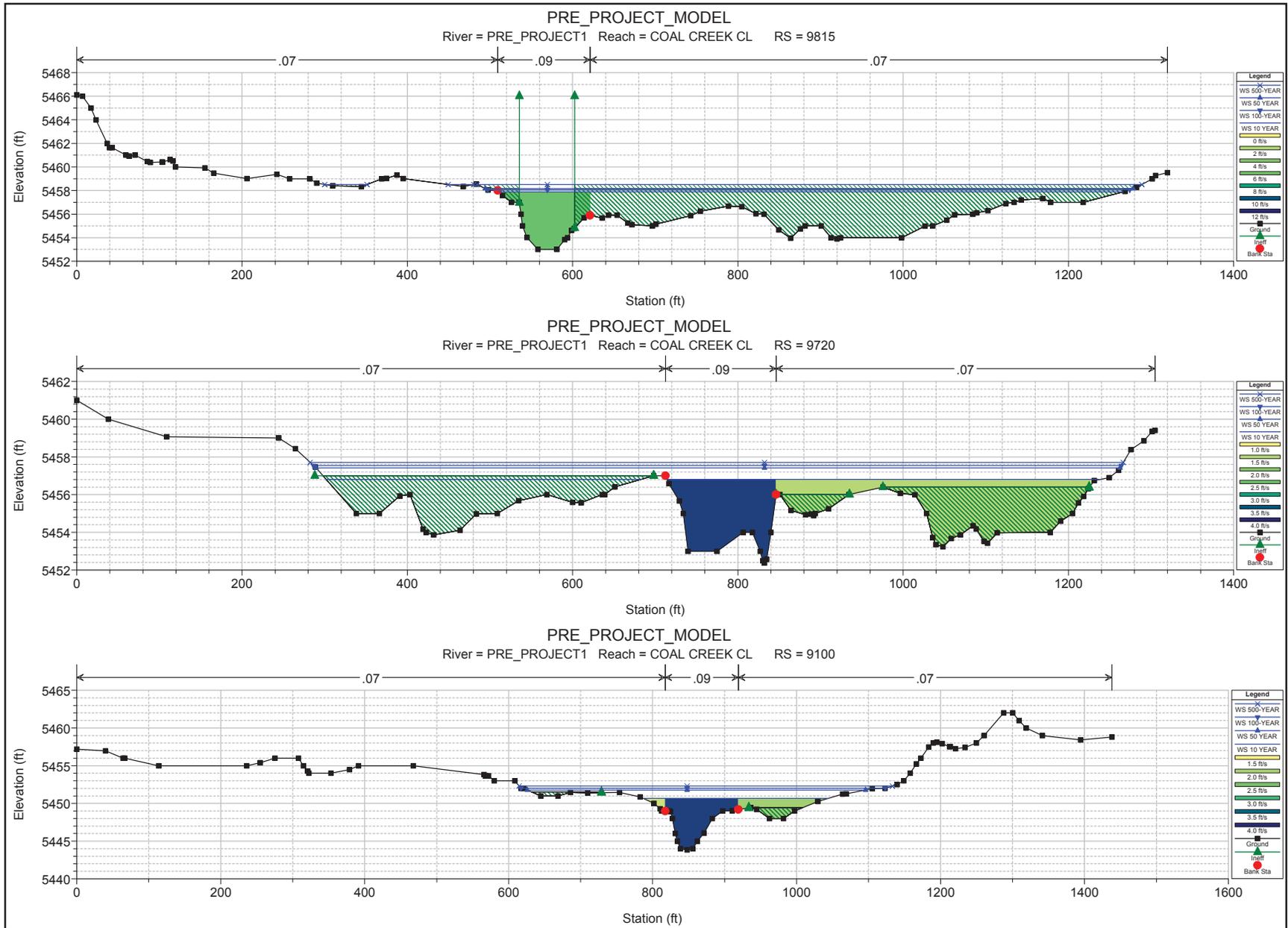
PRE-PROJECT HEC-RAS MODEL



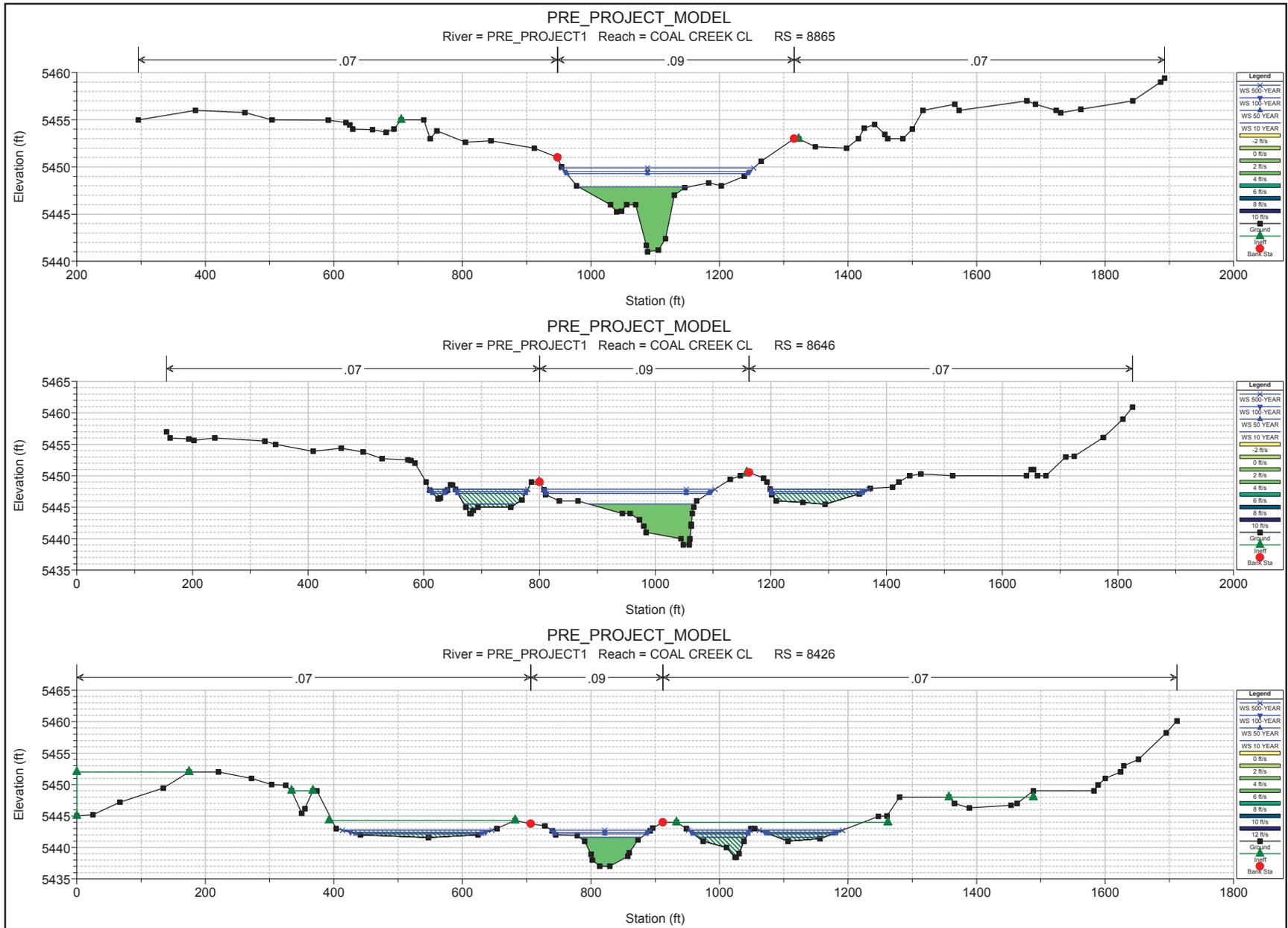
PRE-PROJECT HEC-RAS MODEL



PRE-PROJECT HEC-RAS MODEL



PRE-PROJECT HEC-RAS MODEL



PRE-PROJECT HEC-RAS MODEL

HEC-RAS Plan: Plan 01 River: PRE_PROJECT1 Reach: COAL CREEK CL

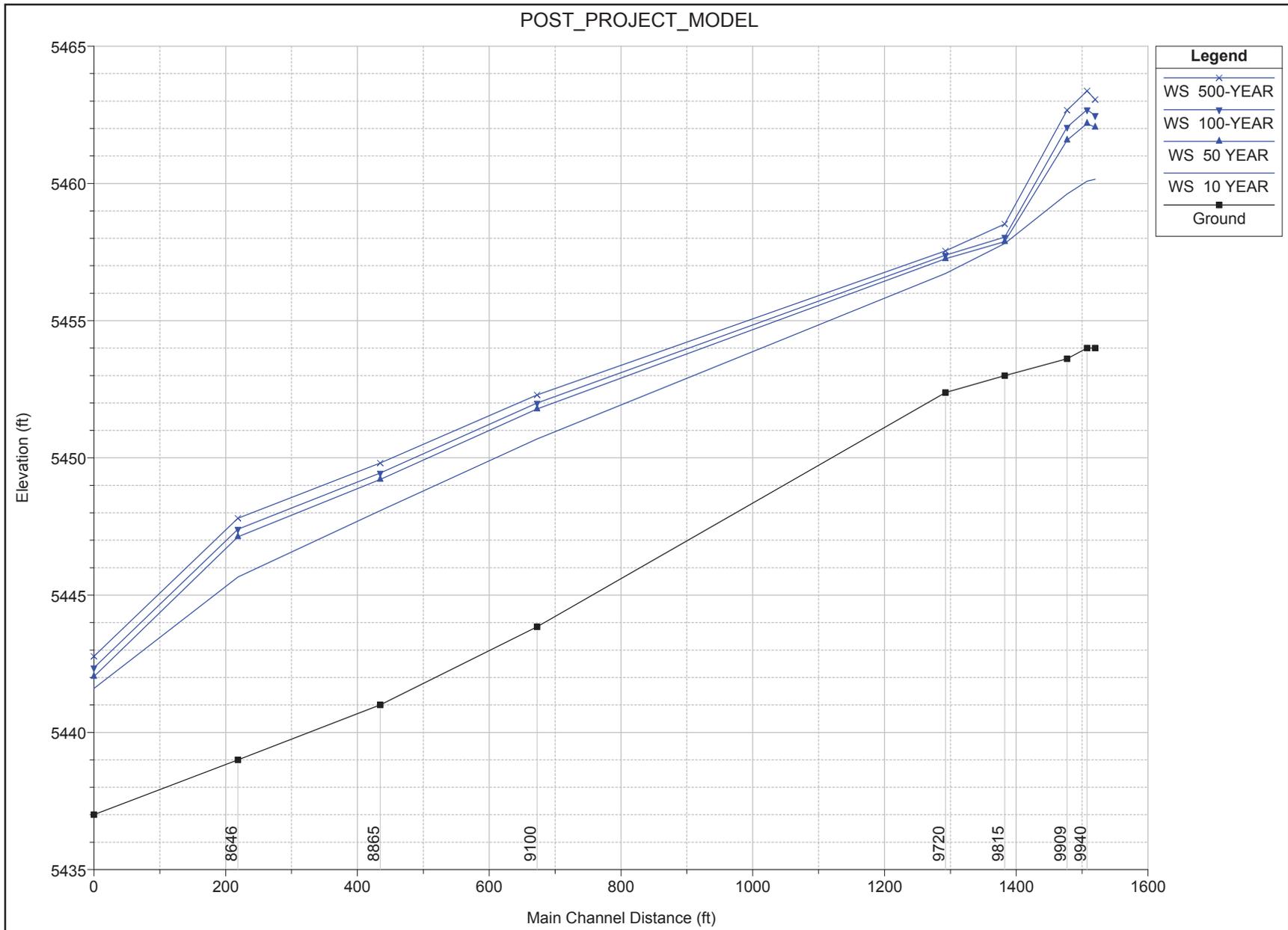
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
COAL CREEK CL	8426	10 YEAR	1740.00	5437.00	5441.60	5440.62	5442.21	0.035623	6.28	276.98	246.28	0.65
COAL CREEK CL	8426	50 YEAR	3070.00	5437.00	5442.19	5442.19	5443.41	0.088977	8.87	346.16	525.65	1.00
COAL CREEK CL	8426	100-YEAR	3434.00	5437.00	5442.41	5442.41	5443.69	0.087260	9.11	377.03	559.26	1.00
COAL CREEK CL	8426	500-YEAR	4005.00	5437.00	5442.73	5442.70	5444.10	0.084339	9.40	425.86	610.87	1.00
COAL CREEK CL	8646	10 YEAR	1740.00	5439.00	5445.50	5442.75	5445.65	0.008630	3.16	550.11	278.29	0.32
COAL CREEK CL	8646	50 YEAR	3070.00	5439.00	5447.21	5444.05	5447.37	0.007280	3.18	965.87	573.33	0.30
COAL CREEK CL	8646	100-YEAR	3434.00	5439.00	5447.48	5444.33	5447.65	0.007291	3.30	1040.47	593.66	0.31
COAL CREEK CL	8646	500-YEAR	4005.00	5439.00	5447.86	5444.70	5448.05	0.007323	3.48	1152.44	623.62	0.31
COAL CREEK CL	8865	10 YEAR	1740.00	5441.00	5447.89	5445.86	5448.12	0.015640	3.89	447.03	171.09	0.42
COAL CREEK CL	8865	50 YEAR	3070.00	5441.00	5449.29	5447.17	5449.52	0.014196	3.90	787.43	280.51	0.41
COAL CREEK CL	8865	100-YEAR	3434.00	5441.00	5449.53	5447.42	5449.78	0.013860	4.01	856.63	287.50	0.41
COAL CREEK CL	8865	500-YEAR	4005.00	5441.00	5449.89	5447.79	5450.16	0.013412	4.16	962.24	297.86	0.41
COAL CREEK CL	9100	10 YEAR	1740.00	5443.85	5450.66	5448.48	5450.85	0.008716	3.71	541.37	256.72	0.34
COAL CREEK CL	9100	50 YEAR	3070.00	5443.85	5451.79	5450.15	5452.01	0.007993	4.22	913.97	470.32	0.34
COAL CREEK CL	9100	100-YEAR	3434.00	5443.85	5452.01	5450.34	5452.24	0.007944	4.34	1023.09	506.14	0.34
COAL CREEK CL	9100	500-YEAR	4005.00	5443.85	5452.31	5450.59	5452.53	0.007666	4.42	1172.42	518.41	0.33
COAL CREEK CL	9720	10 YEAR	1740.00	5452.38	5456.81	5455.38	5456.99	0.011378	3.64	599.97	906.33	0.37
COAL CREEK CL	9720	50 YEAR	3070.00	5452.38	5457.42	5456.78	5457.58	0.010205	3.87	1102.16	973.19	0.36
COAL CREEK CL	9720	100-YEAR	3434.00	5452.38	5457.54	5456.94	5457.71	0.009830	3.89	1225.52	977.84	0.36
COAL CREEK CL	9720	500-YEAR	4005.00	5452.38	5457.71	5457.16	5457.87	0.009726	3.98	1384.54	984.03	0.36
COAL CREEK CL	9815	10 YEAR	1740.00	5453.00	5457.88	5456.41	5458.48	0.021165	6.20	280.69	755.11	0.53
COAL CREEK CL	9815	50 YEAR	3070.00	5453.00	5458.17	5457.75	5459.79	0.052901	10.24	299.80	784.42	0.85
COAL CREEK CL	9815	100-YEAR	3434.00	5453.00	5458.06	5458.06	5460.20	0.071533	11.72	292.90	777.27	0.99
COAL CREEK CL	9815	500-YEAR	4005.00	5453.00	5458.51	5458.51	5460.90	0.070323	12.40	322.86	886.64	1.00
COAL CREEK CL	9909	10 YEAR	1740.00	5453.61	5459.63	5457.66	5460.10	0.013963	5.48	317.70	813.78	0.44
COAL CREEK CL	9909	50 YEAR	3070.00	5453.61	5461.49	5458.92	5462.24	0.014436	6.94	442.21	1043.95	0.48
COAL CREEK CL	9909	100-YEAR	3434.00	5453.61	5462.05	5459.23	5462.84	0.013774	7.16	479.67	1086.62	0.47
COAL CREEK CL	9909	500-YEAR	4005.00	5453.61	5462.68	5459.71	5463.59	0.014141	7.67	521.91	1107.90	0.48
COAL CREEK CL	9940	10 YEAR	1740.00	5454.00	5460.09	5457.82	5460.54	0.014608	5.33	326.52	648.97	0.44
COAL CREEK CL	9940	50 YEAR	3070.00	5454.00	5462.13	5459.27	5462.70	0.014841	6.09	503.79	900.39	0.46
COAL CREEK CL	9940	100-YEAR	3434.00	5454.00	5462.69	5459.62	5463.28	0.013361	6.18	556.07	938.75	0.45
COAL CREEK CL	9940	500-YEAR	4005.00	5454.00	5463.38	5460.21	5464.03	0.012600	6.45	620.67	991.94	0.44
COAL CREEK CL	9954	10 YEAR	1740.00	5454.00	5460.17	5457.80	5460.75	0.013726	6.13	283.65	145.31	0.45
COAL CREEK CL	9954	50 YEAR	3070.00	5454.00	5461.99	5459.37	5463.03	0.016904	8.19	374.62	477.25	0.53

PRE-PROJECT HEC-RAS MODEL

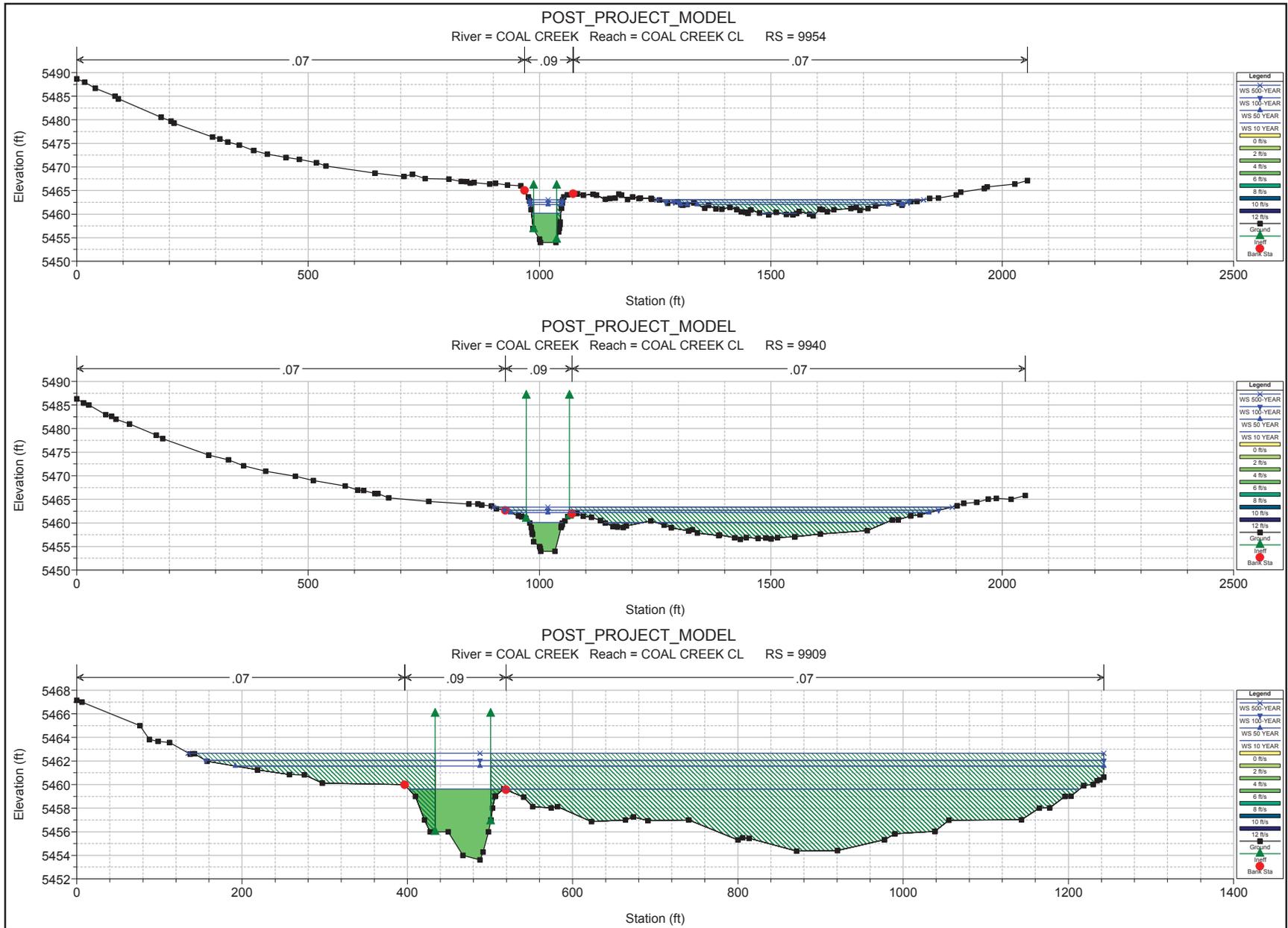
HEC-RAS Plan: Plan 01 River: PRE_PROJECT1 Reach: COAL CREEK CL (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
COAL CREEK CL	9954	100-YEAR	3434.00	5454.00	5462.48	5459.78	5463.63	0.017149	8.61	398.95	585.81	0.54
COAL CREEK CL	9954	500-YEAR	4005.00	5454.00	5463.07	5460.36	5464.42	0.018429	9.35	428.18	652.39	0.56

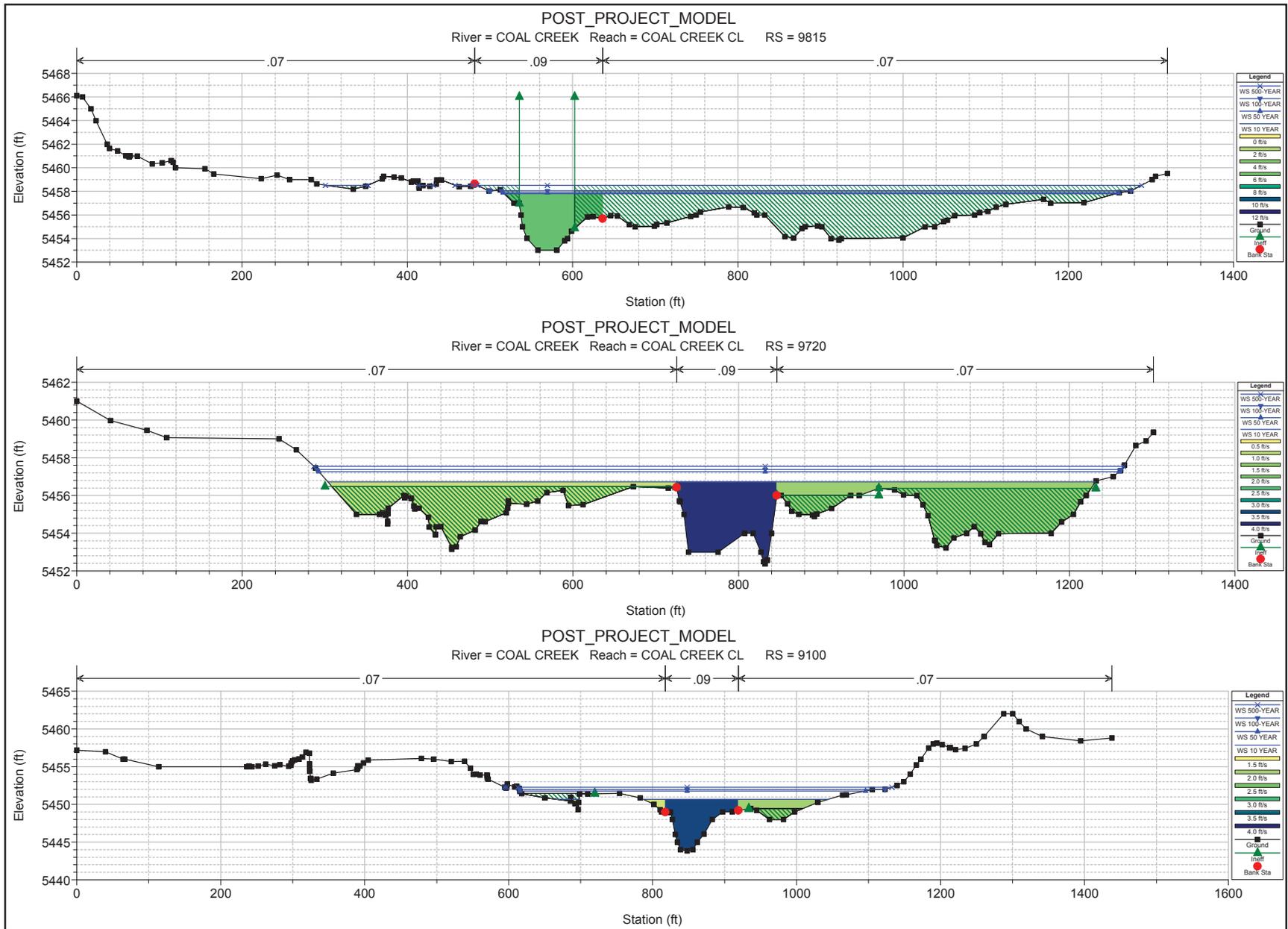
POST PROJECT HECRAS MODEL



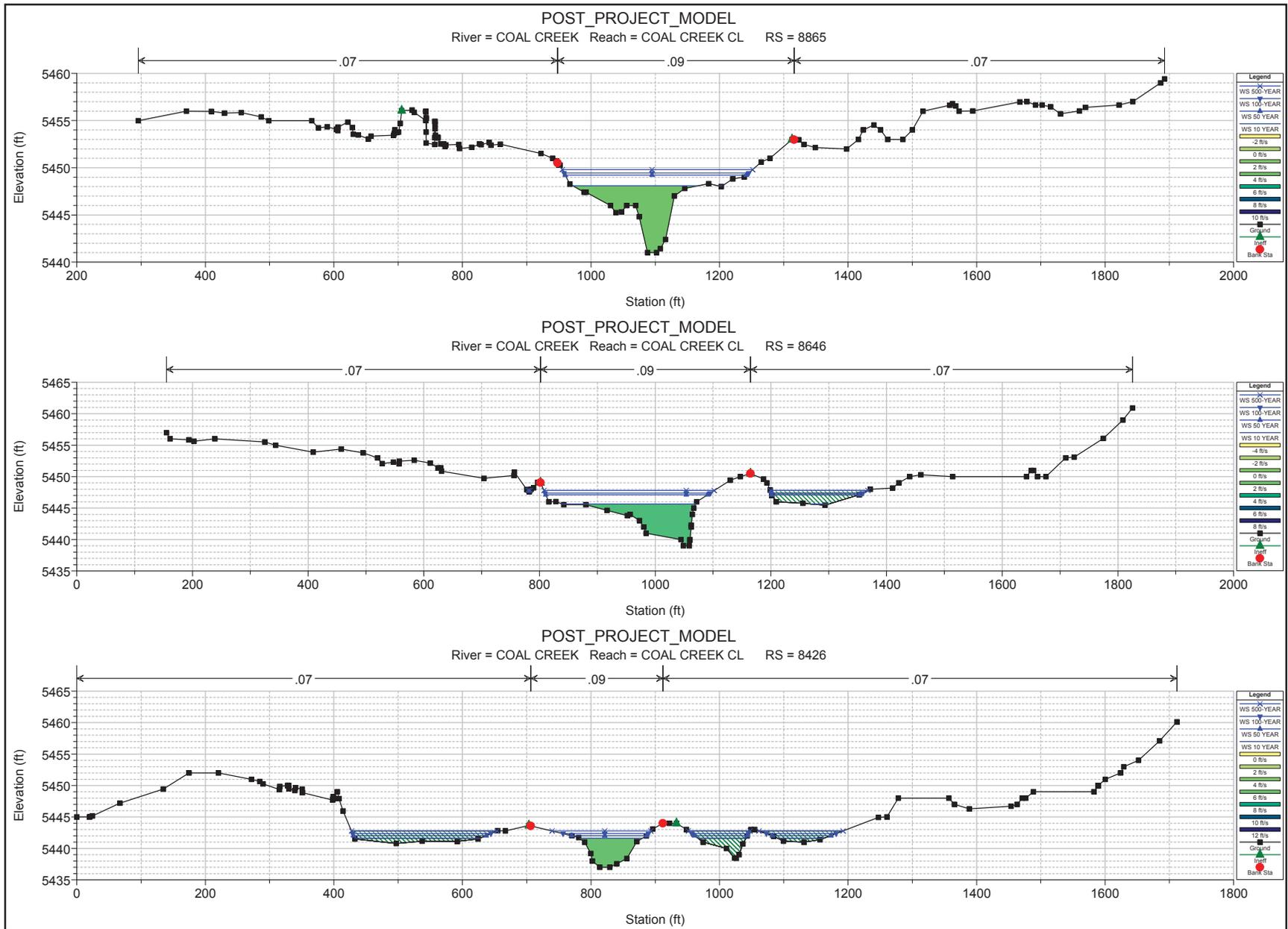
POST PROJECT HECRAS MODEL



POST PROJECT HECRAS MODEL



POST PROJECT HECRAS MODEL



POST PROJECT HECRAS MODEL

HEC-RAS Plan: Plan 02 River: COAL CREEK Reach: COAL CREEK CL

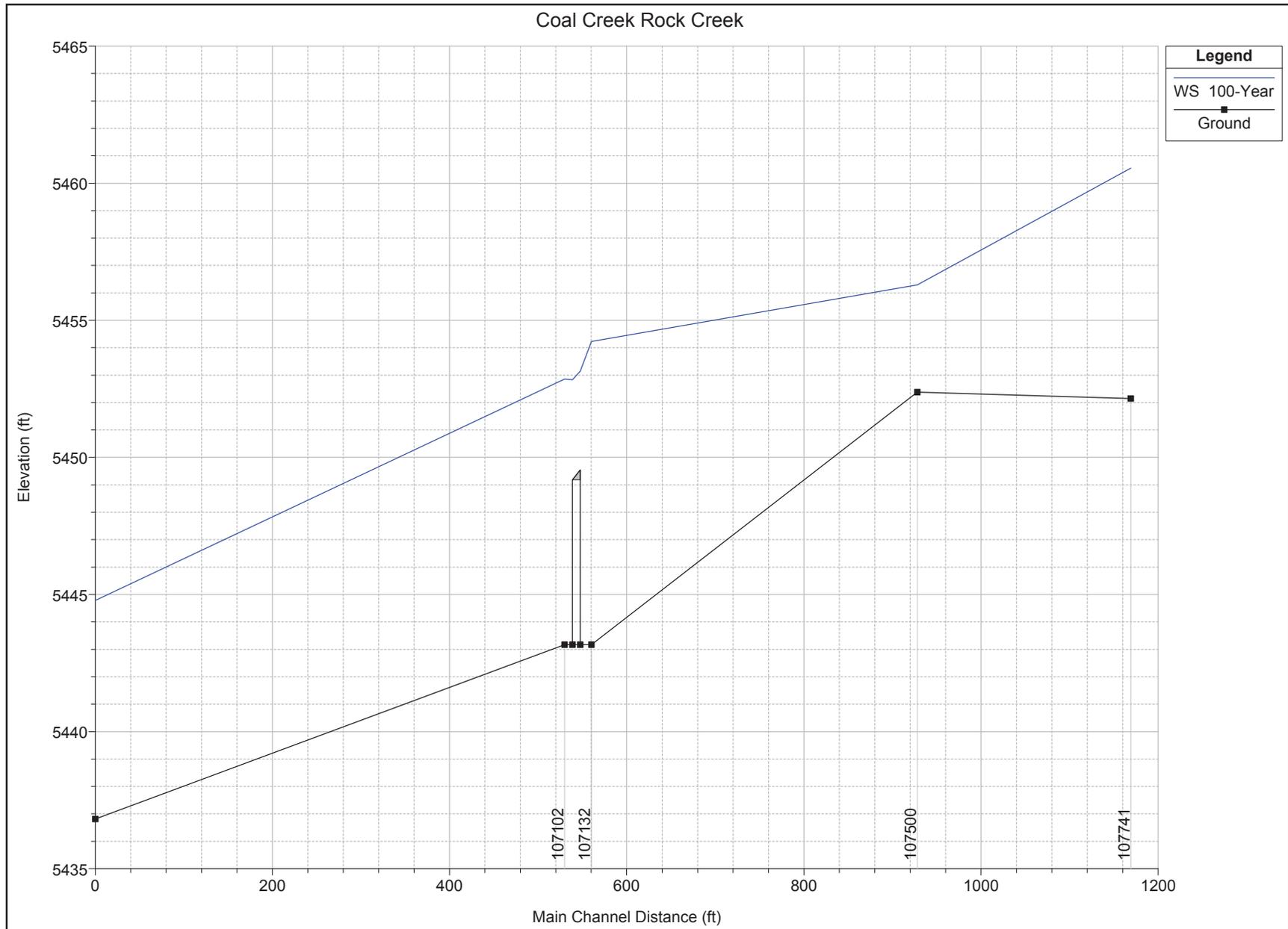
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
COAL CREEK CL	8426	10 YEAR	1740.00	5437.00	5441.60	5440.59	5442.21	0.035772	6.26	277.77	437.40	0.65
COAL CREEK CL	8426	50 YEAR	3070.00	5437.00	5442.03	5442.03	5443.43	0.085348	9.49	323.58	496.55	1.00
COAL CREEK CL	8426	100-YEAR	3434.00	5437.00	5442.36	5442.36	5443.74	0.085944	9.44	363.87	545.01	1.00
COAL CREEK CL	8426	500-YEAR	4005.00	5437.00	5442.77	5442.77	5444.16	0.085899	9.47	422.97	606.87	1.01
COAL CREEK CL	8646	10 YEAR	1740.00	5439.00	5445.66	5442.76	5445.80	0.009218	2.94	591.55	264.36	0.32
COAL CREEK CL	8646	50 YEAR	3070.00	5439.00	5447.12	5444.04	5447.28	0.007037	3.16	972.54	431.39	0.30
COAL CREEK CL	8646	100-YEAR	3434.00	5439.00	5447.40	5444.32	5447.57	0.006995	3.27	1050.85	444.46	0.30
COAL CREEK CL	8646	500-YEAR	4005.00	5439.00	5447.80	5444.71	5447.98	0.006981	3.43	1166.89	466.79	0.30
COAL CREEK CL	8865	10 YEAR	1740.00	5441.00	5448.08	5445.84	5448.28	0.014536	3.57	486.82	200.69	0.40
COAL CREEK CL	8865	50 YEAR	3070.00	5441.00	5449.21	5447.14	5449.46	0.015267	3.98	771.67	281.61	0.42
COAL CREEK CL	8865	100-YEAR	3434.00	5441.00	5449.45	5447.44	5449.71	0.014780	4.09	840.31	287.51	0.42
COAL CREEK CL	8865	500-YEAR	4005.00	5441.00	5449.81	5447.80	5450.09	0.014144	4.24	945.07	296.27	0.42
COAL CREEK CL	9100	10 YEAR	1740.00	5443.85	5450.69	5448.48	5450.87	0.008428	3.66	548.41	287.98	0.33
COAL CREEK CL	9100	50 YEAR	3070.00	5443.85	5451.79	5450.15	5452.00	0.007905	4.20	924.26	480.47	0.33
COAL CREEK CL	9100	100-YEAR	3434.00	5443.85	5452.00	5450.34	5452.23	0.007910	4.33	1029.61	508.07	0.34
COAL CREEK CL	9100	500-YEAR	4005.00	5443.85	5452.29	5450.59	5452.52	0.007655	4.41	1177.53	523.04	0.33
COAL CREEK CL	9720	10 YEAR	1740.00	5452.38	5456.72	5455.37	5456.90	0.011382	3.75	654.68	927.78	0.37
COAL CREEK CL	9720	50 YEAR	3070.00	5452.38	5457.26	5456.84	5457.41	0.009634	3.84	1168.72	967.60	0.35
COAL CREEK CL	9720	100-YEAR	3434.00	5452.38	5457.38	5456.92	5457.53	0.009278	3.85	1287.65	972.78	0.35
COAL CREEK CL	9720	500-YEAR	4005.00	5452.38	5457.54	5457.04	5457.70	0.009139	3.93	1444.88	978.98	0.35
COAL CREEK CL	9815	10 YEAR	1740.00	5453.00	5457.81	5456.44	5458.43	0.022418	6.31	275.89	740.33	0.55
COAL CREEK CL	9815	50 YEAR	3070.00	5453.00	5457.88	5457.73	5459.74	0.066061	10.95	280.47	744.72	0.94
COAL CREEK CL	9815	100-YEAR	3434.00	5453.00	5458.04	5458.04	5460.20	0.072605	11.78	291.60	764.95	0.99
COAL CREEK CL	9815	500-YEAR	4005.00	5453.00	5458.52	5458.52	5460.90	0.069988	12.39	323.33	895.07	0.99
COAL CREEK CL	9909	10 YEAR	1740.00	5453.61	5459.62	5457.65	5460.08	0.013941	5.47	317.86	810.86	0.44
COAL CREEK CL	9909	50 YEAR	3070.00	5453.61	5461.57	5458.93	5462.30	0.013745	6.84	448.78	1050.99	0.47
COAL CREEK CL	9909	100-YEAR	3434.00	5453.61	5462.05	5459.25	5462.84	0.013664	7.14	480.84	1086.72	0.47
COAL CREEK CL	9909	500-YEAR	4005.00	5453.61	5462.67	5459.70	5463.58	0.014105	7.67	522.33	1107.72	0.48
COAL CREEK CL	9940	10 YEAR	1740.00	5454.00	5460.08	5457.84	5460.53	0.014759	5.35	325.05	652.40	0.44
COAL CREEK CL	9940	50 YEAR	3070.00	5454.00	5462.18	5459.28	5462.75	0.014487	6.05	507.56	903.93	0.46
COAL CREEK CL	9940	100-YEAR	3434.00	5454.00	5462.68	5459.65	5463.28	0.013500	6.19	554.47	938.36	0.45
COAL CREEK CL	9940	500-YEAR	4005.00	5454.00	5463.37	5460.24	5464.02	0.012770	6.48	618.30	991.24	0.44
COAL CREEK CL	9954	10 YEAR	1740.00	5454.00	5460.15	5457.80	5460.74	0.013816	6.15	283.09	141.92	0.45
COAL CREEK CL	9954	50 YEAR	3070.00	5454.00	5462.04	5459.40	5463.07	0.016515	8.14	377.25	500.08	0.52

POST PROJECT HECRAS MODEL

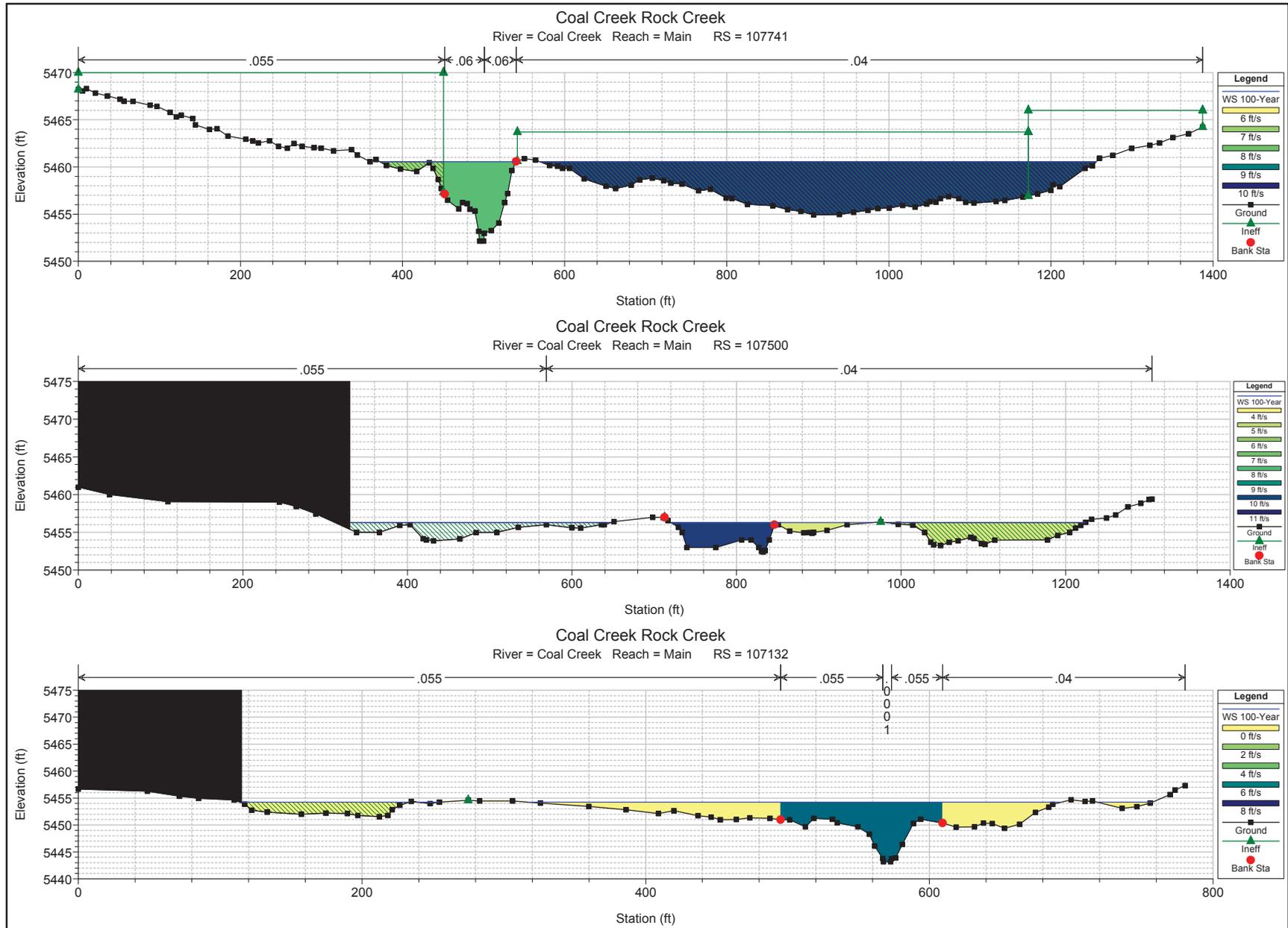
HEC-RAS Plan: Plan 02 River: COAL CREEK Reach: COAL CREEK CL (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
COAL CREEK CL	9954	100-YEAR	3434.00	5454.00	5462.48	5459.78	5463.63	0.017152	8.61	398.93	585.74	0.54
COAL CREEK CL	9954	500-YEAR	4005.00	5454.00	5463.06	5460.36	5464.42	0.018496	9.36	427.71	648.99	0.56

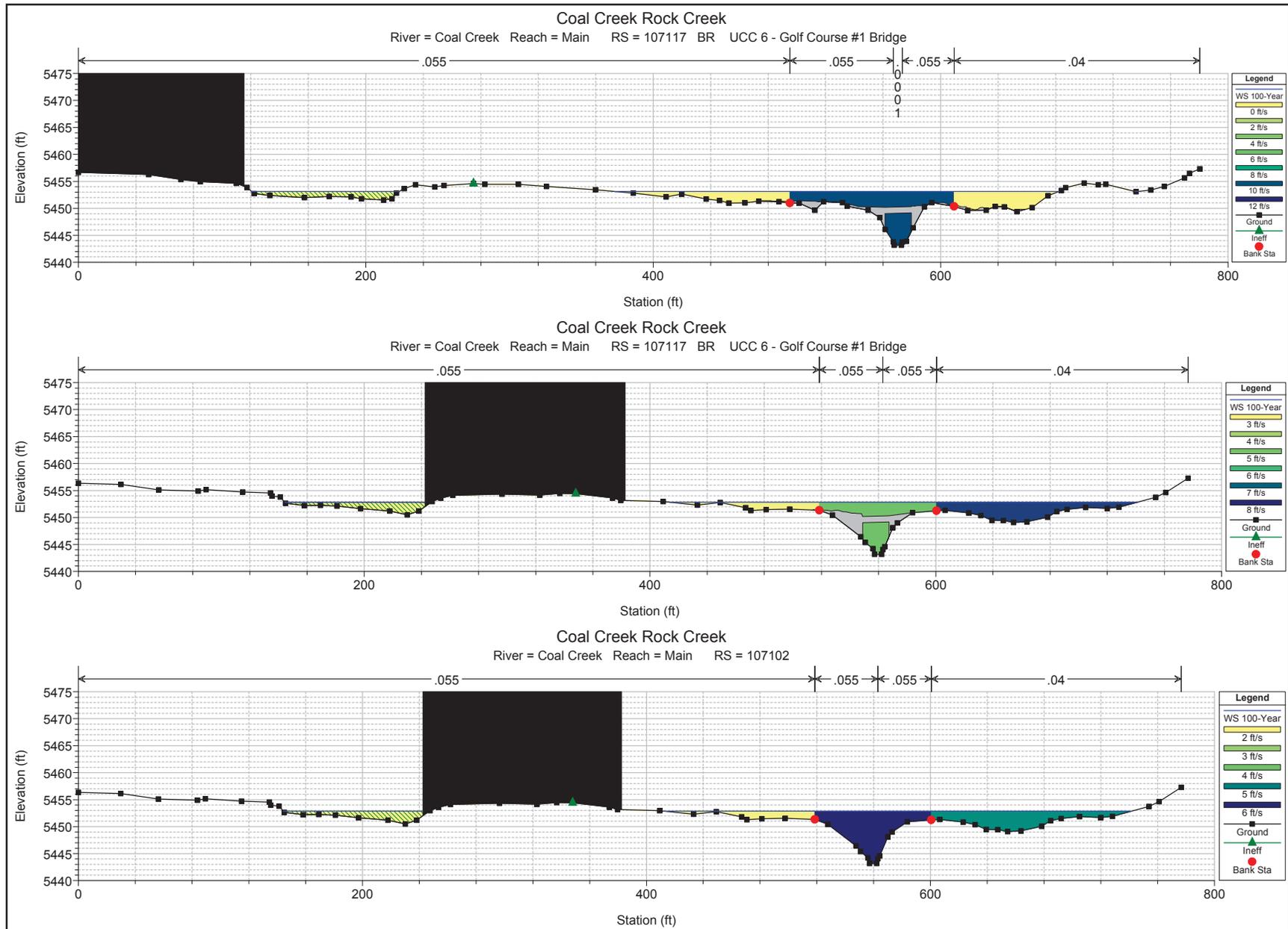
FHAD PRE-PROJECT HEC-RAS MODEL



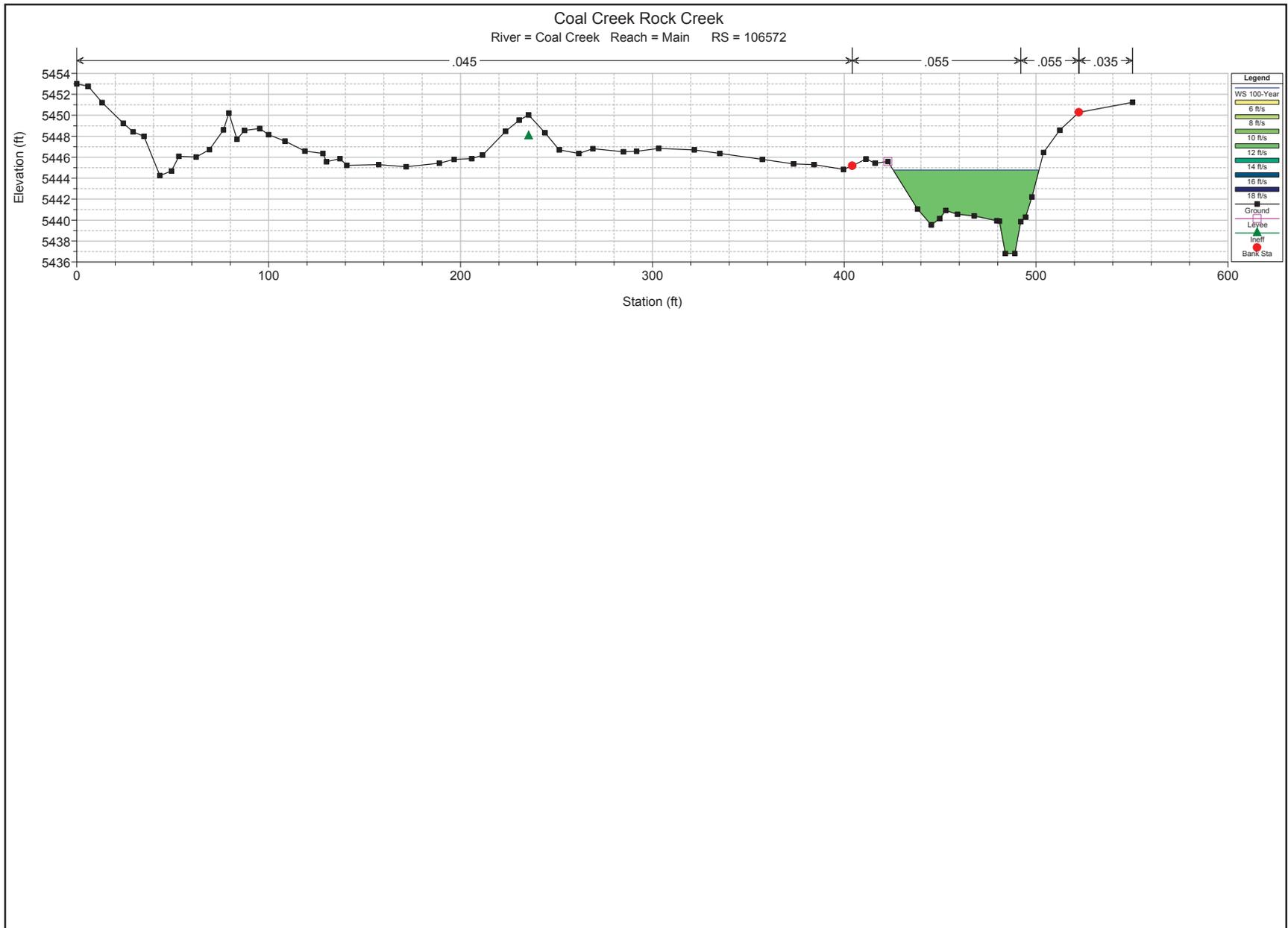
FHAD PRE-PROJECT HEC-RAS MODEL



FHAD PRE-PROJECT HEC-RAS MODEL



FHAD PRE-PROJECT HEC-RAS MODEL

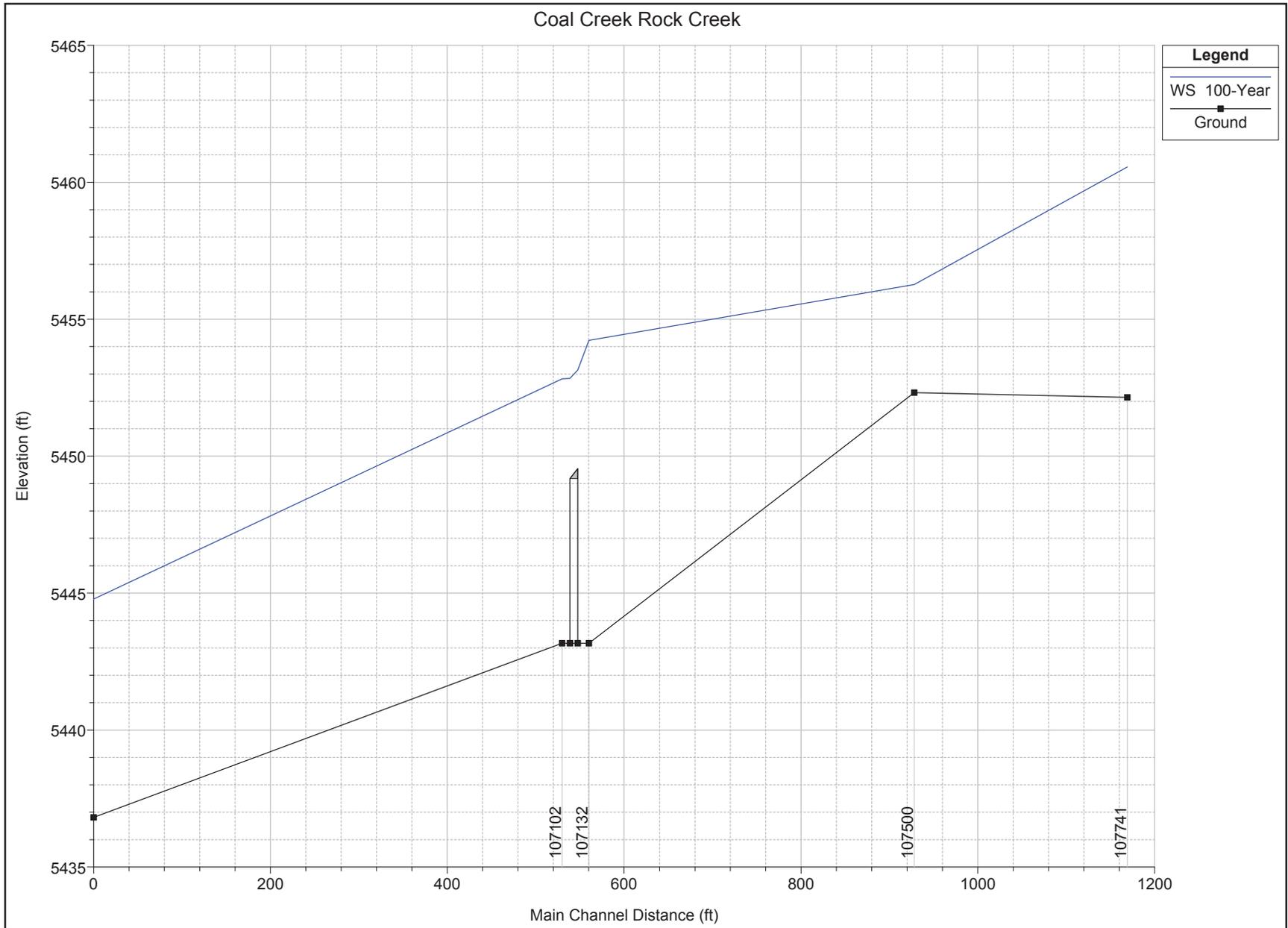


FHAD PRE-PROJECT HEC-RAS MODEL

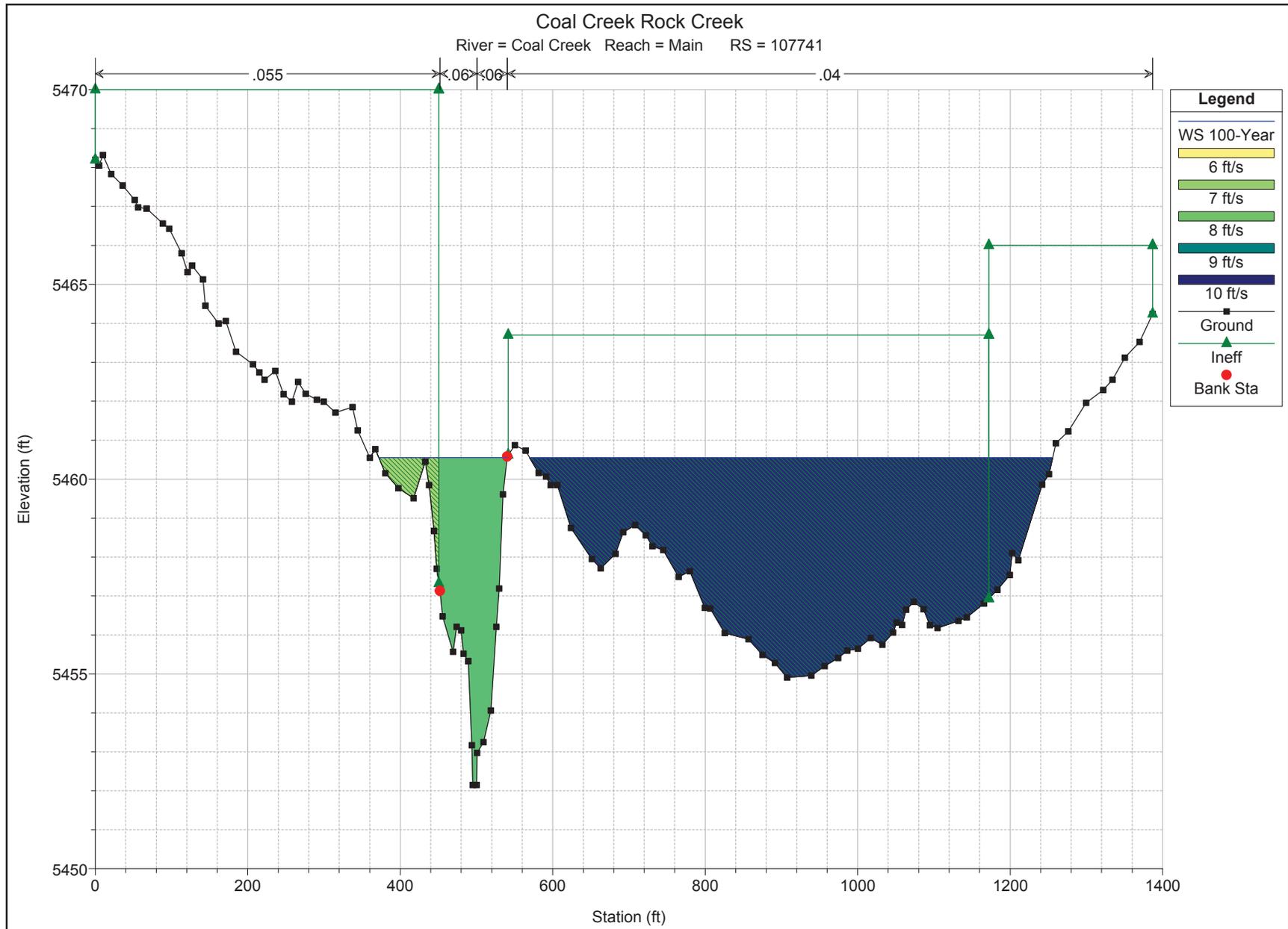
HEC-RAS Plan: PRE River: Coal Creek Reach: Main Profile: 100-Year

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	106572	100-Year	5446.88	5444.78	2.10				3740.00		76.00
Main	107102	100-Year	5453.32	5452.86	0.46	6.31	0.16	191.14	2149.28	1399.58	427.24
Main	107117	Bridge									
Main	107132	100-Year	5454.85	5454.23	0.63	0.00	0.10	9.57	3711.38	19.05	546.97
Main	107500	100-Year	5457.77	5456.29	1.48	0.00	0.26		3349.32	390.68	802.96
Main	107741	100-Year	5461.59	5460.55	1.04	3.77	0.04	32.23	3707.41	0.36	854.12

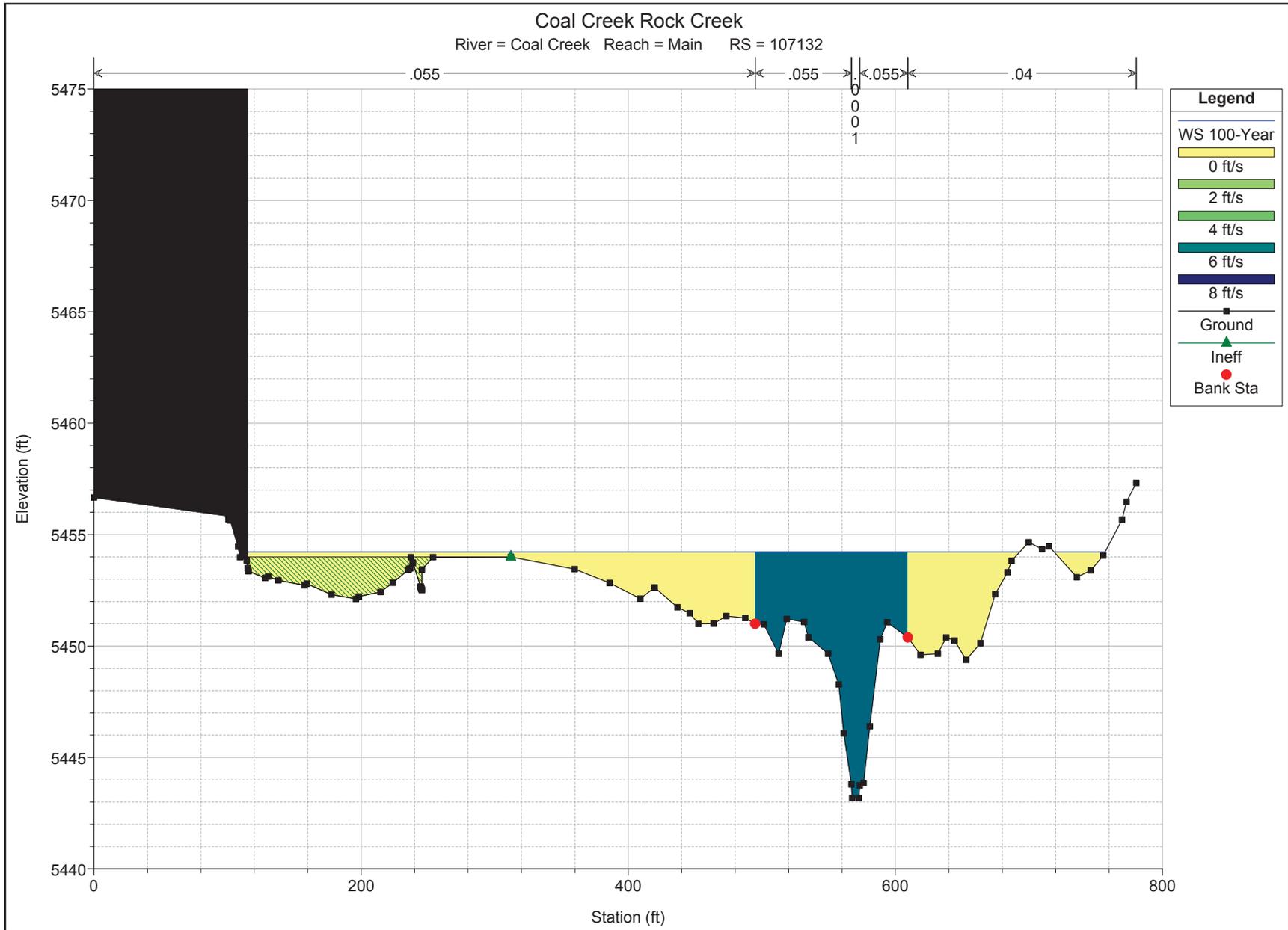
FHAD POST-PROJECT
HEC-RAS MODEL



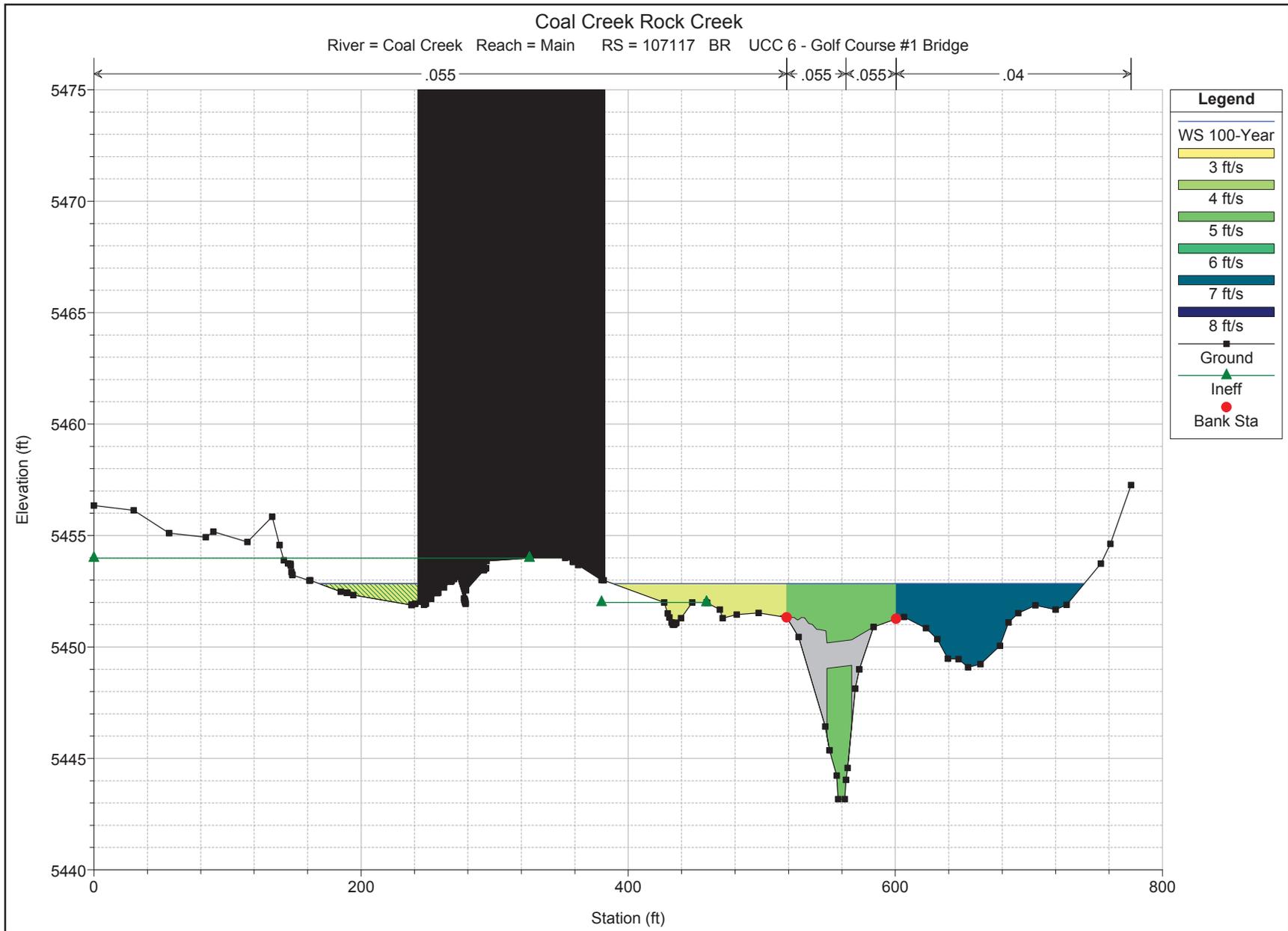
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HEC-RAS MODEL



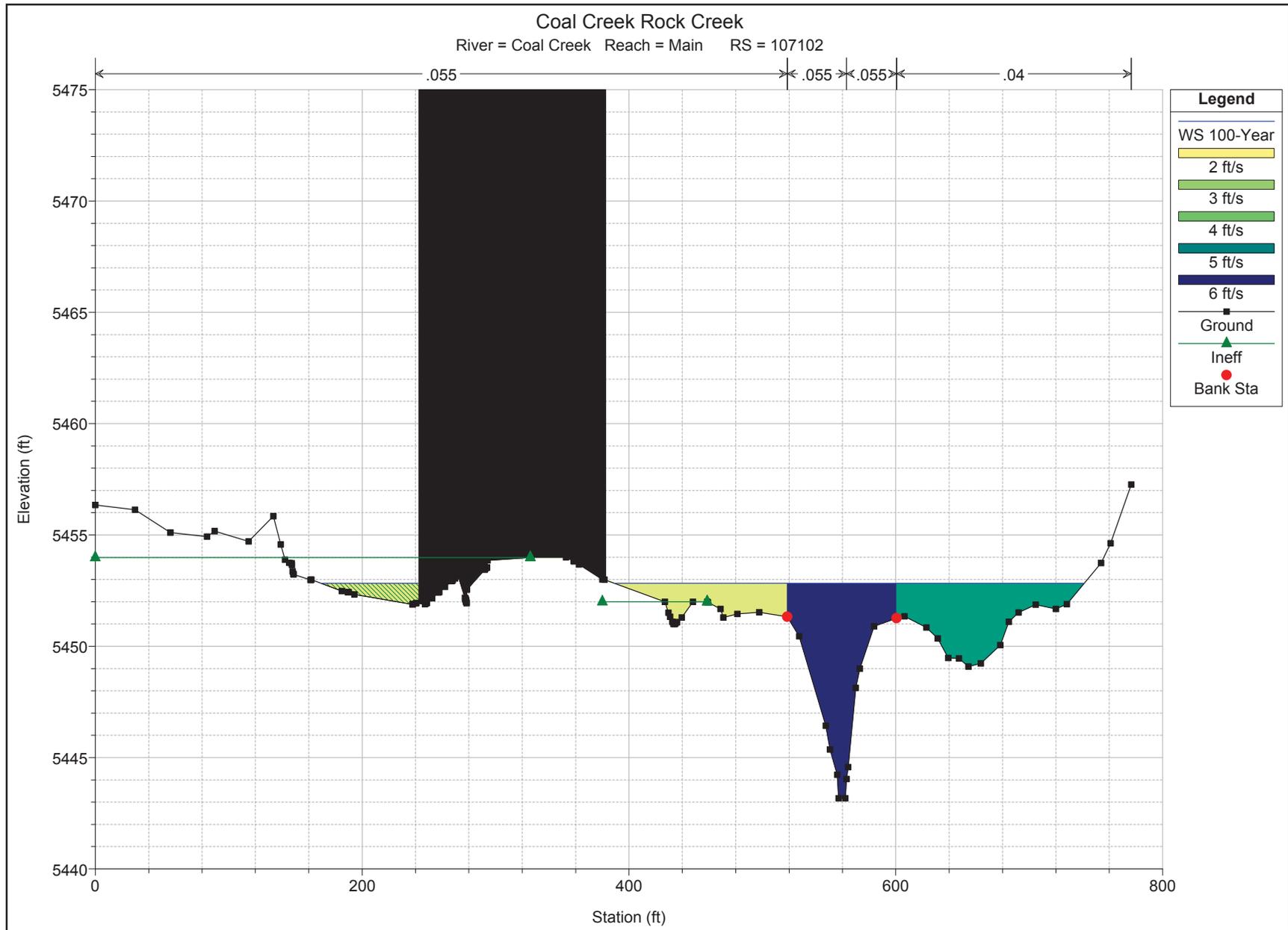
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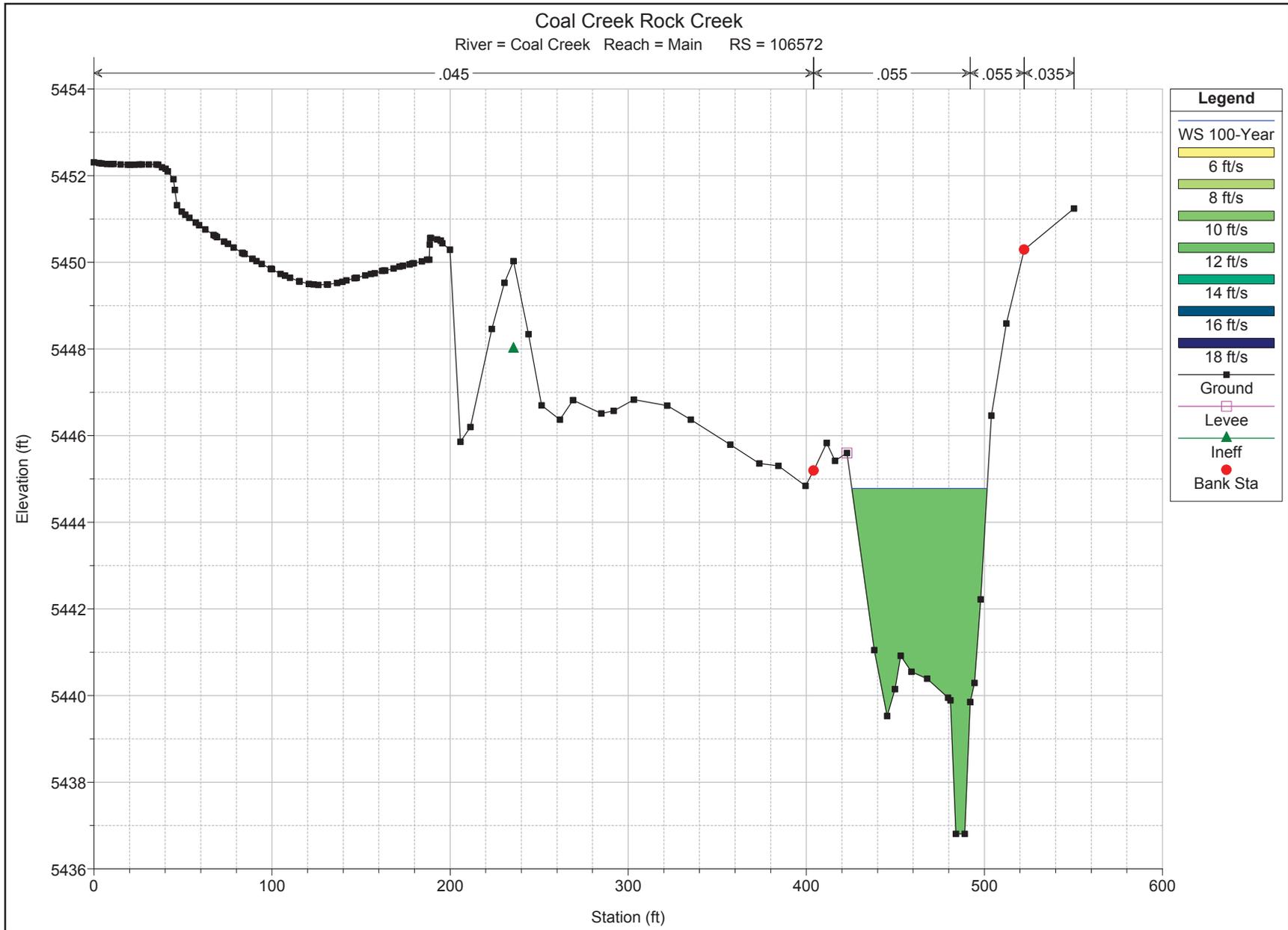
FHAD POST-PROJECT HEC-RAS MODEL



FHAD POST-PROJECT HEC-RAS MODEL



FHAD POST-PROJECT HEC-RAS MODEL



FHAD POST-PROJECT HEC-RAS MODEL

HEC-RAS Plan: POST River: Coal Creek Reach: Main Profile: 100-Year

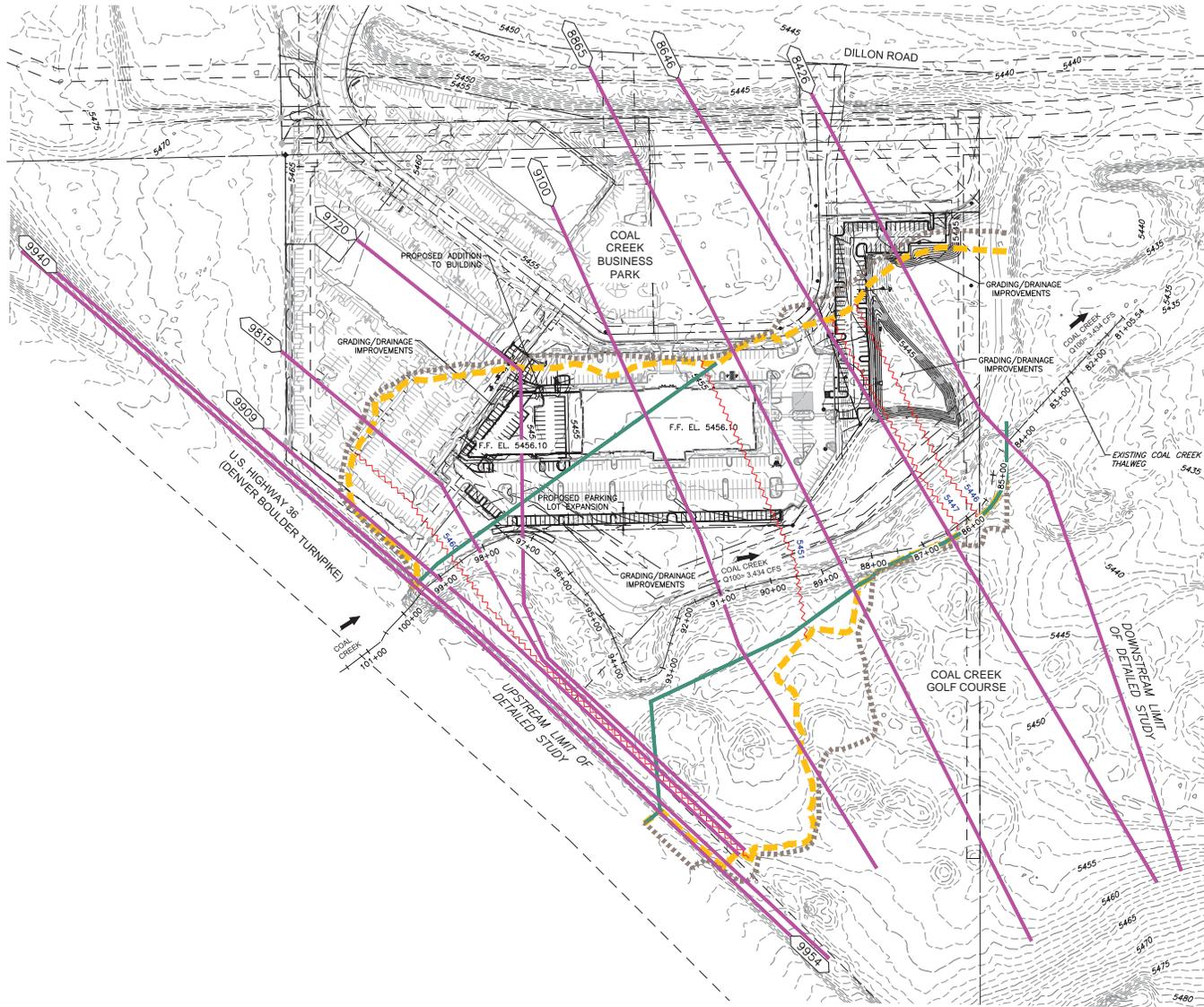
Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	106572	100-Year	5446.88	5444.78	2.10				3740.00		75.98
Main	107102	100-Year	5453.26	5452.83	0.43	6.19	0.17	295.92	2094.93	1349.15	425.35
Main	107117	Bridge									
Main	107132	100-Year	5454.86	5454.23	0.63	0.00	0.10	7.39	3713.55	19.06	616.17
Main	107500	100-Year	5457.77	5456.27	1.50	0.00	0.26		3348.14	391.87	682.79
Main	107741	100-Year	5461.60	5460.56	1.04	3.78	0.05	32.30	3707.34	0.36	855.29

Appendix C

Hydraulic Workmap

Electronic Files (HEC-RAS Models)

PLOT DATE: Friday, October 21, 2016 11:23 AM LAST SAVED BY: JICKERSON
 DRAWING LOCATION: C:\SCHLAPPE\16.0450-Coal Creek\ENG\DRAINAGE\DWG\WORKMAP_FP1.dwg

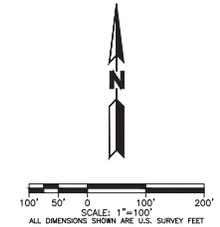


- LEGEND**
- EFFECTIVE 500-YR REGULATORY FLOODPLAIN (PER FEMA FLOOD HAZARD LAYER) [Dashed line]
 - EFFECTIVE 100-YR REGULATORY FLOODPLAIN (PER FEMA FLOOD HAZARD LAYER) [Dashed line]
 - EFFECTIVE 100-YR REGULATORY FLOODWAY (PER FEMA FLOOD HAZARD LAYER) [Solid line]
 - DECEMBER 2012 EFFECTIVE MODEL SECTION LOCATION AND ID (PER 1996 TAGGART STUDY) [Boxed number 12336]
 - CROSS SECTION BASED ON MARTIN/MARTIN INC. JANUARY 2015 SURVEY [Pink line]
 - BASE FLOOD ELEVATION [Wavy line 5501]
 - EXISTING CONTOURS [Dashed line 4480]
 - PROPOSED CONTOURS [Solid line 5750]

- NOTES:**
- EXISTING (PRE-PROJECT) TOPOGRAPHY IS DENVER REGIONAL COUNCIL OF GOVERNMENTS(DRCOG) 2013 AERIAL LIDAR TOPOGRAPHY AND SURVEY BY HKS, DATED MAY 2016.
 HORIZONTAL COORDINATE SYSTEM: MODIFIED NORTH AMERICAN DATUM 1983, STATE PLANE COLORADO CENTRAL, U.S. SURVEY FEET.
 - POST-PROJECT DESIGN TOPOGRAPHY IS PER DESIGN BY MARTIN/MARTIN INC.
 - ALL WATER SURFACE ELEVATIONS LISTED ARE BASED ON THE 1% ANNUAL CHANCE FLOOD UNLESS OTHERWISE NOTED.
- BENCHMARK:**
 BENCHMARK IS NOS POINT W413 AT THE INTERSECTION OF SOUTH BOULDER ROAD AND NORTH 76TH STREET, BEING A STAINLESS STEEL ROD IN LOGO CAP, ELEVATION = 5459.59 NAVD83.

CROSS SECTION ID	EFFECTIVE BFE	PRE-PROJECT BFE	POST-PROJECT BFE
8426	5442.0	5442.4	5442.4
8646	5445.0	5447.5	5447.4
8665	5447.0	5449.5	5449.5
9100	-	5452.0	5452.0
9720	-	5457.5	5457.4
9818	5460.1	5461.1	5461.0
9909	5461.4	5462.1	5462.1
9940	5462.5	5462.7	5462.7
9954	5462.6	5462.5	5462.5

* NO RISE CERTIFICATION IS BASED ON THE COMPARISON BETWEEN PRE AND POST PROJECT BASE FLOOD ELEVATIONS, THE COAL CREEK BUSINESS PARK DEVELOPMENT EXISTING CONDITIONS, AT THE TIME OF THIS STUDY, IMPACT THE EFFECTIVE SFHA AND BFE'S.



MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.



COAL CREEK BUSINESS PARK FLOODPLAIN PERMIT
 FEIMA EFFECTIVE WORKMAP

No.	Issue / Revision	Date	Name
1	ISSUED FOR CITY OF LOUISVILLE APPROVAL	10/21/16	W/M

Job Number	16.0450
Project Manager	R. BYRNE
Design By	J. DICKERSON
Drawn By	J. DICKERSON
Principal in Charge	P. HORN

Sheet Number: **FP1**

NOT FOR CONSTRUCTION

PLOT DATE: Friday, October 21, 2016 12:52 PM LAST SAVED BY: J.DICKERSON
 DRAWING LOCATION: G:\SCHLAPPE\16.0450-Coal Creek\ENG\DRAINAGE\DWG\WORKMAP_FP2.dwg



LEGEND

- EFFECTIVE 500-YR REGULATORY FLOODPLAIN (PER 2014 FHAD) -----
- EFFECTIVE 100-YR REGULATORY FLOODPLAIN (PER 2014 FHAD) -----
- EFFECTIVE 100-YR REGULATORY FLOODWAY (PER 2014 FHAD) -----
- ESTIMATED EXISTING FLOODPLAIN (PER THIS FLOODPLAIN STUDY) - - - - -
- ESTIMATED PROPOSED FLOODPLAIN (TIES INTO ESTIMATED EXISTING FLOODPLAIN) -----
- EFFECTIVE 100-YR REGULATORY FLOODPLAIN (PER FEMA FLOOD HAZARD LAYER) - - - - -
- EFFECTIVE 100-YR REGULATORY FLOODWAY (PER FEMA FLOOD HAZARD LAYER) -----
- DECEMBER 2012 EFFECTIVE MODEL SECTION LOCATION AND ID (PER 1996 TAGGART STUDY) 12336
- FHAD CROSS SECTION BASED ON MARTIN/MARTIN INC. JANUARY 2015 SURVEY -----
- ADDED FHAD CROSS SECTION BASED ON MARTIN/MARTIN INC. JANUARY 2015 SURVEY -----
- BASE FLOOD ELEVATION ~ ~ ~ ~ ~
- EXISTING CONTOURS - - - - -
- PROPOSED CONTOURS -----

NOTES:

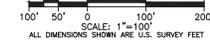
1. EXISTING (PRE-PROJECT) TOPOGRAPHY IS DENVER REGIONAL COUNCIL OF GOVERNMENTS(DRCOG) 2013 AERIAL LIDAR TOPOGRAPHY AND SURVEY BY HKS, DATED MAY 2016.
 HORIZONTAL COORDINATE SYSTEM: MODIFIED NORTH AMERICAN DATUM 1983, STATE PLANE COLORADO CENTRAL, US SURVEY FEET.
2. POST-PROJECT DESIGN TOPOGRAPHY IS PER DESIGN BY MARTIN/MARTIN INC.
3. ALL WATER SURFACE ELEVATIONS LISTED ARE BASED ON THE 1% ANNUAL CHANCE FLOOD UNLESS OTHERWISE NOTED.

BENCHMARK:

BENCHMARK IS NGS POINT WA13 AT THE INTERSECTION OF SOUTH BOULDER ROAD AND NORTH 76TH STREET, BEING A STAINLESS STEEL ROD IN LOGO CAP, ELEVATION = 5459.59 NAVD88.

CROSS SECTION ID	FHAD BFE	PRE-PROJECT BFE	POST PROJECT BFE
106572	5444.8	5444.8	5444.8
107102	5452.8	5452.8	5452.8
107132	5454.2	5454.2	5454.2
107509	5457.84	5456.3	5456.3
107741	5459.1	5459.1	5459.1

- * BFE INTERPOLATED FROM FHAD STUDY
- ** NO RISE CERTIFICATION IS BASED ON THE COMPARISON BETWEEN PRE AND POST PROJECT BASE FLOOD ELEVATIONS.



MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.



COAL CREEK BUSINESS PARK FLOODPLAIN PERMIT
 FHAD WORKMAP
 NOT FOR CONSTRUCTION

No.	Issue / Revision	Date	Name
1	ISSUED FOR CITY OF LOUISVILLE APPROVAL	10/21/16	W/M

Job Number	16.0450
Project Manager	R. BYRNE
Design By	J. DICKERSON
Drawn By	J. DICKERSON
Principal in Charge	P. HORN

THE OFFICE SHOWN HEREIN IS NOT A LICENSED ARCHITECTURAL FIRM. THE OFFICE IS A SERVICE OFFICE OF MARTIN/MARTIN CONSULTING ENGINEERS, INC. A LICENSED PROFESSIONAL ENGINEERING FIRM.

Sheet Number: **FP2**

FINAL PLANNED UNIT DEVELOPMENT
COAL CREEK CORPORATE CENTER I, AMENDMENT A
 COAL CREEK BUSINESS PARK
 LOT 2, COAL CREEK BUSINESS PARK
 CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO



DAVIS PARTNERSHIP ARCHITECTS
 1000 WEST 10TH AVENUE, SUITE 100
 DENVER, COLORADO 80202
 PHONE: 303.733.8800
 FAX: 303.733.8801
 WWW.DAVISARCHITECTS.COM

CORPORATE CENTER I
COAL CREEK BUSINESS PARK
 LOUISVILLE, COLORADO
 TRAMMELLCROW COMPANY

Date: 12/09/09
 Proj. No.: 10-106-01-000

Revised/Issued	DATE
1-14-10	12/09/09
2-14-10	01/20/10
3-14-10	02/03/10
4-14-10	02/03/10
5-14-10	02/03/10
6-14-10	02/03/10
7-14-10	02/03/10
8-14-10	02/03/10
9-14-10	02/03/10
10-14-10	02/03/10
11-14-10	02/03/10
12-14-10	02/03/10

DRAWING TITLE
 SITE PLAN/AS-BUILT

SHEET NUMBER
02
 02 of 13

AMENDMENT 1



- LEGEND**
- 1/2" DOMESTIC WATER
 - 1" FIRE (EMERGENCY)
 - 3" WATER LINE
 - 6" SANITARY SEWER
 - 8" STORM SEWER
 - 1 1/2" FIRE HYDRANT
 - P PARKING LOT LIGHT
 - P ACCESSIBLE PARKING
 - P PARKING COURT NO.
 - P PARKING TALLY
 - P PROPERTY LINE
 - P EASEMENT LINE
 - P FIRE LANE
 - P EXIST. CONTOUR LINE
 - P NEW CONTOUR LINE
 - P 30' RIGHT TRUNKLINE
 - P COLLECTOR-DRAINAGE (CONCRETE DRAINAGE)
 - P 40' CONC. DRIVEWAY

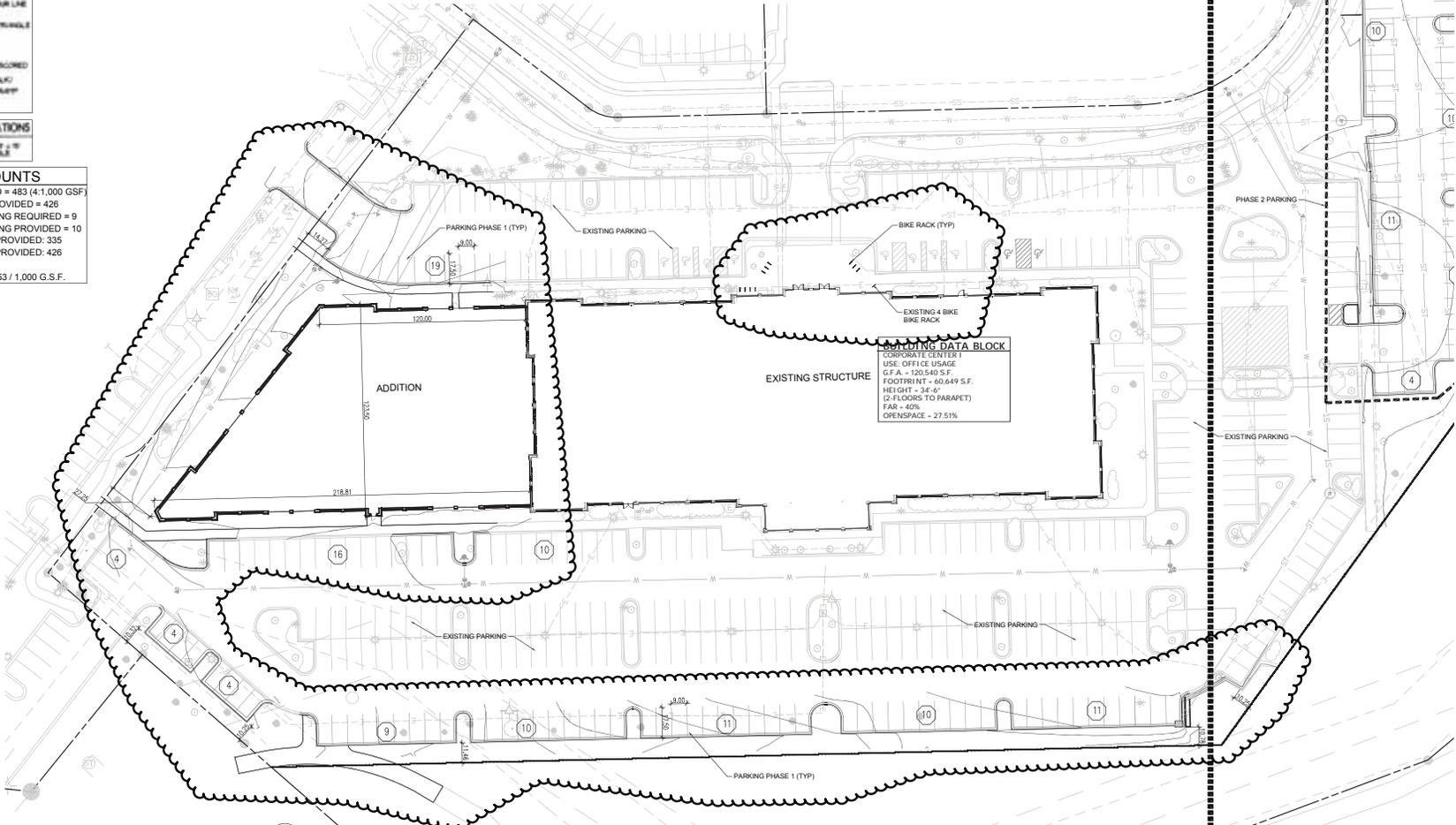
PARKING ABBREVIATIONS

HC = HC ACCESSIBLE (12' x 18')

SA = SA ACCESSIBLE (8' x 12')

PARKING COUNTS

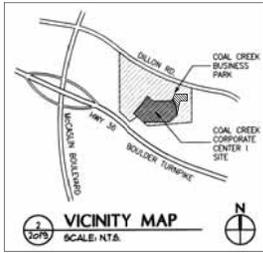
PARKING REQUIRED = 483 (4-1,000 GSF)
 TOTAL PARKING PROVIDED = 426
 ACCESSIBLE PARKING PROVIDED = 9
 PHASE 1 PARKING PROVIDED = 335
 PHASE 2 PARKING PROVIDED = 426
 PARKING RATIO: 3.53 / 1,000 G.S.F.



SITE PLAN EAST
 SCALE: 1" = 30'-0"



FINAL PLANNED UNIT DEVELOPMENT
COAL CREEK CORPORATE CENTER I, AMENDMENT A
 COAL CREEK BUSINESS PARK
 LOT 2, COAL CREEK BUSINESS PARK
 CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO



LEGEND

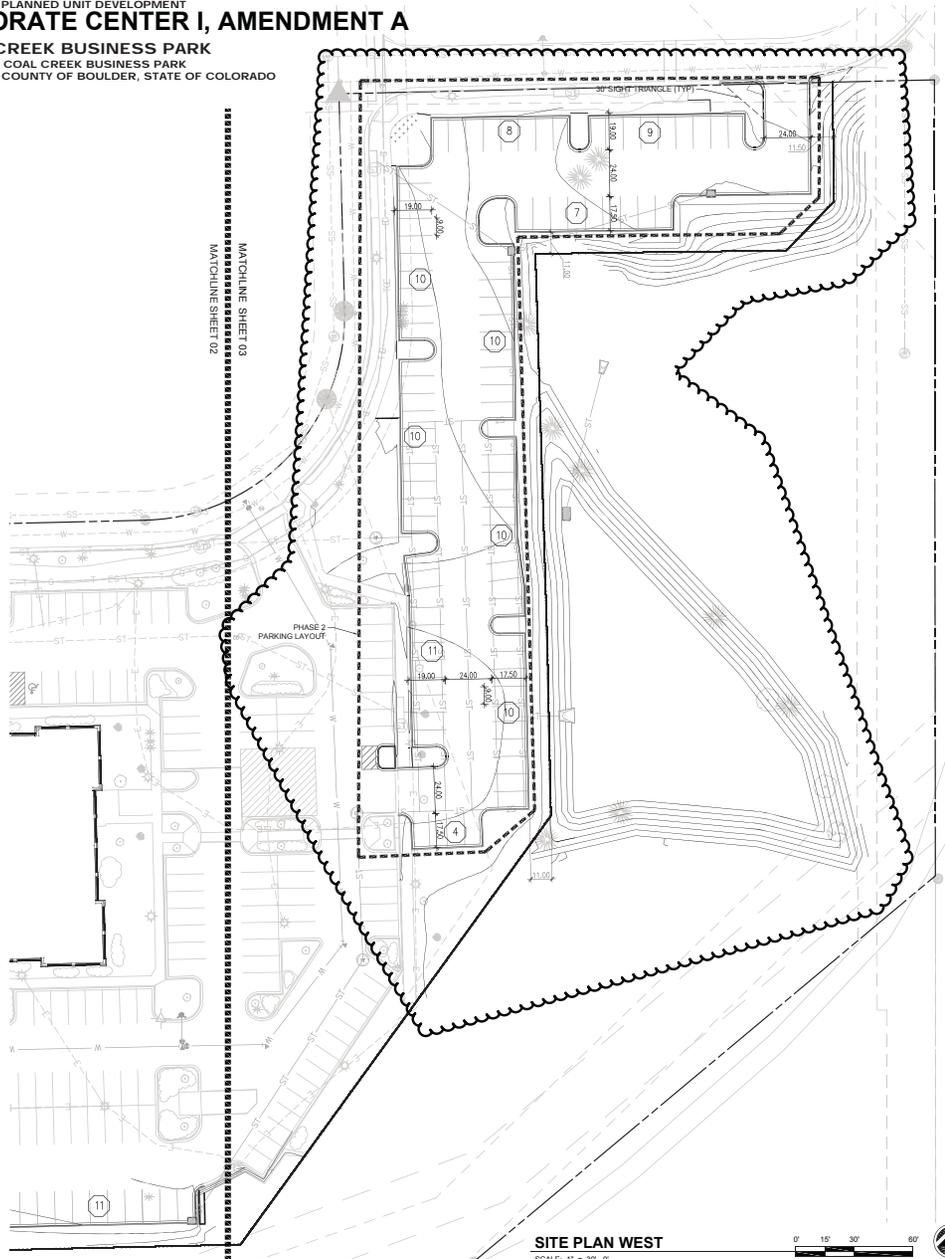
- 1/2" DW DOMESTIC WATER
- 1/2" DW FIRE (DOMESTIC)
- 1/2" DW WATER LINE
- 6" SW SANITARY SEWER
- 8" ST STORM SEWER
- 1/2" DW FIRE HYDRANT
- P PARKING LOT LIGHT
- A ACCESSIBLE PARKING
- C PARKING COURT NO.
- (TR) PARKING TRAILY
- P PROPERTY LINE
- E EASEMENT LINE
- F FIRE LANE (15')
- .50 EXIST. CONTOUR LINE
- .25 NEW CONTOUR LINE
- 30' RIGHT TRUNKLINE
- [Hatched] COLUMBED-SCORED CONCRETE (20000 G.S.F.)
- [Hatched] AC CURB RAMP

PARKING ABBREVIATIONS

- HC = HC ACCESSIBLE - 8' x 12'
- SA = SA ACCESSIBLE

PARKING COUNTS

PARKING REQUIRED = 483 (4,1,000 G.S.F.)
 TOTAL PARKING PROVIDED = 426
 ACCESSIBLE PARKING REQUIRED = 9
 ACCESSIBLE PARKING PROVIDED = 10
 PHASE 1 PARKING PROVIDED: 335
 PHASE 2 PARKING PROVIDED: 426
 PARKING RATIO: 3.53 / 1,000 G.S.F.



DAVIS PARTNERSHIP ARCHITECTS
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 LOUISVILLE, CO 80027
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 FAX: 303.557.8801
 WWW.DAVISARCHITECTS.COM

CORPORATE CENTER I
COAL CREEK BUSINESS PARK
 LOUISVILLE, COLORADO
 TRAMMELLCROW COMPANY

Date: 10/09/09
 Proj. No.: 10-105-01-000

Revised/Issued	DATE
1-1	10/20/09
2-1	10/20/09
3-1	10/20/09
4-1	10/20/09
5-1	10/20/09
6-1	10/20/09
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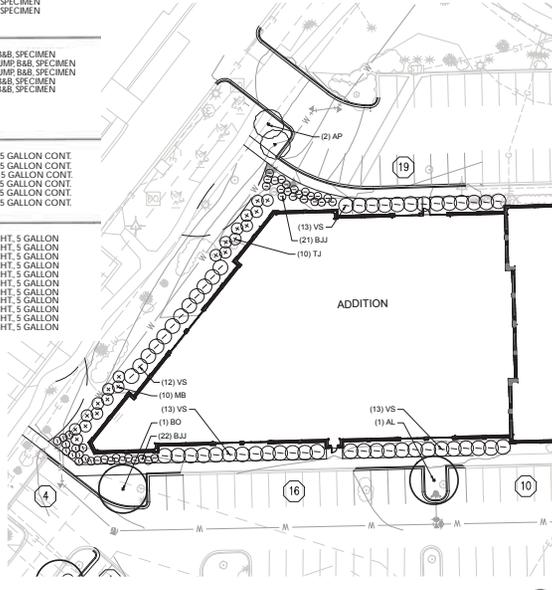
SITE PLAN WEST
 SCALE: 1" = 30' 0"
 NORTH

DRAWING TITLE
 SHEET NUMBER
03
 03 of 13
 AMENDMENT 1

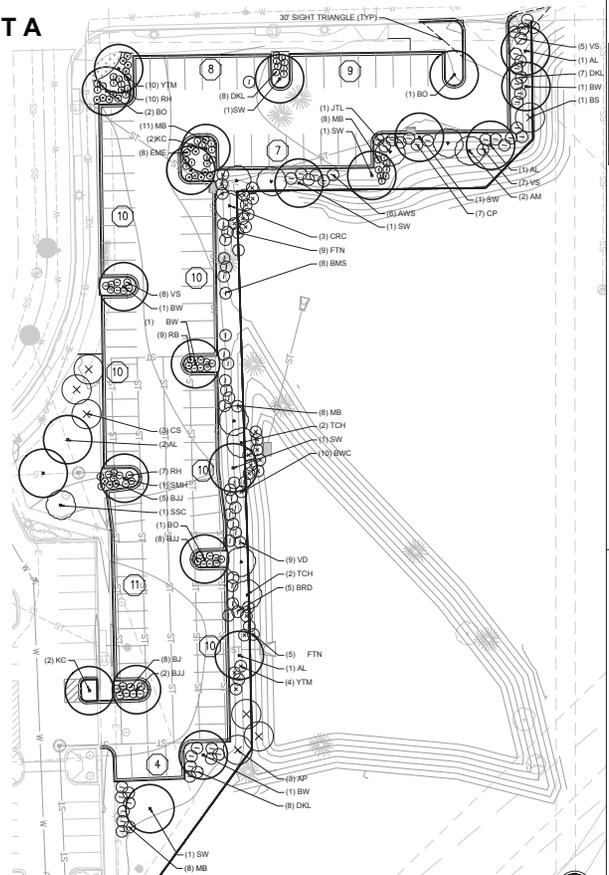
FINAL PLANNED UNIT DEVELOPMENT
COAL CREEK CORPORATE CENTER I, AMENDMENT A
 COAL CREEK BUSINESS PARK
 LOT 2, COAL CREEK BUSINESS PARK
 CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO

LANDSCAPE PLANT LIST

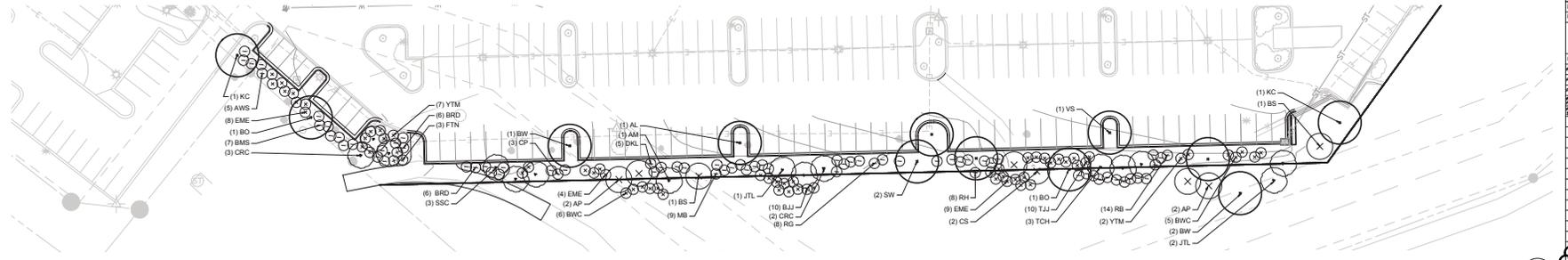
QTY.	SYM.	COMMON NAME	BOTANICAL NAME	SIZE & CONDITION
DECIDUOUS TREES				
6	KC	KENTUCKY COFFEE TREE	GYMNOCLADUS DIOICA	3" CAL. B&B SPECIMEN
7	BW	BLACK WALNUT	JUGLANS NIGRA	3" CAL. B&B SPECIMEN
7	AL	AMERICAN LINDEN	TILIA AMERICANA	3" CAL. B&B SPECIMEN
9	SW	SWAMP WHITE OAK	QUERCUS BICOLOR	3" CAL. B&B SPECIMEN
6	BO	BUR OAK	QUERCUS MACROCARPA	3" CAL. B&B SPECIMEN
EVERGREEN TREES				
7	AP	AUSTRIAN PINE	PINUS NIGRA	NOTE: 25% TO BE 8" HT. SPECIMEN
3	BS	COLORADO BLUE SPRUCE	PICEA PUNGENS VAR GLAUCA	6-8" HT. SPECIMEN
5	CS	COLORADO SPRUCE	PICEA PUNGENS	6-8" HT. SPECIMEN
ORNAMENTAL TREES				
4	SSC	SPRING SNOW GLOBE	MALUS SPRING SNOW	2" CAL. B&B SPECIMEN
3	AM	FLAME AMUR MAPLE	ACER TATARICUM GINNALA FLAME	8-10" CLUMP B&B SPECIMEN
4	JTL	JAPANESE TREE LILAC	SYRINGA RETICULATA	8-10" CLUMP B&B SPECIMEN
8	CRC	CANADA RED CHERRY	PRUNUS VIRGINIANA MELANOCARPA	2" CAL. B&B SPECIMEN
12	TCH	THORNLESS COCKSPUR HAWTHORNE	CRATAEGUS CRUS-GALLI VAR. INERMIS	2" CAL. B&B SPECIMEN
EVERGREEN SHRUBS				
23	YTM	YEW	TAXUS X MEDIA 'HICKSIF'	30" HT. 5 GALLON CONT.
17	FTN	FIRE THORN	PIRACANTHA COCCINEA	30" HT. 5 GALLON CONT.
29	EME	EUCONYMIUS MANHATTAN	EUCONYMIUS KALPTSCHOVICUS MANHATTAN	30" HT. 5 GALLON CONT.
21	BWC	BIGLEAF WINTERCREEPER	EUCONYMIUS FORTUNEI SARCOXIE	30" HT. 5 GALLON CONT.
71	BU	BUFFALO JUNIPER	JUNIPER SIBIRICA BUFFALO	30" HT. 5 GALLON CONT.
20	TJ	TAMMY JUNIPER	JUNIPER CHINESS TAMARISCIFOLIA	30" HT. 5 GALLON CONT.
DECIDUOUS SHRUBS				
11	AWS	ANTHONY WATERER SPIREA	SPIREA JAPONICA ANTHONY WATERER	24" HT. 5 GALLON
15	BMS	BLUE MIST SPIREA	CARYOPTERIS X CLANDONIS	24" HT. 5 GALLON
17	BRD	BAILLY RED TWIG DOGWOOD	CORNUS SERICEA BAILLY	24" HT. 5 GALLON
10	CP	CISTENA PLUM	PRUNUS CISTENA	24" HT. 5 GALLON
28	DKL	DWARF KOREAN LILAC	SYRINGA MENYER	24" HT. 5 GALLON
54	MB	MENIOP MARBERRY	BERBERIS X MENTORENSIS	24" HT. 5 GALLON
8	RC	YELLOW SHRUB ROSE	ROSA X GOLDEN WINGS	24" HT. 5 GALLON
25	RH	PURPLE RED SHRUB ROSE	ROSA X HANSA	24" HT. 5 GALLON
23	RB	RABBIT BRUSH	CHROSOTHAMUS MAUSEOSUS ALBICAULIS	24" HT. 5 GALLON
40	VS	WANDERER'S SPIREA	SPIREA VANHOTTETI	24" HT. 5 GALLON
40	VD	ARROWWOOD VIBURNUM	VIBURNUM DENTATUM	24" HT. 5 GALLON



1 EAST LANDSCAPE PLAN
 SCALE: 1" = 30' - 0"



2 WEST LANDSCAPE PLAN
 SCALE: 1" = 30' - 0"



3 EAST LANDSCAPE PLAN
 SCALE: 1" = 30' - 0"



DAVIS PARTNERSHIP ARCHITECTS
 1000 WEST 10TH AVENUE, SUITE 100
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 TEL: 303.733.1100
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CORPORATE CENTER I
COAL CREEK BUSINESS PARK
 LOUISVILLE, COLORADO
 TRAMMELLCROW COMPANY

Date:	12/29/16
Proj. No.:	16-006-01-000
Revised/Issued:	DATE
Rev. 01/04/17	01/04/17
Rev. 01/10/17	01/10/17
Rev. 01/17/17	01/17/17
Rev. 01/24/17	01/24/17
Rev. 02/01/17	02/01/17
Rev. 02/08/17	02/08/17
Rev. 02/15/17	02/15/17
Rev. 02/22/17	02/22/17
Rev. 03/01/17	03/01/17
Rev. 03/08/17	03/08/17
Rev. 03/15/17	03/15/17
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Rev. 03/29/17	03/29/17
Rev. 04/05/17	04/05/17
Rev. 04/12/17	04/12/17
Rev. 04/19/17	04/19/17
Rev. 04/26/17	04/26/17
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Rev. 09/28/17	09/28/17
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Rev. 11/23/17	11/23/17
Rev. 11/30/17	11/30/17
Rev. 12/07/17	12/07/17
Rev. 12/14/17	12/14/17
Rev. 12/21/17	12/21/17
Rev. 12/28/17	12/28/17

SHEET NUMBER
06
 06 of 13

AMENDMENT 1

FINAL PLANNED UNIT DEVELOPMENT
COAL CREEK CORPORATE CENTER I, AMENDMENT A

COAL CREEK BUSINESS PARK
 LOT 2, COAL CREEK BUSINESS PARK
 CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO



DAVIS PARTNERSHIP ARCHITECTS

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CORPORATE CENTER I
COAL CREEK BUSINESS PARK
 LOUISVILLE, COLORADO
 TRAMMELLCROW COMPANY

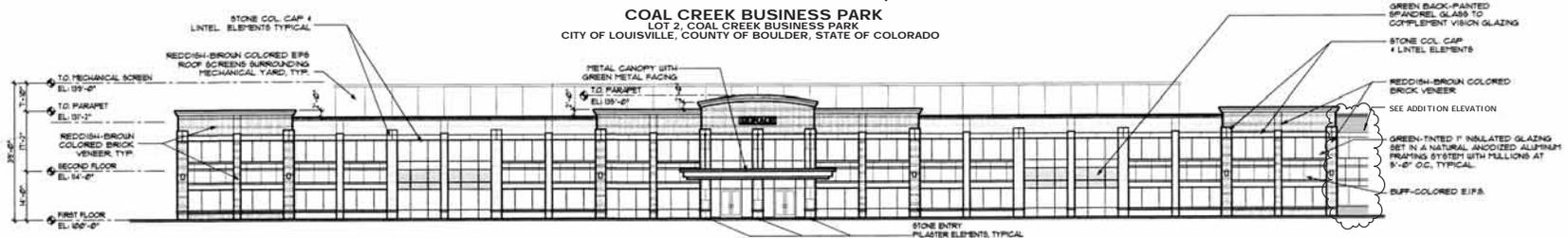
Date: 12/2016
 Proj No.: 14106-01-000

Revised/Issued	DATE
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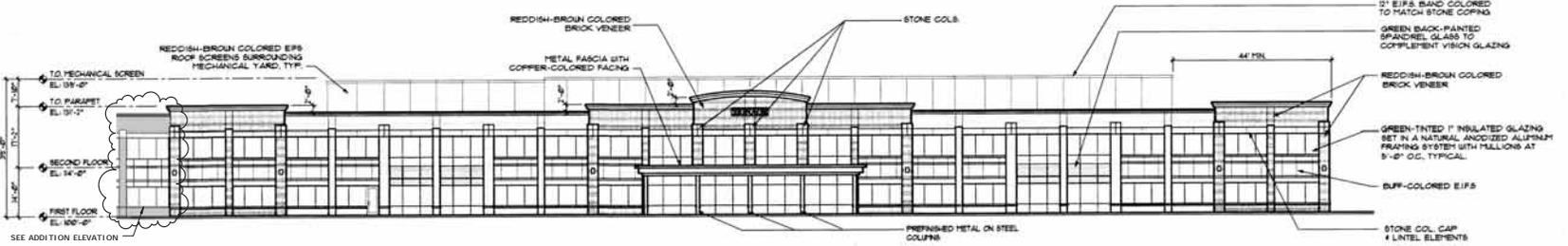
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 EXTERIOR ELEVATIONS

SHEET NUMBER:
07
 OF 12

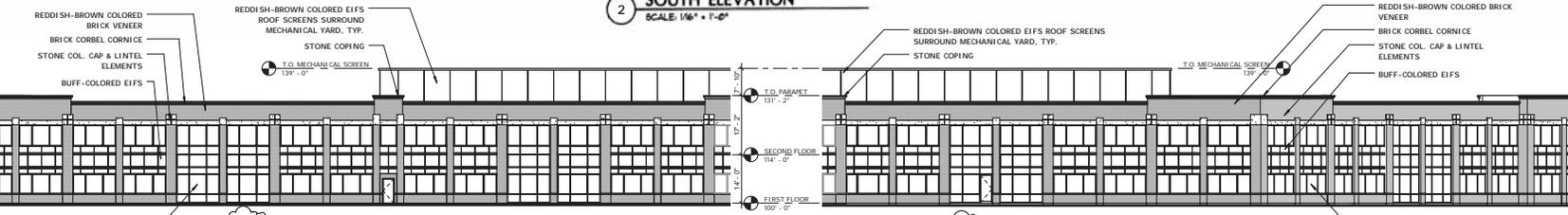
AMENDMENT 1



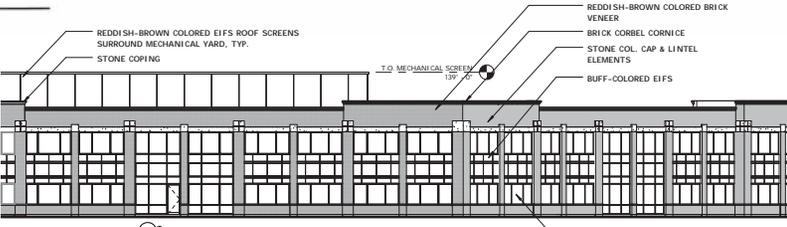
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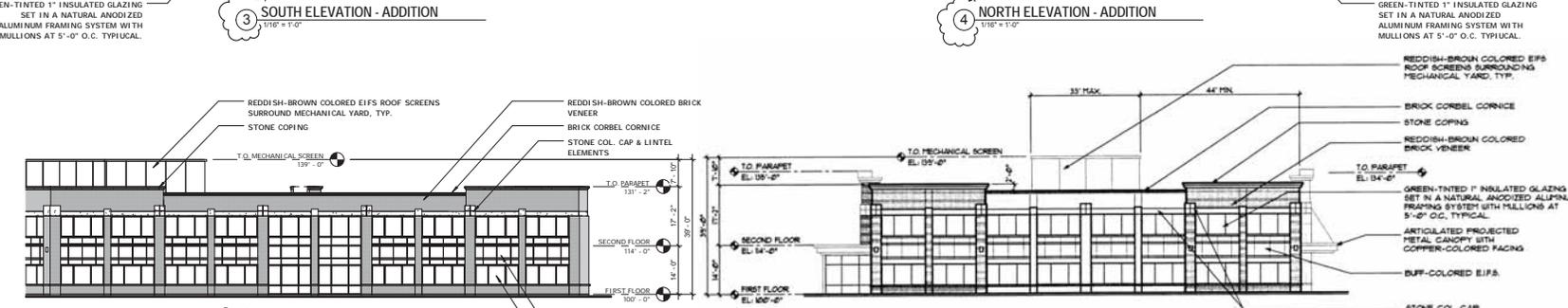
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 SCALE: 1/8" = 1'-0"



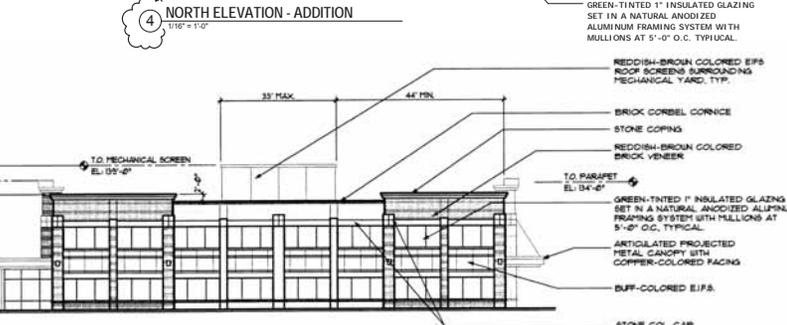
3 SOUTH ELEVATION - ADDITION
 SCALE: 1/16" = 1'-0"



4 NORTH ELEVATION - ADDITION
 SCALE: 1/16" = 1'-0"



5 WEST ELEVATION
 SCALE: 1/16" = 1'-0"



6 EAST ELEVATION
 SCALE: 1/8" = 1'-0"

