Planning and Community Development Department
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DEVIATION REQUEST AND DECISION FORM

Updated: 6/26/2019

PROJECT INFORMATION

Project Name :	Eagle Rising PCD File No. SP205 & SF2225
Schedule No.(s) :	52290-00-034 & 52290-00-035
Legal Description :	See Attached

APPLICANT INFORMATION

Company :	MyPad, Inc., General Partner, Casas Limited Partnership #4
Name :	Stephen J. Jacobs, Jr., President
	☒ Owner ☐ Consultant ☐ Contractor
Mailing Address :	P.O. Box 2076
	Colorado Springs, CO 80901
Phone Number :	(719) 359-1473
FAX Number :	
Email Address :	striplejacobs@gmail.com

ENGINEER INFORMATION

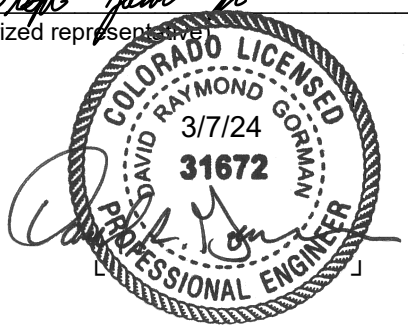
Company :	M.V.E., Inc.		
Name :	David Gorman	Colorado P.E. Number :	31672
Mailing Address :	1903 Lelaray St, Ste 200		
Phone Number :	(719) 635-5736		
FAX Number :			
Email Address :	daveg@mvecivil.com		

OWNER, APPLICANT, AND ENGINEER DECLARATION

To the best of my knowledge, the information on this application and all additional or supplemental documentation is true, factual and complete. I am fully aware that any misrepresentation of any information on this application may be grounds for denial. I have familiarized myself with the rules, regulations and procedures with respect to preparing and filing this application. I also understand that an incorrect submittal will be cause to have the project removed from the agenda of the Planning Commission, Board of County Commissioners and/or Board of Adjustment or delay review until corrections are made, and that any approval of this application is based on the representations made in the application and may be revoked on any breach of representation or condition(s) of approval.

Signature of owner (or authorized representative) — Date: 1/5/24

Engineer's Seal, Signature And Date of Signature



DEVIATION REQUEST (Attach diagrams, figures, and other documentation to clarify request)

A deviation from the standards of or in Section(s) **ECM 3.3.3 B and C** of the Engineering Criteria Manual (ECM) is requested.

Identify the specific ECM standard which a deviation is requested:

ECM 3.3.3.B: Conformance with DCM Volume 1 Sections 6.5.2, Table 10-4 Channel Velocity,
Concrete, riprap, or soil cement linings as approved by the City/County shall be used where channel bottom velocities exceed 6.0 ft/sec. Grass lined channels shall not be used where velocity exceeds permissible velocities in Table 10-4, or the Froude number is greater than 0.9 for the 100-year storm.

DCM Volume 1 Sections 10.2.1 Soft Lined Channels
Grass lined channels are the preferred means of conveying storm water runoff because of their desirability from the standpoint of erosion protection, maintainability, accessibility, and aesthetics.
Grasses typically used for channel lining are Bermudagrass, Kentucky bluegrass, orchardgrass, redtop, Stalian ryegrass, and buffalograss.

ECM 3.3.3.C Channel Types
1. Soft-Lined Channels
2. Hard-Lined Channels

provide project number, should be stand alone document

State the reason for the requested deviation:

Table 10-4 and DCM Volume 1 Section 10.2.1 do not include provisions or standards for the type of willow, sedge, rush and reed vegetation present in Cottonwood Creek within the project reach. Excellent stream stabilization exists within the subject reach of Cottonwood Creek consisting of mature dense vegetation (grasses, sedges, rushes, reeds, 6 species of willows, numerous shrubs and trees), pond embankments which support wetland vegetation and provide stormwater storage, and large boulder grade check and pond bank lining. For more than a decade, the owners, Entech Engineering, Inc. and ERO Resources Corporation consultants have natural conditions of stream and riparian corridor within the site. All referenced parties want to pres bilizing and well-vegetated state. See reports uploaded in Applicants submittal.

is this all within the pond? when you say boulder creek bed do you mean thalweg within the pond?

"Nat channel type in ECM 3.3.3.C
Othe natural channels" however it is not included as a channel type in the ECM standard.
In th uctures 10.1 General Statement "Generally speaking, a stabilize
mad conforms to the character of a stabilized natural channel, is th
desirable.
DCM 2.2.1 Channelization "A stable natural channel reaches "equilibrium" over many years."

has an easement been provided for this pond and overflow? it will be required and this should be identified in the FDR.

Explain the proposed alternative and compare to the ECM standards (May provide applicable region as basis):

Utilize the stabilizing value of the existing established pond embankments, existing willow vegetation and existing boulder placements as fully adequate stabilization and not require additional stabilization where hydraulic analysis indicates channel velocities are less than 6 fps, Froude Number values are lower than 1.0 in accordance with the

explain with what or how?

The Cottonwood Creek channel within the Eagle Rising Preliminary Plan contains two existir lized embankments, existing boulder creek bed and pond embankment stabilization, and established dense willow growth that supports established wetlands which provide natural aesthetic qualities, wildlife habitat, erosion control, and pollutant removal. The two ponds constitute stabilizing features that provide the added benefits of controlling flow rates in the creek. Also, an important engineering consideration is that the slope of the creek for the project reach is mild at 1% to 2% with an average of 1.2% as compared to other offsite creek locations in the immediate vicinity. The existing pond spillway at DP 104 will require additio time of final plat as noted on the Drainage Plan to protect the spillway during severe storm water overflo downstream creek drainageway. The Spillway at DP 126 has adequate existing riprap in place. If Pon overflows will overtop the embankment at the southeast corner and inundate an open area at the south Overflows will then be released at the existing riprap spillway under weir flow conditions. Ponded water in t released at locations other than the riprap protected spillway. The ponds and creek bed have withstood repeated significantly sized rainfall events throughout decades of existence including the events of the 2015 500-year to 1000-year storms and the 2023 100-year storms.

sentence structure is poor. run-on sentence with two half thoughts.

The creek bed, wetland areas and riparian overstory of Cottonwood Creek throughout the site are shrubs and trees as illustrated by the photos contained in the appendix of this report. The Natural R Resources Corporation lists with botanic specificity the various plants found. The ERO repo documentation of the plants and site conditions. Wetland areas feature native grasses such as Redtop and Broadleaf Cattail. The wetlands also contain mature, dense and well-established willows of the creek bed throughout the site. Specific willow species include Sandbar Willow, Greenleaf Willo

do you have substantiation on these numbers. i do not. if you are going to say something like this, please provide back up support to substantiate.

Explain the proposed alternative and compare to the ECM standards (May provide applicable regional or national standards used as basis):

Willow, Park Willow and Shining Willow. The riparian overstory is described as containing Peachleaf Willow and Plains Cottonwood trees. Shrubs present in the riparian corridor through the site include Snowberry, Wood's Rose, Golden Current, and Chokecherry. All these species act together to preserve the existing creek alignment and grades that are observed at the site and documented by photographic evidence.

is this attached?

Supplemental information concerning permissible velocities and permissible shear stresses for channel lining materials is included in the appendix. The information includes suggested permissible values for the native grasses, willows and trees that grow in the project reach. Live willow stakes are included and listed to have permissible velocities of 3 to 10 f/sec with permissible shear stress of 2.10 to 3.10 lbs/sf. However, the supplemental information assumes that the vegetation is newly planted, as in Reed Plantings, Hardwood Tree Plantings and Live Willow Stakes. In this case, the vegetative cover throughout the site is not plantings or stakes, but well established, robust, and dense cover that has served to stabilize the creek bed and banks for de beyond) of the permissible value range applies in this project reach.

this is number 1 and 2. where are the other two? please describe in the same fashion.

The results of the hydraulic analysis contained in this report indicate four locations that exhibit channel fl or exceed 6 fps and/or have Froude Number values that equal or exceed 1.0. The affected locations in spillways which are protected with riprap as indicated on the Drainage Map. The presence of dense project reach serves to provide additional stabilization. The existing boulder structure, located upstre provides stabilization. Portions of the banks inside the DP 104 pond are lined with large boulders. The boulders have been in place for approximately 40 years and are well embedded and incorporated into the creek terrain. They appear to range in size from 3'x3'x2.5' to 7'x4.5'x5'. Based on site observation and riprap sizing calculations that show Type VL (D50 = 6") is more than adequate to remain in place at this location, it is M.V.E., Inc.'s opinion and engineering judgement, that the existing boulders adequately fulfill stabilization function and will remain in place during the 100-year rainfall event. No further improvements are needed in the creek assuming the existing vegetation is preserved. The vegetation is naturally occurring and has been in place for many years. During this time, it has survived various meteorologic cycles. Additionally, with the present level of development in the upstream watershed, the amount of runoff in this section of Cottonwood Creek is not likely to be altered in the future. Considering all these factors, the exiting vegetation is persistent and not in danger of failing. The owners will preserve the vegetation.

The allowances in Section 6.5.2 and Table 10-4 do not account for the types and condition of the vegetation present in the creek channel and are not applicable to this case. Furthermore, hydraulic analysis results for the channel reach comply with the provision of Section 6.5.2 except where expected at the armored pond spillways.

state not covered on the table

Alternative Information is provided in the form of attached Table 2 containing Permissible Velocity and S Native Grasses, Hardwood Tree Plantings and Live Willow Stakes complete with a list of sources including documentation from U.S. Army Engineer Research and Development Center, U.S. Dept. of Transportation, Federal Highway Administration, and others.

The DCM provides that concrete, riprap, or soil cement linings as approved by the City/County shall be used where channel bottom velocities exceed 6.0 ft/sec. Grass lined channels shall not be used where velocity exceeds permissible velocities in Table 10-4 or the Froude number is greater than 0.9 for the 100-year storm. Table 10-4 does not account for the type of vegetation present in the creek throughout the project reach. Alternatively, M.V.E., Inc. recommends the allowable velocities for willow ~~staking~~ and native grasses as included in the Appendix of this report. Long Native Grasses have permissible velocities of 4 fps to 6 fps, while Live Willow Stakes have permissible velocities of up to 10 fps. Allowable Shear stresses are also noted in the cited sources of up to 3.10 lbs. per sf. Shear Stresses at HEC-RAS model section 3700, 3500, 2703, 2669, 2101, 1900, 1700, 1500, 1400, 1200, 409 and 374 exceed 3.10 lbs. per sf. However, all these locations also have velocities and Froude Number that complies with the DCM. Furthermore, the actual vegetation on the site is well established and exhibits dense growth. The existing plants possess stabilizing characteristics far beyond those of recent plant stakings. Although the hydraulic analysis of the creek reach indicates acceptable velocities in accordance with the DCM, except at pond spillways, a Deviation Request is submitted in support of the higher allowable velocities for the specific type of creek vegetation found at the site. Existing conditions at section 3500 and native grass vegetation that is well established. There is no evidence of erosion present at this location. Sections 2703 and of the Pond 1 emergency spillway which will have riprap protection added in developed conditions. Existing s 2101, 1900, 1700, 1500, 1400 and 1200 exhibit dense willow growth and native grass vegetation that is well is no evidence of erosion present at these locations. Sections 409 and 374 is the location of the Pond 2 emergency spillway which has existing riprap protection installed. The property owners will preserve the creek bed and vegetation as required through an HOA or individually in accordance with a channel maintenance agreement.

and maintain

what, state what this is please.

Natural well-established creeks typically don't require maintenance. The creek bed and banks within this subdivision are very well established with dense vegetation as detailed above. The owners **elect ECM 3.3.3.K.2.** This access alternative allows lot line easements to serve as access pathways and omits construction of 15' wide access roads which would unnecessarily deface and destabilize the creekside and interfere with the use and enjoyment of the private residential lots. The 15' access road may be omitted in recognition that the available corridors through the lot line easements are adequate with regard to available travel width and the traversable terrain. See the attached Creek Access Exhibit These access conditions meet the criteria and intent of ECM 3.3.3.K.2.

a preservation easement should be shown on the plat and no trees or vegetation should be allowed that would prevent access to the creek.

change to second box.

LIMITS OF CONSIDERATION
(At least one of the conditions listed below must be met for this deviation request to be considered.)

☐ The ECM standard is inapplicable to the particular situation.
☐ Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.
☒ A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.

Provide justification:

The allowances in Section 6.5.2 and Table 10-4 do not account for the types and condition of the vegetation present in the creek channel and are not applicable to this case. The supplemental information provided with this deviation request with allowable flow velocities and shear stresses are more closely applicable to the type of vegetation found within the subject creek reach and site. The results of hydraulic analysis using this appropriate supplemental engineering data show that all sections of the creek channel comply with the provision of Section 6.5.2. The two pond overflow spillways, as expected do not and are armored.

Furthermore the U.S. Army Core of Engineers has, after staff viewing if the site, recommended that the existing wetlands and natural channel and features not be disturbed, seeing no beneficial outcomes to further structural stabilization. The application of the requested data to this project will preserve the existing stabilizing vegetation and natural terrain for the [illegible] aesthetics, wildlife and future lot owners.

doesn't support this section, possibly move to another? you need to support the statement above.

CRITERIA FOR APPROVAL

Per ECM section 5.8.7 the request for a deviation may be considered if the request is **not based exclusively on financial considerations**. The deviation must not be detrimental to public safety or surrounding property. The applicant must include supporting information demonstrating compliance with **all of the following criteria**:

The deviation will achieve the intended result with a comparable or superior design and quality of improvement.

The requested deviation preserves the existing terrain and vegetation, which provides the current natural stabilization of the creek bed and banks. Current structures on the creek include the two ponds and boulder placements. These were installed prior to the time of current ownership. The owners want to preserve the natural features of the existing riparian creek, wetlands and its wildlife. Furthermore, the owners do not wish to see the creek destabilized or the existing terrain, plantings, and natural beauty of the creek harmed or destroyed by the mechanized interventions required to install unnecessary, functionally inferior and maintenance intensive hard drainage structures.

habitat

The deviation will not adversely affect safety or operations.

The existing vegetation already fulfills all stabilization requirements for creek. The allowance of the deviation will not adversely affect safety or operations. Allowance of the deviation is superior to the level of stabilization available from other stabilization options. The property owners will preserve the creek bed and vegetation as required through an HOA or individually in accordance with a channel maintenance agreement.

and maintain

The deviation will not adversely affect maintenance and its associated cost.

All observation and preservation of the creek and riparian corridor within the Drainage Easement will be undertaken by the owners and the Owners Association in accordance with a channel maintenance agreement. The deviation will not adversely affect maintenance or maintenance costs.

It is understood that "Grass lined channels" are dependent upon continuous growth of "grass." As noted above, the native willow and other dense vegetation in place is significantly superior to grass and is already very well established. It is naturally occurring and has been in place for many decades. During this time, it has survived various meteorologic cycles from drought to overly wet seasons. Additionally, with the present level of development in the upstream watershed, the amount of runoff in this section of Cottonwood Creek is not likely to be altered in the future. Considering all these factors, the existing vegetation is vigorously persistent and not in danger of failing. The owners agree to continue to observe the waterway and to take appropriate steps to

and maintenance

The deviation will not adversely affect maintenance and its associated cost.

preserve the vegetation if its survival is threatened. No maintenance is anticipated, and no maintenance costs will be transferred to El Paso County.

if maintenance is needed, state you shall do it. (HOA or property owners)

The deviation will not adversely affect aesthetic appearance.

The natural aesthetic appearance of the site will remain intact and in place. Conversely, the engineering comment request for additional constructed stabilization would irreparably harm the site's biodynamic stability and aesthetic appearance.

really? that seems like a stretch

The deviation meets the design intent and purpose of the ECM standards.

The supporting documentation provided in this deviation request and the MDDP/Preliminary Drainage Report shows that the existing vegetation has served and will serve as the required stabilization within the creek. The purpose of the ECM standard is met.

The deviation meets the control measure requirements of Part I.E.3 and Part I.E.4 of the County's MS4 permit, as applicable.

-The proposed deviation request meets the control measure requirements specified by the County's MS4 Permit.
- The allowance of this deviation will avoid and prevent disturbance of the creek bed and banks and therefore prevent erosion and sedimentation within the creek.
- Stormwater quality treatment for the development site will be provided as required.
- Appropriate stormwater control measures will be implemented for any land disturbance as required in accordance with an approved Grading and Erosion Control Plan.

REVIEW AND RECOMMENDATION:

Approved by the ECM Administrator
This request has been determined to have met the criteria for approval. A deviation from Section **3.3.3 B and C** of the ECM is hereby granted based on the justification provided.

Denied by the ECM Administrator
This request has been determined not to have met criteria for approval. A deviation from Section _____ of the ECM is hereby denied.

ECM ADMINISTRATOR COMMENTS/CONDITIONS:

PCD File No. SP205 & SF2225

1.1. PURPOSE

The purpose of this resource is to provide a form for documenting the findings and decision by the ECM Administrator concerning a deviation request. The form is used to document the review and decision concerning a requested deviation. The request and decision concerning each deviation from a specific section of the ECM shall be recorded on a separate form.

1.2. BACKGROUND

A deviation is a critical aspect of the review process and needs to be documented to ensure that the deviations granted are applied to a specific development application in conformance with the criteria for approval and that the action is documented as such requests can point to potential needed revisions to the ECM.

1.3. APPLICABLE STATUTES AND REGULATIONS

Section 5.8 of the ECM establishes a mechanism whereby an engineering design standard can be modified when if strictly adhered to, would cause unnecessary hardship or unsafe design because of topographical or other conditions particular to the site, and that a departure may be made without destroying the intent of such provision.

1.4. APPLICABILITY

All provisions of the ECM are subject to deviation by the ECM Administrator provided that one of the following conditions is met:

- The ECM standard is inapplicable to a particular situation.
- Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship on the applicant, and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.
- A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.

1.5. TECHNICAL GUIDANCE

The review shall ensure all criteria for approval are adequately considered and that justification for the deviation is properly documented.

1.6. LIMITS OF APPROVAL

Whether a request for deviation is approved as proposed or with conditions, the approval is for project-specific use and shall not constitute a precedent or general deviation from these Standards.

1.7. REVIEW FEES

A Deviation Review Fee shall be paid in full at the time of submission of a request for deviation. The fee for Deviation Review shall be as determined by resolution of the BoCC.

NORTH PORTION – (10195 KURIE ROAD)

LEGAL DESCRIPTION:

THAT PORTION OF SECTION 29, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M., EL PASO COUNTY, COLORADO DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF THE NORTHEAST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SAID SECTION 29, SAID POINT BEING ON THE SOUTHERLY BOUNDARY OF PARK FOREST ESTATES FILING NO 2 (PLAT BOOK B-2 AT PAGE 52); THENCE S 00° 13'40"E ON THE WEST LINE OF THE EAST HALF OF SAID SECTION 29, A DISTANCE OF 1413.98 FEET TO THE TRUE POINT OF BEGINNING; THENCE N 00° 13'40"W, 1413.98 FEET; THENCE N89˚14'16"E, ON THE SOUTHERLY BOUNDARY OF SAID PARK FOREST ESTATES, A DISTANCE OF 375.32 FEET TO THE SOUTHEAST CORNER OF LOT 14, BLOCK 18 OF SAID PARK FOREST ESTATES; THENCE N89˚13'46"E ALONG SAID SOUTHERLY BOUNDARY, A DISTANCE OF 60.00 FEET TO THE EAST LINE OF KURIE ROAD; THENCE N89˚33'17"E ALONG SAID SOUTHERLY BOUNDARY, A DISTANCE OF 237.50 FEET; THENCE N89˚20'43"E ALONG SAID SOUTHERLY BOUNDARY, A DISTANCE OF 149.96 FEET; THENCE S00˚39'26"E, DEPARTING SAID SOUTHERLY BOUNDARY OF PARK FOREST ESTATES, A DISTANCE OF 231.57 FEET; THENCE S43˚12'03"E, A DISTANCE OF 433.08 FEET; THENCE S43˚12'03"E, A DISTANCE OF 56.61 FEET; THENCE N88˚33'24"E, A DISTANCE OF 0.10 FEET TO THE NORTHWEST CORNER OF LOT 1 POCO SUBDIVISION ACCORDING TO THE TO THE OFFICIAL MAP THEREOF FILED IN THE OFFICE OF THE COUNTY RECORDER OF EL PASO COUNTY, COLORADO, AS RECEPTION NO. 2406425; THENCE SOUTHERLY ALONG THE WESTERLY LINE OF SAID LOT 1 THE FOLLOWING SIX (6) COURSES:

S16˚04'20"E, 158.01 FEET;
S02˚43'41"W, 265.73 FEET:
N84˚46'48"W, 71.67 FEET;
S00˚11'34"W, 147.46 FEET;
N88˚32'26"E, 150.00 FEET;
S01˚27'34"E, 275.63 FEET;

THENCE S89˚45'28"W DEPARTING SAID WESTERLY LINE OF SAID LOT 1, A DISTANCE OF 766.08 FEET; THENCE N00˚14'32"W, 100.00 FEET; THENCE S89˚45'28"W, 152.00 FEET; THENCE S00˚14'32"E, 200.00 FEET; THENCE S89˚45'28"W, 152.00 FEET; THENCE N00˚14'32"W, 100.00 FEET; THENCE S89˚45'28"W, 201.18 FEET TO A POINT ON SAID WEST LINE OF THE EAST HALF OF SAID SECTION 29, SAID POINT BEING THE TRUE POINT OF BEGINNING.

DESCRIPTION PREPARED BY:
M & S CIVIL CONSULTANTS, INC.
102 EAST PIKES PEAK AVE. STE.306
COLORADO SPRINGS, COLORADO

SOUTH PORTION –(10115 KURIE ROAD)

LEGAL DESCRIPTION:

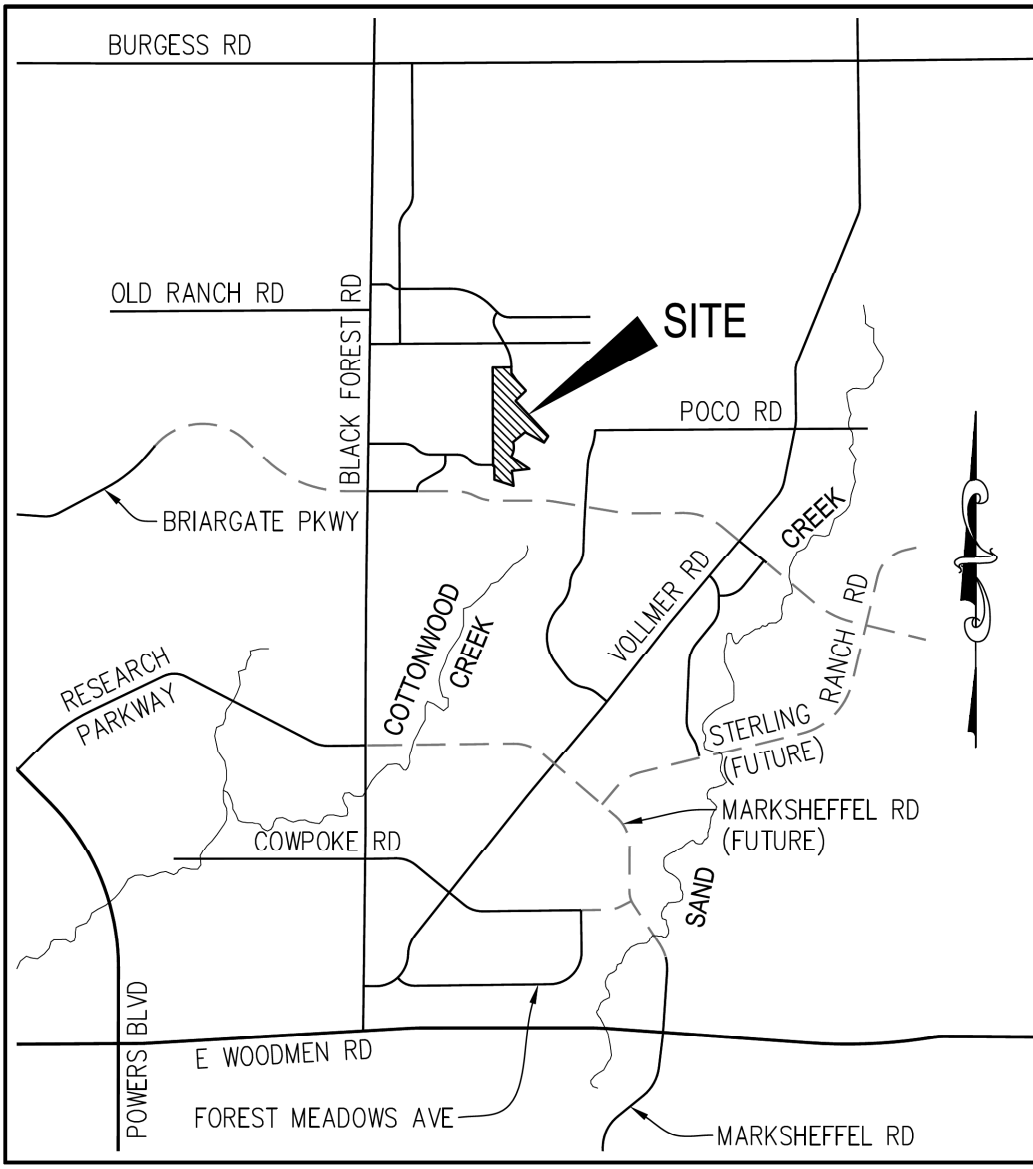
THAT PORTION OF SECTION 29, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M., EL PASO COUNTY, COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF THE NORTHEAST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SAID SECTION 29, SAID POINT BEING ON THE SOUTHERLY BOUNDARY OF PARK FOREST ESTATES FILING NO. 2 (PLAT BOOK B-2 AT PAGE 52), THENCE N89˚14'16"E, ON THE SOUTHERLY BOUNDARY OF SAID PARK FOREST ESTATES, A DISTANCE OF 375.32 FEET TO THE SOUTHEAST CORNER OF LOT 14, BLOCK 18 OF SAID PARK FOREST ESTATES; THENCE N89˚13'46"E ALONG SAID SOUTHERLY BOUNDARY, A DISTANCE OF 60.00 FEET TO THE EAST LINE OF KURIE ROAD; THENCE N89˚33'17"E ALONG SAID SOUTHERLY BOUNDARY, A DISTANCE OF 237.50 FEET; THENCE N89˚20'43"E ALONG SAID SOUTHERLY BOUNDARY, A DISTANCE OF 149.96 FEET; THENCE S00˚39'26"E, DEPARTING SAIDSOUTHERLY BOUNDARY OF PARK FOREST ESTATES, A DISTANCE OF 231.57 FEET; THENCE S43˚12'03"E, A DISTANCE OF 433.08 FEET; THENCE S43˚12'03"E, A DISTANCE OF 56.61 FEET; THENCE N88˚33'24"E, A DISTANCE OF 0.10 FEET TO THE NORTHWEST CORNER OF LOT 1 POCO SUBDIVISION ACCORDING TO THE TO THE OFFICIAL MAP THEREOF FILED IN THE OFFICE OF THE COUNTY RECORDER OF EL PASO COUNTY, COLORADO, AS RECEPTION NO. 2406425; THENCE SOUTHERLY ALONG THE WESTERLY LINE OF SAID LOT 1 THE FOLLOWING SIX (6) COURSES:

S16˚04'20"E, 158.01 FEET;
S02˚43'41"W, 265.73 FEET:
N84˚46'48"W, 71.67 FEET;
S00˚11'34"W, 147.46 FEET;
N88˚32'26"E, 150.00 FEET;

S01˚27'34"E, A DISTANCE OF 275.63 FEET TO THE TRUE POINT OF BEGINNING; THENCE S01˚27'34"E, A DISTANCE OF 178.87 FEET; THENCE S34˚54'56"W, A DISTANCE OF 563.22 FEET; THENCE S00˚00'00"E, A DISTANCE OF 344.55 FEET; THENCE N90˚00'00"E, A DISTANCE OF 87.56 FEET; THENCE S00˚00'00"E, A DISTANCE OF 459.65 FEET; THENCE S89˚59'26"W, A DISTANCE OF 1035.05 FEET TO A POINT ON THE WEST LINE OF THE EAST HALF OF SAID SECTION 29; THENCE N00˚13'40"W, ALONG SAID WEST LINE, A DISTANCE OF 1439.98 FEET TO A POINT WHICH IS DRAWN S 89° 45'28" W FROM THE POINT OF BEGINNING; THENCE N 89˚45'28"E, A DISTANCE OF 201.18 FEET; THENCE S00˚14'32"E, 100.00FEET; THENCE N89˚45'28"E, 152.00 FEET; THENCE N00˚14'32"W, 200.00 FEET; THENCE N89˚45'28"E, 152.00 FEET; THENCE S00˚14'32"E, 100.00 FEET; THENCE N89˚45'28"E, 766.08 FEET, MORE OR LESS TO THE TRUE POINT OF BEGINNING.

DESCRIPTION PREPARED BY:
M & S CIVIL CONSULTANTS, INC.
102 EAST PIKES PEAK AVE. STE 306
COLORADO SPRINGS, COLORADO
80903



VICINITY MAP

N.T.S.

Table 2. Permissible Shear and Velocity for Selected Lining Materials[1]

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/sec)	Citation(s)
Soils	Fine colloidal sand	0.02 - 0.03	1.5	A
	Sandy loam (noncolloidal)	0.03 - 0.04	1.75	A
	Alluvial silt (noncolloidal)	0.045 - 0.05	2	A
	Silty loam (noncolloidal)	0.045 - 0.05	1.75 – 2.25	A
	Firm loam	0.075	2.5	A
	Fine gravels	0.075	2.5	A
	Stiff clay	0.26	3 – 4.5	A, F
	Alluvial silt (colloidal)	0.26	3.75	A
	Graded loam to cobbles	0.38	3.75	A
	Graded silts to cobbles	0.43	4	A
	Shales and hardpan	0.67	6	A
Gravel/Cobble	1-in.	0.33	2.5 – 5	A
	2-in.	0.67	3 – 6	A
	6-in.	2.0	4 – 7.5	A
	12-in.	4.0	5.5 – 12	A
Vegetation	Class A turf	3.7	6 – 8	E, N
	Class B turf	2.1	4 - 7	E, N
	Class C turf	1.0	3.5	E, N
	Long native grasses	1.2 – 1.7	4 – 6	G, H, L, N
	Short native and bunch grass	0.7 - 0.95	3 – 4	G, H, L, N
	Reed plantings	0.1-0.6	N/A	E, N
	Hardwood tree plantings	0.41-2.5	N/A	E, N
Temporary Degradable RECPs	Jute net	0.45	1 – 2.5	E, H, M
	Straw with net	1.5 – 1.65	1 – 3	E, H, M
	Coconut fiber with net	2.25	3 – 4	E, M
	Fiberglass roving	2.00	2.5 – 7	E, H, M
Non-Degradable RECPs	Unvegetated	3.00	5 – 7	E, G, M
	Partially established	4.0-6.0	7.5 – 15	E, G, M
	Fully vegetated	8.00	8 – 21	F, L, M
Riprap	6 – in. d_{50}	2.5	5 – 10	H
	9 – in. d_{50}	3.8	7 – 11	H
	12 – in. d_{50}	5.1	10 – 13	H
	18 – in. d_{50}	7.6	12 – 16	H
	24 – in. d_{50}	10.1	14 – 18	E
Soil Bioengineering	Wattles	0.2 – 1.0	3	C, I, J, N
	Reed fascine	0.6-1.25	5	E
	Coir roll	3 - 5	8	E, M, N
	Vegetated coir mat	4 - 8	9.5	E, M, N
	Live brush mattress (initial)	0.4 – 4.1	4	B, E, I
	Live brush mattress (grown)	3.90-8.2	12	B, C, E, I, N
	Brush layering (initial/grown)	0.4 – 6.25	12	E, I, N
	Live fascine	1.25-3.10	6 – 8	C, E, I, J
	Live willow stakes	2.10-3.10	3 – 10	E, N, O
Hard Surfacing	Gabions	10	14 – 19	D
	Concrete	12.5	>18	H

[1] Ranges of values generally reflect multiple sources of data or different testing conditions.

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USACE TR EL 97-8

Eagle Rising Hydraulic Analsyis Results

Velocity, Froude Number & Shear Stress at Selected Channel Sections

Hydraulic Data from HEC-RAS Analysis, M.V.E., Inc.

Shear Stress $\tau = \gamma RS$

Froude No. $Fr = \frac{V}{\sqrt{gD}}$

τ = Shear Stress (Lbs/sf)

γ = Weight Density of Water (lb/cf) = 62.4

R = Hydraulic Radius = Area/Wetted Perimeter (ft)

S = Energy Grade Slope (ft/ft)

V = Channel Velocity (ft/sec)

D = Hydr Depth = Flow Area / Top Width

g = Accereration of gravity = 32.2 ft/sec^2

Channel Section	Q100 (cfs)	S Energy Slope (ft/ft)	Max Channel Depth (ft)	D Hydraulic (Ave) Depth (ft)	P Wetted Perimeter (ft)	R Hydraulic Radius R (ft)	A Flow Area (sf)	W Top Width (ft)	V Channel Velocity (ft/sec)	Fr Froude No.	τ Shear Stress (lbs/sf)	Notes:	
3800	410	0.013	3.3	2.5	72	2.5	180	71	2.3	0.25	1.98	dense vegetation existing	
3700	410	0.026	3.5	2.5	49	2.4	119	48	3.3	0.37	3.98	dense vegetation existing	
3600	410	0.007	4.1	3.1	73	3.1	222	72	1.9	0.19	1.26	dense vegetation existing	
3500	470	0.079	3.0	2.2	71	2.1	152	70	3.1	0.38	10.52	dense vegetation existing	Shear Greater than 3.10 - See Report
3400	470	0.010	3.3	2.5	88	2.5	223	88	2.1	0.23	1.58	dense vegetation existing	
3300	470	0.011	2.5	1.9	95	1.9	184	94	2.6	0.32	1.34	dense vegetation existing	
3200	470	0.008	2.1	1.5	115	1.5	175	115	2.7	0.39	0.79	boulder check existing	
3100	470	0.001	3.5	2.2	210	2.2	464	210	1.0	0.12	0.10	native grasses and pond existing	
3000	560	0.001	3.7	2.9	188	2.9	536	187	1.1	0.11	0.10	native grasses and pond existing	
2900	560	0.000	5.4	3.7	223	3.6	814	223	0.7	0.06	0.04	native grasses and pond existing	
2801	560	0.000	6.9	5.0	278	4.9	1372	277	0.4	0.03	0.01	native grasses and pond existing	
2745	700	0.005	2.1	1.2	303	1.2	354	303	2.2	0.36	0.37	native grasses and pond existing	
2722	700	0.018	1.7	1.4	139	1.4	190	139	3.7	0.56	1.56	native grasses and pond existing	
2703	700	0.057	1.8	1.0	122	1.0	123	122	6.1	1.06	3.62	spillway riprap proposed	Shear Greater than 3.10 - Riprap Spillway
2669	700	0.036	3.0	1.6	65	1.6	106	64	7.9	1.09	3.66	spillway riprap proposed	Shear Greater than 3.10 - Riprap Spillway
2451	700	0.015	3.7	2.4	125	2.4	295	124	2.4	0.27	2.25	dense vegetation existing	
2200	700	0.013	3.2	2.7	115	2.7	311	114	2.3	0.24	2.23	dense vegetation existing	
2101	750	0.024	3.4	2.9	84	2.8	238	83	3.2	0.33	4.22	dense vegetation existing	Shear Greater than 3.10 - See Report
2000	750	0.011	3.9	2.2	144	2.2	318	144	2.2	0.27	1.48	dense vegetation existing	
1900	820	0.020	3.4	2.5	117	2.5	291	116	2.8	0.31	3.19	dense vegetation existing	Shear Greater than 3.10 - See Report
1800	820	0.012	3.9	3.2	107	3.2	340	106	2.4	0.24	2.33	dense vegetation existing	
1700	820	0.018	3.4	3.0	100	3.0	298	99	2.8	0.28	3.26	dense vegetation existing	Shear Greater than 3.10 - See Report
1600	820	0.010	5.1	3.7	85	3.6	309	84	2.7	0.25	2.33	dense vegetation existing	
1500	820	0.026	4.6	3.1	80	3.1	244	79	3.4	0.34	5.01	dense vegetation existing	Shear Greater than 3.10 - See Report
1400	820	0.035	4.6	2.5	129	2.4	315	128	2.6	0.30	5.34	dense vegetation existing	
1299	820	0.005	4.4	3.5	105	3.5	369	104	2.2	0.21	1.19	dense vegetation existing	
1200	820	0.036	3.1	1.6	113	1.6	183	113	4.5	0.62	3.64	dense vegetation existing	Shear Greater than 3.10 - See Report
1099	820	0.005	1.9	1.5	243	1.5	375	243	2.3	0.32	0.51	native grass existing	
1000	820	0.000	4.9	3.3	293	3.3	963	293	1.0	0.10	0.06	native grasses and pond existing	
791	820	0.000	6.9	5.3	393	5.3	2092	392	0.4	0.03	0.01	native grasses and pond existing	
598	820	0.000	9.0	6.4	321	6.4	2045	320	0.5	0.03	0.01	native grasses and pond existing	
449	820	0.000	4.9	4.0	409	4.0	1626	409	0.5	0.05	0.02	native grasses and pond existing	
409	820	0.059	2.9	1.8	62	1.7	108	62	7.6	1.01	6.42	spillway riprap	Shear Greater than 3.10 - Riprap Spillway
374	820	0.062	1.8	1.5	77	1.5	116	77	7.0	1.01	5.82	spillway riprap	Shear Greater than 3.10 - Riprap Spillway
300	820	0.003	3.7	2.7	121	2.7	326	121	2.6	0.28	0.55	dense vegetation existing	
200	820	0.008	3.3	2.5	157	2.5	391	156	1.8	0.20	1.19	dense vegetation existing	
100	820	0.050	1.6	1.5	184	1.5	282	183	2.9	0.42	4.77	dense vegetation existing	Shear Greater than 3.10 - See Report

* NOTE:

SHEAR STRESSES AT HEC-RAS MODEL SECTION 3700, 3500, 2703, 2669, 2101, 1900, 1700, 1500, 1400, 1200, 409 AND 374 EXCEED 3.10 LBS. PER SF. HOWEVER, ALL THESE LOCATIONS ALSO HAVE VELOCITIES AND FROUDE NUMBER THAT COMPLIES WITH THE DCM. FURTHERMORE, THE ACTUAL VEGETATION ON THE SITE IS WELL ESTABLISHED AND EXHIBITS DENSE GROWTH. THE EXISTING PLANTS POSSESS STABILIZING CHARACTERISTICS FAR BEYOND THOSE OF RECENT PLANT STAKINGS. THERE IS NO EVIDENCE OF EXISTING EROSIVE CONDITIONS AT THESE LOCATIONS.

LEGEND

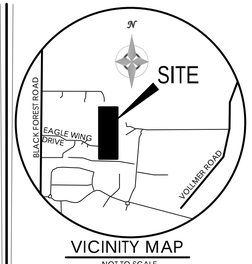
- PROPERTY LINE
- EASEMENT LINE
- LOT LINE

EXISTING

- 5985 INDEX CONTOUR
- 84 INTERMEDIATE CONTOUR

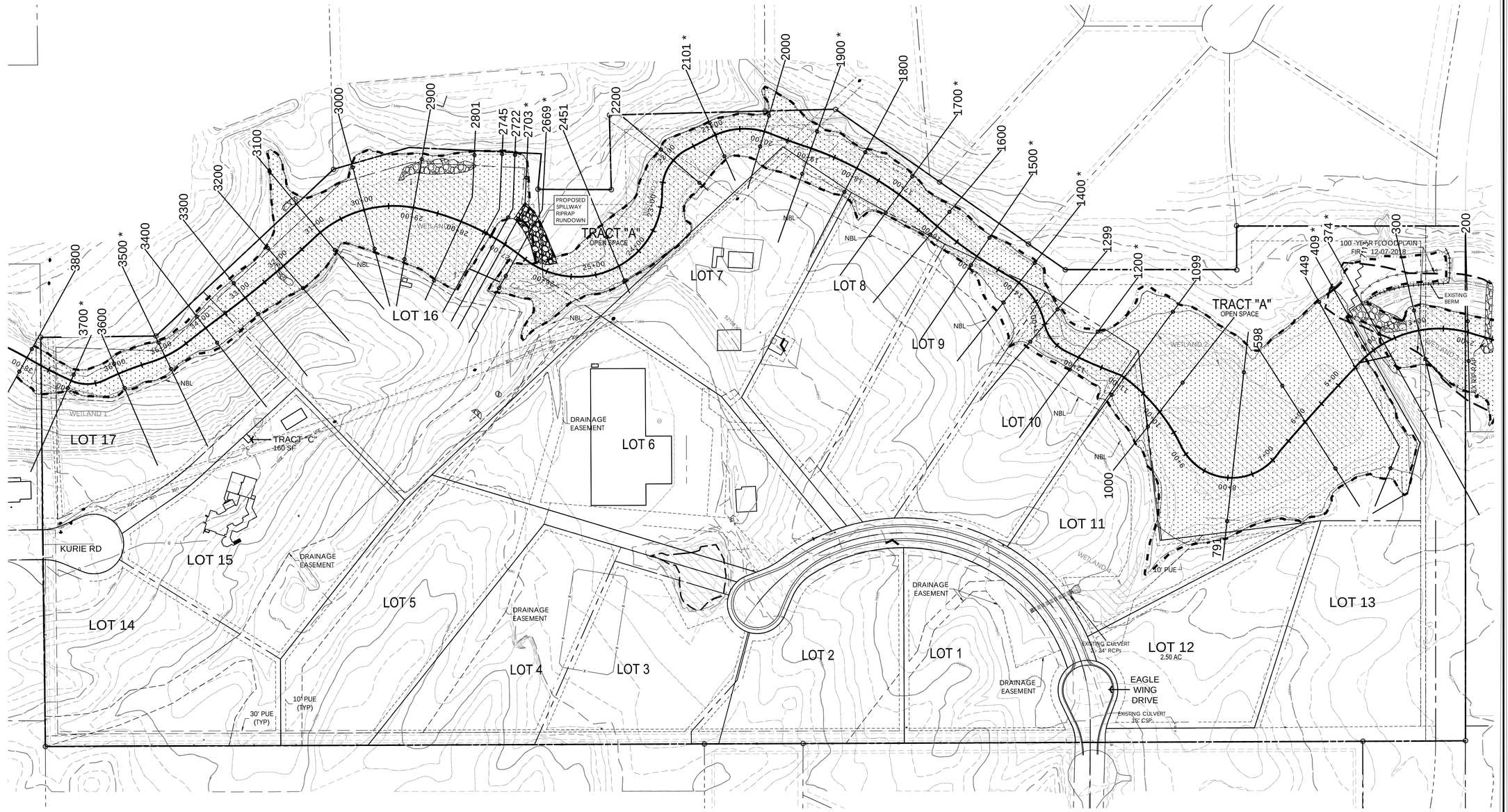
PROPOSED

- 5985 INDEX CONTOUR
- 84 INTERMEDIATE CONTOUR



VICINITY MAP
NOT TO SCALE

BENCHMARK



N

10 0 50 100 200

1" = 100' 1:200

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ENGINEERS, SURVEYORS
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DRAWN BY
CHECKED BY
AS-BUILTS BY
CHECKED BY

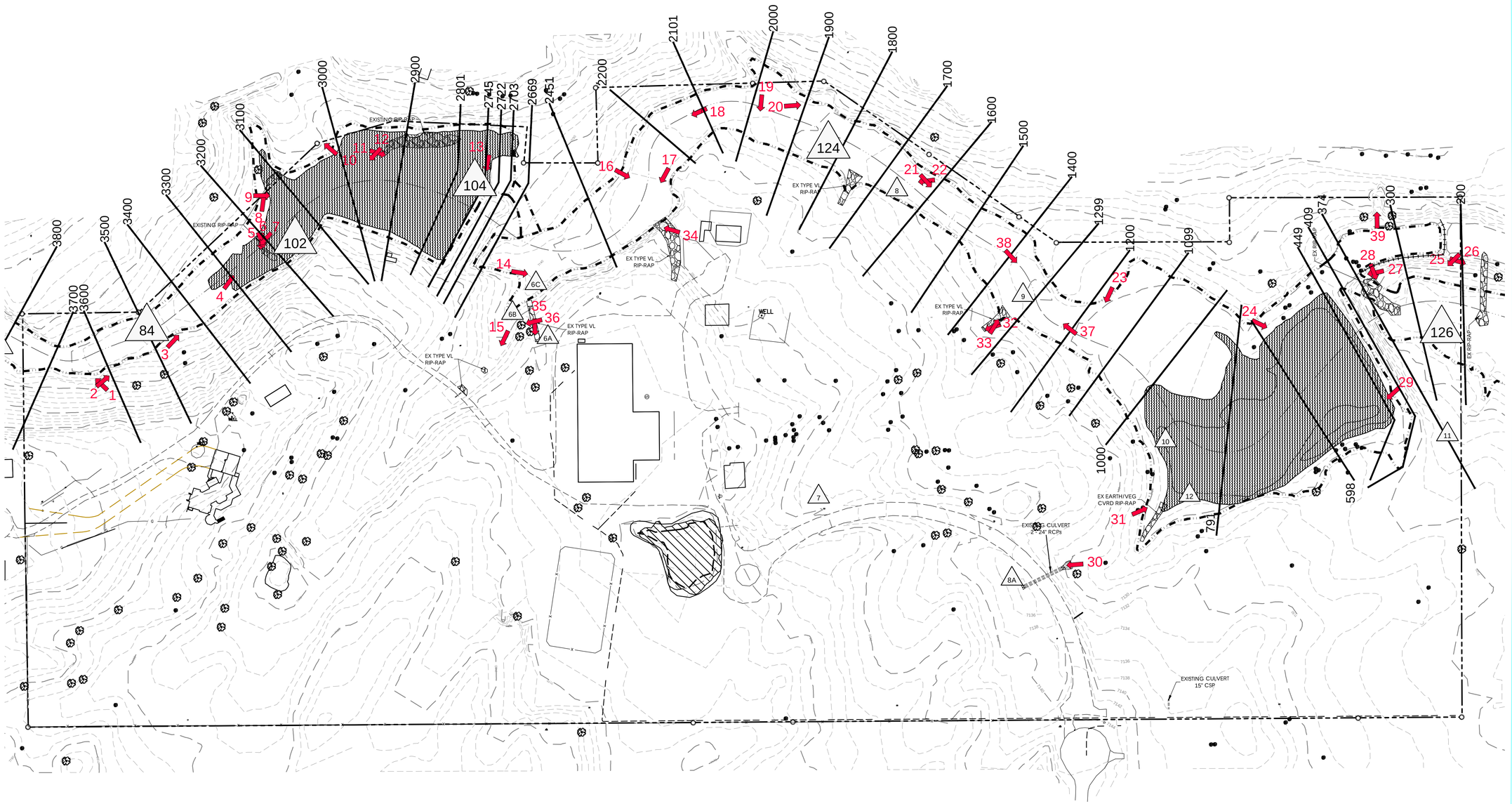
EAGLE RISING
FILING NO.1

PROPOSED
DRAINAGE MAP
HECRAS SECTIONS

MVE PROJECT 61145
MVE DRAWING DRN-MAP-HECRAS

MARCH 7, 2024
SHEET 1 OF 1

HEC-RAS Cross Section Location and Photo Key Map

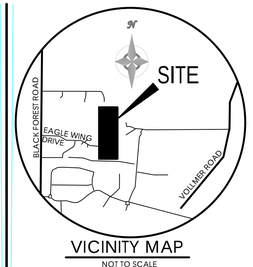


LEGEND

- PROPERTY LINE
- EASEMENT LINE
- LOT LINE

EXISTING

- 5985 INDEX CONTOUR
- 84 INTERMEDIATE CONTOUR
- 104 DBPS DESIGN POINT
- 6C LOCAL DESIGN POINT
- 14 DRAINAGE REPORT PHOTO NUMBER / DIRECTION



VICINITY MAP
NOT TO SCALE

BENCHMARK

N

10 0 50 100 200
1" = 100' 1:1,200

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STREAM VEGETATION PHOTO LOCATIONS

MVE PROJECT 61145
MVE DRAWING DRN-MAP-HECRAS

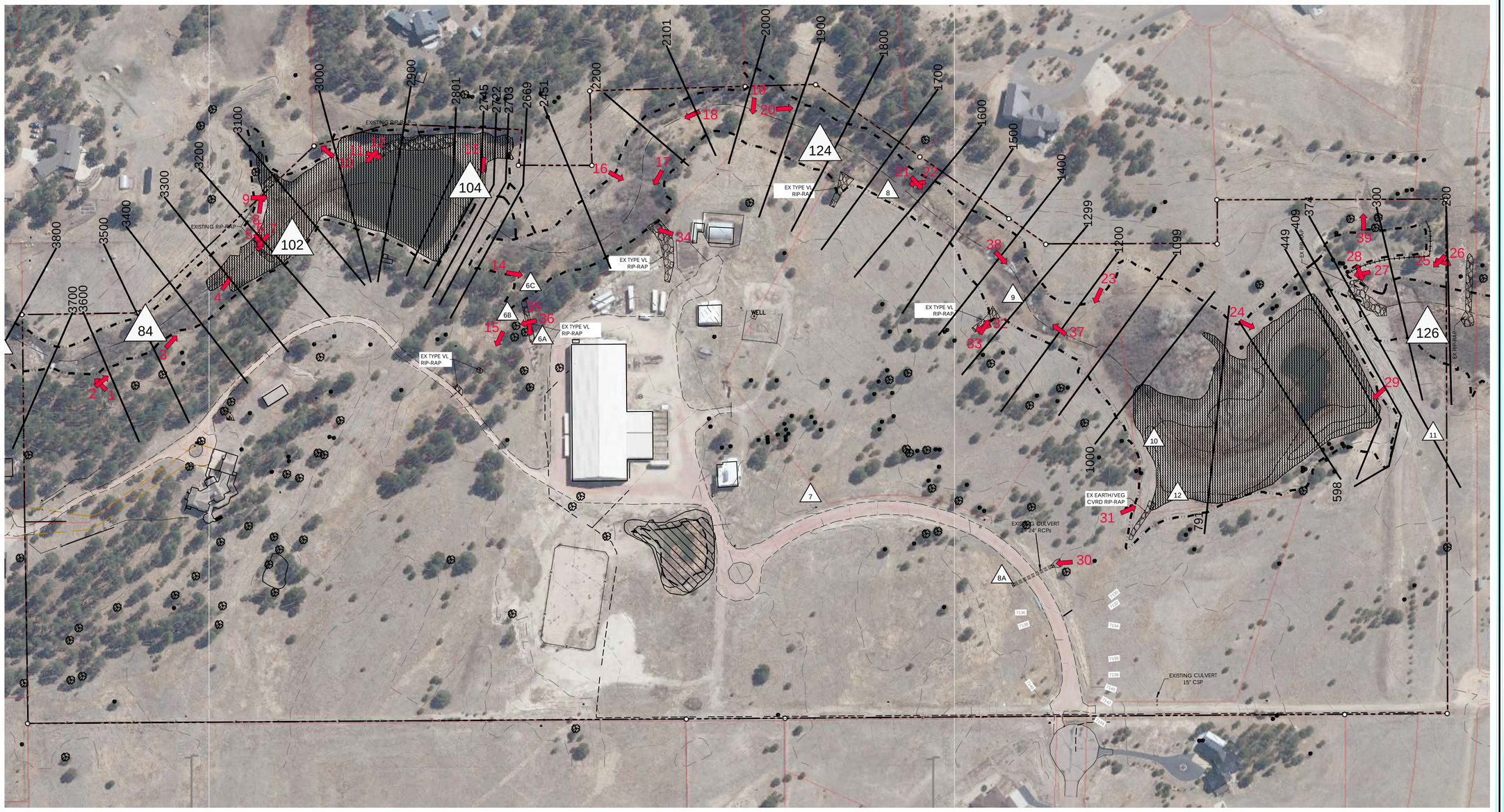
MARCH 7, 2024
SHEET 1 OF 1

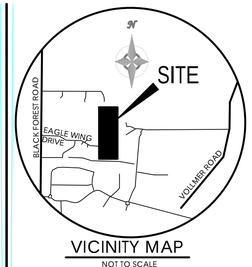
LEGEND

- PROPERTY LINE
- EASEMENT LINE
- LOT LINE

EXISTING

- 5985 INDEX CONTOUR
- 84 INTERMEDIATE CONTOUR
- 104 DBPS DESIGN POINT
- 6C LOCAL DESIGN POINT
- 14 DRAINAGE REPORT PHOTO NUMBER / DIRECTION





VICINITY MAP
NOT TO SCALE

BENCHMARK

N

10 0 50 100 200
1" = 100' 1:1,200

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STREAM VEGETATION PHOTO LOCATIONS

MVE PROJECT 61145
MVE DRAWING DRN-MAP-HECRAS

MARCH 7, 2024
SHEET 1 OF 1

1

Looking downstream, from 250 feet downstream of Cottonwood Creek DBPS Design Point 82.

September 27, 2022

2

Looking upstream, from 250 feet downstream of Cottonwood Creek DBPS Design Point 82.

September 27, 2022

3

Looking downstream, from Cottonwood Creek DBPS Design Point 84.

September 27, 2022

4

Looking downstream, from 200 feet downstream of Cottonwood Creek DBPS Design Point 84.

September 27, 2022

see additional March 1, 2024 photos

4

Looking downstream, from 200 feet downstream of Cottonwood Creek DBPS Design Point 84.

March 1, 2024

4

Looking downstream, from 200 feet downstream of Cottonwood Creek DBPS Design Point 84.

March 1, 2024

5

Looking upstream, from Cottonwood Creek DBPS Design Point 102.

September 27, 2022

6

Looking upstream, from Cottonwood Creek DBPS Design Point 102.

September 27, 2022

7

Looking upstream, from Cottonwood Creek DBPS Design Point 102.

September 27, 2022

8

Looking upstream tributary stream, from Cottonwood Creek DBPS Design Point 102.

September 27, 2022

9

Looking downstream, from Cottonwood Creek DBPS Design Point 102.

September 27, 2022

10

Looking northeast, from 100 feet downstream of Cottonwood Creek DBPS Design Point 102.

September 27, 2022

11

Looking downstream, from 200 feet downstream of Cottonwood Creek DBPS Design Point 102. Emergency spillway on left corner of pond.

September 27, 2022

12

Looking upstream, from 200 feet downstream of Cottonwood Creek DBPS Design Point 102.

September 27, 2022

13

Buried and partially buried riprap at emergency overflow, from Cottonwood Creek DBPS Design Point 104.

September 27, 2022

14

Looking at heavy vegetation downstream, from Design Point 6C.

September 27, 2022

15

Looking at riprap upstream tributary flow, from Design Point 6B.

September 27, 2022

16

Looking southwest across stream, from 450 feet downstream of Cottonwood Creek DBPS Design Point 104.

September 27, 2022

17

Looking up stream, from 450 feet downstream of Cottonwood Creek DBPS Design Point 104.

September 27, 2022

18

Looking upstream, from 300 feet upstream of Cottonwood Creek DBPS Design Point 124.

September 27, 2022

19

Looking west across channel, from 100 feet upstream of Cottonwood Creek DBPS Design Point 124.

September 27, 2022

20

Looking downstream at the upper banks, from 100 feet upstream of Cottonwood Creek DBPS Design Point 124.

September 27, 2022

21

Looking upstream, from Design Point 8.

September 27, 2022

22

Looking downstream, from Design Point 8.

September 27, 2022

23

On the east side of the creek looking west, from 200 feet downstream of Design Point 9.

September 27, 2022

24

Looking southwest towards pond embankment, from 400 feet downstream of Design Point 10.

September 27, 2022

25

Looking downstream towards offsite pond and riprap, from Cottonwood Creek DBPS Design Point 126.

September 27, 2022

Location is off-site, south of property

26

Looking upstream, from Cottonwood Creek DBPS Design Point 126.

September 27, 2022

27

Looking upstream towards riprap of emergency spillway, from east bank 550 feet downstream of Design Point 10.

September 27, 2022

see additional March 1, 2024 photos

28

Riprap of emergency spillway, from east bank 550 feet downstream of Design Point 10.

September 27, 2022

see additional March 1, 2024 photo

Pond 2 Emergency Spillway Looking downstream (southwest)

March 1, 2024

Pond 2 Emergency Spillway Looking upstream (northeast)

March 1, 2024

29

Looking upstream, from the west bank 500 feet downstream of Design Point 10.

September 27, 2022

30

Looking north at culverts, on the east side of the road from 100 feet south of Design Point 8A.

September 27, 2022

31

Riprap lining downstream from DP8A, from 100 feet north of Design Point 12.

September 27, 2022

32

Looking northwest up tributary stream, from 100 feet northwest of Design Point 9.

September 27, 2022

33

Looking east, on west bank of creek, from 100 feet northwest of Design Point 9.

September 27, 2022

34

Riprap lined swale from barn area to creek, 450 feet downstream of DBPS Design Point 104.

September 27, 2022

Riprap added

See additional March 1, 2024 photo

35

Looking west, existing riprap lined swale in need of additional riprap from Design Point 6A.

September 27, 2022

36

Looking at riprap on tributary flow upstream of DP6B, from Design Point 6A.

September 27, 2022

37

Looking northeast from the centerline of the creek at HECRAS Station 1200.

December 11, 2023

38

Looking southwest from the centerline of the creek at HECRAS Station 1400.

December 11, 2023

39

Looking east at east property line at approximately HECRAS station 300.

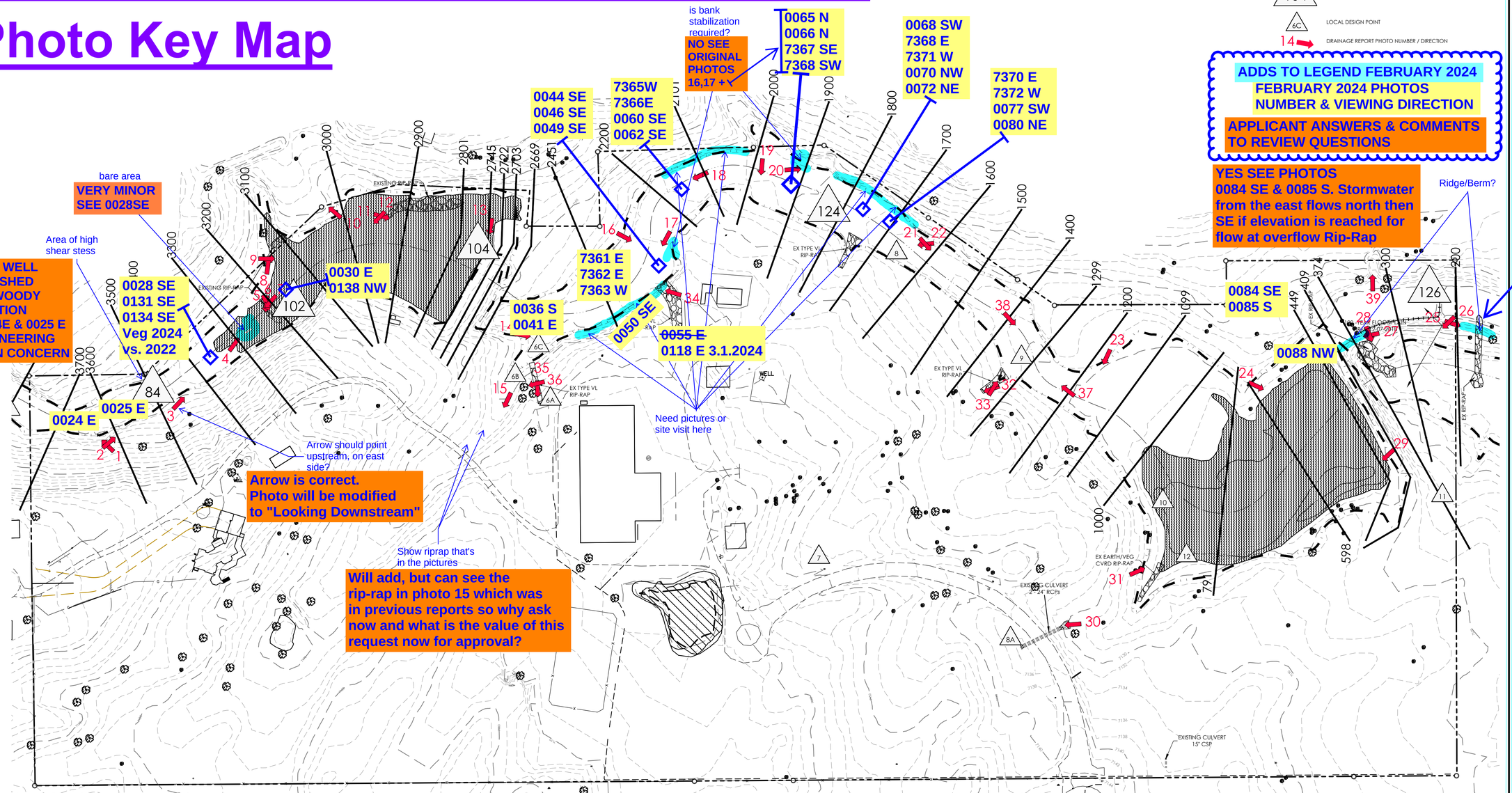
December 11, 2023

Supplimental Photos and Key Map

February 2024

SP205 + SF2225: DRAWING EXTRACTED FROM THE DEVIATION REQUEST SUBMITED FOR EMC 3.3.3 B & C TO SHOW LOCATIONS OF THE ATTACHED ADDED PHOTOS JEFF RICE REQUESTED JANUARY 29, 2024

HEC-RAS Cross Section Location and Photo Key Map



NOTE:
TYPICAL RESIDENTIAL 2.5 ACRE LOT DEVELOVMENTS RESULT IN LESS THAN 5% IMPERVIOUS CONDITIONS. STORM DRAINAGE FROM THIS RESIDENTIAL DEVELOPMENT EVEN IF 10% WILL NOT MATERIALLY DRAIN TO OR AFFECT COTTONWOOD CREEK.

MVE, INC. ENGINEERS, SURVEYORS
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CHECKED BY
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CHECKED BY

EAGLE RISING
FILING NO.1

FEBRUARY 28, 2024 WMT
Revised March 5, 2024

STREAM VEGETATION PHOTO LOCATIONS

MVE PROJECT 61145
MVE DRAWING DRN-MAP-HECRAS

OCTOBER 31, 2023
SHEET 1 OF 1

February, 28 2024

Revised March 5, 2024 Pages 2 + 6

Eagle Rising SP205 & SF2225

Added photos requested by Jeff Rice in the EDARP 1.29.2024 Review Comments

To the Deviation Request submitted for EMC 3.3.3 B & C

0024 E

0025 E

0028 SE Veg Growth vs. 2022

0030 E Boulder dam in place & stable for 40+ years

Commercial Real Estate, Development and Construction Management

735 Lancers Court West, Suite 100, Monument, CO 80132
Telephone: 719-886-6535 Cell: 719-351-8629
www.NLdevelopment.com wtimura@NLdevelopment.com

0138 NW Vegetation Growth vs. 2022 *3.1.2024*

0134 SE Vegetation Growth vs. 2022 *3.1.2024*

0131 SE Vegetation Growth vs. 2022 *3.1.2024*

0036 S

0041 E

7361 E

7362 E

7363W

0044 SE

0046 SE

0049 SE

0050 SE

0118 E *3.1.2024*

7365W

7366E

0060 SE

0062 SE

0065 N

0066 N

7367SE

7368SW

0068 SW

7368 E

7371 W

0070 NW

0072 NE

7370 E

7372 W

0077 SW

0080 NE

0084 SE

0085 S

0088 NW

LEGEND

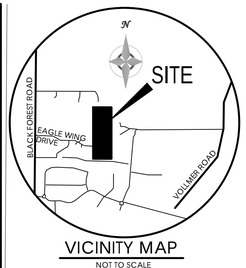
- PROPERTY LINE
- EASEMENT LINE
- NBL — NO BUILD LIMIT LINE
- LOT LINE

EXISTING

- 5985 — INDEX CONTOUR
- 84 — INTERMEDIATE CONTOUR

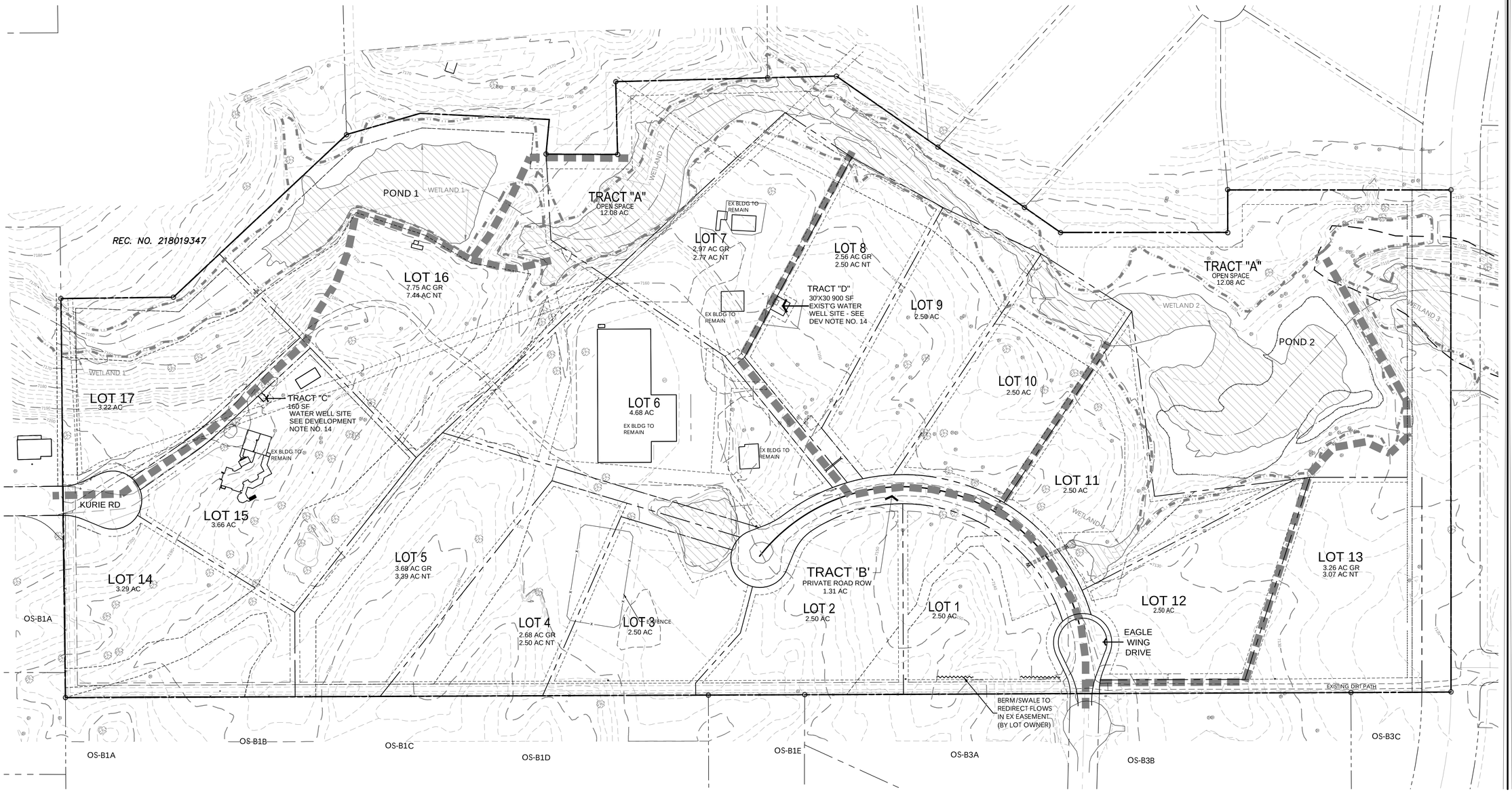
PROPOSED

- 5985 — INDEX CONTOUR
- 84 — INTERMEDIATE CONTOUR
- 100 YEAR STORM WATER FLOOD LEVEL
- POSSIBLE ACCESS PATH



VICINITY MAP
NOT TO SCALE

BENCHMARK



N

10 0 50 100 200

1" = 100' 1:1,200

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EAGLE RISING
PRELIMINARY PLAN

CREEK ACCESS

EXHIBIT

MVE PROJECT 61145
MVE DRAWING DRN-MAP-DEV

MARCH 7, 2024
SHEET 1 OF 1

Path: P:\22_100\22_113 Eagle Rising 2022 NRA\Maps\2023\NRA\22_113 Figure 3.mxd

Eagle Rising 2022 Natural Resources Assessment

- Culvert
- Open Water
- Wetland
- Construction/Disturbance Limit
- Project Area Boundary

Image Source: Maxar Technologies©, October 14, 2022

0 120 240 Feet

N

Figure 3
Proposed Subdivision

Prepared for: Steve Jacobs
File: 22_113 Figure 3.mxd (GS)
August 25, 2023

ERO Resources Corp.

be impacted by development of the project area and to identify any significant changes in natural resources since the assessment conducted in 2012.

The project area has been continually influenced by human activities for more than 100 years. Timber was a major industry in the Black Forest in the late 1800's with numerous lumber mills scattered through the area. Grazing and agriculture dominated the land use in the early 1900's, eventually giving way to summer homes, and full-time residences (El Paso County Land Use Department 1987).

Methods

During the 2022 site visits, ERO conducted an updated natural resources assessment of the project area. In addition to the information gathered during the 2022 site visits, natural resource information was obtained from existing databases and sources such as aerial photography, the Colorado Natural Diversity Information Source (NDIS), U.S. Fish and Wildlife Service (Service) National Wetlands Inventory database, U.S. Geological Survey (USGS) National Hydrography Dataset (NHD), and other sources ("Google, Inc." 2022; Natural Diversity Information Source 2021; U.S. Fish and Wildlife Service, n.d.; U.S. Geological Survey 2022). Based on the information gathered from existing sources and the initial site visit, ERO verified existing vegetation communities and identified important wildlife attributes of the project area.

Project Area Description

The National Land Cover Database maps five land cover types in the project area (U.S. Geological Survey 2016). Grassland/Herbaceous is the most dominant and occurs throughout the majority of the western portion of the project area. The other land cover types in the project area include evergreen forest, scrub/shrub, open water, and barren land.

The project area is on the southern edge of the Black Forest, northeast of Colorado Springs (Figure 1). Vegetation in the project area consists of upland grasslands, patches of ponderosa pine (*Pinus ponderosa*) and upland shrubs, and wetland/riparian vegetation along drainages. Three tributaries to Cottonwood Creek converge at the eastern project area boundary. In the project area, Cottonwood Creek generally flows from north to south and primarily consists of wetlands throughout the channel (Figure 2; Photos 5a through 7a, 5b, 6b). Two ponds (Ponds 1 and 2) occur along Cottonwood Creek in the project area that are contained behind earthen dams (Photos 1a through 4a). As a result of water rights negotiations and drought, the wetlands along Cottonwood Creek and the two ponds were drier in 2022 than what was observed in 2012 (Photos 1b through 4b). A third pond (Pond 3), that was excavated in uplands occurs in the west, central portion of the project area (Figure 2; Photos 6a and 6b)). Wetlands occur in the channel and on benches and terraces along Cottonwood Creek and as small fringes along the ponds. A depressional area and swale consisting of wetland vegetation (Wetland 4) occurs downstream of a culvert in the project area northwest of Pond 2 (Figure 2). Wetlands in the project area are dominated by Nebraska sedge (*Carex nebrascensis*), Baltic rush (*Juncus balticus*), redtop (*Agrostis gigantea*), broadleaf cattail (*Typha angustifolia*), sandbar willow (*Salix exigua*), strapleaf willow

(*Salix ligulifolia*), park willow (*Salix monticola*), and shining willow (*Salix lucida* subsp. *caudata*). The riparian overstory along Cottonwood Creek is dominated by peachleaf willow (*Salix amygdaloides*) and plains cottonwood (*Populus deltoides* subsp. *monilifera*) trees. Upland shrubs in the riparian corridor include snowberry (*Symphoricarpos occidentalis*), Woods' rose (*Rosa woodsii*), golden currant (*Ribes aureum*), and chokecherry (*Padus virginiana*) (Photo 10). The soils in the project area primarily consist of Pring coarse sandy loam, 3 to 8 percent slopes (Natural Resources Conservation Service 2022).

The project area is one of the last remaining nonresidential tracts of land along Cottonwood Creek. Rural residential development (2- to 5-acre lots) surrounds the entire project area. Two existing homes are located in the northwest corner of the project area and a large barn, corral, and disturbed area occurs in the north-central portion of the project area (Photo 8a). The uplands in the project area are a mixture of native grassland and disturbed areas (Photos 9a and 9b). The project area has historically been used for cattle grazing, and some limited grazing continues in the southeast corner of the project area. The native upland areas are dominated by blue grama (*Bouteloua gracilis*), sand dropseed (*Sporobolus cryptandrus*), threeawn (*Aristida* sp.), soapweed yucca (*Yucca glauca*), Canada wildrye (*Elymus canadensis*), intermediate wheatgrass (*Thinopyrum intermedium*), sideoats grama (*Bouteloua curtipendula*), muhly (*Muhlenbergia* sp.), and ponderosa pine (Photos 9a and 9b). The disturbed uplands are dominated by smooth brome (*Bromus inermis*), diffuse knapweed (*Centaurea diffusa*), Canada thistle (*Cirsium arvensis*), musk thistle (*Carduus nutans*), common mullein (*Verbascum thapsus*), common teasel (*Dipsacus fullonum*), and kochia (*Bassia scopara*).

Conclusions

On behalf of the project proponent, ERO is requesting an approved JD for the old stock pond and upland vegetated swale in the northeastern portion of the project area, Pond 3 and associated Wetland 5, and Wetland 4. Based on the information in this report, if the Corps determines that the wetlands and waters are not jurisdictional, ERO would appreciate a written determination of this request confirming that no further consultation under Section 404 is required.

If you have any questions or need additional information, please do not hesitate to contact me at 303-830-1188 or by email at cmarne@eroresources.com. I look forward to hearing from you.

Sincerely,

Courtney Marne
Biologist/Associate

cc: David Jones - Land Resource Associates
Stephen Jacobs - MyPad, Inc.

Attachments: Figures 1 and 2; Photo Log; Routine Wetland Determination Forms; JD Form

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Weber, William A., Ronald C. Wittmann, and Linna Weber Müller-Wille. 2012. *Colorado Flora: Eastern Slope, Fourth Edition. A Field Guide to the Vascular Plants.* University Press of Colorado.

Photo 1a - Cottonwood Creek at the southern boundary of the project area. View is to the south.

Photo 1b - Cottonwood Creek at the southern boundary of the project area. View is to the south.

Photo 2a - Wetlands along Cottonwood Creek in the project area. View is to the south.

Photo 2b - Wetlands along Cottonwood Creek in the project area. View is to the south.

Photo 3a - Pond 1 in the project area. View is to the east.

Photo 3b - Immediately upstream of Pond 1 in the project area. View is to the east.

Photo 4a - Pond 2 in the project area.
View is to the northwest.

Photo 4b - Pond 2 in the project area.
View is to the northwest.

Photo 5a - Vegetated swale upstream of Cottonwood Creek in the project area. View is to the northwest.

Photo 5b - Vegetated swale upstream of Cottonwood Creek in the project area. View is to the northwest.

Photo 6a - Pond 3 in the project area.
View is to the northwest.

Photo 6b - Pond 3 and associate Wetland 5 in the project area.
View is to the northwest.

Photo 7a - Wetland 9 in the project area.
View is to the southeast.

No photo taken in 2022

Photo 7b - Wetland 9 in the project area.
View is to the southeast.

Photo 8a- Disturbed uplands and barn in the project area.
View is to the northeast.

No photo taken in 2022

Photo 8b - Disturbed uplands and barn in the project area.
View is to the northeast.

Photo 9a - Native uplands in the project area.
View is to the northeast.

Photo 9b - Native uplands in the project area.
View is to the northeast.

Photo 10a - Riparian corridor in the project area.
View is to the southeast.

Photo 10b - Riparian corridor in the project area.
View is to the southeast.

Publication indicating the utilization of willow for stream stabilization

Colorado State Parks

COLORADO STATE PARKS STEWARDSHIP PRESCRIPTION

Date Created: April 10, 2002
Revised: April 1, 2005
Author: Mindy Wheeler
Parks Affected: Most

Cottonwood and Willow Management Stewardship Rx

Narrowleaf cottonwoods in autumn along the Yampa River

(See original submittal for complete report)

Publication on utilizatgion of wills for stream stabilization

RESTORING STREAM BANKS WITH WILLOWS

Willows along a stream serve many important functions. They provide shade and cover for stream life and improve water quality by absorbing and storing chemicals. Their ability to withstand flooding, to stabilize soils, and to grow quickly in saturated areas make them ideal for revegetating stream banks.

Establishing willow cuttings, stakes, and/or wattles on a stream bank will benefit you and the stream. The most appropriate material and method to use will depend upon stream size and planting location.

Willows growing in a nearby area, with similar soil and moisture conditions as your problem area, should be used as planting stock to help increase tree survival.

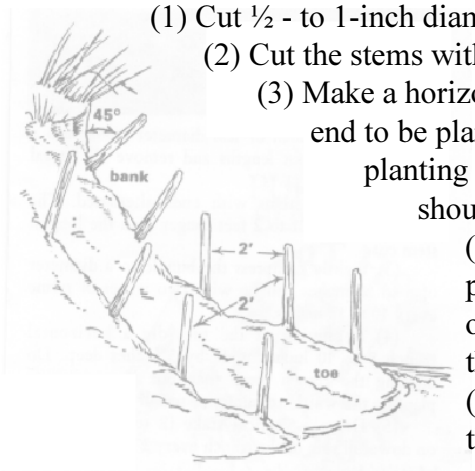
If plants are purchased from a nursery, you should buy cuttings and not rooted seedlings. Also, select a native species to enhance survival and decrease competition with other plants.

Recommended species include black willow (Salix nigra), sand bar willow (S. interior), meadow willow (S. petiolaris), heart-leaved willow (S. rigida) and Ward's willow (S. caroliniana).

Collect and plant the willows during the dormant season. Willows planted in the spring before the buds swell seem to do the best. When storing or transporting plants, keep them cool and slightly moist.

Willow Cuttings

Cuttings are used on small streams where flooding and erosion is minimal. This material is easy to obtain, requires few tools and little labor to plant.



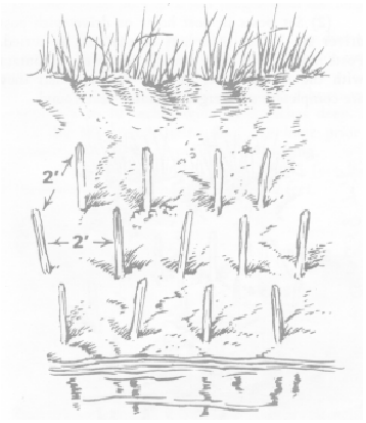
(1) Cut ½ - to 1-inch diameter plants or stems and remove all lateral branches.

(2) Cut the stems with a knife or pruning shears into 12- to 24-inch lengths.

(3) Make a horizontal cut on the end which will remain exposed and a 45° angle cut on the end to be planted. This will prevent you from planting them upside down. Note: Buds on plant should face up.

(4) Push cutting directly into soil or produce a pilot hole by pounding a piece of metal rebar into the soil and then push the cutting into the hole. A planting (dibble) bar may also be used. Plant so that only a few inches remain exposed.

Willow Stakes



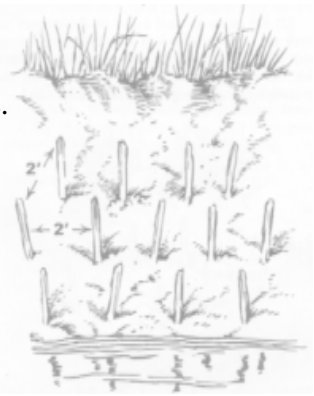
Use stakes where materials need to be driven deeper to improve moisture supply to the stakes.

(1) Cut 1- to 3-inch diameter stems into 18- to 36-inch lengths with a hand saw or chainsaw and remove all lateral stems. (Note: Using an axe or knife to cut the stems may damage the plant.)

(2) Use dibble bar or drive stake with mallet until approximately 3 to 6 inches remain exposed or to refusal. **Do not force and split stake.**

Willow Posts

Posts can also be used to revegetate stream banks. They are most appropriate in situations where a stable moisture supply is deep in the soil and willow materials need to be driven deeper to reach it. This is a very labor intensive method, but posts can withstand relatively high flows.



(1) Cut 3- to 6-inch diameter trees into 6- to 8-foot lengths with a chainsaw and remove all lateral branches. Sharpen bottom end to ease planting and score 12 to 14 inches.

(2) Set posts in post holes or drive with post driver so that at least half of the post is buried. Posts must be set deep enough to maintain contact with the water table, but not so deep that they are completely submerged in water year-round.

(3) The damaged top few inches of each post should be cut after planting if posts were driven.

Wattles

Use wattles in slow-moving water areas to trap sediments and revegetate banks. This method is more labor intensive than planting cuttings or stakes.

(1) Cut 1 1/2-inch or less diameter stems into a minimum of 3-foot lenghts and remove all lateral branches.
(2) Bundle stems with ends alternated. The bundle should be 1 to 2 feet longer than the longest stem cut.
(3) Tightly compress bundle to a diameter of 8 to 10 inches and tie with two wraps of twine every 10 - 15 inches.
(4) Beginning at the toe, dig a horizontal trench 8 to 10 inches wide by 5 inches deep. Do not dig the trench more than one hour prior to planting the wattle to minimize soil drying.
(5) Drive a vertical stake (2 to 3 feet long) on done-hill side of trench every 2 feet.
(6) Place wattles in trench and drive 2- to 3-foot long stakes through the bundle every 3 feet.
(7) Cover with soil and tamp wattle so that no more than 20 percent of the wattle is exposed.

A combination of these methods may be needed based on the characteristics of the stream and its banks.

Proper maintenance will be needed to attain long-term success. Protect young, growing willows from livestock. Also, avoid herbicide treatment on planted areas.

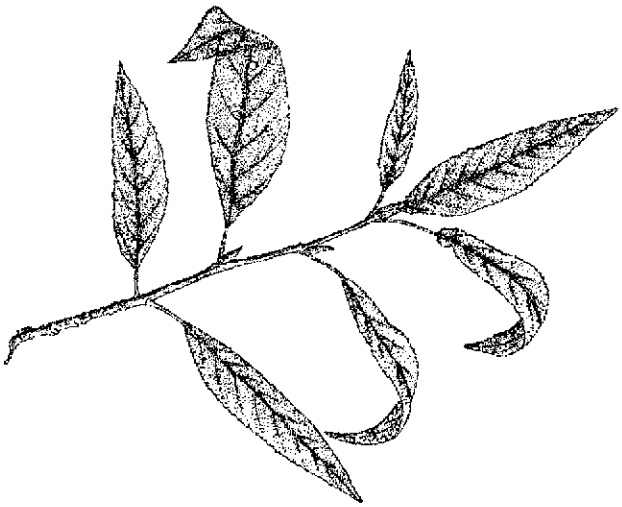
Planting willows along and on stream banks provides a number of benefits to the fragile stream environment and the surrounding land. However, this technique does not replace the need for responsible stream corridor management such as maintaining a permanent corridor of trees along streams. It is merely a tool to help mend problem areas. If you have further questions, please contact your local Conservation Agency District office - http://www.wvca.us/districts.cfm.

Wetland / Riparian Plant Finder 6: Riparian – Foothills and Canyons

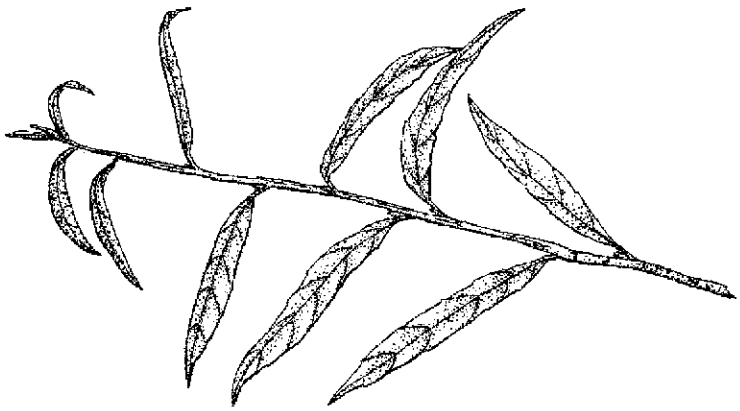
(dominant species in bold type)

TREES AND SHRUBS (continued)

Rubacer parviflorum	thimbleberry
Salix amygdaloides	peachleaf willow
Salix bebbiana	Bebb willow
Salix drummondiana	Drummond's willow
Salix geyeriana	Geyer's willow
Salix irrorata	bluestem willow
Salix lucida	shining willow
Salix monticola	mountain willow
Swida sericea	red-osier dogwood

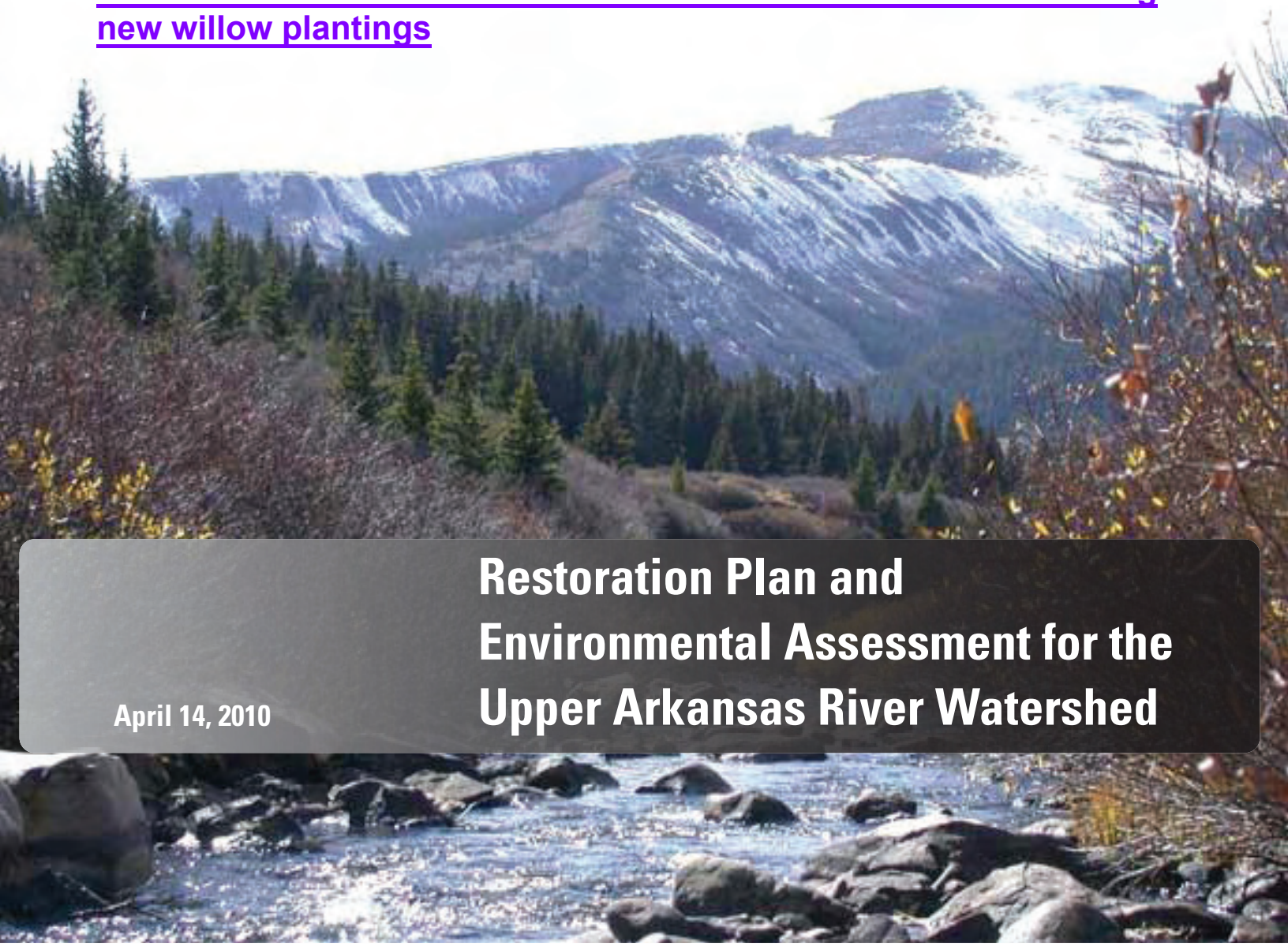


Populus angustifolia



Salix exigua

Publication on restoration of Colorado streams and rivers utilizing new willow plantings



Restoration Plan and Environmental Assessment for the Upper Arkansas River Watershed

April 14, 2010

PREPARED FOR

U.S. Department of the Interior
U.S. Fish and Wildlife Service
U.S. Bureau of Land Management
U.S. Bureau of Reclamation

State of Colorado
Department of Natural Resources
Department of Public Health and Environment
Department of Law

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