



REQUEST FOR PROPOSAL

Construction

R24-001MZ

Date issued: December 27, 2024

SNYDER QUARRY RECLAMATION

THE CITY OF COLORADO SPRINGS



The City of Colorado Springs requests Fixed Unit Price) proposals, as detailed in this Request for Proposal (RFP), for Snyder Quarry Reclamation.

This RFP is posted to Rocky Mountain E-Purchasing BidNet Direct and the City of Colorado Springs' Procurement Services Website. It is available for all vendors free of charge, following free registration, at the Rocky Mountain E-Purchasing BidNet Direct website.

SUBMITTALS FOR THIS PROJECT WILL ONLY BE ACCEPTED ON THE ROCKY MOUNTAIN E-PURCHASING BIDNET DIRECT PLATFORM.

Please login to the following website to register (Free Registration) to submit a bid for this project. All required documents will be uploaded to the website.

<https://www.bidnetdirect.com/>

BIDNET Support

800-835-4603

Estimated Project Magnitude: \$750,000.00 - \$1,000,000.00



SECTION INDEX

SECTION I PROPOSAL INFORMATION

SECTION II PROPOSAL CONTENT

SECTION III EVALUATION FACTORS

SECTION IV SPECIAL CONTRACT TERMS AND CONDITIONS/SPECIAL SOLICITATION PROVISIONS

SECTION V EXHIBITS

SECTION VI SCHEDULES



SECTION I – PROPOSAL INFORMATION

1.0 PROPOSAL INFORMATION

Section I provides general information to potential Offerors, such as proposal submission instructions and other similar administrative elements. This RFP is available on BidNet Direct under the Rocky Mountain E-Purchasing Group (www.BidNetDirect.com). All addenda or amendments shall be issued through BidNet Direct and may not be available through any other source.

1.1 RFP SCHEDULE OF EVENTS

The upcoming schedule of events is as follows:

<u>Event</u>	<u>Date</u>
Issue Request for Proposal	December 27, 2024
Pre-Proposal Conference	January 9, 2025 2:00PM

We will hold a pre-proposal conference via Microsoft Teams. This meeting is not mandatory. However all Offerors are encouraged to attend. Please use the link below to attend this meeting:

Microsoft Teams [Need help?](#)
[Join the meeting now](#)
Meeting ID: 233 625 360 707
Passcode: Wn2kc3cA

Dial in by phone
[+1 720-617-3426](tel:+17206173426), [1555035255#](tel:+1555035255) United States, Denver
[Find a local number](#)
Phone conference ID: 155 503 525#

Parks staff will also be hosting an on site visit on January 13, 2025 at 1:30PM. Please meet at the gate to the quarry located at: 2250 Black Canyon Road Colorado Springs, CO 80907 (Adjacent to the Cedar Heights Gatehouse)

Google Map Location: <https://maps.app.goo.gl/YbiBqyq6bviCoaWi6>

Please ensure you are driving a high clearance vehicle, 4 wheel drive recommended.

Cut Off Date for Questions January 15, 2025 1:00PM

All questions shall be submitted to the following Contract Specialist. All questions must be received no later than **1:00PM**.

Requests for Information, support and questions shall be directed to:

CONTRACT SPECIALIST Mike Zeller



CONTRACT SPECIALIST michael.zeller@coloradosprings.gov

DO NOT CONTACT ANY OTHER INDIVIDUAL AT THE CITY OF COLORADO SPRINGS REGARDING THIS SOLICITATION.

The only acceptable method of submitting questions is via email to the Contracts Specialist above.

Proposal Due Date	January 24, 2025 2:00PM
Interviews (if applicable)	TBD
Award of Contract	EST February 7, 2025
Notice to Proceed	EST February 17, 2025

1.2 SUBMISSION OF PROPOSAL

Proposals are to be submitted electronically on BidNet Direct (www.bidnetdirect.com). Please review the submission requirements **well in advance** of submission date and time, and allow for ample time to upload each required document. It is recommended that Offerors begin the submission process at least one (1) day in advance of the proposal deadline.

Offerors are solely responsible to ensure all required proposal documents are uploaded and submitted correctly, and that a **confirmation number** is obtained upon successful submission. Customer support for BidNet Direct may be reached at (800) 835-4603.

*******NO LATE OFFERS WILL BE ACCEPTED*******

Date/Time: Proposals shall be received on or before 2:00PM January 24, 2025.

Identification of Proposal:

Proposals must be submitted to the BidNet Direct Procurement Platform (www.bidnetdirect.com). The solicitation number and Offeror name must be clearly marked within the proposal.

Proposal No.: R25-001MZ
Due Date and Time: January 24, 2025 2:00PM

Any offer that is submitted without being properly marked may be opened for identification prior to the deadline for receipt of proposals and then resealed.

1.3 NUMBER OF COPIES

Offerors shall submit **one (1)** softcopy to the BidNet Direct platform. Upon submission, all proposal documents shall become and remain the property of the City of Colorado Springs.



1.4 SPECIAL TERMS

Please note the following definitions of terms as used herein:

The term “City” means the City of Colorado Springs.

The term “Contractor” or “Consultant” means the Offeror whose offer is accepted and is awarded the contract to provide the products or services specified in the RFP.

The term “Offer” means the proposal.

The term “Offeror” means the person, firm, or corporation that submits a formal proposal or offer and that may or may not be successful in being awarded the contract.

The term “Project” refers to Snyder Quarry Reclamation.

The term “Request for Proposal” or “RFP” means this solicitation of a formal, negotiable proposal/offer. Any offer that is accepted will be the offer that is deemed by the City of Colorado Springs to be most advantageous in terms of the criteria designated in the RFP.

1.5 RFP OBJECTIVE

The objective of this RFP is to provide sufficient information to enable qualified Offerors to submit written proposals to the City of Colorado Springs. The RFP is not a contractual offer or commitment to purchase products or services. The Offeror may present options and variables to the scope while still meeting the minimum requirements of this solicitation. Innovative proposals/solutions are encouraged and considered in the selection and/or award.

All information included in proposals must be legible. Any and all corrections and or erasures must be initialed by Offeror. Each proposal shall be accompanied by a cover letter signed by an authorized representative of the Offeror. The contents of the proposal submitted by the successful Offeror may become part of any contract awarded as a result of this solicitation.

1.6 CONFIDENTIAL OR PROPRIETARY INFORMATION

If an Offeror believes that parts of an offer are confidential, then the Offeror must so specify. The Offeror must include in bold letters the term “CONFIDENTIAL” on that part of the offer which the Offeror believes to be confidential. The Offeror must submit in writing specific detailed reasons, including any relevant legal authority, stating why the Offeror believes the material to be confidential. Vague and general claims as to confidentiality will not be accepted. The City of Colorado Springs will be the sole judge as to whether a claim is acceptable. Decisions regarding the confidentiality of information will be made when requests are made to make the information public. All offers and parts of offers, which are not marked as confidential, will automatically be considered public information after the contract is awarded. The successful offer may be considered public information even though parts are marked confidential.



1.7 AMENDMENTS

Amendments to this RFP may be issued at any time prior to the time set for receipt of proposals. Offerors are required to acknowledge receipt of any amendments issued to this RFP by returning a signed copy of each amendment issued. Signed copies of each amendment must be received on or before the time set for receipt of offers.

The City of Colorado Springs will post all amendments on BidNet Direct under the Rocky Mountain E-Purchasing Group (www.BidNetDirect.com). It is the Offeror's responsibility to check the website for posted amendments or contact the Contracts Specialist listed in RFP §1.1 to confirm the number of amendments which have been issued.

1.8 WITHDRAWAL OR MODIFICATION OF OFFERS

Any Offeror may modify or withdraw an offer in writing at any time prior to the deadline for submission of an offer.

1.9 ACCEPTANCE

Any offer received and not withdrawn shall be considered an offer, which may be accepted by the City of Colorado Springs based on initial submission without discussions or negotiations.

By submitting an offer in response to this solicitation, the Offeror agrees that any offer it submits may be accepted by the City of Colorado Springs at any time within 90 calendar days from the date of submission deadline.

The City of Colorado Springs reserves the right (a) to reject any or all offers, (b) to waive informalities and minor irregularities in offers received, and/or (c) to accept any portion of an offer if deemed in the best interest of the City of Colorado Springs. Failure of the Offeror to provide in its offer any information requested in the RFP may result in rejection of the offer for non-responsiveness.

1.10 PROPOSAL PREPARATION COST

The cost of proposal preparation is not a reimbursable cost. Proposal preparation shall be at the Offeror's sole expense and is the Offeror's total and sole responsibility.

1.11 AWARD

The City of Colorado Springs intends to make an award using the evaluation criteria listed in this RFP to determine the best value, considering all factors and criteria in the proposals submitted. Best value means the expected outcome of an acquisition that, in the City's estimation, provides the greatest overall benefit in response to the requirements detailed in the RFP. The City of Colorado Springs reserves the right to reject any or all offers and to not make an award.

1.12 PERFORMANCE PERIOD

The performance period for the project detailed in this RFP will be established as **EST FEBRUARY 17, 2025 THROUGH JULY 31, 2026**



1.13 DEBRIEFING

Offerors not selected may request a debriefing on the selection process as well as discussion of the strengths and weaknesses of their proposal upon receipt of notification that their offer was not selected.

A debriefing may be scheduled by contacting the Contracts Specialist listed above. The Contracts Specialist must receive a written request for debriefing no later than ten (10) calendar days after issuance of a notification that the Offeror's offer was not selected.

1.14 SUBSTANTIVE PROPOSALS

By responding to this RFP, the Offeror certifies (a) that Offeror's proposal is genuine and is not made in the interest of, or on behalf of, an undisclosed person, firm, or corporation; (b) that Offeror has not directly or indirectly induced or solicited any other offerors to put in a false or sham proposal; (c) that Offeror has not solicited or induced any other person, firm, or corporation to refrain or abstain from proposing an offer or proposal; (d) that Offeror has not sought by collusion to obtain for themselves any advantage over any other offerors or over the City of Colorado Springs; and (e) that Offeror has not violated or caused any person to violate, and shall not violate or cause any person to violate, the City's Code of Ethics contained in Article 3, of Chapter 1 of the City Code and in the City's Procurement Rules and Regulations.

1.15 OFFEROR'S QUALIFICATIONS

Each Offeror must complete Exhibit 1 – Qualification Statement.

No contract will be awarded to any Offeror who is in arrears to the City, upon any debt or contract, or who is in default, in any capacity, upon any obligation to the City or is deemed to be irresponsible or unreliable by the City based on past performance.

1.16 NON-COLORADO ENTITIES

If Offeror is a foreign entity, Offeror shall comply with C.R.S. section 7-90-801, "Authority to transact business or conduct activities required," and section 7-90-802, "Consequences of transacting business or conducting activities without authority."

Before or at the time that the contract is awarded to an entity organized or operating outside the State of Colorado, such entity shall obtain authorization to do business in the State of Colorado, designate a place of business herein, and appoint an agent for service of process.

Such entity must furnish the City of Colorado Springs with a certificate from the Secretary of the State of Colorado to the effect that a certificate of authority to do business in the State of Colorado has been issued by that office and is still valid. The entity shall also provide the City with a certified copy of the designation of place of business and appointment of agent for service of process from the Colorado Secretary of State, or a letter from the Colorado Secretary of State that such designation of place of business and agent for service of process has been made.



1.17 PROCUREMENT RULES AND REGULATIONS

All projects advertised by the City of Colorado Springs are solicited in accordance with the City's Procurement Rules and Regulations. The City's Procurement Rules and Regulations can be reviewed and/or downloaded from the City website www.coloradosprings.gov. The Contracts Specialist may also provide a softcopy of the Rules and Regulations upon request. Any discrepancies regarding conflicting statements, decisions, irregularities, clauses, or specifications will be rectified utilizing the City's Procurement Rules and Regulations, when applicable. It is the Offeror's responsibility to advise the Contracts Specialist listed in this RFP of any perceived discrepancies prior to the date and time the offer is due.

1.18 FAIR TREATMENT OF OFFERORS

The City Procurement Services Division shall be responsible for ensuring the procurement of products, commodities, and services are in a manner that affords all responsible businesses a fair and equal opportunity to compete. If an Offeror believes that a procurement is not conducted in a fair and equitable manner, the Offeror is encouraged to inform the City Procurement Services Manager as soon as possible.

1.19 ORDER OF PRECEDENCE

Any inconsistency in this solicitation shall be resolved by giving precedence in the following order:

- A. Sections I-IV of this Solicitation
- B. Special Construction Terms and Conditions
- C. General Construction Terms and Conditions
- D. Exhibits
- E. Plans
- F. Detailed Plans
- G. Standard Drawings
 - a. Calculated dimensions will govern over scaled dimensions.
- H. Special Specifications
- I. Standard Specifications

1.20 SALES TAX

The successful Offeror, if awarded a contract, shall apply to the Colorado Department of Revenue for a tax-exempt certificate for this project. The certificate does not apply to City of Colorado Springs Sales and Use Tax which shall be applicable and should be included in all proposals. The tax exempt project number and the exemption certificate only apply to County, PPRTA (Pikes Peak Rural Transportation Authority), and State taxes when purchasing construction and building materials **to be incorporated into this project**.

Furthermore, the exemption **does not** include or apply to the purchase or rental of equipment, supplies or materials that **do not become a part of the completed project or structure**. In these instances, the purchase or rental is subject to full taxation at the current taxation rate.

The Offeror and all subcontractors shall include in their Offer City of Colorado Springs Sales and Use Tax on the work covered by the offer, and all other applicable taxes.



Forms and instructions can be downloaded at <https://coloradosprings.gov/sales-tax>. Questions can be directed to the City Sales Tax Division at (719) 385-5903 or Construction_SalesTax@coloradosprings.gov.

Our Registration Numbers are as follows:
City of Colorado Springs
Federal I.D.: 84-6000573
Federal Excise: A-138557
State Sales Tax: 98-03479

1.21 BOND REQUIREMENTS

The Offeror is advised that the successful Offeror shall be required to furnish to the City of Colorado Springs, upon award, one copy of each: Performance Bond, Labor and Materials Payment Bond, and a Maintenance Bond in the amount of 100% of the total contract within ten (10) calendar days after notification of award of a contract. The cost of all bonds shall be included in Offeror's offer.

Bonds shall:

- A. Be for the full amount of the contract price.
- B. Guarantee the Contractor's faithful performance of the work under the contract, and the prompt and full payment for all labor and materials involved therein.
- C. Guarantee protection to the City of Colorado Springs against liens of any kind.
- D. Be, when a surety bond is furnished, from a surety company operating lawfully in the State of Colorado and be accompanied with an acceptable "Power-of-Attorney" form attached to each bond copy.
- E. Be issued from a surety company that is acceptable to the City of Colorado Springs.
- F. Be submitted using the forms in the Exhibit section of this solicitation.

1.22 INTERPRETATION OF QUANTITIES IN PROPOSAL FORM

Except as otherwise provided in this RFP, the quantities appearing in the proposal form are estimates prepared for the comparison of proposals.

After award, payment to the Contractor will be made in accordance with the following procedures:

- A. Measurement required. When the Contract requires measurement of work performed or material furnished, payment will be made for actual quantities measured and accepted.
- B. Measurement Not Required. When the Contract does not require quantities of work performed or materials furnished to be measured, payment will be made for the quantities appearing in the Contract.

The estimated quantities of work to be performed and materials to be furnished may be increased, decreased or omitted.

1.23 INTERPRETATION OF PLANS AND SPECIFICATIONS

Any change to proposal forms, plans, or specifications prior to the opening of proposals will be issued by the City in the form of an Amendment. Certain individuals may be named in the RFP



that have authority to provide information, clarification or interpretation to Offerors prior to opening of proposals. Information obtained from persons other than those named individuals is invalid and shall not be used for proposal purposes.

1.24 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF WORK.

The Offeror is expected to examine the site of the proposed work, the proposal, plans, specifications, supplemental specifications, special provisions, and Contract forms, before submitting a proposal. The submission of a proposal will be considered conclusive evidence that the Offeror has made this examination and is aware of the conditions to be encountered in performing the work according to the Contract.

Boring logs and other records of subsurface investigations, if they exist, are available for inspection by Offerors. These logs and records are made available so that all Offerors have access to identical subsurface information that is available to the City, and is not intended as a substitute for personal investigation, interpretation, and judgment of the Offerors.

The City does not warrant the adequacy of boring logs and other records of subsurface investigations, and such information is not considered to be a part of the Contract. When a log of test borings is included in the subsurface investigation record, the data shown in the individual log of each test boring apply only to that particular boring and are not intended to be conclusive as to the character of any material between or around test borings. If Offerors use this information in preparing a proposal, it is used at their own risk, and Offerors are responsible for all conclusions, deductions, and inferences drawn from such information.

Offerors may conduct subsurface investigations at the project site at Offeror's expense; the City will afford them this opportunity prior to public opening of proposals.

If an Offeror discovers an apparent error or omission in the proposal form, estimated quantities, plan, or specifications, the Offeror shall immediately notify the Contracting Specialist to enable the City to make any necessary revisions. The City may consider it to be detrimental to the City for an Offeror to submit an obviously unbalanced unit proposal price.

1.25 COMBINATION OR CONDITIONAL PROPOSALS

If an RFP is issued for projects in combination and separately, the Offeror may submit proposals either on the combination or on separate units of the combination. The City reserves the right to make awards on combination or separate proposals to the advantage of the City. Combination proposals will be considered, only when specified.

1.26 ANTI-COLLUSION AFFIDAVIT

The Offeror by signing their proposal submitted to the City is certifying that the Offeror has not participated in any collusion or taken any action in restraint of free competitive bidding. This statement may also be in the form of an affidavit provided by the City and signed by the Offeror. The original of the signed anti-collusion affidavit, if separately required and provided with the RFP, shall be submitted with the proposal. The proposal will be rejected if it does not contain the completed anti-collusion affidavit.



1.27 MATERIAL GUARANTY

The successful Offeror may be required to furnish a complete statement of the origin, composition, and manufacture of materials used in the construction of the work together with samples, which will be tested for conformance with Contract requirements.



SECTION II – PROPOSAL CONTENT

2.0 PROPOSAL CONTENT

- A. Section II provides instructions regarding the format and content required for proposals submitted in response to this solicitation.

2.1 PROPOSAL FORMAT

Offeror's written proposal should include concise, but complete, information, emphasizing why the Offeror is best or best qualified to provide the required services. The Offeror's written proposal should include the information in the format outlined below and must be limited to no more than twenty-five (25) pages. **A page shall be defined as 8-1/2" x 11"; single sided, with one inch margins, and a minimum font of Times New Roman 10.** The only exception to the 8-1/2" x 11" paper size is the proposed project schedule. It may be submitted on 11" x 17" paper. Each 11" x 17" page for the schedule shall be counted in the overall page limitations above. Each section of the proposal should be labeled to clearly follow the requirements sections identified in this section of the RFP. The following listed Exhibits must be filled out and returned with the proposal and are not counted against the page limit:

Exhibit 1	Qualifications Documents
Schedule A	Price Sheet

2.2 COVER LETTER

The cover letter shall be no more than three pages. The cover letter shall contain at least the following information.

- A. RFP Number and Project Name.
- B. Statement that the Offeror is qualified to perform the work.
- C. Certification Statement that the information and data submitted are true and complete to the best knowledge of the individual signing the letter.
- D. Name, telephone number, email address, and physical address of the individual to contact regarding the proposal.
- E. The signature of an authorized principal, partner, or officer of the Offeror.

2.3 PROPOSAL CERTIFICATION

The Offeror must fill out and submit Exhibit 1 with its Proposal.

2.4 ORGANIZATIONAL BACKGROUND AND OVERVIEW

The Offeror must provide a brief history and overview of its company and its organizational structure, with special emphasis on how this project will fit within that structure. Also include principal place of business location(s), office locations, size of firm, and financial stability (annual public reports or private financial statements shall be included in an appendix or under separate cover; private financial information will be kept confidential by the City).



2.5 PROPOSAL NARRATIVE/TECHNICAL AND MANAGEMENT APPROACH

In the proposal narrative/technical and management approach section, the Offeror should explain what the Offeror will do and how it will perform if awarded a contract.

2.5.1 TECHNICAL AREA

The Offeror must explain its overall solution, considering the scope of work or statement of work provided. The content must include, but not necessarily be limited to, the following information.

A. Project Approach

In the Technical Area, the Offeror should clearly present proposed solutions and indicate that it has performed adequate planning to accomplish project tasks as defined in the Statement of Work. Innovations, efficiencies, and detailed specifics are all encouraged.

The Offeror must at least address the following areas:

1. Construction phasing and sequencing for the project. Explain the phases, and the logic in the construction phasing and work sequence.
2. Erosion and sediment control during all phases of construction as well as post construction efforts through permit closure.
3. Schedule Management. Discuss Offeror's approach to schedule management including updating and reporting progress of the work.
4. Quality Control. Discuss Offeror's quality control plan, processes and approach to ensure that the City receives a quality product.
5. Safety. Discuss Offeror's approach and commitment to safety for both construction workers and the public traveling through the construction site.
6. Potential issues that Offeror foresees with this project and how Offeror would make adjustments if encountered. Describe factors limiting construction phasing flexibility and potential remedies.

It is highly recommended that the Offeror provide sufficient content and detail to answer completely the following questions.

1. Does the proposal include a complete plan to accomplish each requirement, including equipment being used and subcontracting (if applicable)?
2. Does the proposal demonstrate that appropriate and qualified personnel and equipment will be provided to carry out the requirement?
3. Is the proper level of effort directed toward each requirement? Does the level of effort look unrealistically low or unreasonably high?

2.5.2 MANAGEMENT AREA

The Offeror must explain its method of managing the work to be performed. The content must include, but no necessarily be limited to, the following information.

A. Program Management Controls



In the Management Area, the Offeror should provide:

1. A plan of operation, to include management of personnel, workload, schedule, and budget
2. An organization chart which demonstrates clear and effective lines of authority, responsibility, and communication for management, supervisory, and technical personnel. The plan should address which job classification or personnel will be assigned to each task and how that determination is made. Basic human resource management concepts should be addressed, including hiring, firing, discipline, incentive plans, etc.
3. If the Offeror plans to subcontract more than 10% of the work, include information on how the Offeror plans to manage its subcontractors.
4. A detailed construction schedule for the project showing the key construction activities and how they will meet or improve the City's timeframe and maximize construction efficiency to provide the best value to the City and minimize impacts to the public. The schedule shall be based on the Offeror's understanding and approach to the work as addressed above. Schedules should address controls to ensure the project will remain on schedule and on budget. Schedules submitted for this project shall assume a start date of February 17, 2025.

It is highly recommended that the Offeror provide sufficient content and detail to answer completely the following questions.

1. Does the proposal address the issues above in sufficient detail to demonstrate a sophisticated and mature management control system?
2. Are program management controls consistent with the technical portion of the proposal, especially regarding schedule and level of effort?
3. Do the plan and controls indicate that the Offeror will obtain, keep, and efficiently utilize high-quality personnel?
4. Does the proposal explain how the Offeror will address corrective actions in case of delays (e.g. expediting materials, additional resources, etc.)?
5. Does the proposal explain how the Offeror will remain within schedule and budget?

B. Past Performance/Relevant Experience

In the Management Area, the Offeror should provide at least three references or name contracts demonstrating that it successfully provided services/products that are the same or similar to those required in the RFP. The proposal should adequately explain how the projects were completed on schedule and within budget. It is highly recommended that the Offeror provide sufficient content and detail to answer completely the following questions.

1. Does the proposal include at least three references or past performance citations?
2. Are the references or past performance citations relevant to the requirements of the Statement of Work of the RFP?
3. Does the Offeror explain how they were successful on the projects provided as past performance?
4. Does the Offeror apply the past performance to the City requirement in such a way as to demonstrate added value due to experience?



C. Key Personnel

In the Management Area, resumes must be provided for all personnel considered key, as required by the RFP. Resumes do not count toward the page limit. It is highly recommended that the Offeror provide sufficient content and detail to answer completely the following questions. Explain how the key personnel were related to the projects cited as relevant past performance.

1. Does the Offeror provide complete resumes, including education, experience, background information, accomplishments, and other pertinent information?
2. Does the Offeror provide resumes for all key personnel, as required by the RFP?
3. Do the resumes demonstrate adequate professional, technical, and management levels to accomplish the work effectively and efficiently?

2.6 PRICE AREA

In the Price Area, the Offeror should provide a detailed breakdown of the price for each year of performance. The price must be all-inclusive and include all unit costs for material, labor, other direct costs (e.g. travel), indirect costs (i.e. overhead and general and administrative costs), and profit/fee. Offers must include sufficient detail to allow insight into the fairness and reasonableness of the price. If the contract type will be Time and Material (T&M) labor categories, labor rates, separated profit, and estimated material costs must be included in detail.

In addition, although price may not be the most important factor, it is still very important to the City of Colorado Springs. The Offeror's pricing must be competitive as compared to the budget amount, market pricing in the industry, and the pricing of other Offerors. It is highly recommended that the Offeror provide sufficient content and detail to answer completely the following questions.

1. How does the price compare to the industry competition?
2. If low, is it unrealistically low?
3. If high, is there demonstrated added value for the additional cost?
4. Does the proposal describe any cost savings and areas to improve efficiency?
5. Does the proposal describe any value added to the project by the contractor?

2.7 PROPOSAL PRESENTATION

Presentation is an important factor. Offerors should provide a highly professional product, which is complete, accurate, easily understood, and effectively presented.

2.8 EXCEPTIONS

All Offerors must complete Exhibit 1, Exceptions Form and return it with their proposal. Some terms and conditions are not negotiable. Exceptions may be grounds for rendering the proposal unacceptable without further discussions.



2.9 INSURANCE REQUIREMENTS

All Offerors must complete Exhibit 1, Minimum Insurance Requirements and return with their proposal. Lack of responsiveness in this area may be grounds for rendering the proposal unacceptable without further discussions.



SECTION III – EVALUATION FACTORS

3.0 EVALUATION AND AWARD

Section III provides information regarding evaluation criteria and scoring. It also includes information regarding proposal selection and award of the resultant contract.

3.1 EVALUATION CRITERIA

3.1.1 TECHNICAL AREA – PROJECT APPROACH

See Section II - Item 2.5.1A

3.1.2 MANAGEMENT AREA – PROGRAM MANAGEMENT CONTROLS

See Section II - Item 2.5.2A

3.1.3 MANAGEMENT AREA – PAST PERFORMANCE/RELEVANT EXPERIENCE/KEY PERSONNEL

See Section II – Item 2.5.2B

3.1.4 PRICE/COST AREA – PRICE/COST

See Section II – Item 2.6

3.1.5 PROPOSAL PRESENTATION AREA – PROPOSAL PRESENTATION

See Section II – Item 2.7

3.1.6 EXCEPTIONS AND INSURANCE

See Section II – Items 2.8 and 2.9

3.2 RANKING

- A. The order of ranking or importance in the evaluation shall be as follows:

First: Price/Cost Area
Second: Technical Area – Project Approach
Third: Management Area
Fourth: Proposal Presentation Area

- B. Possible scores for each criterion shall be as follows:

5 – Exceptional
4 – Very Good
3 – Satisfactory
2 – Marginal
1 – Unacceptable

- C. Definitions for scoring are as follows:

Exceptional – The proposal meets all and exceeds many of the requirements of the RFP to the benefit of the City, and the information provided is of such a nature as to answer all



questions without need for further inquiry. There are no corrective actions required, and no compromise of requirements is needed.

Very Good – The proposal meets all and exceeds some of the requirements of the RFP to the benefit of the City, and the information provided is of such a nature as to answer most questions without need for further inquiry. There are no corrective actions required, and no compromise of requirements is needed.

Satisfactory – The proposal meets the requirements of the RFP, and the information provided is of such a nature as to answer many questions without need for further inquiry. There are very few corrective actions required, and no substantive compromise of requirements is needed.

Marginal – The proposal does not meet some of the requirements of the RFP, and the information provided is of such a nature as to require some clarification. There are some corrective actions required, and some non-substantive compromise of requirements is needed.

Unacceptable – The proposal does not meet many of the requirements of the RFP, and the information provided is of such a nature as to require much clarification. There are many corrective actions required, and substantive compromise of requirements is needed.

D. Area Scoring

The score for each area will be determined by multiplying the sum of the criteria in each area by the area evaluation factor. The area evaluation factors are as follows:

Price/Cost Area: .30
Technical Area: .30
Management Area: .30
Proposal Presentation Area: .10

E. Final/Overall Scoring

The final proposal score will be determined by adding the area scoring. The sum of the area scores will be the final/overall score.

3.3 SELECTION COMMITTEE

A selection committee will review all proposals. Through this process, the City will determine which proposals are acceptable or unacceptable. The City will notify, in writing, the Offerors whose proposals are deemed to be unacceptable. Those Offerors offering proposals deemed to be acceptable by the City will be evaluated and scored by the selection committee. This scoring will determine which Offerors are considered to be in the competitive range and may be the basis for an award decision without further steps.

If the selection committee elects not to award based upon evaluation scoring, it may engage in a forced elimination process. To inform this process, it may require oral presentations or interviews with the Offerors considered to be in the competitive range. If oral presentations or interviews are



conducted, they may also be scored, or they may simply be considered as information supporting the forced elimination process. The selection committee may request revisions to the proposal from each of the Offerors at the conclusion of the interviews. The intent of the forced elimination process is to reach consensus. The decision will be based on all relevant factors, and based upon perception of best value. The final decision may or may not exactly reflect scoring ranking.

The City also reserves the right to request best and final offers from all Offerors at any point in the proposal evaluation process.

3.4 AWARD OF CONTRACT

It is anticipated that there will be negotiations or discussions with Offerors. However, the City reserves the right to award without negotiations or discussions. The City also reserves the right to award a contract not necessarily or merely to the Offeror with the most advantageous price. The City intends to award to the Offeror that demonstrates the best value to the City and the most substantiated ability to fulfill the requirements contained in this Request for Proposal. A contract prepared by the City will be finalized and/or negotiated with the successful Offeror. In the event a contract cannot be negotiated with the top ranked Offeror, the City may enter into negotiations with the second highest ranked Offeror, or the City may decide to call for new proposals. Immediately after the notice of award, the successful Offeror will begin planning in conjunction with the City of Colorado Springs staff (to be designated by the City) to ensure fulfillment of all its obligations. The successful Offeror may be expected to attend regular meetings as required by the City to assist in the preparation for startup.



SECTION IV – SPECIAL CONTRACT TERMS AND CONDITIONS

4.0 SPECIAL CONTRACT TERMS AND CONDITIONS/SPECIAL SOLICITATION PROVISIONS

In addition to the special contract terms and conditions listed below, the City's sample contract, see Exhibit 2, contains contract terms and conditions.

ADA Standards: It is a requirement of the City and required by law that any new or renovated facility meet the scoping and technical requirements of the 2010 ADA Standards for newly designed and constructed or altered local government facilities, public accommodations, and facilities. The selected Design Professional shall design the project so it both conforms to the 2010 ADA Standards, as applicable and as amended, and is readily accessible to and usable by individuals with disabilities. The selected Contractor shall build the project so it both conforms to the 2010 ADA Standards, as applicable and as amended, and is readily accessible to and usable by individuals with disabilities. Facilities that are designed, constructed, and/or altered facilities that meet or exceed the IBC 2015/ANSI A117.1 2009, used by Pikes Peak Regional Building Department, will be accepted as meeting or exceeding the 2010 ADA Standards.



SECTION V – EXHIBITS

5.0 EXHIBITS

Exhibit 1	Qualifications Documents
Exhibit 2	Sample Contract
Exhibit 3	Subsurface Study
Exhibit 4	1994 Approved Reclamation Plan
Exhibit 5	Evaluation Score Sheet



EXHIBIT 1 QUALIFICATIONS DOCUMENTS

FOLLOWS THIS PAGE



SOLICITATION QUALIFICATIONS DOCUMENTS

Please complete all sections of this document including the Solicitation Certification, Representations and Certifications, Qualification Statement, Exceptions, Minimum Insurance Requirements, and Signature Page.

Please submit all completed documents with your bid/ proposal and sign the Minimum Insurance Requirements and Signature Page.

Solicitation:

Solicitation Number:

Firm Name:

Date:

Address:

Federal Tax ID #:

Tax Classification:

Sole Proprietorship

Partnership

C Corporation

S Corporation

LLC

Nonprofit

DUNS Number:

OFFEROR REPRESENTATIVE

Offeror has appointed the following as the offeror's representative and contact for all questions or clarifications in regard to this offeror.

Name:

Telephone:

E-mail:



SOLICITATION CERTIFICATION

PLACE OF BUSINESS

Company's Principal Place of Business

Does Offeror Have an established office or facility in Colorado Springs? YES NO

If Yes, Indicate address below if different from principal place of business.

Year Facility Was Established

Percent of Work to be performed from principal place of business.

Percent of Work to be performed from Colorado Springs Facility

INSURANCE

Indicate your ability to provide a certificate of insurance evidencing the required coverage types and limits specified in Minimum Insurance Requirements Exhibit. (The certificate of insurance must reflect the City of Colorado Springs as an Additional Insured, as applicable.)

Initial Here

Indicate your Ability to Comply with the following requirements:

The City shall be added as an Additional Insured to all liability policies

YES

NO



Your property and liability insurance company is licensed to do business in Colorado

YES

NO

Your property and liability insurance company has an AM best rating of not less than B+ and/or

YES

NO

Worker's Compensation Insurance is carried for all employees and covers work done in Colorado.

YES

NO

Provide the name of your property and liability insurance company here:

FINANCIAL STATEMENTS

Current Financial Statements are not required for this solicitation.

Current Financial Statements are required for this solicitation. Please include financial statements as a separate document with your proposal.

Initial Here

COMPLETED PROPOSAL

Provide the completed and signed proposal. (Proposals must be identified as specified in this RFP document). All required Exhibits are attached.

Initial Here



REPRESENTATIONS AND CERTIFICATIONS

1. INSURANCE REQUIREMENTS

Offeror shall comply with all insurance requirements and will submit the Insurance Certificates prior to performance start date. If limits are different from the stated amounts, Offeror shall explain variance. Certain endorsements and “additionally insured” statements may require further clarification and specific statements on a project specific basis and should have been described in the Offeror’s proposal.

Initial Here #1

2. ETHICS VIOLATIONS

- a) The Offeror shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in this clause in its own operations and direct business relationships.
- b) Offeror certifies the Offeror has not violated or caused any person to violate, and shall not violate or cause any person to violate, the City’s Code of Ethics contained in Article 3, of Chapter 1 of the City Code and in the City’s Procurement Rules and Regulations
- c) When the Offeror has reasonable grounds to believe that a violation described in this clause may have occurred, the Offeror shall promptly report the possible violation to the City Contracts Specialist in writing.
- d) The Offeror must disclose with the signing of this proposal, the name of any officer, director, or agent who is also an employee of the City and any City employee who owns, directly or indirectly, an interest of ten percent (10%) or more in the Offeror’s firm or any of its branches.
- e) In addition, the Offeror must report any conflict or apparent conflict, current or discovered during the performance of the Contract, to the City Contracts Specialist.
- f) The Offeror shall not engage in providing gifts, meals or other amenities to City employees. The right of the Offeror to proceed may be terminated by written notice issued by City Contracts Specialist if Offeror offered or gave a gratuity to an officer, official, or employee of the City and intended by the gratuity to obtain a contract or favorable treatment under a contract.
- g) The Offeror shall cooperate fully with the City or any agency investigating a possible violation on behalf of the City. If any violation is determined, the Offeror will properly compensate the City.
- h) The Offeror agrees to incorporate the substance of this clause (after substituting “Contractor” for “Offeror”) in all subcontracts under this offer.

Initial Here #2



3. COOPERATION WITH OTHER CONTRACTORS

Other City activities/contracts may be in progress or start during the performance of this contract. The Offeror shall coordinate the work harmoniously with the other contractors or City personnel, if applicable.

Initial Here #3

4. INTERNET USE

Should the Offeror require access to City Internet resources in the performance of this requirement, a "Contractor's Internet Use Agreement" form must be separately signed by each individual having access to the City Network. The completed Contractor's Internet Use Agreement will be maintained with this agreement. Inappropriate use of the City Network will be grounds for immediate termination of any awarded contact.

Initial Here #4

5. LITIGATION

If awarded a contract, Offeror shall notify the City within five (5) calendar days after being served with a summons, complaint, or other pleading in any matter which has been filed in any federal or state court or administrative agency. The Offeror shall deliver copies of such document(s) to the City's Procurement Services Manager. The term "litigation" includes an assignment for the benefit of creditors, and filings of bankruptcy, reorganization and/or foreclosure.

Initial Here #5

6. CONTRACTOR'S REGISTRATION INFORMATION

Offeror's firm verifies and states that they are (check all that apply):

Large Business (i.e. do not qualify as a small business or non-profit)

Nonprofit

Small Business

Minority Owned Business/Small Disadvantaged Business

Woman Owned Business



Veteran Owned Business

Service-Disabled Veteran Owned Business

HUBZone Business

Note: The City accepts self-certification for these categories in accordance with Small Business Administration (SBA) standards. The SBA size standards are found on the SBA website <https://www.sba.gov/content/am-i-small-business-concern>.

Initial Here #6

7. CONTRACTOR PERSONNEL

- a) The Offeror shall appoint one of its key personnel as the “Authorized Representative” who shall have the power and authority to interface with the City and represent the Offeror in all administrative matters concerning this proposal and any awarded contract, including without limitation such administrative matters as correction of problems modifications, and reduction of costs.
- b) The Authorized Representative shall be the person identified in the Offeror’s proposal, unless the Offeror provides written notice to the City naming another person to serve as its Authorized Representative. Communications received by the City Contracts Specialist from the Authorized Representative shall be deemed to have been received from the Offeror.

Name:

Telephone:

E-mail:

Initial Here #7

8. OFFEROR’S CERTIFICATION

The undersigned hereby affirms that:

- a) He/She is a duly authorized agent of the Offeror;
- b) He/She has read and agrees to the City’s standard terms and conditions attached.
- c) The offer is presented in full compliance with the collusive prohibitions of the City of Colorado Springs. The Offeror certifies that no employee of its firm has discussed, or



compared the offer with any other offeror or City employee and has not colluded with any other offeror or City employee.

- d) The Offeror certifies that it has checked all of its figures, and understands that the City will not be responsible for any errors or omissions on the part of the Offeror in preparing its proposal.
- e) By submitting an offer the Offeror certifies that it has complied and will comply with all requirements of local, state, and federal laws, and that no legal requirements have been or will be violated in making or accepting this solicitation.

I hereby certify that I am submitting the proposal based on my company's capabilities to provide quality products and/or services on time.

Initial Here #8

9. OFFEROR CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS:

- 1. The Offeror certifies to the best of its knowledge and belief, that (i) the Offeror and/or any of its Principals

Are Are Not

Presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency.

Have Have Not

Within a three year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state, local) contract or subcontract; violation of Federal or state antitrust statutes relation to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statement, tax evasion, or receiving stolen property; and

Are Are Not

presently indicated for, or otherwise criminally or civilly charged by a governmental entity with commission of any of the offenses enumerated in any paragraphs above.

- 2. The Offeror shall provide immediate written notice to the City Contracts Specialist if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reasons of changed circumstances.
- 3. The certification in paragraph 1. above, is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the City, the



City Contracts Specialist may terminate the contract resulting from this solicitation for default. Termination for default may result in additional charges being levied for the costs incurred by the City to initiate activities to replace the awarded Contractor.

Initial Here #9

10. ACCEPTANCE OF CITY CONTRACTS SPECIALIST'S SOLE AUTHORITY FOR CHANGES

Unless otherwise specified in the Contract, the Offeror hereby agrees that any changes to the scope of work, subsequent to the original contract signing, shall be generated in writing and an approval signature shall be obtained from the City Contracts Specialist prior to additional work performance.

Initial Here #10

11. CITY CONTRACTOR SAFETY PROGRAM

The Offeror hereby agrees to adhere to a worker safety program for contractor employees on a City job site or location. By initialing below, the Offeror has reviewed the information and will abide by the City Policy which is available for review:

<https://coloradosprings.gov/finance/page/procurement-regulations-and-documents>

Initial Here #11

12. ACCEPTANCE OF CITY ENVIRONMENTALLY PREFERRED PURCHASING (EPP) POLICY

The City of Colorado Springs is committed to buying more environmentally preferable goods and services, as long as they meet performance needs, are available within a reasonable time and at a reasonable cost. The Offeror hereby acknowledges review of this policy by initialing below.

<https://coloradosprings.gov/finance/page/procurement-regulations-and-documents>

Initial Here #12



13. FRAUD, WASTE, AND ABUSE

Everyone has a duty to report any suspected unlawful act impacting the City of Colorado Springs operations and its enterprises. Anyone who becomes aware of the existence or apparent existence of fraud, waste, and abuse in City of Colorado Springs is encouraged to report such matters to the City Auditor's Office in writing or on the telephone hotline 385-2387 (ADTR). Written correspondence can be mailed to:

City Auditor

P.O. Box 2241

Colorado Springs CO 80901

Or via email FraudHotline@ColoradoSprings.gov. Any of these mechanisms allow for anonymous reporting. For more information, please go to the website <https://coloradosprings.gov/cityfraud>.

Initial Here #13



QUALIFICATION STATEMENT

This statement will provide information which will enable the City to evaluate the qualifications of your firm and staff with regard to the requirements of this solicitation. Please complete this form in its entirety. If a request in the Qualification Statement is contained in the proposal, indicate the section in the proposal where that information can be found.

1. TYPE OF LICENSE(S) HELD

2. TYPE OF SERVICE TO BE PROVIDED FOR THIS SOLICITATION

3. NUMBER OF YEARS IN BUSINESS

4. FIRM HISTORY & STAFF QUALIFICATIONS

In your proposal provide a brief history of your firm, staff size, and experience. Submit a resume for the project manager and each key personnel assigned to this project.

5. WHAT OTHER NAME(S) HAS YOUR COMPANY OPERATED UNDER

My Firm has not operated under any other names

6. HAVE YOU OR YOUR FIRM EVER FAILED TO COMPLETE ANY WORK AWARDED TO YOU?

Yes No

If Yes, Please Explain



7. HAS ANY OFFICER OF PARTNER OF YOUR ORGANIZATION EVER BEEN AN OFFICER OR PARTNER OF ANOTHER ORGANIZATION THAT FIALED TO COMPLETE A CONTRACT WITHIN THE LAST FIVE (5) YEARS?

Yes No

If Yes, Please Explain

8. HAS YOUR FIRM OR ANY PARTNERS OR OFFICERS EVER BEEN INVOLVED IN ANY BANKRUPTCY ACTION?

Yes No

If Yes, Please Explain

9. ARE YOU PRESENTLY INVOLVED IN ANY LITIGATION WITH ANY GOVERNMENT AGENCY?

Yes No

If Yes, Please Explain Type, Kind, Plaintiff, Defendant, etc. and state the current status:

10. BANK REFERENCE

Bank Name:

Address:

Contact:

Phone #:

E-mail:



11. SIMILAR PROJECTS

List Three similar projects (local or state-wide) from the last five (5) years. Include the location of the project, size of project (contract amount), contract name and information.

NOTE: Detailed information on these projects may also be requested in the solicitation package

Indicate here if this information is provided within your proposal and identify where in the proposal it is located.

1. Company:

Location of Project:

Contract Amount:

Contract Period of Performance:

Company Representative:

Representative's Title:

Representative's Address:

Representative's Phone #:

Representative's E-mail:

Brief Description of service/goods provided and how your firm was successful carrying out the scope of work of the contract.

2. Company:

Location of Project:

Contract Amount:

Contract Period of Performance:

Company Representative:



Representative's Title:

Representative's Address:

Representative's Phone #:

Representative's E-mail:

Brief Description of service/goods provided and how your firm was successful carrying out the scope of work of the contract.

3. Company:

Location of Project:

Contract Amount:

Contract Period of Performance:

Company Representative:

Representative's Title:

Representative's Address:

Representative's Phone #:

Representative's E-mail:

Brief Description of service/goods provided and how your firm was successful carrying out the scope of work of the contract.



12. SIMILAR PROJECTS CURRENTLY UNDER CONTRACT

list three projects currently under contract and in progress (local or state-wide) from the last five (5) years. Include the location of the project, size of project (contract amount), contract name and information. NOTE: Detailed information on these projects may also be requested in the solicitation package

Indicate here if this information is provided within your proposal and Identify where in the proposal it is located.

1. Company:

Location of Project:

Contract Amount:

Contract Period of Performance:

Company Representative:

Representative's Title:

Representative's Address:

Representative's Phone #:

Representative's E-mail:

Brief Description of service/goods provided.

2. Company:

Location of Project:

Contract Amount:

Contract Period of Performance:

Company Representative:



Representative's Title:

Representative's Address:

Representative's Phone #:

Representative's E-mail:

Brief Description of service/goods provided.

3. Company:

Location of Project:

Contract Amount:

Contract Period of Performance:

Company Representative:

Representative's Title:

Representative's Address:

Representative's Phone #:

Representative's E-mail:

Brief Description of service/goods provided.



13. ADDITIONAL QUALIFICATION REQUIREMENTS

There are no additional qualification requirements for this solicitation.

There are additional qualification requirements as follows:



EXCEPTIONS

Please Indicate below if there are any exceptions taken to any of the terms, conditions, or specifications of these proposal documents or contract.

If there are exceptions taken to any of the terms, conditions, or specifications of the proposal document or contract, they must be clearly stated on an additional document attached to this exhibit and returned with your proposal.

NOTE: All potential Offerors are hereby advised that exceptions taken may be considered during the evaluation phase which may affect the final scoring of proposals. Offerors stipulating that the City must use their contract or agreement may be determined non-responsive and their Proposal determined unacceptable.

Please indicate below:

My Firm has no exceptions.

My Firm does have exceptions. (Attach Exceptions to this exhibit)



MINIMUM INSURANCE REQUIREMENTS

The following listed minimum insurance requirements shall be carried by all contractors and consultants unless otherwise specified in the City's solicitation package, Special Provisions or Standard Specifications.

- Commercial General Liability for limits not less than \$1,000,000 combined single limit with \$2,000,000 aggregate for bodily injury and property damage for each occurrence. Coverage shall include blanket contractual, broad form property damage, products and completed operations.
- Workers' Compensation and Employers Liability as required by statute. Employers Liability coverage is to be carried for a minimum limit of \$1,000,000.
- Automobile Liability covering any auto (including owned, hired, and non-owned autos) with a minimum of \$1,000,000 each accident combined single limit.
- Professional Liability Insurance covering any damages caused by an error, omission or any negligent acts with limits of not less than \$2,000,000 per occurrence and in the aggregate.
 - In the event that any professional liability insurance required by this Contract is written on a claims-made basis, Consultant warrants that any retroactive date under the policy shall precede the effective date of this Contract; and that either continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (3) years beginning at the time work under this Contract is completed
 - Policy shall contain a waiver of subrogation against the CITY.
- Pollution Legal Liability Insurance shall apply to sudden and gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants (including asbestos). If the coverage is written on a claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of this Contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (3) years beginning from the time that work under this contract is completed. Policy limits shall be no less than \$1,000,000 per loss with \$2,000,000 aggregate coverage.

Except for workers' compensation and employer's liability insurance and Professional Liability, the City of Colorado Springs must be named as an additional insured. Certificates of Insurance must be submitted before commencing the work and provide 30 days' notice prior to any cancellation, non-renewal, or material changes to policies required under the contract.

Name of Company

Signature

Date



SIGNATURE PAGE

By signing below, the Offeror certifies that no person or firm other than the Offeror or as otherwise indicated has any interest whatsoever in this offer or any Contract that may be entered into as a result of this offer and that in all respects the offer is legal and firm, submitted in good faith without collusion or fraud.

The undersigned additionally declares that it has carefully examined the Bid/Proposal information and the complete Solicitation prior to submitting a Bid / Proposal. The Offeror's signature will be considered the Offeror's acknowledgement of understanding and ability to comply with all items in the solicitation.

The undersigned acknowledges and understands the terms, conditions, Specifications and all Requirements contained and/or referenced and are legally authorized by the Offeror to make the above statements or representations.

Signature

Name (Printed)

Company Name

Title

Date



EXHIBIT 2 SAMPLE CONTRACT
CONSTRUCTION CONTRACT

Contract Number:		Project Name/Title	
Vendor/Contractor			
Contact Name:		Telephone:	
Email Address:			
Address:			
Federal Tax ID #		Please check one:	<input type="checkbox"/> Corporation <input type="checkbox"/> Individual <input type="checkbox"/> Partnership
City Contracting Specialist		City Dept Rep	
NOT TO EXCEED Contract Amount:		City Account #	
Contract Type:	Fixed Unit Price	Period of Performance:	

1. INTRODUCTION

THIS Fixed Unit Price CONTRACT ("Contract") is made and entered into this XXX day of XXX, 2022 by and between the City of Colorado Springs, a Colorado municipal corporation and home rule city, in the County of El Paso, State of Colorado, (the "City"), and _____ (the "Contractor").

THE CITY AND THE CONTRACTOR HEREBY AGREE AS FOLLOWS:

The City has heretofore prepared the necessary Contract Documents for the following Activity: XXXX.

The Contractor did on the XXX day of XXX, 2022 submit to the City the Contractor's written offer and proposal to do the work therein described under the terms and conditions therein set forth and furnish all materials, supplies, labor, services, transportation, tools, equipment, and parts for said work in strict conformity with the accompanying Contract Documents, which are attached hereto and incorporated herein by this reference, including the following:

1. This Contract
2. Schedule A – Price Sheet
3. Schedule B – General Construction Terms and Conditions
4. Schedule C – Special Contract Terms and Conditions
5. Schedule D – General Specifications
6. Schedule E – Special and Technical Specifications
7. Schedule F – Scope of Work
8. Exhibit 1 – Performance, Labor and Material Payment, and Maintenance Bonds
9. Exhibit 2 – Minimum Insurance Requirements



2. COMPENSATION/CONSIDERATION

THIS FIXED UNIT PRICE CONTRACT is established at the Not to Exceed amount of \$xxxxxxx.

Subject to the terms and conditions of the Contract Documents, Contractor agrees to furnish all materials and to perform all work as set forth in its proposal and as required by the Contract Documents.

All pricing is in accordance with the fixed unit prices found in Schedule A, as proposed by the Contractor. Payment made for actual quantities as set forth in Schedule B, General Construction Terms and Conditions. At no time shall the total obligation of the City exceed the not to exceed amount of this Contract.

3. TERM OF CONTRACT

Contractor will start work promptly after the Notice to Proceed and continue to work diligently until completed. The Contractor shall complete all work on an as ordered basis throughout the Contract period which is **the date of Notice to Proceed through April 30, 2022** ("Period of Performance") as per the specifications and drawings. The Contractor shall provide a two-year guarantee on all work performed under this Contract after the job has been completed and accepted.

4. INSURANCE

The Contractor shall provide and maintain acceptable Insurance Policy(s) consistent with the Minimum Insurance Requirements attached as Exhibit 2, which includes Property, Liability, and as otherwise listed in Exhibit 2. The City of Colorado Springs shall be reflected as an additional insured on the Property and Liability policy(s).

Further, Contractor understands and agrees that Contractor shall have no right of coverage under any existing or future City comprehensive, self, or personal injury policies. Contractor shall provide insurance coverage for and on behalf of Contract that will sufficiently protect Contractor, or Contractor's agents, employees, servants or other personnel, in connection with the services which are to be provided by Contractor pursuant to this Contract, including protection from claims for bodily injury, death, property damage, and lost income. Contractor shall provide worker's compensation insurance coverage for Contractor and all Contractor personnel. Contractor shall file applicable insurance certificates with the City and shall also provide additional insurance as indicated in this Contract. ***A CURRENT CERTIFICATE OF INSURANCE IS REQUIRED PRIOR TO COMMENCEMENT OF SERVICES LISTING THE CITY AS ADDITIONALLY INSURED.***

5. RESPONSIBILITY OF THE CONTRACTOR

- A. The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all Scope of Work services furnished by the Contractor under this Contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiencies in services provided under this Contract to the satisfaction of the City.
- B. The City's review, approval of, acceptance of, or payment for the services required under this Contract shall not be construed to operate as a waiver of any rights under this Contract or of any cause of action arising out of the performance of this Contract, and the Contractor shall



be and remain liable to the City for any and all damages to the City caused by the Contractor's negligent performance of any of the services furnished under this Contract.

- C. The rights and remedies of the City provided for under this Contract are in addition to any other rights and remedies provided by law.
- D. If the Contractor is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.

6. WORK OVERSIGHT

- A. The extent and character of the work to be done by the Contractor shall be subject to the general approval of the City's delegated Project Manager.
- B. If any of the work or services being performed does not conform with Contract requirements, the City may require the Contractor to perform the work or services again in conformity with Contract requirements, at no increase in Contract amount. When defects in work or services cannot be corrected by re-performance, the City may (1) require the Contractor to take necessary action to ensure that future performance conforms to Contract requirements and (2) reduce the Contract price to reflect the reduced value of the work or services performed.
- C. If the Contractor fails to promptly perform the defective work or services again or to take the necessary action to ensure future performance is in conformity with Contract requirements, the City may (1) by Contract or otherwise, perform the services and charge to the Contractor any cost incurred by the City that is directly related to the performance of such work or service or (2) terminate the Contract for breach of contract.

7. SUBCONTRACTORS, ASSOCIATES, AND OTHER CONTRACTORS

- A. Any subcontractor, outside associates, or other contractors used by the Contractor in connection with Contractor's work under this Contract shall be limited to individuals or firms that are specifically identified by the Contractor in the Contractor's proposal and agreed to by the City. The Contractor shall obtain the City's Project Manager's written consent before making any substitution of these subcontractors, associates, or other contractors.
- B. The Contractor shall include a flow down clause in all of its subcontracts, agreements with outside associates, and agreements with other contractors. The flow down clause shall cause all of the terms and conditions of this Contract, including all of the applicable parts of the Contract Documents, to be incorporated into all subcontracts, agreements with outside associates, and agreements with other contractors. The flow down clause shall provide clearly that there is no privity of contract between the City and the Contractor's subcontractors, outside associates, and other contractors.

8. KEY PERSONNEL

The key personnel listed in the proposal and/or below will be the individuals used in the performance of the work. If any of the listed key personnel leave employment or are otherwise not utilized in the performance of the work, approval to substitute must be obtained by the



Contractor from the City's Project Manager. Any substitute shall have the same or a higher standard of qualifications that the key personnel possessed at the time of Contract award.

9. START AND CONTINUANCE OF WORK

It is further agreed that the Contractor will start work promptly and continue to work diligently until this Contract is completed.

10. APPROPRIATION OF FUNDS

This Contract is expressly made subject to the limitations of the Colorado Constitution and Section 7-60 of the Charter of the City of Colorado Springs. Nothing herein shall constitute, nor be deemed to constitute, the creation of a debt or multi-year fiscal obligation or an obligation of future appropriations by the City Council of Colorado Springs, contrary to Article X, § 20, Colo. Const., or any other constitutional, statutory, or charter debt limitation. Notwithstanding any other provision of this Contract, with respect to any financial obligation of the City which may arise under this Agreement in any fiscal year after the year of execution, in the event the budget or other means of appropriation for any such year fails to provide funds in sufficient amounts to discharge such obligation, such failure (i) shall act to terminate this Contract at such time as the then-existing and available appropriations are depleted, and (ii) neither such failure nor termination shall constitute a default or breach of this Contract, including any sub-agreement, attachment, schedule, or exhibit thereto, by the City. As used herein, the term "appropriation" shall mean and include the due adoption of an appropriation ordinance and budget and the approval of a Budget Detail Report (Resource Allocations) which contains an allocation of sufficient funds for the performance of fiscal obligations arising under this Contract.

11. CHANGES

The Contractor and the City agree and acknowledge as a part of this Contract that no change order or other form or order or directive may be issued by the City which requires additional compensable work to be performed, which work causes the aggregate amount payable under the Contract to exceed the amount appropriated for this Contract as listed above, unless the Contractor has been given a written assurance by the City that lawful appropriations to cover the costs of the additional work have been made or unless such work is covered under a remedy-granting provision of this Contract. The Contractor and the City further agree and acknowledge as a part of this Contract that no change order or other form or order or directive which requires additional compensable work to be performed under this Contract shall be issued by the City unless funds are available to pay such additional costs, and, regardless of any remedy-granting provision included within this Contract, the Contractor shall not be entitled to any additional compensation for any change which increases or decreases the Contract completion date, or for any additional compensable work performed under this Contract, and expressly waives any rights to additional compensation, whether by law or equity, unless, prior to commencing the additional work, the Contractor is given a written change order describing the change in Contract completion date or the additional compensable work to be performed, and setting forth the amount of compensation to be paid, and such change order is signed by the authorized City representative, as defined below. The amount of compensation to be paid, if any, shall be deemed to cover any and all additional, direct, indirect or other cost or expense or profit of the Contractor whatsoever. It is the Contractor's sole responsibility to know, determine, and ascertain the authority of the City representative signing any change order under this Contract.



No change, amendment, or modification to this Contract shall be valid unless duly approved and issued in writing by the City of Colorado Springs Procurement Services Division. The City shall not be liable for any costs incurred by the Contractor resulting from work performed for changes not issued in writing by the City of Colorado Springs Procurement Services Division.

The following personnel are authorized to sign changes, amendments, or modifications to this Contract.

The Department Manager: up to \$149,999.99

The City of Colorado Springs Deputy Chief of Staff: \$150,000.00 to \$499,999.99

The City of Colorado Springs Chief of Staff: \$500,000.00 to \$1,999,999.99

The Mayor of Colorado Springs: Unlimited

12. ECONOMIC PRICE ADJUSTMENT

- A. The Contractor shall notify the City of Colorado Springs Procurement Services Division if, at any time during contract performance, the rate of pay for labor or the unit prices for material shown in Schedule A experiences a significant increase. A change in price shall be considered significant when the unit price of an item increases by 10% from the execution date of this Contract. The Contractor shall furnish notice of this increase within 60 days after the increase, or within any additional period that the City Procurement Services Division may approve in writing, but not later than the date of final payment under this Contract. The notice shall include the Contractor's proposal for an adjustment in the Contract unit prices to be negotiated under paragraph (b) of this clause, and shall include, in the form required by the City Procurement Services Division, supporting data explaining the cause, effective date, and amount of the increase and the amount of the Contractor's adjustment proposal.
- B. Promptly after the City Procurement Services Division receives the notice and data under paragraph (a) of this clause, the City Procurement Services Division and the Contractor shall negotiate a price adjustment in the contract unit prices and its effective date. However, the City Procurement Services Division may postpone the negotiations until an accumulation of increases in the labor rates (including fringe benefits) and unit prices of material shown in Schedule A results in an adjustment allowable under paragraph (c)(3) of this clause. The City Procurement Services Division shall modify this contract (1) to include the price adjustment and its effective date and (2) to revise the labor rates (including fringe benefits) or unit prices of material as shown in Schedule A to reflect the increases resulting from the adjustment. The Contractor shall continue performance at current rates pending agreement on, or determination of, any adjustment and its effective date.
- C. Any price adjustment under this clause is subject to the following limitations:
1. Any adjustment shall be limited to the effect on unit prices of the increases in the rates of pay for labor (including fringe benefits) or unit prices for material shown in Schedule A. There shall be no adjustment for:
 - (i) Supplies or services for which the production cost is not affected by such changes;
 - (ii) Changes in rates or unit prices other than those shown in Schedule A; or
 - (iii) Changes in the quantities of labor or material used from those shown in Schedule A for each item.
 2. No upward adjustment shall apply to supplies or services that are required to be delivered or performed before the effective date of the adjustment, unless the Contractor's failure to



deliver or perform according to the delivery schedule results from causes beyond the Contractor's control and without its fault or negligence, within the meaning of the Default clause.

3. There shall be no adjustment for any change in rates of pay for labor (including fringe benefits) or unit prices for material which would not result in a net change of at least 3 percent of the then-current total contract price. This limitation shall not apply, however, if, after final delivery of all line items, either party requests an adjustment under paragraph (b) of this clause.
4. The aggregate of the increases in any contract unit price made under this clause shall not exceed 10 percent of the original unit price.

13. ASSIGNMENT

No assignment or transfer by the Contractor of this Contract or any part thereof or of the funds to be received thereunder by the Contractor will be recognized unless such assignment has had the prior written approval of the City and the surety has been given due notice of such assignment. Such written approval by the City shall not relieve the Contractor of the obligations under the terms of this Contract. In addition to the usual recitals in assignment contracts, the following language must be included in the assignment:

It is agreed that the funds to be paid to the assignee under this assignment are subject to a prior lien for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms, or corporations rendering such services or supplying such materials.

14. CHOICE OF LAW

This Contract is subject to and shall be interpreted under the law of the State of Colorado, and the Charter, City Code, Ordinances, Rules and Regulations of the City of Colorado Springs, Colorado, a Colorado home rule city. Court venue and jurisdiction shall be exclusively in the Colorado District Court for El Paso County, Colorado. The Parties agree that the place of performance for this Contract is deemed to be in the City of Colorado Springs, El Paso County, State of Colorado. The Contractor shall ensure that the Contractor and the Contractor's employees, agents, officers and subcontractors are familiar with, and comply with, applicable Federal, State, and Local laws and regulations as now written or hereafter amended.

15. WORKERS' COMPENSATION INSURANCE

Contractor shall take out and maintain during the Period of Performance, Colorado Worker's Compensation Insurance for the Contractor and all employees of the Contractor. If any service is sublet by the Contractor, the Contractor shall require the subcontractor to provide the same coverage for the subcontractor and subcontractor's employees. Workers' Compensation Insurance shall include occupational disease provisions covering any obligations of the Contractor in accord with the provisions of the Workers' Compensation Act of Colorado.

16. INDEMNIFICATION

Contractor agrees that the Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents, from and against any and all loss, damage, injuries, claims,



cause or causes of action, or any liability whatsoever resulting from, or arising out of, or in connection with the Contractor's obligations or actions under this Contract caused by any willful or negligent error, omission or act or a failure to observe any applicable standard of care by the Contractor or any person employed by it or anyone for whose acts the Contractor is legally liable. In consideration of the award of this Contract, to the extent damages are covered by insurance, the Contractor agrees to waive all rights of subrogation against the City, its subsidiary, parent, associated and/or affiliated entities, successors, or assigns, its elected officials, trustees, employees, agents, and volunteers for losses arising from the work performed by the Contractor for the City. The indemnification obligation shall survive the expiration or termination of this Contract.

17. INDEPENDENT CONTRACTOR

In the performance of the Contractor's obligations under this Contract, it is understood, acknowledged and agreed between the parties that the Contractor is at all times acting and performing as an independent contractor, and the City shall neither have nor exercise any control or direction over the manner and means by which the Contractor performs the Contractor's obligations under this Contract, except as otherwise stated within the Contract terms. The City shall not provide any direction to the Contractor on the work necessary to complete the project. Contractor understands that it is an independent contractor responsible for knowing how to perform all work or tasks necessary to complete project. The Contractor understands and agrees that the Contractor and the Contractor's employees, agents, servants, or other personnel are not City employees. The Contractor shall be solely responsible for payment of salaries, wages, payroll taxes, unemployment benefits or any other form of compensation or benefit to the Contractor or any of the Contractor's employees, agents, servants or other personnel performing services or work under this Contract, whether it is of a direct or indirect nature. Further in that regard, it is expressly understood and agreed that for such purposes neither the Contractor nor the Contractor's employees, agents, servants or other personnel shall be entitled to any City payroll, insurance, unemployment, worker's compensation, retirement or any other benefits whatsoever.

18. APPLICABLE LAW AND LICENSES

In the conduct of the services or work contemplated in this Contract, the Contractor shall ensure that the Contractor and all subcontractors comply with all applicable state, federal and City and local law, rules and regulations, technical standards or specifications. The Contractor shall qualify for and obtain any required licenses prior to commencement of work.

19. PRIOR AGREEMENTS

This is a completely integrated Contract and contains the entire agreement between the parties. Any prior written or oral agreements or representations regarding this Contract shall be of no effect and shall not be binding on the City. This Contract may only be amended in writing, and executed by duly authorized representatives of the parties hereto.

20. INTELLECTUAL PROPERTY

The Parties hereby agree, and acknowledge, that all products, items writings, designs, models, examples, or other work product of the Contractor produced pursuant to this Contract are works made for hire, and that the City owns, has, and possesses any and all ownership rights and



interests to any work products of the Contractor made under this Contract, including any and all copyright, trademark, or patent rights, and that compensation to the Contractor for Agreement and acknowledgment of this intellectual property right section of this Contract is included in any compensation or price whatsoever paid to the Contractor under this Contract. It is the intent of the parties that the City shall have full ownership and control of the Contractor's work products produced pursuant to this Contract, and the Contractor specifically waives and assigns to the City all rights which Contractor may have under the 1990 Visual Artists Rights Act, federal, and state law, as now written or later amended or provided. In the event any products, items writings, designs, models, examples, or other work product produced pursuant to this Contract is deemed by a court of competent jurisdiction not to be a work for hire under federal copyright laws, this intellectual property rights provision shall act as an irrevocable assignment to the City by the Contractor of any and all copyrights, trademark rights, or patent rights in the Contractor's products, items writings, designs, models, examples, or other work product produced pursuant to this Contract, including all rights in perpetuity. Under this irrevocable assignment, the Contractor hereby assigns to the City the sole and exclusive right, title, and interest in and to the Contractor's products, items writings, designs, models, examples, or other work product produced pursuant to this Contract, without further consideration, and agrees to assist the City in registering and from time to time enforcing all copyrights and other rights and protections relating to the Contractor's products, items writings, designs, models, examples, or other work product in any and all countries. It is the Contractor's specific intent to assign all right, title, and interest whatsoever in any and all copyright rights in the Contractor's products, items writings, designs, models, examples, or other work product produced pursuant to this Contract, in any media and for any purpose, including all rights of renewal and extension, to the City. To that end, the Contractor agrees to execute and deliver all necessary documents requested by the City in connection therewith and appoints the City as Contractor's agent and attorney-in-fact to act for and in Contractor's behalf and stead to execute, register, and file any such applications, and to do all other lawfully permitted acts to further the registration, prosecution, issuance, renewals, and extensions of copyrights or other protections with the same legal force and effect as if executed by the Contractor; further, the parties expressly agree that the provisions of this intellectual property rights section shall be binding upon the parties and their heirs, legal representatives, successors, and assigns.

21. WAIVERS

No waiver of default by the City of any of the terms, covenants, and conditions hereof to be performed, kept, and observed by the Contractor shall be construed, or shall operate, as a waiver of any subsequent default of any of the terms, covenants, or conditions herein contained to be performed, kept, and observed by the Contractor.

22. THIRD PARTIES

It is expressly understood and agreed that enforcement of the terms and conditions of this Contract, and all rights of action relating to such enforcement, shall be strictly reserved to the Parties hereto, and nothing contained in this Contract shall give or allow any such claim or right of action by any other or third person or entity on such Contract. It is the express intention of the Parties hereto that any person or entity, other than the Parties to this Contract, receiving services or benefits under this Contract shall be deemed to be incidental beneficiaries only.

23. TERMINATION



A. Termination for Convenience.

By signing this Contract, Contractor represents that it is a sophisticated business and enters into the Contract voluntarily, has calculated all business risks associated with this Contract, and understands and assumes all risks of being terminated for convenience, whether such risks are known or not known. Contractor agrees that the City may terminate this Contract at any time for convenience of the City, upon written notice to the Contractor. Contractor expressly agrees to and assumes the risk that the City shall not be liable for any costs or fees of whatsoever kind and nature if termination for convenience occurs before Contractor begins any work or portion of the work. Contractor further expressly agrees and assumes the risks that the City shall not be liable for any unperformed work, anticipated profits, overhead, mobilizations costs, set-up, demobilization costs, relocation costs of employees, layoffs or severance costs, administrative costs, productivity costs, losses on disposal of equipment or materials, cost associated with the termination of subcontractors, costs associated with purchase orders or purchases, or any other costs or fees of any kind and nature, if Contractor has started or performed portions of the Contract prior to receiving notice from the City. The City shall be liable only for the portions of work Contractor actually satisfactorily completed up to the point of the issuance of the Notice of Termination for convenience. Upon receipt of this notice the Contractor shall immediately: discontinue all services affected (unless the notice directs otherwise), and deliver to the City all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this Contract, whether completed or in process.

B. Termination for Cause: The occurrence of any one or more of the following events ("Event of Default") will justify termination for cause:

1. Contractor's failure to perform the work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule as adjusted from time to time.
2. Contractor's disregard of the laws or regulations of any public body having jurisdiction.
3. Contractor's disregard of the authority of Project Manager.
4. Contractor's violation in any material provision of the Contract Documents.
5. Contractor's failure to make prompt payments to its subcontractors, and suppliers of any tier, or laborers or any person working on the work by, through, or under the Contractor or any of them, any all of their employees, officers, servants, members, and agents.
6. Contractor files a petition commencing a voluntary case under the U.S. Bankruptcy Code, or for liquidation, reorganization, or an arrangement pursuant to any other U.S. or state bankruptcy Laws, or shall be adjudicated a debtor or be declared bankrupt or insolvent under the U.S. Bankruptcy Code, or any other federal or state laws relating to bankruptcy, insolvency, winding-up, or adjustment of debts, or makes a general assignment for the benefit of creditors, or admits in writing its inability to pay its debts generally as they become due, or if a petition commencing an involuntary case under the U.S. Bankruptcy Code or an answer proposing the adjudication of Contractor as a debtor or bankrupt or proposing its liquidation or reorganization pursuant to the Bankruptcy Code or any other U.S. federal or state bankruptcy laws is filed in any court and Contractor consents to or acquiesces in the filing of that pleading or the petition or answer is not discharged or denied within sixty (60) Calendar Days after it is filed.
7. A custodian, receiver, trustee or liquidator of Contractor, all or substantially all of the assets or business of Contractor, or of Contractor's interest in the Work or the Contract, is



appointed in any proceeding brought against Contractor and not discharged within sixty (60) Calendar Days after that appointment, or if Contractor shall consent to or acquiesces in that appointment.

8. Contractor fails to commence correction of defective work or fails to correct defective work within a reasonable period of time after written notice.

If one or more of the events identified in Paragraphs 1-8 above occur, City may give Contractor written notice of the event and direct the event be cured. Any such Notice to Cure will provide Contractor a minimum of ten (10) calendar days to prepare and submit to the Project Manager a plan to correct the Event of Default. If such plan to correct the Event of Default is not submitted to the Project Manager within ten (10) days after the date of the written notice or such plan is unacceptable to the City, the City may, give Contractor (and the Surety, if any) written notice that Contractor's services are being terminated for cause. Upon delivery of the termination notice, City may terminate the services of Contractor in whole or in part, exclude Contractor from the site, and take possession of the work and of all Contractor's tools, appliances, construction equipment, and machinery at the project site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the work all materials and equipment stored at the site or for which City has paid Contractor but which are stored elsewhere, and finish the work as City may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until Certificate of Completion of the work. In the event City terminates this Contract for Cause and the cost of completing the work exceeds the unpaid balance of the Contract price, Contractor shall pay City for any costs of completion which exceed the Contract price when combined with all amounts previously paid to Contractor. When exercising any rights or remedies under this paragraph City shall not be required to obtain the lowest price for the work performed. Should the cost of such completion, including all proper charges, be less than the original Contract price, the amount so saved shall accrue to the City. Neither the City nor any officer, agent or employee of the City shall be in any way liable or accountable to the Contractor or the Surety for the method by which the completion of the said work, or any portion thereof, may be accomplished or for the price paid.

Where Contractor's services have been so terminated by City, the termination will not affect any rights or remedies of City against Contractor or Surety then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by City will not release Contractor from liability.

- C. Termination Notice. Upon receipt of a termination notice, whether for convenience or cause, the Contractor shall immediately: discontinue all services affected (unless the notice directs otherwise), and deliver to the City all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this Contract, whether completed or in process.
- D. Removal of Equipment. Except as provided above, in the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the City, shall promptly remove any part or all of Contractor's equipment and supplies from the property of the City, failing which the City shall have the right to remove such equipment and supplies at the expense of the Contractor.

24. BOOKS OF ACCOUNT AND AUDITING



The Contractor shall make available to the City if requested, true and complete records, which support billing statements, reports, performance indices, and all other related documentation. The City's authorized representatives shall have access during reasonable hours to all records, which are deemed appropriate to auditing billing statements, reports, performance indices, and all other related documentation. The Contractor agrees that it will keep and preserve for at least seven years all documents related to the Contract which are routinely prepared, collected or compiled by the Contractor during the performance of this Contract.

The City's Auditor and the Auditor's authorized representatives shall have the right at any time to audit all of the related documentation. The Contractor shall make all documentation available for examination at the Auditor's request at either the Auditor's or Contractor's offices, and without expense to the City.

25. COMPLIANCE WITH IMMIGRATION REFORM AND CONTROL ACT OF 1986

Contractor certifies that Contractor has complied with the United States Immigration Reform and Control Act of 1986. All persons employed by Contractor for performance of this Contract have completed and signed Form I-9 verifying their identities and authorization for employment.

26. LABOR

The Contractor shall employ only competent and skilled workmen and foremen in the conduct of work on this Contract. The Contractor shall at all times enforce strict discipline and good order among Contractor's employees. The Project Manager shall have the authority to order the removal from the work of any person, including Contractor's or any subcontractor's employees, who refuses or neglects to observe any of the provisions of these Plans or Specifications, or who is incompetent, abusive, threatening, or disorderly in conduct and any such person shall not again be employed on the Project.

In accord with the Keep Jobs in Colorado Act, codified at sections 8-17-101, et seq., C.R.S., Colorado labor shall be employed to perform the work to the extent of not less than eighty percent (80%) of each type or class of labor in the several classifications of skilled and common labor employed on this Project et seq.; provided however, that this paragraph shall not apply if the Project receives federal funding.

In no event shall the City be responsible for overtime pay.

27. GRATUITIES

- A. This Contract may be terminated if the Mayor, the Mayor's designee, and/or the Procurement Services Manager determine, in their sole discretion, that the Contractor or any officer, employee, agent, or other representative whatsoever, of the Contractor offered or gave a gift or hospitality to a City officer, employee, agent or Contractor for the purpose of influencing any decision to grant a City contract or to obtain favorable treatment under any City contract.
- B. The terms "hospitality" and "gift" include, but are not limited to, any payment, subscription, advance, forbearance, acceptance, rendering or deposit of money, services, or anything of



value given or offered, including but not limited to food, lodging, transportation, recreation or entertainment, token or award.

- C. Contract termination under this provision shall constitute a breach of contract by the Contractor, and the Contractor shall be liable to the City for all costs of reletting the contract or completion of the project. Further, if the Contractor is terminated under this provision, or violates this provision but is not terminated, the Contractor shall be subject to debarment under the City's Procurement Regulations. The rights and remedies of the City provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

28. NON-DISCRIMINATION

- A. In accord with section 24-34-402, C.R.S., Title VII of the Civil Rights Act of 1964, Americans with Disabilities Act of 1990 as amended, all applicable federal and state laws, the Contractor will not discriminate against any employee or applicant for employment because of disability, race, creed, color, sex, sexual orientation, gender identity, gender expression, religion, age, national origin, or ancestry.
- B. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- C. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to disability, race, creed, color, sex, sexual orientation, gender identity, gender expression, religion, age, national origin, or ancestry.

29. ORDER OF PRECEDENCE

Any inconsistency in this Contract shall be resolved by giving precedence in the following order:

- A. This Contract document with its terms and conditions
- B. Specific Construction Terms and Conditions
- C. General Construction Terms and Conditions
- D. The Statement of Work
- E. Specific Specifications
- F. General Specifications
- G. Other Appendices, Attachments, Exhibits, or Schedules

30. HEADINGS

The section headings contained in this Contract are for reference purposes only and shall not affect the meaning or interpretation of this Contract.

31. DISPUTES

- A. All administrative and contractual disputes arising from or related to this Contract other than those arising under Unanticipated Circumstances provisions (in section 107.27 of Schedule B



General Construction Terms and Conditions) shall be addressed in the following manner:

1. If either Party disputes or disagrees with a Contract term or the other Party's interpretation of a Contract term or has any other administrative or contractual dispute not addressed in the Unanticipated Circumstances provisions, such Party shall promptly give the other Party written notice of said dispute.
2. The Parties shall hold a meeting as soon as reasonably possible, but in no event later than thirty (30) calendar days from the initial written notice of the dispute, attended by persons with decision-making authority regarding the dispute, to attempt in good faith to negotiate a resolution of the dispute; provided, however, that no such meeting shall be deemed to vitiate or reduce the obligations and liabilities of the Parties or be deemed a waiver by a Party of any remedies to which such Party would otherwise be entitled unless otherwise agreed to by the Parties in writing.
3. If, within thirty (30) calendar days after such meeting, the Parties have not succeeded in negotiating a resolution of the dispute, they agree to submit the dispute to non-binding mediation and to bear equally the costs of the mediation.
4. The Parties will jointly appoint a mutually acceptable mediator. If they fail to do so within twenty (20) calendar days from the conclusion of the negotiation period, they shall each select a mediator. The two mediators will then appoint a third mediator who shall conduct mediation for the Parties as the sole mediator.
5. The Parties agree to participate in good faith in the mediation and negotiations for a period of thirty (30) calendar days. The substantive and procedural law of the State of Colorado shall apply to the proceedings. If the Parties are not successful in resolving the dispute through mediation, then the Parties shall be free to pursue any other remedy afforded by the laws of the State of Colorado.
6. Until final resolution of any dispute hereunder, the Contractor shall diligently proceed with the performance of this Contract as directed by the City. For purposes of this Contract, termination for convenience shall not be deemed a dispute. The City of Colorado Springs and the Contractor agree to notify each other in a timely manner of any claim, dispute, or cause of action arising from or related to this Contract, and to negotiate in good faith to resolve any such claim, dispute, or cause of action. To the extent that such negotiations fail, the City of Colorado Springs and the Contractor agree that any lawsuit or cause of action that arises from or is related to this Contract shall be filed with and litigated only by the Colorado District Court for El Paso County, CO.

32. DELIVERY

The City may cancel this Contract or any portion thereof if delivery is not made when and as specified, time being of the essence in this Contract. Contractor shall pay the City for any loss or damage sustained by the City because of failure to perform in accordance with this Contract.

33. PAYMENTS

All invoices shall be sent to the Project Manager identified in this Contract.

The City will pay the Contractor, upon submission of proper invoices, the prices stipulated in the Contract for services rendered and accepted, less any deductions provided in this Contract within 30 days (Net 30). The City will not pay late fees or interest. Any discount payment terms offered on the invoice may be taken by the City.



All payments for Construction will be made in accordance with the Payment provisions found in Schedule B – General Construction Terms and Conditions.

Each invoice must contain at least the following information:

Contract number, issued purchase order number, invoice number, invoice date, timeframe covered by invoice, type and amount of labor and materials used for that time period, dollar amount in unit price, extended price, and total value of invoice.

34. INSPECTION OF SERVICES

The Contractor is responsible for performing or having performed all inspections and tests necessary to substantiate that the services furnished under this Contract conform to Contract requirements, including any applicable technical requirements for specified manufacturers' parts. This clause takes precedence over any City inspection and testing required in the Contract's specifications, except for specialized inspections or tests specified to be performed solely by the City.

- A. Definition of "services", as used in this clause, includes services performed, workmanship, and material furnished or utilized in the performance of services.
- B. The Contractor shall provide and maintain an inspection system acceptable to the City covering the services under this Contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to the City during Contract performance and for as long afterwards as the Contract requires.
- C. The City has the right to inspect and test all services called for by the Contract, to the extent practicable at all times and places during the term of the Contract. The City will perform inspections and tests in a manner that will not unduly delay the work.
- D. If the City performs inspections or test on the premises of the Contractor or a subcontractor, the Contractor shall furnish, and shall require subcontractors to furnish, at no increase in Contract price, all reasonable facilities and assistance for the safe and convenient performance of these duties.

35. SECURITY

The City maintains security requirements regarding access to City buildings and other City workplaces and worksites on City property. All Contractor personnel accessing City buildings, workplaces, or worksites, may be required to produce a valid, Government issued picture identification. Contractor personnel lacking such identification may not be allowed access to such sites. No costs incurred by the Contractor due to City security requirements shall be allowable or payable under this Contract.

36. TIME IS OF THE ESSENCE

In as much as the Contract concerns a needed or required service, the terms, conditions, and provisions of the Contract relating to the time of performance and completion of work are of the essence of this Contract. The Contractor shall begin work on the day specified and shall prosecute



the work diligently so as to assure completion of the work within the number of calendar days or date specified, or the date to which the time for completion may have been extended.

37. EMPLOYMENT OF LABOR

The Contractor shall comply with, and defend and hold the City harmless from any violation of all laws and lawful rules and regulations, both of the State of Colorado and of the United States, relating to Workmen's Compensation, unemployment compensation, Social Security, payment for overtime, and all other expenses and conditions of employment under this Contract.

38. SALES TAX

The Contractor must have a tax-exemption certificate from the Colorado Department of Revenue for this project. The certificate does not apply to City of Colorado Springs Sales and Use Tax which shall be applicable. The tax exempt project number and the exemption certificate only applies to County, PPRTA (Pikes Peak Rural Transportation Authority), and State taxes when purchasing construction and building materials **to be incorporated into this project**.

Furthermore, the exemption **does not** include or apply to the purchase or rental of equipment, supplies or materials that **do not become a part of the completed project or structure**. Such purchases and rentals are subject to full applicable taxation.

All contracts with subcontractors must include the City of Colorado Springs Sales and Use Tax on the work covered by the Contract, and other taxes as applicable.

Note: For all equipment, materials and supplies incorporated into the work purchased from vendors or suppliers not licensed to collect City Sales Tax (i.e. out of state suppliers, etc.), City Use Tax is due and payable to the City. The Contractor shall execute and deliver and shall cause the Contractor's subcontractors to execute and deliver to the City Sales Tax Office, the appropriate ST forms as designated by the City Sales Tax Office. These forms shall list all said equipment, materials and supplies and the corresponding use tax due, along with payment for said taxes. Any outstanding taxes due may be withheld from the final payment due the Contractor and may result in suspension of Contractor from bidding on City projects.

Forms and instructions can be downloaded at <https://coloradosprings.gov/sales-tax>. Questions can be directed to the City Sales Tax Division at (719) 385-5903.

Our Registration Numbers are as follows:
City of Colorado Springs
Federal I.D.: 84-6000573
Federal Excise: A-138557
State Sales Tax: 98-03479

The Contractor's payment or exemption of State of Colorado, El Paso County and City Sales and Use Taxes shall be as specified herein.

39. SEVERABILITY



If any terms, conditions, or provisions of this Contract shall be held unconstitutional, illegal, or void, such finding shall not affect any other terms, conditions, or provisions of this Contract.

40. LIABILITY OF CITY EMPLOYEES

All authorized representatives of the City are acting solely as agents and representatives of the City when carrying out and exercising the power or authority granted to them under the Contract. There shall not be any liability on them either personally or as employees of the City.

41. USE OF CITY NAME OR LOGO

Except as otherwise provided in this Contract, the Contractor shall not refer to this Contract or the City of Colorado Springs in any advertising or promotions in such a manner as to state or imply that the product or service provided is endorsed or preferred by the City of Colorado Springs, its employees, or its Departments, or is considered by these entities to be superior to other products or services. Any use of the name or logo of the City of Colorado Springs in advertising or promotions must be approved in writing by the City of Colorado Springs Contracts Specialist assigned to the Contract prior to such use.

42. TRAVEL

If travel expenses are included as a line item in this Contract, all travel expenses incurred and billable by the Contractor are subject to City approval. Air travel shall be limited to the round trip "economy coach" fare. Travel from the Colorado Springs Airport is encouraged. Unless there are extenuating circumstances, the Contractor should take advantage of lower airfares by purchasing tickets more than 14 days in advance of travel. In-state travel by air must be more economical than travel by private vehicle. Use of a private vehicle may be reimbursed per mile at the current rate published by the IRS annually. Short-term parking, long-term parking or cab fare associated with airport departure and arrival may be allowable expenses. Valet parking will not be allowed unless it is the least expensive or only option. Car rental rates may be reimbursed for car rentals no greater than the intermediate or standard classification. The City will not reimburse any other travel methods or expenses. The City will pay for lodging, meals, and miscellaneous expenses on a per diem basis only, in accordance with the current per diem rates published by the IRS annually. The City will not pay for Contractor expenses exceeding the per diem rates. Receipts for all reimbursable expenses must be provided with the Contractor's invoice.

43. ELECTRONIC SIGNATURE

This Agreement and all other documents contemplated hereunder may be executed using electronic signature with delivery via facsimile transmission, by scanning and transmission of electronic files in Portable Document Format (PDF) or other readily available file format, or by copy transmitted via email, or by other electronic means and in one or more counterparts, each of which shall be (i) an original, and all of which taken together shall constitute one and the same agreement, (ii) a valid and binding agreement and fully admissible under state and federal rules of evidence, and (iii) enforceable in accordance with its terms

44. APPENDICES

The following Appendices are made a part of this Agreement:



1. Schedule A – Price Sheet
2. Schedule B – General Construction Terms and Conditions
3. Schedule C – Special Contract Terms and Conditions
4. Schedule D – General Specifications
5. Schedule E – Special and Technical Specifications
6. Schedule F – Scope of Work
7. Exhibit 1 – Performance, Labor and Material Payment, and Maintenance Bonds
8. Exhibit 2 – Minimum Insurance Requirements



CONTRACT SIGNATURE PAGE

IN WITNESS WHEREOF, the parties have caused these presents to be executed on the day and the year first above written.

This Contract is executed in one (1) original copy.

THE CITY OF COLORADO SPRINGS, COLORADO:

SECOND PARTY:	
Corporate Name	
Signature	Date
Title	



EXHIBIT 3 SUBSURFACE STUDY

FOLLOWS THIS PAGE

October 23, 2024

City of Colorado Springs
Parks, Recreation & Cultural Services Department
Attn: Mr. David Deitemeyer
1401 Recreation Way, MC 1200
Colorado Springs, CO 80905

david.deitemeyer@coloradosprings.gov

Subject: Results of Subsurface Study, Black Canyon Quarry Reclamation Project,
Colorado Springs, Colorado.

Project No. 24-2-180

Dear Mr. Deitemeyer:

This report presents the results of a subsurface study for the subject project. The study was conducted in general accordance with the scope of work in our proposal C24-160, dated March 15, 2024, to provide information on the subsurface conditions at the requested locations.

We understand the quarry reclamation will consist of grading the site to remove some of the steeper site topographic features. The purpose of our study was to determine the overburden soil thickness and depth to bedrock, if encountered within the requested exploration depths.

Site Conditions: The project site is accessed via Black Canyon Road, located south of the site. The quarry is generally surrounded by undeveloped forest, with the Cedar Heights residential neighborhood located nearby to the east. The former limestone quarry is tiered into multiple elevations, with the south being the lower side of the site and the north being the highpoint. A structure is situated on the south end of the quarry, and an access road traverses the east side of the site heading up in elevation to the north. A large pit occupies the center portion of the site with near vertical cliff faces benched in to form the walls of the pit. A smaller pit is located near the north side of the site with several tiers separating the pits. There is up to approximately 250 feet of elevation separation between the north and south sides of the site, which is vegetated with native weeds sporadically throughout the quarry. A patch of small to medium evergreen trees is located north center of the site, with small to large sized evergreen trees surrounding the quarry extents.

Field Exploration: The field exploration of subsurface conditions consisted of drilling six borings at the approximate locations shown on the attached Fig. 1. The field exploration was completed on September 30th and October 1st, 2024, using a conventional 2WD truck mounted drill rig. The borings were drilled with 7-inch diameter continuous flight hollow stem auger, and were logged by a representative of Kumar & Associates, Inc. Samples of the soils were taken with a 2-inch I.D. California sampler. The sampler was driven into the various strata with blows from a 140-pound

hammer falling 30 inches. Penetration resistance values, when properly evaluated, provide an indication of the relative density or consistency of the soils. Depths at which the samples were taken and the penetration resistance values are shown on the boring logs. The boring log and the corresponding legend and notes are presented on Figs. 2 and 3, respectively.

Laboratory Testing: Samples obtained from the exploratory boring were visually classified in the laboratory by the project engineer and samples were selected for laboratory testing. Laboratory testing included index property tests such as in-situ moisture content and dry unit weight, grain size analysis, and Atterberg limits. The testing was conducted in general accordance with recognized test procedures, primarily those of the American Society for Testing of Materials (ASTM). Results of the laboratory testing program are shown on Figs. 2 thru 7, and are summarized in Table I.

Subsurface Conditions: A layer of topsoil was encountered at the surface in Boring T-5, and the remaining boring locations were devoid of vegetation. Existing fill was encountered in each of the borings, and extended to the depths summarized in the table below.

Boring	Fill Depth (ft)	Total Depth Explored (ft)
T-1	18	20
T-2.1	12.5	13
T-2.2	5	5.5
T-3	18	46.5
T-4	21	21
T-5	20	20

The fill consisted of clayey gravel with sand (GC), and clayey sand with varied amounts of gravel (SC), included occasional cobbles and boulders, appeared dry to moist, and varied from red, pink, tan, and gray in color. The lateral or vertical extent of the fill beyond the boring locations is unknown.

Native soils consisting of clayey sand with gravel (SC) with occasional lenses of sandy lean clay (CL) were encountered below the fill in Boring T-3, beginning at a depth of approximately 18 feet, and extending to 46 feet. The soils appeared slightly moist to moist, and varied from pink, red, and reddish-brown in color. Sampler penetration blow counts indicate the native soils are medium dense to very dense.

Limestone bedrock was encountered below the fill or native overburden in Borings T-1, T-2.1, T-2.2, and T-3, beginning at depths between approximately 18', 12.5', 5', and 46', respectively, and extending to the maximum 13 to 46.5-foot depths explored. Practical auger drilling refusal was encountered within the bedrock in Borings T-2.1, T-2.2, and T-3. The bedrock appeared dry, and varied from pink to gray in color. Sampler penetration blow counts indicate the bedrock is very hard.

Groundwater was not encountered in the borings at the time of drilling, or when checked 16 to 17 days later. The borings were backfilled with auger cuttings upon completion of the water level follow-up.

Limitations: This study has been conducted for exclusive use by the client for geotechnical related design and construction criteria for the project. The conclusions and recommendations submitted in this report are based upon the data obtained from the exploratory borings at the locations indicated on Fig. 1 or as described in the report, and the proposed type of construction. This report may not reflect subsurface variations that occur, and the nature and extent of variations across the site may not become evident until site grading and excavations are performed. If during construction, fill, soil, bedrock, or water conditions appear to be different from those described herein, Kumar & Associates, Inc. should be advised at once so that a re-evaluation of the recommendations presented in this report can be made. Kumar & Associates, Inc. is not responsible for liability associated with interpretation of subsurface data by others.

If you have any questions or require any additional information, please do not hesitate to contact us.

KUMAR & ASSOCIATES, INC.

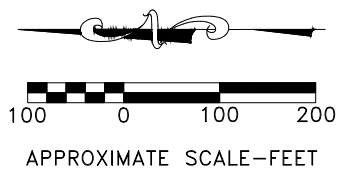
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Duane P. Craft, P.E.

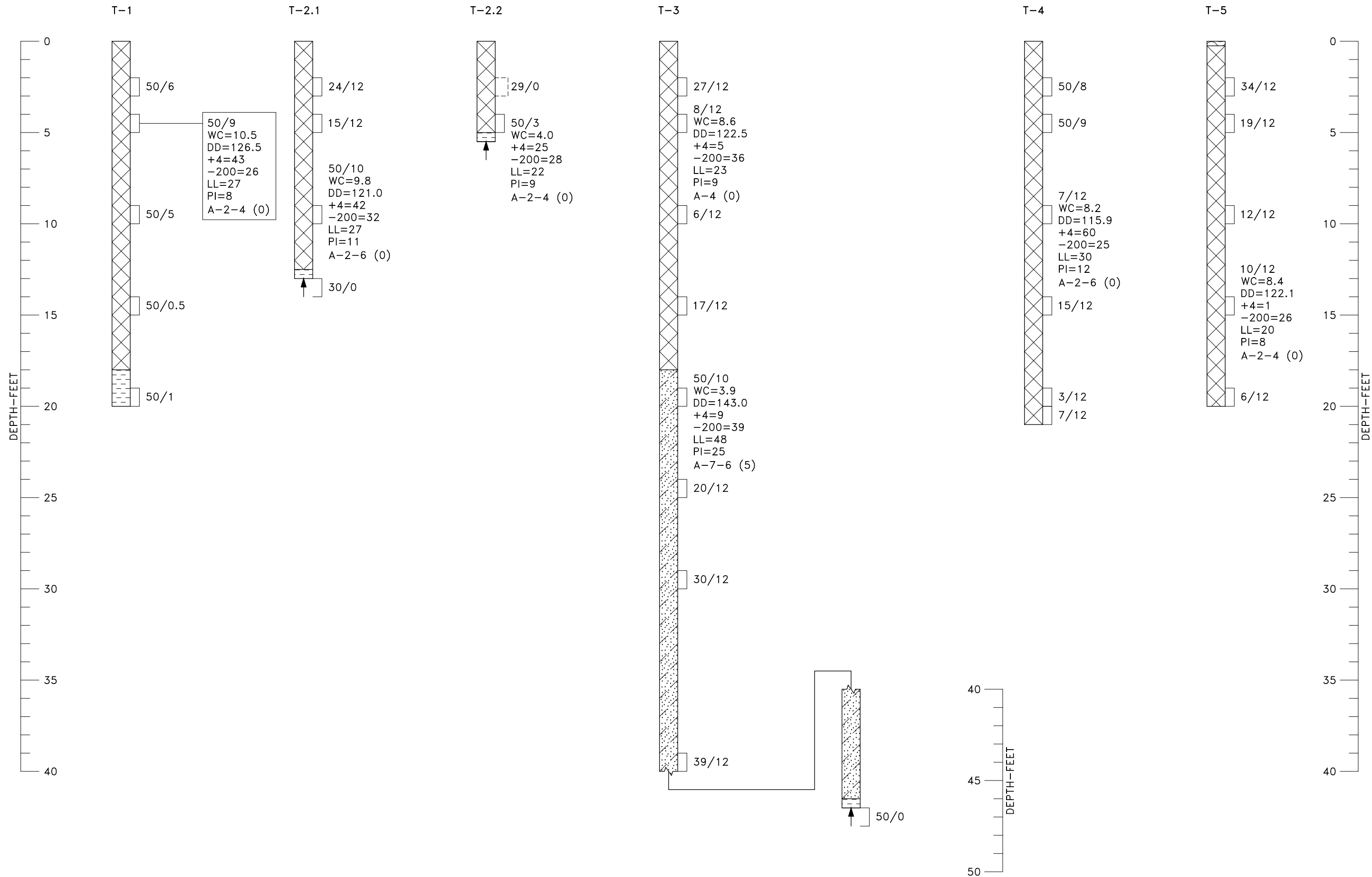
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Attachments



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LEGEND



TOPSOIL.



FILL: CLAYEY GRAVEL WITH SAND (GC), AND CLAYEY SAND WITH VARIED AMOUNTS OF GRAVEL (SC), WITH OCCASIONAL COBBLES AND BOULDERS, DRY TO MOIST, RED, PINK, TAN, AND GRAY.



CLAYEY SAND WITH GRAVEL (SC), WITH OCCASIONAL LENSES OF SANDY LEAN CLAY (CL), MEDIUM DENSE TO VERY DENSE, SLIGHTLY MOIST TO MOIST, PINK, RED, AND REDDISH-BROWN.



LIMESTONE BEDROCK, VERY HARD, DRY, PINK TO GRAY.



DRIVE SAMPLE, 2-INCH I.D. CALIFORNIA LINER SAMPLE.

50/6

DRIVE SAMPLE BLOW COUNT. INDICATES THAT 50 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE THE SAMPLER 6 INCHES.

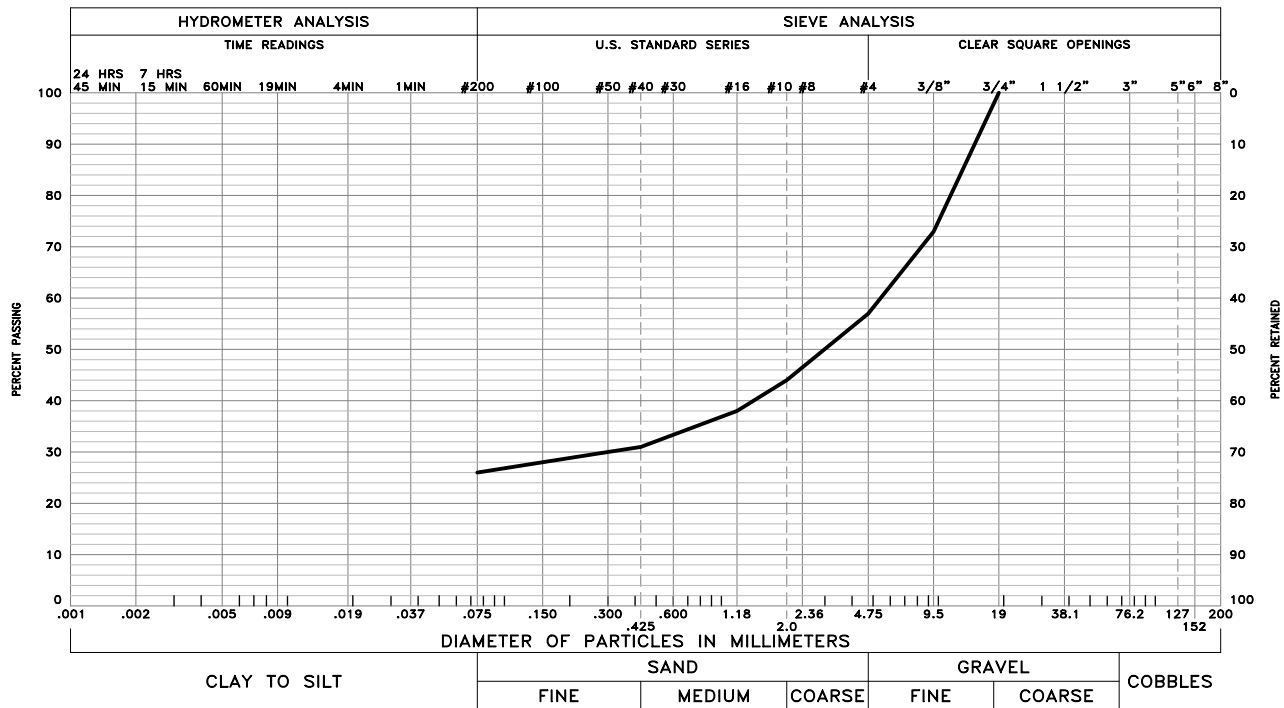


PRACTICAL AUGER REFUSAL.

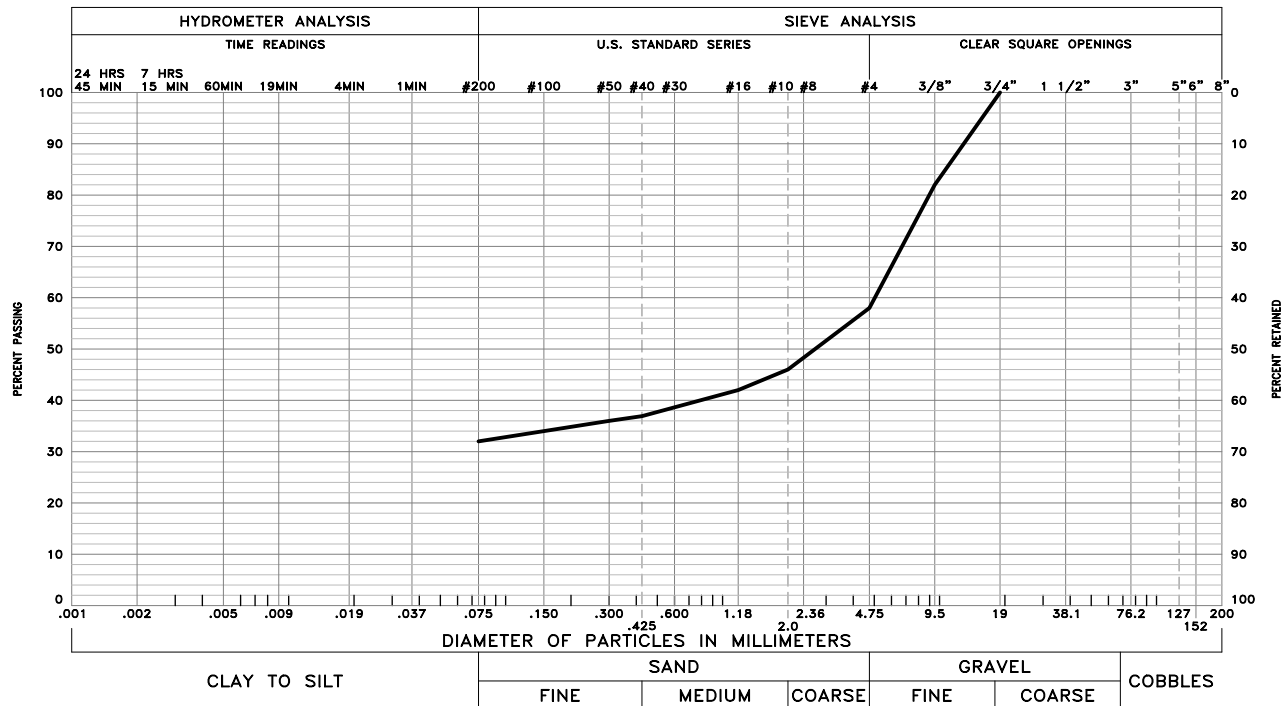
NOTES

1. THE EXPLORATORY BORINGS WERE DRILLED ON SEPTEMBER 30th AND OCTOBER 1st, 2024 WITH A 7-INCH-DIAMETER CONTINUOUS-FLIGHT HOLLOW STEM POWER AUGER.
2. THE LOCATIONS OF THE EXPLORATORY BORINGS WERE MEASURED APPROXIMATELY BY HANDHELD GPS DEVICE AND SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
3. THE ELEVATIONS OF THE EXPLORATORY BORINGS WERE NOT MEASURED AND THE LOGS OF THE EXPLORATORY BORINGS ARE PLOTTED TO DEPTH.
4. THE LINES BETWEEN MATERIALS SHOWN ON THE EXPLORATORY BORING LOGS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES AND THE TRANSITIONS MAY BE GRADUAL.
5. GROUNDWATER WAS NOT ENCOUNTERED IN THE BORINGS AT THE TIME OF DRILLING OR WHEN CHECKED 16 TO 17 DAYS LATER. FLUCTUATIONS IN THE WATER LEVEL MAY OCCUR WITH TIME.
6. LABORATORY TEST RESULTS:
 WC = WATER CONTENT (%) (ASTM D2216);
 DD = DRY DENSITY (pcf) (ASTM D2216);
 +4 = PERCENTAGE RETAINED ON NO. 4 SIEVE (ASTM D6913);
 -200 = PERCENTAGE PASSING NO. 200 SIEVE (ASTM D1140);
 LL = LIQUID LIMIT (ASTM D4318);
 PI = PLASTICITY INDEX (ASTM D4318);
 A-2-4 (0) = AASHTO CLASSIFICATION (GROUP INDEX) (AASHTO M 145).

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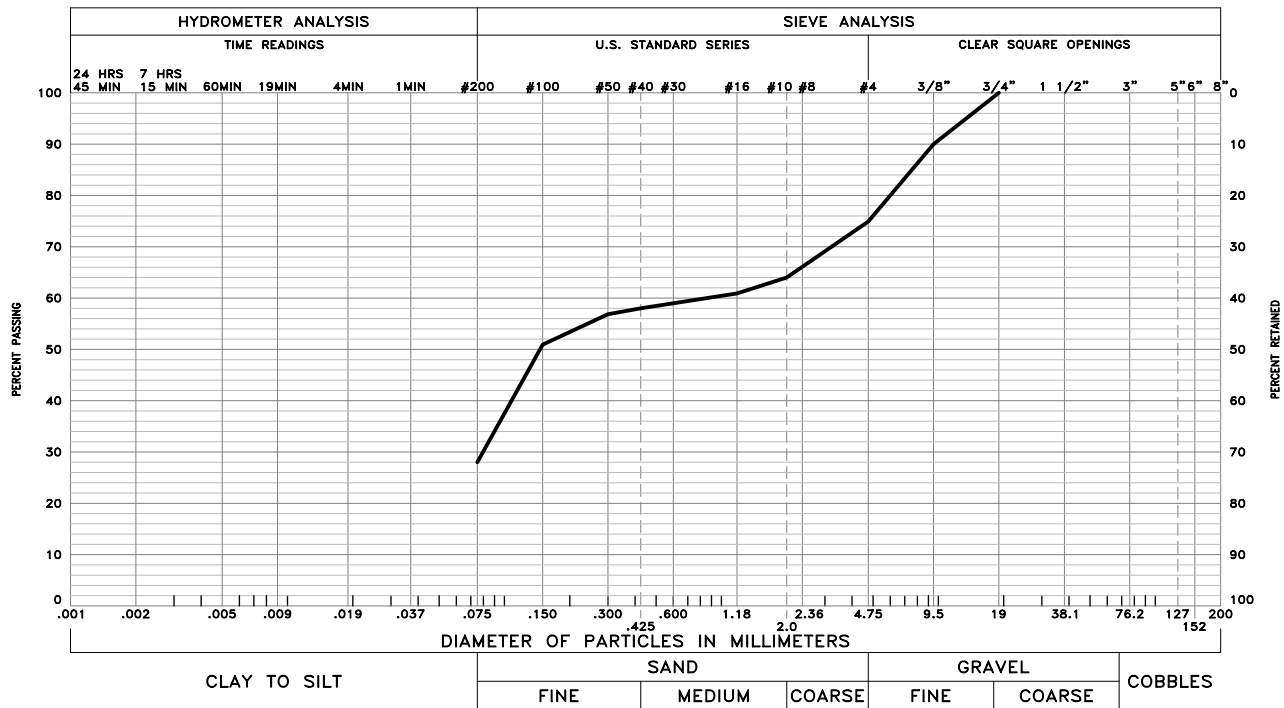


GRAVEL 43 % SAND 31 % SILT AND CLAY 26 %
 LIQUID LIMIT 27 PLASTICITY INDEX 8
 SAMPLE OF: Fill: Clayey Gravel with Sand (GC) FROM: T-1 @ 4'

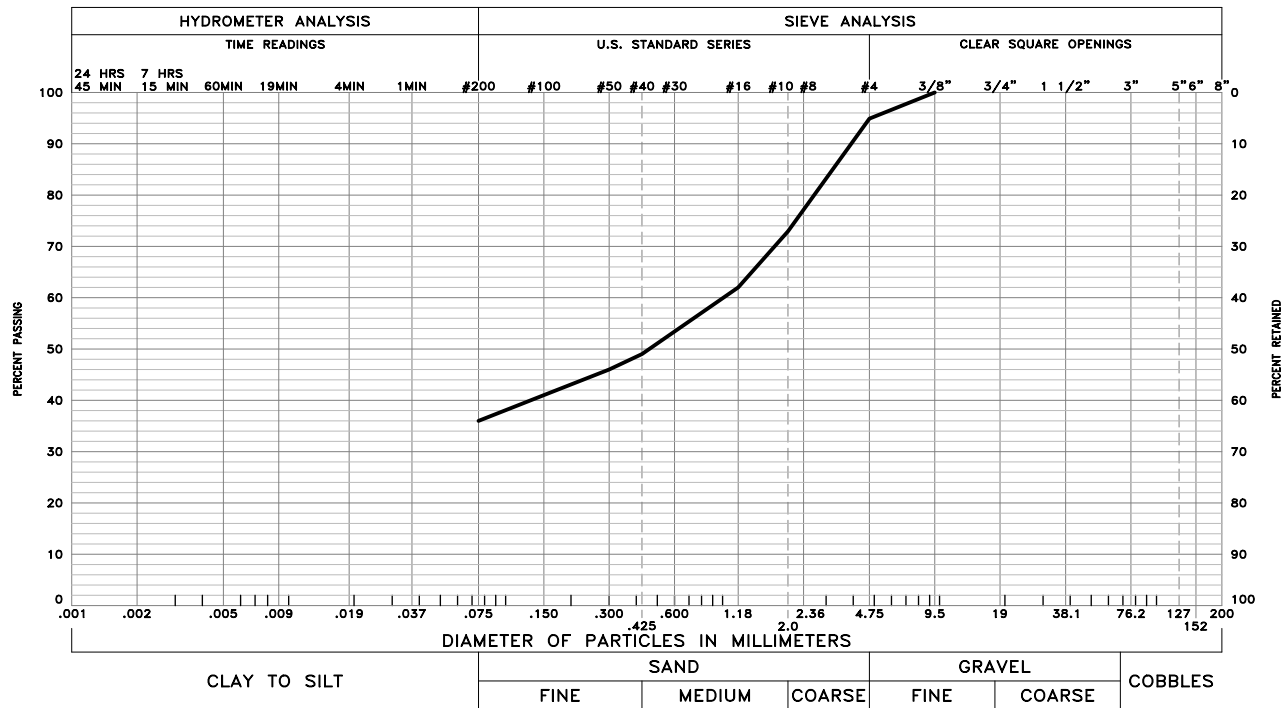


GRAVEL 42 % SAND 26 % SILT AND CLAY 32 %
 LIQUID LIMIT 27 PLASTICITY INDEX 11
 SAMPLE OF: Fill: Clayey Gravel with Sand (GC) FROM: T-2.1 @ 9'

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. Sieve analysis testing is performed in accordance with ASTM D6913, ASTM D7928, ASTM C136 and/or ASTM D1140.

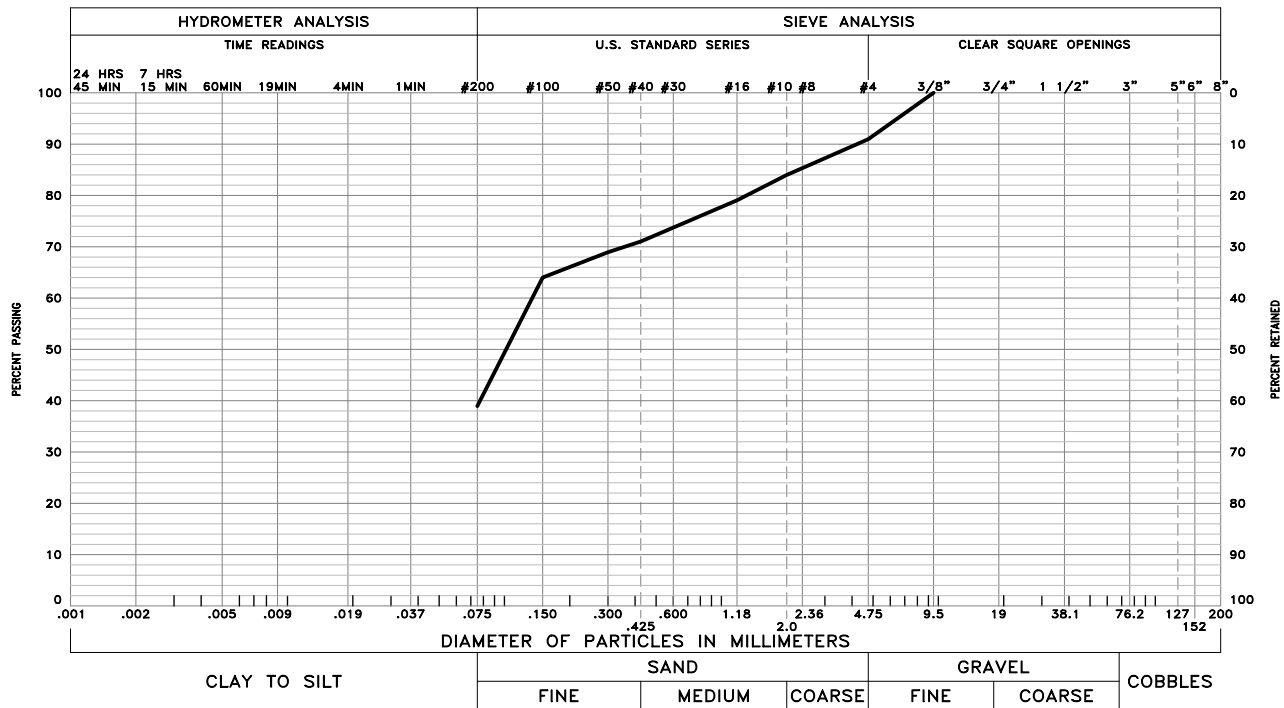


GRAVEL 25 % SAND 47 % SILT AND CLAY 28 %
 LIQUID LIMIT 22 PLASTICITY INDEX 9
 SAMPLE OF: Fill: Clayey Sand with Gravel (SC) FROM: T-2.2 @ 4'

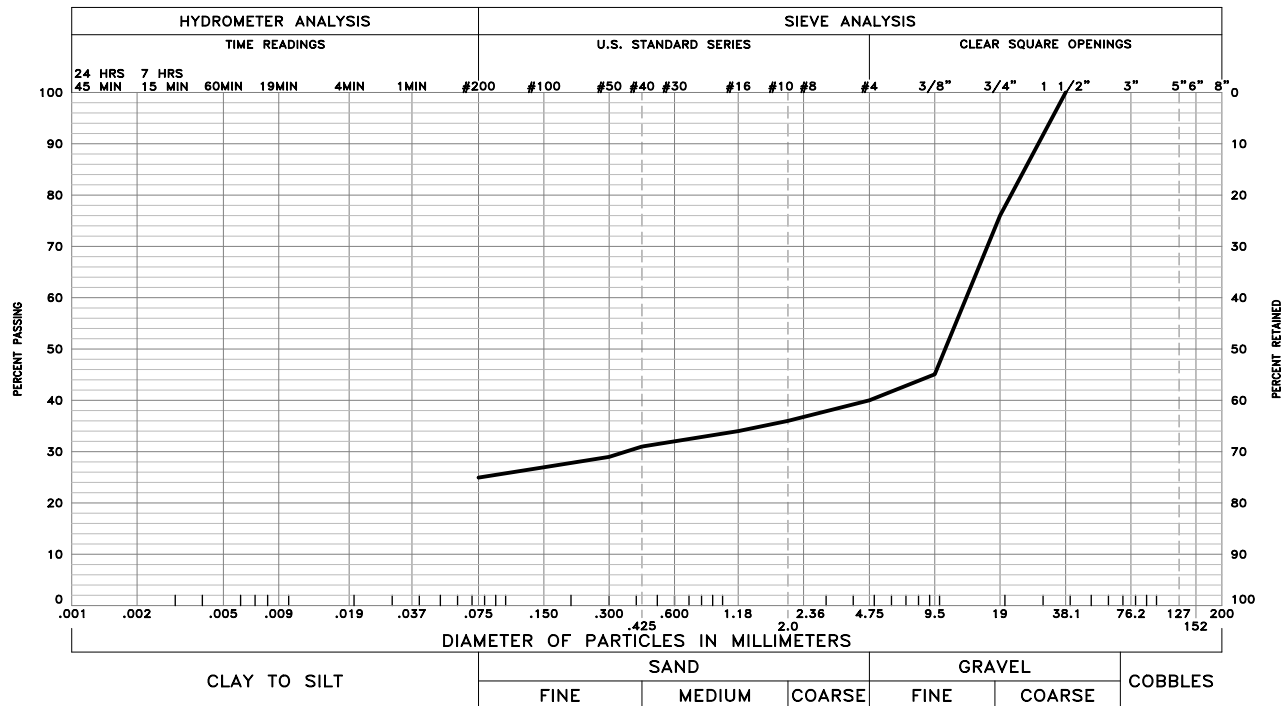


GRAVEL 5 % SAND 59 % SILT AND CLAY 36 %
 LIQUID LIMIT 23 PLASTICITY INDEX 9
 SAMPLE OF: Fill: Clayey Sand (SC) FROM: T-3 @ 4'

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. Sieve analysis testing is performed in accordance with ASTM D6913, ASTM D7928, ASTM C136 and/or ASTM D1140.

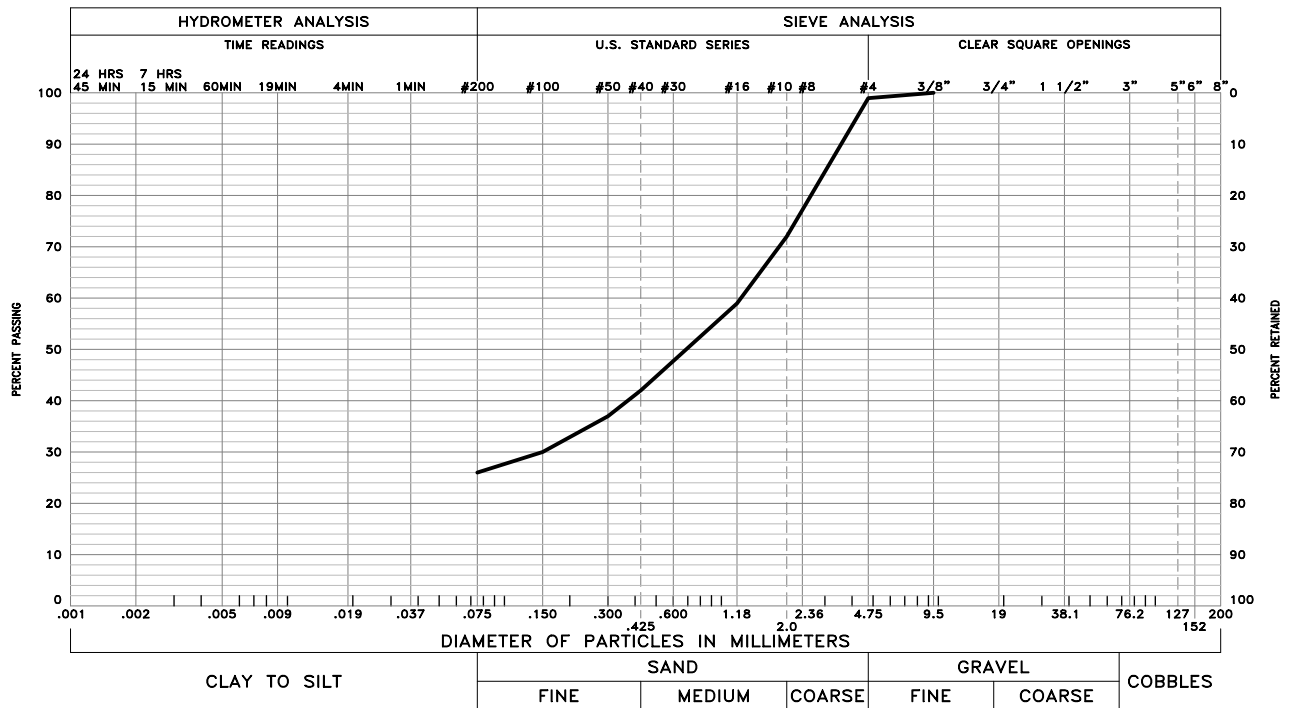


GRAVEL 9 % SAND 52 % SILT AND CLAY 39 %
 LIQUID LIMIT 48 PLASTICITY INDEX 25
 SAMPLE OF: Clayey Sand (SC) FROM: T-3 @ 19'



GRAVEL 60 % SAND 15 % SILT AND CLAY 25 %
 LIQUID LIMIT 30 PLASTICITY INDEX 12
 SAMPLE OF: Fill: Clayey Gravel with Sand (GC) FROM: T-4 @ 9'

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. Sieve analysis testing is performed in accordance with ASTM D6913, ASTM D7928, ASTM C136 and/or ASTM D1140.



GRAVEL 1 % SAND 73 % SILT AND CLAY 26 %
 LIQUID LIMIT 20 PLASTICITY INDEX 8
 SAMPLE OF: Fill: Clayey Sand (SC) FROM: T-5 @ 14'

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. Sieve analysis testing is performed in accordance with ASTM D6913, ASTM D7928, ASTM C136 and/or ASTM D1140.

Kumar and Associates, Inc.

TABLE I SUMMARY OF LABORATORY TEST RESULTS

Project No.: 24-2-180

Page 1 of 1

Project Name: Black Canyon Quarry

Date Sampled: 9/30/2024 and 10/1/2024

Date Received: 10/2/2024

SAMPLE LOCATION		DATE TESTED	NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	GRADATION		PERCENT PASSING NO. 200 SIEVE	ATTERBERG LIMITS		AASHTO CLASSIFICATION (Group Index)	SOIL OR BEDROCK TYPE (Unified Soil Classification)
BORING	DEPTH (ft)				GRAVEL (%)	SAND (%)		LIQUID LIMIT	PLASTICITY INDEX		
T-1	4'	10/17/24	10.5	126.5	43	31	26	27	8	A-2-4 (0)	Fill: Clayey Gravel w/Sand (GC)
T-2.1	9'	10/17/24	9.8	121.0	42	26	32	27	11	A-2-6 (0)	Fill: Clayey Gravel w/Sand (GC)
T-2.2	4'	10/17/24	4.0		25	47	28	22	9	A-2-4 (0)	Fill: Clayey Sand w/Gravel (SC)
T-3	4'	10/17/24	8.6	122.5	5	59	36	23	9	A-4 (0)	Fill: Clayey Sand (SC)
	19'	10/17/24	3.9	143.0	9	52	39	48	25	A-7-6 (5)	Clayey Sand (SC)
T-4	9'	10/17/24	8.2	115.9	60	15	25	30	12	A-2-6 (0)	Fill: Clayey Gravel w/Sand (GC)
T-5	14'	10/17/24	8.4	122.1	1	73	26	20	8	A-2-4 (0)	Fill: Clayey Sand (SC)



EXHIBIT 4 1994 APPROVED RECLAMATION PLAN

FOLLOWS THIS PAGE

Exhibit E

Reclamation Plan

Introduction: The complete reclamation plan for the Snyder Quarry is composed of two separate plans that overlap and intermingle in various ways. As will be explained in more detail later, the complete reclamation plan includes a Base Reclamation Plan and an Enhanced Reclamation Plan. The complete reclamation plan is expected to turn the quarry site into a combination of open forest and grassland. Although opportunities may exist at some point in the future to develop the site, right now the site would be reclaimed for wildlife habitat, mainly for deer. Other species will undoubtedly use the site, but the main function of the reclamation will be to create deer habitat.

Each section in this reclamation plan will primarily address the obligations of Castle Concrete in reclaiming the site. At various places in the plan reference will be made to the Enhanced Reclamation Plan included at the end of this exhibit. Those references will primarily address interactions that could occur as each plan is carried out. Most often, interactions, particularly negative interactions, are minor or inconsequential. However, in the revegetation of the site, dynamic interaction between the two plans could potentially become significant 30 to 100 years after application of the reclamation. To the extent possible, those interactions are addressed.

Many of those interactions are conjectural and based upon various scenarios involving certain conditions that may or may not exist in the environment. Whether the interactions, especially the negative ones, actually occur is dependent upon a multitude of variables, many of which are not controllable. The discussions of potential interactions are included to assess the damage risk to the Base Reclamation by doing the Enhanced Reclamation. The risk of adverse interactions and damage are low in most cases. However, the dynamics of complex vegetation systems such as those proposed in this plan are poorly understood. That lack of understanding of how these ecosystems actually function could result in a final reclamation, after several decades of development, becoming somewhat different from what is currently envisioned.

Another reason for including interactive risk assessments in the plan is to alert those people who will be carrying out this plan that there is a great deal to be learned from a plan such as this one. Carefully documenting the changes as they occur helps to better understand these complex systems. This is not to say the plan is highly experimental, but it does have experimental aspects that, if carefully documented, could add a great deal to our knowledge of how these systems function.

The format of the reclamation plan in this exhibit closely follows Rule 6 in the Rules and Regulations of the Colorado Mined Land Reclamation Board.

Base Reclamation vs. Enhanced Reclamation

As mentioned above, the full reclamation plan contains two plans. The primary plan and the plan that Castle Concrete will implement is called the Base Reclamation Plan. A secondary plan, called the Enhanced Reclamation Plan, is mostly a vegetation overlay implemented on top of the Base Reclamation. The Base Reclamation Plan will create the necessary topography appropriate to that plan as well as a topography suitable for the Enhanced Reclamation Plan.

From the point of view of legal obligation and bonding under the Act, only the Base Reclamation Plan should be considered. That is, Castle Concrete will be obligated to implement the Base Reclamation, but the company will not be legally responsible for the implementation of the Enhanced Reclamation.

The distinction between these plans is the result of years of negotiations between the company and representatives of the local communities and interest groups. The Enhanced Reclamation Plan is the plan the public wants to implement on the site to further mitigate the visual impact caused by the quarry. Castle Concrete is cooperating with that desire by agreeing to produce the kind of final topographic configuration suitable for the Enhanced Reclamation Plan. The company plan establishes the basic vegetation cover appropriate for erosion control and the final land use. The Enhanced Reclamation Plan, among other things, increases the tree and shrub cover beyond what the company would implement.

Final Land Use

Many possible uses could be made of this land as community needs and desires change. At this point, wildlife habitat is the only use upon which reclamation will focus. Therefore, all reclamation, both Base and Enhanced, is directed toward that end. All grading and revegetation is intended to create habitat appropriate primarily for deer. Other species occur in the area, including Rocky Mountain Bighorn Sheep, but those species form a minor part of the total wildlife population in this area. The site will be useful for the other species, but is primarily intended for deer.

General Overview





To set the stage for the actual reclamation plan, several figures are presented that illustrate the general sequence and pattern of reclamation. Figures RP-1 through RP-7 present this generalized view. Figures RP-1 through RP-4 are plan view graphics of the entire permit area and the lands to be affected. The figures show the different reclamation stages using polygons filled with various patterns. Some patterns show graphic trees in highly regular patterns. These are not to be interpreted as representing the tree pattern that will be produced on the land. These patterns are for diagrammatic purposes only. Furthermore, the boundaries between different units are approximate and are not intended to represent the precise area that will fall into a particular class at that point in time. These four figures are therefore intended to give a "feel" for the general direction and sequence of mining and reclamation.

Figure RP-1 shows the existing condition at the start of this amendment. The Phase I area of the existing plan is shown as under reclamation in accordance with that plan. The actual western edge of Phase I is not at the permit boundary, but is shown that way for simplicity. That figure also shows the Visual Berm as under reclamation. The north end shows the land as forested, which it is. Actually the forest extends into the shaded portion "Excluded Land." These two patterns (graphic trees and shading) were used to distinguish between permitted land but land excluded from the affected land (shaded), and permitted land that will be affected land (tree pattern).

In Figure RP-2, Enhanced Reclamation has been applied to the Visual Berm and to the Phase I reclaimed land shown in Figure RP-1. This figure also shows that Base Reclamation has been applied to the West Ridge and mining has begun in the West Drainage area. If Enhanced Reclamation is not applied then those areas shown with Enhanced Reclamation would remain as shown in Figure RP-1. This also applies to all subsequent figures of this type.

As shown in Figure RP-3, by the time the West Drainage has been completed with mining and Pit mining is well underway, Enhanced Reclamation should have been applied to the West Ridge, and Base Reclamation to much of the West Drainage. Although the drainage course in the West Drainage is shown in the same location as it was before mining, that may not strictly be the case. After mining and backfilling, the actual course of this drainage may deviate somewhat from its premining path.

Figure RP-1 Initial Conditions

-  Undisturbed; to be mined
-  Excluded land
-  Base Reclamation: Phase 1
-  Base Reclamation: Visual Berm

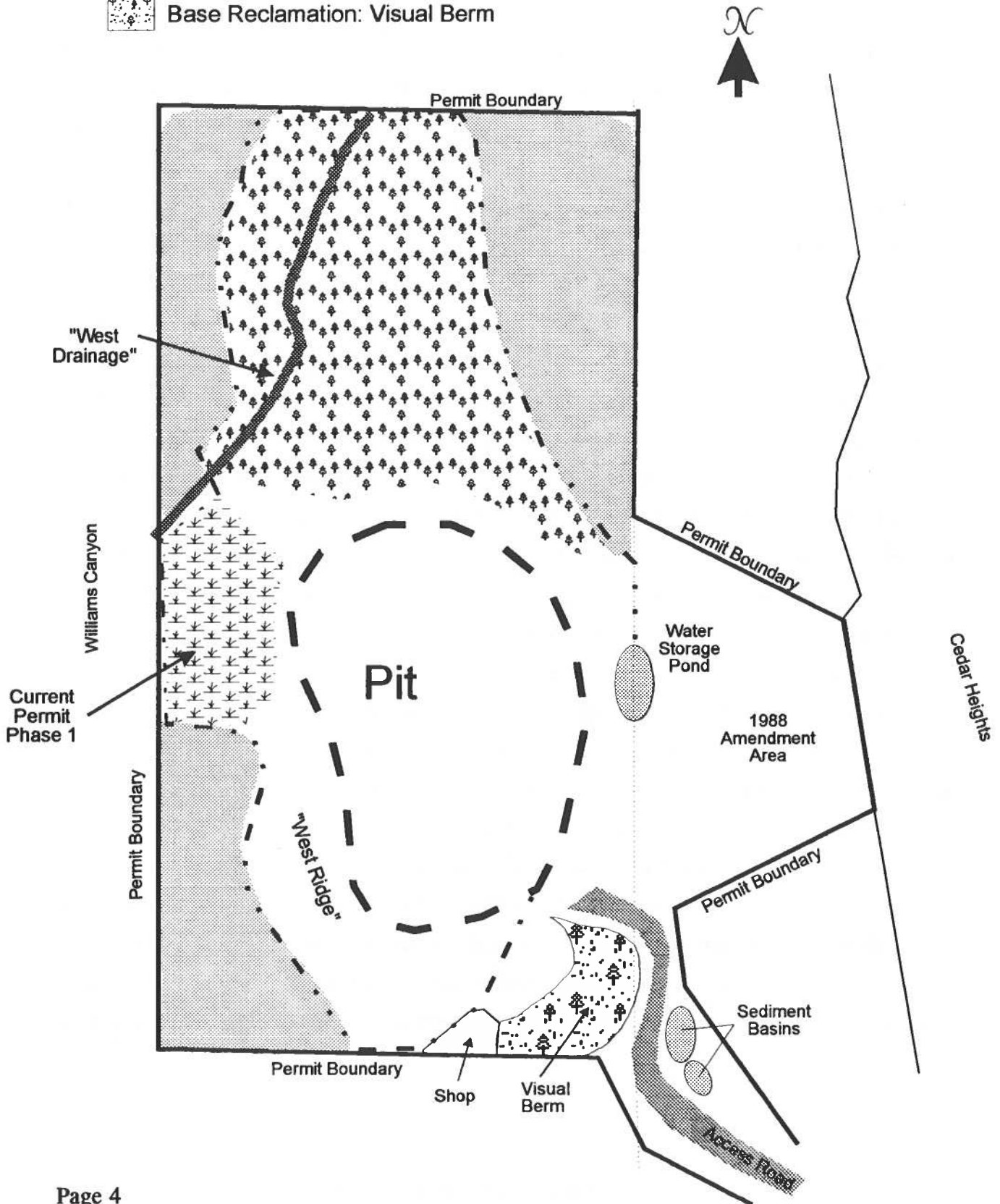


Figure RP-2 End of West Ridge Mining

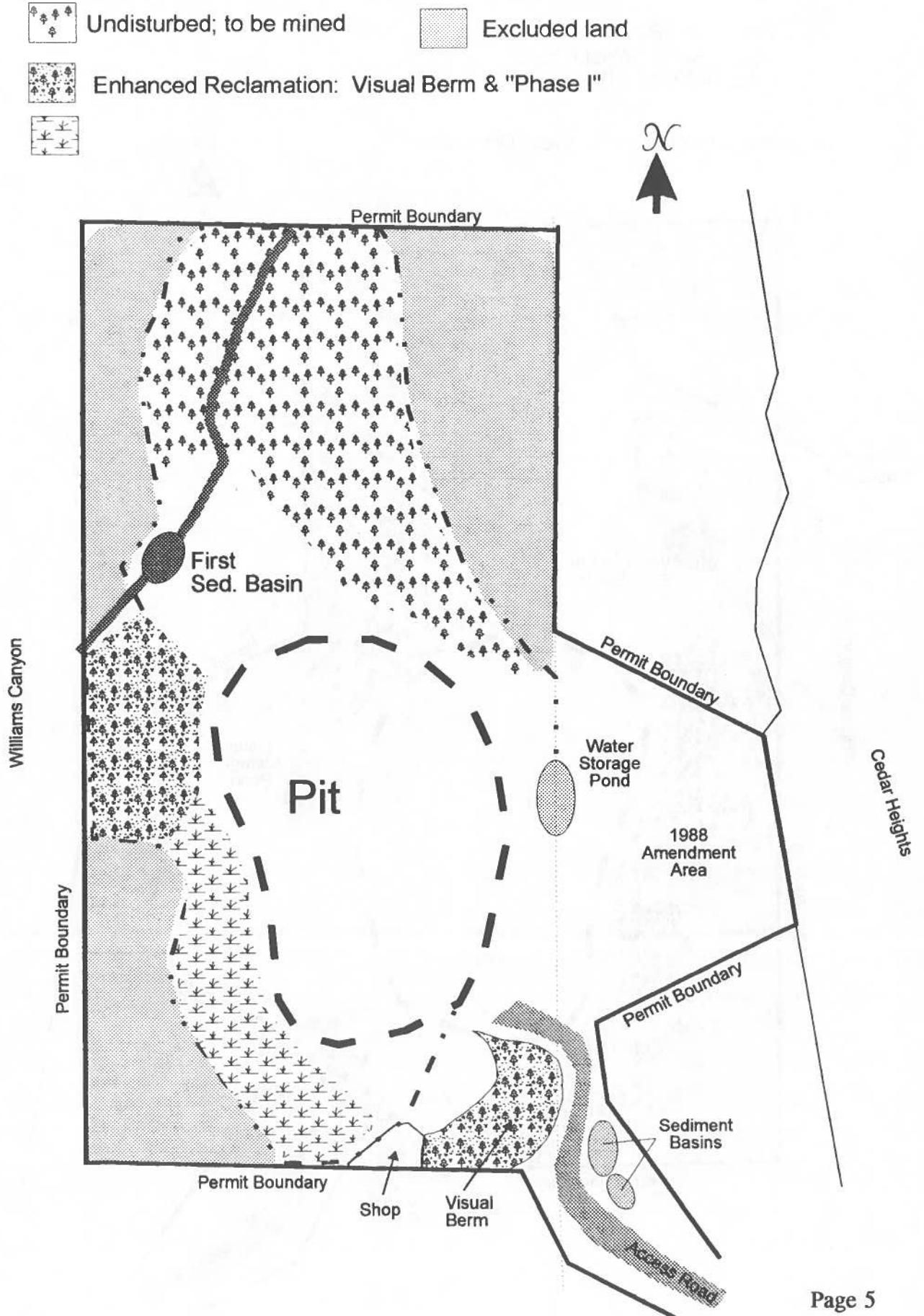


Figure RP-3 During Pit Mining



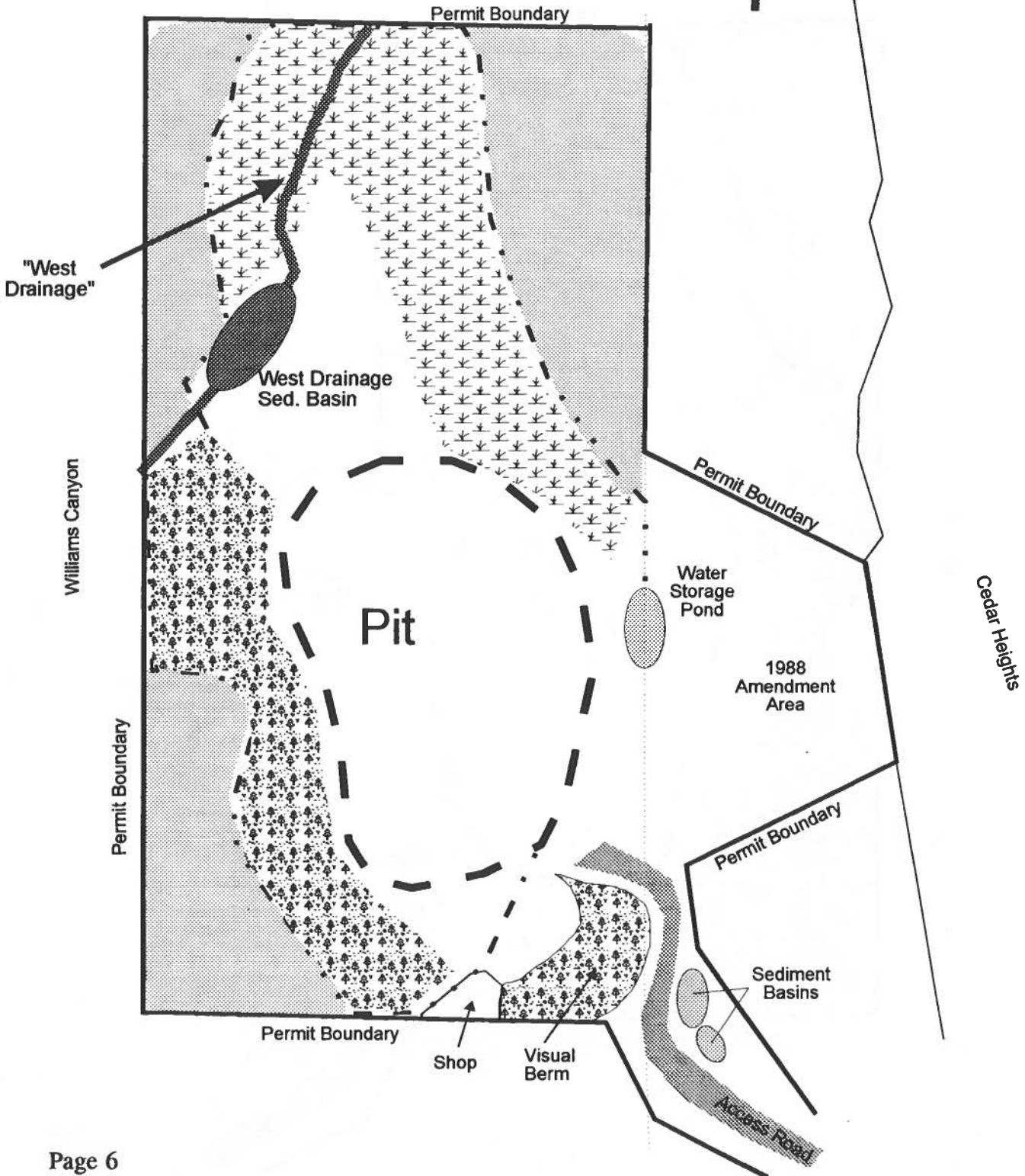
Enhanced Reclamation
Visual Berm, West Ridge,
Initial (Phase I).



Excluded land



Base Reclamation, West Drainage



However, that deviation will not and cannot be very great simply because the valley is being established with a form similar to its premining configuration. That does not leave much flexibility for placing the drainage in a very different course.





The south end of the West Drainage is shown as unreclaimed. This is likely as this area will probably be a temporary waste and soil storage area while the Pit is being mined. Notice that the unreclaimed land is located to the east of the drainage. This is in accordance with a statement in the Mining Plan (Exhibit D) that requires such storage be out of drainage courses. Drainage from this area will mostly be toward the Pit. This will reduce the sediment load on the West Drainage Sediment Basin.

Figure RP-4 shows the site as it will be when fully reclaimed. Enhanced Reclamation should have been applied to all visible lands (Phase AP). Only Base Reclamation will be applied to the surface of the backfilled Pit. That area will not be visible. This Base Reclamation will produce thick grass growth that controls erosion. That kind of reclamation is most appropriate for the backfilled Pit. If grass cover on the higher slopes is eventually reduced by the effects of maturing trees, the grass cover on the backfilled Pit will help control the additional sediment loads that may eventually come from the slopes.

The sediment basin on the west side and the water storage pond on the east side of the operation will be converted to a "wetland" type of growth. Whether that can actually be done will depend upon the volume of water reaching those basins. If deciduous tree growth cannot be established, these sites should still produce a very thick and rich grass growth. The two small sediment basins just east of the Visual Berm and next to the road will remain as basins to control sediment that might come from the backfilled pit area. Eventually, these will fill with sediment, although it may take decades to occur. They will then reclaim themselves into a dense grass type of vegetation.

Figures RP-5 through RP-7 are cross-sections taken from the Reclamation Plan Map (Exhibit F). Whereas Figures RP-1 through RP-4 are diagrammatic, the cross-sections are more objective. These sections cross the same land traversed by the three similar sections in the Mining Plan (Exhibit D). Those figures only showed the existing and mining topography, while these figures show the existing, mining, and reclamation topography. Examination of these sections shows the extent of backfilling proposed for various portions of the permit. Of course, the amount of fill in the Pit (Figures RP-6 and RP-7) is quite great whereas the amount of fill in the northern area (Figure RP-5) is not so significant.

Figure RP-4 Final Reclamation

-  Enhanced Reclamation
-  Grassed Backfilled Pit
-  "Wetlands" in sediment basins
-  Excluded land

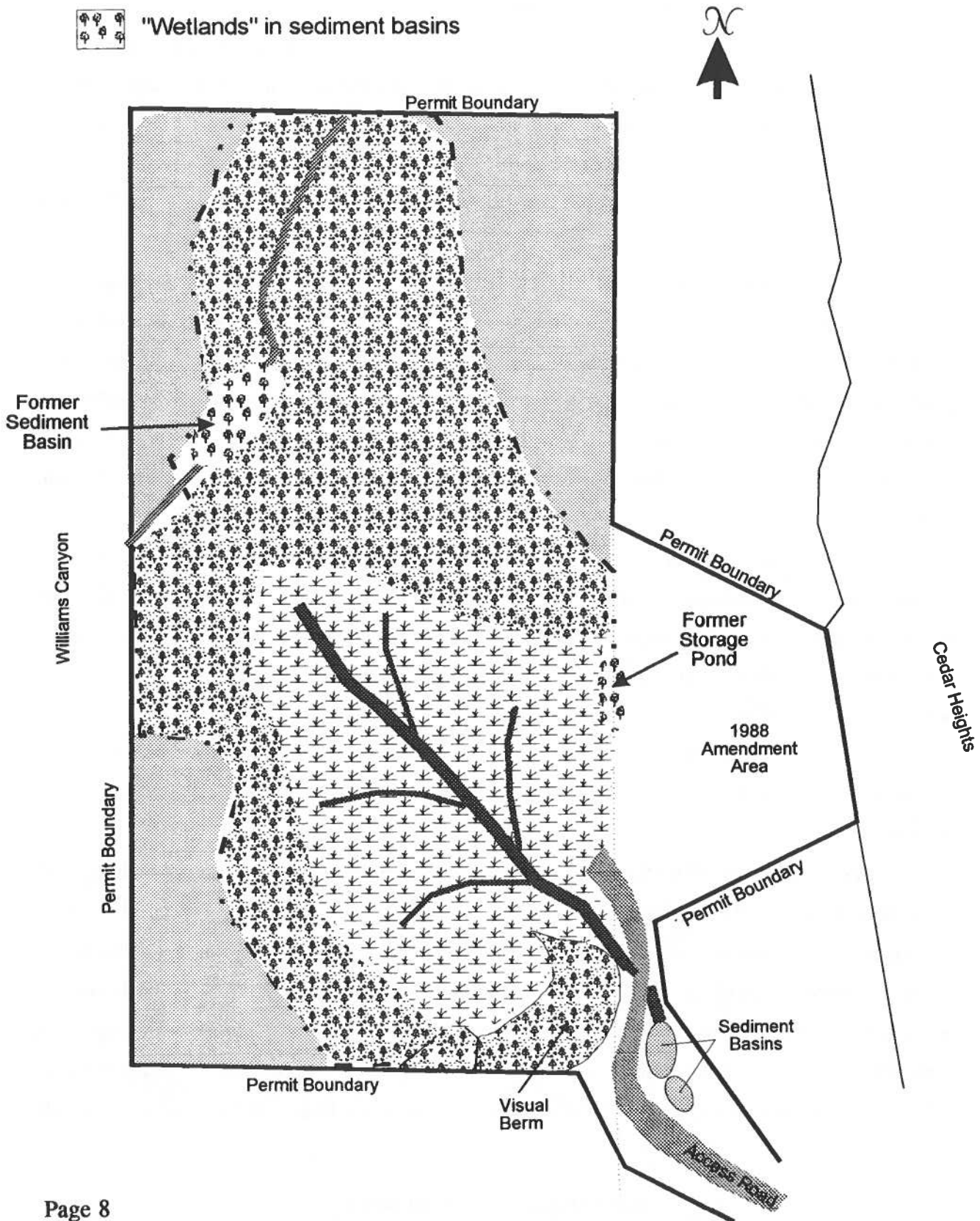


Figure RP-5
Section A - A'
Snyder Quarry Amendment

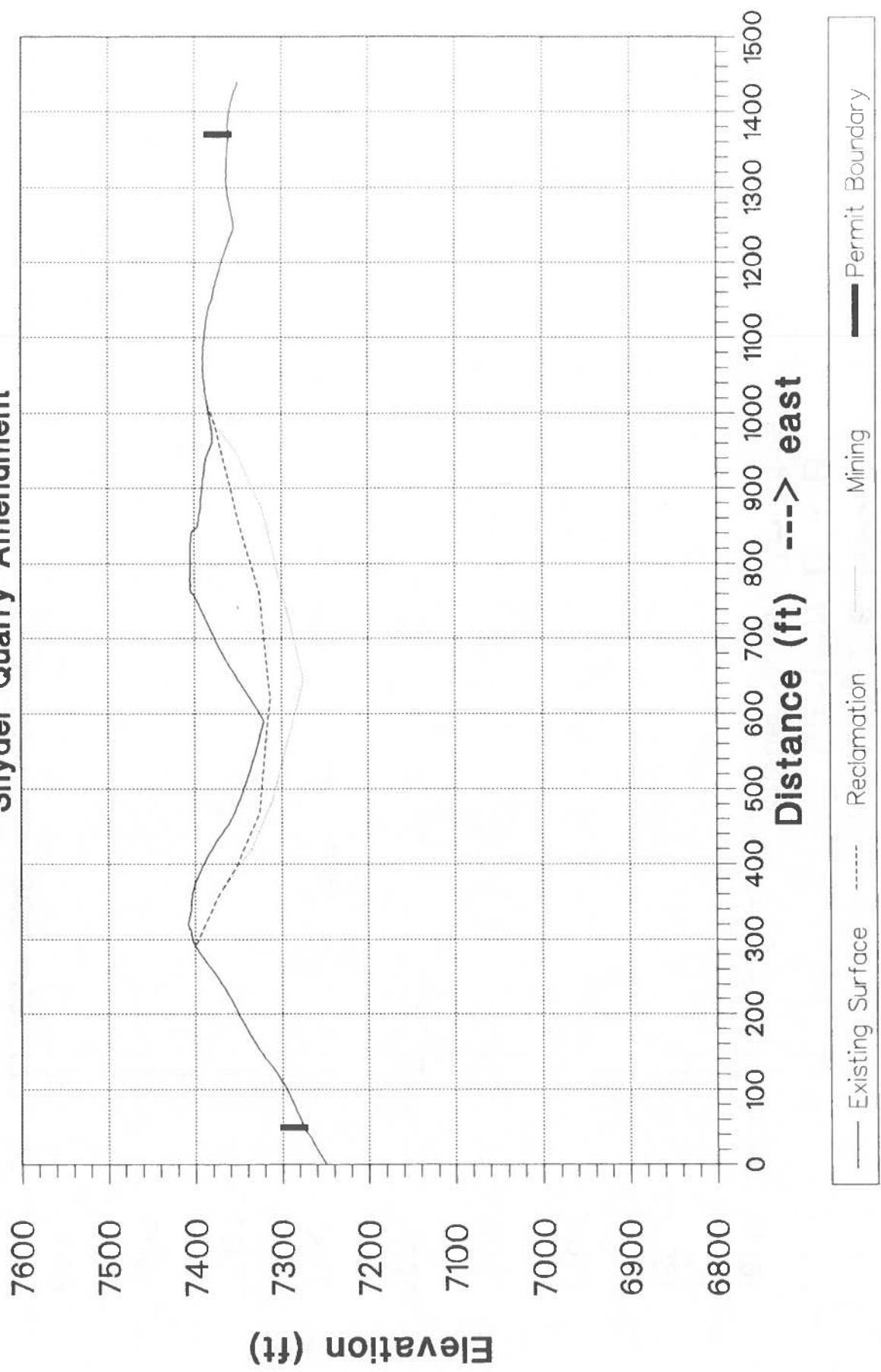
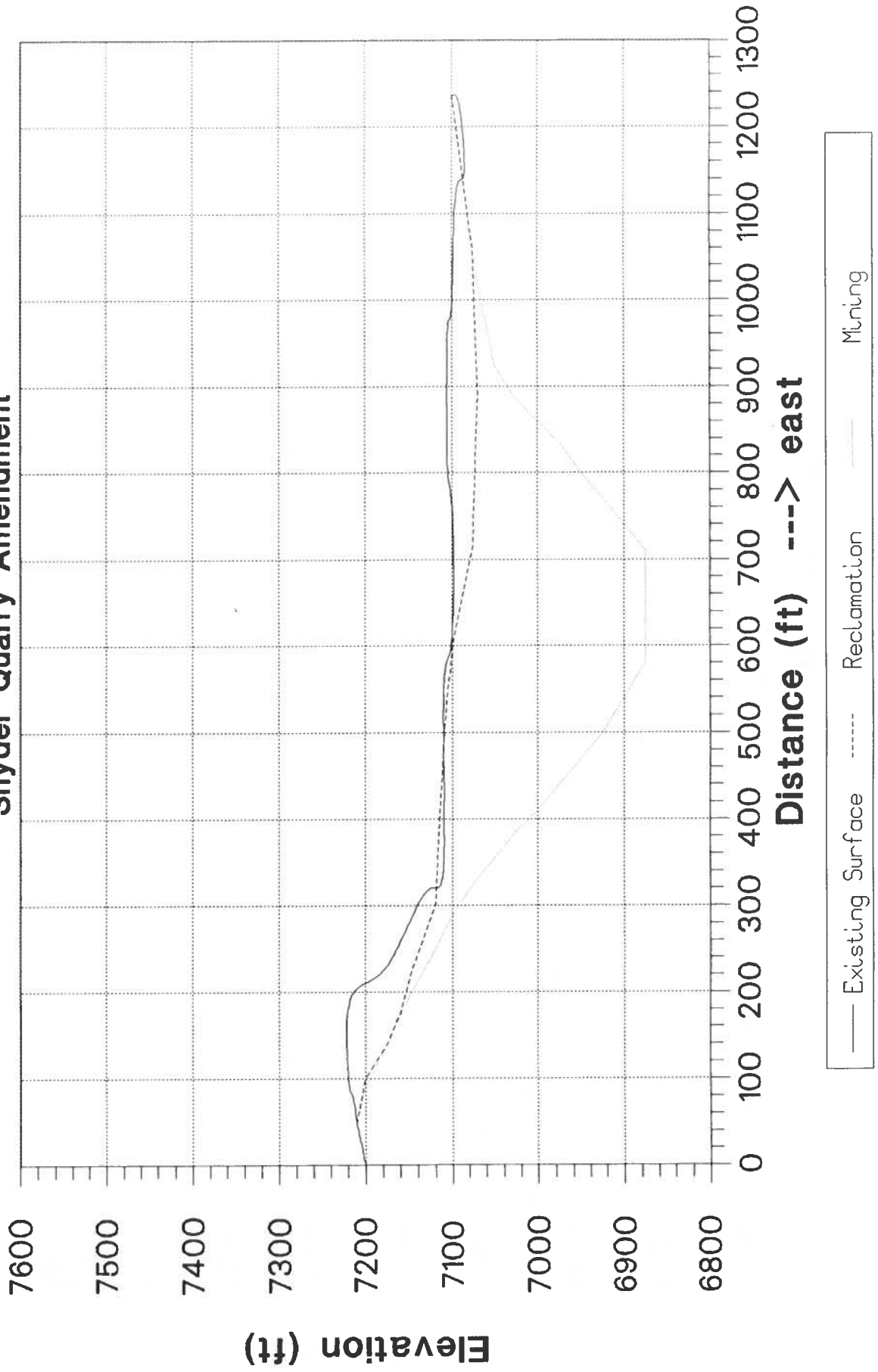
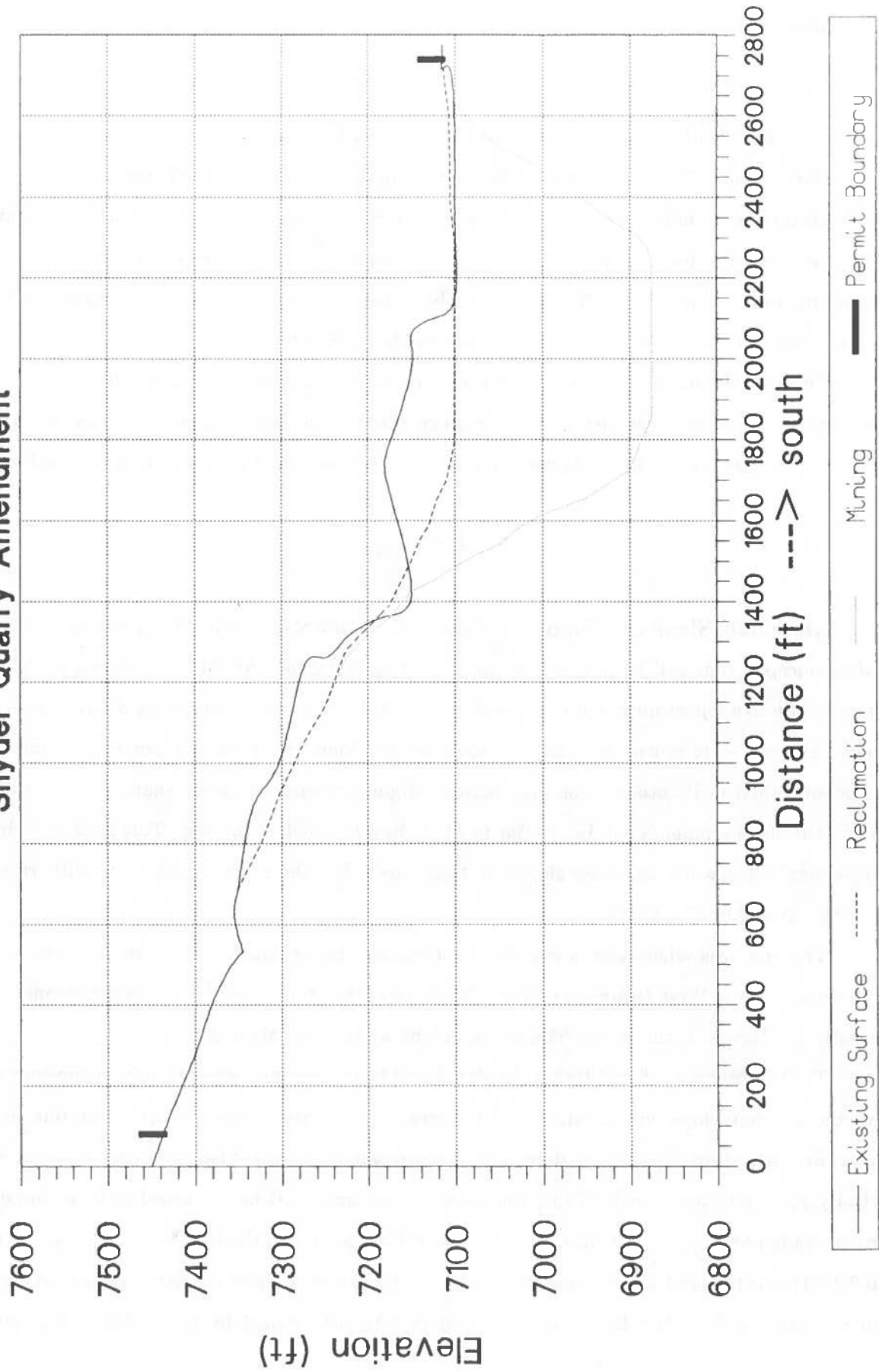


Figure RP-6
Section B - B'
Snyder Quarry Amendment



**Figure RP-7
Section C - C'
Snyder Quarry Amendment**



Note that on Figure RP-5 the drainage course is in a very similar location after reclamation to what it was before mining. But, during mining it is shifted to the east about 50 to 75 feet along that section. If other sections were made, the shifting of the stream channel would be less in some places and more in other places. The point is, although mining may cause significant temporary realignment of the stream channel, reclamation will closely establish the original course. This is important for the maintenance of a similar stream profile to what existed before mining.

Throughout this Reclamation Plan reference to these and other figures will be made. These figures present a broad brush picture of what is expected to happen as reclamation proceeds. The rest of this exhibit will explain how this general picture will be produced during mining and reclamation.

Grading

Maximum Slope Gradients: The Reclamation Plan Map (Exhibit F) shows the approximate final topography that will be produced at the end of reclamation. As this map shows, the plan will generally create a topography that is reasonably similar to what was there before mining. Deviations to some extent are, of course, necessary in some areas. Some of the original small hills and valleys will be smoothed while other areas may become slightly steeper or more gradual. In many areas, though, the slope gradients will be similar to what they were before mining. This section of the plan will primarily focus on the steep slopes as those are often the most troublesome with respect to revegetation and erosion control.

The one area where slopes will be significantly steeper than the premining slopes is on the northern end of the West Drainage valley. The head of this valley will be somewhat steeper than it presently is. However, the stream channel gradient will still be about 3:1.

To the northwest of the stream the slopes will be steeper, on average, than the present slopes. Here the average slope will be about 1.6:1 compared to current slopes of 2:1. But this figure is somewhat misleading. The actual slope will be composed of a series of benches, each of which will be partially or totally backfilled. Thus, the slope in this area will be composed of a combination of vertical walls and more gentle fill slopes. The backfilled portion of the benches will be between 2.5:1 and 3:1. This is the land where vegetation will be established. Behind the fill slope will be a vertical wall of some height. The height of that wall will be determined by the width of the bench as

determined by the Bench Geometry Model presented in the Mining Plan (Exhibit D). For further discussion of this, please refer to the next section of this portion of this exhibit.

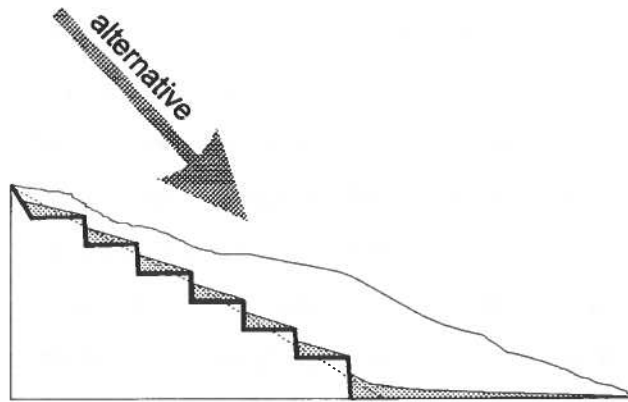
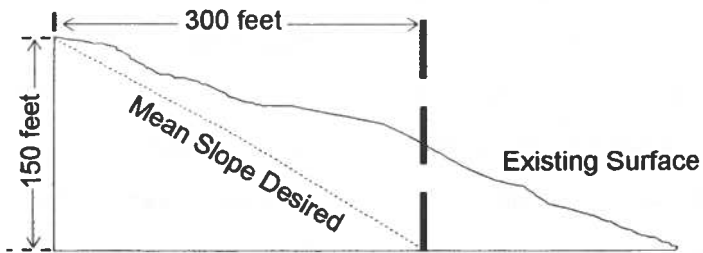
Elsewhere, the reclamation slopes will be maintained at no steeper than about 2.5:1 and most will be closer to 3:1 or less steep. Some short sections of some slopes may reach 2:1 for perhaps 25 feet of elevation change, but that should not present problems with revegetation if good quality soil is used on those slopes. Slopes steeper than 2:1 will be strictly avoided except where bench backwalls must be left. In those cases the average slope may exceed 2:1 when the vertical walls and backfill slopes are combined. These restrictions are necessary because revegetating slopes steeper than 2:1, unless north facing, can be quite difficult. Slopes steeper than 2:1 can show serious erosion problems before the vegetation can become sufficiently established to control that erosion.

Benching and Final Gradient Production: As discussed in the previous subsection, where benching is needed and the average resulting slopes are rather steep, the final dimensions of those benches become critical. In the Mining Plan (Exhibit D) a geometric model was presented that allows the operator to calculate the proper average dimensions of the benches across any particular piece of land that is to be mined. Of course, these calculations should be done *before* the benches are created so a final bench configuration is produced that will minimize the remaining wall while keeping the backfill at a slope appropriate for revegetation.

Figure RP-8 illustrates this process of bench production through the use of the geometric model contained in the mining plan. This figure shows two possible alternatives on the same parcel of land. Each alternative produces a similar result, but the details of what is produced differ. Both produce highly reclaimable land, but the amount of exposed wall at the back of each bench differs. Where possible, through the mining process, the goal will be to produce as little exposed wall as possible so the maximum amount of revegetation land can be created. Exactly how much will be produced in any particular situation will depend upon how this land must be blended into adjacent land. Usually, the blending factor will dictate bench production parameters that result in small amounts of exposed wall. Each area where this model applies will need to be examined carefully *before* mining to decide the best combination of wall height and bench width to produce the maximum amount of blending while allowing for maximum rock production through the mining process. No set pattern can be stated.

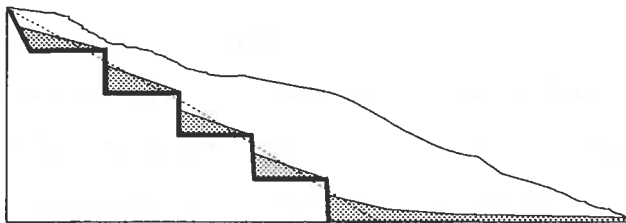
Coordination Between Mining and Reclamation: The Mined Land Reclamation Act requires that reclamation be done on mined land as soon as possible after completion of mining. This is generally covered by the concept of "contemporaneous reclamation." Although no precise definition

Figure RP-8



From Geometric Model:

- Benches = 7
- Wall Height = 20 feet
- Bench Width = 40 feet
- Mean Slope = 2:1
- Fill Slope = 3:1
- Max. Fill Depth = 13.3 feet
- Remaining Wall = 6.67 feet



Example 2

From Geometric Model:

- Benches = 5
- Wall Height = 30 feet
- Bench Width = 60'
- Mean Slope = 2:1
- Fill Slope = 3:1
- Max Fill Depth = 20 feet
- Remaining Wall = 10 feet

exists of what contemporaneous reclamation is, as a rule it means that when a piece of land that has been mined is no longer needed it should be reclaimed.

In the mining and reclamation of Phase I under the existing plan, the application of this approach has resulted in almost immediate reclamation of benches once the final bench pattern was created. Sometimes, reclamation has occurred immediately adjacent to mining. This same concept will be applied to the land mined in Phase AP under this amendment. Only in Phase WP will this approach not be applied in a strict sense.

In Phase WP, as a rule, an entire portion of the Pit must be mined completely before any reclamation can be applied. In this phase final reclamation must be delayed until the very end of the operation. This is because the entire backfilled Pit must be graded in one operation so the drainage can be properly established. Additionally, most of the backfill surface will be needed for transportation corridors to and from the processing plant while the Pit is being mined. Therefore, the idea of contemporaneous reclamation does not and cannot be strictly applied to Phase WP.

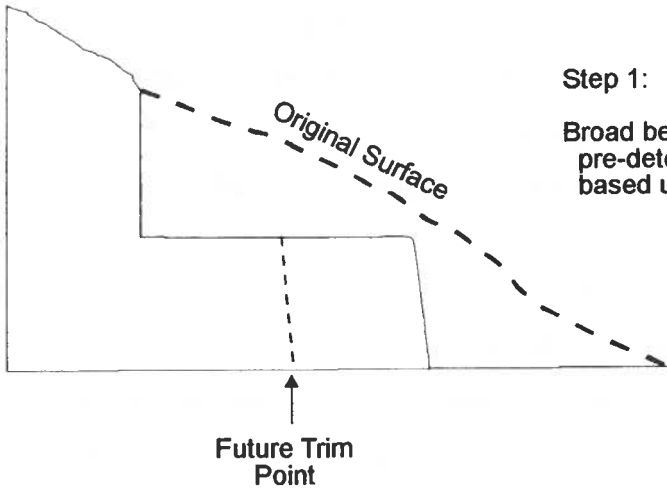
In most of Phase AP the mining will be done through the creation of benches that will have configurations appropriate to that land. Figure RP-9 shows the process of creating and reclaiming a bench as has been done over the past several years at this operation. A similar procedure will be applied to bench reclamation on all lands mined in Phase AP, with only a few exceptions.

As stated in the Mining Plan (Exhibit D) and elsewhere in this exhibit, certain lands that have been mined cannot be reclaimed until the end of the operation. Those lands include land where transportation corridors are still needed, land where waste and soil is being stockpiled for use in future reclamation, and land where active operations or associated functions (e.g., processing and stockpiling of product) are occurring. Any land that does not fall into one of these classifications will be placed under reclamation as the mining is completed.

Figure RP-9 shows that before completion of a bench, backfill is placed on the final bench area. The fill is then graded and topsoiled and, if the season is appropriate, seeded. The final step is to trim the edge of the final bench back to very near the outer edge of the backfill. The next bench is thus created with a wall height that closely approximates the requirements of the benching model for that portion of the mine.

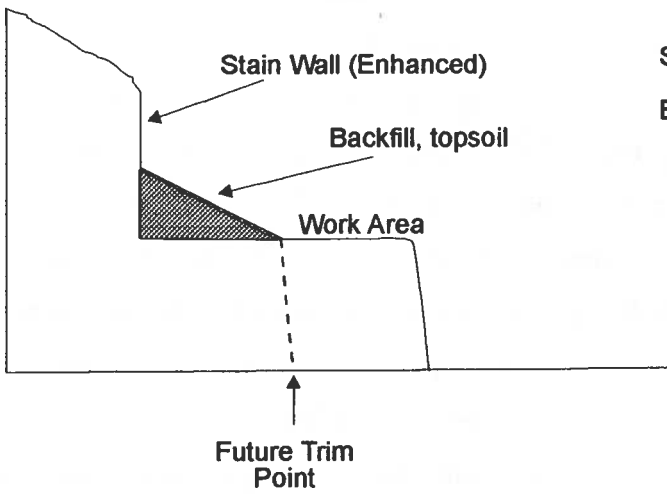
This process allows full access to the final bench so it can be backfilled, graded, topsoiled and treated in whatever other way is needed before vehicular access is removed through trimming and creating the next bench. After trimming, foot access is always available, but vehicular access is

Figure RP-9



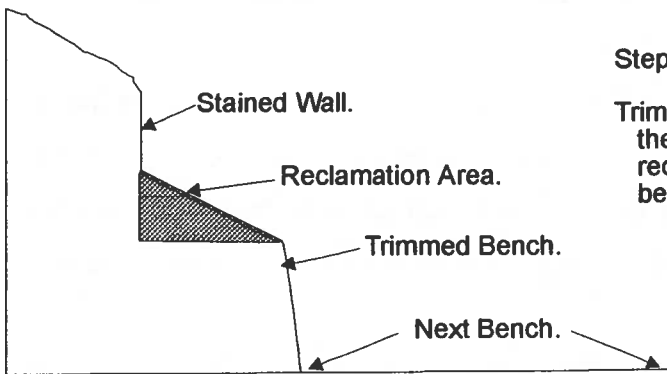
Step 1:

Broad bench with a pre-determined trim point based upon geometric model.



Step 2:

Backfill and topsoil bench while still accessible and prior to trimming bench.



Step 3:

Trim to toe of backfill to create the next bench. Finish the reclamation of the backfilled bench.

usually difficult or impossible. This is not actually a problem as once the site has been topsoiled vehicles should not enter the site anyway. That would damage the surface, could create erosion pathways, and would harm any vegetation growing on the surface.

Backfilling Processes:

Benches: Through the use of the Bench Geometry Model in the Mining Plan (Exhibit D) each bench is configured so the appropriate wall height and fill depth is created after backfilling. Although reducing the wall height is important for visual purposes, of much greater importance is having a sufficient depth of fill on the bench to support the vegetation that will be grown on that bench. Ground cover is not highly sensitive to fill depth provided there is at least a foot or so of combined fill and soil on the bench. But where trees and shrubs are to be grown the fill depth can be critical. If the fill depth is insufficient to produce a suitable rooting depth, tree growth, in particular, can be severely retarded.

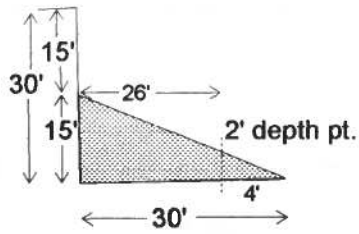
Although Pinyon Pine can grow in very thin, highly immature and intensely rocky soils, its growth rate is extremely slow. Trees in that environment may take a hundred years or more to reach a mature size.

On the other hand, very rich growth media of great depth usually does not benefit this species and, sometimes, may be harmful to its growth. This species is highly adapted to harsh conditions and, in nature, is rarely found growing in the more favorable environments that many tree species require as a minimum habitat.

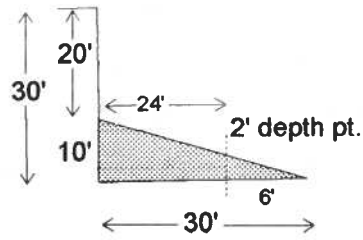
Bench backfill, to produce a suitable growth substrate for trees, should not be less than about 5 to 7 feet at the back of the bench. If two feet is assumed to be the minimum depth to allow trees like Pinyon Pine to be established, a depth of 6 feet at the wall allows for trees to be planted over the back about 2/3 to 3/4 of the bench. This is illustrated in Figure RP-10. This figure shows some possible combinations of bench width, fill depth, and slope gradients that would be appropriate for tree establishment.

Backfilling is not a highly precise process and some deviation from the ideal is expected. Of course, the growth medium requirements of individual trees is also highly variable and largely dependent on the genetics of the individual. So, although the models and formulas make the process look very precise, applying such precision during construction is rather pointless. Therefore, the models presented above are intended as a guide, but need not be implemented precisely. An accuracy of plus

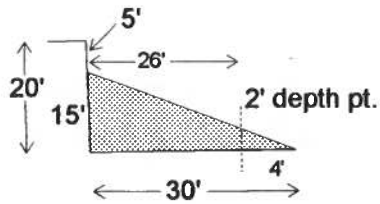
Figure RP-10



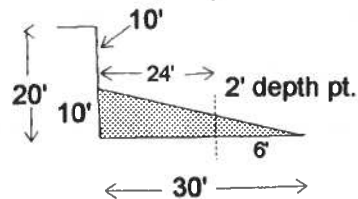
Mean slope 1:1;
Fill slope 2:1.
87% tree suitable.



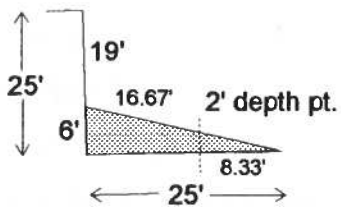
Mean slope 1:1;
Fill slope 3:1.
80% tree suitable.



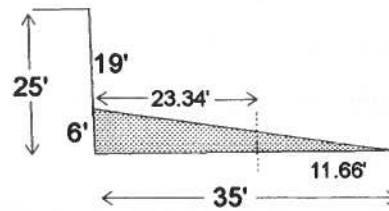
Mean slope 1.5:1;
Fill slope 2:1.
87% tree suitable.



Mean slope 1.5:1;
Fill slope 3:1.
80% tree suitable.



Mean slope 1:1;
Fill slope 4.17:1.
67% tree suitable.



Mean slope 1.4:1;
Fill slope 5.83:1.
67% tree suitable.

or minus 25% to 30% should be sufficient to still allow for adequate backfill depth to reduce the wall height and provide for an adequate rooting medium for future tree growth. A variable fill depth at the wall also helps prevent linear patterns that are visually harmful.

Pit: Backfilling of the Pit, compared to backfilling benches, is a simple operation. It primarily involves simply dumping or hauling the waste into the mined out portions of the Pit. Because the Pit will be bounded on all sides by native rock the fill cannot go anywhere so creating a highly compacted and stable structure is not of great concern. Reasonable compaction can be achieved by simply running equipment over the surface of the backfilled Pit. Limestone waste tends to compact very tightly which is why the waste, by itself, is a very poor growth medium. It tends to become so highly compacted after exposure to rain and snow that plants are generally unable to grow in it without a suitable topdressing of soil. Limestone waste does make excellent subsoil.

Slope gradients are not important in the Pit area as the land will be practically level. Furthermore, because of the depth of the fill, even if trees were grown in the Pit backfill area, rooting depth is essentially unlimited.

Water Resources

Experience with reclaiming benches has shown that once the ground cover vegetation is established (one or two seasons depending upon the time of seeding), erosion and sediment loads decline rapidly. The revegetation plan is designed to produce a dense cover of ground level vegetation, as has been applied in the past. Therefore, water quality should not be a problem after the second (or certainly the third) growing season. Until then, sediment control is needed in the event very severe storms cause heavy runoff.

The West Drainage sediment basins will be maintained until all land that drains into that area is vegetated to a sufficient degree that sediment control is no longer needed. This sediment basin will probably need to remain in place until a few years after completion of the operation. Before reclaiming the land around the sediment basin, the basin will be cleaned out in hopes that sediment capacity will be sufficient to carry through the initial stages of revegetating the surrounding lands. In this way, access may not be needed to maintain the sediment basin.

If access was needed, the access route would need to be reclaimed later than the surrounding areas. Experience has shown that when that much difference exists in the timing of revegetation, the

access road corridor remains highly visible for a long time, although it is not actually there. This is caused by the difference in the appearance of the vegetation established on the reclaimed access route from that growing on adjacent land. Eventually, the patterns converge and the route becomes less visible, but that can take many years to happen. There is no way to accelerate the rate of development on the access route so it "catches up" more quickly with the surrounding vegetation. All future reclamation of the sediment basin (tree planting, etc.) will need to be done by foot travel only, or, if vehicles are used, they will be limited to no more than two trips across vegetated land.

Drainage from the Pit area must be carefully controlled until the sediment loads are reduced by developing vegetation within the reclaimed Pit area. Therefore, the guiding principle will be to: *Establish a drainage outlet only after the Pit has been totally backfilled and the vegetation is established.* Until that is achieved, a shallow basin and berm will be maintained at the outlet location on the east side of the backfilled area. Under this option, the flow of large amounts of sediment from the backfilled surface will be retained on site until the vegetation is sufficiently established to control the sediment outflow.

Wildlife Resources

As has always been the case with the reclamation plans for this operation, wildlife habitat production has been the focus of the plan. This area is not noted for any unusual wildlife populations, but what is there is rich and varied. The site is on the boundary between the urbanized lands to the east and the natural land to the west and northwest.

The primary big game species in the area is Mule Deer, but Rocky Mountain Bighorn Sheep, Mountain Lion, and Black Bear are also known to exist in this area for at least part of the year. Non-game wildlife include a variety of birds and mammals, many of which rely upon the varied habitats in Williams Canyon to sustain them. The site itself is not high quality habitat, as access to water is sometimes difficult and forage is not abundant.

The reclamation plan will not significantly increase the availability of water for wildlife. Wildlife will still need to rely on the stream in Williams Canyon for water. Forage value can be greatly improved, especially for deer, through the revegetation program. Deer tend to be forest edge animals and because of the moderately dense forest found on the site, deer are not very abundant on the site itself. The dense forest and poor soils presently on the site limit the amount of forage for deer.

Through the revegetation program the forage value will be greatly increased. Furthermore, even with the Enhanced Reclamation, much of the forage established by the Base Reclamation will continue for many decades until the increasing tree cover causes a decline in ground level forage.

The Base Revegetation is designed to produce a rich deer habitat with abundant food resources. Although the Enhanced Reclamation Plan calls for more tree and shrub cover than Castle Concrete would implement, it is not expected that the Enhanced Reclamation will greatly reduce the quality of that habitat for several decades. Thus both plans allow for good wildlife habitat creation that should last into the second half of the 21st century.

Topsoiling

Topsoil replacement is an essential ingredient in the success formula for both the Base Reclamation and the Enhanced Reclamation Plans. Experience has shown that although adequate growth can be established on this site without the use of a soil growth medium, the time required to achieve that growth is quite long. Furthermore, erosion control management when soil is not used can be intensive and difficult.

Studies at the Queens Canyon Quarry have shown that cover can be established in about three or four years that is comparable to the cover established in about 10 to 12 years without soil. Thus by using soil the revegetation process can be accelerated about three to four times over what it takes without soil.

However, as will also be discussed in the Revegetation section of this exhibit, that acceleration carries with it some ecological costs with respect to the "quality" of the vegetation. In brief, acceleration of growth by using a rich growth medium benefits the most opportunistic species the most. This can and often does lead to long term developmental stagnation. The rich growth environment removes the environmental stresses that drive developmental change such that development stops at a low seral stage as measured by species composition and interaction.

This condition can last until the system is altered in some way. Stressing the system through environmental alteration is the only way to induce renewed development. It can take decades before autogenic changes can induce stress. Allogenic changes (e.g., fire), however, can quickly induce stress that can bring on succession and other types of beneficial development.

Nevertheless, the need for prompt reclamation, not only to mitigate visual impacts, but more importantly to control erosion and sediment loads into connecting waterways, requires that the risk of developmental stagnation be accepted. Current reclamation technology does not know how to create a high diversity, developmental vegetation quickly. It may not even be possible to do this in a semi-arid environment such as this one. At this time it is mostly a choice between slowly developing "natural" vegetation or rapidly developing, but possibly stagnating vegetation.

Topsoiling operations will occur as each area is completed with backfilling and grading. Topsoil will be placed to a depth of not less than six inches in areas where only grass and legumes are to be established. Where trees are to be planted under either the Base Reclamation or the Enhanced Reclamation, soil depth will be not less than one foot. Because soil is always to be placed on a base material ("subsoil") that will be at least six to twelve inches deep, the minimal possible rooting depth will be at least a foot and in most cases at least 18 inches.

These minimal depths are similar to the soil structure of the typical native soils. However, where trees are to be established the depth to be created greatly exceeds the pre-existing natural condition. Over most of the site trees are growing in soils that are rarely in excess of 18 inches to bedrock. An argument could be made that if the natural forests have developed on such thin soils then there is no need to provide more rooting depth than is present in the natural condition.

The problem with that argument is that under these plans achieving a fairly mature growth is expected to occur more rapidly than may have happened in nature. Nobody knows how long it took the existing forests to develop, but it probably took several hundred years, at best. During much of that time the trees were probably sending their roots out over broad areas or deeply into cracks in the bedrock. Because those conditions usually result in very slow growth it is hoped that by *avoiding* those conditions the rate of development can be accelerated.

Of course, the rate of growth of the trees to be planted, even in an ideal habitat, is ultimately controlled by genetics and not environment. Trees that are genetically predisposed to slow growth cannot be induced to grow faster by supplying them with a better growth environment (more water, fertilizer, etc.). But supplying the trees with an optimal environment will allow the genetically controlled growth rate to become the limiting factor rather than the habitat limiting the growth rate.

Soil resources will come from two sources. First are the native soils found on the site. These are certainly the best soils to use in the revegetation because they are well adapted to the site. Because the native soils are clearly of insufficient quantity to complete the job, soils from other areas

outside the quarry will need to be used. These soils, as has been occurring on the Queens Canyon Quarry, are often of better quality than the native soils, but often come from very different environments.

To some extent their behavior in the new environments have been monitored at the Queens Canyon Quarry and no serious problems have been noted. However, developmental changes in soils usually take a very long time to be expressed and it may be many years before any problems are noted. Furthermore, for grasses, legumes, shrubs and probably wildflowers, the often drastic deviations in those soils from the natural soils does not make a great deal of difference to the growth. Unfortunately, that is probably not true for trees.

Gymnosperms usually rely heavily on the microbiology of the soil for their survival and growth. Mycorrhizal associations are not only common, but are usually required for survival of most gymnosperms, especially for pines, spruces, true firs, and Douglas Fir. Studies have shown that if the proper mycorrhizae are not present in the soil or cannot survive in the soil then the trees will not survive either, even when all other environmental factors are optimal. Unfortunately, what is known about the biology of these vital associations is extremely limited. Supplying the proper microbiological environment for the trees is vital for the success of the Enhanced Reclamation and the Base Reclamation tree components. Unfortunately, not much is known about what forms a "proper microbiological environment." Various approaches, however, can be used to help insure that environment does exist, although it cannot be guaranteed that it will exist even when these techniques are used.

The first approach is to rely upon natural dispersal of mycorrhizae from the surrounding forests on to the reclaimed areas. Although this is known to occur in nature, it is a slow process and when the soil environment is quite different it may not ultimately be very successful. Therefore, this approach is not a preference, but *will* undoubtedly occur no matter what is done.

A second approach is to rely upon mycorrhizal associations between the tree and its initial growth medium to inoculate the rest of the site. That is, if it is assumed that the proper mycorrhizae are present in the growth medium of the seedling tree then that population should expand as the tree grows. Although not unreasonable, there is still the problem of whether the mycorrhizae can survive in the soil the tree is planted in. It is safer than relying upon invasion, but possibly still insufficient as a single technique.

Furthermore, for some tree species, it is known that the mycorrhizae needed by seedlings are not the same species of mycorrhizae those trees need when mature. It has even been theorized that part of what drives ecological succession is an underlying succession in soil microbiology. As the microbiology changes this induces instability in the existing vegetation and it changes accordingly. Therefore, if those mycorrhizal species required for mature trees are not present when the trees reach that stage of growth, the trees would only grow to a point where the seedling stage mycorrhizae are no longer appropriate. The trees would then either die, stop growing, or grow very slowly.

A third approach would be to inoculate the introduced soils with native soils by blending and refrain from planting tree species that are not present in the native community. Of course, there is still no guarantee that the mycorrhizae from the native soils can survive in the blended soils or actually infect the trees. But that is a risk that must be taken, because there is not enough native soil to complete the reclamation.

This third approach is the one that will be the preferred approach. By stockpiling introduced soils with native soils this inoculation should occur and if the species can survive in the blend then mycorrhizal problems should not limit the success of the tree plantings. Of course, this approach is combined with the introduction of mycorrhizae along with the growth medium the seedlings were grown in and invasion of mycorrhizae from surrounding lands.

The revegetation program will rely heavily on Pinyon Pine. Unfortunately, little is known about the mycorrhizal requirements of Pinyon Pine other than the dependency probably exists and may be critical for allowing this species to survive in the harsh environments where it is usually found. The technique proposed is probably the best that can be done at this point and it can only be hoped that it will work.

Topsoil replacement will occur, usually, just before planting. This approach has worked very well in the past and capitalizes on the often rich nutrient store released by the destruction of most of the soil microbiology when soil is stripped and replaced. The loose growth medium is also highly suitable for broadcast seeding which is what will be done on most areas to be reclaimed within the quarry.

Linking soil distribution to the time of seeding also helps increase the species diversity of the final vegetation. The seed bank within the soil is most able to be expressed in the final vegetation if the soil is spread just before the time when those seeds are most likely to germinate. Of course, if most of the soil seed bank is composed of undesirable weeds, as can occur when soils are introduced from

highly urbanized lands, this approach can actually work against the success of the program. Unfortunately, there is no reliable way to determine what will happen until it happens. If a problem occurs then the problem is dealt with when it occurs. This is part of normal revegetation management.

Protection of topsoil stockpiles, both introduced and native soils, is not only good practice but also required by law. Where the soil contains a predominance of woody material (stems, branches, tree trunks, etc.) seeding the stockpile to keep it from eroding is usually not necessary. The woody material itself provides excellent protection against wind and water erosion. But if the soil is mostly fine particles and contains no or only small amounts of woody material then protection is important.

Topsoil stockpiles that require protection and will be in place for at least one season before replacement will be seeded with the following mixture. This mixture contains some species present in the final seed mix, but its emphasis is on rapid growth of grass species that usually produce tall culms. Tall culms provide the maximum protection against wind erosion and to a lesser extent water erosion.

Topsoil Stockpile Protection Seed Mix		
<i>Species</i>	<i>Rate Lbs/Acre PLS</i>	<i>Seeds per Sq Ft</i>
Intermediate Wheatgrass	10	22.27
Pubescent Wheatgrass	10	20.66
Russian Wildrye	8	32.14
Ranger Alfalfa	1	4.82
TOTALS	29	79.89

Staining Walls and Topsoil Replacement: If the backwall of the bench needs to be stained to reduce its visibility and if the Enhanced Reclamation Plan is being implemented, then the wall should be stained prior to topsoiling. This is not an absolute necessity, but would limit any adverse effects the stain might have on the ability of the soil to produce good vegetation. In other words, staining before topsoiling insures that the stain will not affect the growth. Staining should not be done after seeding or after the vegetation has begun growth.

Revegetation

The heart of both the Base Reclamation Plan and the Enhanced Reclamation Plan is revegetation of the site. Although both plans have slightly different intents in their revegetation, they are generally complimentary.

The primary intent of the Base Reclamation Plan is to produce a rapid cover of grasses and legumes that can control erosion and provide forage for wildlife, primarily deer. The Enhanced Reclamation Plan has as its primary intent the reduction of visual impact. This is mainly achieved through the introduction of more trees and shrubs than the Base Reclamation Plan calls for. This additional tree and shrub cover will provide additional blending of the site with surrounding lands that are mainly forested. In effect, the Enhanced Reclamation Plan adds more texture to the Base Revegetation so the site will eventually conform more with the texture of the surrounding landscape.

This section of the Reclamation Plan will refer to the Enhanced Reclamation Plan, particularly with respect to how the two will interact over time. Interactions are an important aspect because the Enhanced Reclamation will be proposing actions that *could* affect the Base Reclamation. Many interactions have been identified, some of which are negative interactions. No precise probability of any interaction occurring can be presented because the system to be created is complex and such systems are poorly understood with respect to their functioning. Therefore, addressing possible interactions, particularly negative ones, are primarily red flags that mark aspects that should be watched with particular care.

Visual Berm: The Base Reclamation will not do anything to the Visual Berm. As for the permit obligations, Castle Concrete considers the Visual Berm to be completed.

Base Reclamation: The current condition, after about ten years of growth and development, shows rich growth on the bench steps with reduced growth on the step backslopes of the benches. This pattern is what was expected. Growth on slopes rarely is as good as growth on level ground where water collects and soil resources are more abundant. Erosion is minimal and well controlled, even during major thunderstorms.

Shrub growth on the berm now is very strong. Tree growth is moderate. Mountain Mahogany (*Cercocarpus montanus*) is growing quite thickly on both the benches and the bench back slopes. Many of these shrubs are approaching mature dimensions and reproduction is strong. Browsing effects are minimal. This species was not planted on the berm, but came from the soil seed bank that was used

to reclaim the site. This site, more than any other, shows that when soil taken from similar vegetation is used, the growth of native species from the seed bank can be very strong and highly beneficial.

Among those species that were planted, the success is variable. Hanson Rose, a variety of the native Wood Rose (*Rosa woodsii*), has done very well and shown tremendous reproductive expansion, particularly on the backslopes of the benches.

Nanking Cherry, an introduced ornamental, did very well for the first few years, but in recent years has declined significantly. It does not appear to invade the more harsh backslopes and it appears that competition with the dense grass on the benches has reduced its vigor considerably.

The native sumac that was planted has not done well, except for a few isolated individuals. It appears this species is not very tolerant of the fairly high pH of the waste underlying the topsoil. It may also be unable to compete successfully with the thick grass on the benches.

Russian Olive has done remarkably well and several trees are ten or more feet tall. Some reproduction appears to have occurred, but it is quite minor and probably of little significance. Again, competition from grass probably limits reproduction.

Rocky Mountain Juniper has generally done poorly, but certain individuals are doing quite well and showing strong growth and vigor. Considering the extremely high genetic variability and hybridization rates in the genus *Juniperus*, this pattern of certain individuals doing well while others do poorly is not surprising. Success with this species appears to largely be a matter of planting enough plants that at least some have a genetic compatibility with the local conditions. Although the species is often very successful when used, it does tend to exhibit high sensitivity to soil texture and probably soil pH.

The experimental planting of Cottonwood was a total failure. All five of the trees died by the end of the second year. This was about what was expected, although it was hoped that at least a couple might survive. This site is probably too high for this species and possibly the dense limestone waste subsoil is limiting. Cottonwood tends to prefer more open, gravelly soils.

Another native that has invaded in small numbers is Gambel Oak. The few plants on the site show strong vigor and excellent growth, but reproduction does not appear to have occurred. In time, this species should expand, primarily through root sprouting.

Species diversity on the berm is high, even with the strong growth of introduced grasses. This diversity is probably a response to the low fertility of the original soils. The limitation of nitrogen resources tends to allow a faster succession to native vegetation. This occurs because the very

opportunistic species are limited in their growth by the limited nutrient levels, but the natives that are well adapted to growing in low nitrogen soils do well. Still, locations where soil was deep and rich when placed on the berm show a clear predominance of opportunistic, introduced grasses with sparse growth of native species. In those situations, the natives simply cannot compete with the vigorous growth of the introduced species.

On the backslopes of the benches the ground level vegetation is predominantly composed of native grasses and forbs. The low fertility growth medium favors those species and the opportunistic, introduced species are either out competed or do not even germinate. Thus, the difference in the vegetation between the benches and the backslopes is a reflection of the nutrient conditions in the soil and its impact on the character of the resulting vegetation.

Enhanced Reclamation: All future reclamation work on the Visual Berm will be through Enhanced Reclamation. For a complete description of what will be done please refer to the plan at the end of this exhibit. The plans for the berm will be summarized here. This summary is not a part of the Base Reclamation.

The Enhanced Reclamation Plan calls for increasing the growth on bench backslopes (the most visible areas of the berm), boosting the shrub growth through fertilization, and the planting of additional trees to help blend the site better with surrounding areas. By introducing a dryland alfalfa it is hoped that the nitrogen levels will eventually be increased, especially on the bench backslopes, and that will help support better grass growth. Fertilization of the shrubs, particularly Mountain Mahogany, is expected to increase the growth rate of this species to increase the shrub component and add texture. Planting larger trees on the benches and small trees on the backslopes is hoped to increase the tree cover. Full details are contained in the Enhanced Reclamation Plan.

Interactive Processes: The Enhanced Reclamation Plan contains a discussion of the rationale behind the treatment to be applied and some reservations regarding those treatments. Here some additional discussion of possible interactions are presented.

Growth on the benches is already very high and fertilization will primarily increase the vigor of those species. Because they are quite competitive, it is possible that the addition of fertilizer to the berm will decrease species diversity. This would primarily occur by driving out the invading native species. Eventually, however, the additional growth and vigor produced by the fertilizer will decline and total density will decline. This would allow reinvasion of natives. However, the additional high carbon biomass introduced through a surge in productivity might render the berm bench vegetation

highly unstable and cause a very severe shift in species composition. It is recommended that before application of the fertilizer the vegetation be carefully measured and described through quantitative sampling. Then, at least once a year, that description should be repeated over the subsequent five to ten years. This would allow a full description of the kinds of changes induced by this treatment.

It is not known whether fertilizer will produce any response in the Mountain Mahogany. This species probably has a low nitrogen requirement. Whether that means it is simply able to grow well with low nitrogen sources or is high nitrogen intolerant is not known. It is possible that fertilization would actually reduce the growth rate of this species if it is high nitrogen intolerant. It is recommended that after the application of nitrogen, records of terminal node and internode lengths of selected plants be kept to find out how this species responds to the additional fertilizer. It needs to also be noted that if the species responds favorably, the plants on the backslopes will probably respond the most because fertilizer spread on the benches probably will not get past the grasses.

Planting large trees could create weaknesses in the berm bench structures resulting in increased erosion damage by slumping. *This is not likely, but is possible.* Planting of trees on the backslopes, even small seedlings, may not reap much benefit as that environment is not very favorable for tree growth. Digging planting holes in the backslopes could also create local weaknesses that could increase erosional damage to the backslopes. *This is not likely, provided the holes are kept small.* But if the process of producing planting holes is done with excessive "enthusiasm" serious damage could result that would not only affect the backslopes but also the benches and increase sediment discharge from the berm.

The most probable scenario for Enhanced treatment of the Visual Berm is that the overall growth will become more dense and visually more attractive with little negative effect on existing vegetation. At worst, some local erosional damages might result from surface disturbance, the fertilization will not affect shrubs and will decrease species diversity, and all efforts to increase growth on the backslopes will fail. If the worst were to happen the result would be something quite similar to what is there now. The most likely result of Enhanced Reclamation will be a slight to moderate improvement in the short term (5 years) followed by increased blending with surrounding forested land (15 or more years).

Phase AP Revegetation: The Base Reclamation (this plan) will produce the necessary ground cover to control erosion and add a small amount of shrub and tree growth. The Enhanced

Reclamation, again, is designed to increase the shrub and tree components of the Base Reclamation and add a wildflower component.

EROSION CONTROL REVEGETATION:

Base Reclamation: Experience on the Phase I area of the current permit and the Visual Berm has shown that dense growths of grass can be produced in two to three years when vigorous species are used. High diversity vegetation is not generally produced through past practices, but the growth is nevertheless effective and shows evidence of use by wildlife. Therefore, by expanding upon the past practices this component of the revegetation can be produced.

The species mix to be used on the topsoiled areas of Phase AP is as follows. It would be preferable, from an administrative point of view, to keep Base Reclamation seeding separate from Enhanced Reclamation seeding, but that is not practical. If the Base Reclamation seeding was done first and later the Enhanced Reclamation seeding introduced, the success rate of the Enhanced Reclamation seeding would be essentially zero. Because the Enhanced Reclamation species are not generally very competitive it is unlikely that many of those plants would ever appear in the vegetation and the effort and money spent would be wasted. Therefore, all ground level species are included in the seed mix.

Phase AP - Grass/Legume Seed Mix		
<i>Species</i>	<i>Rate Lbs/Acre PLS</i>	<i>Seeds per Sq Ft</i>
Blue Grama	0.8	13.06
Fairway Crested Wheatgrass	1.0	6.93
Intermediate Wheatgrass	2.5	5.57
Pubescent Wheatgrass	2.5	5.17
Russian Wildrye	3.0	12.05
Sideoats Grama	3.5	11.49
Little Bluestem	2.5	12.91
Green Needlegrass	2.75	11.43
Ranger Alfalfa	1.0	4.82
TOTALS	19.55	83.43

(Note: Shrub and wildflower seeding are included here but are discussed under Enhanced Reclamation)

Phase AP - Shrub Mixture		
<i>Species</i>	<i>Rate Lbs/Acre PLS</i>	<i>Seeds per Sq Ft</i>
Mountain Mahogany	5	6.77
Antelope Bitterbrush	6	2.07
Rubber Rabbitbrush	1.5	11.54
Cliffrose	4	5.88
TOTALS	16.5	26.26

Phase AP - Wildflower Mix (subject to change based on availability)				
<i>Species</i>	<i>Common Name</i>	<i>Flower Color</i>	<i>Rate Lbs/Acre PLS</i>	<i>Seeds per Sq Ft</i>
<i>Achillea millefolium</i>	White Yarrow	White	0.25	16.01
<i>Cichorium intybus</i>	Chicory	Blue	0.5	4.89
<i>Coreopsis lanceolata</i>	Lance-leaved Coreopsis	Yellow	1.5	6.96
<i>Gaillardia aristata</i>	Perennial Gaillardia	Yellow-Red	2.0	7.36
<i>Gypsophila elegans</i>	Baby's Breath	White	0.5	4.34
<i>Liatris spicata</i>	Gayfeather	Purple	1.0	3.10
<i>Linum perenne lewisii</i>	Blue Flax	Blue	2.0	13.54
<i>Ratibida columnifera</i>	Prairie Coneflower	Yellow	0.5	9.55
<i>Artemisia frigida</i>	Fringed Sage	indistinct	0.25	14.35
TOTALS			8.5	80.1

Planting on this site can occur in late fall or in early spring. Fall plantings have been quite successful, although the vigor of the initial stand is somewhat reduced compared to what is produced

by spring planting. This difference lasts only through the first year. After the first couple of years there does not appear to be any great difference in the density or cover of the growth.

Actual species composition, even when the same mixture is used, tends to vary from one site to another. This seems to be an artifact of different initial conditions. Because most immature and many mature vegetation stands exhibit behavior characteristic of chaotic systems, slight differences in the initial conditions produce different results. Over time the initial differences tend to be obscured and the initially different vegetation shows considerable convergence. This convergence probably results from a combination of expansion and increasing dominance by the most competitive species plus the effects of climatic condition averaging. Initially, even slight differences in climatic conditions are expressed in differential seed germination. Over time, competition eliminates many of those initial species resulting in a reduced species diversity but increased plant density and cover. Climatic averaging over a few years augments the competitive process and allows newer sites to develop cover similar to old sites. However, at a very fine scale, differences between different seedings remain evident for a long time. Therefore, although the gross structural changes in the vegetation tend to exhibit convergence, the fine structure continues to express those different initial conditions.

All seeding will be done by broadcasting as has been done in the past. Often, the sites to be seeded are on slopes that are difficult to work with most farm equipment and the presence of sticks, branches, and stones in the soils would make farm equipment difficult to use. Furthermore, most sites that will be seeded at one time will be small and will be effectively seeded in just a couple of hours at most.

Seeding will occur not more than 5 to 7 days after the spreading of the topsoil. This is particularly important for sites where access with equipment is limited or impossible. By seeding at this time, experience has shown that the growth medium is still loose enough to accept the seed without any additional treatment. If seeding occurs much beyond that 5 to 7 day limit the resulting vegetation is less dense because less seed was able to work into the cracks and crevices in the soil. After about a week the soil starts to seal and only larger cracks are present. Sites seeded too late usually take an additional year or two to reach the same level of growth as sites seeded within a week after soil distribution. During that time the probability of erosional damage increases and if access with equipment is limited or impossible, repair of erosional damages becomes very difficult.

This constraint on the time of seeding relates back to the topsoiling section of this exhibit. Unless the site can be roughened with equipment before seeding, topsoiling must only be done when the seed can be planted. If topsoiling must be done but seeding cannot be done and access will be

removed before seeding, then the site needs to be roughened by hand before seeding. This can be done with large tong rakes or with a spiked drag pulled by hand. The drag can only be used if the surface is fairly free of woody material and large rocks. A small ORV could also be used to pull the drag if the slope is not too steep for safe operation of the vehicle.

No fertilizer or mulch will be used for the ground level vegetation establishment. Experience has shown these are not necessary. Furthermore, when fertilizer is used in combination with introduced soils that may contain prodigious amounts of weed seed, the weeds are benefited the most by the fertilizer. This prolongs the annual stage of the vegetation development and can result in reduced vigor of the perennials. The vegetation eventually achieves a growth that is similar to growths produced without fertilizer, but it can take several more years before that happens. If any fertilizer is used it will be applied only in the fall and only if the vegetation exhibits nutrient deficiency symptoms as exhibited by deviated elongation patterns, leaf color, or chlorosis and necrosis.

Mulches and irrigation are not necessary as the site receives adequate moisture to establish the desired vegetation.

Enhanced Reclamation: As previously noted, Enhanced seeding will be undertaken as part of the Base Reclamation seeding program. The contribution of the Enhanced Reclamation Plan to the ground level vegetation is primarily the addition of a wildflower component to the grass components included in the Base Reclamation. Wildflower planting is often difficult because seed purity and germination rates are low. Growth conditions for wildflowers are often very specific. Most species are rarely very competitive and dense grass often limits growth of wildflowers. Nevertheless, planting of wildflowers, even with a low initial success rate, increases species diversity and inoculates the community with seed sources that allow accelerated expansion compared to what would occur through invasion.

The term "wildflower" is highly ambiguous from a botanical point of view. It can mean any species, introduced or native, that has showy flowers and is not a horticultural cultivar specifically bred for ornamental purposes. For the purposes of this permit, wildflower means an angiosperm that is at least regionally native and usually exhibits showy flower parts (petals, sepals, or bracts) and is not considered a weed, noxious or otherwise. It may be an annual, but is usually a biennial or perennial. In certain genera, it need not have showy flower parts. For example, the sages (*Artemisia sp.*) are usually considered wildflowers although their flowers are certainly not showy.

Interactive Processes: The only possible negative interaction between the Base Reclamation and the Enhanced Reclamation ground level vegetation is a possible overpowering

of the wildflowers by the grass. Excessive competition from grass could render the wildflower planting a total failure. This is not considered likely, especially on more south facing slopes. Grass density on those sites will be less and there should be room for some wildflower growth if the seed germinates.

As for positive interactions, the addition of wildflowers to the ground level vegetation will increase species diversity and possibly improve soil biology by introducing additional nutrient and energy flow pathways. Many wildflower species are known to exhibit some nitrogen fixing capabilities and this will help maintain nutrient levels which helps avoid the decline in vigor that is often seen in revegetation programs.

VEGETATION FOR VISUAL IMPACT MITIGATION (Trees and Shrubs):

Base Reclamation: The 1989 amendment required a tree and shrub planting in what was then called Phase III. The 1984 amendment also discussed some limited amount of tree and shrub establishment in Phase I, II and IV (1989 phase designations). No other land would be planted with trees. Examination of the requirements on each of these areas shows somewhat different planting plans. On the land included in the 1984 amendment, no specific rate of planting or establishment was stated. But after considering the narrative, it can be concluded that around 25 trees per acre would be established.

The 1989 amendment was more specific about requirements. That amendment set the standard at 35 trees and 35 shrubs per acre as the minimal *establishment* rate. That is, before bond could be released on Phase III the vegetation would need to contain that amount of tree and shrub growth as a minimum *and* that growth must be established. Established usually means having survived several growing seasons, usually three at a minimum.

Under this amendment, the committed amount of tree planting contained in the existing plan (includes 1984 and 1989 amendments) is not changed with respect to the Base Reclamation Plan. However, the Enhanced Reclamation Plan will increase these amounts very significantly, especially for the planting rates. Therefore, the Base Reclamation Plan will commit to 35 trees per acre and 35 shrubs per acre on that land included as Phase III in the 1989 amendment. Through interpretation of the description in the 1984 amendment, about 25 trees per acre and about 75 shrubs per acre will be committed to for Phases I, II, and IV, as those phases are defined in the 1989 amendment. All of these lands are included in this amendment as part of Phase AP. These are the minimum *establishment* rates that will be expected of Castle Concrete before bond release can be achieved. The

density will be defined by quantitative sampling and shall be the average density over that land where a particular standard is applied. That is, if there are 3 acres in a particular area and the density standard is 35 trees per acre then before bond release there must be at least 105 trees established on those three acres. The pattern of distribution can be uniform or contagious. A contagious pattern is non-uniform; one acre might have 55 trees, another acre 20 trees, and the third acre 30 trees. The total is still 105 with an average of 35 trees per acre.

Establishment shall be defined as a minimal survival period of 3 years from the time of planting for each tree. That is, trees that have not survived for at least 3 years cannot be included in determining whether the density standard has been met. They can only be included after successful completion of their third growing season.

All tree planting in the Base Reclamation Plan and the Enhanced Reclamation Plan will be done using the same methods. Tree planting for both the Base Reclamation and the Enhanced Reclamation will be done in April. Probably the trees will not be planted until at least the second year growth of ground cover vegetation, but they could be planted when the ground cover seeding is done if the time of planting seeds and trees happen to coincide. No tree planting will be done during the first growing season of the ground cover as that could damage the ground cover and affect the erosion control capability of the grasses.

No irrigation will be used for the tree plantings. However, mulch mats, weed control fabric, moisture collection basins, and the use of polyacrylamides in the planting mix will all be used to improve the survival rate of the tree plantings. Mulch mats and weed control fabric will help control competition from vigorous young grasses which is a major cause of tree planting failure. Moisture collection basins and polyacrylamides help relieve moisture fluctuations.

Species to be planted will be consistent with the Enhanced Reclamation Plan. On most sites, and based upon experience, Pinyon Pine and Rocky Mountain Juniper are clearly the most adaptable to the site. Douglas Fir can be used on moist, well protected sites, but past success with this species on this site has been very poor.

Shrub species to be planted will be the same under both plans. The emphasis will be on Mountain Mahogany (*Cercocarpus montanus*), but other species, as stated in the Enhanced Reclamation Plan, will also be used. Mountain Mahogany is well suited to the site as it is drought resistant and is often a pioneer on disturbed sites. In the successional pathways that appear to occur on this site, significant numbers of this species are included in the mature forest vegetation, especially on south

facing slopes. Because of this versatile growth pattern and moderately broad tolerance curve, ranging from very dry sites to sites on the dry end of mesic, the species is an excellent one to emphasize.

Shrubs will be seeded. The seeding will occur when the grass/legume/wildflower seeding is done. The shrub seed mix was shown earlier.

Enhanced Reclamation: Trees and shrubs in Phase AP that will be added through Enhanced Reclamation should considerably increase the tree and shrub cover on the site beyond what is required by the Base Reclamation. However, as can be determined from an examination of the Enhanced Reclamation Plan there is no defined establishment rate. Under the Enhanced Reclamation Plan trees are to be planted with a density of "approximately 250 trees per acre." This is in addition to the Base Reclamation establishment rate of 25 to 35 trees per acre, depending upon exactly what piece of land is being reclaimed. Assuming a survival rate of 25% (reasonable) the Enhanced Reclamation would add about 60 to 65 trees per acre. This would produce a total of about 85 to 100 trees per acre. Assuming a mature tree diameter of 18 feet, a density of 90 trees per acre should eventually produce a canopy cover of about 50%. This allows some room for continued growth of ground level vegetation, but the extent largely depends upon the distribution pattern of the trees that form the canopy.

Shrubs under the Enhanced Reclamation Plan will be seeded along with the grass and forb mixtures. Shrub seedlings will not be used. Shrub seedings are often more successful than planting seedlings and are certainly much less expensive.

Interactive Processes: Interactive processes between the woody vegetation to be included in these plans will initially be minimal. This is mainly because each tree and shrub will be fairly isolated from its nearest neighbor tree or shrub.

As the trees and shrubs begin to reach mature size, root competition between the woody plants will increase very significantly. This competition will establish a pattern in the vegetation characteristic of moisture limited forests such as those that occur in this area. Tree and shrub spacing will largely be controlled by the amount of territory each plant can claim through root growth. In extreme cases, such as *Larrea tridentata* (Creosote Bush) populations in parts of the southwest deserts, the resulting patterns look as though the shrubs were planted in a highly regular hexagonal pattern. In these forests, those highly regular patterns are rarely evident, but density and pattern are greatly influenced by root competition.

Although the Enhanced Reclamation Plan envisions a fairly specific result with respect to the impact of trees on the visual characteristics of the site, the success of that plan is largely dependent upon the degree of root competition that will occur in the mature forest. Under pre-mining conditions soil depth is quite limited in most areas, even where tree density is moderately high. Through reclamation, the total available rooting depth will be increased which should result in a potentially greater density in the mature community. Whether that greater density will be achieved cannot be predicted because there are many other factors that control the result. Nevertheless, the complete reclamation plan provides an environment that helps establish a greater potential tree density by increasing available rooting depth which reduces the potential root competition that limits density.

Interactive processes between trees and ground cover are far more important from the environmental integrity point of view. Although trees and shrubs address the needs of visual perception by human beings, it is grass that controls erosion and maintains water quality. Therefore, the eventual effects of increasing tree and shrub dominance is an important consideration in the long term success of the plan.

For the first 25 to 50 years after plan implementation, grass cover will dominate the site and should control erosion and therefore sedimentation in adjacent drainages. Mountain Mahogany and grass tend to be quite compatible, even on very moisture limited sites. That is, grass density under and near the shrubs declines, but the erosion control produced by shrub leaves and branches combined with what grass does live under and near the shrubs result in little net change in sediment loads leaving the site. Unfortunately, with most trees, especially Pinyon and Juniper, this developmental pattern does not hold. Increasing tree density usually results in an increase in sediment loads leaving the land, when compared to sediment loads from a shrub/grass or pure grass vegetation.

Initially tree seedling survival is largely controlled by competition between grasses and trees. Cultural practices such as the use of mulches and weed control fabrics can reduce the competition and increase tree seedling survival. But as the trees mature the trees themselves tend to control grass competition and contribute to increased erosion.

This is achieved through a combination of shading effects and what amounts to chemical warfare. Most grasses that normally grow in Pinyon/Juniper forest are fairly shade intolerant. Therefore, as the size of the tree increases the effects of shade reduces grass growth under the tree thereby increasing available moisture for the tree but also increasing erosion through a reduction in ground cover. But Pinyon and especially Juniper also exude chemicals from their leaves that adversely

affect species that compete with the trees for moisture. These chemicals, which exhibit hormonal behavior, either act as grass growth inhibitors or as seed germination inhibitors so the grass seeds cannot even germinate under the trees.

Once the trees established through the reclamation plans achieve a size where shading and chemical effects control vegetation composition, grass density and cover near the trees will decline as compared to the condition seen during the first 20 or 30 years of vegetation development.

Erosion and therefore sediment load is strongly controlled by water drop velocity when it reaches the ground. Water drops falling from tree branches quickly reach sufficient velocity to induce significant soil erosion. Therefore, for the first 20 or 30 years of vegetation development, sediment loads should be rather low, but once the trees become a dominant feature of the vegetation erosion and sediment load will likely increase.

This is a negative interaction between the trees included in the plans for visual mitigation purposes and the grasses intended to control erosion. Whether this increase will cause difficulties in adjacent drainages in the second half of the 21st century cannot be determined, but it will bear watching. The increased erosion potential is probably a necessary result of this reclamation plan and may create some problems decades after bond release. If this does occur, the problems will need to be dealt with then. The reclamation techniques for Phase WP will help control the potential adverse effects of this problem.

This pattern of changing sediment discharge as the vegetation develops and changes is not unusual. As vegetation character changes, whether by natural or artificial means, the overall character of the system changes and must undergo various adjustments before establishing stability under the new character. Although sediment loads may increase as the vegetation changes from grass domination to forest domination, sediment discharge will decline later as readjustment occurs. Thus, these kinds of changes over time would occur irrespective of whether we reclaim the land or the land was abandoned and nature was allowed to do all the reclamation.

Phase WP Revegetation: Revegetation of the backfilled land within (or on top of) the Pit will be to grass cover only. This is needed to help control erosion of upland sites that may occur especially in the long term. Having grass on this land will help control sediment leaving the site. Assuming this land continues as grass and is not invaded by trees, this land will probably help alleviate some of the problems resulting from increased erosion of the upland areas as the tree cover increases over the first four to six decades after reclamation. Because of the nature of the subsoil to

be placed in the backfilled Pit, it is unlikely that trees would invade this land to any significant degree. Pinyon and Juniper are not well adapted to growing in the limestone waste even when topsoiled. If planted they seem to grow moderately well, but reproduction rates appear to be very low, especially if grass density and cover is high.

The species to be planted in this area are different from those to be planted in Phase AP. Here, very vigorous, highly competitive species are to be used in hopes that grass domination can be maintained for many decades. Diversity is not of concern on this area. Therefore, the mixture contains only a few species planted at relatively high rates. In effect, rapid vegetation closure is needed on this land and long term "stagnation" is actually desirable so the erosion and sediment control function of this portion of the site can be maintained with little additional work.

Phase WP - Grass/Legume Seed Mix		
<i>Species</i>	<i>Rate Lbs/Acre PLS</i>	<i>Seeds per Sq Ft</i>
Intermediate Wheatgrass	5	11.13
Pubescent Wheatgrass	5	10.33
Smooth Brome	3	9.99
Tall Wheatgrass	5	9.07
Perennial Ryegrass	2	11.34
Russian Wildrye	5	20.09
Ranger Alfalfa	1	4.82
Yellow Sweetclover	.5	2.98
TOTALS	26.5	79.75

Little, if any, planting will occur on the backfilled Pit area until the entire area is completed with backfilling. This is required because the entire site must be carefully blended topographically with the edges of the reclamation work done on Phase AP. The site will probably remain as a closed basin until the vegetation is established (see Grading in this exhibit). Because of the limited amount of sediment control provided by the small sediment basins located along the road and below the visual berm, allowing drainage from this site to those basins before dense vegetation establishment is achieved could create a severe management problem at the small sediment basins. Once the vegetation

is well established, then the barrier to drainage can be removed, that area revegetated and the small sediment basins used to control the greatly reduced sediment flow from the area.

It is likely that a rich, imported soil medium will be used on Phase WP. That will not only increase the capability of the grasses to quickly achieve closure but should also retard invasion of Pinyon and Juniper. Such a medium might also encourage more shrub growth, especially Gambel Oak. Such shrub growth would be beneficial to the purpose of the backfilled Pit portion of the plan and would also help retard tree invasion.

Following is the Enhanced Reclamation Plan for the Snyder Quarry.

This plan is not to be considered a part of the Castle Concrete Company reclamation obligations for this operation. Only the Base Reclamation Plan portions of the Base Reclamation Plan (Exhibit E) in this amendment application describes the company obligations. It is that plan that should be considered for meeting permit requirements and bonding obligations.

In Exhibit E, Reclamation Plan, reference is made to the Enhanced Reclamation Plan. A reference in that plan to the Enhanced Reclamation Plan should not be taken to indicate the permittee assumes any financial or legal obligation under the Colorado Mined Land Reclamation Act for implementation of the Enhanced Reclamation Plan. Any reclamation work mentioned in the Base Reclamation Plan that is actually Enhanced Reclamation is referenced only to help describe potential interaction or timing requirements. Referencing that work in the Base Reclamation does not mean that Castle Concrete will assume responsibility for the success of those portions of the reclamation activity that are attributable to the Enhanced Reclamation Plan.

ENHANCED RECLAMATION
FOR THE SNYDER QUARRY^{1/}

submitted by
Castle Concrete Co.

March 6, 1991

Reviewed by Castle and the Joint City/County
Mining Reclamation Advisory Committee, February 5, 1993

Revised by the Committee and Castle

March 15, 1993

^{1/} This plan is submitted subject to the statement of reservation by the MRAC set forth at Exhibit A, attached hereto.

I. INTRODUCTION:

The Snyder Quarry is located on the far west side of Colorado Springs and is immediately north of Manitou Springs. The quarry site has been mined intermittently since the late 1800's. Castle Concrete Company, the current owner, acquired the property in 1970 and expanded the quarry to its present size. Although it is difficult to estimate the life of the Quarry, Castle currently anticipates that mining operations will continue another 20-30 years.

The current mining and reclamation plan is designed to produce wide benches (approximately 20-60 feet) and fairly low walls (a maximum of 30 feet high before backfilling, approximately 20 feet maximum after backfilling). Because of a number of factors, it is thought that the Quarry will be relatively easy to reclaim. These factors include:

relatively flat bedding planes of the limestone

wide benches and low backwalls resulting in a gentle slope

significantly greater precipitation than either the Queens or Pikeview Quarries

The Quarry, consisting of 80 acres permitted for mining and another 40 acres designated as a buffer zone, is divided into five phases and a visual berm. A map of the Quarry is attached as Exhibit B. Phases I and II form the southern and western edges of the processing area and the existing pit. The visible portion of Phase I is essentially complete and is now being reclaimed. Phase II consists of the hillside to the west

and south of the existing processing area. Mining in this space will not eliminate this hillside, but will create a series of benches which will be reclaimed in the same manner in which Phase I is being reclaimed. These two phases are visible from anywhere along Colorado Avenue, west of downtown Colorado Springs. These first two phases are relatively independent from the other phases in that they are separated from the other phases by the existing pit. Phases I and II are more or less on the southern end of the mining tract while Phases III and IV are on the northern end of the mining tract.

In Phase III, Castle will mine up the hill (northwest) into what is known as the South Peak. As that phase nears completion, mining will begin on Phase IV which lies just east of an existing drainage course that runs essentially north-south. Phase IV will be mined from west to east through the ridge. In 1984 Castle proposed and received approval of this sequence, in part, to leave until last the ridge comprising Phase IV and thereby screen the mining operations of Phase III from most of the community. By mining Phase IV from west to east, most of the final mining operations will be screened as well.

Phase V consists of the original pit which will be reclaimed by backfilling with waste.

II. THE VISUAL BERM.^{2/}

In February of 1991, Castle submitted its proposal for enhanced reclamation on the visual berm. That proposal follows, as revised to reflect changes since agreed to by Castle and the Committee.

Status.

The visual berm at the Snyder Quarry was constructed over a number of years. It is composed of limestone waste derived from the processing of limestone aggregate at the Quarry. In 1982 and 1983 the berm was placed under reclamation. The initial step of the reclamation was to convert the limestone waste into a benched structure that would have physical stability and be capable of supporting vegetation. Subsequent to cutting the six benches, topsoil was spread over the benches and backslopes to a depth of four to ten inches with an average of around six inches. This soil came from Cedar Heights when it was under construction. It was hauled to the quarry for disposal and use in reclamation. This soil has been used not

^{2/} Attached are two figures. Figure 1, which is Exhibit C, is a top view of the visual berm showing the benches and slopes and some of the key features of the berm as it relates to surrounding areas. This figure was traced from an aerial photo and then enlarged to a scale of 1" = 50'.

Figure 2, which is Exhibit D, is a panoramic view of the berm made from three photographs taken in December 1990. The attached copy has sufficient detail to show the major vegetation components and various features of the berm. This figure is extensively labeled with key features of the berm, and references to ongoing reclamation efforts and enhanced reclamation options.

only to reclaim the visual berm but also for reclaiming quarry benches and disturbances along the quarry access road.

The vegetation on the visual berm is quite variable in both composition and density. The best growth is on the more or less level benches where moisture is high and soil depth generally greater. Over most of the benches complete closure has been achieved in the plant community. Present inventories have shown that at least 40 species of angiosperms live on the benches. About eight of these species were planted; the rest have been derived from seed sources carried to the site in the topsoil.

By late summer the grass on the benches is often from two to three feet in height and produces about 2,000 to 4,000 pounds per acre. The success of the bench growth is outstanding and far exceeds, in both cover and species diversity, any natural ground cover found in this area.

The vegetation on the bench backslopes tends to be more variable and less dense than the growth on the benches. Much of this reduced cover and diversity is related to slope gradient. It is well recognized by plant ecologists that in a given environment increasing slope gradient results in decreased cover and often decreased species diversity. This is largely due to moisture reduction as a result of the slope, reduced soil depth, reduced soil development rates in the geochemical cycle, and sometimes small movements in the growth medium. This more harsh environment also tends to limit species diversity. Fewer species have tolerance curves that allow excellent growth and

reproduction under these more severe conditions. The character of the backslope vegetation is more similar to the dry grassland areas surrounding the quarry. Actually, most of the backslopes have an herbaceous cover that is quite similar in character and cover to the herbaceous cover surrounding the quarry.

Thus, the herbaceous cover on the berm ranges from a condition of essentially 100% cover and high production over most of the berm benches to a low of about 10% cover and low production on the steeper slopes. In local areas where limestone waste is exposed and/or the slope is near vertical, vegetation cover is minimal.

After constructing the benches, the water derived mainly from thunderstorms was allowed to cut away portions of the benches. These washouts were then repaired using rip rap and have become the drainage channels from the central portions of the benches. In unconsolidated material with a benched pattern, this approach of letting nature determine where the water should flow is highly preferable to trying to force the water into discrete drainage channels. In most other topographic situations this approach would be foolish, but on a structure such as this it is usually very successful. Since the initial rip rap repair work, washouts have been rare. A few are present on the berm now and are being repaired as a part of normal reclamation maintenance.

With all the similarity that exists between the grass cover on the berm and the grass cover in areas surrounding the quarry the question is why the surrounding vegetation appears

so much more dense. The cause of this difference is directly attributed to the significant shrub and tree component in the surrounding vegetation and the comparatively less shrub and tree cover on the berm. While tree and shrub cover is slower to develop than grass cover, the shrub and tree component on the berm is developing rapidly and only needs an increase in the evergreen component and more time to fully develop.

After the berm was topsoiled and seeded with grasses, approximately 400 trees and shrubs were planted on the berm. The overall mortality rate of these trees and shrubs was about 20% to 30%, that is, there are about 300 of the originally planted trees and shrubs still growing on the berm. Some of the Russian Olive trees that were about 18 inches tall when planted on the berm are now eight to ten feet tall. Hansen Rose, a variety of wild rose, has increased to such an extent that there are about three times as many individuals as were originally planted.

In addition to the species that were planted, the native Mountain Mahogany (Cercocarpus montanus) number into the hundreds of individuals. Many of these native shrubs are now two to three feet tall and growing well, especially on the backslopes of the benches where conditions are drier. This native shrub, which is a major component of the natural vegetation in this area, came from the soil that was placed on the berm after grading.

Another native that has been found on the berm is Gambel Oak (Quercus gambelii). In time, this shrub should

increase, but it usually requires deep and highly mature soils to do well. Therefore, there will not soon be an abundance of this species.

Approximately 100 Rocky Mountain Junipers were also planted on the berm. This evergreen is a major component of the forest surrounding the quarry and therefore determines much of the character of the natural vegetation. On February 15, 1991 an inventory of Rocky Mountain Juniper on the berm found a total of 58 individuals (see Exhibit C for distribution). The size of these individuals, at the time of the inventory, ranged from about two feet to a maximum of about six feet with an estimated average of about three and one half feet. Although the number of these important evergreens, from the point of view of visual impact, is significant, their small size currently has little impact on the visual character of the vegetation growing on the berm.

A sampling of the forest density on similar aspects in the surrounding vegetation showed an average of about 125 trees per acre. This density is divided in various proportions between Rocky Mountain Juniper and Pinyon Pine. Thus, the evergreen tree density on the berm is about half of the natural evergreen tree density in surrounding areas. A few Pinyon Pines have been found on the berm and they are invaders.

Ongoing Reclamation Efforts.

Weak vegetation growth is being increased to create a growth that will meet the intent of the existing approved plan. Erosional damages are being corrected and managed until

such time as they become insignificant. In February and March 1991, Castle Concrete will be grading exposed limestone areas on the south end of the berm. Topsoiling will also be done on some of the weaker slopes where the initial soil layer was either insufficient, eroded away by sheet erosion, or did not initially establish sufficient vegetation cover to protect the growth medium. Slope 1 and Bench 1 will be regraded and merged with Slope 2 to create a more rounded top to the berm and eliminate the short but problematic exposed limestone areas at the top of Slope 2. These areas will be retopsoiled and seeded with grasses and legumes. These actions will prepare these specific areas for further enhancement.

ENHANCEMENT

Based on this description of a) the existing vegetation on the berm, as compared to the natural vegetation in the surrounding lands, and b) Castle's ongoing reclamation efforts, a list of specific enhanced reclamation options can be defined.

- Backslope Vegetation Cover. Low density ground cover vegetation on the backslopes of the benches may be increased to produce more uniformity in the overall background vegetation cover. Existing grass growth on the backslopes may be increased to produce maximum possible closure after considering slope gradient.

- Mountain Mahogany. Shrub cover may be increased through fertilization to provide more of the texture found in

surrounding areas. This shrub cover enhancement is not so much an increase in the number of shrubs as an increase in the size of the shrubs.

- Blending of Tree Cover. The evergreen component of the berm vegetation may be increased in both density and size. Density increase in the evergreen component can be achieved by additional planting of evergreens, but evergreen size is largely a matter of allowing sufficient time for the trees to grow. Rocky Mountain Juniper and Pinyon Pine are both fairly slow growing trees that have a low tolerance for irrigation and fertilization. These species normally grow in dry conditions and rarely do well where moisture is abundant. Pinyon Pine also has a high preference for rocky, well drained and generally dry soils. Thus, enhancement of the evergreen component requires careful consideration of these rather specific growth requirements.

Enhancement of Existing Backslope Vegetation Cover.

Revegetation of the backslopes of the visual benches can be enhanced by using a two step process:

Fertilization

The first step is to increase the nutritional level in the growth medium by using a largely organic source such as poultry waste. Richlawn Turf Food (or comparable) should be applied to the backslopes at a rate of approximately 50% the recommended rate for lawns. Optimally, the fertilizer would be applied twice for one year. There is no need to fertilize the

benches as growth there is already at maximum. Backslope fertilization should produce greater age diversity and cover closure.

Fertilization should NOT be done with inorganic fertilizers such as pure ammonium nitrate. The soils on these backslopes are still highly immature and the biological activity is undoubtedly very unstable and poorly integrated. A high intensity fertilization with inorganics could damage the biological activity and create instability in the nutrient cycling.

It is unlikely that a multi-year application would enhance growth any further than would be produced by a single year application. Many of the species growing on the backslopes have low nutrient requirements. Research on coal strip mine revegetation has shown that excessive fertilization often causes a strong shift in the vegetation toward high dominance of very competitive cool season grasses. Because the backslopes of the berm are more appropriate for warm season or near warm season grasses, inducing such a shift would create instability in the community structure and a reduction in diversity resulting in a less adequate vegetation than is currently present on the backslopes. Thus, over fertilization of the backslopes would be counterproductive to creating a vegetation character similar to the surrounding vegetation.

A first fertilization should occur between September 15 and October 15, 1991. Fertilizing at this time should increase root production of grasses and forbs currently growing

on the backslopes. This increased root production will translate into greater top growth and reproductive rate in the 1992 and subsequent growing seasons. Estimated Cost: \$190.

A second fertilization should occur between April 15 and May 15, 1992. This should provide an additional boost to the growth of grasses, forbs, and shrubs during the 1992 growing season. This fertilization should thus provide a nutritional base so the additional roots produced by the fall fertilization can more easily achieve the greater top growth and reproduction. Estimated Cost: \$225.

Grass Plantings

The second step in the process is the planting of a strong nitrogen fixing species. A drought resistant alfalfa such as Ladak or Ranger may be planted at a rate of approximately one to two pounds per acre. Native lupine could also be planted, but the seed is quite expensive and establishment is often very difficult except under ideal moisture conditions. The alfalfa would undoubtedly be far more successful and would more likely produce the desired result.

The fertilization should enhance the existing grass growth and reproduction while the establishment of a strong nitrogen fixer should help to increase the efficiency of nitrogen cycling in the immature soils. This should eventually cause the grass to achieve a higher level of cover than is currently the case and will help the shrub component to mature. Research by the Colorado State University Agronomy Department in the 1960's showed that this approach produced significant

gains in vegetation cover on coal mine spoils near Hayden, Colorado. Research on the reclamation of oil shale waste also showed this to be true. Recent investigations on the natural revegetation of lands around Mount St. Helens have shown that strong nitrogen fixing species are key elements in the revegetation of even the most drastically devastated lands around this volcano.

An alfalfa planting to stabilize the nitrogen cycle in the growth medium should occur between March 15 and April 15, 1992. Alternatively, it could be done in October of 1991, but the risk of germination and loss of the alfalfa over the winter would be considerable. Estimated Cost: \$1,000 (native lupine may be substituted at approximately the same price).

Mountain Mahogany Enhancement.

Mountain Mahogany growth can be enhanced by providing it with good protection from browsing and a good growth environment. Browsing of Mountain Mahogany is not a real problem on this site. Although deer have browsed some shrubs, the impact is not significant.

From observations since 1967, it appears that once the shrub reaches a height of about three feet it rather quickly grows to its maximum height of five to seven feet. Once it achieves maximum size, it adds internal branches eventually producing a dense, rounded shape. It appears to take from five to ten years to reach that three foot height, assuming limited browsing. Therefore, many of the Mountain Mahogany shrubs on

the berm should show a high acceleration in growth rate over the next two to four years.

The general fertilization program described previously to enhance the ground level vegetation should also favorably impact this species. Furthermore, planting of alfalfa should help to increase the nutrient cycling rate. This should help the small individuals of this shrub to achieve maximum size once they are large enough to undergo the growth burst. Providing some additional fertilizer to the larger individuals might produce an acceleration in growth, but there appears to be nothing in the literature about how this species reacts to fertilizers. Spreading a little more organic fertilizer around the base of the currently larger plants should not hurt them and might accelerate growth.

These shrubs should NOT be irrigated. It is already clear that the shrubs on the berm that are doing the worst are the ones located where moisture is most abundant. This species is rarely found in moist or wet situations and achieves maximum size in drier, well drained, rocky soils. Irrigation would probably be the very worst action that could be taken in an attempt to increase the growth of this species.

The estimated cost of shrub fertilization is included in the cost estimate of fertilization under backslope vegetation cover.

Enhancement and Blending of Tree Cover.

The natural vegetation surrounding the location of the berm is a mixture of forest and shrub dominated growth. The primary character of this vegetation is dominated by the evergreen Pinyon Pines and Rocky Mountain Junipers. The density of these forests is highly variable ranging from about 30 trees per acre to about 175 trees per acre. An average of ten samples taken from aerial photos shows a density of about 115 to 130 full grown trees per acre.

Currently the berm has 58 Rocky Mountain Junipers. The total surface area of the berm is 2.1 acres, but about 0.75 acre of this would not be suitable for the easy growth of trees due to the benched structure needed to provide physical stability. Therefore an optimal tree count would be about 150 evergreens or about 90 more than are currently living on the berm.

The elimination of Bench 1 to correct areas of exposed limestone waste (pursuant to the existing reclamation plan) will eliminate 15 Junipers from the current count. Therefore, after this grading is completed about 100 to 110 evergreen trees would be added to reach the optimal number. The species that would be used in this increase should include both Pinyon Pine and Rocky Mountain Juniper.

The texture of the growth medium favors Rocky Mountain Juniper, but Pinyon Pine, as evidenced by its limited invasion of the backslopes, apparently can grow on the berm. Additional trees may be added at a ratio of two Rocky Mountain Junipers for

each Pinyon Pine, that is, about 35 Pinyon Pines and about 70 Rocky Mountain Junipers could be established in addition to the evergreen component currently on the berm.

The original planting of 100 bare root Rocky Mountain Junipers showed a mortality rate of 42%. If potted stock is used this mortality rate would be reduced, but a 40% mortality rate should be anticipated in any additional plantings. If lower, any additional plantings will simply increase the total number of evergreens. Assuming a 40% mortality rate, 150 to 160 additional trees can be planted on the berm to eventually produce 100 to 110 additional trees.

Two different sizes of trees can be planted. Larger trees (about four to six feet tall) can be planted on the benches. The benches are about twelve feet wide and therefore planting of this size tree on the benches would not require such a large planting hole that a local weakness would be produced in the bench structure. Planting any larger tree than this would very likely create structural weaknesses that could result in local collapse of the bench that would be difficult to repair without destroying much of the existing vegetation.

On the back slopes, small containerized trees can be planted. These do not require a large planting hole and therefore disturbance to the stability of the slope should not occur.

About one third (about 50) of the total number of trees can be planted on the benches. The remaining about 100 trees can be planted on the slopes. This will help to avoid a

linear pattern in the final tree growth that would result if all plantings occurred on the benches. The pattern of tree planting on the slopes should be randomized and concentrated on the top four benches where visibility is the greatest and the visual impact of the trees will be most significant.

Plantings of the trees on the slopes can emphasize the use of polyacrylamides to improve the moisture condition in the root zone of the young trees. Irrigation of trees on the slopes should be avoided as much as possible to prevent the development of small rills that could expand to undercut the young trees and either damage their growth or even kill them.

Plantings of trees on the benches should not utilize polyacrylamides because the moisture level on the benches is already quite high. The polyacrylamides could create excessively moist conditions around the trees on the benches. Instead, irrigation of the trees on the benches can be used for the first year or two. However, that irrigation should be carefully managed to avoid excessive moisture especially during July and August when monsoonal rains can create very wet conditions on the benches. Irrigation should therefore primarily be restricted to the dry times of the year, mainly late September through February. Spring moisture, although often good, can be lacking and therefore irrigation in May and June might be necessary if moisture is limited.

A drip irrigation system would be quite complex on this berm and is probably unnecessary due to the good moisture retention capability of the limestone waste underneath the soil.

Although more tedious, water can be provided by hoses and/or carried to individual plants in buckets. The area is small enough that this should not be difficult. Furthermore, for only occasional irrigation, establishing a semi-permanent irrigation system would probably not be worth the effort and expense.

Any trees which are added should be planted in late April 1992. This would include both the small containerized trees on the backslopes and the larger stock on the benches. If sufficient tree stock can be obtained at appropriate prices, the planting could take place in April of 1991. Estimated Cost: \$100 per tree. (150 trees X \$100 = \$15,000.) (This estimated cost includes the cost of irrigation and use of polyacrylamides.)

III. ENHANCED PROPOSAL - PHASES I-IV

Because Phases I through V were last reviewed in 1989, Castle is of the view that the existing plans for these areas reflect contemporary standards. However, Castle and the Committee have agreed to the following enhancements for these areas:

This proposal for enhanced reclamation proposes to supplement and may accelerate the vegetation contained in the existing reclamation plan. This proposal contemplates the possibility of importing top soil to supplement the soil which will be scavenged from the site. The seed mixture will be amended to add shrub seeds. The number of tree plantings contained in the existing reclamation plan will also be

increased, however the goal of the enhanced plan is not to reforest the site. From a distant perspective, the reclaimed site will be grassland with a sparse distribution of trees. The backwalls that will remain, although relatively low, may be stained to reduce their contrast with the color of the grasses, shrubs and trees that will occupy the reclaimed slopes. The remainder of this proposal details each of these proposed enhancements.

Backfilling of Benches:

Castle's experience indicates that when backfilled benches are covered with a thin layer of topsoil, revegetation is accelerated. This proposal contemplates that the backfilling described in Castle's 1989 Amendment for Phase III will apply to Phase IV and any other areas of the Quarry to be reclaimed in the future. Backfilling will minimize the height of the backwalls. Based on preliminary studies, Castle estimates that backwalls, having an initial height of 20-36 feet, will measure only 8-12 feet after backfilling and in some places will be eliminated. Backfilling also softens the rigid bench-backwall pattern that would otherwise remain as mining operations are completed. Backfilling will take place as each bench is finished.

Estimated Cost: \$242,000 (assumes average backfill of 5 cu. ft./sq. ft. of land backfilled at \$1.00/cu. yd. and 30 acres to be backfilled).

Topsoil

The current Division of Mineral & Geology approved plan acknowledges the importance of topsoil in achieving Castle's reclamation goals. Unfortunately, the quantity of topsoil located on the areas to be mined in the future is inadequate for the level and speed of reclamation the Committee deems desired by the community. Therefore, additional topsoil may have to be imported to the site. The necessary topsoil should be obtained from community donations of appropriate excavation materials and composting materials. Some topsoil might be obtained from continued development of the nearby Cedar Heights subdivision. One problem with this approach is that storage room at the Quarry is limited. A nearby location will need to be found where topsoil and composting materials can be accumulated and stored until needed. If the logistics of storing and moving the needed topsoil cannot be solved, then this element of the plan might have to be abandoned, thereby delaying revegetation. Assuming that adequate topsoil supplies can be obtained, topsoil should be spread on benches after backfilling with rubble and waste is completed and immediately prior to seeding.

Projected Costs: \$60,100 (assumes 27 acres to be topsoiled to a mean depth of 8" at a cost of \$2.00/cu. yd.).

Vegetation

The vegetation proposed for the Quarry consists of grasses, shrubs and trees. Revegetation, whether through

seeding or hand planting, will take place as each bench is finished. The original reclamation plan calls for seeding grasses and planting some trees and shrubs. The plan relies on natural invasion of shrubs and trees. This enhanced proposal suggests that the seed mixture should be amended to include shrubs to potentially accelerate the revegetation process. The specific seed mixture will be determined by Castle's reclamation specialist and the Committee's reclamation specialist.

The tree component of this plan is important because, while grasses and shrubs are essential components of the plant community, trees will have the greatest impact on altering the visual texture of the reclaimed site. The current reclamation plan calls for attaining 25 coniferous evergreen trees per acre in Phases I, II and IV and approximately 35 trees per acre in Phase III. This enhanced plan proposes to increase the tree density by planting approximately 250 trees per acre. After grasses are established, tree seedlings should be planted in random clusters near the remaining backwalls. Pinon Pine and Douglas Fir will be planted in Phases I and II, which are north and east facing, while only Pinon Pine will be planted in Phases III and IV which are south facing. Polyacrylimides should be used in preparing the soil for tree plantings to provide moisture retention. Unlike at Castle's Queens Canyon Quarry, destructive browsing of tree seedlings by wildlife is not expected to be a problem.

Projected Costs: Shrubs: unable to estimate until species specified. Trees: \$51,000 (assumes 250 trees/acre on

34 plantable acres, Colorado State Forest Service tublings, including planting and polymers).

Staining

The current mining plan is designed to leave relatively wide benches with relatively low backwalls. Castle predicts that after the placement of rubble, fines and topsoil on the benches, few if any high backwalls will remain. These walls, however, will contrast with the color of the grasses, shrubs and trees that will occupy the reclaimed slopes and that contrast may be visible. To reduce this contrast, the exposed backwalls may be stained with an organic rock stain. The staining decision should be made immediately prior to the distribution of the topsoil to avoid trampling the soil.

Projected Costs: (\$18,000 per acre X ___ acres)

TV. ESTIMATED COST OF MAINTENANCE: \$ 36,933

EXHIBIT A

CITY OF COLORADO SPRINGS/COUNTY OF EL PASO
MINING RECLAMATION ADVISORY COMMITTEE
CITY PURCHASING OFFICE
30 S. NEVADA
COLORADO SPRINGS, CO 80903

March 18, 1993

Statement of Reservation by the MRAC

The current reclamation plan proposes that the final land use for the site "should be designated as Wildlife/Recreation/Residential/light Industry, with the production of wildlife habitat as the primary emphasis of the plan." The Committee recommends that the reclaimed site be maintained as open space, particularly if community funds are to be contributed to fund enhanced reclamation at the Quarry. In response to this recommendation, Castle has stated that it is not willing to make any commitments that the quarry will remain dedicated as either open space or as wildlife habitat. The Committee asked Castle to agree to land use restrictions or to suggest any alternative mechanism that would assure the community that the enhanced reclamation contained in this proposal, once funded and implemented, would not be degraded by future development. Castle is not willing to agree to any land use restrictions beyond current County zoning regulations and has not suggested any other mechanisms to address this concern. Because of this position, the Committee is concerned that the community may not be willing to help fund the enhanced reclamation outlined in this proposal. The Committee and Castle were not able to reach agreement on this issue and will refer the issue to the community for its input.



EXHIBIT 5 – EVALUATION SCORESHEET

**PROPOSAL EVALUATION SCORE SHEET
SOLICITATION NUMBER AND TITLE:**

RFP EVALUATION CRITERIA DESCRIPTION	SCORE
<p>1. TECHNICAL AREA</p> <p>The Offeror must explain its overall solution, considering the scope of work or statement of work provided. The content must include, but not necessarily be limited to, the following information.</p>	
<p>A. Project Approach</p>	
<p>In the Technical Area, the Offeror should clearly present proposed solutions and indicate that it has performed adequate planning to accomplish tasks as defined in the Statement of Work. Innovations, efficiencies, and detailed specifics are all encouraged.</p> <p>The Offeror must at least address the following areas:</p> <ol style="list-style-type: none"> 1. Construction phasing and sequencing for the project. Explain the phases, and the logic in the construction phasing and work sequence. 2. Erosion and sediment control during all phases of construction as well as post construction efforts through permit closure. 3. Schedule Management. Discuss your approach to schedule management including updating and reporting progress of the work. 4. Quality Control. Discuss your quality control plan, processes and approach to ensure that the City receives a quality product. 5. Safety. Discuss the contractor’s approach and commitment to safety for both construction workers and the public traveling through the construction site. 6. Potential issues that your firm foresees with this project and how you would make adjustments if encountered. Describe factors limiting construction phasing flexibility and potential remedies. <p>Consider the following questions.</p> <ol style="list-style-type: none"> 1. Does the proposal include a complete plan to accomplish each requirement, including equipment being used and subcontracting (if applicable)? 	<p>5 – Exceptional 4 – Very Good 3 – Satisfactory 2 – Marginal 1 – Unacceptable</p>



<p>2. Does the proposal demonstrate that appropriate and qualified personnel and equipment will be provided to carry out the requirement?</p> <p>3. Is the proper level of effort directed toward each requirement? Does the level of effort look unrealistically low or unreasonably high?</p> <p>COMMENTS:</p>	
<p>Sum of Ratings in Technical Area (Add numbers in Section 1.A. and 1.B):</p>	
<p>2. MANAGEMENT AREA</p> <p>The Offeror must explain its method of managing the work to be performed. The content must include, but no necessarily be limited to, the following information.</p>	
<p>A. Program Management Controls</p>	
<p>In the Management Area, the Offeror should provide a plan of operation, to include management of personnel, workload, schedule, and budget. It should also include an organization chart which demonstrates clear and effective lines of authority, responsibility, and communication for management, supervisory, and technical personnel. The plan should address which job classification or personnel will be assigned to each task and how that determination is made. Basic human resource management concepts should be addressed, including hiring, firing, discipline, incentive plans, etc. If the Offeror plans to subcontract more than 10% of the work, include information on how the Offeror plans to manage its subcontractors.</p> <p>The Offeror shall provide a detailed construction schedule for the project showing the key construction activities and how they will meet or better the County's timeframe and maximize construction efficiency to provide the best value to the City and minimize impacts to the public. The schedule shall be based on the Offeror's understanding and approach to the work as addressed above. Schedules submitted for this proposal shall assume a start date of February 17, 2025.</p> <p>Consider the following questions.</p> <ol style="list-style-type: none"> 1. Does the proposal address the issues above in sufficient detail to demonstrate a sophisticated and mature management control system? 2. Are program management controls consistent with the technical portion of the proposal, especially regarding schedule and level of effort? 3. Does the plan and controls indicate that the Offeror will obtain, keep, and efficiently utilize high quality personnel? 4. Does the offer address corrective actions? 5. Does the proposal explain how the Offeror will remain within schedule and budget? <p>COMMENTS:</p>	<p>5 – Exceptional 4 – Very Good 3 – Satisfactory 2 – Marginal 1 – Unacceptable</p>



<p align="center">B. Past Performance/Relevant Experience</p>	
<p>In the Management Area, the Offeror should provide at least three references or contracts demonstrating that it successfully provided services/products same or similar to those required in the RFP. The proposal should adequately explain how the projects were completed on schedule and within budget.</p> <p>Consider the following questions.</p> <ol style="list-style-type: none"> 1. Does the proposal include at least three references or past performance citations? 2. Are the references or past performance citations relevant to the requirements of the Statement of Work of the RFP? 3. Does the Offeror explain how they were successful on the projects provided as past performance? 4. Does the Offeror apply the past performance to the City requirement in such a way as to demonstrate added value due to experience? <p>COMMENTS:</p>	<p>5 – Exceptional 4 – Very Good 3 – Satisfactory 2 – Marginal 1 – Unacceptable</p>
<p align="center">C. Key Personnel</p>	
<p>In the Management Area, resumes must be provided for all personnel considered key, as required by the RFP. It is highly recommended that the Offeror provide sufficient content and detail to answer completely the following questions. Resumes do not count toward the page limitation. Explain how the key personnel were related to the projects cited as relevant past performance.</p> <p>Consider the following questions.</p> <ol style="list-style-type: none"> 1. Does the Offeror provide complete resumes, including education, experience, background information, accomplishments, and other pertinent information? 2. Does the Offeror provide resumes for all key personnel, as required by the RFP? 3. Do the resumes demonstrate adequate professional, technical, and management levels to accomplish the work effectively and efficiently? <p>COMMENTS:</p>	<p>5 – Exceptional 4 – Very Good 3 – Satisfactory 2 – Marginal 1 – Unacceptable</p>
<p>Sum of Ratings in Management Area (Add numbers in Sections 2.A., 2.B. and 2.C.)</p>	
<p>3. PRICE/COST AREA</p>	
<p>In the Price Area, the Offeror should provide a detailed breakdown of the price for each year of performance. The price must be fully loaded/all-inclusive and include unit cost for material, labor, other direct costs (e.g. travel), indirect costs (i.e. overhead and general and administrative costs), and profit/fee. Offers must include</p>	<p>5 – Exceptional 4 – Very Good 3 – Satisfactory 2 – Marginal 1 – Unacceptable</p>



<p>sufficient detail to allow insight into the fairness and reasonableness of the price. If the contract type will be T&M, labor categories, labor rates, separated profit, and estimated material costs must be included in detail.</p> <p>In addition, although price may not be the most important factor, it is still very important to the City of Colorado Springs. The Offeror's pricing must be competitive as compared to the budget amount, market pricing in the industry, and the pricing of the other Offerors.</p> <p>Consider the following questions:</p> <ol style="list-style-type: none"> 1. How does the price compare to the industry competition? 2. If low, is it unrealistically low? 3. If high, is there demonstrated added value for the additional cost? 4. Does the proposal describe any cost savings and areas to improve efficiency? 5. Does the proposal describe any value added to the project by the contractor? <p>COMMENTS:</p>	
<p>Total Price/Cost Area (Insert number from Section 3 evaluation above):</p>	
<p>4. PROPOSAL PRESENTATION</p>	
<p>Presentation is an important factor. Offerors should provide a highly professional product, which is complete, accurate, easily understood, and effectively presented.</p> <p>COMMENTS:</p>	<p>5 – Exceptional 4 – Very Good 3 – Satisfactory 2 – Marginal 1 – Unacceptable</p>
<p>Total Proposal Presentation Area (Insert number from Section 4 evaluation above):</p>	
<p>LOCATION BONUS (IF APPLICABLE)</p>	
<p>Total Bonus Points for location:</p>	
<p>EXCEPTIONS PROPOSED</p>	
<p>What (if any) exceptions (redlines to our terms and conditions) were proposed? Are they acceptable?</p> <p>COMMENTS:</p>	<p>Pass/Fail</p>
<p>TOTAL SCORE – Add Evaluation Scores from Sections 1-4 and location bonus (if applicable). The sum is the total score.</p>	<p>Total Score:</p>



SCHEDULES

Schedule A	Price Sheet
Schedule B	General Construction Terms and Conditions
Schedule C	Scope of Work
Schedule D	Special Specifications
Schedule E	Construction Plan Set



SCHEDULE A – PRICE SHEET

PLEASE FILL OUT AND RETURN THE ATTACHED PRICE SHEET IN EXCEL FORM.

PLEASE FILL OUT BIDNET PRICE SHEET WITH TOTAL BASE PRICE



SCHEDULE B – GENERAL CONSTRUCTION TERMS AND CONDITIONS

Schedule B -- General Construction Terms and Conditions, Version 100316 are hereby incorporated by reference, with the same force and effect as if they were given in full text. Upon request, the City will make their full text available. Also, the full text of a clause may be accessed electronically at this address:

<https://www.coloradosprings.gov/finance/page/procurement-regulations-and-documents>

The referenced General Construction Terms and Conditions will be incorporated in the resultant Contract.



SCHEDULE C – SCOPE OF WORK

C.1 OVERVIEW

The Snyder Quarry Reclamation project will include 38.9 acres of earthwork and grading, growth medium placement, reseeding and planting and stormwater management to restore the former quarry into a natural landscape.

C.2 BACKGROUND AND HISTORY

The City of Colorado Springs Parks, Recreation, and Cultural Services Department (PRCS) acquired the 163-acre Black Canyon Open Space property from the previous owner in 2020. Within the open space contains the historic and decommissioned Snyder Quarry. PRCS has initiated the reclamation of the quarry site and seeks qualified contractors to complete the restoration of the quarry to reestablish historic drainages, naturalized hillslopes, native landscapes, and improved wildlife habitat.

C.3 RECLAMATION PLAN SUMMARY

The Snyder Quarry Reclamation Plan is approved by the State of Colorado Division of Reclamation, Mining and Safety (DRMS) and included in the bid documents, is designed to turn the quarry site into a combination of open forest and grassland. The site will be reclaimed to restore the natural drainages, improve wildlife habitat, establish open space aesthetics and enhance the mountain backdrop from the urban and suburban areas.

The approved Reclamation Plan with the DRMS establishes a Base Reclamation Plan. The Base Reclamation Plan will create the necessary topography appropriate to the desired form and function of the open space. More focus will be added to reducing and mostly eliminating the vertical cut slopes, to conceal and re-establish a more sustainable and natural hillslope. The Reclamation Plan addresses an Enhanced Reclamation Plan that serves to provide additional vegetation to further mitigate the visual impacted caused by the quarry. The included Plan Set and Bid items address incorporating some elements of the Enhance Reclamation. The drainage areas will be rip rapped with the sediment traps/ bio swales and be planted with wetland vegetation. The Bid Documents and Plan Set seeks to incorporate the Base Reclamation Plan with some additional tree plantings in select areas.

C.4 STORMWATER MANAGEMENT

The contractor shall implement stormwater management control measure prior to and during the work. Stormwater control measures are identified on the plans and are designed to control, manage and treat stormwater that leaves the site. The contractor shall be responsible for daily and weekly maintenance. Repairs must be completed as soon as possible to stormwater control measures. Rocks installed as part of the control measures will remain in place after work is completed.



C.5 GRADING PLAN SUMMARY

The final grading plan seeks to create a topography and drainage that is reasonably similar to pre-mining activities. The design intent is to remove high-walls, smooth out and stabilize the slopes for a non-engineered natural look and provide suitable slopes for favorable growing conditions for native species. The grading plan goal will be to have as little exposed vertical walls as possible so the maximum amount of revegetated land can be created.

Drainages: Reestablished drainages will have a max grade of 3:1 (ideally shallower when possible) and will be rip rap lined. Sediment traps and bio swales shall have a shallower gradient and a depression to slow water and allow for sediment to accumulate.

Swales: proposed swales shall have positive drainage with a minimum slope of 2%. Rip Rap Rock Check Dams shall be installed at regular intervals and will remain in place permanently.

C.6 UPPER BOWL GRADING (PHASE AP)

The Reclamation Plan identifies that this area may integrate a series of benches walls as cliffs, each of which may be partially or totally backfilled and have a max slope of 2:1. However, the desired grading in this area will be a smooth, sculpted naturalized slope with very limited to no visible vertical walls. Where vertical walls are kept, they shall serve as an isolated cliff with a natural appearance.

C.7 REMAINING QUARRY SLOPES GRADING (PHASE AP – ABOVE PIT)

While benching and backfill on terraces slopes in acceptable within the DRMS Reclamation Plan, the City's desired is to, again, grade the site so the final topography will look naturalized. This will be more aggressive of a backfill and regarding plan than the minimal guidance in the Reclamation Plan.

Per the Reclamation Plan, the average max slopes shall not exceed 2.5:1. In short sections, with a max elevation change of 25 vertical feet, slopes may exceed 2.5:1. Slopes steeper than 2.1 will be strictly avoided except where bench back walls must be left. This will likely occur on a small portion of the West Ridge. The City's goal would be to establish a naturalized but consistent hill slope between a 2.5: and 3:1 grade with minimal to no vertical walls shown.

C.8 PIT OR QUARRY FLOOR GRADING (PHASE AP – WITHIN PIT)

The lower slopes of the project in and around the valley floor of the quarry, also known as the Pit, or Lowland Area will be graded with more gradual topography. The Pit area generally consists of quarry processing remains (crusher fines). The valley floor will also



be a source of fill dirt therefor a portion of the floor can be used and lowered in elevation. The lower, gentle slopes will incorporate defined swales for water flow.

C.9 BENCHING PER THE RECLAMATION PLAN

If benching (steps and terraces) is to be used, fill and topsoil depths will be critical for vegetation and tree growth. Suitable fill depth for tree planting areas shall be 6' depth. Refer to Figure RP-10 of the Reclamation Plan. Depths at the back of the wall shall be varied and undulating to prevent linear patterns that are visually harmful. The City desires to minimize the use of benching.

C.10 SLOPE BACK FILLING AND EARTH MOVING

The driving concept for the restoration and earthwork is moving existing overburden and cutting of specific slopes to generate fill material. The fill material can be placed to create and establish naturalized slopes, drainages, swales and the valley bottom. Fill dirt shall be compacted in 24" lifts. With this concept, imported materials are not anticipated but clean imported fill will be acceptable.

C.11 OPEN HOLE BACKFILLING

The two notable holes in the Pit on the site can be backfilled with clean fill dirt and limestone waste found onsite. This includes the quarry "floor," which will be lowered in elevation per the grading plan. This material can be used and integrated into the backfilling of the pit (or any other areas in the quarry). Backfilling shall be compacted in 24" lifts.

C.12 MINING DEBRIS (BENIGN) AND TREE REMOVAL

The site has some remnant debris from previous mining activities and operations. This includes scrap metal, old timber power poles, rubber conveyor belts, tires, pipes, concrete pads and concrete blocks. All material shall be hauled off site and legally disposed of.

Some existing trees and larger bushes will be removed with the earthwork. Tree debris shall be stockpiled close to the staging area to allow for City Forestry to pick up and haul away tree debris. Contractor may select to chip material on site for use as amendments. Concrete blocks in good to great condition shall be relocated into a location off the grading area (near the stormwater ponds along the roadway) for future use. Concrete blocks in poor condition shall be removed from the site and legally disposed of.

The former shop building we NOT be removed as part of this work. Additionally, at the time of this writing there is a lift and an old storage trailer on site that should be removed by others prior to work starting.



C.13 GROWTH MEDIUM

Use of growth medium, soil amendment or topsoil will be critical for the success of the revegetation. Appropriate growth medium can be utilized from the existing site, in approved work areas within the project limits or imported to the site from other means.

A. Use of existing soils from import piles on site with some added organics (wood chips) with approved soils amendment blended together then placed

B. Onsite blending of soils, composts and organics to produce topsoil

C. Donated topsoil/growth medium - Clean, tested dirt from outside the project site may be accepted for use and can be stockpiled during the project. This may be coordinated with the selected contractor as well as the City Staff.

D. Purchased Topsoil – Clean and processed topsoil may be acceptable for use and can be stockpiled during the project. All costs incurred will be part of the contractor work.

E. Soil Amendment in Phase AP (upland) shall be integrated into the regraded slope. Application rates for traditional amendments are estimated at 2” cover and integrated into the top 6” of fill (600 to 800 CY per AC). Appropriate soil amendments can incorporate:

1. Traditional Organic soil amendments
2. Blending of wood chips from City Forestry mulch (delivery of Mulch to site by City)
3. Use of BioChar (Chip medium size) –
 - a. <https://extension.colostate.edu/topic-areas/agriculture/biochar-in-colorado-0-509/>
 - b. Available form Biochar Now, LLC - biocharnow.com
4. Mix of Wood Chips and BioChar

The City would like to explore using a Biochar amendment for the phase AP (upland) area. This item is listed as a bid item but open to other proposals that are effective and cost appropriate. Application Rates for the Biochar are 5 CF per 1,000 SF, or 218 CY per the 26.99 Acres. The production can be directly placed on soil and integrated into the top 6” of the soil.

Any growth medium and amendments shall be integrated to a depth of 6”. In locations on benches or with shallow fill dirt, a depth of 12” shall be required. It is assumed that the majority of the site will utilize a 6” depth of growth medium. Non-native topsoils shall be stockpiled with native topsoils and blended.

WP Phase (Lowland, Pit or valley floor) to rely on an import or on-site processed growth medium of 6” depth to support a more rigorous growth of the seed mix. This material may be from appropriate growth medium on site or imported.



The timing of growth medium placement shall occur just prior to planting and seeding to maximize the benefits of placement, nutrient availability and seed germination. Seeding will occur not more than 5-7 days after spreading of the growth medium. After 1 week, the growth medium starts to seal and only larger cracks remain. This leads to lower success rates. Topsoil/growth medium can only be done when seed can be planted. If the sites must be topsoiled but cannot be seeded, then the site needs to be roughened by hand before seeding.

Any Stockpile locations shall incorporate BMP's to protect runoff and sedimentation. Refer to the Stormwater Management Plan on Sheet 14 and 16 of the Plan Set.

C.14 RIP RAP

Use of rip rap will be critical in key drainages and swales. Rip Rap for the project is anticipated to be generated from the project site. There are existing stockpiles of rip rap on site, scattered piles, large boulders and source rock from grading (excavation) can be harvested, processed and used. Rip rap will be used as rock check dams and rundowns per plan. The rip rap shall use rock 12" to 24" collected and sorted from native rock on site (in stockpiles and found during work). Estimated rock needed for the rip rap is 2,151 TONS

A. Area Breakdown:

1. Rip Rap Line Drainages estimate = 1,259 TONS
2. Rip Rap at Pond Crest estimate = 370 TONS
3. Rip Rap Rundowns (dissipaters) = 266 TONS
4. Rip Rap Check Dams = 3,248 TONS

C.15 REVEGETATION PLAN

The revegetation plan is designed to produce a dense cover of ground level vegetation with seedling trees for the future forest generation. The project site will be seeded with three distinct areas based on species and seed mixes. This includes the Upland Phase AP (majority of the project area), Lowland Phase WP (the Pit), and Wetland meadow. Updated Seed Mixes and application rates are shown in the Construction Plan Set (Schedule E).

Timing: Seeding shall occur in the early spring or the late fall. Its anticipated seeding will occur in Spring 2025 for this project. All seeding shall be done by drill seeding and/or broadcasting and must be completed no later than 5 to 7 days after placement of growth medium. All areas of disturbance will use the approved seed mixes.

Shrubs will be seeded and completed at the time of seeding with the grass seed in specific areas identified in the plan. This includes areas where the Phase AP will be used. Shrub seedlings and potted plants will not be used for the project



Wildflower seed mix will be incorporated into the plan as funding allows. The list is provided in the plan set with the bid item listed as an ad alt.

C.16 EROSION CONTROL METHODS ON SEEDED AREAS

In an effort to maintain slope stability, mitigate stormwater runoff erosion and protect and maintain soil moisture for the seed, erosion control methods will be utilized in the reclamation area.

Hydromulched: All disturbed areas in the project area are to be hydromulched with wood fiber tackifier. Its anticipated seed will be drill seeded and broadcasted, then covered with the Hydromulch (tackifier). This method is anticipated as a base bid for all areas of disturbance.

Erosion Control Blanket: As an Ad Alt in the bid, Slopes of approximately 3:1 and steeper shall be covered with erosion control blanket as specified in the plans. Where slopes are to be covered with erosion control blanket, hydromulching (tackifier) in the same area will be deducted as not to duplicate the efforts.

All other areas to use Hydromulch with tackifier on slopes less than 3:1. This includes wetland areas and the valley floor (pit), the transition areas of erosion control blanket. Stormwater Control measures shall be incorporated into the project. Refer to the Stormwater Management Plan on Sheet 14 for the locations of specific stormwater measure such as check dams, sediment control logs, and temporary measures to be utilized during earth moving activities (soil tracking)

C.17 TREE PLANTING PLAN

Tree Planting is listed as an Ad Alt in the bid items. Tree planting shall occur after the placement of the erosion control blankets and hydromulch in the April – May window. Tree Planting not occurring in this planting window and with the timing of seeding must occur after the first growing season.

Tree placement shall be naturalized, randomly spaced and completed in clusters to establish natural mosaics. Additional coordination with Park Staff on placement is anticipated to support the tree placement. Trees to received mulch mat (Mulch provided by city) and a tree protection cage.

Tree plantings will rely heavily on Pinyon Pine and Rocky Mountain Juniper seedlings – bare root seedlings, hand planted on the slopes. The planting ratio shall include two Rocky Mountain Junipers to every one Pinyon Pine. Established tree rates are 35 trees per acres after three (3) years. It will be assumed the trees will have a 40% mortality rate.



C.18 ROADWAY, SITE ACCESS AND DUST MANAGEMENT

Parks staff may be able to support one (1) day a month to assist with light grading of the roadway from the locked gate to the project site. The contractor shall be responsible for maintaining daily project access on the roadway for the duration of the project. This may consist of light maintenance which may include, light roadway grading to ensure the roadway is passible at all times for construction access between the City's monthly maintenance. Contractor maintenance shall ensure the roadway is free of ruts, rills and gullies, and maintains positive drainage into the culverts so trucks (tandems) and vehicles have appropriate access.

The contractor shall be responsible for mitigating dust from the worksite and the access road. Its anticipated this will be completed with water spraying on a regular basis as needed.

The contractor shall assume responsibly for snow plowing the roadway from the locked gate to the project area in the winter season to ensure and maintain project access. Parks staff may occasionally support plowing operations, but any kind of regularity should not be considered for the project bid. Please note the roadway is south facing, so plowing early allows for faster melt out.

C.19 ADD ALT LINE ITEMS

The following items are identified as ad alts and will be included subject to available funding and final cost proposals.

- A. Erosion control blanket in leu of hydromulch
- B. Wildflower seed mix incorporation
- C. Bare root tree seedling planting

C.20 ADDITIONAL INFORMATION

A. Permits

All permits shall be the responsibility of the City of Colorado Springs. The contractor may be required to sign associated permits as the contractor conducting the work.

1. City SWENT Stormwater management
2. State CDPHE Stormwater Permit for construction activities
3. CDPHE Air Pollution Permit



B. Specifications

The following specifications are included in the bid documents

1. Earthwork
2. Seeding, mulching and erosion control matting
3. Tree Protection
4. BioChar
5. Road maintenance
6. Stormwater Management – Construction Control Measures

C. Hours of Operations

Site is in proximity to neighborhoods so work hours should be considerate of noise impacts.

Standard Hours of operations can be discussed with the City, but anticipate 7am to 7pm

D. Site Access

The project site is accessed from Highway 24 via Manitou Ave, El Paso Blvd, Garden Drive and Black Canyon Road.

There is no other contractor access to the site

Contractor to follow all posted traffic signs, rules and regulations, including stopping at the Stop Sign at the Cedar Heights Gate House

There is no public access to Black Canyon Open Space – the property is closed.

E. Gated Access

The project site is located behind a gate. The Contractor will have access to the Parks Lock or may choose to add their own lock to the chain. Please note, there are several other private landowners and entities that have access to the gate.

F. Waste Management

Contractor to provide and manage sanitary restroom facilities (port-o-lets) for their crews for the duration of the project

Construction trash shall be collected daily and removed from the site weekly

Debris removal from the project site shall be legally disposed of, with recycling of appropriate materials.



G. Stormwater Management

Contractor shall maintain stormwater management infrastructure, including weekly inspections and maintenance and make all necessary repairs to ensure the site is in compliance with the approved stormwater management plan.

H. Reclamation Plan from DRMS

The reclamation plan follows the requirements of the approved reclamation plan. The plan is provided for reference, however the plans included reflect the requirements of the approved reclamation plan and shall be implemented with this project.

I. Imported Fill Requirements

Clean fill with a supporting soils test

Clean soil amendments and Grade AA Topsoil

No debris, organic material or material.

J. Cost Savings

The City is open different approaches to the project that would represent significant cost savings approaches to maximize the reclamation work. The contractor may include recommend approached and the associated cost savings

The City is also open different approaches to for valued added to the project.

C.21 CONSTRUCTION RENOVATION SUBSECTIONS

The following subsections shall apply to construction and/or renovation related projects/activities:

A. Plans & Specifications. Construction plans and specifications shall be drawn up by a qualified engineer or architect licensed in the State of Colorado, or pre-engineered in accordance with Colorado law, and hired by the Grantee through a competitive selection process.

B. Procurement. A construction contract shall be awarded to a qualified construction firm through a formal selection process with the Grantee being obligated to award the construction contract to the lowest responsive, responsible bidder meeting the Grantee's specifications.

C. Subcontracts. Copies of any and all contracts entered into by the Grantee in order to accomplish this Project shall be submitted to DOLA upon request, and any and all



contracts entered into by the Grantee or any of its Subcontractors shall comply with all applicable federal and state laws and shall be governed by the laws of the State of Colorado.

D. Standards. Grantee, Subgrantees and Subcontractors shall comply with all applicable statutory design and construction standards and procedures that may be required, including the standards required by Colorado Department of Public Health and Environment, and shall provide the State with documentation of such compliance.



SCHEDULE D – SPECIAL SPECIFICATIONS

FOLLOWS THIS PAGE

CHECK DAM

CD



1.0 DESCRIPTION

- Check dams are small temporary rock dams constructed across a swale or drainage ditch.

2.0 PURPOSE

- Used to slow down the velocity of concentrated flow to limit erosion and to promote sedimentation.
- Placed in areas of concentrated flow, such as a ditch or swale.

3.0 IMPLEMENTATION

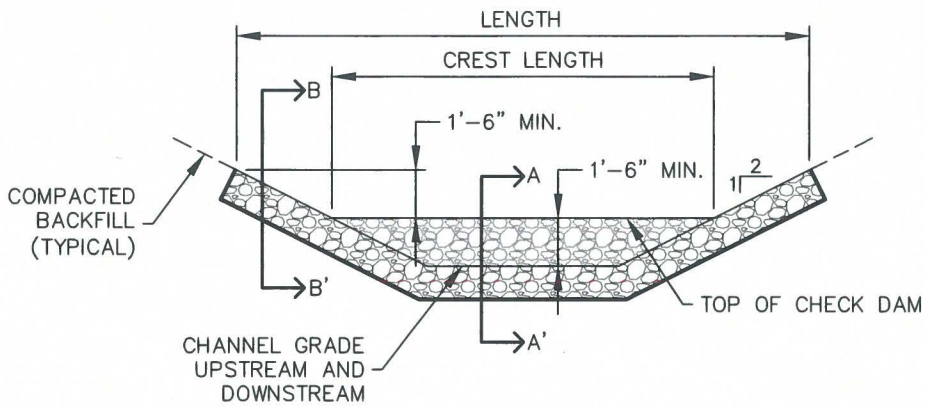
- Place check dams at regular intervals perpendicular to the direction of flow.
- Use check dams on mild or moderately steep slopes.
- Install wide enough check dams to reach from bank to bank of the ditch or swale.
- In general, the maximum spacing between check dams should be such that the toe of the upstream check dam is at the same elevation as the top of the downstream check dam.
- During installation, place rock mechanically or by hand.

4.0 TIMING

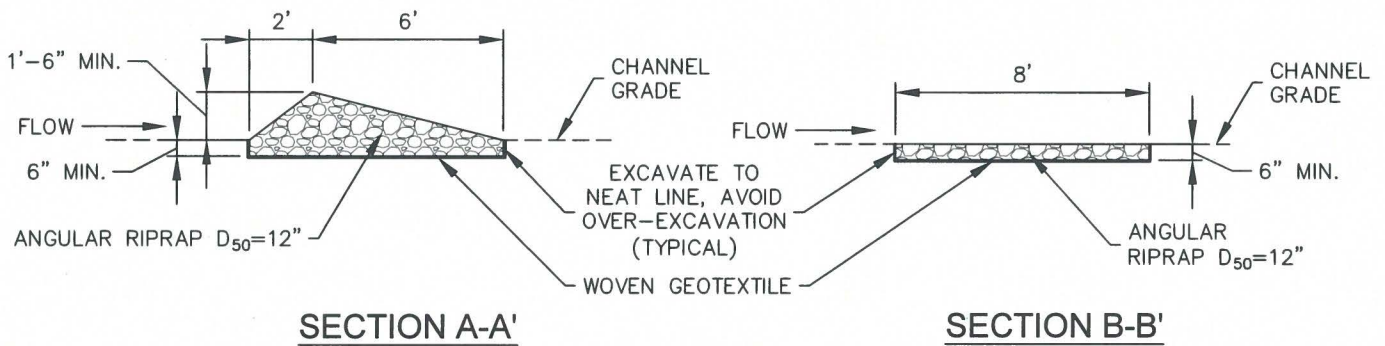
- Install prior to land disturbing activities.
- Remove after surrounding area has been permanently stabilized, or immediately prior to installation of a non-erodible lining. Permanently stabilize bare areas caused by check dams after removal.

5.0 MAINTENANCE

- Remove and properly dispose of sediment when it has accumulated to 1/2 of the height of the check dam crest.
- Replace missing rocks causing voids in the check dam.
- Inspect for erosion along the ends of check dams and repair when necessary.

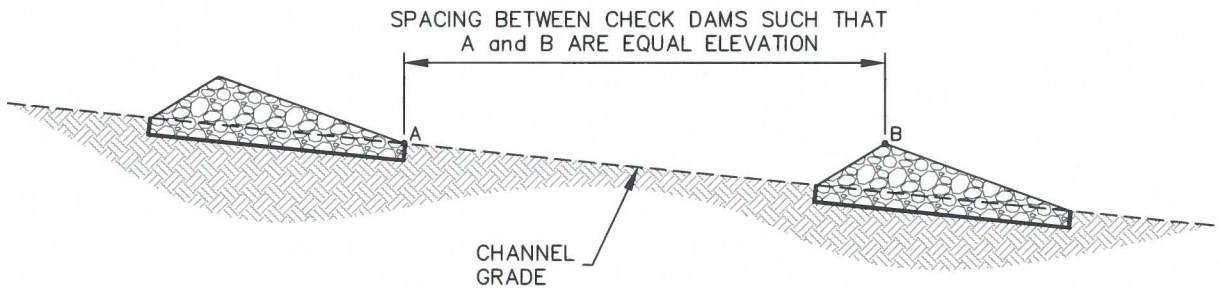


CHECK DAM ELEVATION VIEW



SECTION A-A'

SECTION B-B'



PROFILE


INSTALLATION NOTES

1. CHECK DAMS SHOULD BE INSTALLED BEFORE UPSTREAM LAND DISTURBING ACTIVITIES.
2. RIPRAP PAD SHOULD BE TRENCHED INTO GROUND BY A MINIMUM OF 6".

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE HEIGHT REACHES 1/2 THE HEIGHT OF THE CHECK DAM CREST.
3. CHECK DAMS MUST REMAIN UNTIL THE UPSTREAM DISTURBANCE AREA IS STABILIZED.
4. PERMANENTLY STABILIZE AREA AFTER CHECK DAMS ARE REMOVED IF REMOVAL IS REQUIRED.



CHECK DAM		
APPROVED: 		
SWENT MANAGER		
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-CD

EROSION CONTROL BLANKET

ECB



1.0 DESCRIPTION

- Woven blankets made of natural and biodegradable materials placed on disturbed areas and secured to the ground with staples or stakes.

2.0 PURPOSE

- Used to control erosion, retain sediment resulting from sheet flow, and protect newly seeded areas.

3.0 IMPLEMENTATION

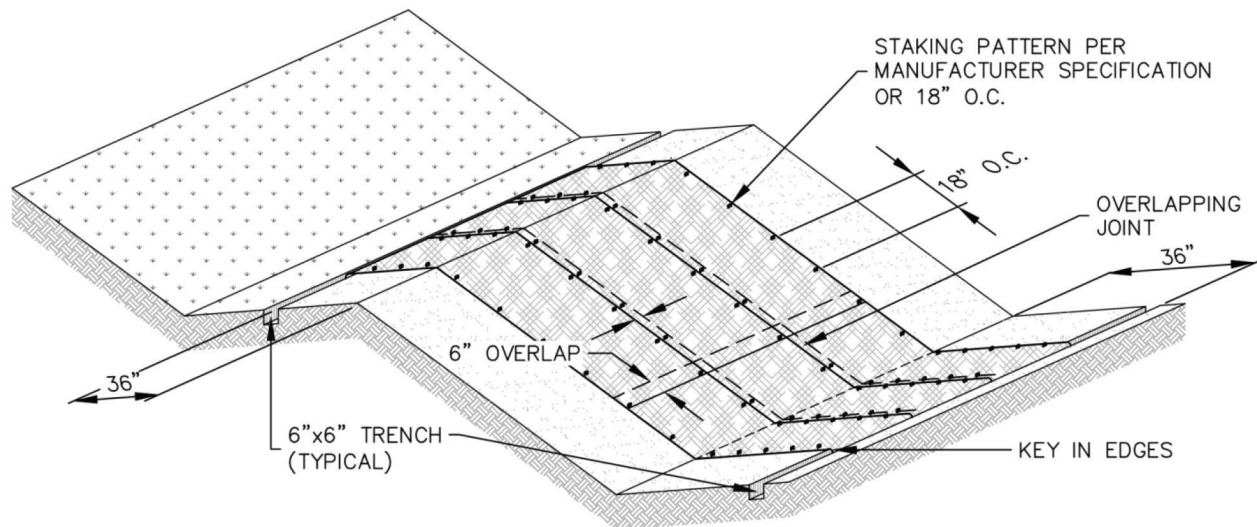
- Install erosion control blankets over uniform surfaces, with no large rocks, vegetation, or rills.
- Properly prepare topsoil and apply seed prior to blanket installation.
- Erosion control blankets must be made from 100% natural and biodegradable materials.
- Turf reinforcement mats may be used in place of erosion control blankets when specified by engineer.

4.0 TIMING

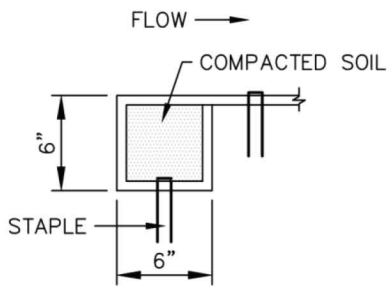
- Install in disturbed areas after final grading and seeding has been completed.
- Leave erosion control blankets in place to biodegrade, or remove if required by the GEC Inspector.

5.0 MAINTENANCE

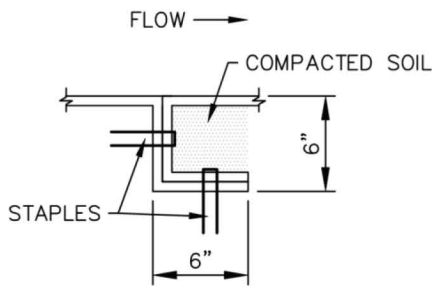
- Any erosion control blanket pulled out, torn, or otherwise damaged shall be repaired or reinstalled.
- Any subgrade areas below the geotextile that have eroded to create a void under the blanket, or that remain devoid of grass shall be repaired, reseeded and mulched and the erosion control blanket reinstalled.
- Broken or damaged staking must be repaired immediately when identified.



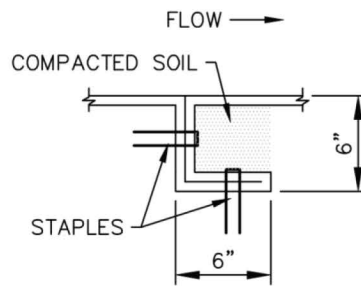
EROSION CONTROL BLANKET



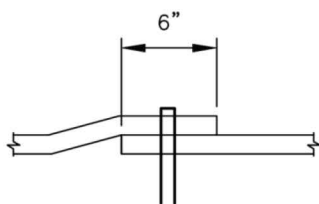
PERIMETER ANCHOR TRENCH



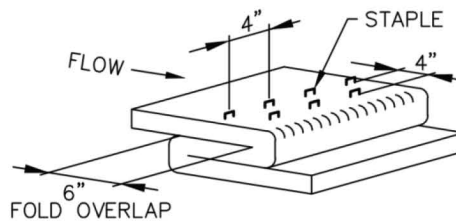
JOINT ANCHOR TRENCH



INTERMEDIATE CHECK SLOT



OVERLAPPING JOINT



STAPLE CHECK
TO BE USED ON SLOPE EVERY 15 FEET



EROSION CONTROL BLANKET

APPROVED: 
SWENT MANAGER

ISSUED: 10/7/19

REVISED: 8/19/2020

DRAWING NO. 900-ECB-1

INSTALLATION NOTES

1. 100% NATURAL AND BIODEGRADABLE MATERIALS ARE REQUIRED FOR EROSION CONTROL BLANKETS. TRM PRODUCTS MAY BE USED WHERE APPROPRIATE AS DESIGNATED BY THE ENGINEER.
2. IN AREAS WHERE EROSION CONTROL BLANKETS ARE SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO EROSION CONTROL BLANKET INSTALLATION, AND THE EROSION CONTROL BLANKET SHALL BE IN FULL CONTACT WITH THE SUBGRADE. NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
3. PERIMETER ANCHOR TRENCH SHALL BE USED ALONG THE OUTSIDE PERIMETER OF ALL BLANKET AREAS.
4. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL EROSION CONTROL BLANKETS.
5. INTERMEDIATE CHECK SLOT OR STAPLE CHECK SHALL BE INSTALLED EVERY 15' DOWN SLOPES. IN DRAINAGEWAYS, INSTALL CHECK SLOTS EVERY 25' PERPENDICULAR TO FLOW DIRECTION.
6. OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER FOR EROSION CONTROL BLANKETS ON SLOPES.
7. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKETS SHALL CONFORM TO TABLE ECB-1.
8. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKETS SHALL BE RESEEDED AND MULCHED.
9. STRAW EROSION CONTROL BLANKETS SHALL NOT BE USED WITHIN STREAMS AND DRAINAGE CHANNELS.
10. COMPACT ALL TRENCHES.


MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. EROSION CONTROL BLANKETS SHALL BE LEFT IN PLACE TO EVENTUALLY BIODEGRADE. TRM MUST BE REMOVED AT THE DISCRETION OF THE GEC INSPECTOR.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE REPAIRED OR REINSTALLED. ANY SUBGRADE AREAS BELOW GEOTEXTILE THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.

TABLE ECB-1, EROSION CONTROL BLANKET MATERIAL SPECIFICATIONS

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	RECOMMENDED NETTING
STRAW	-	100%	-	DOUBLE/NATURAL
STRAW-COCONUT	30% MIN.	70% MAX.	-	DOUBLE/NATURAL
COCONUT	100%	-	-	DOUBLE/NATURAL
EXCELSIOR	-	-	100%	DOUBLE/NATURAL



EROSION CONTROL BLANKET		
APPROVED: 		
SWENT MANAGER		
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-ECB-2

PORTABLE TOILET

PT



1.0 DESCRIPTION

- The portable toilet detail provides requirements for portable toilet use on construction sites.

2.0 PURPOSE

- Used to minimize the risk of pollutant migration to State Waters.

3.0 IMPLEMENTATION

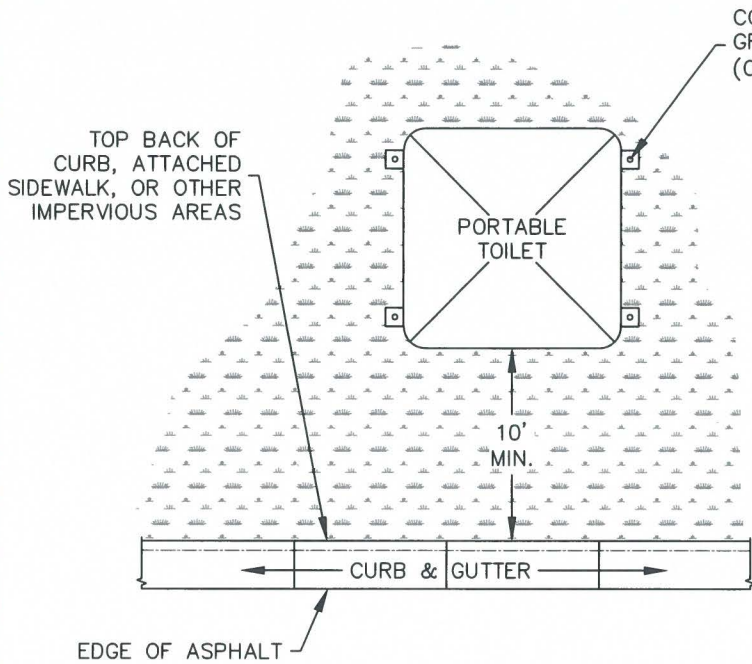
- Place portable toilet a minimum of 10 feet from the back of curb or on a trailer for road projects or sites that are mostly paved.
- Anchor portable toilet to the ground, at a minimum of two opposing corners (on a diagonal) using U-shaped rebar stakes.

4.0 TIMING

- Install as needed.
- Remove prior to the end of construction. Permanently stabilize any disturbed areas associated with the installation, maintenance, and/or removal of the toilets.

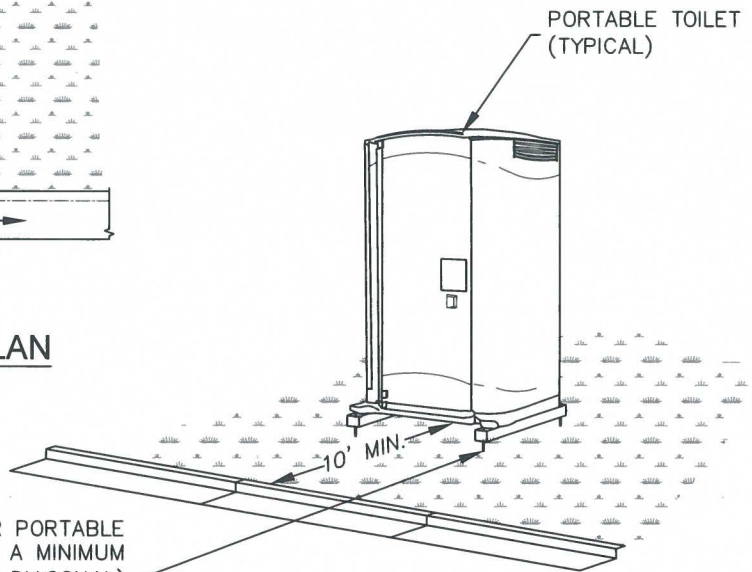
5.0 MAINTENANCE

- Portable toilets shall be serviced at the necessary intervals to eliminate the possibility of overflow.



PORTABLE TOILET PLAN

CONTRACTOR SHALL ANCHOR PORTABLE TOILET TO THE GROUND, AT A MINIMUM OF TWO OPPOSING CORNERS (ON A DIAGONAL) USING U-SHAPED REBAR STAKES



ISOMETRIC

CONTRACTOR SHALL ANCHOR PORTABLE TOILET TO THE GROUND, AT A MINIMUM OF TWO OPPOSING CORNERS (ON A DIAGONAL) USING U-SHAPED REBAR STAKES OR OTHER EFFECTIVE ANCHORING

INSTALLATION NOTES

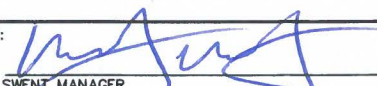
1. PORTABLE TOILETS SHALL BE PLACED A MINIMUM OF 10 FEET BEHIND ALL CURBS, SIDEWALKS, AND OTHER IMPERVIOUS AREAS; 50 FEET FROM STORM INLETS, AND 100 FEET FROM WATERWAYS.
2. PORTABLE TOILETS IN THE RIGHT-OF-WAY ARE REQUIRED TO BE PLACED ON MOBILE TRAILERS AND MUST BE ANCHORED OR WEIGHTED DOWN. PORTABLE TOILETS MAY BE INSTALLED IN ACCORDANCE WITH NOTE #1 IN STAGING AREAS/YARDS.
3. PORTABLE TOILETS SHALL BE SECURELY ANCHORED TO THE GROUND USING U-SHAPED REBAR STAKES, OR OTHER EFFECTIVE ANCHORING.
4. ANCHORING SHALL BE POSITIONED ON AT LEAST TWO OPPOSING (DIAGONAL) CORNERS.
5. TOILET CONTAINMENT PANS MAY BE USED IN PLACE OF A TRAILER AT THE GEC INSPECTOR'S DISCRETION. TOILET CONTAINMENT PANS MUST BE ANCHORED IN PLACE AND MUST NOT BE USED WITHIN THE CITY R.O.W.



MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. PORTABLE TOILETS SHALL BE SERVICED AT THE NECESSARY INTERVALS TO ELIMINATE THE POSSIBILITY OF OVERFLOW.
3. WHEN THE PORTABLE TOILETS ARE REMOVED, ANY DISTURBED AREAS ASSOCIATED WITH THE INSTALLATION, MAINTENANCE, AND/OR REMOVAL OF THE TOILETS MUST BE PERMANENTLY STABILIZED.

PORTABLE TOILET

APPROVED: 
SWENT MANAGER

ISSUED: 2/19/19	REVISED: 8/19/2020	DRAWING NO. 900-PTM
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SEDIMENT CONTROL LOG

SCL



1.0 DESCRIPTION

- A sediment control log is a temporary sediment barrier consisting of a linear roll of natural materials such as straw, compost, excelsior or coconut fiber.

2.0 PURPOSE

- Used to intercept sheet flow prior to leaving a construction site.
- May be used around the perimeter of a construction site.
- Placed on long slopes to slow down flows.

3.0 IMPLEMENTATION

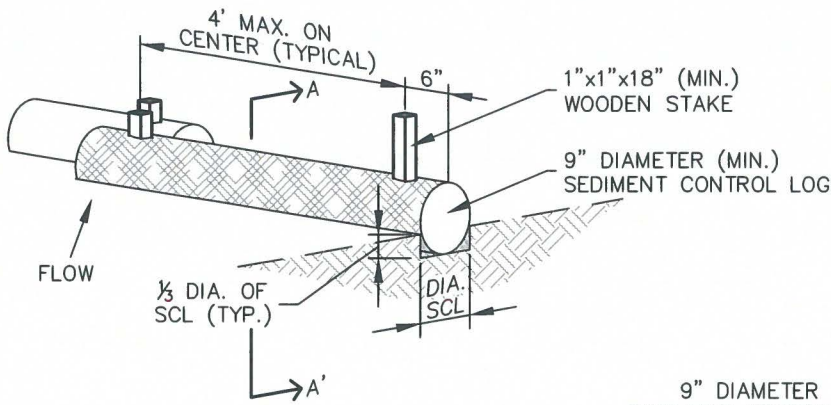
- Install sediment control logs to intercept sheet flow runoff from disturbed areas.
- Install sediment control logs along the contour of slopes or in a manner to avoid creating concentrated flow.
- Place sediment control logs against sidewalk or back of curb when adjacent to these features.
- The maximum tributary drainage area per 100 liner feet of sediment control logs is 1/4 acre.
- Sediment control logs shall consist of straw, compost, excelsior or coconut fiber, and shall be free from any noxious weed seeds or defects.

4.0 TIMING

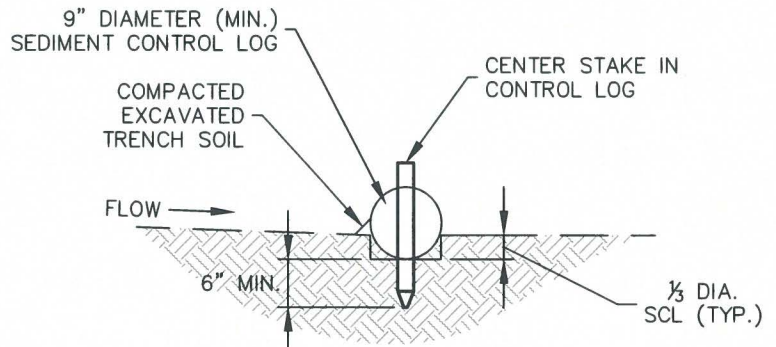
- Install prior to land disturbing activities.
- Remove sediment control logs after the upstream area has been permanently stabilized.

5.0 MAINTENANCE

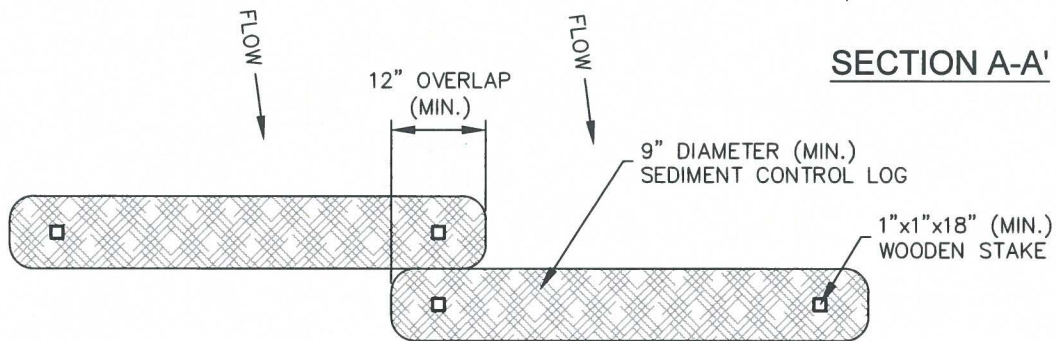
- Remove and properly dispose of sediment when it has accumulated to 1/2 of the height of the exposed sediment control log.
- Inspect for and repair or replace damaged sediment control logs.



SEDIMENT CONTROL LOG



SECTION A-A'



SEDIMENT CONTROL LOG JOINTS

INSTALLATION NOTES

1. ALL SEDIMENT CONTROL LOGS MUST BE EMBEDDED TO $\frac{1}{3}$ OF THE HEIGHT OF THE LOG
2. LARGER DIAMETER SEDIMENT CONTROL LOGS NEED TO BE EMBEDDED DEEPER.
3. PLACE SEDIMENT CONTROL LOG AGAINST SIDEWALK OR BACK OF CURB WHEN ADJACENT TO THESE FEATURES.
4. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR OR COCONUT FIBER, AND SHALL BE FREE FROM ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.
5. IF USING AS SLOPE PROTECTION, INSTALL SEDIMENT CONTROL LOGS ALONG THE CONTOUR.

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE HEIGHT REACHES $\frac{1}{2}$ OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.
3. PERMANENTLY STABILIZE AREA AFTER SEDIMENT CONTROL LOGS HAVE BEEN REMOVED.



SEDIMENT CONTROL LOGS

APPROVED: 
SWENT MANAGER

ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-SCL
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SILT FENCE

SF



1.0 DESCRIPTION

- Silt fence is a temporary sediment barrier consisting of woven geotextile fabric attached to supporting posts and trenched into the soil.

2.0 PURPOSE

- Used to intercept sheet flow prior to leaving a construction site.
- May be used around the perimeter of a construction site.

3.0 IMPLEMENTATION

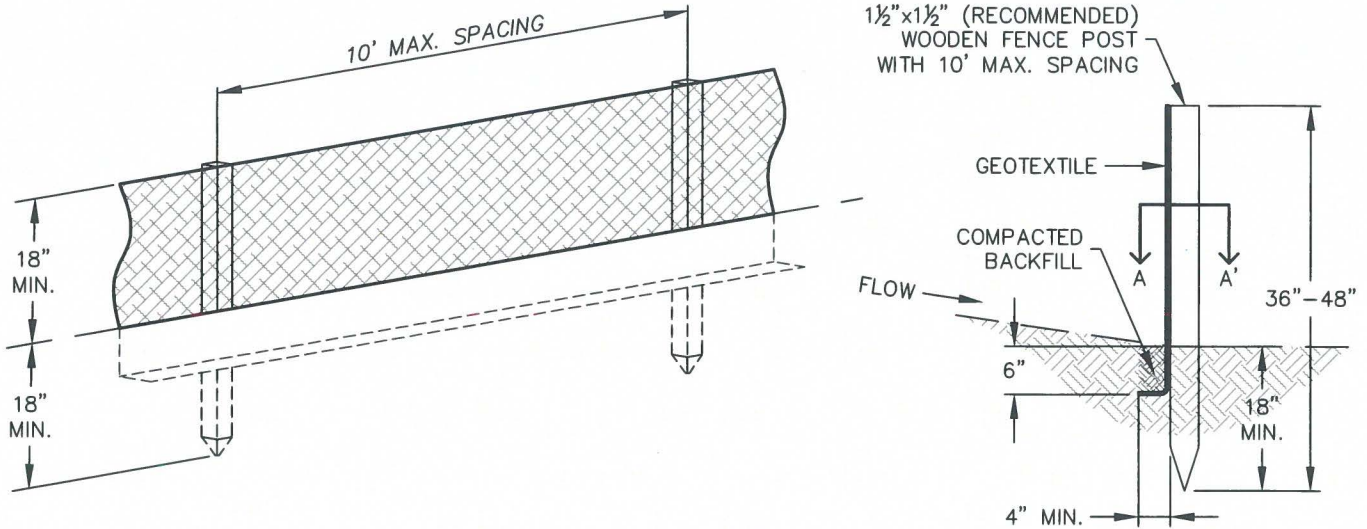
- Install silt fence to intercept sheet flow runoff from disturbed areas.
- Silt fence is not designed to be used as a filter fabric.
- Do not install silt fence across streams, channels, swales, ditches, or other drainageways.
- Install silt fence along the contour of slopes or in a manner to avoid creating concentrated flow (i.e. "J-hook" installation).
- The maximum tributary drainage area per 100 linear feet of silt fence is 1/4 acre.
- Properly installed silt fence should not be easily pulled out by hand and there should be no gaps between the ground and fabric.

4.0 TIMING

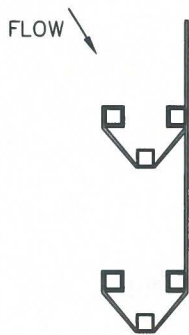
- Install prior to land disturbing activities.
- Remove silt fence after the upstream area has been permanently stabilized.

5.0 MAINTENANCE

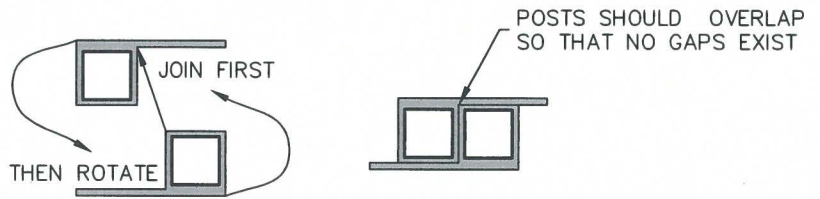
- Remove and properly dispose of sediment when it has accumulated to 1/2 of the height of the exposed silt fence.
- Inspect for and repair or replace damaged silt fence.



SILT FENCE



J-HOOK INSTALLATION



SECTION A-A'

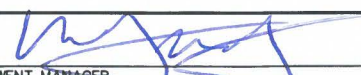
INSTALLATION NOTES

1. SILT FENCE MUST BE PLACED ON A FLAT SURFACE 2'-5' AWAY FROM TOE OF THE SLOPE TO ALLOW FOR PONDING AND DEPOSITION.
2. COMPACT THE TRENCH USING A JUMPING JACK OR WHEEL ROLLING TO THE POINT THAT THE FENCE RESISTS BEING PULLED OUT OF THE GROUND BY HAND.
3. SILT FENCE SHALL BE TAUT WITH NO SAGS AFTER IT HAS BEEN ANCHORED.
4. FABRIC SHALL BE ATTACHED TO POSTS WITH 1" HEAVY DUTY STAPLES OR 1" NAILS. THESE SHOULD BE PLACED VERTICALLY DOWN THE POST, 3" APART.
5. THE PREFERRED INSTALLATION METHOD USES A TRENCHER OR SILT FENCE INSTALLATION DEVICE.
6. INSTALL SILT FENCE ALONG THE CONTOUR OF THE SLOPES OR IN A MANNER TO AVOID CREATING CONCENTRATED FLOW (SUCH AS A "J-HOOK" INSTALLATION).

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE HEIGHT REACHES 1/2 OF THE DESIGN HEIGHT OF THE SILT FENCE.
3. SILT FENCE MUST REMAIN UNTIL THE UPSTREAM DISTURBANCE AREA IS STABILIZED.
4. PERMANENTLY STABILIZE AREA AFTER SILT FENCE IS REMOVED.



SILT FENCE		
APPROVED: 		
SWENT MANAGER		
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-SF

SEEDING AND MULCHING

SM



1.0 DESCRIPTION

- The preparation of soil, application of mulch, and application of seed to disturbed areas.

2.0 PURPOSE

- Used to control runoff and erosion on disturbed areas by establishing vegetative cover.
- Reduces erosion and sediment loss.
- Provides permanent stabilization in disturbed areas.

3.0 IMPLEMENTATION

- All soil testing, soil amendment and fertilizer documentation, and seed load and bag tickets must be added to the CSWMP.
- Properly prepare soil prior to seeding and mulching.
- Apply seed mixes as specified in the City of Colorado Springs Stormwater Construction Manual. Alternative seed mixes are acceptable if included in an approved Landscaping Plan.
- Mulch seeded areas using hay or straw mulch, hydraulic mulching, or install erosion control blanket.

4.0 TIMING

- Seed and mulch disturbed areas after final grading.
- Seeding and mulching may also be used as a temporary erosion control measure during construction.

5.0 MAINTENANCE

- Repair and reseed bare areas as necessary.
- Restrict vehicle access to seeded areas.

SEEDING & MULCHING

ALL SOIL TESTING, SOILS AMENDMENT AND FERTILIZER DOCUMENTATION, AND SEED LOAD AND BAG TICKETS MUST BE ADDED TO THE CSWMP.

SOIL PREPARATION

1. IN AREAS TO BE SEEDED, THE UPPER 6 INCHES OF THE SOIL MUST NOT BE HEAVILY COMPACTED, AND SHOULD BE IN FRIABLE CONDITION. LESS THAN 85% STANDARD PROCTOR DENSITY IS ACCEPTABLE. AREAS OF COMPACTION OR GENERAL CONSTRUCTION ACTIVITY MUST BE SCARIFIED TO A DEPTH OF 6 TO 12 INCHES PRIOR TO SPREADING TOPSOIL TO BREAK UP COMPACTED LAYERS AND PROVIDE A BLENDING ZONE BETWEEN DIFFERENT SOIL LAYERS.
2. AREAS TO BE PLANTED SHALL HAVE AT LEAST 4 INCHES OF TOPSOIL SUITABLE TO SUPPORT PLANT GROWTH.
3. THE CITY RECOMMENDS THAT EXISTING AND/OR IMPORTED TOPSOIL BE TESTED TO IDENTIFY SOIL DEFICIENCIES AND ANY SOIL AMENDMENTS NECESSARY TO ADDRESS THESE DEFICIENCIES. SOIL AMENDMENTS AND/OR FERTILIZERS SHOULD BE ADDED TO CORRECT TOPSOIL DEFICIENCIES BASED ON SOIL TESTING RESULTS.
4. TOPSOIL SHALL BE PROTECTED DURING THE CONSTRUCTION PERIOD TO RETAIN ITS STRUCTURE AVOID COMPACTION, AND TO PREVENT EROSION AND CONTAMINATION. STRIPPED TOPSOIL MUST BE STORED IN AN AREA AWAY FROM MACHINERY AND CONSTRUCTION OPERATIONS, AND CARE MUST BE TAKEN TO PROTECT THE TOPSOIL AS A VALUABLE COMMODITY. TOPSOIL MUST NOT BE STRIPPED DURING UNDESIRABLE WORKING CONDITIONS (E.G. DURING WET WEATHER OR WHEN SOILS ARE SATURATED). TOPSOIL SHALL NOT BE STORED IN SWALES OR IN AREAS WITH POOR DRAINAGE.

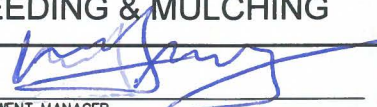
SEEDING

1. ALLOWABLE SEED MIXES ARE INCLUDED IN THE CITY OF COLORADO SPRINGS STORMWATER CONSTRUCTION MANUAL. ALTERNATIVE SEED MIXES ARE ACCEPTABLE IF INCLUDED IN AN APPROVED LANDSCAPING PLAN.
2. SEED SHOULD BE DRILL-SEEDED WHENEVER POSSIBLE
 - SEED DEPTH MUST BE $\frac{1}{2}$ TO $\frac{1}{4}$ INCHES WHEN DRILL-SEEDED IS USED
3. BROADCAST SEEDING OR HYDRO-SEEDED WITH TACKIFIER MAY BE SUBSTITUTED ON SLOPES STEEPER THAN 3:1 OR ON OTHER AREAS NOT PRACTICAL TO DRILL SEED.
 - SEEDING RATES MUST BE DOUBLED FOR BROADCAST SEEDING OR INCREASED BY 50% IF USING A BRILLION DRILL OR HYDRO-SEEDED
 - BROADCAST SEEDING MUST BE LIGHTLY HAND-RAKED INTO THE SOIL

MULCHING

1. MULCHING SHOULD BE COMPLETED AS SOON AS PRACTICABLE AFTER SEEDING, HOWEVER PLANTED AREAS MUST BE MULCHED NO LATER THAN 14 DAYS AFTER PLANTING.
2. MULCHING REQUIREMENTS INCLUDE:
 - HAY OR STRAW MULCH
 - ONLY CERTIFIED WEED-FREE AND CERTIFIED SEED-FREE MULCH MAY BE USED. MULCH MUST BE APPLIED AT 2 TONS/ACRE AND ADEQUATELY SECURED BY CRIMPING AND/OR TACKIFIER.
 - CRIMPING MUST NOT BE USED ON SLOPES GREATER THAN 3:1 AND MULCH FIBERS MUST BE TUCKED INTO THE SOIL TO A DEPTH OF 3 TO 4 INCHES.
 - TACKIFIER MUST BE USED IN PLACE OF CRIMPING ON SLOPES STEEPER THAN 3:1.
 - HYDRAULIC MULCHING
 - HYDRAULIC MULCHING IS AN OPTION ON STEEP SLOPES OR WHERE ACCESS IS LIMITED.
 - IF HYDRO-SEEDED IS USED, MULCHING MUST BE APPLIED AS A SEPARATE, SECOND OPERATION.
 - WOOD CELLULOSE FIBERS MIXED WITH WATER MUST BE APPLIED AT A RATE OF 2,000 TO 2,500 POUNDS/ACRE, AND TACKIFIER MUST BE APPLIED AT A RATE OF 100 POUNDS/ACRE.
 - EROSION CONTROL BLANKET
 - EROSION CONTROL BLANKET MAY BE USED IN PLACE OF TRADITIONAL MULCHING METHODS.



SEEDING & MULCHING		
APPROVED: 		
SWENT MANAGER		
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-SM

STOCKPILE PROTECTION

SP



1.0 DESCRIPTION

- Perimeter control placed around stockpiles of soil and other erodible materials.

2.0 PURPOSE

- Used to avoid the migration of sediment and other materials from stockpiles.

3.0 IMPLEMENTATION

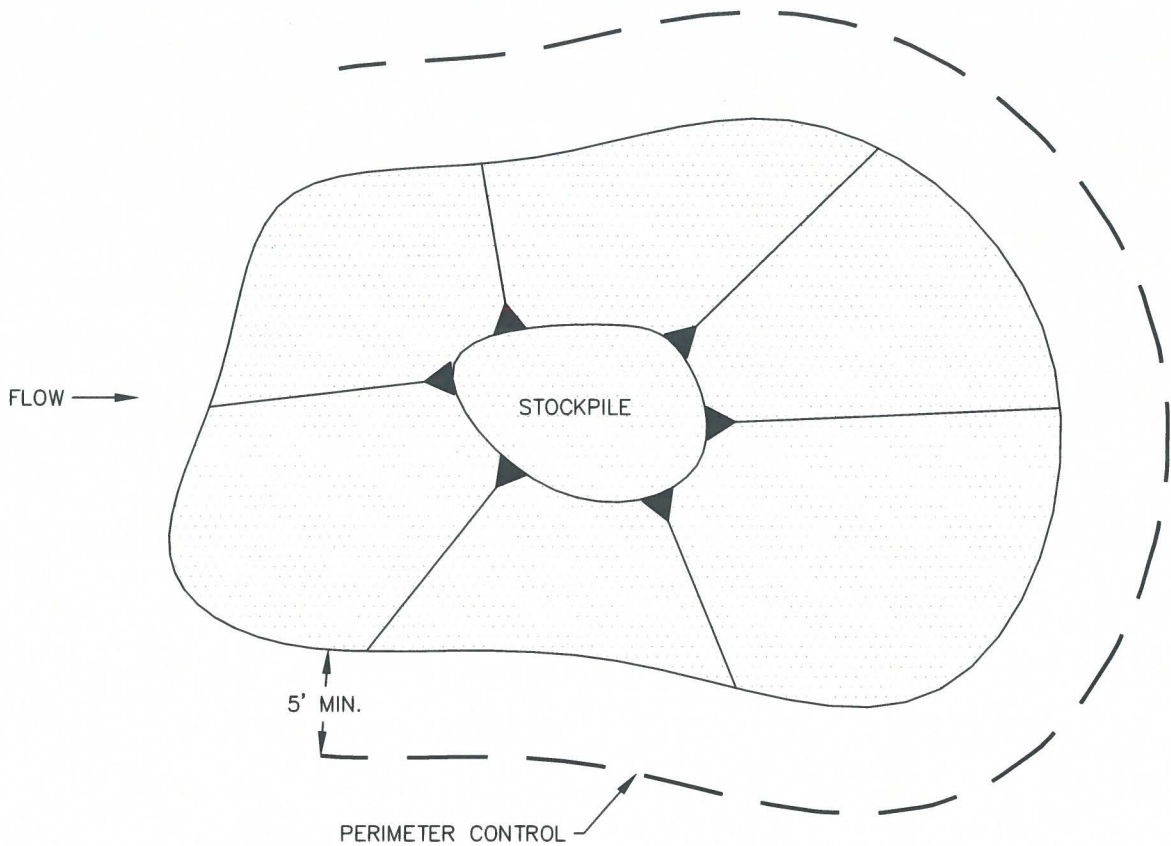
- Install perimeter control around stockpile on downgradient side.
- Stockpile perimeter controls may not be required for stockpiles on the interior portion of a construction site where other downgradient controls including perimeter control are in place.

4.0 TIMING

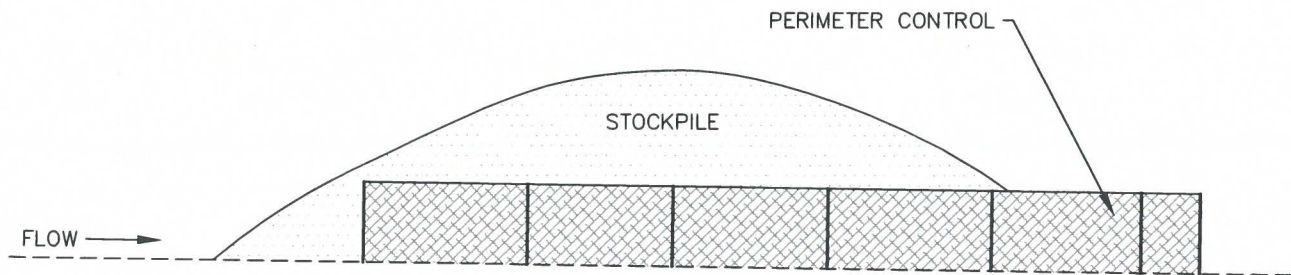
- Install immediately after stockpile has formed or limits are known, whichever occurs first.
- Remove stockpile protection after the stockpile has been removed.

5.0 MAINTENANCE

- Remove and properly dispose of sediment according to the perimeter control detail.
- If perimeter controls must be moved to access stockpile, replace perimeter controls by the end of the work day.
- Inspect for and repair and/or replace perimeter controls as needed to maintain functionality.



STOCKPILE PROTECTION PLAN



STOCKPILE PROTECTION ELEVATION

INSTALLATION NOTES

1. INSTALL PERIMETER CONTROL AROUND STOCKPILE ON DOWNGRAIDENT SIDE. PERIMETER CONTROL MUST BE SUITABLE TO SITE CONDITIONS AND INSTALLED ACCORDING TO THE RELEVANT DETAIL.
2. FOR STOCKPILES ON THE INTERIOR PORTION OF A CONSTRUCTION SITE, WHERE OTHER DOWNGRAIDENT CONTROLS INCLUDING PERIMETER CONTROL ARE IN PLACE, STOCKPILE PERIMETER CONTROLS MAY NOT BE REQUIRED.

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. IF PERIMETER CONTROLS MUST BE MOVED TO ACCESS STOCKPILE, REPLACE PERIMETER CONTROLS BY THE END OF THE WORK DAY.
3. ACCUMULATED SEDIMENT MUST BE REMOVED ACCORDING TO PERIMETER CONTROL DETAIL.



	STOCKPILE PROTECTION	
	APPROVED:	
	SWENT MANAGER	
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-SP

SURFACE ROUGHENING

SR



1.0 DESCRIPTION

- Surface roughening is a practice where the soil surface is roughened by the creation of grooves and depressions that run parallel to the contour of the land.

2.0 PURPOSE

- Used to create variations in the soil surface that slow down the velocity of runoff, increase infiltration, reduce erosion, and trap soil.
- May be used to help establish vegetative cover by reducing runoff velocity and giving seed an opportunity to take hold.

3.0 IMPLEMENTATION

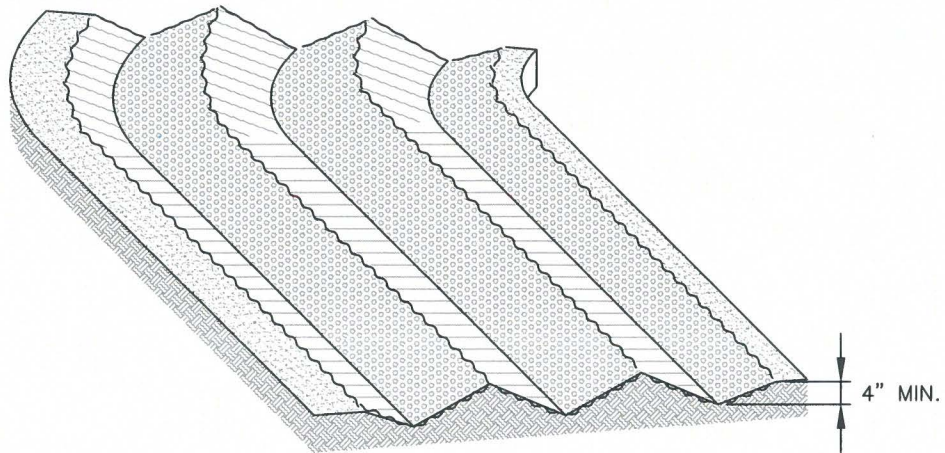
- Roughen soil in areas flatter than 3:1.
- Surface roughening may be completed by furrowing, scarifying, ripping, or disking soil.
- Grooves must be installed along contours to avoid concentrating flow.
- Do not use in areas with extremely sandy or rocky soils.

4.0 TIMING

- Install after overlot grading activities when area is in an interim condition or at final grade.
- Remove prior to permanent stabilization during soil preparation.

5.0 MAINTENANCE

- Inspect roughened areas for signs of erosion. Repeat surface roughening as needed.
- Do not allow vehicles to drive over surface roughened areas.



SURFACE ROUGHENING



INSTALLATION NOTES

1. SURFACE ROUGHENING MAY BE USED IN AREAS FLATTER THAN 3:1. INSTALL FURROWS ALONG CONTOUR TO INTERCEPT SHEET FLOW.
2. SURFACE ROUGHENING MAY BE ACCOMPLISHED BY FURROWING, SCARIFYING, RIPPING OR DISKING THE SOIL.
3. FURROWS MUST BE A MINIMUM OF 4" IN DEPTH.
4. SURFACE ROUGHENING SHALL NOT BE USED ON EXTREMELY SANDY OR ROCKY SOILS.

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. VEHICLES AND EQUIPMENT SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SURFACE ROUGHENED.



 <p>STORMWATER ENTERPRISE</p>	SURFACE ROUGHENING		
	APPROVED:  SWENT MANAGER		
	ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-SR

SLOPE TRACKING

ST



1.0 DESCRIPTION

- Slope tracking is a practice where construction equipment is used to create grooves and depressions that run parallel to the contour of the land on slopes.

2.0 PURPOSE

- Used to create variations in the soil surface that slow down the velocity of runoff, increase infiltration, reduce erosion, and trap soil.

3.0 IMPLEMENTATION

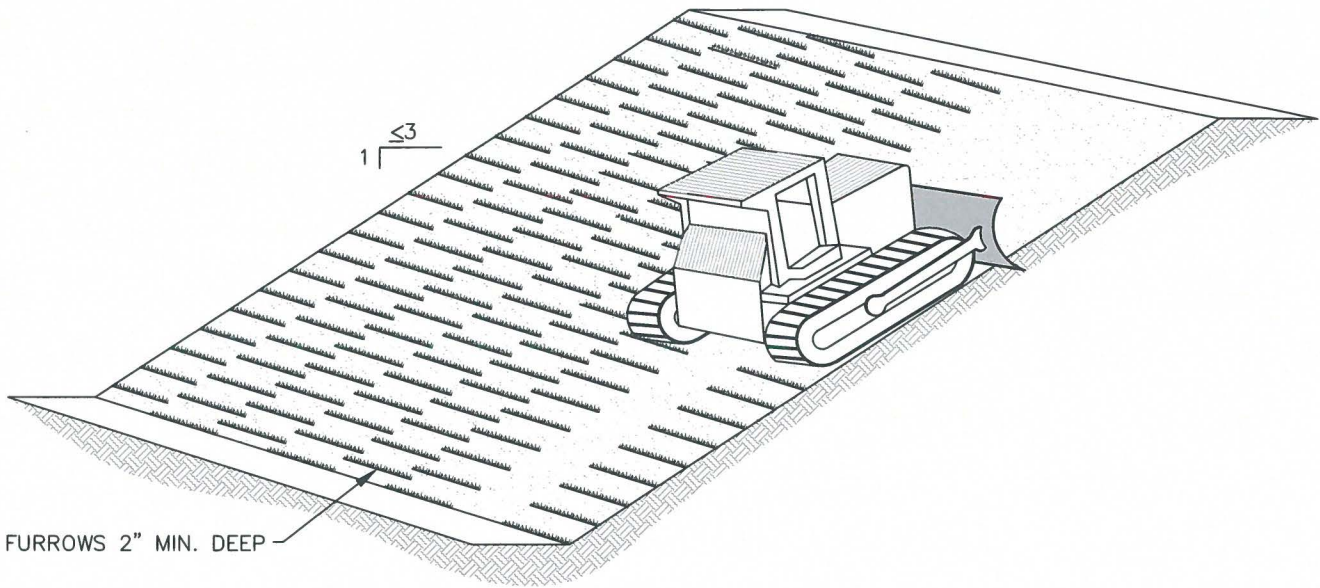
- Use slope tracking on slopes 3:1 or steeper.
- Grooves must be installed along contours to avoid concentrating flow.
- Do not use in areas with extremely sandy or rocky soils.

4.0 TIMING

- Install after land disturbing activities when area is in an interim condition or at final grade.
- Remove prior to permanent stabilization during soil preparation.

5.0 MAINTENANCE

- Inspect areas with tracking for signs of erosion. Repeat slope tracking as needed.
- Do not allow vehicles to drive over tracked areas.



SLOPE TRACKING



INSTALLATION NOTES

1. SLOPE TRACKING MAY BE USED ON SLOPES 3:1 OR STEEPER.
2. TRACKING GROOVES SHALL BE PERPENDICULAR TO THE SLOPE.
3. SLOPE TRACKING SHALL NOT BE USED ON EXTREMELY SANDY OR ROCKY SOILS.

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. VEHICLES AND EQUIPMENT SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SLOPE TRACKED.



 <p>STORMWATER ENTERPRISE</p>	SLOPE TRACKING		
	APPROVED: 		
	<small>SWENT MANAGER</small>		
<small>ISSUED:</small> 10/7/19	<small>REVISED:</small> 8/19/2020	<small>DRAWING NO.</small> 900-ST	

VEHICLE TRACKING CONTROL

VTC



1.0 DESCRIPTION

- Vehicle tracking control consists of a pad of coarse stone aggregate placed on a geotextile filter fabric.

2.0 PURPOSE

- Used to reduce the tracking of sediment onto roadways by construction vehicles.
- As vehicles drive over the VTC device, mud and sediment is removed from the tires.

3.0 IMPLEMENTATION

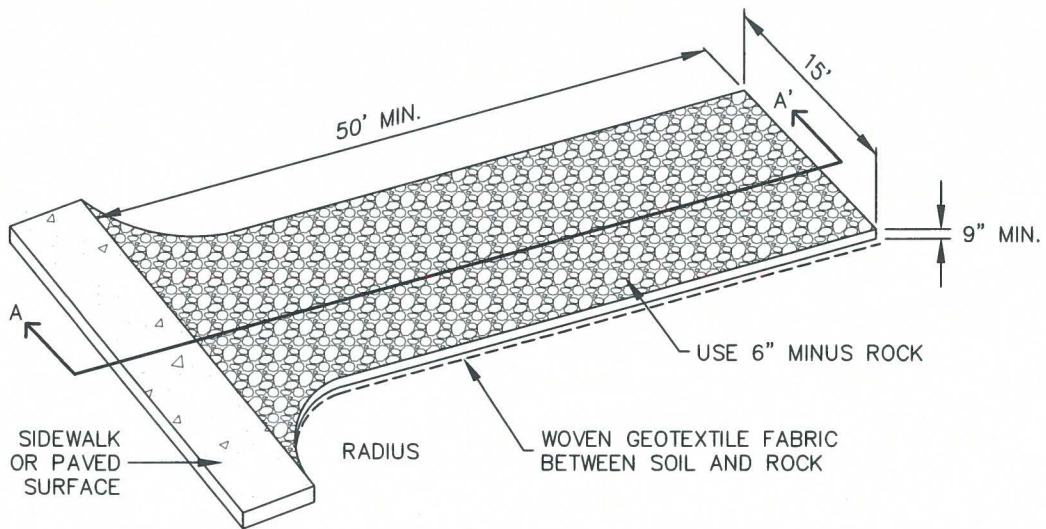
- Locate at construction entrance/exit.
- Organize site to ensure that all vehicles use the vehicle tracking control device.
- Where possible, grade VTC device to drain to construction site rather than to street.
- Proprietary VTC devices may be used if approved as an alternative Construction Control Measure.

4.0 TIMING

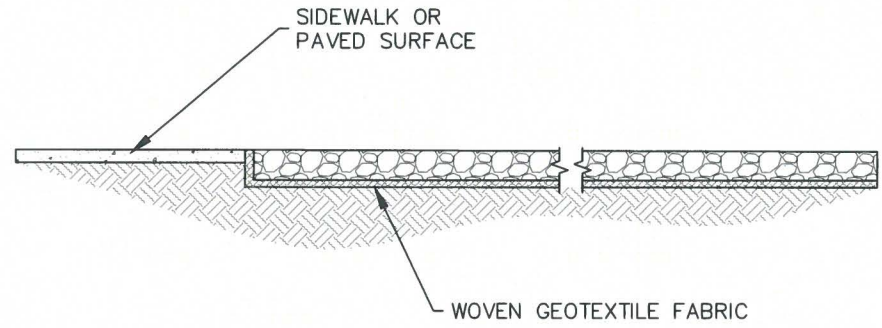
- Install prior to land disturbing activities.
- Remove when the potential for sediment migration onto adjacent roadways no longer exists (typically after site has been stabilized). Permanently stabilized area after vehicle tracking control is removed.

5.0 MAINTENANCE

- Roughen, replace, and/or add rock as needed to maintain a consistent depth and to prevent sediment tracking onto adjacent street.
- Sediment tracked onto the adjacent road shall be removed daily, by sweeping or shoveling, and never washed down storm drains.



AGGREGATE VEHICLE TRACKING CONTROL



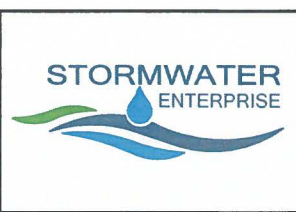
SECTION A-A'

INSTALLATION NOTES

1. A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHOULD BE LOCATED AT ALL POINTS WHERE VEHICLES EXIT THE CONSTRUCTION SITE TO ADJACENT ROADWAY.
2. STABILIZED CONSTRUCTION ENTRANCE/EXITS SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
3. RADIUS MUST BE ADEQUATE FOR INTENDED CONSTRUCTION VEHICLE TURNING.
4. ROCK SHOULD CONSIST OF 6" MINUS ROCK.
5. INSTALL CONSTRUCTION FENCE ON BOTH SIDES OF VEHICLE TRACKING CONTROL PAD WHEN NEEDED OR REQUIRED BY INSPECTOR.

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. SEDIMENT TRACKED ONTO THE ADJACENT ROAD SHALL BE REMOVED DAILY, BY SWEEPING OR SHOVELING, AND NEVER WASHED DOWN STORM DRAINS.
3. ROUGHEN, REPLACE AND/OR ADD ROCK AS NEEDED TO MAINTAIN CONSISTENT DEPTH AND TO PREVENT SEDIMENT TRACKING ONTO ADJACENT STREET.
4. PERMANENTLY STABILIZE AREA AFTER VEHICLE TRACKING CONTROL IS REMOVED.



VEHICLE TRACKING CONTROL		
APPROVED: 		
SWENT MANAGER		
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-VTC

GENERAL NOTES

1. ALL WORK WITHIN THE CITY RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE CURRENT CITY OF COLORADO SPRINGS (CITY) STANDARD SPECIFICATIONS.
2. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS (TRAFFIC CONTROL, EXCAVATION, CONCRETE), FOR CITY PERMITS WITHIN THE RIGHT-OF-WAY UTILIZING THE ON-LINE PERMITTING SYSTEM. INSPECTION SHALL BE SCHEDULED BY 1500 HOURS ON THE BUSINESS DAY BEFORE THE INSPECTION IS REQUIRED.
3. APPROVAL FROM THE CITY FORESTER IS REQUIRED TO PLANT, PRUNE, CONTROL INSECTS AND DISEASES, REMOVE, DESTROY, CUT, DEFACE OR IN ANY WAY INJURE ANY TREE OR SHRUB IN THE PUBLIC RIGHT-OF-WAY.
4. ANY PERSON PERFORMING EXCAVATIONS OR TRENCHING WITHIN TWENTY (20) FEET OF A PUBLIC TREE MUST CONTACT THE CITY FORESTER'S OFFICE FORTY-EIGHT (48) HOURS PRIOR TO BEGINNING EXCAVATION FOR APPROVAL OF TREE PRESERVATION PROCEDURES.
5. AVOID CUTTING SURFACE ROOTS WHENEVER POSSIBLE. A CITY FORESTER'S PERMIT MUST BE OBTAINED PRIOR TO CUTTING OF ANY ROOTS. (PERMITS AND INSPECTIONS ARE AVAILABLE VIA OUR WEBSITE AT:
<https://coloradosprings.gov/forestry/page/permit-work-city-tree?mlid=46966>)
6. TREE PROTECTION ZONE WHICH ENCIRCLES THE OUTER LIMITS OF THE CRITICAL ROOT ZONE OF THE TREE SHALL BE CONSTRUCTED AND MAINTAINED FOR EACH PROTECTED TREE ON THE CONSTRUCTION SITE DURING CONSTRUCTION.
7. TREE PROTECTION FENCING SHALL BE PLACED PRIOR TO CONSTRUCTION ACTIVITY AND REMAIN UNTIL COMPLETION OF CONSTRUCTION.
8. TREE PROTECTION SHALL BE A MINIMUM FOUR (4) FEET HIGH, IS CLEARLY VISIBLE, AND SHALL HAVE A TREE PROTECTION SIGN AFFIXED TO THE FENCE EVERY TWENTY (20) FEET IN SUCH A MANNER TO BE CLEARLY VISIBLE TO WORKERS ON THE SITE.
9. NO GRADING SHALL OCCUR WITHIN THE TREE PROTECTION/FENCED AREAS OF EXISTING TREES.
10. TREE PROTECTION ZONE SHALL BE CONSTRUCTED OF:
 - 1) ORANGE VINYL FENCE WHEN THERE IS NO CONSTRUCTION OF VEHICULAR ACTIVITY WITHIN TEN (10) FEET OF THE FENCE;
 - 2) CHAIN LINK, WOOD OR SEMI-RIGID VINYL TAPE FENCING SUPPORTED WITH A TOP WIRE AFFIXED TO METAL OR WOODEN POSTS WHEN CONSTRUCTION IS EXPECTED WITHIN TEN (10) FEET OF THE FENCE. THIS FENCING SHALL BE SIX (6) FEET IN HEIGHT.
11. ALL TREE PROTECTION SHALL BE SUPPORTED AT A MINIMUM OF TEN (10) FOOT INTERVALS BY APPROVED METHODS SUFFICIENT ENOUGH TO KEEP THE FENCE UPRIGHT AND IN PLACE FOR THE DURATION OF THE CONSTRUCTION.
12. WHERE TRENCHING FOR IRRIGATION SYSTEMS OR UNDERGROUND ELECTRICAL WORK, THE CONTRACTOR SHALL PROVIDE SUFFICIENT PLANS TO PROVIDE PROTECTION OF THE TREES IN THE VICINITY OF THE WORK.
13. ALL OF THE ABOVE CONDITIONS MUST BE ADHERED TO AND INSPECTED BY THE CITY OF COLORADO SPRINGS FORESTRY DEPARTMENT PRIOR TO ISSUANCE OF ANY PERMITS.

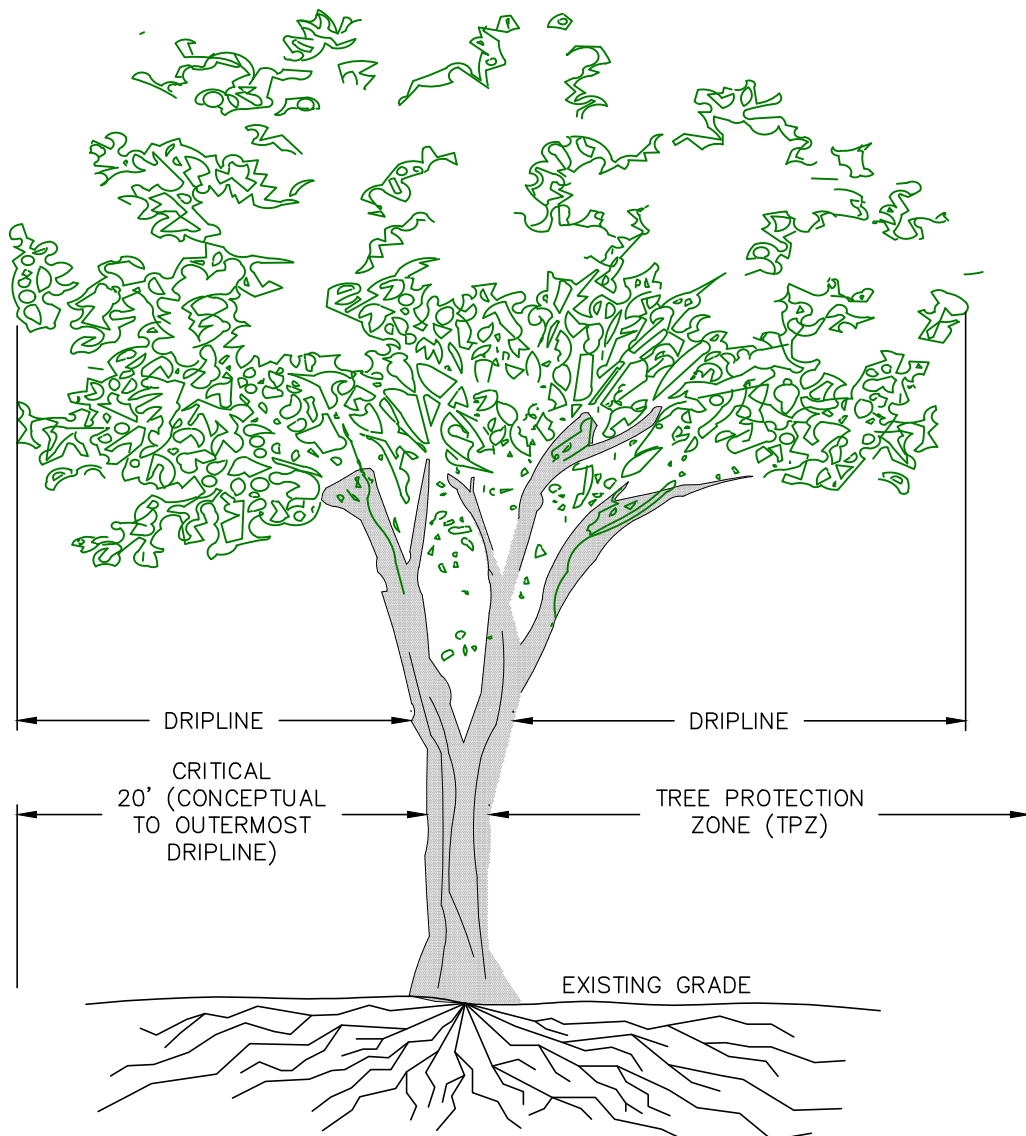
NOTES & PROCEDURES

THE FOLLOWING ACTIVITIES ARE PROHIBITED WITHIN THE LIMITS OF THE TREE PROTECTION ZONE (TPZ) OF ANY PROTECTED TREE SUBJECT TO THE PROVISIONS OF THE TREE PRESERVATION ORDINANCE. THE FOLLOWING PROCEDURES SHALL BE FOLLOWED ON ALL TYPES OF CONSTRUCTION PROJECTS (INCLUDING RESIDENTIAL, COMMERCIAL, AND MUNICIPAL/PUBLIC DOMAIN PROJECTS)

1. NO STORAGE OR PLACEMENT OF MATERIALS INTENDED FOR USE IN CONSTRUCTION OR WASTE MATERIALS ACCUMULATED DUE TO EXCAVATION OR DEMOLITION SHALL BE PLACED WITHIN THE LIMITS OF THE TREE PROTECTION ZONE.
2. NO EQUIPMENT SHALL BE CLEANED OR OTHER LIQUIDS, INCLUDING WITHOUT LIMITATION, PAINT, OIL, SOLVENTS, ASPHALT, CONCRETE, MORTAR OR SIMILAR MATERIALS DEPOSITED OR ALLOWED TO FLOW INTO THE TREE PROTECTION ZONE OF A PROTECTED TREE.
3. NO SIGN, WIRES OR OTHER ATTACHMENTS, OTHER THAN THOSE OF A PROTECTIVE NATURE, SHALL BE ATTACHED TO ANY PROTECTED TREE.
4. NO VEHICULAR TRAFFIC AND/OR CONSTRUCTION EQUIPMENT TRAFFIC OR PARKING SHALL TAKE PLACE WITHIN THE TREE PROTECTION ZONE OF ANY PROTECTED TREE.
5. NO GRADE CHANGES SHALL BE ALLOWED WITHIN THE LIMITS OF THE TREE PROTECTION ZONE OF ANY PROTECTED TREE UNLESS ADEQUATE PROTECTIVE CONSTRUCTION METHODS ARE APPROVED IN ADVANCE IN WRITING BY THE CITY FORESTER.
6. EQUIPMENT INCLUDING TRUCKS, TRAILERS, BULLDOZERS, TRACTORS, TRENCHERS, COMPRESSORS, AND HOISTS, SHALL NOT BE ALLOWED INSIDE THE TREE PROTECTION ZONE OF ANY PROTECTED TREE ON ANY CONSTRUCTION SITE WITHOUT WRITTEN PERMISSION OF THE CITY FORESTRY DEPARTMENT.





TREE PROTECTION DETAILS		
APPROVED: Dennis Will		
CITY FORESTER		
ISSUED: 5/6/22	REVISED:	DRAWING NO. CG-1

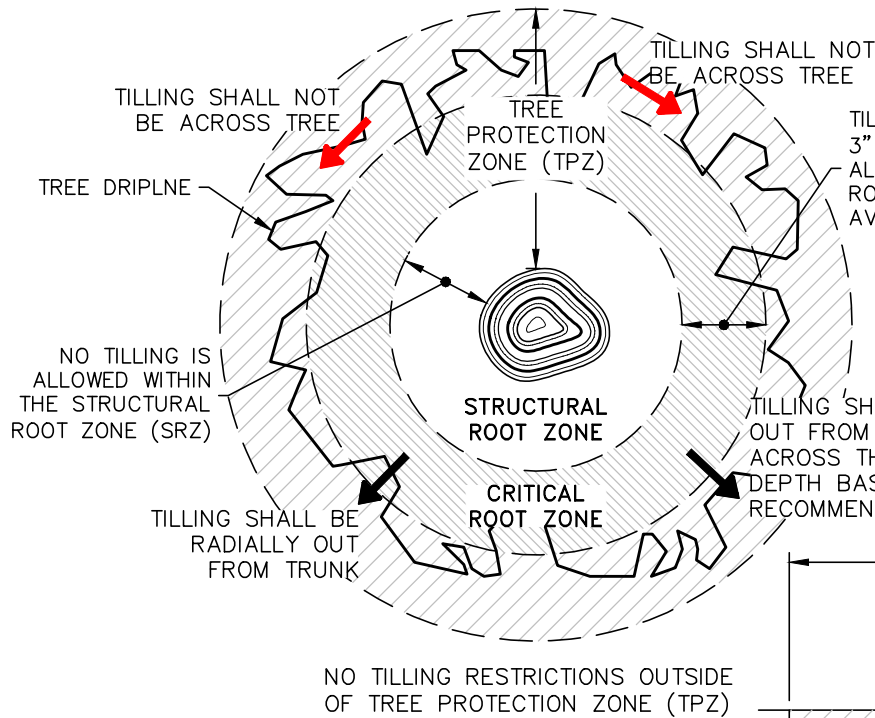


CRITICAL ROOT ZONE AREA

STRUCTURAL ROOT ZONE (SRZ).....12" RADIALLY / 1" OF TRUNK DIAMETER
 CRITICAL ROOT ZONE (CRZ).....18" RADIALLY / 1" OF TRUNK DIAMETER
 TREE PROTECTION ZONE (TPZ).....24" RADIALLY / 1" OF TRUNK DIAMETER

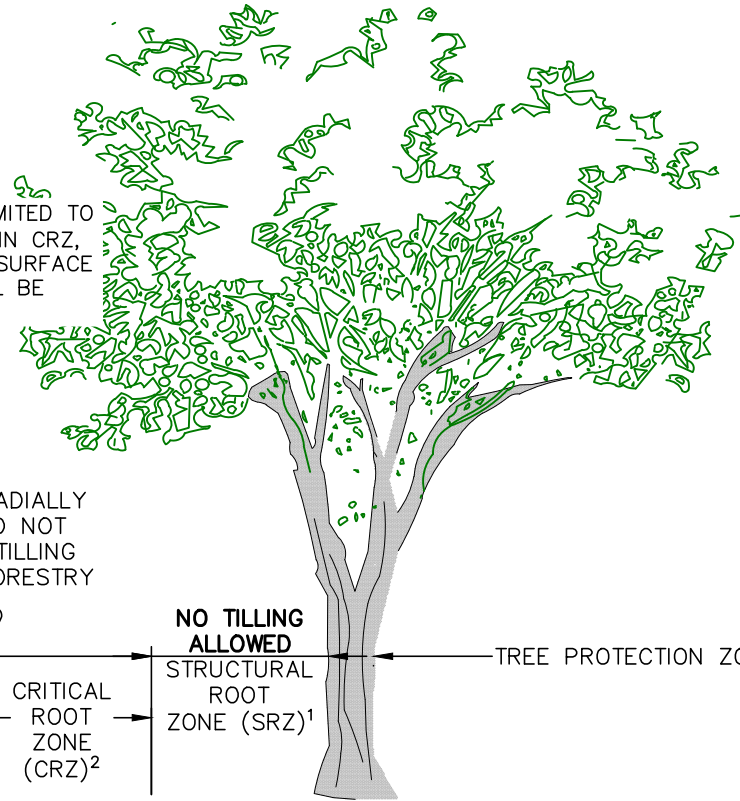
1. TREES CALLED OUT FOR PRESERVATION SHALL BE FENCED AT THE TREE PROTECTION ZONE. ERECTION OF FENCE PROTECTION AROUND TREES SHALL BE MINIMUM 6-FEET LONG #5 REBAR OR T-POSTS DRIVEN 1-FOOT INTO THE GROUND AT 8-FEET O.C. AT TREE PROTECTION ZONE. ATTACH ORANGE MESH BARRIER WITH NYLON ZIP TIES OR TWISTED WIRE TO REBAR OR T-POSTS. FENCING MAY OCCUR AT THE COMBINED TREE PROTECTION ZONES OF GROVES OF TREES. PLACE 4-6 INCH BARK MULCH BENEATH DRIPLINES OF TREES TO BE PRESERVED. KEEP BARK 2-3 FEET FROM TREE TRUNKS.
2. NO CONSTRUCTION MATERIALS OR CONSTRUCTION VEHICLES MAY BE STORED WITHIN TREE PROTECTION ZONES/FENCED AREAS OF EXISTING TREES.
3. CONSTRUCTION VEHICLES OR MACHINERY MAY NOT PASS BETWEEN TWO OR MORE EXISTING TREES IDENTIFIED FOR PRESERVATION IF THEIR CANOPIES ARE WITHIN 10-FEET OF TOUCHING. ADDITIONAL FENCING MAY BE REQUIRED AS NEEDED TO SATISFY THIS REQUIREMENT.
4. CONTRACTOR IS REQUIRED TO HAVE AN ARBORIST CERTIFIED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA), APPROVED BY CSPR, ON SITE IF SITE CONSTRUCTION EFFORTS REQUIRE REMOVAL OF EXISTING ROOTS OR BRANCH PRUNING. ROOTS APPROVED FOR CUTTING MUST BE CUT CLEANLY WITH A SAW. RIPPING OR SHREDDING ROOTS SUBJECT TO FINE/PENALTY.
5. UNAUTHORIZED TREE REMOVAL IS SUBJECT TO REPLACEMENT EQUAL TO THE APPRAISED VALUE OF THE TREE LOST.
6. THE CONTRACTOR IS REQUIRED TO WATER AND ATTEND TO OTHER MAINTENANCE NEEDS OF EXISTING TREES TO MAINTAIN HEALTHY GROWTH THROUGHOUT THE CONSTRUCTION PERIOD. TREES SHALL BE WATERED ACCORDING TO WEATHER AND TREE SPECIES REQUIREMENT.
7. ALL IRRIGATION TRENCHING WITHIN 'TREE PROTECTION LIMITS' DEFINED ABOVE SHALL BE 'HAND EXCAVATED' AVOIDING AS MUCH DAMAGE TO ROOTS AS POSSIBLE.

		TREE PROTECTION DETAILS	
		APPROVED: Dennis Will CITY FORESTER	
ISSUED: 5/6/22	REVISED:	DRAWING NO. CG-1	



TILLING IS LIMITED TO 3" OR LESS IN CRZ, ALL VISIBLE SURFACE ROOTS SHALL BE AVOIDED

TILLING SHALL BE RADially OUT FROM TREE AND NOT ACROSS THE TREE. TILLING DEPTH BASED ON FORESTRY RECOMMENDATION



PLAN

ELEVATION

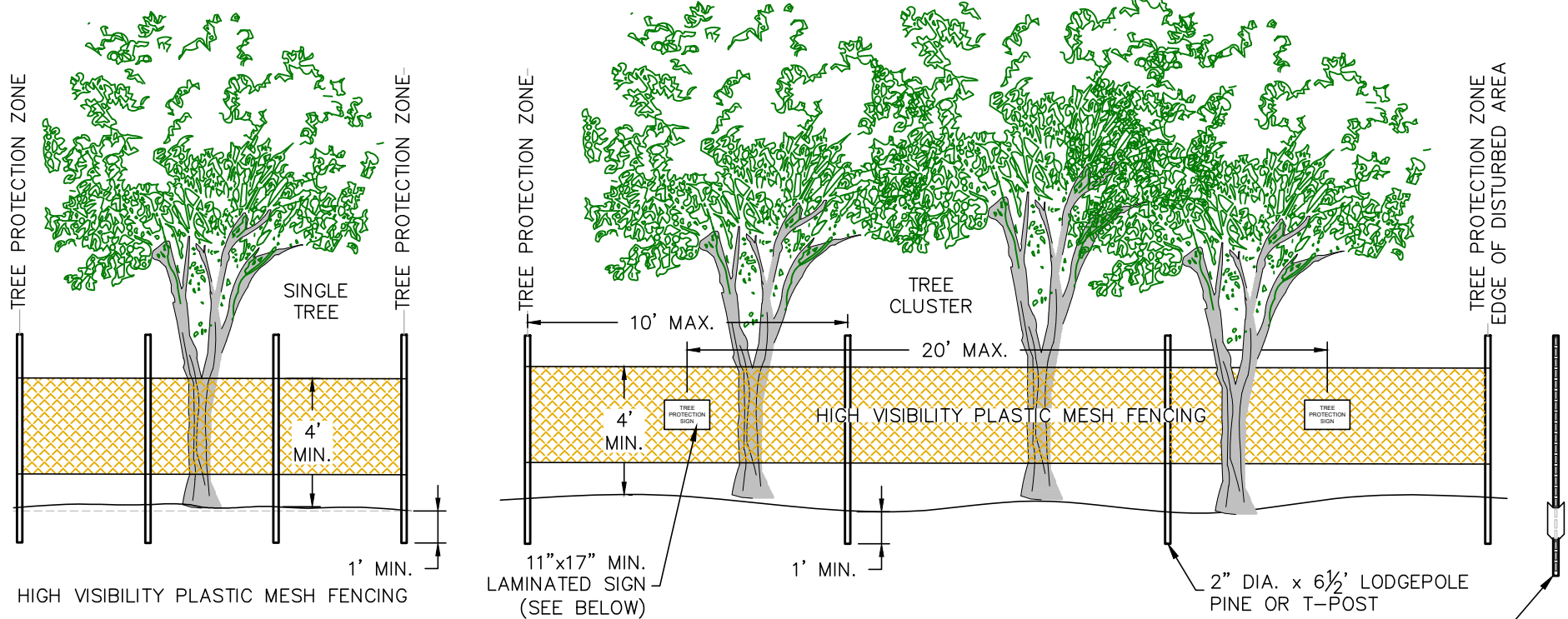
TILLING SHALL BE RADially OUT FROM THE TREE AND NOT ACROSS THE TREE. MAXIMUM TILLING DEPTH SHALL BE 3"

- ¹ 12" RADially / 1" OF TRUNK DIAMETER (SRZ)
- ² 18" RADially / 1" OF TRUNK DIAMETER (CRZ)
- ³ 24" RADially / 1" OF TRUNK DIAMETER (TPZ)

TREE PROTECTION DETAIL



TREE PROTECTION DETAILS		
APPROVED: <u>Dennis Will</u> CITY FORESTER		
ISSUED: 5/6/22	REVISED:	DRAWING NO. CG-1



TYPICAL FENCING TREE PROTECTION DETAIL

PRIOR TO CONSTRUCTION

TREE PROTECTION SHALL BE CONSTRUCTED AND MAINTAINED FOR EACH PROTECTED TREE ON THE CONSTRUCTION SITE. A PROTECTIVE FENCING WHICH ENCIRCLES THE OUTER LIMITS OF THE TREE PROTECTION ZONE OF THE TREE TO PROTECT IT FROM CONSTRUCTION ACTIVITY SHALL BE CONSTRUCTED.

6 1/2' GREEN STUDDED T-STYLE WHITE TOP FENCE POST - 1.25 LBS. PER FOOT APPROXIMATE INCLUDING NUBS PLUS A STABILIZING PLATE APPROX. ONE FOOT FROM THE BOTTOM WEIGHS APPROX. 0.5 LBS., TOTAL WEIGHT 8.3 LBS.APROX.

PROTECTIVE FENCING

PROTECTIVE FENCING SHALL BE AT LEAST FOUR (4) FEET HIGH, IS CLEARLY VISIBLE, AND SHALL HAVE A TREE PROTECTION SIGN AFFIXED TO THE FENCE EVERY TWENTY (20) FEET IN SUCH A MANNER TO BE CLEARLY VISIBLE TO WORKERS ON THE SITE.



		TREE PROTECTION FENCING DETAILS	
		APPROVED: Dennis Will CITY FORESTER	
ISSUED: 5/6/22	REVISED:	DRAWING NO. CG-1	



IN SITUATIONS WHERE A PROTECTED TREE REMAINS IN THE IMMEDIATE AREA OF INTENDED CONSTRUCTION AND THE TREE MAY BE IN DANGER OF BEING DAMAGED BY CONSTRUCTION EQUIPMENT OR OTHER ACTIVITY, THE CONTRACTOR OR SUBCONTRACTOR SHALL PROTECT THE TREE WITH 2x4 LUMBER ENCIRCLED WITH WIRE OR OTHER MEANS THAT DO NOT DAMAGE THE TREE. THE INTENT IS TO PROTECT THE TREE TRUNK AND BARK AGAINST INCIDENTAL CONTACT BY LARGE CONSTRUCTION EQUIPMENT.

NOTE:

1. WRAP ORANGE CONSTRUCTION FENCE ON TOP OF WOOD SLATS WITH AN OVERLAP OF 12-INCHES AND TIE WITH WIRE
2. TRUNK WRAP SHALL BE IN PLACE NO MORE THAN 5 DAYS BEFORE WORK ADJACENT TO THE TREE AND REMOVED NO MORE THAN 5 DAYS AFTER WORK ADJACENT TO THE TREE UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY FORESTER.

LOWEST BRANCH

12" MIN.

2x4 LUMBER

WIRE

EXISTING GRADE

2x4 WOOD SLATS
MAX 3" SPACING
BETWEEN WOOD
SLATS WITH MIN. OF
3 SLATS PER TREE

EXISTING TREE TRUNK

ORANGE PLASTIC CONSTRUCTION
FENCE WRAPPED TO A MINIMUM
OF 3 LAYERS OUTSIDE SLATS

SECTION VIEW

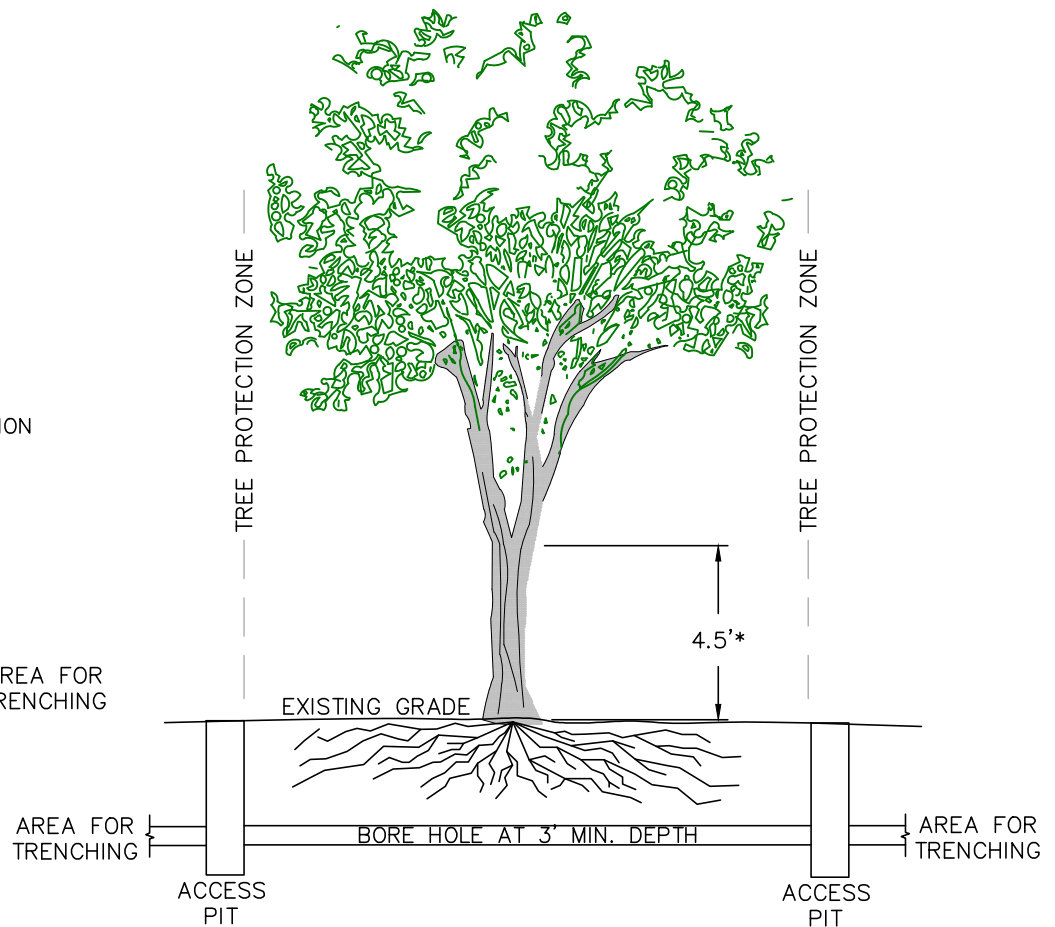
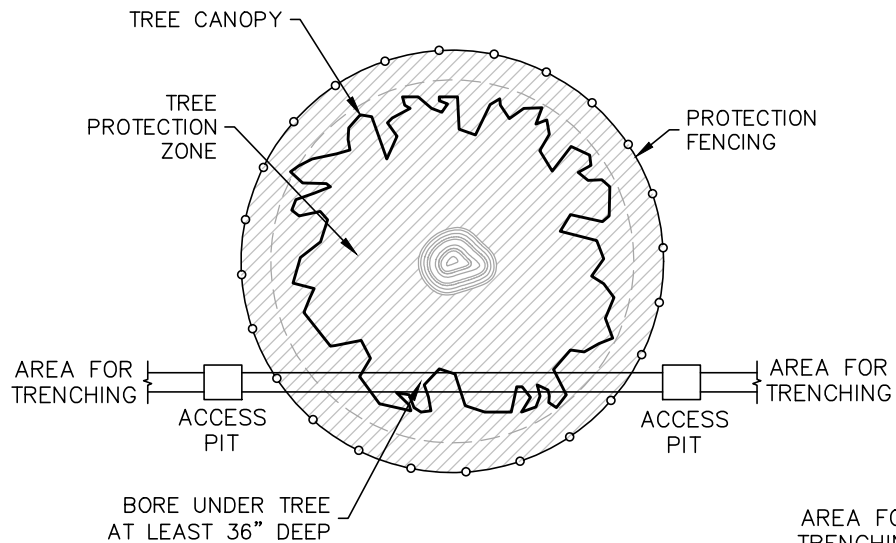
ELEVATION

TREE TRUNK & BARK PROTECTION DETAIL



TREE TRUNK & BARK PROTECTION DETAILS

APPROVED:		
Dennis Will CITY FORESTER		
ISSUED:	REVISED:	DRAWING NO.
5/6/22		CG-1



TRENCHING DETAIL

- * 1. TREE TRUNK DIAMETER IN INCHES TO BE MEASURED AT 4.5' FROM GROUND (D).
- 2. TREE PROTECTION ZONE AS CALCULATED BY DIAMETER OF THE TREE MULTIPLIED BY 24". (TPZ)
- 3. ACCESS PIT SHALL BE LOCATED AT TPZ/2.



**TREE PROTECTION
TRENCHING DETAILS**

APPROVED: Dennis Will
CITY FORESTER

ISSUED: 5/6/22	REVISED:	DRAWING NO. CG-1
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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes the following:
 - 1. Surveying and grade staking.
 - 2. Preparing subgrades for slabs-on-grade, walks, pavements, turfs, and plantings.
 - 3. Excavating and backfilling for building and structures.
 - 4. Drainage course of slabs-on-grade.
 - 5. Subbase course for concrete walks and pavements. If indicated on drawings.
 - 6. Base course for asphalt paving.
 - 7. Subsurface drainage backfill for walls and trenches.
 - 8. Excavating and backfilling trenches within building lines.
 - 9. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
 - 10. Rough Grading
 - 11. Finish Grading
 - 12. Site clean up
 - 13. Specialty subgrade preparations for pond liners, artificial turf fields, and courts.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls."
 - 2. Division 2 Section "Site Clearing" for site stripping, grubbing, removing topsoil, and protecting trees to remain.
 - 3. Division 2 Section "Tree Protection and Trimming" for protecting and trimming trees to remain.
 - 4. Division 2 Section "Landscaping" for finish grading, including placing and preparing topsoil for Turfs and plantings.

1.3 UNIT PRICES

- A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following:
 - 1. 24 inches outside of concrete forms other than at footings.
 - 2. 12 inches outside of concrete forms at footings.
 - 3. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - 4. Outside dimensions of concrete walls indicated to be cast against rock with out forms or exterior waterproofing treatments.
 - 5. 6 inches beneath bottom of concrete slabs on grade.
 - 6. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
- B. Unit prices for rock excavation include replacement with approved materials.

1.4 DEFINITIONS

- A. Backfill: Soil materials used to fill and excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Layer placed between the subbase course and asphalt paving.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

- F. Excavation: Removal of material encountered above subgrade elevations.
 1. Additional Excavation: Excavation below subgrade elevations as directed by Owner's Representative. Additional excavations and replacement material will be paid for according to Contract provisions for changes in the Work.
 2. Bulk Excavation: Excavations more than 10 feet in width and pits more than 30 feet in either length or width.
 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Owner's Representative. Unauthorized excavation, as well as remedial work directed by Owner's Representative, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock Material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. for bulk excavation or ¼ cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 1. Excavation of Footing, Trenches, and Pits: Late-model, track-mounted hydraulic excavator, equipped with a 42-inch wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lbf and stick-crowd force of not less than 18,700 lbf; measured according to SAE J-1179.
 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 45,000-lbf breakout force; measured according to SAE J-732.
- I. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material ¼ cu. yd. or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches.
- J. Scarify: Preparation of an existing grade or subgrade by uniformly and mechanically breaking up the soils to a predetermined depth.
- K. Structures: Buildings, footings, foundation, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, other man-made stationary features constructed above or below the ground surface.
- L. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.
- M. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- N. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Product Data: For the following:
 1. Each type of plastic warning tape.
 2. Drainage fabric.
 3. Separation fabric.
- B. Samples: For the following:
 4. 30-lb samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources.
 5. 12-by-12-inch sample of drainage fabric.
 6. 12-by-12-inch sample of separation fabric.
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.

3. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.
- D. Blasting plan approved by authorities having jurisdiction, for record purposes.

QUALITY ASSURANCE

- A. Comply with applicable requirements of NFPA 495, "Explosive Materials Code."
- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
 1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 2. Seismographic monitoring services during blasting operations.
- C. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- D. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner's Representative and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Notify Owner's Representative not less than two working days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without written permission from Owner's Representative.
 3. Contact utility-locator services for area where Project is located, at least 48 hours prior to commencing excavating. Call 1-800-922-1987 for all utility locations, including TV cable.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups, MH, CH, OL, OH, and PT, or a combination of these group symbols.
- D. Backfill and Fill: Satisfactory soil materials.
- E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 3/4 inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

- H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand: ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- I. Drainage Fill: Washed, uniformly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57: with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- J. Filter Material: Uniformly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

2.2 ACCESSORIES

- A. Warning Tape: Acid-and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:
- B. Detectable Warning Tape: Acid-and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.
- C. Drainage Fabric: Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D4759 and referenced standard test methods:
 - 1. Grab Tensile Strength: 120 lbf; ASTM D 4632.
 - 2. Tear Strength: 50 lbf; ASTM D 4533
 - 3. Puncture Resistance: 70 lbf; ASTM D4833
 - 4. Water Flow Rate: 135 gpm per sq. ft.; ASTM D 4491.
 - 5. Apparent Opening Size: No. 70; ASTM D4751
- D. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D4759 and referenced standard test methods.
 - 1. Grab Tensile Strength: 200 lbf; ASTM D 4632
 - 2. Tear Strength: 75 lbf; ASTM D 4533.
 - 3. Puncture Resistance: 90 lbf; ASTM D 4833.
 - 4. Water Flow Rate: 4 gpm per sq. ft.; ASTM D 4491.
 - 5. Apparent Opening Size: No. 30; ASTM D 4751.

PART 3 - EXECUTION

3.1 PREPARTION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 DE-WATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Obtain de-watering permit if required.
 - 2. Reroute surface water runoff away from excavation areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 3. Install a de-watering system to keep subgrades dry and convey ground water away from excavations. Maintain until de-watering is no longer required.

3.3 EXPLOSIVES

- A. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.
 - 1. Do not damage adjacent structures, property, or site improvements or weaken the bearing capacity of rock subgrade when using explosives.

3.4 SURVEYING AND GRADE STAKING

- A. Before earthwork operations are started, the site shall be completely staked out by the Contractor for the work of this section for the approval of the Owner's Representative. Surveying and staking is to be done by a City approved licensed surveyor.
- B. Grade stakes shall be set where spot elevations are shown on drawings as well as breaks in grade, along drainage swales and as otherwise required, to complete the work of this section to the elevations shown on the drawings or as modified in the field by the Owner's Representative.
- C. Maintain all benchmarks and other reference points; if disturbed or destroyed, notify the Owner's Representative and replace as directed.
- D. All surveys to consist of (50') foot grids with spot elevations unless otherwise specified.
- E. Rough Grade: Refer to Section 3.17 Rough Grading.
- F. Blue Tops: Refer to Section 3.19 Blue Topping.

3.5 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Classified Excavation: Excavation to subgrade elevations classified as earth and rock. Rock excavation will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.
 - 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
 - 2. Rock excavation includes removal and disposal of rock.
 - a. Do not excavate rock until it has been classified and cross-sectioned by Owner's Representative.
- C. Protection, Shoring and Bracing.
 - 1. In the event that existing utilities, structures, or underground water is encountered or exposed during the execution of this work, the Contractor shall notify the Owner's Representative immediately for procedures to follow.
 - 2. Install and maintain shoring, bracing and safety fencing or safety tape as required to keep structures, sidewalks, drives and streets safe to life, limb and property at all time. Provide shoring and bracing as required to stabilize earth slopes.
 - 3. Provide necessary decking, guards, fences, or planking to maintain safe pedestrian and vehicular traffic on and adjacent to the site.
 - 4. Keep public streets and existing paved areas clean at all times.

3.6 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete form work, for installing services and other construction, and for inspections.
 - 1. Excavations for footing and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Pile Foundations: Stop excavations from 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
 - 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.
 - 4. Compliance with City of Colorado Springs grading and erosion control plan as per drainage criteria manual, (manual can be obtained from the City of Colorado Springs Engineering Division).

3.7 EXCAVATION FOR POND LINERS, COURTS, ARTIFICIAL TURF FIELDS, WALKS AND PAVEMENTS

- A. Excavate surfaces under pond liners, courts, artificial turf fields, walks and pavements to indicated cross sections, elevations, and grades.

3.8 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of tops of pipe in accordance with local requirements.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: 12 inches on each side of pipe or conduit.
 - 2. Clearance: As indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - 3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
 - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.9 APPROVAL OF SUBGRADE

- A. Notify Owner's Representative when excavations have reached required subgrade.
- B. If Owner's Representative determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 - 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulator water, or construction activities, as directed by Owner's Representative.

3.10 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footings by extending bottom, without altering top elevation. Lean concrete fill may be used when approved by Owner's Representative.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Owner's Representative.

3.11 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Conform to fugitive dust permit.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 BACKFILL

- A. Place and compact backfill excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspecting and testing underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.13 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings.
- C. Place compact initial backfill of subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.
 - 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- D. Coordinate backfilling with utilities testing.
- E. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- F. Place and compact final backfill of satisfactory soil material to final subgrade.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.14 FILL

- A. Preparation: In areas requiring fill, all stripping operations shall be completed before backfilling has begun. Place fill and backfill on reasonably dry soil. No fill shall be placed on wet ground. Fill shall be laced in eight inch (8") lifts in compacted depth under pavements or concrete and ten inch (10") lifts compacted depth under planted, turfed or other areas. Each layer shall be compacted to a firm surface by sheepfoot rollers or pneumatic rollers. Fill and backfill shall be compacted to 85% density under areas to be turned or planted and 95% density under all pavements and improvements. Density tests shall be modified Proctor Test taken at optimum moisture content.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

- C. Place and compact fill material in layers to required elevations as follows:
 1. Under grass and planted areas, use satisfactory soil material, in no more than 10" lifts.
 2. Under walks and pavements, use satisfactory soil material, in no more than 8" lifts.
 3. Under steps and ramps, use engineered fill.
 4. Under building slabs, use engineered fill.
 5. Under footing and foundations, use engineered fill.
- D. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

3.15 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 1. Do not place backfill of fill material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percents and is too wet to compact to specified dry unit weight.

3.16 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according ASTM D 1557:
- D. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 92 percent.
 3. Under Turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.

3.17 ROUGH GRADING

- A. General: Uniformly grade all areas covered by the project, including excavated and fill sections. The finished surface shall be smooth, within a 1/10 of a foot compacted and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade grade operations. The final surface shall be not more than (.1) feet above or below the established grade or approved cross section.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1/10 of an inch.
 2. Walks: Plus or minus 1/10 of an inch.
 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.
- D. Contractor to provide survey to verify grades, to include swales, to satisfaction of Owner's Representative.
- E. The Owner's Representative shall approve final rough grade, prior to Contractor proceeding with any permanent site improvements.

3.18 FINISH GRADING

- A. Upon completion of construction, all areas which have been excavated, filled, or otherwise disturbed shall be covered with earth to a depth required to bring finished grade to the elevation indicated on drawings. This shall include the depth of topsoil.
- B. Topsoil shall be placed to provide a minimum depth of four inches (4") in all areas to receive, sod or as otherwise indicated.
- C. Topsoil shall be graded and dragged to prevent irregularities and depressions in which water will be retained.

3.19 BLUE TOPPING

- A. Provide blue top staking at 50 foot grids in all disturbed areas to receive imported topsoil and sodded turfgrass, to be done for all areas 5% or less, as well as under all areas to receive asphalt pavement.

3.20 SUBSURFACE DRAINAGE

- A. Drainage Piping: Drainage pipe is specified in Division 2 Section "Foundation Drainage Systems."
- B. Subsurface Drain: Place a layer of drainage fabric around perimeter of drainage trench as indicated. Place a 6-inch course of filter material on drainage fabric to support drainage pipe. Encase drainage pipe in a minimum of 12 inches of filter material and wrap in drainage fabric, overlapping sides and ends at least 6 inches.
 - 1. Compact each course of filter material to 95 percent of maximum dry unit weight according to ASTM D 698.
- C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade. Overlay drainage backfill with one layer of drainage fabric, overlapping sides and ends at least 6 inches.
 - 1. Compact each course of filter material to 95 percent of maximum dry density according to ASTM D 698.
 - 2. Place and compact impervious fill material over drainage backfill to final subgrade.

3.21 SUBBASE AND BASE COURSES

- A. Under pavements and walks, place subbase course on prepared subgrade and as follows: If indicated on drawings.
 - 1. Place base course material over subbase.
 - 2. Compact sub base and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
 - 3. Shape subbase and base to required crown elevations and cross-slope grades.
 - 4. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
 - 5. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.22 DRAINAGE COURSE

- A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
 - 1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
 - 2. When compacted thickness of drainage course is 6 inches or less, place materials in a single layer.
 - 3. When compacted thickness of drainage course exceeds 6 inches, place materials in equal layers, with no layer more that 6 inches thick or less than 3 inches thick when compacted.

3.23 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing. A sufficient number of density tests of the backfill and subgrade may be ordered by the Owner's Representative to determine that the backfill and subgrade complies with the appropriate Subsection of this Section.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Owner's Representative.
- D. Testing agency with test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2992, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sp. ft. or less of paved area or building slab, but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
 - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained. These tests shall be made by an approved testing laboratory and paid for by the City on a first time basis only.
- F. Owner's Representative shall approve final rough grade.

3.24 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Owner's Representative; reshape and re-compact.
- C. Where settling occurs before contract period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.25 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property. All associated costs and fees will be the responsibility of the contractor.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner's Representative.

3.26 SCARIFY EXISTING GRADE AND SUBGRADE

- A. Prepare an existing grade or subgrade by uniformly and mechanically breaking up the soils to the depth shown on the construction plans, geotechnical report, or as directed by the owner's representative.
- B. Testing of the subgrade moisture content will be at the discretion and direction of the owner's representative. The moisture content will be adjusted to 2% of the optimum prior to final grade and compaction.

- C. The subgrade will be compacted to compliance with the recommendations of the geotechnical report, construction plans, and City of Colorado Springs Engineering Standards.
- D. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property. All associated costs and fees will be the responsibility of the contractor.
- E. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner's Representative.

END OF SECTION 02300

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 1. Examination of the site.
 2. Marshalling and access.
 3. Protecting existing trees and vegetation to remain.
 4. Removing trees and other vegetation.
 5. Clearing and grubbing.
 6. Topsoil stripping.
 7. Removing above-grade site improvements.
 8. Disconnecting, capping or sealing, and abandoning site utilities in place.
 9. Disconnecting, capping or sealing, and removing site utilities.
- B. Related Sections include the following:
 1. Division 1 Section “Field Engineering” for verifying utility locations and for recording field measurements.
 2. Division 1 Section “Construction Facilities and Temporary Controls” for temporary utilities, temporary construction and support facilities, temporary security and protection facilities and environmental protection measures during site operations.
 3. Division 2 Section “Tree Protection and Trimming” for protecting trees remaining on-site that are affected by site operations.
 4. Division 2 Section “Earthwork” for soil materials, excavating, backfilling, and site grading.
 5. Division 2 Section “Landscaping” for finish grading, including placing and preparing topsoil for lawns and planting.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than ¾ inches in diameter; and free of weeds, roots and other deleterious materials.

1.4 MATERIALS OWNERSHIP

- A. Except for materials to be stockpiled or to remain Owner’s property, cleared materials shall become Contractor’s property and shall be removed from the site.

1.5 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings according to Division 1 Section “Contract Close-out.”
 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.
- C. An approved traffic control plan and all environmental permits as required by local and state agencies.

1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section “Project Meetings.”

1.7 PROJECT CONDITIONS

- A. The Contractor shall visit, inspect and thoroughly become familiar with the site and the scope of work. The Contractor will judge conditions that will exist when carrying out the contract. The Contractor shall meet with the Owner's Representative to determine the point of access and marshaling area to be utilized to perform this work. No gasoline, oil concrete or other material shall be dumped anywhere on site.
- B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 - 3. When working in the City Right of Way, submit an approved traffic control plan to Owner's Representative.
- C. Improvements on Adjoining Property: Authority for performing indicated removal and alteration work on property adjoining Owner's property will be obtained by owner before award of Contract.
- D. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- E. Notify utility locator service for area where Project is located before site clearing.

PART 2-PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3-EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Submit a storm water control plan and fugitive dust permit as required by local and state agencies.
- C. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Locate and clearly flag trees and vegetation to remain or to be relocated.
- E. Refer to City of Colorado Springs stormwater management manual.
- F. Protect existing site improvements both in and outside of construction zone.
 - 1. Restore damaged improvements both on and off the site to their original condition, as acceptable to Owner.

3.2 TREE PROTECTION

- A. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
 - 2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.
- B. Do not excavate within drip line of trees, unless otherwise indicated.
- C. Refer to the related plans as indicated, and/or consult with the City Forester or the Designee assigned to the project.
- D. Furnish all labor, material, tools, land equipment necessary to complete the work indicated on drawings and as required herein.

- E. Existing trees to remain shall be protected at all times during the Contract period, by using fencing (i.e., snow fencing, or chain link fencing with metal staking). Tree protection fencing shall be maintained by the Contractor during construction. The Protection area to be fenced (2') outside the dripline of the tree unless otherwise required by the Owner's Representative. No equipment shall be parked, driven or material stockpiled within the dripline area of the existing trees to remain. No gasoline, oil, chemicals, concrete or other material shall be dumped anywhere on site. Where vehicle or equipment traffic is necessary in the protection area of a tree, the soil shall be protected from compaction by (6"-10") layer of wood chip mulch.
- F. Any trees damaged during construction shall be promptly reported to the Owner's Representative, who shall contact the City Forester or the Designee for an assessment of damages. The contractor will be responsible for repair or replacement to the satisfaction of the City Forester or the Designee.
- G. Tree roots are to be clean cut when necessary using proper equipment, i.e. loppers or concrete saw. The Contractor shall submit with the Bid the cost to implement proper boring under roots.
- H. The City Forester or the Designee will be informed of all construction projects, especially when trees are involved.
- I. The City Forester or the Designee will survey the site to set and determine what the contractor needs to do before construction begins. The Contractor shall set up tree protection devices.
- J. The City Forester or the Designee shall be informed of:
 1. Soil grade changes adjacent to trees.
 2. Probable trenching through roots.
 3. Location of stored heavy equipment.
 4. Paths heavy equipment will take during construction project, to avoid root compaction and root breakage.
- K. The City Forester or the Designee shall be notified during the project design phase, to aid in tree protection during the primary phase.
 1. When equipment must be used in close proximity of the trunk, the entire tree trunk shall be protected by banding large 2"x4" wooden boards to avoid direct contact. The soil shall be protected from compaction with a 6-10" layer of wood chip mulch.
 2. The Forestry Division will conduct all pruning if limb elevation is needed to avoid equipment contact.
- L. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 1. Cover exposed roots with burlap and water regularly.
 2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
 3. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
- M. Rehabilitate or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.
 1. Employ a qualified arborist, as approved by the City Forester or the Designee, to submit details of proposed rehabilitation for the damage to trees and shrubs.
 2. The Contractor will replace trees that cannot be rehabilitated and restored to full-growth status, as determined by the qualified arborist and the City Forester or the Designee

3.3 UTILITIES

- A. Contractor will coordinate for disconnecting and sealing indicated utilities that serve existing structures before site clearing with Owner's Representative.
 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
 2. Arrange to shut off indicated utilities with utility companies.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or other unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Owner's Representative written permission.
- D. Excavate for and remove underground utilities indicated to be removed.

3.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 3. Completely remove or grind stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
 4. Use only hand methods for grubbing within drip line of remaining trees.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
1. Place fill material in horizontal layers not exceeding 8-inch loose depth, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Comply with fugitive dust permit.
1. Do not stockpile topsoil within drip line of remaining trees.
 2. Dispose of excess topsoil as specified for waste material disposal.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.7 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property. All associated costs and fees are the responsibility of the contractor.

END OF SECTION 02230 SITE CLEARING (REVISED 2013)

CARING FOR TREES

Watering

Water each seedling with one gallon at planting time. Check soil moisture periodically by feeling the soil near the plant. Fabric mulch is highly recommended to conserve water and a drip system can be installed.

Fertilizing

Fertilize seedlings with a slow release tablet that breaks down over time. Do not put any fresh material that may be too harsh for the seedlings such as manure, fish or bone meal in the planting hole. **DO NOT USE NITROGEN UNTIL THE ROOTS HAVE HAD AT LEAST ONE GROWING SEASON.** Nitrogen can be applied the second year to stimulate root growth.

Mulching

Fabric mulch reduces weed competition and water loss from the soil, and can be obtained from the Colorado State Forest Service. Mulch allows moisture to pass through the fabric to the soil, restrict weed growth, and permit oxygen exchange between the air and the soil. Installation of fabric mulch on large plantings can be done efficiently by renting a weed barrier implement, available from the Colorado State Forest Service. Alternative products include wood chips, straw, peeler shavings, rotted sawdust, and corn cobs. Keep these alternative products less than two inches deep to avoid rodent problems. Keep mulch away from stem of seedling.

Weed Control

Eliminate weeds around each seedling for at least two feet. This may be accomplished by hand pulling, mulching, mowing (watch out for the seedling), hoeing, or chemically treating. Herbicide can be sprayed, under low pressure, on weeds near seedlings. Cover seedling with bucket, pvc pipe or use another form of shield to keep spray from the seedling. When hoeing, use care not to damage shallow roots.

Wildlife Damage

Weed control will discourage rodents from chewing seedlings. Commercial tree guards can be purchased from the Colorado State Forest Service or use window screen or chicken wire to make a rodent guard. Deer or elk may need to be fenced out of the planting entirely. An effective deer repellent can be made by mixing whole eggs with tap water to form a 20 percent solution; strain and spray on seedlings. If deer are really hungry, a combination of methods may be required.



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COLORADO STATE FOREST
SERVICE ALAMOSA DISTRICT

SEEDLING TREE PLANTING GUIDE



**COLORADO STATE
FOREST SERVICE**

COLORADO STATE UNIVERSITY

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PLANTING SEEDLING TREES

Trees and shrubs are a permanent part of a home landscape. When properly selected, and planted correctly in an appropriate location, they can improve a home's appearance and increase its value, as well as provide shade, weather protection, privacy, and year-round enjoyment. Because your trees and shrubs are such an important investment, take care with their planting.

Care and Storage of Seedlings

Improper care of seedlings between delivery and time of planting is one of the greatest causes of mortality. Do not store seedlings in heated buildings, or where they are exposed to warm air, sun, or wind. Potted trees should be watered frequently to keep soil moist. The packages drain properly from holes in the bottom.

If planting is to occur within five days of delivery, leave bare root bundles intact and store in a cool, dry place (40°-50°F). Water the package from the top, but turn over to drain. Keep sawdust moist, but do not allow seedlings to stand in water. If planting is not planned for more than a week, open the bundle, separate the seedlings and place them in a trench, cover the roots with loose soil, and fill the trench with soil. Keep the soil in the trench moist and protect the roots from exposure to air.

Site Preparation

Site preparation enhances the soil's ability to catch and store moisture, reduces grass and weed competition, and prepares the soil for planting.

Medium to heavy (clay) soils can be summer fallowed the year prior to planting. Leave rough over winter and disk, harrow, or roto-till just before planting.

Do not summer fallow light, sandy soils as they are subject to wind erosion. Instead, plant cover crops

such as sorghum, grain, or Sudan grass the summer prior to tree planting.

Cultivate just before planting, leaving the strips between rows uncultivated.

Weeds and grasses take much-needed moisture away from newly planted seedlings. Eradicate weeds such as Canada thistle and bindweed before trees are planted; grasses should also be eliminated.

Preparing Seedlings for Planting

Bare Root: Create a slurry by mixing a shovelful of soil, or two tablespoons of polymer, in a five gallon bucket half-filled with water. Open the bundle and place seedlings immediately into the bucket, submerging the roots completely in the slurry. Plant as quickly as possible. Do not store seedlings this way for more than a few hours or root death may occur.

Potted: Remove seedlings from container one at a time by grasping main stem of seedling near soil level and pulling gently. You may also push up through slot in bottom of container with a pencil or ruler. Do not break the root ball or leave seedlings in sun or wind following removal from container. Seedlings should be removed from the containers just prior to planting.

Hand Planting

Bare Root: Dig a round hole at least one foot in diameter. Make a small mound of soil in the bottom of the hole. Take the seedling from the bucket of slurry and spread the roots out in all directions using the mound as a root support. Be careful not to "J" root the seedling. Pull loose soil back over roots and lightly tamp soil down and water. Do not compact the soil by tamping wet soil too firmly! **SOIL COMPACTION ELIMINATES OXYGEN, WHICH ROOTS NEED TO SURVIVE!**

Be sure the seedling root collar (where it was planted in nursery) is at the finished soil level. Watering is the best method to settle the soil, eliminate air pockets, and provide moisture to the root system. Be gentle!

Potted: Follow the same planting instructions as for bare root, but do not disturb the roots. Make sure the root ball does not become exposed after final watering.

Machine Planting

When planting more than 1000 seedlings, consider using a planting machine. These are available for rent from your local Colorado State Forest Service Forester. Instructions on machine planting should be obtained at the time of rental.

COMMON CAUSES OF SEEDLING MORTALITY

- Roots exposed to hot, dry air
- Roots tangled or not spread out
- Improper storage
- Seedlings planted too deep
- Seedlings planted too shallow
- Lack of water
- Seedling mowed off
- Livestock trampling
- Rodents
- Deer and elk
- Weed killer spray
- Weeds not eradicated before trees are planted
- Poor control of competing weeds/vegetation
- Lack of maintenance!

For more information visit our website :

csfs.colostate.edu¹⁰

Biochar in Colorado

Fact Sheet No. 0.509

Crop Series | Soil

By M. Ramlow, C.M.H. Keske, M.F. Cotrufo*

Introduction

Biochar is an organic soil amendment currently being researched and used in a variety of applications across Colorado. Biochar has the potential to provide benefits to multiple economic sectors integrated within its supply chain, for example biochar and biofuel co-production can provide additional revenue streams for forestry and waste management. Biochar applications may have a critical role in mitigating climate change, reclaiming and restoring land, and boosting soil fertility for agriculture and horticulture. This article explores some of the latest research relevant to biochar applications in Colorado such as:

- Providing a market for beetle-killed wood
- Generating biofuels as a co-product
- Storing carbon and reducing greenhouse gas emissions
- Restoring contaminated sites
- Aiding in water and nutrient cycling in agriculture

Biochar Production

What is Biochar?

Biochar is charred organic matter used deliberately as a soil amendment, with the intent to improve soil properties¹. Biochar is made by heating biomass to high temperatures (480-1800°F) in the absence of oxygen through pyrolysis². Pyrolysis chemically and physically alters the composition of the biomass producing a highly porous, stable form of organic matter that can be used as a soil amendment. Biochar can be produced from a variety of feedstocks including forest residues, agricultural residues, waste, and purpose grown biomass. The source material and the pyrolysis conditions are major controls

*M. Ramlow, doctoral student, soil and crop sciences; original publication by C.M.H. Keske, former associate professor, soil and crop sciences; G. Lohman Birch, doctoral student, soil and crop sciences; M.F. Cotrufo, professor, soil and crop sciences. 1/16

on the biochar's pH, ash content, elemental composition and stability. Therefore, both the biochar feedstock and production conditions can have important implications on how biochar amendments influence soil properties and their efficacy for different management objectives.

Forest Management

If biochar production can be accomplished in a cost effective manner, it may change how forests are managed. Specifically, trees that are killed by pests, such as mountain pine beetle, may be viewed as a productive source for manufacturing biochar, rather than a wasted resource. At this writing, Colorado's forests suffer from overcrowding due to wildfire suppression and massive losses from recent pest outbreaks³. Current forest management practices involve controlled burning and harvesting and burning in smaller slash piles.

These practices are expensive, pose fire risks, cause smoke pollution, and can degrade the land if not properly managed. Biochar production has potential to turn beetle-damaged stands, hazard trees and other residues from fuels reduction treatments into value-added product. Rather than being burned, the trees and residues would be harvested as a feedstock. Preliminary results demonstrate that there may be support among Colorado residents for this type of management program. A recent study of Colorado households indicated that residents were hypothetically willing to pay roughly the same for burning slash on-site and moving it off-site for biochar production as a means of reducing the intensity of future wildfires⁴.

Biochar companies in Colorado are producing woody biochar on a small-scale, experimental basis from forest stewardship contracts with the USFS and residues at pelleting operations. If woody biochar is found to be an effective soil amendment, then there will likely be an increase in demand. Biochar production would thus provide additional



Quick Facts

- Biochar shows promise for a variety of applications—such as utilizing residues from overcrowded and beetle-infested forests, storing carbon in soils, soil reclamation and mining remediation, and a soil amendment for gardening—but continued research is necessary to better inform management decisions..
- A commercial biochar market has begun to develop in the U.S., however it is largely confined to laboratories, experimental field sites, mine reclamation and home gardening.
- Biochar production can be profitable on a case-by-case basis but success is often dependent on reduced transport for feedstocks, pricing for carbon reductions and demand for economic uses of biochar soil amendments.

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value by helping to lower the cost of forest management practices. While there is promise for market development, the effectiveness of using pine-based biochar as a soil amendment needs to be better documented. Preliminary studies also indicate that long distances between the forest and the biochar processing centers should prompt a closer look at pre-processing or other means for reducing transportation costs associated with making biochar from pine beetle killed wood^{5,6}.

Biofuel Co-production

Biochar producers can also optimize the operating conditions to produce gas (syngas) and liquids (bio-oil) in addition to the solid biochar residues. The gas and liquid fraction can then be upgraded to produce biofuel. These systems typically apply fast pyrolysis, using moderate pyrolysis temperatures (~950°F) and shorter residence times, to optimize for bio-oil production and gasification, using higher temperatures (~1,650°F) and moderate residence times, to optimize syngas production⁽²⁾. Studies have found that biochars produced under higher temperatures tend to have more stable compounds, higher ash content and increased porosity leading to more persistent biochar with higher sorption capacity⁷. In a recent industry survey the International Biochar Initiative found that 12% of respondents were pursuing syngas production as a by-product of biochar production and 7% were working towards collecting and refining bio-oils⁸. While none of the commercial biochar facilities in Colorado currently co-generate biofuels there are some companies working on scaling up such technologies. Recent biochar and bio-energy co-production studies show that co-production may reduce overall waste and carbon footprints⁽⁶⁾. However, at this writing, biochar and bio-energy co-generation is generally not an economically viable venture unless a monetary value is assigned to carbon dioxide emissions^{5,9}. Some bioenergy and biochar production has been shown to be economically feasible on a case-by-case basis⁽¹⁰⁾⁽¹¹⁾. Product selling price uncertainty contributes to risk of private investment into a biofuel production facility⁽¹²⁾.

Biochar Applications

Carbon Sequestration and Greenhouse Gas Management

Biochar has recently gained much attention as a way to capture carbon from the atmosphere and mitigate global climate change. Plants naturally convert atmospheric CO₂ into biomass which then gets recycled back to the atmosphere through respiration, burning or decomposition. In natural systems 80-90% of the carbon in biomass returns to the atmosphere after a few years to decades from decomposition in the soil. Likewise, after a natural fire, it is estimated that up to 25% of the carbon in the burned biomass is converted in more stable forms of organic matter like biochar⁽¹³⁾. Pyrolysis of organic matter under controlled conditions can significantly increase the retention of carbon with 10 to 50% of the original biomass carbon retained depending on the conversion process³.

A study looking at the stability of multiple types of biochar showed biochar had a mean residence time ranging from 90 to 1,600 years¹⁴. Similarly, in a two year lab study at Colorado State University (CSU), wood-derived biochar amended to four soil types primarily remained in the soil, yet a small fraction of it (<3.2%) was consumed by the soil microbes⁽¹⁵⁾. In the soils with an organic carbon content larger than 1.97%, the biochar applications lead to increased soil respiration with the biochar possibly providing a shorter-term carbon source¹⁵. Therefore it is important to continue to study the stability of biochar using long-term field experiments to better understand the biochar's full carbon sequestration potential.

Research shows biochar can also reduce emissions from more potent greenhouse gasses such as nitrous oxide (N₂O). A recent review of 56 studies found that biochar has been shown to decrease N₂O emission by 49%¹⁶. Researchers have looked at a variety of mechanism by which biochar could reduce N₂O emissions including reducing the amount of nitrogen available for transformation into N₂O, altering the soil conditions most favorable to N₂O production and generating conditions that more efficiently convert N₂O to N₂ gas. CSU is currently conducting lab incubations and field experiments to better understand the mechanisms by which biochar impacts nitrogen cycling and decreases N₂O emissions from fertilizer. This work can help inform how biochar can be applied to reduce greenhouse gas emissions and manage nitrogen cycling in soils.

Mine Reclamation and Restoration

Certain biochars have also been shown to have high sorption capacity which could be used to immobilize contaminants in soil. Biochar with small particle sizes and high surface area have also been shown to sorb organic pollutants⁽⁷⁾. Biochar's high pH can also help provide a liming effect for reclamation of highly acidic soils. A study by the USGS on two hardrock mine tailing sites, where soils are subject to metal toxicity and high acidity, found that the addition of biochar had differing effects across sites⁽¹⁷⁾. At one site, biochar amendments decreased the leaching of aluminum, cadmium, copper, lead and zinc. However, at the other site, biochar addition increased the mobilization of copper and zinc. The study also found that higher application



Agricultural field sites where CSU researches are studying biochar's impacts on crop yields, water retention and GHG emissions

rates may be necessary to sufficiently raise pH and reduce toxicity. Therefore, biochar addition can potentially provide a low-cost alternative for reclamation of soils contaminated with heavy metals, organic pollutants or high acidity but requires careful consideration of site-specific properties beforehand. There is considerable opportunity for mining companies or other private sector companies to earn a profit by investing into the development of biochar technologies that are specific to mine site remediation¹⁸.

Biochar is also being explored for its potential to aid in ecological restoration of degraded soils to help build soil organic matter, facilitate plant regeneration and provide preferential habitat for soil microbes and biota. The USFS and CSU are currently collaborating on a project exploring biochar's ability to aid in carbon sequestration, nutrient retention and revegetation of decommissioned forest roads in the Arapahoe National Forest.

In a series of qualitative research interviews conducted in 2011 with biochar purchasers and home/ garden supply stores, the majority of biochar in Colorado was sold for mine reclamation applications and experimental forest research conducted by government agencies and entrepreneurs. Pine wood chips comprised the typical feedstock, and the average order was approximately 6,400 lbs, or on the order of 25 to 30 cubic yards depending on the density of the specific biochar¹⁸.

Agriculture and Horticulture

Biochar has many properties that have potential to enhance soil fertility. Biochar constitutes a highly stable form of soil organic matter. Soil organic matter is important in retaining water, regulating the exchange of nutrients, and building soil structure through aggregation. Biochar additions may have the ability to increase the water holding capacity of soils by adding additional pore space and supporting aggregation. However, studies have also looked at how biochar may increase infiltration of water through soils so there may be a tradeoff⁹. Research is currently underway at CSU to explore biochar's impact on soil moisture across different irrigation treatments. Other regions are also looking at the application of biochar to provide a liming effect in more acidic soils or help mitigate nitrate leaching in regions with higher precipitation.

Biochar can also play an important role in higher valued crop systems like orchards or gardens where the economics are more favorable. Biochar producers have worked in turfgrass management, vineyards, and are looking at opportunities in the emerging cannabis industry in Colorado. Biochar has been considered as a growth medium, a soil inoculum or an organic matter source. With its stable structure, biochar does not always offer many nutrient inputs to the soil, although some manure-based biochars have been shown to add nitrogen to soil. However, biochar's sorption properties can play a key role in retaining nutrients⁽²⁰⁾. Many producers offer biochar blends mixed with other organic fertilizers to deliver a slower release of nutrient over time.

For More Information

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Commercial biochar sales:
Agricharge
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Biochar Now
www.biocharnow.com
Biochar Solutions
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Colorado Biochar Resources
www.colobiochar.com
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Summary

A small commercial biochar market has developed in Colorado and biochar is being applied to meet a diverse range of management objectives. The biochar literature is rapidly expanding and many studies have shown the effects of various biochar treatments. We must continue this research to examine the mechanisms controlling these effects which will allow us to better inform management practices. Biochar's impacts on soils are not universal and must be tailored to suit the given management goals. As the research and applications continue to develop, scientists, entrepreneurs and land managers will all play a critical role in determining the opportunities for biochar in Colorado.

Should you have the inclination, you could experiment with biochar in your own garden to assess the performance in Colorado soils. The section below contains information for finding biochar producers. Look for more information on biochar as it becomes available from research projects across the state.

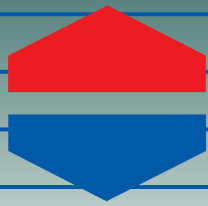


Research comparing biochar to other soil amendments for restoring closed forest roads.

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Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating. CSU Extension programs are available to all without discrimination. No endorsement of products mentioned is intended nor is criticism implied of products not mentioned.



Curlex® Blankets

Excelsior Erosion Control Blankets

American Excelsior Company is the inventor of biodegradable erosion control blankets. Developed in the early 60's, Curlex excelsior blankets are specifically designed to actually promote ideal growing conditions for grass seed, while simultaneously protecting topsoil from wind and water erosion. Curlex excelsior blankets have long passed the test of time. By design, Curlex blankets have a built-in swell factor - wet curled excelsior fibers slightly expand in thickness and interlock to form a strong, fiber matrix. This allows the fibers to provide intimate contact with local terrain. Water flow is trained to follow the curled fiber matrix. The roughness of the curled excelsior matrix slows the velocity to a point where gravity takes over, which allows moisture to slowly seep into the topsoil to promote ideal growing conditions.

MATERIAL CHARACTERISTICS

Curlex blankets consist of unique softly barbed, interlocking, curled, Aspen excelsior fibers. They are weed seed free. Curlex blankets are available with a variety of environmentally sensitive and/or stronger netting types to match job site requirements. We offer a green color-coded plastic netting for applications requiring UV resistance strength and longevity. Our photodegradable QuickMow™ netting is recommended for urban, golf course, and certain roadside projects. It is color-coded white to identify it as a rapid break-down, polypropylene netting designed for use in areas to be mowed. Also available is our FibreNet™ - 100% biodegradable netting - for use in critical environmentally sensitive areas.

Most straight-line fiber blankets draw the line at 270 g/m² (.50 lb/yd²), but not Curlex. At just under 400 g/m² (.75 lb/yd²) Curlex blankets bring 50% more erosion control fibers to your job site. Curlex blankets are available in natural Aspen or QuickGRASS® (green). Combine that with a roll that's wider than conventional blankets and you have today's most effective and efficient, multi-purpose degradable erosion control blanket. Curlex excelsior blankets are available individually wrapped or in master packs to allow for mechanical unloading and stacking.

PERFORMANCE CAPABILITIES

Product	Slopes	Shear Stress Rating
Curlex I	2H:1V & flatter	84 Pa (1.75 lb/ft ²)
Curlex II	1.5H:1V & flatter	108 Pa (2.25 lb/ft ²)

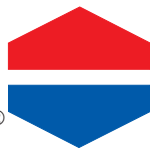
TYPICAL APPLICATIONS

- Highway embankments, ditch bottoms and slopes, bridges, approaches and medians
- Residential, commercial, & industrial developments
- Urban drainage, stream banks, and waterways
- Golf course fairways, roughs, waterways, & drop structures
- Landfill caps, side slopes, and let down structures
- Pipeline right-of-ways

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Earth Science Division

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SUGGESTED SPECIFICATIONS

Curlex Single Net (Curlex I)

A specific cut of Great Lakes Aspen curled wood excelsior with 80% six-inch fibers or greater fiber length. It shall be of consistent thickness, with fibers evenly distributed throughout the entire area of the blanket. The top of each blanket shall be covered with photodegradable or biodegradable netting. Material shall not contain any weed seed or chemical additives.



Specifications

Recommended Use: Slopes to 2:1, Channel to 7 ft/s, shear stress to 1.75 lb/ft²
Roll Sizes: 4' x 112.5' (50 yd²), 8' x 112.5' (100 yd²), 16' x 112.5' (200 yd²)
Standard Weight*: .73 lb/yd²
Netting Options: Green, QuickMow White (90 day), FibreNet
Color: Natural Aspen or QuickGRASS Green

Curlex Double Net (Curlex II)

A specific cut of Great Lakes Aspen curled wood excelsior with 80% six-inch fibers or greater fiber length. It shall be of consistent thickness, with fibers evenly distributed throughout the entire area of the blanket. The top and bottom of each blanket shall be covered with photodegradable or biodegradable netting. Material shall not contain any weed seed or chemical additives.



Specifications

Recommended Use: Slopes to 1.5:1, Channels to 9 ft/s, shear stress to 2.25 lb/ft²
Roll Sizes: 4' x 112.5' (50 yd²), 8' x 112.5' (100 yd²), 16' x 112.5' (200 yd²)
Standard Weight*: .73 lb/yd²
Netting Options: Green, QuickMow White (90 day), FibreNet
Color: Natural Aspen or QuickGRASS Green

*Weight is based on a dry fiber weight basis at time of manufacture. Baseline moisture content of Great Lakes Aspen Excelsior is 22%.

Installation

Before installing Curlex blankets, the seedbed shall be inspected by the Owner's Representative to ensure it has been properly compacted and fine graded to remove any existing rills. It shall be free of obstructions, such as tree roots, projections such as stones, and other foreign objects. Grass seed shall match soil conditions to allow for maximum germination, dense vegetation, and a structural root system. Contractor shall proceed when satisfactory conditions are present. After the area has been properly shaped, seeded, fertilized, and compacted, locate the start of the roll, making sure the roll is facing toward the area to be covered, and then roll out the blanket. Blankets shall be rolled out flat, even, and smooth without stretching the material then anchored to the subgrade.

Slopes: It is recommended that the blankets be installed in the same direction as the water flow; however, on short slopes it may be more practical to install horizontally across the width of the application. If more than one width is required, simply abut the edges together and secure the blankets with a common row of biodegradable staples, steel staples, or stakes. Overlapping of Curlex excelsior blankets is not required or recommended. An exception is waterway slopes.

Channels: Curlex blankets shall be centered to offset a seam in the middle of the waterway. They shall be installed in the same direction as the water flow. The adjoining blankets shall be installed away from the center of channel and concentrated water flow. They shall be secured by a common row of staples. It is usually not necessary to overlap Curlex blankets; however, a 2" shingle type installation shall be used in waterway slopes applications. Curlex blanket installation should continue up the side slopes 3' above the anticipated high water elevation. Flanks exposed to runoff, or sheet flow, must be protected by a check slot or trenched. Curlex blankets shall be trenched at the start of the channel and anchored using a staggered staple pattern at end of roll overlaps and end of roll terminations.

Disclaimer: Curlex is a system for erosion control and re-vegetation on slopes and channels. American Excelsior Company (AEC) believes that the information contained herein to be reliable and accurate for use in erosion control and re-vegetation applications. However, since physical conditions vary from job site to job site and even within a given job site, AEC makes no performance guarantees and assumes no obligation or liability for the reliability or accuracy of information contained herein for the results, safety, or suitability of using Curlex, or for damages occurring in connection with the installation of any erosion control product whether or not made by AEC or its affiliates, except as separately and specifically made in writing by AEC. These specifications are subject to change without notice.



R25-001M2

If you would like to receive more information or consult with one of our Customer Care Center Specialists, please call us toll free at (888-352-9582) PDF download specifications available in the Technical Support Library at www.curlex.com

Form#235/092013E



SCHEDULE E – CONSTRUCTION PLAN SET

FOLLOWS THIS PAGE

Snyder Quarry Reclamation Black Canyon Open Space

1001 Black Canyon Road, Colorado Springs, CO 80904

PERMIT NUMBER: M-77-210
OCT 15, 2024
FOR BIDDING PURPOSES

SITE DATA

Owner: City of Colorado Springs
1401 Recreation Way
Colorado Springs, CO 80905

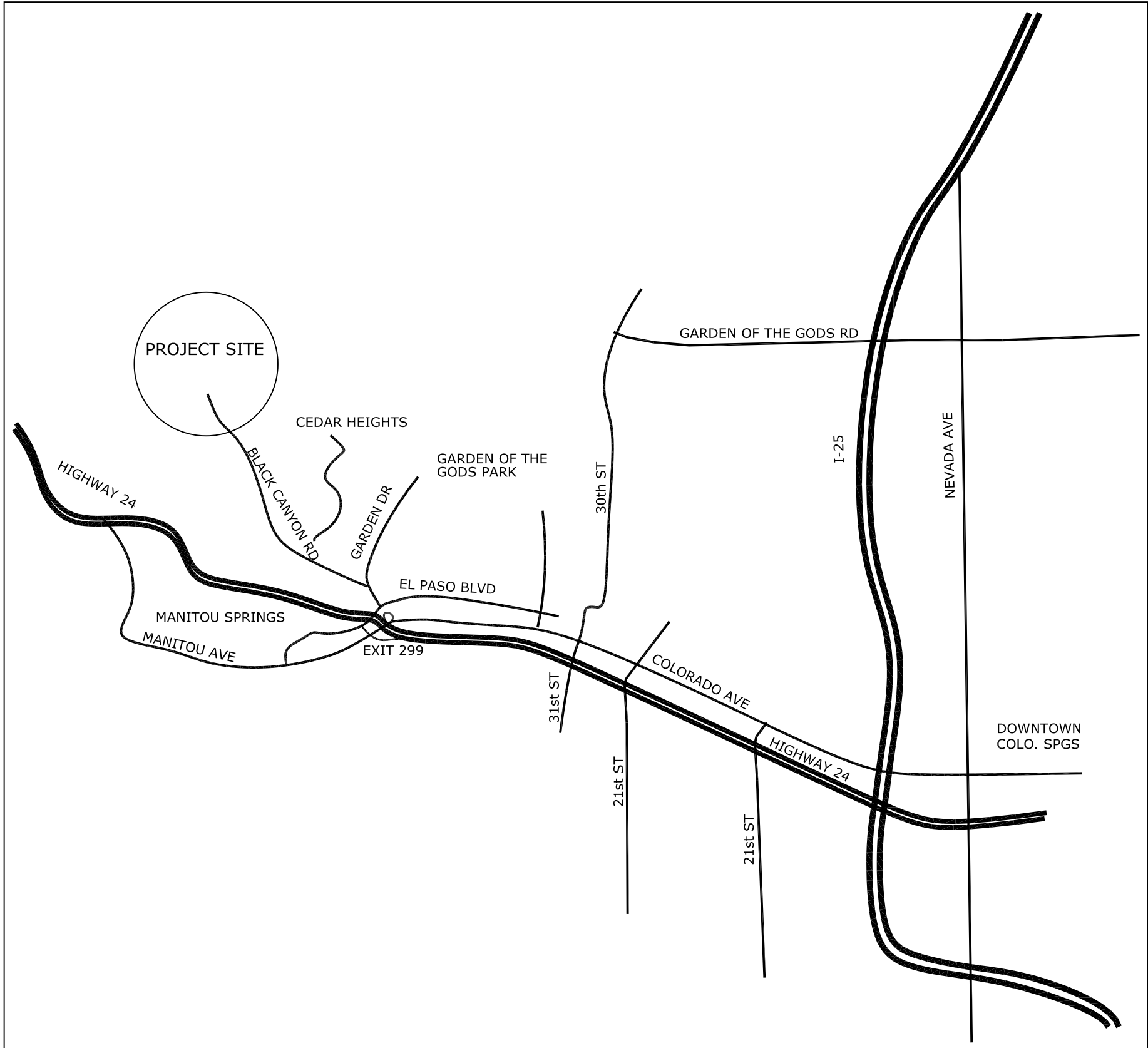
Project Manager/Plan Preparer:
David Deitemeyer
Senior Program Administrator, TOPS, PLA, ASLA
City of Colorado Springs Parks, Recreation and Cultural Services
719-385-6515
david.deitemeyer@coloradosprings.gov

GENERAL NOTES

Access to project site

- 1) The only access will be from Black Canyon Road. No other access points are permitted into Black Canyon Open Space and Quarry.
- 2) The suggested best staging area is located at the south center of the project area, near the existing maintenance building that will remain. Equipment can be staged on the project at the risk of the Contractor. Please note the area is closed to public access.
- 3) The project site is located behind a locked gate. The contractor will have access to this gate, which shall remain closed at all times, unless accepting deliveries. There are three other parties (land owners) that have access to this gate for use of the road at any time. There are no homes or businesses behind the gate.
- 4) The construction equipment has the right of way for the access road. Speed limit is 10 MPH for safety and reducing dust production. Contractor and all parties involved shall obey all posted traffic signs, including the stop sign at the exit of the project site.
- 5) Construction Surveying is not anticipated for the work.. The Grading Plan shows desired grades and contours. The work will be field fit to not exceed maximum slopes, provide positive drainage, and utilize FILL DIRT generation for the project.
- 6) Cut/Fill numbers are approximate. The Grading Plan shows more areas of CUT to produce FILL DIRT. Final contours may differ from the grading plan to not exceed the necessary FILL DIRT for the project.
- 7) Rip Rap for the project is anticipated to be generated and used from on site materials. This can include all current stockpiles of rocks, loose boulders and excavated rocks from grading operations.
- 8) Refer to the plan regarding soil growth medium, amendments and or topsoil placement. Contractor may utilize the existing piles of imported material on in the quarry "floor".
- 9) Contractor shall call 811 prior to any earth moving work. The current existing overhead utility pole and conduit within the project area are anticipated to be removed by CSU in the fall of 2024. No other live utilities are known to exist on the site.
- 10) Contractor to provide and maintain a portable toilet for their crew for the duration of the project.
- 11) Prior to construction, the City will host a site walk-thru to review the design intent, the project schedule, project walk thru, and answer any outstanding questions. The City will require weekly or biweekly construction meetings to be able to answer any questions and provide additional information, if needed. The Parks Department representative can be available if the Contractor has additional questions and needs on-site clarifications between the weekly/biweekly meetings.
- 12) The City of Colorado Springs shall apply and cover the cost for the necessary stormwater permits (State Permit and City of Colorado Springs Permit) associated with the Black Canyon Quarry Reclamation Project. It is anticipated that prior to the starting the work, the contractor will be required to sign associated permits as the project contractor/operator. Earthwork will not be allowed to start until permits are approved.
- 13) The contractor shall be responsible for the weekly maintenance and repair/replacement of stormwater control measures.
- 14) Contours shown in the existing topography are at 2' intervals with 10' index contour intervals. The Proposed Grading Plan is shown at 10' intervals with 100' Contour Intervals.

VICINITY MAP



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DESIGNED BY: D. DEITEMEYER
DRAWN BY: D. DEITEMEYER
DATE: MAR 15, 2024
SCALE: 1" = 100'
REVISIONS:



SHEET INDEX

- S1 Cover Sheet
- S2 Existing Site Plan
- S3 Existing Site Aerial Photo
- S4 Existing Site Photos
- S5 Existing Site Photos page 2
- S6 Roadway Access Map
- S7 Approved Reclamation Site Plan
- S8 Reclamation Layout Plan
- S9 Reclamation Grading Plan
- S10 Cut-Fill Plan North Area
- S11 Cut-Fill Plan South Area
- S12 Landscape Plan
- S13 Landscape and Site Details
- S14 Stormwater Management Plan
- S15 Stormwater Plan Enlargement
- S16 Stormwater Details

TITLE:
SNYDER QUARRY RECLAMATION
BLACK CANYON OPEN SPACE
COVER SHEET

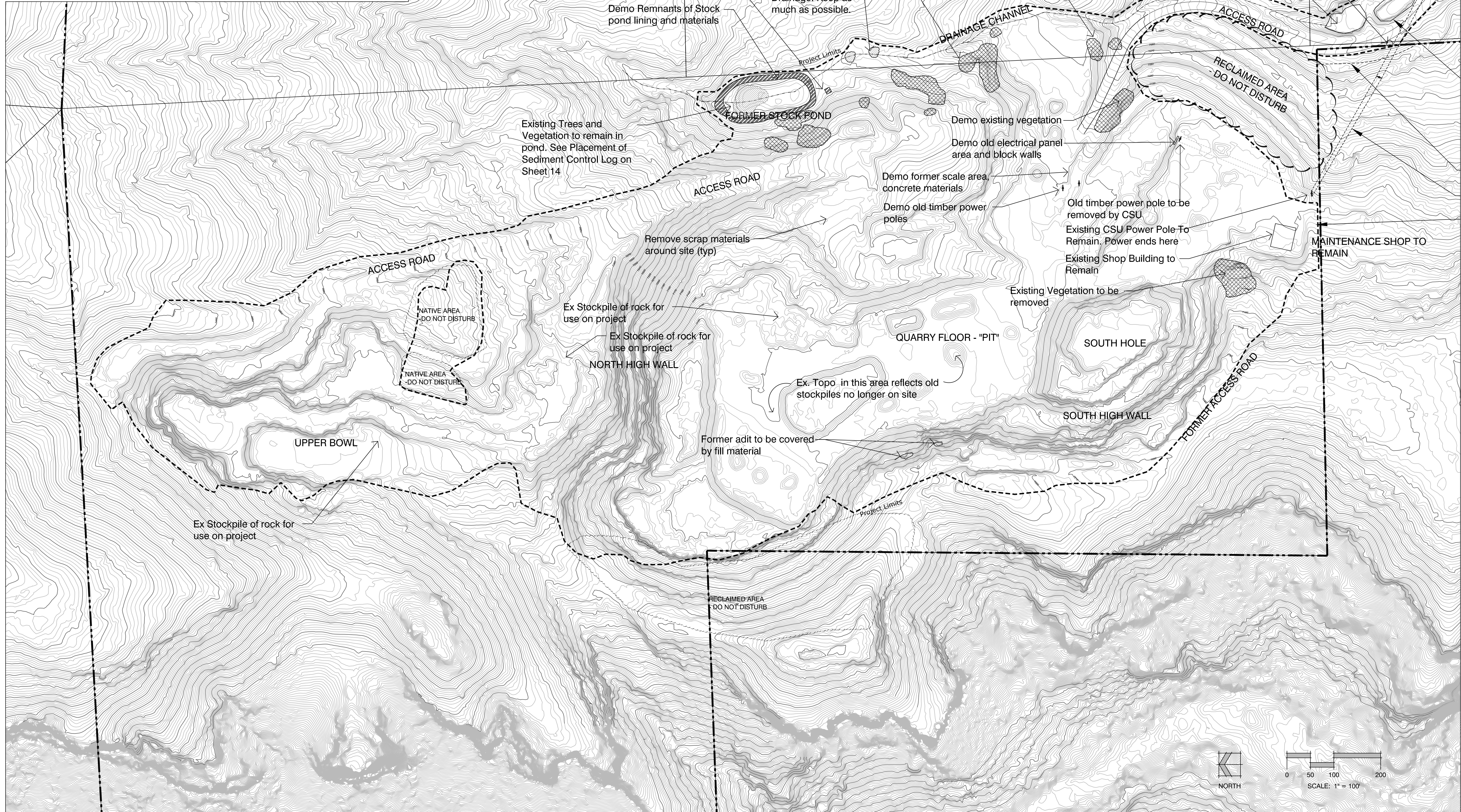
SHEET **1**
OF **16** SHEETS

FILE NUMBER:

HERE

NOTES:

1. THE EXISTING BUILDING WILL REMAIN IN PLACE. ALL OTHER "CONSTRUCTION" DEBRIS, MINING DEBRIS AND TRASH SHALL BE REMOVED DURING THE PROJECT. FOREIGN AND MANMADE MATERIALS CANNOT BE BURIED.
2. CONCRETE BLOCKS IN AVERAGE CONDITION CAN BE SALVAGED AND STOCKPILED ALONG ACCESS ROAD.
3. CONTRACTOR TO CALL 811 BEFORE EARTH MOVING BEGINS. THE ONLY DOCUMENTED UTILITIES IN THE PROJECT AREA ARE OVERHEAD ELECTRIC LINES OWNED BY CSU. ONE POLE IN THE RECLAMATION SITE WILL BE DECOMMISSIONED BY CSU PRIOR TO EARTH MOVING
4. EXISTING NATIVE VEGETATION AND PREVIOUSLY RECLAIMED AREAS ARE TO REMAIN UNDISTURBED, UNLESS OTHERWISE NOTED. TREES REMOVED CAN BE MULCHED OR REMOVED FROM SITE LEGALLY
5. EXISTING VEGETATION TO REMAIN IN STOCK POND.
6. CONTOURS SHOWN ARE AT 2' INTERVALS, INDEX CONTOURS AT 10' INTERVALS.
7. PLEASE NOTE CONTOURS ARE APPROXIMATE, ESPECIALLY IN THE PIT, AS STOCKPILES ARE NO LONGER ON SITE.



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DESIGNED BY: D. DEITEMEYER
 DRAWN BY: D. DEITEMEYER
 DATE: OCT 15, 2024
 SCALE: 1" = 100'
 REVISIONS: _____



SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 EXISTING SITE AND DEMO PLAN

TITLE:

SHEET **2**

OF **16** SHEETS

FILE NUMBER:

HERE

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DATE: OCT 15, 2024
SCALE: 1" = 100'
REVISIONS: _____



BLACK CANYON
QUARRY RECLAMATION PLAN
EXISTING SITE AERIAL (2023)

TITLE:

SHEET **3**

OF **16** SHEETS

FILE NUMBER: _____



HERE



LOOKING WEST
BLACK CANYON QUARRY OVERVIEW

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1401 RECREATION WAY
COLORADO SPRING CO 80905
(719) 385-5940

TITLE:
SNYDER QUARRY RECLAMATION
BLACK CANYON OPEN SPACE
SITE PHOTOS



LOOKING SOUTH
OVERBURDEN AREA



LOOKING NORTHWEST
NORTH HIGH WALL



LOOKING NORTHWEST
ENTRANCE TO SITE AND EAST DRAINAGE

TITLE:

SHEET **4**
OF **16** SHEETS

FILE NUMBER: _____



LOOKING NORTH
UPPER BOWL



LOOKING NORTHWEST
EASTERN SIDE OF UPPER BOWL AND NORTH
HIGH WALL



LOOKING NORTH
UPPER BOWL AND TOP OF NORTH HIGHWALL



LOOKING SOUTH
PIT, SOUTH HOLE AND SOUTH HIGH WALL

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TITLE:
SNYDER QUARRY RECLAMATION
BLACK CANYON OPEN SPACE
SITE PHOTOS

SHEET **5**

OF **16** SHEETS

FILE NUMBER: _____

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 SCALE: 1" = 240'
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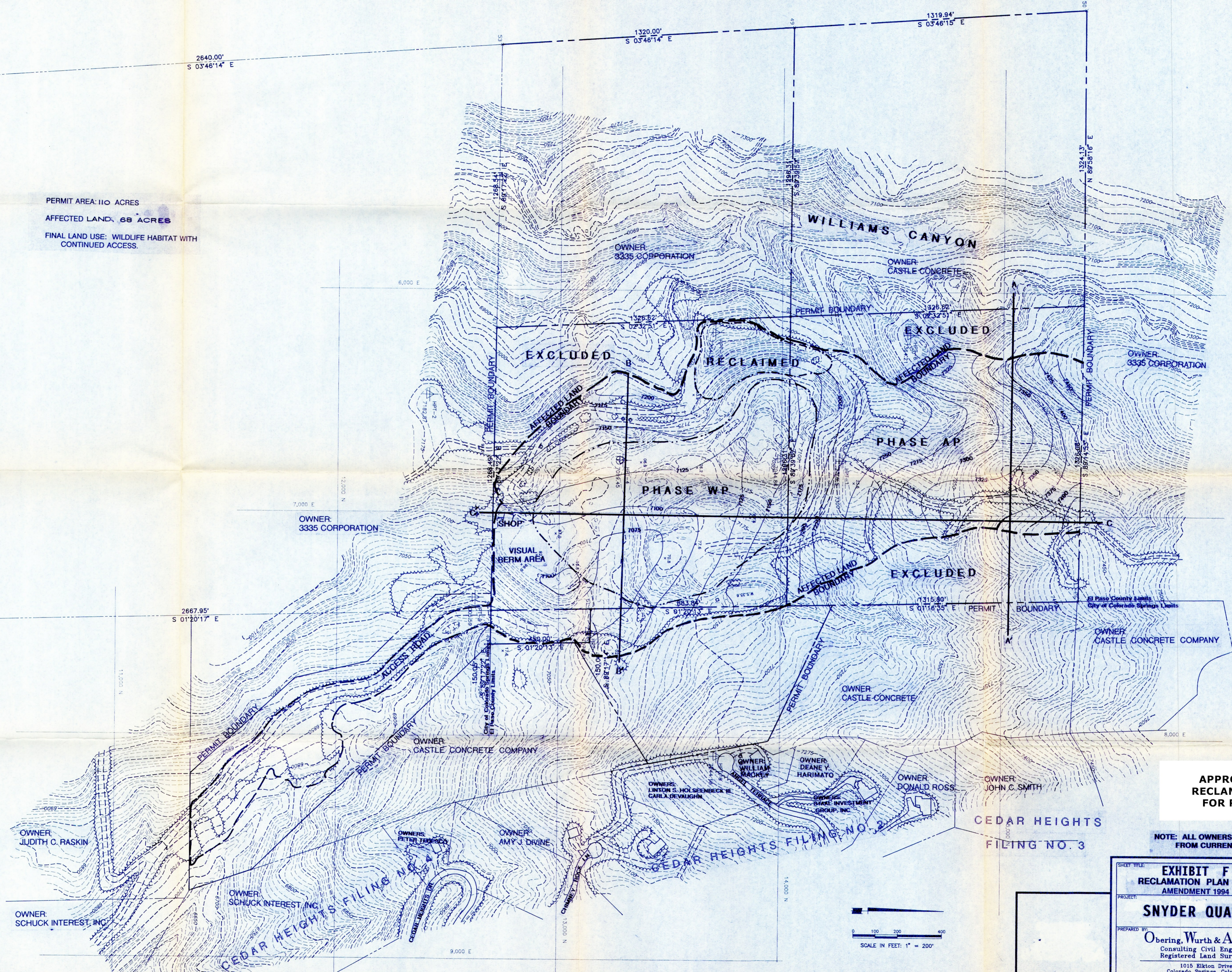
TITLE:
 SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 EXISTING SITE ROADWAY ACCESS

SHEET 6
 OF 16 SHEETS
 FILE NUMBER:

Roadway plan shown
 for reference.

HERE

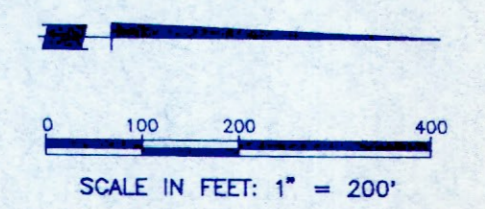
PERMIT AREA: 110 ACRES
 AFFECTED LAND: 68 ACRES
 FINAL LAND USE: WILDLIFE HABITAT WITH CONTINUED ACCESS.



APPROVED DRMS RECLAMATION PLAN FOR REFERENCE

NOTE: ALL OWNERSHIPS SHOWN ARE FROM CURRENT ASSESSOR'S RECORDS.

SHEET TITLE: EXHIBIT F RECLAMATION PLAN MAP AMENDMENT 1994		FIELD BOOK NO. N/A
PROJECT: SNYDER QUARRY		SCALE: 1" = 200'
PREPARED BY: Obering, Wurth & Associates Consulting Civil Engineers Registered Land Surveyors 1015 Elkon Drive Colorado Springs, Colorado Phone (719) 581-8200		DESIGNED BY: TLW/RGO
PROJECT NO. 93023		CHECKED BY: TLW/RGO
SHEET NO. 7 of 16		OF SHEETS

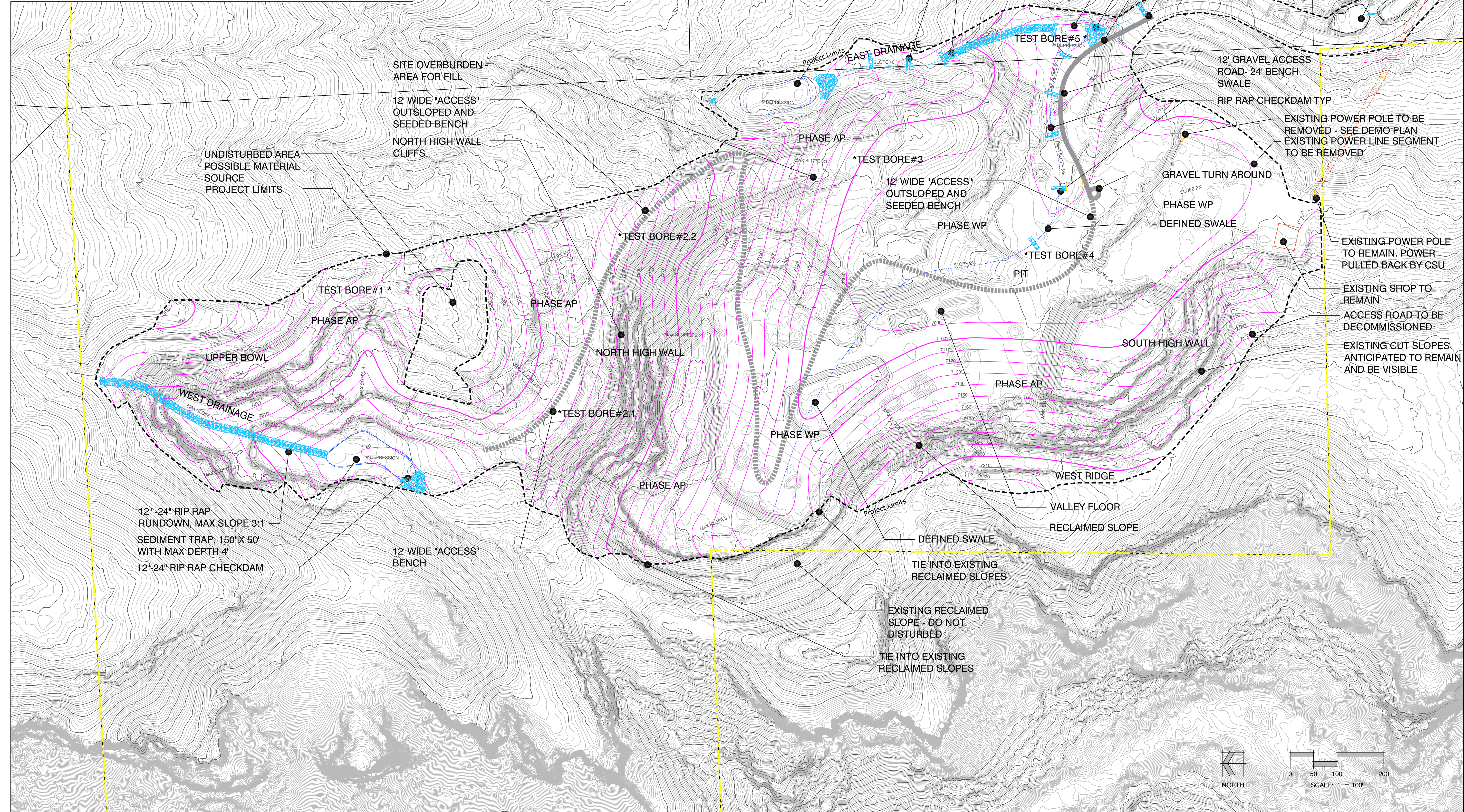


PROJECT NAME: SNYDER QUARRY
 DRAWN BY: JCP
 ACAD DWG. NAME: J:\VIA 93023\22784540.DWG
 PROJECT NO: 93023
 UPDATED VERSION: 12-03-1992

Design Drafting Support
 Joseph C. Pell III
 4215 Ridgeway Lane
 Colorado Springs
 Colorado 80908
 (719) 495-9097

NOTES:

1. GEOTECHNICAL TEST BORE HOLE LOCATIONS SHOWN. REFER TO THE REPORT FOR SOIL CONDITIONS AND DEPTH TO BEDROCK
2. THE GRADE OF THE SITE TO BE FIELD ADJUSTED WITH COORDINATION BETWEEN CITY AND CONTRACTOR. DESIRED CONDITIONS SHOWN BUT MAY BE ADJUSTED BASED ON FIELD CONDITIONS ONCE WORK BEGINS
3. THE CITY IS COORDINATING NOW WITH COLORADO SPRINGS UTILITIES (CSU) REGARDING THE REMOVAL OF THE REMAINING "LIVE" POWER POLE. CONTRACTOR TO ASSUME THE POWER WILL BE DISCONNECTED AT LAST POLE
4. ALIGNMENT OF THE 12' ACCESS BENCH TO BE COORDINATED WITH CITY STAFF. ACCESS BENCH TO BE APPROXIMATELY 10% GRADES
5. RIP RAP USED FOR THE DRAINAGE TO BE SOURCE FROM ON-SITE MATERIALS. CONTRACTOR SHALL BE RESPONSIBLE FOR SORTING, SIZING, PLACING RIP RAP.
6. GENERAL LOCATIONS OF PHASE WP - WITH-IN PIT (LOWLAND AREAS) AND PHASE AP - ABOVE PIT (UPLAND AREAS) ARE SHOWN ON SHEET



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SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 LAYOUT PLAN

TITLE:

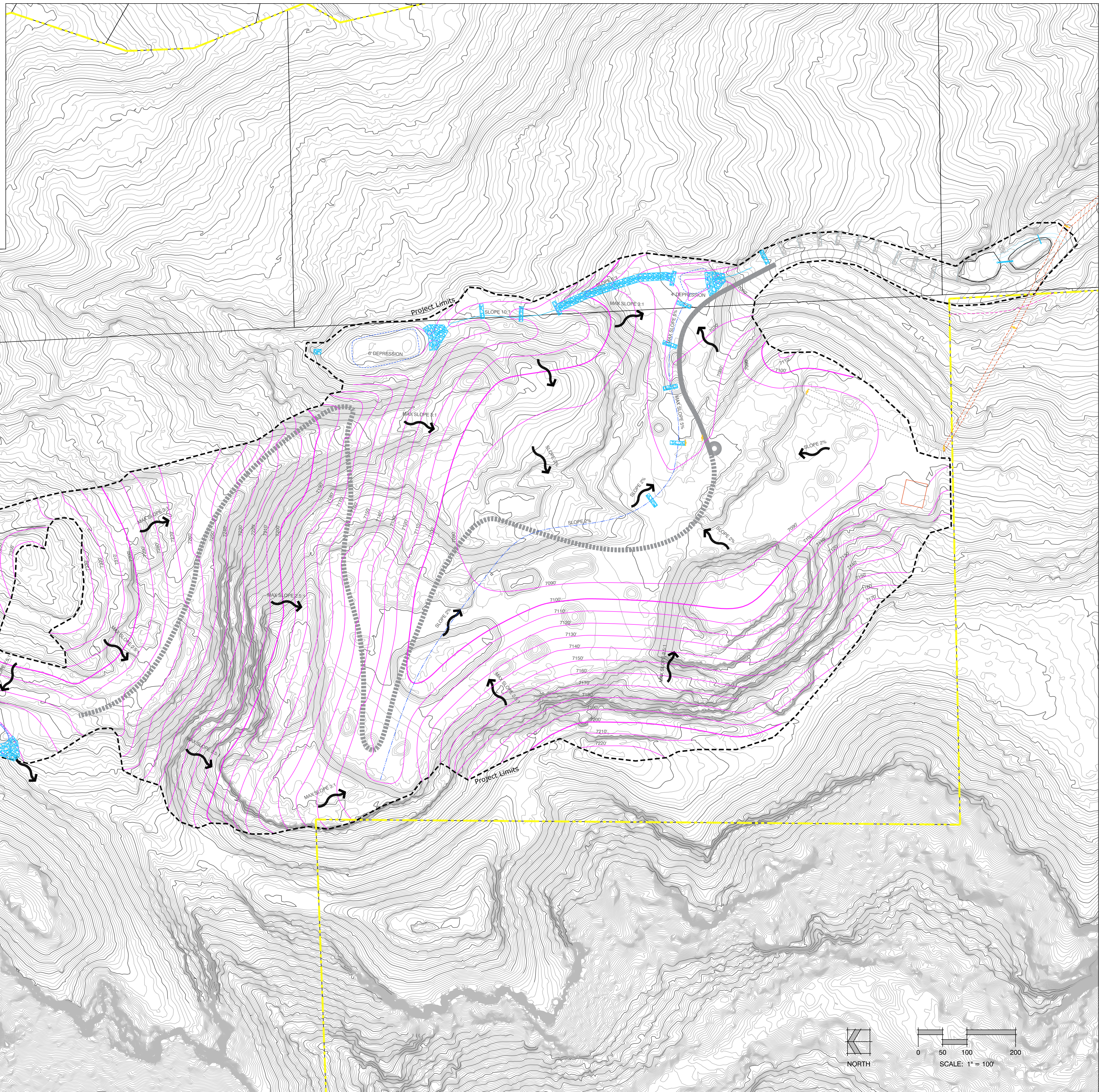
SHEET **8**

OF **16** SHEETS

FILE NUMBER:

GRADING PLAN NOTES:

1. Grading plan is shown for design intent and desired slopes. Field adjustments are anticipated as the site is balanced with cut and fill.
2. Proposed Contour index shown at 100', contour intervals are 10'. Existing Contours are shown at 2' intervals and 10' Index.
3. Swales and drainage channels are shown for water flow and water management. Desired placement of swales shown but can be coordinated with city staff and field adjusted as necessary.
4. General slopes are shown, refer to reclamation plan for max grades and desire of look of the slopes.
5. Cut/Fill volumes are estimated. Needed FILL for the plan is estimated at 345,052 CY. The available FILL generated from grading CUTS per the grading plan show available material at 961,361 CY (includes expansion factor). Final grading in the the areas to be CUT will be subject adjustment through coordination with the contractor and City Staff. No over cut in necessary.
6. The 24' wide gravel road and the 12' access bench (seeded) shall be outsloped to allow for positive drainage to the hillside or adjacent swales.
7. General Sheet Flow is shown with the use of arrows. The project site will drain entirely into either the West Drainage or the East Drainage control measures.



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TITLE:
 SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 GRADING PLAN

SHEET **9**
 OF **16** SHEETS
 FILE NUMBER: _____

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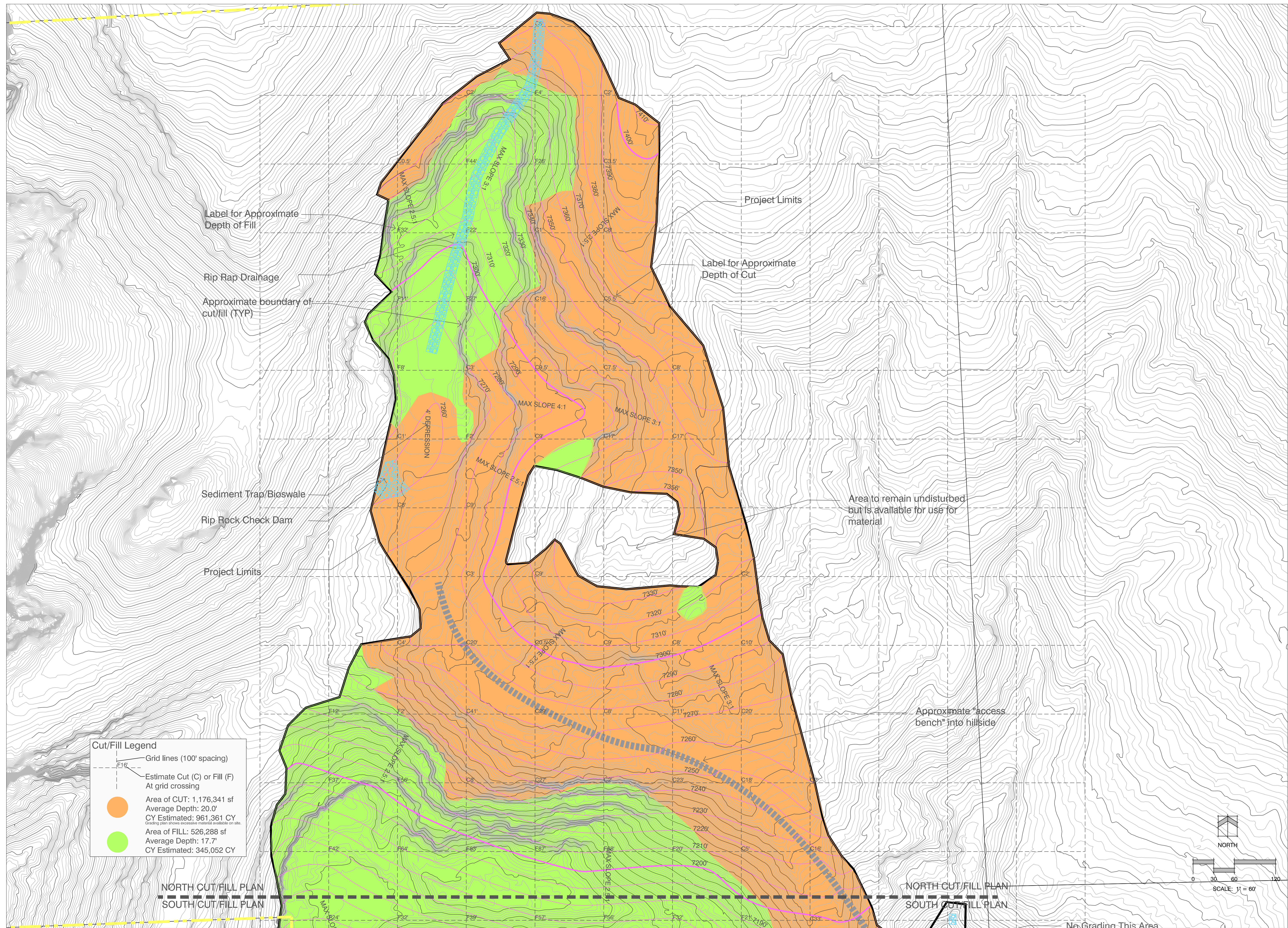


SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 CUT AND FILL PLAN - NORTH

TITLE:

SHEET 10
 OF 16 SHEETS

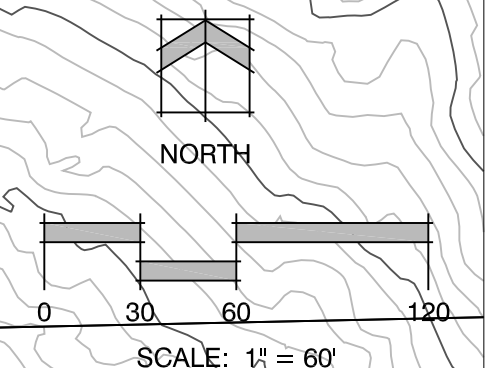
FILE NUMBER:



Cut/Fill Legend	
	Grid lines (100' spacing)
	Estimate Cut (C) or Fill (F) At grid crossing
	Area of CUT: 1,176,341 sf Average Depth: 20.0' CY Estimated: 961,361 CY <small>Grading plan shows excessive material available on site.</small>
	Area of FILL: 526,288 sf Average Depth: 17.7' CY Estimated: 345,052 CY

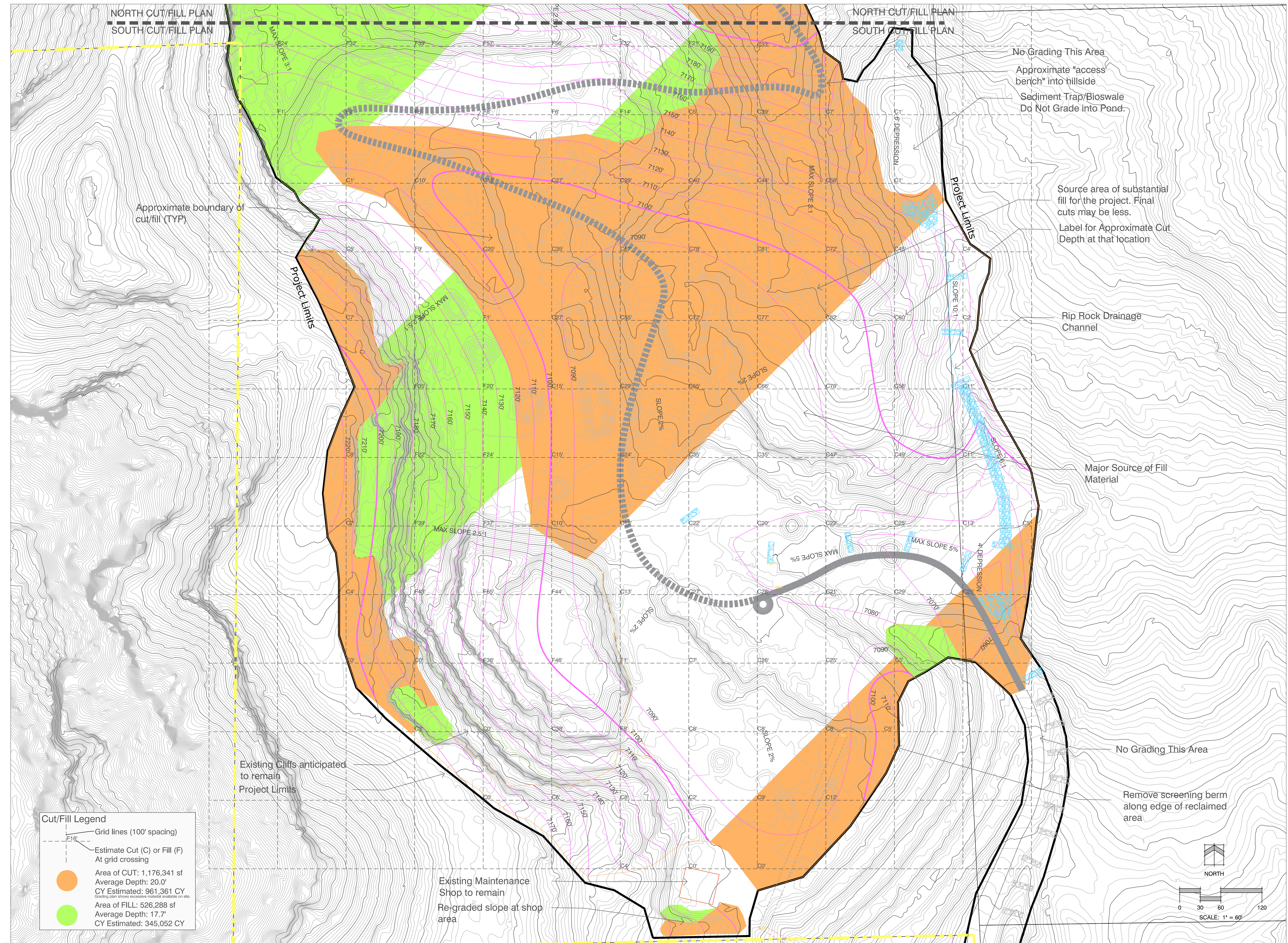
NORTH CUT/FILL PLAN
 SOUTH CUT/FILL PLAN

NORTH CUT/FILL PLAN
 SOUTH CUT/FILL PLAN



No Grading This Area

HERE



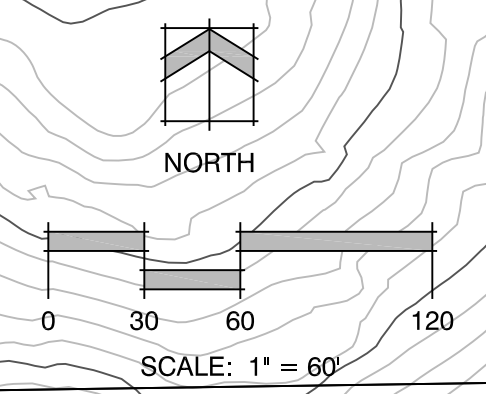
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SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 CUT AND FILL PLAN - SOUTH

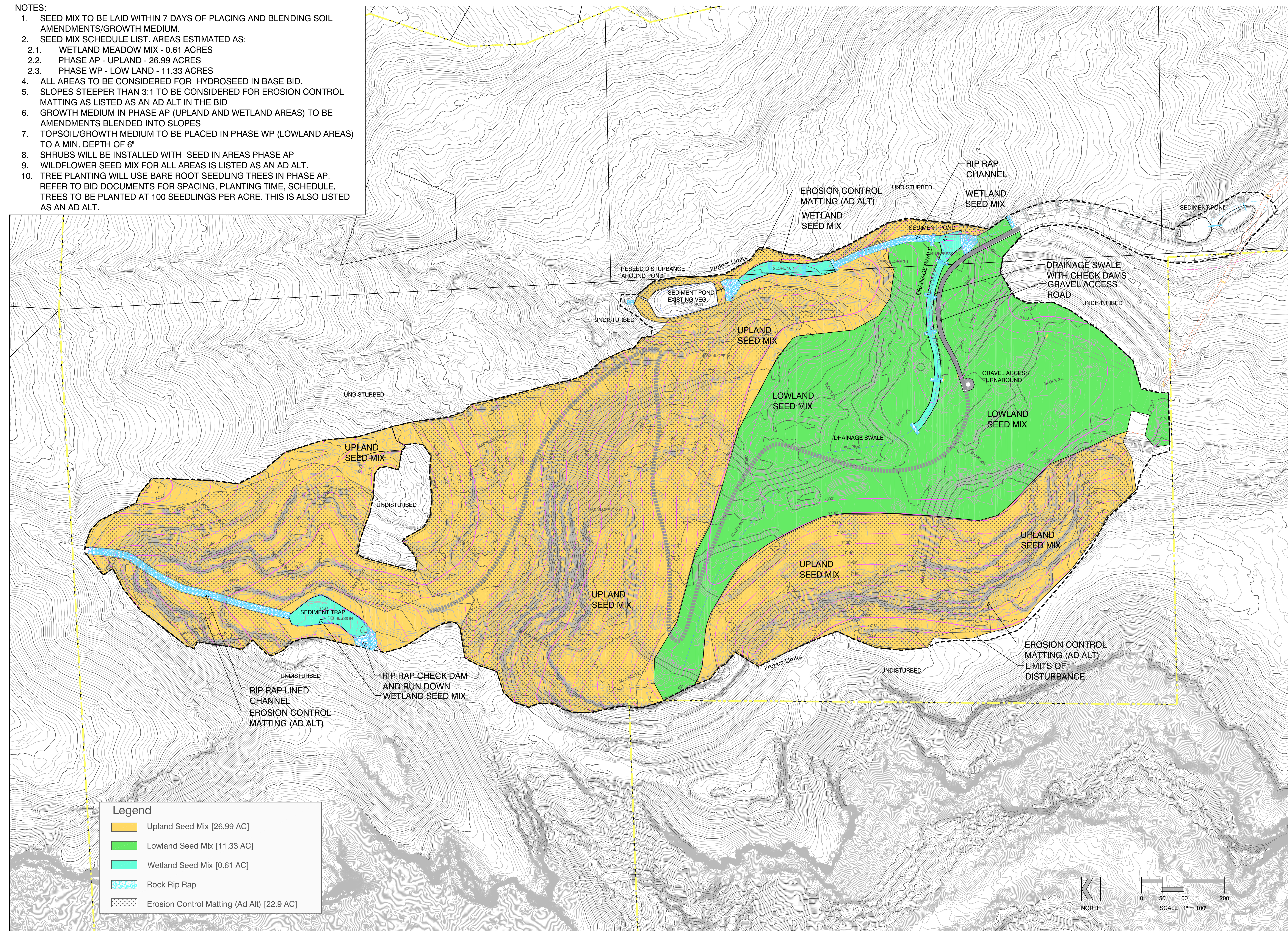
TITLE:
 SHEET **11**
 OF **16** SHEETS
 FILE NUMBER:



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NOTES:

1. SEED MIX TO BE LAID WITHIN 7 DAYS OF PLACING AND BLENDING SOIL AMENDMENTS/GROWTH MEDIUM.
2. SEED MIX SCHEDULE LIST. AREAS ESTIMATED AS:
 - 2.1. WETLAND MEADOW MIX - 0.61 ACRES
 - 2.2. PHASE AP - UPLAND - 26.99 ACRES
 - 2.3. PHASE WP - LOW LAND - 11.33 ACRES
4. ALL AREAS TO BE CONSIDERED FOR HYDROSEED IN BASE BID.
5. SLOPES STEEPER THAN 3:1 TO BE CONSIDERED FOR EROSION CONTROL MATTING AS LISTED AS AN AD ALT IN THE BID
6. GROWTH MEDIUM IN PHASE AP (UPLAND AND WETLAND AREAS) TO BE AMENDMENTS BLENDED INTO SLOPES
7. TOPSOIL/GROWTH MEDIUM TO BE PLACED IN PHASE WP (LOWLAND AREAS) TO A MIN. DEPTH OF 6"
8. SHRUBS WILL BE INSTALLED WITH SEED IN AREAS PHASE AP
9. WILDFLOWER SEED MIX FOR ALL AREAS IS LISTED AS AN AD ALT.
10. TREE PLANTING WILL USE BARE ROOT SEEDLING TREES IN PHASE AP. REFER TO BID DOCUMENTS FOR SPACING, PLANTING TIME, SCHEDULE. TREES TO BE PLANTED AT 100 SEEDLINGS PER ACRE. THIS IS ALSO LISTED AS AN AD ALT.



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TITLE:
 SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 LANDSCAPE PLAN

SHEET 12
 OF 16 SHEETS
 FILE NUMBER:

HERE

Seeding Tree Planting (Ad Alt bid item)

Tree Species (Bare Root plants)	Trees/AC	Acres	Total
Rocky Mountain Juniper	67	26.9 AC	1,802
Pinyon Pine	33	26.9 AC	888

Tree Placement

Trees to be planted in the Phase AP (Upland Area) at a rate of 100 trees per acres. Trees to be installed in non-organized spacing to maximize the natural mosaics. Coordinate with City Staff for additional placement information.

Care and Storage of Seedlings

Improper care of seedlings between delivery and time of planting is one of the greatest causes of mortality. Do not store seedlings in heated buildings, or where they are exposed to warm air, sun, or wind.

If planting is to occur within five days of delivery, leave bare root bundles intact and store in a cool, dry place (40°-50°F). Water the package from the top, but turn over to drain. Keep sawdust moist, but do not allow seedlings to stand in water. If planting is not planned for more than a week, open the bundle, separate the seedlings and place them in a trench, cover the roots with loose soil, and fill the trench with soil. Keep the soil in the trench moist and protect the roots from exposure to air.

Site Preparation

Site preparation enhances the soil's ability to catch and store moisture, reduces grass and weed competition, and prepares the soil for planting.

Cultivate and decompact soil at tree location just before planting, leaving the strips between rows uncultivated. If erosion control matting is present, cut a small narrow slit in the blanket perpendicularly, prepare the soils, plant tree and place small mulch ring.

Preparing Seedlings for Planting

Bare Root: Create a slurry by mixing a shovelfull of soil, or two tablespoons of polymer, in a five gallon bucket half-filled with water. Open the bundle and place seedlings immediately into the bucket, submerging the roots completely in the slurry. Plant as quickly as possible. Do not store seedlings this way for more than a few hours or root death may occur.

Bare Root: Dig a round hole at least one foot in diameter. Make a small mound of soil in the bottom of the hole. Take the seedling from the bucket of slurry and spread the roots out in all directions using the mound as a root support. Be careful not to "J" root the seedling. Pull loose soil back over roots and lightly tamp soil down and water. Do not com-pact the soil by tamping wet soil too firmly! SOIL COMPACTION ELIMINATES OXYGEN, WHICH ROOTS NEED TO SURVIVE!

Be sure the seedling root collar (where it was planted in nursery) is at the finished soil level. Watering is the best method to settle the soil, eliminate air pockets, and provide moisture to the root system. Be gentle!

Watering

Water each seedling with up to one gallon at planting time.

Mulching

Mulch rings shall be installed around trees to help reduce weed competition and water loss from the soil. Mulch available from City Forestry. Coordinate with the Project Manager. Keep these wood mulch less than two inches deep and 12" diameter planting ring. Keep mulch away from stem of seedling.

Seedling Protective Netting

Plastic Tree Guards shall be installed around each tree. Each guard shall be staked to the ground.

Source: CSFS.COLOSTATE.EDU

Soil Amendments

Recommend product (or equal or as proposed)

Type: Bio Char

Size: Medium Chip Size

Application: Direct Placement and tilled into top 6" of soil

Application Rate: 5% by Volume in soil, up to 5 CF per 1,000 SF

OR 218 CF/AC -> 8 CY/AC

Estimated TOTAL: 218 CY for the 26.99 AC area

Available from (or equal): BioCharNow.com

Seeding

All areas of disturbance to be seeding with the one of the following seed mixes and as identified in the plans. Drill seeding is anticipated for the project areas. Wetland areas can be hand seeded (broadcast) and lightly raked in.

Wetland Seed Mix

Mountain Meadow Mix (or similar)
Available from Pawnee Buttes Seed Inc

Ingredients: Fowl Bluegrass; Canada Wildrye; Ticklegrass; Tufted Hairgrass; Nebraska Sedge; Fowl Mannagrass; Small Winged Sedge; Creeping Spikerush; Beaked Sedge; Small Fruited Bulrush; Baltic Rush; Three Square Bulrush; Woolly sedge; Meadow Rush; Aquatic Sedge; Dagger Leaf Rush

Seeding Rate 10 LBS/ Acre

Lowland Seed Mix (WP)

Species List (or similar proposed)

Ingredients:	Rate LBS/ Acre PLS
Intermediate Wheatgrass	5
Pubescent Wheatgrass	5
Smooth Brome	3
Tall Wheatgrass	5
Perennial Ryegrass	2
Russian Wildrye	5
Ranger Alfalfa	1
Yellow Sweetcolver	0.5

Seeding Rate 26.5 LBS/ Acre

Shrub Seed Mix (AP Area)

Species List (or similar proposed)

Ingredients:	Rate LBS/ Acre PLS
Mountain Mahogany	5
Antelope Bitterbrush	6
Rubber Rabbitbrush	1.5
Cliffrose	4

Seeding Rate 16.5 LBS/ Acre

Upland Seed Mix (AP)

Species List (or similar proposed)

Ingredients:	Rate LBS/ Acre PLS
Blue Grama	0.8
Fairway Crested Wheatgrass	1.0
Intermediate Wheatgrass	2.5
Pubescent Wheatgrass	2.5
Russian Wildrye	3.0
Sideoats Grama	3.5
Little Bluestem	2.5
Green Needlegrass	2.75
Ranger Alfalfa	1.0
Mountain Brome	2.0
Purple three-Awn	1.5

Seeding Rate 23.05 LBS/ Acre

Wildflower Seed Mix (for all areas; subject to Ad Alt and seed availability)

Species List (or similar proposed)

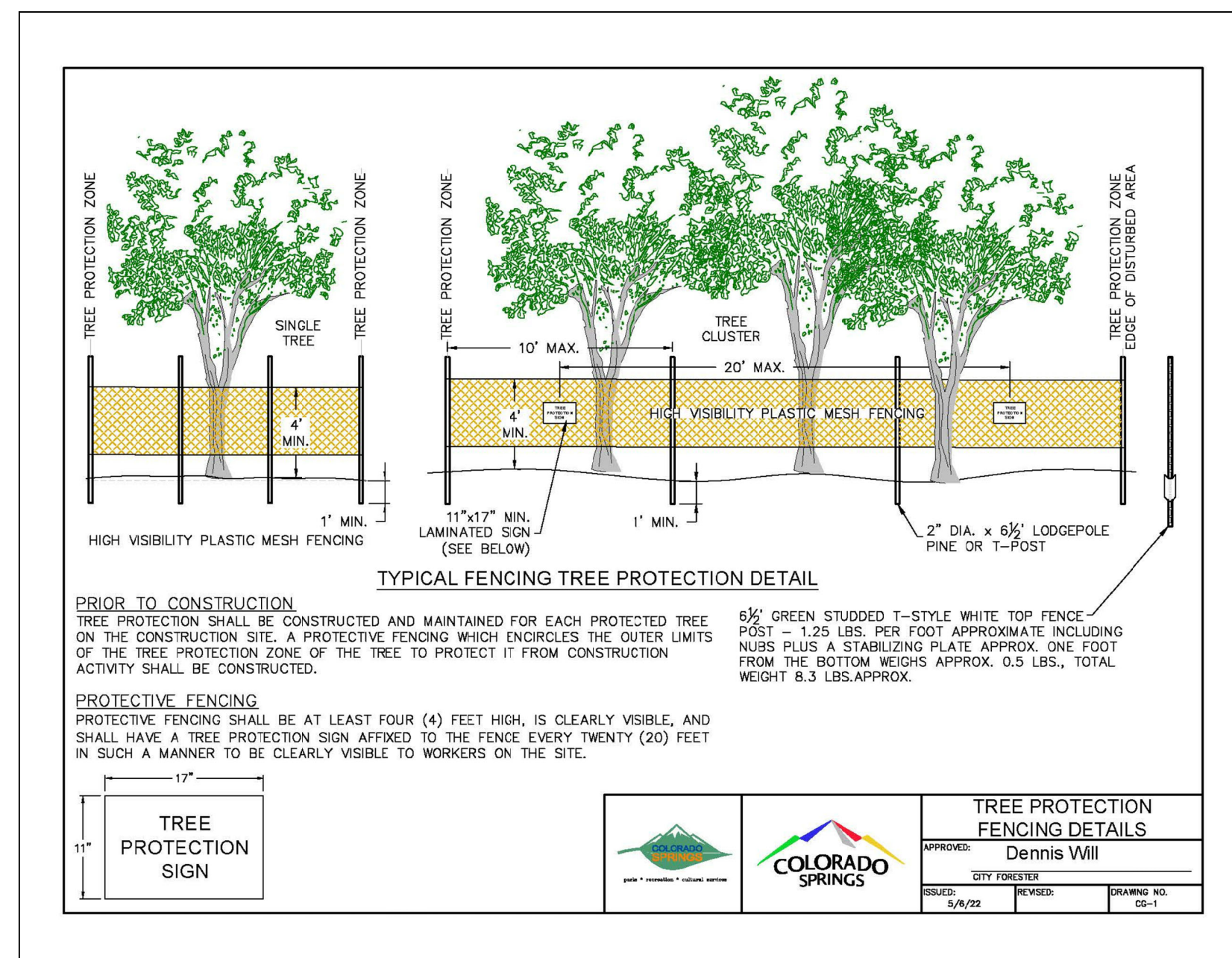
Ingredients:	Rate LBS/ Acre PLS
White Yarrow	0.25
Lance-leaved Coreopsis	1.5
Perennial Gaillardia	2.0
Baby's Breath	0.5
Gayfeather	1.0
Blue Flax	2.0
Prairie Coneflower	0.5
Fringed Sage	0.25

Seeding Rate 8.0 LBS/ Acre

Existing Tree Protection

Select trees in the project area shall be preserved. Trees to remain shall have an orange construction fencing with T-posts installed along the drip line of the tree canopy (or greater). Coordinate with Project Manager for final placement.

It is estimated there will be up to 100 linear feet of tree protection installed. Refer to specifications.



Hydromulch

Total Quantity Subject to Ad Alt Bid Item

Type: Standard wood fiber with Plantago Tackifier (or equal or as proposed)
Application: Spray

Erosion Control Matting

Subject to Ad Alt Bid Item

Type: Curlex II
Excelsior Erosion Control Blankets
Roll Size: 16' x 112.5' (200 SQYD)
Color: Natural Aspen
Netting Options: Green or FiberNet
Staple: Follow manufactures guidelines

INSTALLATION:

Before installing Curlex blankets, the seedbed shall be inspected by the Owner's Representative to ensure it has been properly compacted and fine graded to remove any existing rills. It shall be free of obstructions, such as tree roots, projections such as stones, and other foreign objects. Grass seed shall match soil conditions to allow for maximum germination, dense vegetation, and a structural root system. Contractor shall proceed when satisfactory conditions are present. After the area has been properly shaped, seeded, fertilized, and compacted, locate the start of the roll, making sure the roll is facing toward the area to be covered, and then roll out the blanket. Blankets shall be rolled out flat, even, and smooth without stretching the material then anchored to the subgrade.

SLOPES:

It is recommended that the blankets be installed in the same direction as the water flow; however, on short slopes it may be more practical to install horizontally across the width of the application. If more than one width is required, simply abut the edges together and secure the blankets with a common row of biodegradable staples, steel staples, or stakes. Overlapping of Curlex excelsior blankets is not required or recommended. An exception is waterway slopes.

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SCALE: AS NOTED
REVISIONS:



SNYDER QUARRY RECLAMATION
BLACK CANYON OPEN SPACE
DETAILS

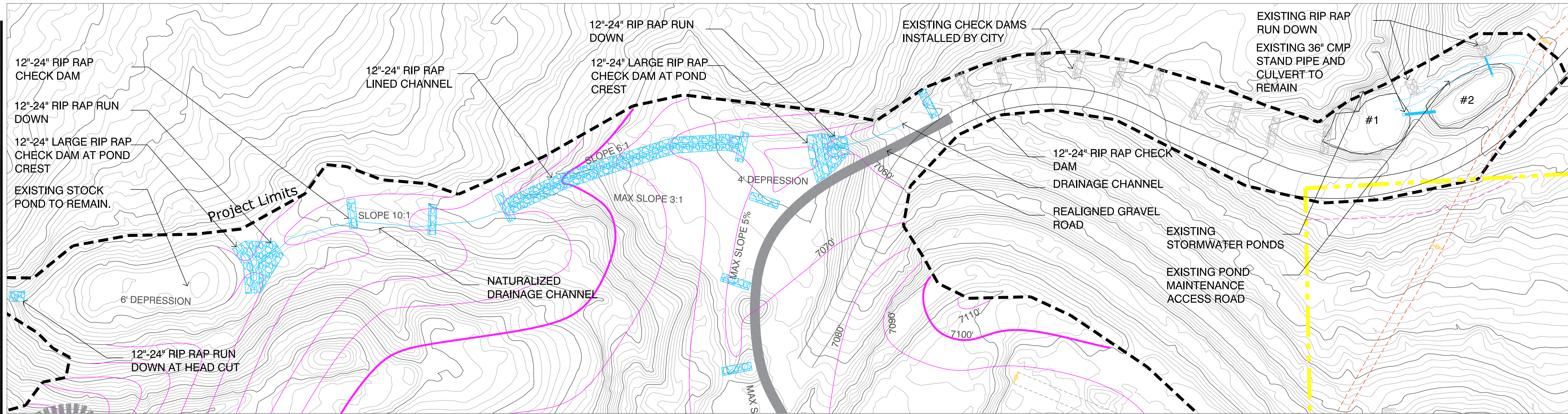
TITLE:

SHEET 13

OF 16 SHEETS

FILE NUMBER:

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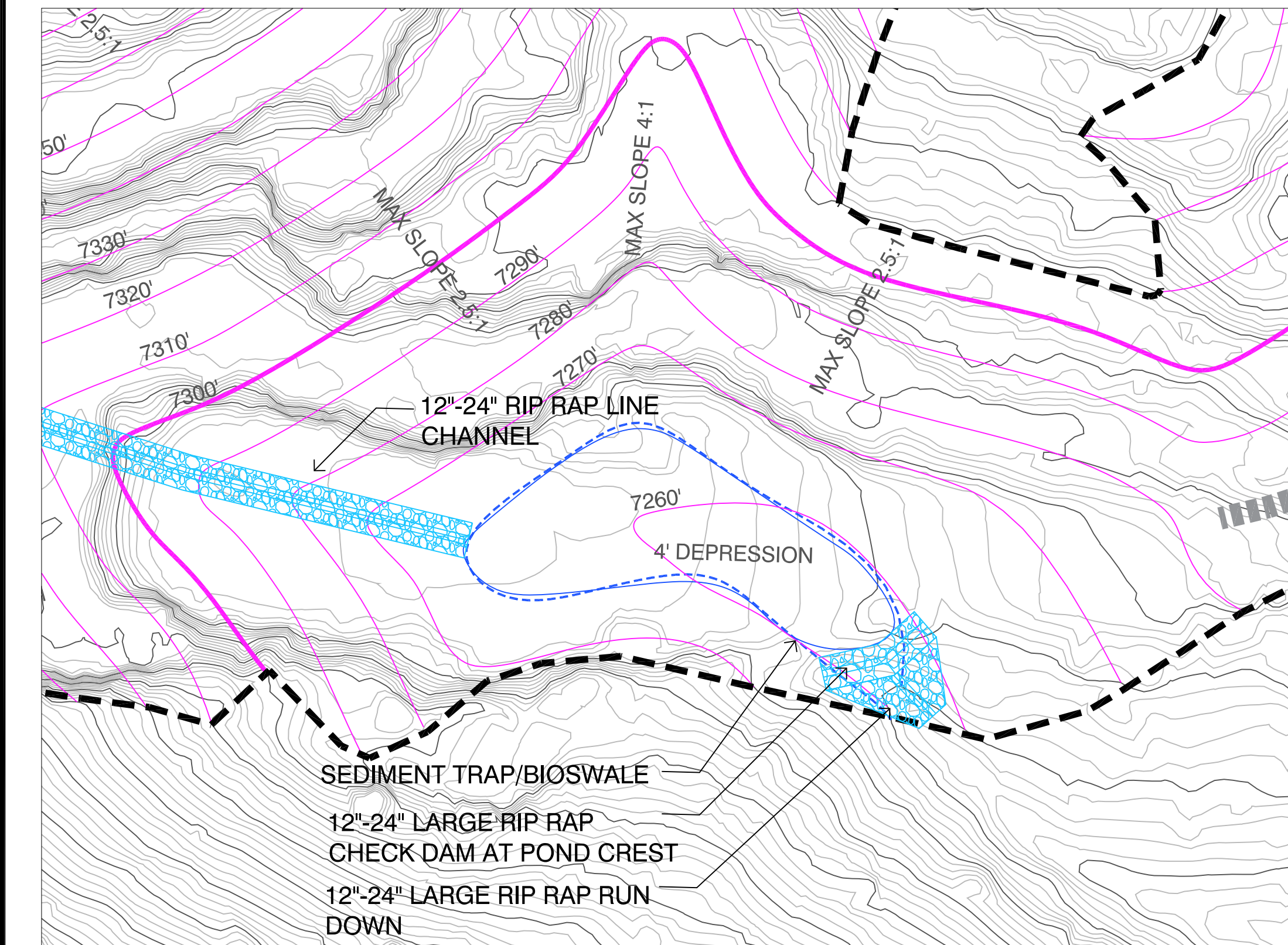
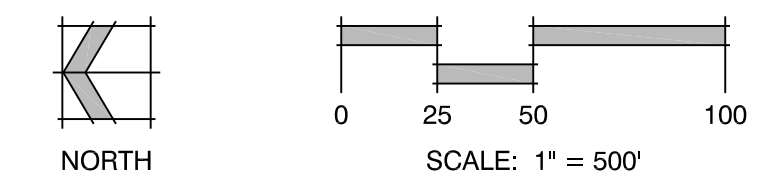


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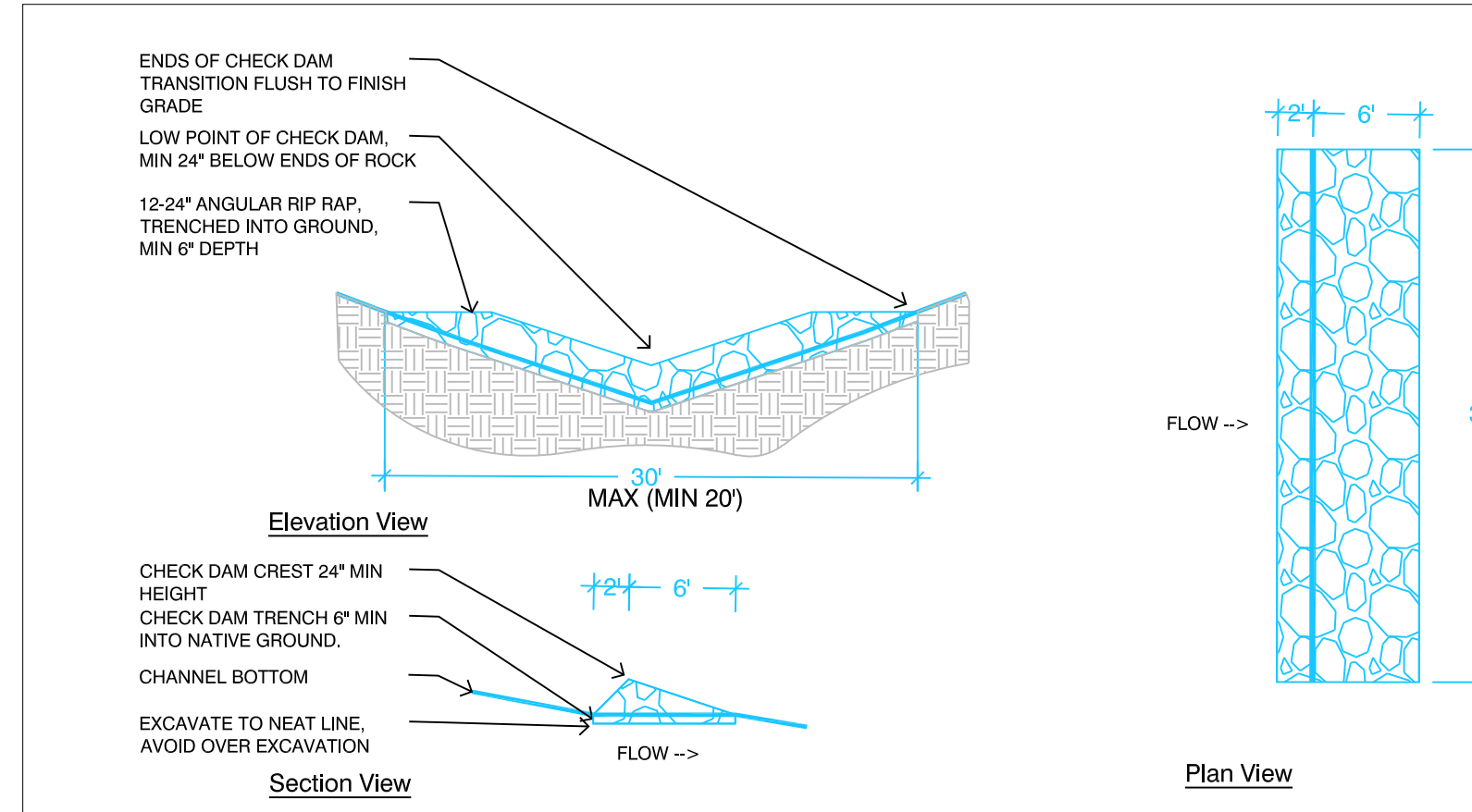
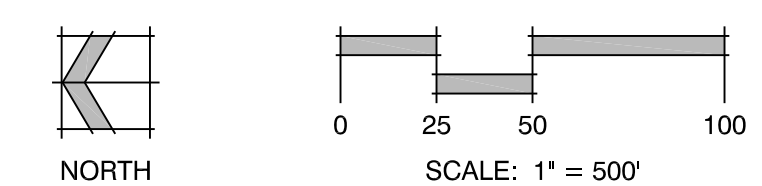
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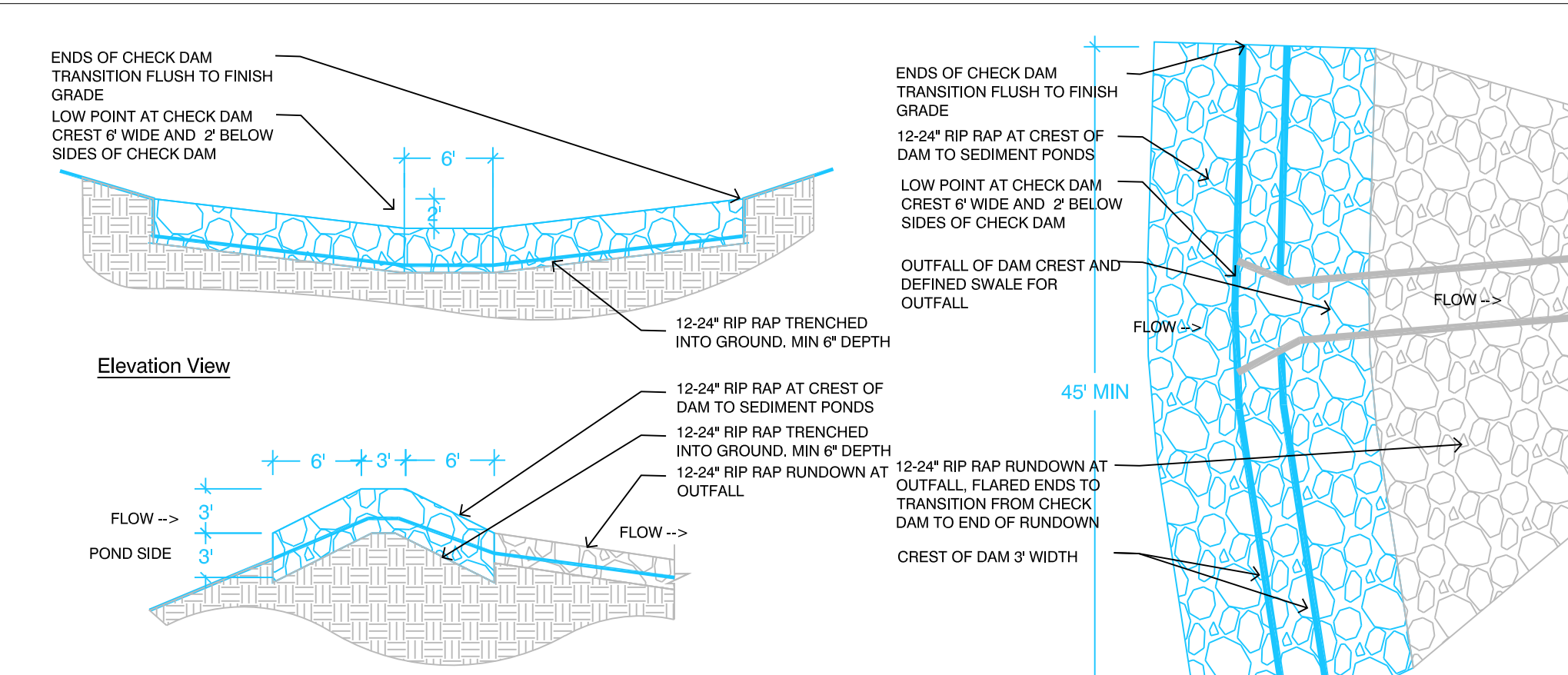
East Drainage Channel Enlargement



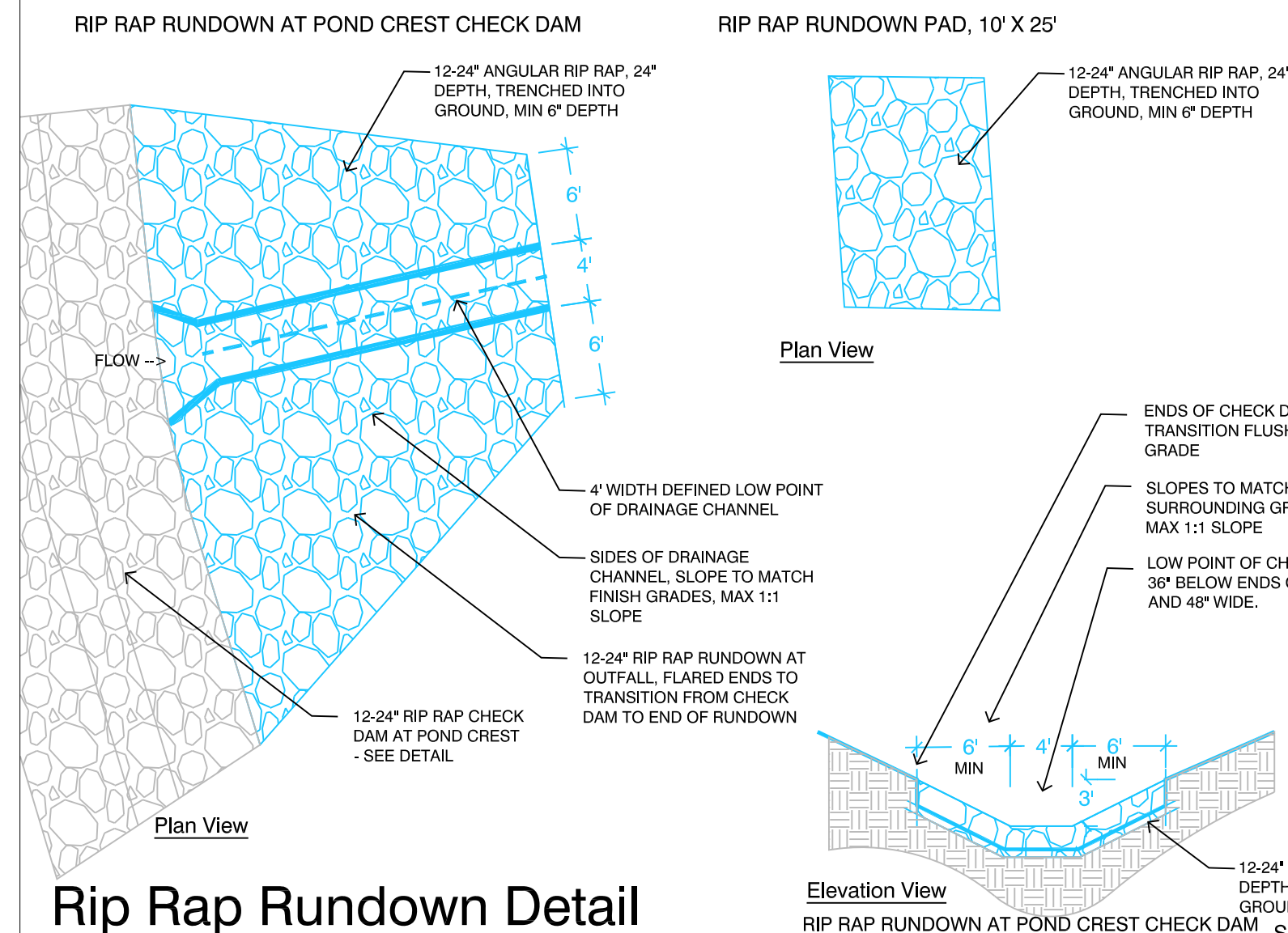
West Drainage Channel Enlargement



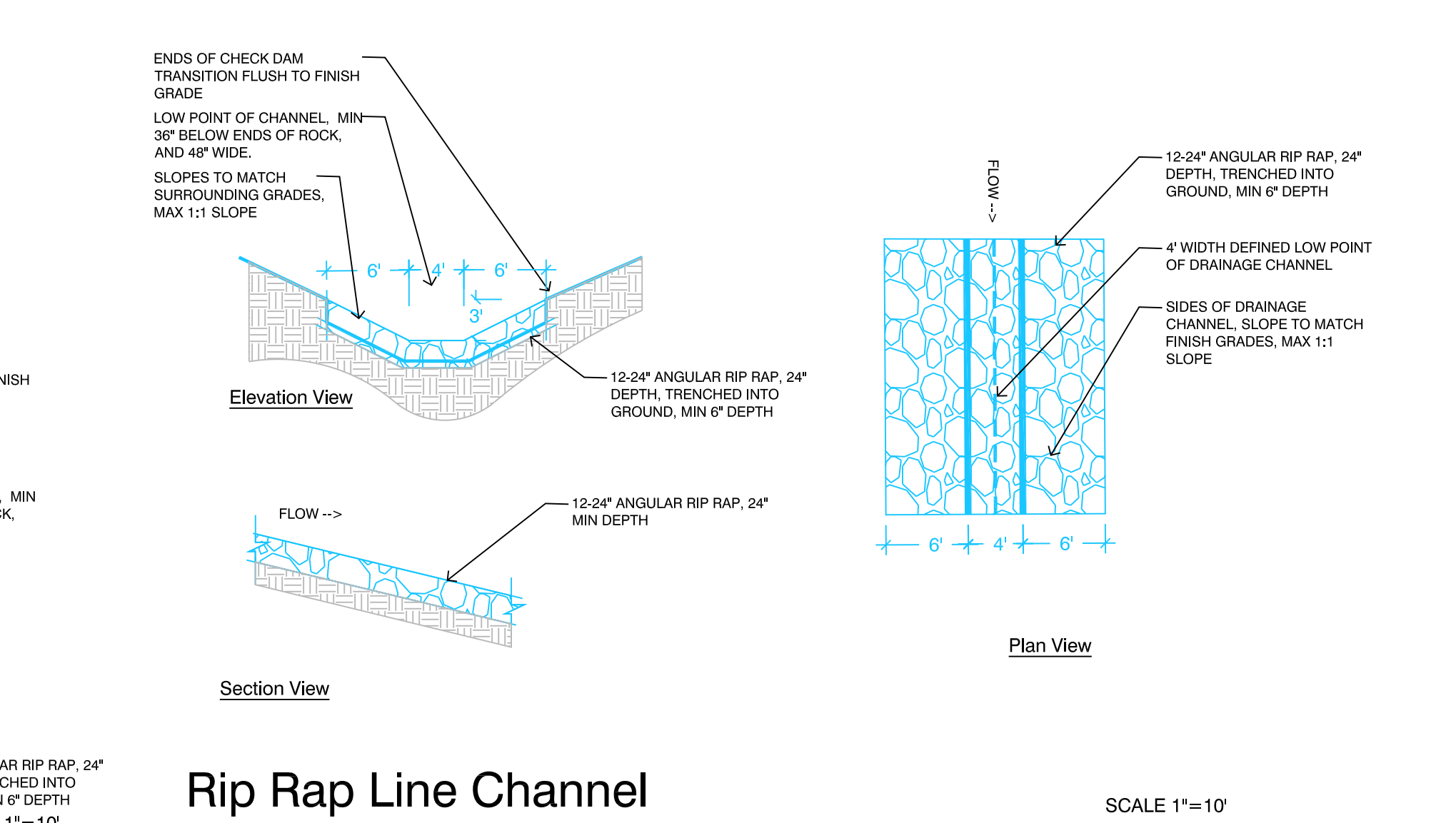
Check Dam Detail
 SCALE 1"=10'



Check Dam At Pond Crest Detail
 SCALE 1"=10'



Rip Rap Rundown Detail
 SCALE 1"=10'



Rip Rap Line Channel
 SCALE 1"=10'

SNYDER QUARRY RECLAMATION
 BLACK CANYON OPEN SPACE
 DRAINAGE IMPROVEMENTS PLAN

TITLE:

SHEET **15**
 OF **16** SHEETS
 FILE NUMBER:

HERE



CHECK DAM ELEVATION VIEW

SECTION A-A

SECTION B-B

PROFILE

INSTALLATION NOTES

- CHECK DAMS SHOULD BE INSTALLED BEFORE UPSTREAM LAND DISTURBING ACTIVITIES.
- RIPRAP PAD SHOULD BE TRENCHED INTO GROUND BY A MINIMUM OF 6".
- CHECK DAMS MUST REMAIN UNTIL THE UPSTREAM DISTURBANCE AREA IS STABILIZED.
- PERIMETER ANCHOR TRENCH SHALL BE USED ALONG THE OUTSIDE PERIMETER OF ALL BLANKET AREAS.
- JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL EROSION CONTROL BLANKETS.
- INTERMEDIATE CHECK SLOT OR STAPLE CHECK SHALL BE INSTALLED EVERY 15' DOWN SLOPE. IN DRAINAGEWAYS, INSTALL CHECK SLOTS EVERY 25' PERPENDICULAR TO FLOW DIRECTION.
- OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER FOR SLOPES.
- MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKETS SHALL CONFORM TO TABLE ECB-1.
- ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKETS SHALL BE RESEDED AND MULCHED.
- STRAW EROSION CONTROL BLANKETS SHALL NOT BE USED WITHIN STREAMS AND DRAINAGE CHANNELS.
- COMPACT ALL TRENCHES.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE HEIGHT REACHES 2/3 OF THE HEIGHT OF THE CHECK DAM CREST.
- PERMANENTLY STABILIZE AREA AFTER CHECK DAMS ARE REMOVED IF REMOVAL IS REQUIRED.

CD

EROSION CONTROL BLANKET

PERIMETER ANCHOR TRENCH

JOINT ANCHOR TRENCH

INTERMEDIATE CHECK SLOT

OVERLAPPING JOINT

STAPLE CHECK

INSTALLATION NOTES

- 100% NATURAL AND BIODEGRADABLE MATERIALS ARE REQUIRED FOR EROSION CONTROL BLANKETS. TFM PRODUCTS MAY BE USED WHERE APPROPRIATE AS DESIGNATED BY THE ENGINEER.
- EROSION CONTROL BLANKETS SHALL BE LEFT IN PLACE TO EVENTUALLY BIODEGRADE. TFM SHALL BE REMOVED AT THE DISCRETION OF THE SDC INSPECTOR.
- ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE REPAIRED OR REINSTALLED. ANY SUBGRADE AREAS BELOW GEOTEXTILE THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEDED AND MULCHED, AND THE EROSION CONTROL BLANKET REINSTALLED.
- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
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- JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL EROSION CONTROL BLANKETS.
- INTERMEDIATE CHECK SLOT OR STAPLE CHECK SHALL BE INSTALLED EVERY 15' DOWN SLOPE. IN DRAINAGEWAYS, INSTALL CHECK SLOTS EVERY 25' PERPENDICULAR TO FLOW DIRECTION.
- OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER FOR SLOPES.
- MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKETS SHALL CONFORM TO TABLE ECB-1.
- ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKETS SHALL BE RESEDED AND MULCHED.
- STRAW EROSION CONTROL BLANKETS SHALL NOT BE USED WITHIN STREAMS AND DRAINAGE CHANNELS.
- COMPACT ALL TRENCHES.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE HEIGHT REACHES 2/3 OF THE HEIGHT OF THE CHECK DAM CREST.
- PERMANENTLY STABILIZE AREA AFTER CHECK DAMS ARE REMOVED IF REMOVAL IS REQUIRED.

ECB

INSTALLATION NOTES

- 100% NATURAL AND BIODEGRADABLE MATERIALS ARE REQUIRED FOR EROSION CONTROL BLANKETS. TFM PRODUCTS MAY BE USED WHERE APPROPRIATE AS DESIGNATED BY THE ENGINEER.
- EROSION CONTROL BLANKETS SHALL BE LEFT IN PLACE TO EVENTUALLY BIODEGRADE. TFM SHALL BE REMOVED AT THE DISCRETION OF THE SDC INSPECTOR.
- ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE REPAIRED OR REINSTALLED. ANY SUBGRADE AREAS BELOW GEOTEXTILE THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEDED AND MULCHED, AND THE EROSION CONTROL BLANKET REINSTALLED.
- PERIMETER ANCHOR TRENCH SHALL BE USED ALONG THE OUTSIDE PERIMETER OF ALL BLANKET AREAS.
- JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL EROSION CONTROL BLANKETS.
- INTERMEDIATE CHECK SLOT OR STAPLE CHECK SHALL BE INSTALLED EVERY 15' DOWN SLOPE. IN DRAINAGEWAYS, INSTALL CHECK SLOTS EVERY 25' PERPENDICULAR TO FLOW DIRECTION.
- OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF EROSION CONTROL BLANKETS TOGETHER FOR SLOPES.
- MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKETS SHALL CONFORM TO TABLE ECB-1.
- ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKETS SHALL BE RESEDED AND MULCHED.
- STRAW EROSION CONTROL BLANKETS SHALL NOT BE USED WITHIN STREAMS AND DRAINAGE CHANNELS.
- COMPACT ALL TRENCHES.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE HEIGHT REACHES 2/3 OF THE HEIGHT OF THE CHECK DAM CREST.
- PERMANENTLY STABILIZE AREA AFTER CHECK DAMS ARE REMOVED IF REMOVAL IS REQUIRED.

TABLE ECB-1, EROSION CONTROL BLANKET MATERIAL SPECIFICATIONS

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCESSION SPECIFICATIONS	RECOMMENDED NETTING
STRAW	-	100%	-	DOUBLE/NATURAL
STRAW-COCONUT	30% MIN.	70% MAX.	-	DOUBLE/NATURAL
COCONUT	100%	-	-	DOUBLE/NATURAL
EXCESSION	-	-	100%	DOUBLE/NATURAL

PORTABLE TOILET PLAN

ISOMETRIC

INSTALLATION NOTES

- PORTABLE TOILETS SHALL BE PLACED A MINIMUM OF 10 FEET BEHIND ALL CURBS, SIDEWALKS, AND OTHER IMPERVIOUS AREAS; 50 FEET FROM STORM INLETS, AND 100 FEET FROM WATERWAYS.
- PORTABLE TOILETS IN THE RIGHT-OF-WAY ARE REQUIRED TO BE PLACED ON MOBILE TRAILERS AND MUST BE ANCHORED OR WEIGHTED DOWN. PORTABLE TOILETS MAY BE INSTALLED IN ACCORDANCE WITH NOTE #1 IN STAGING AREAS/YARDS.
- PORTABLE TOILETS SHALL BE SECURELY ANCHORED TO THE GROUND USING U-SHAPED REBAR STAKES, OR OTHER EFFECTIVE ANCHORING.
- ANCHORING SHALL BE POSITIONED ON AT LEAST TWO OPPOSING CORNERS (ON A DIAGONAL).
- TOILET CONTAINMENT PANS MAY BE USED IN PLACE OF A TRAILER AT THE SDC INSPECTOR'S DISCRETION. TOILET CONTAINMENT PANS MUST BE ANCHORED IN PLACE AND MUST NOT BE USED WITHIN THE CITY R.O.W.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHEN THE PORTABLE TOILETS ARE REMOVED, ANY DISTURBED AREAS ASSOCIATED WITH THE INSTALLATION, MAINTENANCE AND/OR REMOVAL OF THE TOILETS MUST BE PERMANENTLY STABILIZED.

PORTABLE TOILET

PT

SEDIMENT CONTROL LOG

SECTION A-A'

SEDIMENT CONTROL LOG JOINTS

INSTALLATION NOTES

- ALL SEDIMENT CONTROL LOGS MUST BE EMBEDDED TO 2/3 OF THE HEIGHT OF THE LOG.
- LARGER DIAMETER SEDIMENT CONTROL LOGS NEED TO BE EMBEDDED DEEPER.
- PLACE SEDIMENT CONTROL LOGS AGAINST SIDEWALK OR BACK OF CURB WHEN ADJACENT TO THESE FEATURES.
- SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COCONUT, EXCESSION OR COCONUT FIBER, AND SHALL BE FREE FROM ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.
- IF USING AS SLOPE PROTECTION, INSTALL SEDIMENT CONTROL LOGS ALONG THE CONTOUR.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE HEIGHT REACHES 2/3 OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.
- PERMANENTLY STABILIZE AREA AFTER SEDIMENT CONTROL LOGS HAVE BEEN REMOVED.

SCL

SEEDING & MULCHING

ALL SOIL TESTING, SOILS AMENDMENT AND FERTILIZER DOCUMENTATION, AND SEED LOAD AND BAG TICKETS MUST BE ADDED TO THE CSMP.

SOIL PREPARATION

- IN AREAS TO BE SEEDED, THE UPPER 6 INCHES OF THE SOIL MUST NOT BE HEAVILY COMPACTED, AND SHOULD BE IN FAVORABLE CONDITION. LESS THAN 85% STANDARD PROCTOR DENSITY IS ACCEPTABLE. AREAS OF COMPACTION OR GENERAL CONSTRUCTION ACTIVITY MUST BE SCARIFIED TO A DEPTH OF 8 TO 12 INCHES PRIOR TO SPREADING TOPSOIL TO BREAK UP COMPACTED LAYERS AND PROVIDE A BLENDING ZONE BETWEEN DIFFERENT SOIL LAYERS.
- AREAS TO BE PLANTED SHALL HAVE AT LEAST 4 INCHES OF TOPSOIL SUITABLE TO SUPPORT PLANT GROWTH.
- THE CITY RECOMMENDS THAT EXISTING AND/OR IMPORTED TOPSOIL BE TESTED TO IDENTIFY SOIL DEFICIENCIES AND ANY SOIL AMENDMENTS NECESSARY TO ADDRESS THESE DEFICIENCIES. SOIL AMENDMENTS AND/OR FERTILIZERS SHOULD BE ADDED TO CORRECT TOPSOIL DEFICIENCIES BASED ON SOIL TESTING RESULTS.
- TOPSOIL SHALL BE PROTECTED DURING THE CONSTRUCTION PERIOD TO RETAIN ITS STRUCTURE. AVOID COMPACTION, AND TO PREVENT EROSION AND CONTAMINATION. STRIPPED TOPSOIL MUST BE STORED IN AN AREA AWAY FROM MACHINERY AND CONSTRUCTION OPERATIONS, AND CARE MUST BE TAKEN TO PROTECT THE TOPSOIL AS A VALUABLE COMMODITY. TOPSOIL MUST NOT BE STRIPPED DURING UNDESIRABLE WORKING CONDITIONS (E.G. DURING WET WEATHER OR WHEN SOILS ARE SATURATED). TOPSOIL SHALL NOT BE STORED IN SHIELDS OR IN AREAS WITH POOR DRAINAGE.

SEEDING

- ALLOWABLE SEED MIXES ARE INCLUDED IN THE CITY OF COLORADO SPRINGS STORMWATER CONSTRUCTION MANUAL. ALTERNATIVE SEED MIXES ARE ACCEPTABLE IF INCLUDED IN AN APPROVED LANDSCAPING PLAN.
- SEED SHOULD BE DRILL-SEEDED WHENEVER POSSIBLE.
- SEED DEPTH MUST BE 3/8 TO 3/4 INCHES WHEN DRILL-SEEDED IS USED.
- BROADCAST SEEDING OR HYDRO-SEEDED WITH TACKIFIER MAY BE SUBSTITUTED ON SLOPES STEEPER THAN 3:1 OR ON OTHER AREAS NOT PRACTICAL TO DRILL SEED.
- SEEDING RATES MUST BE DOUBLED FOR BROADCAST SEEDING OR INCREASED BY 50% IF USING A BRILLIANT DRILL OR HYDRO-SEEDED.
- BROADCAST SEEDING MUST BE LIGHTLY HAND-RAKED INTO THE SOIL.

MULCHING

- MULCHING SHOULD BE COMPLETED AS SOON AS PRACTICABLE AFTER SEEDING, HOWEVER PLANTED AREAS MUST BE MULCHED NO LATER THAN 14 DAYS AFTER PLANTING.
- MULCHING REQUIREMENTS INCLUDE:
 - ONLY CERTIFIED WEED-FREE AND CERTIFIED SEED-FREE MULCH MAY BE USED. MULCH MUST BE APPLIED AT 2 TONS/ACRE AND ADEQUATELY SECURED BY CRIMPING AND/OR TACKIFIER.
 - MULCH MUST NOT BE USED ON SLOPES GREATER THAN 3:1, AND MULCH FIBERS MUST BE TUCKED INTO THE SOIL TO A DEPTH OF 3 TO 4 INCHES.
 - TACKIFIER MUST BE USED IN PLACE OF CRIMPING ON SLOPES STEEPER THAN 3:1.
- HYDRAULIC MULCHING IS AN OPTION ON STEEP SLOPES OR WHERE ACCESS IS LIMITED.
 - IF HYDRO-SEEDED IS USED, MULCHING MUST BE APPLIED AS A SEPARATE, SECOND OPERATION.
 - WOOD CELLULOSE FIBERS MIXED WITH WATER MUST BE APPLIED AT A RATE OF 2,000 TO 2,500 POUNDS/ACRE, AND TACKIFIER MUST BE APPLIED AT A RATE OF 100 POUNDS/ACRE.
- EROSION CONTROL BLANKET
 - EROSION CONTROL BLANKET MAY BE USED IN PLACE OF TRADITIONAL MULCHING METHODS.

SM

STOCKPILE PROTECTION PLAN

STOCKPILE PROTECTION ELEVATION

INSTALLATION NOTES

- INSTALL PERIMETER CONTROL AROUND STOCKPILE ON DOWNGRADIENT SIDE.
- PERIMETER CONTROL MUST BE SUITABLE TO SITE CONDITIONS AND INSTALLED ACCORDING TO THE RELEVANT DETAIL.
- FOR STOCKPILES ON THE INTERIOR PORTION OF A CONSTRUCTION SITE, WHERE OTHER DOWNGRADIENT CONTROLS INCLUDING PERIMETER CONTROL ARE IN PLACE, STOCKPILE PERIMETER CONTROLS MAY NOT BE REQUIRED.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- IF PERIMETER CONTROLS MUST BE MOVED TO ACCESS STOCKPILE, REPLACE PERIMETER CONTROLS BY THE END OF THE WORK DAY.
- ACCUMULATED SEDIMENT MUST BE REMOVED ACCORDING TO PERIMETER CONTROL DETAIL.

SP

SURFACE ROUGHENING

INSTALLATION NOTES

- SURFACE ROUGHENING MAY BE USED IN AREAS FLATTER THAN 3:1. INSTALL FURROWS ALONG CONTOUR TO INTERCEPT SHEET FLOW.
- SURFACE ROUGHENING MAY BE ACCOMPLISHED BY FURROWING, SCARIFYING, RIPPING OR DISKING THE SOIL.
- FURROWS MUST BE A MINIMUM OF 4" IN DEPTH.
- SURFACE ROUGHENING SHALL NOT BE USED ON EXTREMELY SANDY OR ROCKY SOILS.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- VEHICLES AND EQUIPMENT SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SURFACE ROUGHENED.

SR

SLOPE TRACKING

INSTALLATION NOTES

- SLOPE TRACKING MAY BE USED ON SLOPES 3:1 OR STEEPER.
- TRACKING GROOVES SHALL BE PERPENDICULAR TO THE SLOPE.
- SLOPE TRACKING SHALL NOT BE USED ON EXTREMELY SANDY OR ROCKY SOILS.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- VEHICLES AND EQUIPMENT SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SLOPE TRACKED.

ST

AGGREGATE VEHICLE TRACKING CONTROL

SECTION A-A'

INSTALLATION NOTES

- A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHOULD BE LOCATED AT ALL POINTS WHERE VEHICLES EXIT THE CONSTRUCTION SITE TO ADJACENT ROADWAY.
- STABILIZED CONSTRUCTION ENTRANCE/EXITS SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- RADIUS MUST BE ADEQUATE FOR INTENDED CONSTRUCTION VEHICLE TURNING.
- ROCK SHOULD CONSIST OF 6" MINUS ROCK.
- INSTALL CONSTRUCTION FENCE ON BOTH SIDES 4' FROM TRACKING CONTROL PAD WHEN NEEDED OR REQUIRED BY INSPECTOR.

MAINTENANCE NOTES

- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- SEDIMENT TRACKED ONTO THE ADJACENT ROAD SHALL BE REMOVED DAILY BY SWEEPING OR SHOULDERING, AND NEVER WASHED DOWN STORM DRAINS.
- ROUGHEN, REPLACE AND/OR ADD ROCK AS NEEDED TO MAINTAIN CONSISTENT DEPTH AND TO PREVENT SEDIMENT TRACKING ONTO ADJACENT STREET.
- PERMANENTLY STABILIZE AREA AFTER VEHICLE TRACKING CONTROL IS REMOVED.

VTC

TITLE: SNYDER QUARRY RECLAMATION
BLACK CANYON OPEN SPACE
STORMWATER DETAILS

HERE