

**PROJECT MANUAL
FOR
COLORADO STATE UNIVERSITY - PUEBLO
FOR
BARTLEY BOULEVARD EXTENSION**

(PROJECT NO. 2015-132M-15)

NORTHSTAR PROJECT NO. 14 036 01

DECEMBER 2016



OWNER:

COLORADO STATE UNIVERSITY - PUEBLO
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PUEBLO, COLORADO 81001



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PROCEDURAL DOCUMENTS



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

INFORMATION FOR BIDDERS

Institution or Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

1. **BID FORM:** Bidders are required to use the Bid form attached to the bidding documents. Each bidder is required to bid on all alternates and indicate the time from the date of the Notice to Proceed to Substantial Completion in calendar days, and in addition, the bidder is required to indicate the period of time to finally complete the project from Substantial Completion to Final Acceptance, also in calendar days. Bids indicating times for Substantial Completion and Final Acceptance in excess of the number of days indicated in the Advertisement for Bids for completion of the entire Project may be found non-responsive and may be rejected. The bid shall not be modified or conditioned in any manner. Bids shall be submitted in sealed envelopes bearing the address and information shown below. If a bid is submitted by mail, this aforementioned sealed envelope should be enclosed in an outer envelope and sent to the following addressee:

Sealed Bids shall be delivered to Colorado State University – Pueblo at Purchasing Department, Administration Building, Room 309

The outside of the sealed inner envelope should bear the following information:

Project #
Project Name
Name and Address of Bidder
Date of Opening
Time of Opening

2. **INCONSISTENCIES AND OMISSIONS:** Bidders may request clarification of any seeming inconsistencies, or matters seeming to require explanation, in the bidding documents at least three (3) business days prior to the time set for the opening of Bids. Decisions of major importance on such matters will be issued in the form of addendum.
3. **APPLICABLE LAWS AND REGULATIONS:** The bidder's attention is called to the fact that all work under this Contract shall comply with the provisions of all state and local laws, approved state building codes, ordinances and regulations which might in any manner affect the work to be done or those to be employed in or about the work. Attention is also called to the fact that the use of labor for work shall be governed by the provisions of Colorado law which are hereinafter set forth in Articles 27 and 52E of the GENERAL CONDITIONS.
4. **UNAUTHORIZED IMMIGRANTS:** Note that the Special Provisions of the General Conditions of the Contract includes the following language: PUBLIC CONTRACTS FOR SERVICES - CRS 8-17.5-101 and PUBLIC CONTRACTS WITH NATURAL PERSONS - 24-76.5-101. The Contractor certifies that the Contractor shall comply with the provisions of CRS 8-17.5-101 et seq. The Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to the Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. The Contractor represents, warrants, and agrees that it (i) has verified that it does not employ any illegal aliens, through participation in the Basic Pilot Employment Verification Program administered by the Social Security Administration and Department of Homeland Security, and (ii) otherwise will comply with the requirements of CRS 8-17.5-102(b). The Contractor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Contractor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate this contract for breach and the Contractor shall be liable for actual and consequential damages to the State.

A Contractor that operates as a sole proprietor hereby swears or affirms under penalty of perjury that the Contractor (i) is a citizen of the United States or otherwise lawfully present in the United States pursuant to federal law, (ii) shall comply with the provisions of CRS 24-76.5-101 et seq, and (iii) shall produce one of the

forms of identification required by CRS 24-76.5-103 prior to the effective date of this Contract. Except where exempted by federal law and except as provided in CRS 24-76.5-103(3), a Contractor that receives federal or state funds under this contract must confirm that any individual natural person eighteen years of age or older is lawfully present in the United States pursuant to CRS 24-76.5-103(4) if such individual applies for public benefits provided under this contract.

5. **TAXES:** The bidder's attention is called to the fact that the Bid submitted shall exclude all applicable federal excise or manufacturers' taxes and all state sales and use taxes as hereinafter set forth in Article 9C of the GENERAL CONDITIONS.
6. **OR EQUAL:** The words "OR EQUAL" are applicable to all specifications and drawings relating to materials or equipment specified. Any material or equipment that will fully perform the duties specified, will be considered "equal", provided the bid submits proof that such material or equipment is of equivalent substance and function and is approved, in writing. Requests for the approval of "or equal" shall be made in writing at least five (5) business days prior to bid opening. During the bidding period, all approvals shall be issued by the Architect/Engineer in the form of addenda at least two (2) business days prior to the bid opening date.
7. **ADDENDA:** Owner/architect initiated addenda shall not be issued later than two (2) business days prior to bid opening date. All addenda shall become part of the Contract Documents and receipt must be acknowledged on the Bid form.
8. **METHOD OF AWARD - LOWEST RESPONSIBLE BIDDER:** If the bidding documents for this project require alternate prices, additive and/or deductible alternates shall be listed on the alternates bid form provided by the Principal Representative. Bidders should note the Method of Award is applicable to this Bid as stated below.
 - A. **DEDUCTIBLE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid combined with deductible alternates, deducted in numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The subtraction of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be subtracted from the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.
 - B. **ADDITIVE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid plus all additive alternates added in the numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The addition of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be added to the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.
 - C. **DEDUCTIBLE AND ADDITIVE ALTERNATES:** Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.
9. **NOTICE OF CONTRACTOR'S SETTLEMENT** – Agencies/institutions must indicate in the initial Solicitation (Advertisement for Bids, Documented Quotes, or Requests for Proposals) whether settlement will be advertised in newspapers or electronic media.

The Advertisement for Bids can be located at the web site: www.colorado.gov/pacific/osa/cdnotices
(Click on the appropriate link [ColoradoVSS or ColoradoBIDS] or on the State Purchasing Office website)



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

Bidder Acknowledges Receipt of Addenda Numbers:

Bidder Anticipates Services outside the United States or Colorado:

No Yes If Yes see 3A below

Bidder will comply with 80% Colorado Labor on project above \$500,000:

Yes No If No see 3B below

Bidder is a Service-Disabled Veteran Owned Small Business:

No Yes If Yes see 3C below

Base Bid (per attached Schedule of Values)

\$ _____

(Refer to Bid Alternate Form SC-6.13.1 Attached, If Applicable)

Bidder's Time of Completion

a. Time Period from Notice to Proceed to Substantial Completion: _____

b. Time Period from Substantial Completion to Final Acceptance: _____

c. Total Time of Completion of Entire Project (a + b): _____

1. **BID:** Pursuant to the advertisement by the State of Colorado dated _____ the undersigned bidder hereby proposes to furnish all the labor and materials and to perform all the work required for the complete and prompt execution of everything described or shown in or reasonably implied from the Bidding Documents, including the Drawings and Specifications, for the work and for the base bid indicated above. Bidders should include all taxes that are applicable.
2. **EXAMINATION OF DOCUMENTS AND SITE:** The bidder has carefully examined the Bidding Documents, including the Drawings and Specifications, and has examined the site of the Work, so as to make certain of the conditions at the site and to gain a clear understanding of the work to be done.
3. **PARTIES INTERESTED IN BID:** The bidder hereby certifies that the only persons or parties interested in this Bid are those named herein, and that no other bidder or prospective bidder has given any information concerning this Bid.
 - A. If the bidder anticipates services under the contract or any subcontracts will be performed outside the United States or Colorado, the bidder shall provide in a written statement which must include, but need not be limited to the type of services that will be performed at a location outside the United States or Colorado and the reason why it is necessary or advantageous to go outside the United States or Colorado to perform such services. (Does not apply to any project that receives federal moneys)
 - B. For State Public Works projects per C.R.S. 8-17-101, Colorado labor shall be employed to perform at least 80% of the work. Colorado Labor means any person who is a resident of the state of Colorado at the time of the Public Works project. Bidders indicating that their bid proposal will not comply with the 80% Colorado Labor requirement are required to submit written justification along with the bid submission. (Does not apply to any project that receives federal moneys—)
 - C. A Service-Disabled Veteran Owned Small Business (SDVOSB) per C.R.S. 24-103-211, means a business that is incorporated or organized in Colorado or maintains a place of business or has an office in Colorado and is officially registered and verified by the Center for Veteran Enterprise within the U.S. Department of Veteran Affairs. Attach proof certification along with the bid submission.
4. **BID GUARANTEE:** This Bid is accompanied by the required Bid Guarantee. You are authorized to hold said Bid Guarantee for a period of not more than thirty (30) days after the opening of the Bids for the work above indicated, unless the undersigned bidder is awarded the Contract, within said period, in which event the Director, State Buildings

Programs, may retain said Bid Guarantee, until the undersigned bidder has executed the required Agreement and furnished the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants.

5. **TIME OF COMPLETION:** The bidder agrees to achieve Substantial Completion of the Project from the date of the Notice to Proceed within the number of calendar days entered above, and in addition, further agrees that the period between Substantial Completion and Final Acceptance of the Project will not exceed the number of calendar days noted above. If awarded the Work, the bidder agrees to begin performance within ten (10) days from the date of the Notice to Proceed subject to Article 46, Time of Completion and Liquidated Damages of The General Conditions of the Contract, and agrees to prosecute the Work with due diligence to completion. The bidder represents that Article 7D of the Contractor's Agreement (SC-6.21) has been reviewed to determine the type and amount of any liquidated damages that may be specified for this contract.
6. **EXECUTION OF DOCUMENTS:** The bidder understands that if this Bid is accepted, bidder must execute the required Agreement and furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of the Notice of Award, and that the bidder will be required to sign to acknowledge and accept the Contract Documents, including the Drawings and Specifications.
7. **ALTERNATES:** Refer to the Information for Bidders (SC-6.12) for Method of Award for Alternates and use State Form SBP-6.13.1 Bid Alternates form to be submitted with this bid form if alternates are requested by the institution/agency in the solicitation documents.
8. **Submit wage rates** (direct labor costs) for prime contractor and subcontractor as requested by the institution/agency in the solicitation documents.
9. **The right is reserved to waive informalities and to reject any and all Bids.**

SIGNATURES: If the Bid is being submitted by a Corporation, the Bid shall be signed by an officer, i.e., President or Vice-President. If a sole proprietorship or a partnership is submitting the Bid, the Bid shall so indicate and be properly signed.

Dated this _____ Day of _____, 20_____

THE BIDDER:

Company Name

Address (including city, state and zip)

Phone number: _____

Name (Print) and Title

Signature

SCHEDULE OF VALUES
COLORADO STATE UNIVERSITY - PUEBLO
BARTLEY BOULEVARD EXTENSION
(2015-132M-15)

DESCRIPTION	TOTAL PRICE
1. Mobilization, Demobilization, Insurance, Bonding, General Conditions, and Contractor Plant and Equipment (not to exceed 7% of total Bid Price payable at 70% for mobilization and 30% for demobilization):	
2. Furnish, Install, and Maintain Erosion Control Facilities including Erosion Control/Storm Water Management Plan, Permitting and all incidentals of Construction throughout the entire Project construction schedule:	
3. Temporary dewatering system for control of surface water throughout the entire Project construction schedule:	
4. Demolition including saw cutting, site clearing, salvage for Owner (as indicated in the Bidding Documents), and legal off-site disposal of existing facilities not intended for reuse in the Project including, but not limited to, sidewalks, pans, curbs, ramps, paving, fencing, utilities, lighting with bases and appurtenances, vegetation, and all other items encountered within the Project area whether indicated on the Drawings or not:	
5. Clear, Grub (6" thickness), and strip and stockpile Topsoil (6" minimum thickness) all areas, including staging areas, to be disturbed by Construction Operations. Includes also locating and protecting existing utilities within and adjacent to the Project area. Legally dispose (off-site) of any organic or inorganic materials encountered which are not intended for re-use in	
6. Earthwork and grading of the site to contours and spot elevations as indicated on the Drawings including unclassified excavation, subgrade preparation including scarification and compaction, subgrade proof-rolling, and compacted fill, complete in place with all incidentals of construction. Subgrade shall be prepared as required for placement of specified roadway	
7. Furnish and Install Specified cast-in-place concrete improvements complete with preparation, excavation, cast-in-place concrete, reinforcing, formwork, finishing, curing, backfill and compaction, complete in place with all incidental materials of construction:	
a. Curb and gutter	
b. 7" thick square pan radius with reinforcing	
c. 4" thick sidewalk with welded wire fabric	
d. 7" thick crosspans with reinforcing	
e. ADA handicap ramps with tactile bands	
8. Finish and Install specified pavement sections compacted in place to the limits indicated on the Drawings, to include all incidental materials of construction, complete in place.	
a. Bartley Boulevard pavement section - 6 1/2" Hot Bituminous Pavement placed on 12" of Aggregate Base Course	
b. Pavement patch at areas such as curb and gutter removal and replacement - 4" Hot Bituminous Pavement placed on 9" of Aggregate Base Course	
9. Furnish and Install specified pavement markings/stripping as indicated on the Drawings, to include all incidental materials of construction, complete in place:	
a. Lane lines, arrows, stop bars, and crosswalk marking	
b. Handicap parking marking	
c. Parking lot striping	

	10. Furnish and Install specified signage complete with concrete bases, finishes, and all		
	a. Handicap parking signs		
	b. T-intersection signs		
	c. Stop signs		
	d. 4 way intersection signs		
	11. Furnish and Install City Standard Survey Monuments complete with all incidentals of		
	12. Furnish and Install bumper blocks and ADA tactile bands at Student Recreational Field		
	13. Furnish and Install specified Lighting and Electrical improvements complete with concrete bases, circuitry, transformer and service equipment, controls, luminaires, junction boxes, to		
	a. Street lights		
	b. Service and lighting for new campus monument sign		
	c. Improvements to existing service to accommodate new loads complete with any existing		
	14. Complete cleanup and revegetation of all disturbed areas of Project site upon completion of		
	15. Furnish and Install the specified Landscaping and Irrigation System improvements as indicated on the Drawings and as indicated hereafter with all incidental materials of		
	a. 2" cal. Crimson Spire White Oak		
	b. 2" cal. Chanticleer Pear		
	c. 2" cal. Autumn Fantasy Maple		
	d. 6' ht. Pinon Pine		
	e. 8' ht. Ponderosa Pine		
	f. #5 Austrian Copper Rose		
	g. #5 Golden Elder		
	h. #5 Hughes Juniper		
	i. #5 Medora Juniper		
	j. #5 Staghorn Sumac		
	k. #5 Russian Sage		
	l. #1 Feather Reed Grass		
	m. #5 Plume Grass		
	n. 1/8" x 4" Galvanized Steel Edging		
	o. 1 1/2" Aggregate Type 1		
	p. 4 - 6" Aggregate Type 2		
	q. 3' - 4' Boulders		
	r. Seed/mulch		
	s. Irrigation System including all sleeves		
	TOTAL (Items 1 through 15)		
			Dollars (\$



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID BOND

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO
Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, _____ hereinafter called the "PRINCIPAL", is submitting a PROPOSAL for the above described project, to the STATE OF COLORADO, hereinafter called the "OBLIGEE".

WHEREAS, the Advertisement for Bids has required as a condition of receiving the Proposals that the Principal submit with the PROPOSAL GUARANTY in an amount not less than five per cent (5%) of the Proposal, which sum it is specifically agreed is to be forfeited as Liquidated Damages in the event that the Principal defaults in his obligation as hereinafter specified, and, in pursuance of which Requirement, this Bid is made, executed and delivered.

NOW THEREFORE, the Principal and _____ a corporation of the State of _____, duly authorized to transact business in Colorado, as Surety, are held and firmly bound unto the Obligee, in the sum of five per cent (5%) of the Principal's total bid price, lawful money of the United States for the payment of which sum, well and truly to be made to the Obligee, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

FURTHER THAT, a condition of the obligation that the Principal shall maintain his Proposal in full force and effect for thirty (30) days after the opening of the proposals for the project, or, if the Principal's Proposal is accepted, the Principal shall, within the prescribed time, execute the required Agreement, furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy, Certificates of Insurance and Certification and Affidavit Regarding Illegal Aliens, then this obligation shall be null and void, otherwise it shall remain in full force and effect, and subject to forfeiture upon demand as Liquidated Damages.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of _____, A.D., 20_____.

(Corporate Seal)

THE PRINCIPAL

ATTEST

Company Name _____

Secretary _____

Address (including city, state and zip) _____

Phone number: _____

Name (Print) _____

Signature _____

Name (Print) and Title _____

SIGNATURES If the "Principal" is doing business as a Corporation, the Bid Bond shall be signed by an officer, i.e., President or Vice President. The signature of the officer shall be attested to by the Secretary and properly sealed.

If the "Principal" is an individual or a partnership, the Bid Bond shall so indicate and be properly signed.

(Corporate Seal)

THE SURETY

By _____

Secretary _____

Attorney-in-Fact _____

**THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED.
FAILURE TO PROVIDE A PROPERLY EXECUTED BID BOND WITH A PROPERLY EXECUTED POWER OF
ATTORNEY WILL RESULT IN THE BIDDER'S PROPOSAL BEING DEEMED NON-RESPONSIVE.**



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF AWARD

Date of Notice: _____

_____ Date to be inserted by the Principal Representative

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

TO:

The State of Colorado, represented by the undersigned, has considered the Proposals submitted for the above described work.

Your Proposal, deemed to be in the best interest of the State of Colorado, in the amount of _____ DOLLARS AND NO/100* (\$_____*) is hereby accepted, pending final execution of the Agreement.

You **are** required to execute the approved Agreement and to furnish the Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance within ten (10) days from the date of this Notice.

If you fail to execute said Agreement and to furnish said Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, and Certification and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of this Notice, the State Controller is entitled to retain the amount of the Proposal Guaranty submitted with your Proposal as Liquidated Damages. In this event, the right is reserved to consider all of your rights arising out of the acceptance of your Proposal as abandoned and to award the work covered by your Proposal to another, or to re-advertise the Project, or otherwise dispose thereof.

By _____
State Buildings Programs Date
(of Authorized Delegate)

By _____
Principal Representative Date
(Institution or Agency)

When completely executed, this form is to be sent by **certified mail** to the Contractor by the Principal Representative or delivered by any other means to which the parties agree.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

MINORITY/WOMEN BUSINESS ENTERPRISE PARTICIPATION REPORT

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO
Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

TO BE ELIGIBLE FOR AWARD OF THIS CONTRACT, EACH CONTRACTOR (INCLUDING ARCHITECT/ENGINEER/CONSULTANT/CONTRACTOR) IS REQUESTED TO COMPLY WITH THESE REQUIREMENTS.

- I. The undersigned Architect/Engineer/Consultant/Contractor hereby certifies that the (company) (joint venture) (is) (is not)* a minority enterprise as defined in this report. The undersigned Architect/Engineer/Consultant/Contractor hereby certifies the (company) (joint venture) (is) (is not)* a woman-owned business enterprise as defined. (*Strike out where inapplicable.)

*Persons signing hereby swear and affirm that they are authorized to act on Architect/Engineer/Consultant/Contractor's behalf and acknowledge that the State is relying on their representations to that effect. **Principal is not a recognized title and will not be accepted**

ARCHITECT/ENGINEER/CONSULTANT/CONTRACTOR

Legal Name of Contracting Entity

*Signature

By: _____
Name (print) Title

Date: _____

- II. It is the general policy of the State of Colorado to be as inclusive as possible to all member communities when spending taxpayer dollars.

III. REQUIREMENTS

- A. Minority Business Enterprise (MBE) means, for the purpose of this report, a business enterprise at least 51 percent that is owned and controlled by minority group members, or, in the case of a publicly owned business, at least 51 percent of the stock of which is owned and controlled by minority group members. Eligible persons are expected to be engaged full time in the day-to-day operation and management of the business. Minority group members are ethnic minorities including African American, Hispanic American, Native American or Asian/Pacific American.
- B. Women Business Enterprise (WBE) means, for the purpose of this report, a business enterprise of at least 51 percent of which is owned and controlled by a woman or women, or, in the case of a publicly-owned business, at least 51 percent of the stock of which is owned and controlled by women. Women are expected to be engaged full time in the day-to-day operation and management of the business.
- C. The State of Colorado does not have a certification process nor does it require MBE's and WBE's to be certified EXCEPT for certain contracts for highway and bridge construction administered by the Colorado Department of Transportation.
- D. The percentages of minority and women-owned business participation will be determined by dollar value of the work subcontracted to or joint ventured with minority and women-owned firms, as compared to the total dollar value of the bid amount for all work bid under this contract.

CONTRACT DOCUMENTS

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**



**CONTRACTOR'S DESIGN/BID/BUILD (D/B/B) AGREEMENT
(STATE FORM SC-6.21)**

DEPARTMENT ID: _____

CONTRACT ID #: _____

PROJECT #:

2015-132M-15

PROJECT NAME: BARTLEY BOULEVARD EXTENSION

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

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- A. Contractor's Bid (Form SC-6.13)
- B. Performance Bond (Form SC-6.22)
- C. Labor and Material Payment Bond (Form SC-6.221)
- D. Insurance Certificates
- E. Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work)
- F. Building Code Compliance Policy: Coordination of Approved Building Codes, Plan Reviews and Building Inspections.

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD (D/B/B) AGREEMENT
(STATE FORM SC-6.21)**

Department ID: _____ Contract ID #: _____ Project #: _____

1. PARTIES. THIS AGREEMENT is entered into by and between the STATE OF COLORADO, acting by and through the (agency), hereinafter referred to as the Principal Representative, and (vendor name) having its offices at (vendor address) hereinafter referred to as the Contractor.

2. EFFECTIVE DATE AND NOTICE OF NONLIABILITY. This Agreement shall not be effective or enforceable until it is approved and signed by the State Controller or its designee (hereinafter called the "Effective Date"), but shall be effective and enforceable thereafter in accordance with its provisions. The State shall not be liable to pay or reimburse Contractor for any performance hereunder or be bound by any provision hereof prior to the Effective Date.

RECITALS:

WHEREAS, the Principal Representative intends to (project name) hereinafter called the Project; and

WHEREAS, authority exists in the Law and Funds have been budgeted, appropriated, and otherwise made available, and a sufficient unencumbered balance thereof remains available for payment In Fund Number _____, Account Number _____; and

WHEREAS, this is a phase one waived contract, waiver number 156 Contractors Agreement for Capital Construction Form SC6.21.

WITNESSETH, that the State of Colorado and the Contractor agree as follows:

ARTICLE 1. PERFORMANCE OF THE WORK

The Contractor shall perform all of the Work required for the complete and prompt execution of everything described or shown in, or reasonably implied from the Contract Documents for the above referenced Project.

ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS

The Contractor agrees to perform the Work to the highest industry standards and to the satisfaction of the State of Colorado and its Architect/Engineer in strict accordance with the provisions of the Contract Documents.

ARTICLE 3. TIME OF COMPLETION

The Contractor agrees to Substantially Complete the Project within 75 calendar days from the date of the Notice to Proceed, in addition, the Contractor agrees to finally complete the Project from Substantial Completion to Final Acceptance within 30 calendar days for a total time of completion of the entire Project of 105 calendar days. The Contractor shall perform the Work with due diligence to completion.

ARTICLE 4. ESSENTIAL CONDITION

Timely completion of the Project is an essential condition of this Agreement. The Contractor shall be subject to any liquidated damages described in Article 7.4 for failure to satisfactorily complete the Work within the time periods in Article 3 above.

ARTICLE 5. CONTRACT SUM

The Contractor shall be paid for the performance of this Agreement, subject to any additions and deductions as provided for in Articles 32, 34 and 35 of The General Conditions of the Construction Contract SC-6.23, the sum of _____ DOLLARS AND NO/100* (\$ 0.00*).

ARTICLE 6. CONTRACT DOCUMENTS

The Contract Documents, as enumerated in Article 1 of The General Conditions of the Contractor’s Design/Bid/Build (D/B/B) Agreement SC-6.23, are all essential parts of this Agreement and are fully incorporated herein.

ARTICLE 7. OPTIONAL PROVISIONS AND ELECTIONS

The provisions of this Article 7 alter the Articles (The General Conditions of the Contractor’s Design/Bid/Build Agreement SC-6.23) or enlarge upon them as indicated:

The Principal Representative and or the State Buildings Program shall mark boxes and initial where applicable.

1. MODIFICATION OF ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION

If the box below is marked the six month guarantee inspection is not required.

_____ Principal Representative initial

2. MODIFICATION OF ARTICLE 27. LABOR AND WAGES

If the box is marked the Federal Davis-Bacon Act shall be applicable to the Project. The minimum wage rates to be paid on the Project shall be furnished by the Principal Representative and included in the Contract Documents.

_____ Principal Representative initial

3. MODIFICATION OF ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS

If the box is marked, and initialed by the State as noted, the requirement to participate in facilitated negotiations shall be deleted from this Contract. Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, shall be deleted in its entirety and all references to the right to the same where ever they appear in the contract shall be similarly deleted.

The box may be marked only for projects with an estimated value of less than \$500,000.

_____ Principal Representative initial

4. MODIFICATION OF ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

If an amount is indicated immediately below, liquidated damages shall be applicable to this Project as, and to, the extent shown below. Where an amount is indicated below, liquidated damages shall be assessed in accordance with and pursuant to the terms of The General Conditions of the Design/Bid/Build Agreement Article 46, Time of Completion And Liquidated Damages, in the amounts and as here indicated. The election of liquidated damages shall limit and control the parties right to damages only to the extent noted.

1. For the inability to use the Project, for each day after the number of calendar days specified in the Contractor's bid for the Project and the Agreement for achievement of Substantial Completion, until the day that the Project has achieved Substantial Completion and the Notice of Substantial Completion is issued, the Contractor agrees that an amount equal to Six hundred Dollars (\$600.00) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due, but amounts remaining are insufficient to cover the entire assessment.

2. For damages related to or arising from additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period, for each day in excess of the number of calendar days specified in the Contractor's bid for the Project and the Agreement to finally complete the Project as defined by the issuance of the Notice of Final Acceptance) after the issuance of the final Notice of Substantial Completion, the Contractor agrees that an amount equal to Three hundred Dollars (\$300.00) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due but amounts remaining are insufficient to cover the entire assessment.

5. NOTICE IDENTIFICATION

All Notices pertaining to General Conditions or otherwise required to be given shall be transmitted in writing, to the individuals at the addresses listed below, and shall be deemed duly given when received by the parties at their addresses below or any subsequent persons or addresses provided to the other party in writing.

Notice to Principal Representative:

With copies to (State Buildings Program (or Delegate) State of Colorado):

Notice to Contractor:

With copies to:

SIGNATURE APPROVALS:

THE PARTIES HERETO HAVE EXECUTED THIS CONTRACT

*Persons signing for Contractor hereby swear and affirm that they are authorized to act on Contractor's behalf and acknowledge that the State is relying on their representations to that effect. **Principal is not a recognized title and will not be accepted**

THE CONTRACTOR

STATE OF COLORADO, acting by and through:
(Insert Name & Title of Agency or IHE)

Legal Name of Contracting Entity

By: _____
(Insert Name & Title of Person Signing for Agency or IHE)

Date: _____

*Signature

APPROVED
DEPARTMENT OF PERSONNEL &
ADMINISTRATION
STATE BUILDINGS PROGRAM
State Architect (or authorized Delegate)

By _____
Name (print) Title

By: _____
(Insert Name of Authorized Individual)

Date: _____

Date: _____

ALL CONTRACTS MUST BE APPROVED BY THE STATE CONTROLLER:

CRS §24-30-202 requires the State Controller to approve all State Contracts. This Contract is not valid until signed and dated below by the State Controller or delegate. Contractor is not authorized to begin performance until such time. If Contractor begins performing prior thereto, the State of Colorado is not obligated to pay Contractor for such performance or for any goods and/or services provided hereunder.

APPROVED:
STATE OF COLORADO
STATE CONTROLLER'S OFFICE
State Controller (or authorized Delegate)

By: _____
(Insert Name & Title of Authorized Individual)

Date: _____

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT A

CONTRACTOR'S BID (Form SBP-6.13)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT B

PERFORMANCE BOND (Form SC-6.22)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT C

LABOR AND MATERIAL PAYMENT BOND (Form SC-6.221)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT D

INSURANCE CERTIFICATE(S) (attached)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT E

Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work) (UI-1, attached)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT F

Building Code Compliance Policy: Coordination of Approved Building Codes, Plan Reviews and Building Inspections



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

PERFORMANCE BOND

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____
_____ are held and firmly bound unto **the STATE OF COLORADO**

acting by and through _____
(AGENCY OR INSTITUTION)

hereinafter called the "Principal Representative", in the sum of _____
_____ Dollars (\$ _____)

for the payment whereof the Principal and Surety bind themselves, their heirs, executors,
administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative
have entered into a certain Contract, hereinafter called "Contract," dated _____, 20
_____, for the construction of a PROJECT described as

which Contract is hereby by reference made a part hereof;

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION, is such that, if the Principal shall promptly, fully and faithfully perform all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract any extensions thereof that may be granted by the Principal Representative with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

AND THE SAID SURETY, for value received hereby stipulates and agrees that whenever the Principal shall be, and declared by the Principal Representative to be in default under said Contract, the State of Colorado having performed its obligations thereunder, the Surety may promptly remedy the default or shall promptly (1) Complete the Contract in accordance with its terms and conditions, or (2) Obtain a bid or bids for submittal to the Principal Representative for completing the Contract in accordance with its terms and conditions, and upon determination by the Principal Representative and Surety of the lowest responsible bidder, arrange for a contract between such bidder and the State of Colorado acting by and through the Principal Representative and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion, less the balance of the contract price but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount hereinbefore set forth. The term "balance of the contract price" as herein used shall mean the total amount payable to the Principal under the Contract and any amendments thereto, less the amount properly paid by the State of Colorado to the Contractor.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the State of Colorado.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of ,
A.D., _____ 20____.

(Corporate Seal)

THE PRINCIPAL

ATTEST:

By: _____

Title: _____

Secretary

(Corporate Seal)

SURETY

By: _____

Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful payment for all labor and material of the contract.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

LABOR AND MATERIAL BOND

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____ are held and firmly bound unto the STATE OF COLORADO

acting by and through _____
(agency or institution)

hereinafter called "Principal Representative," and to all subcontractors and any others who have supplied or furnished or shall supply or furnish materials, rental machinery, tools, or equipment actually used in the performance of the hereinafter identified Contract, or who have performed or shall perform labor in the performance of or in connection with said Contract, hereinafter called "Obligees" in the sum of _____ Dollars (\$ _____)

together with interest at the rate of eight per cent (8%) per annum on all payments becoming due in accordance with said Contract, from the time such payments shall become due until such payment shall be made, for the payment of which, well and truly made to the Obligees, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called "Contract," dated _____, 20__ for the construction of a PROJECT described as

which Contract is hereby by reference made a part hereof;

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal and the Surety shall fully indemnify and save harmless the State of Colorado and the Principal Representative from and against any and all costs and damages, including patent infringements, which either may suffer by reason of any failure or failures of the Principal promptly and faithfully to perform all terms and conditions of said Contract and shall fully reimburse and repay the State of Colorado and the Principal Representative all outlay and expense which the State of Colorado and the Principal Representative may incur in making good any such failure or failures, and further, if the Principal and his subcontractors shall duly and promptly pay for any and all labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools, or equipment and other supplies which have been or shall be used or consumed by said Principal or his subcontractors in the performance of the work of said Contract , and it said Principal shall duly and promptly pay all his subcontractors the sums due them for any and all materials, rental machinery, tools, or equipment and labor that have been or shall be furnished, supplied, performed or used in connection with performance of said Contract, and shall also fully indemnify and save harmless the State of Colorado and the Principal Representative to the extent of any and all expenditures which either or both of them may be required to make by reason of any failures or defaults by the Principal or any subcontractor in connection with such payments; then this obligation shall be null and void, otherwise it shall remain in full force and effect.

It is expressly understood and agreed that any alterations which may be made in the terms of said Contract or in the work to be done under said Contract, or any extension(s) of time for the performance of the Contract, or any forbearance on the part of either the State of Colorado or the Principal to any of the others, shall not in any way release the Principal and the Surety, or either of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety of any such alteration, extension or forbearance being hereby waived.

IN WITNESS WHEREOF, the Principal and the Surety have executed this Bond, this _____ day of _____, A.D., 20_____.

(Corporate Seal)

THE PRINCIPAL

ATTEST:

By: _____

Title: _____

Secretary

(Corporate Seal)

SURETY

By: _____
Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful performance of the contract.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE TO PROCEED (DESIGN/BID/BUILD CONTRACT)

Date of Notice: _____
Date to be inserted by the Principal Representative
Date/Description of Contract Documents: _____
Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO
Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

Attach Notice of Code Compliance from Code Review Agent/Building Official for Documents Listed Above

To:

This is to advise you that your Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, and Affidavit Regarding Unauthorized Immigrants have been received. Our issuance of this Notice does not relieve you of responsibility to assure that the bond and insurance requirements of the Contract Documents are met for the duration of the Agreement. The Agreement dated _____ covering the above described work has been fully executed.

You are hereby authorized and directed to proceed within ten (10) days from date of this Notice as required in the Agreement. Any liquidated damages for failure to achieve Substantial Completion by the date agreed that may be applicable to this Contract will be calculated using the date of this Notice for the date of the commencement of the Work.

The completion date of the Project is _____ (M/D/YYYY).

By _____
State Buildings Programs Date
(or Authorized Delegate)

By _____
Principal Representative Date
(Institution or Agency)

When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative; or delivered by any other means to which the parties agree.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CERTIFICATION AND AFFIDAVIT REGARDING UNAUTHORIZED IMMIGRANTS

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

A. CERTIFICATION STATEMENT CRS 8-17.5-101 & 102 (HB 06-1343, SB 08-193)

The Vendor, whose name and signature appear below, certifies and agrees as follows:

1. The Vendor shall comply with the provisions of CRS 8-17.5-101 et seq. The Vendor shall not knowingly employ or contract with an unauthorized immigrant to perform work for the State or enter into a contract with a subcontractor that knowingly employs or contracts with an unauthorized immigrant.
2. The Vendor certifies that it does not now knowingly employ or contract with an unauthorized immigrant who will perform work under this contract, and that it will participate in either (i) the "E-Verify Program", jointly administered by the United States Department of Homeland Security and the Social Security Administration, or (ii) the "Department Program" administered by the Colorado Department of Labor and Employment in order to confirm the employment eligibility of all employees who are newly hired to perform work under this contract.
3. The Vendor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Vendor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate work for breach and the Vendor shall be liable for damages to the State.

B. AFFIDAVIT CRS 24-76.5-101 (HB 06S-1023)

1. If the Vendor is a **sole proprietor**, the undersigned hereby swears or affirms under penalty of perjury under the laws of the State of Colorado that (check one):

- I am a United States citizen, or
- I am a Permanent Resident of the United States, or
- I am lawfully present in the United States pursuant to Federal law.

I understand that this sworn statement is required by law because I am a sole proprietor entering into a contract to perform work for the State of Colorado. I understand that state law requires me to provide proof that I am lawfully present in the United States prior to starting work for the State. I further acknowledge that I will comply with the requirements of CRS 24-76.5-101 et seq. and will produce the required form of identification prior to starting work. I acknowledge that making a false, fictitious, or fraudulent statement or representation in this sworn affidavit is punishable under the criminal laws of Colorado as perjury in the second degree under CRS 18-8-503 and it shall constitute a separate criminal offense each time a public benefit is fraudulently received.

CERTIFIED and AGREED to this _____ day of _____, 20____.

VENDOR:

Vendor Full Legal Name

BY: _____

Signature of Authorized Representative

Title

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**



**THE GENERAL CONDITIONS OF THE CONTRACTOR'S DESIGN/BID/BUILD (D/B/B)
AGREEMENT
(STATE FORM SC-6.23)**

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**THE GENERAL CONDITIONS OF THE CONTRACTOR’S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.23)**

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**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**THE GENERAL CONDITIONS OF THE CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.23)**

ARTICLE 1. DEFINITIONS

A. CONTRACT DOCUMENTS

The Contract Documents consist of the following some of which are procedural documents used in the administration and performance of the Agreement:

1. Contractor's Design/Bid/Build Agreement; (SC-6.21);
2. Performance Bond (SC-6.22) and Labor and Material Payment Bond (SC-6.221);
3. General Conditions of the Contractor's Design/Bid/Build Agreement (SC- 6.23) and if applicable, Supplementary General Conditions;
4. Detailed Specification Requirements, including all addenda issued prior to the opening of the bids; and,
5. Drawings, including all addenda issued prior to the opening of the bids.
6. Change Orders (SC-6.31) and Amendments (SC-6.0), if any, when properly executed.
7. Authorization to Bid (SBP-6.10)
8. Information for Bidders (SBP-6.12);
9. Bid (SBP-6.13);
10. Bid Bond (SBP-6.14);
11. Notice of Award (SBP-6.15);
12. Builder's risk insurance certificates of insurance (ACORD 25-S);
13. Liability and Workers' compensation certificates of insurance;
14. Notice to Proceed (Design/Bid/Build) (SBP-6.26);
15. Notice of Approval of Occupancy/Use (SBP-01);
16. Notice of Partial Substantial Completion (SBP-071);
17. Notice of Substantial Completion (SBP-07);
18. Notice of Partial Final Acceptance (SC-6.27);
19. Notice of Final Acceptance (SBP-6.271);
20. Notice of Partial Contractor's Settlement (SC-7.3);
21. Notice of Contractor's Settlement (SBP-7.31);
22. Application and Certificate for Contractor's Payment (SBP-7.2);
23. Other procedural and reporting documents or forms referred to in the General Conditions, the Supplementary General Conditions, the Specifications or required by the State Buildings Program or the Principal Representative, including but not necessarily limited to Pre-Acceptance Check List (SBP-05) and the Building Inspection Record (SBP-BIR). A list of the current standard State Buildings Program forms applicable to this Contract may be obtained from the Principal Representative on request.

B. DEFINITIONS OF WORDS AND TERMS USED

1. **AGREEMENT.** The term "Agreement" shall mean the written agreement entered into by the State of Colorado acting by and through the Principal Representative and the Contractor for the performance of the Work and payment therefore, on State Form SC-6.21. The term Agreement when used without reference to State Form SC-6.21 may also refer to the entirety of the parties' agreement to perform the Work described in the Contract Documents or reasonably inferable there from. The term "Contract" shall be interchangeable with this latter meaning of the term Agreement
2. **ARCHITECT/ENGINEER.** The term "Architect/Engineer" shall mean either the architect of record or the engineer of record under contract to the State of Colorado for the Project identified in the Contract Documents.

3. CHANGE ORDER. The term "Change Order" means a written order directing the Contractor to make changes in the Work, in accordance with Article 35A, The Value of Changed Work.
4. COLORADO LABOR. The term "Colorado labor", as provided in C.R.S. § 8-17-101(2)(a), as amended, means any person who is a resident of the state of Colorado, at the time of the public Works project, without discrimination as to race, color, creed, sex, sexual orientation, marital status, national origin, ancestry, age, or religion except when sex or age is a bona fide occupational qualification. A resident of the state of Colorado is a person who can provide a valid Colorado driver's license, a valid Colorado state-issued photo identification, or documentation that he or she has resided in Colorado for the last thirty days.
5. CONTRACTOR. The word "Contractor" shall mean the person, company, firm, corporation or other legal entity entering into a contract with the State of Colorado acting by and through the Principal Representative
6. DAYS. The term "days" whether singular or plural shall mean calendar days unless expressly stated otherwise. Where the term "business days" is used it shall mean business days of the State of Colorado.
7. DRAWINGS. The term "Drawings" shall mean all drawings approved by appropriate State officials which have been prepared by the Architect/Engineer showing the Work to be done, except that where a list of drawings is specifically enumerated in the Supplementary General Conditions or division 1 of the Specifications, the term shall mean the drawings so enumerated, including all addenda drawings.
8. EMERGENCY FIELD CHANGE ORDER. The term "Emergency Field Change Order" shall mean a written change order for extra Work or a change in the Work necessitated by an emergency as defined in Article 35C executed on State form SC 6.31 and identified as an Emergency Field Change Order. The use of such orders is limited to emergencies and to the amounts shown in Article 35C.
9. FINAL ACCEPTANCE. The terms "final acceptance" or "finally complete" mean the stage in the progress of the Work, after substantial completion, when all remaining items of Work have been completed, all requirements of the Contract Documents are satisfied and the Notice of Acceptance can be issued. Discrete physical portions of the Project may be separately and partially deemed finally complete at the discretion of the Principal Representative when that portion of the Project reaches such stage of completion and a partial Notice of Acceptance can be issued.
10. FIXED LIMIT OF CONSTRUCTION COST. The term "Fixed Limit of Construction Cost" shall set forth a dollar amount available for the total Construction Cost of all elements of the Work as specified by the Principal Representative.
11. NOTICE. The term "Notice" shall mean any communication in writing from either contracting party to the other by such means of delivery that receipt cannot properly be denied. Notice shall be provided to the person identified to receive it in Article 7.5 (Contractor's Design/Bid/Build Agreement SC-6.21), Notice Identification, or to such other person as either party identifies in writing to receive Notice. Notice by facsimile transmission where proper transmission is evidence shall be adequate where facsimile numbers are included in Article 7.5 (Contractor's Design/Bid/Build Agreement SC-6.21). Notwithstanding an email delivery or return receipt, email Notice shall not be adequate. Acknowledgment of receipt of a voice message shall not be deemed to waive the requirement that Notice, where required, shall be in writing.
12. OCCUPANCY. The term "Occupancy" means occupancy taken by the State as Owner after the Date of Substantial Completion at a time when a building or other discrete physical portion of the Project is used for the purpose intended. The Date of Occupancy shall be the date of such first use, but shall not be prior to the date of execution of the Notice of Approval of Occupancy/Use. Prior to the date of execution of a Notice of Approval of Occupancy/Use, the state shall have no right to occupy and the project may not be considered safe for occupancy for the intended use.

13. OWNER. The term "Owner" shall mean the Principal Representative.
14. PRINCIPAL REPRESENTATIVE. The term "Principal Representative " shall be defined, as provided in § 24-30-1301(11), C.R.S., as the governing board of a state department, institution, or agency; or if there is no governing board, then the executive head of a state department, institution, or agency, as designated by the governor or the general assembly and as specifically identified in the Contract Documents, or shall have such other meaning as the term may otherwise be given in § 24-30-1301(11), C.R.S., as amended. The Principal Representative may delegate authority. The Contractor shall have the right to inquire regarding the delegated authority of any of the Principal Representative's representatives on the project and shall be provided with a response in writing when requested.
15. PRODUCT DATA. The term "Product Data " shall mean all submittals in the form of printed manufacturer's literature, manufacturer's specifications, and catalog cuts.
16. PROJECT. The "Project" is the total construction of which the Work performed under the Contract Documents is a part, and may include construction by the Principal Representative or by separate contractors.
17. REASONABLY INFERABLE. The phrase "reasonably inferable" means that if an item or system is either shown or specified, all material and equipment normally furnished with such items or systems and needed to make a complete installation shall be provided whether mentioned or not, omitting only such parts as are specifically excepted, and shall include only components which the Contractor could reasonably anticipate based on his or her skill and knowledge using an objective, industry standard, not a subjective standard. This term takes into consideration the normal understanding that not every detail is to be given on the Drawings and Specifications. If there is a difference of opinion, the Principal Representative shall make the determination as to the standards of what reasonably inferable.
18. SAMPLES. The term "Samples" shall mean examples of materials or Work provided to establish the standard by which the Work will be judged.
19. SBP. The term "SBP" means "State Buildings", which is used in connection with labeling applicable State form documents (e.g., "SBP-01" is the form number for Notice of Approval of Occupancy/Use).
20. SC. The term "SC" means "State Contract" which is used in connection with labeling applicable State form documents (e.g. "SC 6.23" is the State form number for these General Conditions of the Contractor's Design/Bid/Build Agreement).
21. SCHEDULE OF VALUES. The term "Schedule of Values" is defined as the itemized listing of description of the Work by Division and Section of the Specifications. The format shall be the same as Form SC-7.2. Included shall be the material costs, and the labor and other costs plus the sum of both.
22. SHOP DRAWINGS. The term "Shop Drawings" shall mean any and all detailed drawings prepared and submitted by Contractor, Subcontractor at any tier, vendors or manufacturers providing the products and equipment specified on the Drawings or called for in the Specifications.
23. SPECIFICATIONS. The term "Specifications" shall mean the requirements of the CSI divisions of the project manual prepared by the Architect/Engineer describing the Work to be accomplished.
24. STATE BUILDINGS PROGRAM. Shall refer to the Office of the State Architect within the Department of Personnel & Administration of Colorado State government responsible for project administration, review, approval and coordination of plans, construction procurement policy, contractual procedures, and code compliance and inspection of all buildings, public Works and improvements erected for state purposes; except public roads and highways and projects under the supervision of the division of wildlife and the division of parks and outdoor recreation as provided in § 24-30-1301, *et seq*, C.R.S. The term State Buildings Program shall also mean that individual within a State Department agency or institution, including institutions of higher education, who has signed an agreement accepting delegation to perform all or part of the responsibilities and functions of State Buildings Program.
25. SUBCONTRACTOR. The term "Subcontractor" shall mean a person, firm or corporation supplying labor, materials, equipment and/or Services for Work at the site of the Project for, and under separate contract or agreement with the Contractor.

26. SUBMITTALS. The term "submittals" means drawings, lists, tables, documents and samples prepared by the Contractor to facilitate the progress of the Work as required by these General Conditions or the Drawings and Specifications. They consist of Shop Drawings, Product Data, Samples, and various administrative support documents including but not limited to lists of subcontractors, construction progress schedules, schedules of values, applications for payment, inspection and test results, requests for information, various document logs, and as-built drawings. Submittals are *required* by the Contract Documents, but except to the extent expressly specified otherwise are not themselves a part of the Contract Documents.
27. SUBSTANTIAL COMPLETION. The terms "substantial completion" or "substantially complete" mean the stage in the progress of the Work when the construction is sufficiently complete, in accordance with the Contract Documents as modified by any Change Orders, so that the Work, or at the discretion of the Principal Representative, any designated portion thereof, is available for its intended use by the Principal Representative and a Notice of Substantial Completion can be issued. Portions of the Project may, at the discretion of the Principal Representative, be designated as substantially complete.
28. SUPPLIER. The term "Supplier" shall mean any manufacturer, fabricator, distributor, material man or vendor.
29. SURETY. The term "Surety" shall mean the company providing the labor and material payment and performance bonds for the Contractor as obligor.
30. VALUE ENGINEERING. "Value Engineering" or "VE" is defined as an analysis and comparison of cost versus value of building materials, equipment, and systems. VE considers the initial cost of construction, coupled with the estimated cost of maintenance, energy use, life expectancy and replacement cost. VE related to this Project shall include the analysis and comparison of building elements in an effort to reduce overall Project costs, while maintaining or enhancing the quality of the design intent, whenever possible.
31. WORK. The term "Work" shall mean all or part of the labor, materials, equipment, and other services required by the Contract Documents or otherwise required to be provided by the Contractor to meet the Contractor's obligations under the Contract.

ARTICLE 2. EXECUTION, CORRELATION, INTENT OF DOCUMENTS, COMMUNICATION AND COOPERATION

A. EXECUTION

The Contractor, within ten (10) days from the date of Notice of Award, will be required to:

1. Execute the Agreement, State Form SC-6.21;
2. Furnish fully executed Performance and Labor and Material Payment Bonds on State Form s SC-6.22 and SC-6.221; and
3. Furnish certificates of insurance evidencing all required insurance on standard Acord forms designed for such purpose.
4. Furnish certified copies of any insurance policies requested by the Principal Representative.

B. CORRELATION

By execution of the Agreement the Contractor represents that the Contractor has visited the site, has become familiar with local conditions and local requirements under which the Work is to be performed, including the building code programs of the State Buildings Program as implemented by the Principal Representative, and has correlated personal observations with the requirements of the Contract Documents.

C. INTENT OF DOCUMENTS

The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all. The intention of the documents is to include all labor, materials, equipment and transportation necessary for the proper execution of the Work. Words describing materials or Work which have a well-known technical or trade meaning shall be held to refer to such recognized standards.

In any event, if any error exists, or appears to exist, in the requirements of the Drawings or Specifications, or if any disagreement exists as to such requirements, the Contractor shall have the

same explained or adjusted by the Architect/Engineer before proceeding with the Work in question. In the event of the Contractor's failure to give prior written Notice of any such errors or disagreements of which the Contractor or the Subcontractors at any tier are aware, the Contractor shall, at no additional cost to the Principal Representative, make good any damage to, or defect in, Work which is caused by such omission.

Where a conflict occurs between or within standards, Specifications or Drawings, which is not resolved by reference to the precedence between the Contract Documents, the more stringent or higher quality requirements shall apply so long as such more stringent or higher quality requirements are reasonably inferable. The Architect/Engineer shall decide which requirements will provide the best installation.

With the exception noted in the following paragraph, the precedence of the Contract Documents is in the following sequence:

1. The Agreement (SC-6.21);
2. The Supplementary General Conditions, if any;
3. The General Conditions (SC-6.23); and
4. Drawings and Specifications, all as modified by any addenda.

Change Orders and Amendments, if any, to the Contract Documents take precedence over the original Contract Documents.

Notwithstanding the foregoing order of precedence, the Special Provisions of Article 52 of the General Conditions, Special Provisions, shall take precedence, rule and control over all other provisions of the Contract Documents.

Unless the context otherwise requires, form numbers in this document are for convenience only. In the event of any conflict between the form required by name or context and the form required by number, the form required by name or context shall control. The Contractor may obtain State forms from the Principal Representative upon request.

D. PARTNERING, COMMUNICATIONS AND COOPERATION

In recognition of the fact that conflicts, disagreements and disputes often arise during the performance of construction contracts, the Contractor and the Principal Representative aspire to encourage a relationship of open communication and cooperation between the employees and personnel of both, in which the objectives of the Contract may be better achieved and issues resolved in a more fully informed atmosphere.

The Contractor and the Principal Representative each agree to assign an individual who shall be fully authorized to negotiate and implement a voluntary partnering plan for the purpose of facilitating open communications between them. Within thirty days (30) of the Notice to Proceed, the assigned individuals shall meet to discuss development of an informal agreement to accomplish these goals.

The assigned individuals shall endeavor to reach an informal agreement, but shall have no such obligation. Any plans these parties voluntarily agree to implement shall result in no change to the contract amount, and no costs associated with such plan or its development shall be recoverable under any contract clause. In addition, no plan developed to facilitate open communication and cooperation shall alter, amend or waive any of the rights or duties of either party under the Contract unless and except by written Amendment to the Contract, nor shall anything in this clause or any subsequently developed partnering plan be deemed to create fiduciary duties between the parties unless expressly agreed in a written Amendment to the Contract. It is also recognized that projects with relatively low contract values may not justify the expense or special efforts required. In the case of small projects with an initial Contract value under \$500,000, the requirements of the preceding paragraph shall not apply.

ARTICLE 3. COPIES FURNISHED

The Contractor will be furnished, free of charge, the number of copies of Drawings and Specifications as specified in the Contract Documents, or if no number is specified, all copies reasonably necessary for the execution of the Work.

ARTICLE 4. OWNERSHIP OF DRAWINGS

Drawings or Specifications, or copies of either, furnished by the Architect/Engineer, are not to be used on any other Work. At the completion of the Work, at the written request of the Architect/Engineer, the Contractor shall endeavor to return all Drawings and Specifications.

The Contractor may retain the Contractor's Contract Document set, copies of Drawings and Specifications used to contract with others for any portion of the Work and a marked up set of as-built drawings.

ARTICLE 5. ARCHITECT/ENGINEER'S STATUS

The Architect/Engineer is the representative of the Principal Representative for purposes of administration of the Contract, as provided in the Contract Documents and the Agreement. In case of termination of employment or the death of the Architect/Engineer, the Principal Representative will appoint a capable Architect/Engineer against whom the Contractor makes no reasonable objection, whose status under the Contract shall be the same as that of the former Architect/Engineer.

ARTICLE 6. ARCHITECT/ENGINEER DECISIONS AND JUDGMENTS, ACCESS TO WORK AND INSPECTION

A. DECISIONS

The Architect/Engineer shall, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work or the interpretation of the Contract Documents, and in the exercise of due diligence shall be reasonably available to the Contractor to timely interpret and make decisions with respect to questions relating to the design or concerning the Contract Documents.

B. JUDGMENTS

The Architect/Engineer is, in the first instance, the judge of the performance required by the Contract Documents as it relates to compliance with the Drawings and Specifications and quality of Workmanship and materials.

The Architect/Engineer shall make judgments regarding whether directed Work is extra or outside the scope of Work required by the Contract Documents at the time such direction is first given. If, in the Contractor's judgment, any performance directed by the Architect/Engineer is not required by the Contract Documents or if the Architect/Engineer does not make the judgment required, it shall be a condition precedent to the filing of any claim for additional cost related to such directed Work that the Contractor, before performing such Work, shall first obtain in writing, the Architect/Engineer's written decision that such directed Work is included in the performance required by the Contract Documents. If the Architect/Engineer's direction to perform the Work does not state that the Work is within the performance required by the Contract Documents, the Contractor shall, in writing, request the Architect/Engineer to advise in writing whether the directed Work will be considered extra Work or Work included in the performance required by the Contract Documents.

The Architect/Engineer shall respond to any such written request for such a decision within three (3) business days and if no response is provided, or if the Architect/Engineer's written decision is to the effect that the Work is included in the performance required by the Contract Documents, the Contractor may file with the Principal Representative and the Architect/Engineer a Notice of claim in accordance with Article 36, Claims. Whether or not a Notice of claim is filed, the Contractor shall proceed with the ordered Work. Disagreement with the decision of the Architect/Engineer shall not be grounds for the Contractor to refuse to perform the Work directed or to suspend or terminate performance.

C. ACCESS TO WORK

The Architect/Engineer, the Principal Representative and representatives of State Buildings Program shall at all times have access to the Work. The Contractor shall provide proper facilities for such access and for their observations or inspection of the Work.

D. INSPECTION

The Architect/Engineer has agreed to make, or that structural, mechanical, electrical engineers or other consultants will make, periodic visits to the site to generally observe the progress and quality of the Work to determine in general if the Work is proceeding in accordance with the Contract Documents. Observation may extend to all or any part of the Work and to the preparation, fabrication or manufacture of materials.

Without in any way meaning to be exclusive or to limit the responsibilities of the Architect/Engineer or the Contractor, the Architect/Engineer has agreed to observe, among other aspects of the Work, the following for compliance with the Contract Documents:

1. Compaction testing reports based upon the findings and recommendations of the Principal Representative's testing consultant;
2. Bearing surfaces of excavations before concrete is placed based upon the findings and recommendations of the Principal Representative's soils engineering consultant;
2. Reinforcing steel after installation and before concrete is poured;
3. Structural concrete;
4. Laboratory reports on all concrete testing based upon the findings and recommendations of the Principal Representative's testing consultant;
5. Structural steel during and after erection and prior to its being covered or enclosed;
6. Steel welding; Principal Representative will furnish steel welding inspection consultant/agency if required or necessary for the project;
7. Mechanical and plumbing Work following its installation and prior to its being covered or enclosed;
8. Electrical Work following its installation and prior to its being covered or enclosed; and
9. Any special or quality control testing required in the Contract Documents provided by the Principal Representative's testing consultant.

If the Specifications, the Architect/Engineer's instructions, laws, ordinances of any public authority require any Work to be specifically tested or approved, the Contractor shall give the Principal Representative, Architect/Engineer and appropriate testing agency (if necessary) timely notice of its readiness for observation by the Architect/Engineer or inspection by another authority, and if the inspection is by another authority, of the date fixed for such inspection, required certificates of inspection being secured by the Contractor. The Contractor shall give all required Notices to the Principal Representative or his or her designee for inspections required for the building inspection program. It shall be the responsibility of the Contractor to determine the Notice required by the State pursuant to Building Inspection Record for the Project, according to State form SBP-B.I.R., or the equivalent form required by the Principal Representative as approved by the State Buildings Program. If any such Work is covered up without approval or consent of the Architect/Engineer or prior to any building code inspection, it must, if required by the Architect/Engineer, the Principal Representative or the State Buildings Program, be uncovered for examination, at the Contractor's expense. If such Work is found to be not in accordance with the Contract Documents, the Contractor shall pay such costs, unless he or she shall show that the defect in the Work was caused by another contractor engaged by the Principal Representative. In addition, examination of questioned Work may be ordered, and if so ordered, the Work must be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the Contractor shall be reimbursed the cost of examination and replacement.

ARTICLE 7. CONTRACTOR'S SUPERINTENDENCE AND SUPERVISION

The Contractor shall employ, and keep present (as applicable) on the Project during its progress, a competent project manager as satisfactory to the Principal Representative. The project manager shall not be changed except with the consent of the Principal Representative, unless the project manager proves to

be unsatisfactory to the Contractor and ceases to be in his or her employ. The project manager shall represent the Contractor for the Project, and in the absence of the Contractor, all directions given to the project manager shall be as binding as if given to the Contractor. Directions received by the project manager shall be documented by the project manager and communicated in writing with the Contractor.

The Contractor shall employ, and keep present on the Project during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Architect/Engineer and the Principal Representative. The superintendent shall not be changed except with the consent of the Architect/Engineer and the Principal Representative, unless the superintendent proves to be unsatisfactory to the Project Manager/Contractor and ceases to be in his or her employ. The superintendent shall represent the Project Manager/Contractor in his or her absence and all directions given to the superintendent shall be as binding as if given to the Project Manager/Contractor. Directions received by the superintendent shall be documented by the superintendent and confirmed in writing with the Project Manager/Contractor.

The Contractor shall give efficient supervision to the Work, using his or her best skill and attention. He or she shall carefully study and compare all Drawings, Specifications and other written instructions and shall without delay report any error, inconsistency or omission which he or she may discover in writing to the Architect/Engineer. The Contractor shall not be liable to the Principal Representative for damage to the extent it results from errors or deficiencies in the Contract Documents or other instructions by the Architect/Engineer, unless the Contractor knew or had reason to know, that damage would result by proceeding and the Contractor fails to so advise the Architect/Engineer.

The superintendent shall see that the Work is carried out in accordance with the Contract Documents and in a uniform, thorough and first-class manner in every respect. The Contractor's superintendent shall establish all lines, levels, and marks necessary to facilitate the operations of all concerned in the Contractor's Work. The Contractor shall lay out all Work in a manner satisfactory to the Architect/Engineer, making permanent records of all lines and levels required for excavation, grading, foundations, and for all other parts of the Work.

ARTICLE 8. MATERIALS AND EMPLOYEES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the Work.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be first class and of uniform quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor is fully responsible for all acts and omissions of the Contractor's employees and shall at all times enforce strict discipline and good order among employees on the site. The Contractor shall not employ on the Work any person reasonably deemed unfit by the Principal Representative or anyone not skilled in the Work assigned to him.

ARTICLE 9. SURVEYS, PERMITS, LAWS, TAXES AND REGULATIONS

A. SURVEYS

The Principal Representative shall furnish all surveys, property lines and bench marks deemed necessary by the Architect/Engineer, unless otherwise specified.

B. PERMITS AND LICENSES

Permits and licenses necessary for the prosecution of the Work shall be secured and paid for by the Contractor. Unless otherwise specified in the Specifications, no local municipal or county building permit shall be required. However, State Buildings Program requires each Principal Representative to administer a building code inspection program, the implementation of which may vary at each agency or institution of the State. The Contractors' employees shall become personally familiar with these local conditions and requirements and shall fully comply with such requirements. State electrical and

plumbing permits are required, unless the requirement to obtain such permits is altered by State Building's Programs. The Contractor shall obtain and pay for such permits.

Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Principal Representative, unless otherwise specified.

C. TAXES

1. Refund of Sales and Use Taxes

The Contractor shall pay all local taxes required to be paid, including but not necessarily limited to all sales and use taxes. If requested by the Principal Representative prior to issuance of the Notice to Proceed or directed in the Supplementary General Conditions or the Specifications, the Contractor shall maintain records of such payments in respect to the Work, which shall be separate and distinct from all other records maintained by the Contractor, and the Contractor shall furnish such data as may be necessary to enable the State of Colorado, acting by and through the Principal Representative, to obtain any refunds of such taxes which may be available under the laws, ordinances, rules or regulations applicable to such taxes. When so requested or directed, the Contractor shall require Subcontractors at all tiers to pay all local sales and use taxes required to be paid and to maintain records and furnish the Contractor with such data as may be necessary to obtain refunds of the taxes paid by such Subcontractors. No State sales and use taxes are to be paid on material to be used in this Project. On application by the purchaser or seller, the Department of Revenue shall issue to a Contractor or to a Subcontractor at any tier, a certificate or certificates of exemption per § 39-26-114(1)(d), C.R.S., and § 39-26-203, C.R.S.

2. Federal Taxes

The Contractor shall exclude the amount of any applicable federal excise or manufacturers' taxes from the proposal. The Principal Representative will furnish the Contractor, on request exemption certificates.

D. LAWS AND REGULATIONS

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn or specified. If the Contractor observes that the Drawings or Specifications require Work which is at variance therewith, the Contractor shall without delay notify the Architect/Engineer in writing and any necessary changes shall be adjusted as provided in Article 35, Changes In The Work.

The Contractor shall bear all costs arising from the performance of Work required by the Drawings or Specifications that the Contractor knows to be contrary to such laws, ordinances, rules or regulations, if such Work is performed without giving Notice to the Architect/Engineer.

ARTICLE 10. PROTECTION OF WORK AND PROPERTY

A. GENERAL PROVISIONS

The Contractor shall continuously maintain adequate protection of all Work and materials, protect the property from injury or loss arising in connection with this Contract and adequately protect adjacent property as provided by law and the Contract Documents. The Contractor shall make good any damage, injury or loss, except to the extent:

1. Directly due to errors in the Contract Documents;
2. Caused by agents or employees of the Principal Representative; and,
3. Due to causes beyond the Contractor's control and not to fault or negligence; provided such damage, injury or loss would not be covered by the insurance required to be carried by the Contractor;

B. SAFETY PRECAUTIONS

The Contractor shall take all necessary precautions for the safety of employees on the Project, and shall comply with all applicable provisions of federal, State and municipal safety laws and building

codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. He or she shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of Workers and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials; and he or she shall designate a responsible member of his or her organization on the Project, whose duty shall be the prevention of accidents. The name and position of any person so designated shall be reported to the Architect/Engineer by the Contractor.

The Contractor shall provide all necessary bracing, shoring and tying of all structures, decks and framing to prevent any structural failure of any material which could result in damage to property or the injury or death of persons; take all precautions to insure that no part of any structure of any description is loaded beyond its carrying capacity with anything that will endanger its safety at any time during the execution of this Contract; and provide for the adequacy and safety of all scaffolding and hoisting equipment. The Contractor shall not permit open fires within the building enclosure. The Contractor shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations and floors, pits and trenches free of water. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work, except as otherwise noted.

The Contractor shall take due precautions when obstructing sidewalks, streets or other public ways in any manner, and shall provide, erect and maintain barricades, temporary walkways, roadways, trench covers, colored lights or danger signals and any other devices necessary or required to assure the safe passage of pedestrians and automobiles.

C. **EMERGENCIES**

In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor without special instruction or authorization from the Architect/Engineer or Principal Representative, is hereby permitted to act, at his or her discretion, to prevent such threatened loss or injury; and he or she shall so act, without appeal, if so authorized or instructed. Provided the Contractor has no responsibilities for the emergency, if the Contractor incurs additional cost not otherwise recoverable from insurance or others on account of any such emergency Work, the Contract sum shall be equitably adjusted in accordance with Article 35, Changes In The Work.

ARTICLE 11. DRAWINGS AND SPECIFICATIONS ON THE WORK

The Contractor shall keep on the job site one copy of the Contract Documents in good order, including current copies of all Drawings and Specifications for the Work, and any approved Shop Drawings, Product Data or Samples, and as-built drawings. As-built drawings shall be updated weekly by the Contractor and Subcontractors to reflect actual constructed conditions including dimensioned locations of underground Work and the Contractor's failure to maintain such updates may be grounds to withhold portions of payments otherwise due in accordance with Article 33, Payments Withheld. All such documents shall be available to the Architect/Engineer and representatives of the State. In addition, the Contractor shall keep on the job site one copy of all approved addenda, Change Orders and requests for information issued for the Work.

The Contractor shall develop procedures to insure the currency and accuracy of as-built drawings and shall maintain on a current basis a log of requests for information and responses thereto, a Shop Drawing and Product Data submittal log, and a Sample submittal log to record the status of all necessary and required submittals.

ARTICLE 12. REQUESTS FOR INFORMATION AND SCHEDULES

A. **REQUESTS FOR INFORMATION**

The Architect/Engineer shall furnish additional instructions with reasonable promptness, by means of drawings or otherwise, necessary for the proper execution of the Work. All such drawings and instructions shall be consistent with the Contract Documents and reasonably inferable there from. The

Architect/Engineer shall determine what additional instructions or drawings are necessary for the proper execution of the Work.

The Work shall be executed in conformity with such instructions and the Contractor shall do no Work without proper drawings, specifications or instructions. If the Contractor believes additional instructions, specifications or drawings are needed for the performance of any portion of the Work, the Contractor shall give Notice of such need in writing through a request for information furnished to the Architect/Engineer sufficiently in advance of the need for such additional instructions, specifications or drawings to avoid delay and to allow the Architect/Engineer a reasonable time to respond. The Contractor shall maintain a log of the requests for information and the responses provided.

B. SCHEDULES

1. Submittal Schedules

Prior to filing the Contractor's first application for payment, a schedule shall be prepared which may be preliminary to the extent required, fixing the dates for the submission and initial review of required Shop Drawings, Product Data and Samples for the beginning of manufacture and installation of materials, and for the completion of the various parts of the Work. It shall be prepared so as to cause no delay in the Work or in the Work of any other contractor. The schedule shall be subject to change from time to time in accordance with the progress of the Work, and it shall be subject to the review and approval by the Architect/Engineer. It shall fix the dates at which the various Shop Drawings Product Data and Samples will be required from the Architect/Engineer. The Architect/Engineer, after review and agreement as to the time provided for initial review, shall review and comment on the Shop Drawings, Product Data and Samples in accordance with that schedule. The schedule shall be finalized, prepared and submitted with respect to each of the elements of the Work in time to avoid delay, considering reasonable periods for review, manufacture or installation.

At the time the schedule is prepared, the Contractor, the Architect/Engineer and Principal Representative shall jointly identify the Shop Drawing, Product Data and Samples, if any, which the Principal Representative shall receive simultaneously with the Architect/Engineer for the purposes of owner coordination with existing facility standards and systems. The Contractor shall furnish a copy for the Principal Representative when so requested. Transmittal of Shop Drawings and Product Data copies to the Principal Representative shall be solely for the convenience of the Principal Representative and shall neither create nor imply responsibility or duty of review by the Principal Representative.

The Contractor may also, or at the direction of the Principal Representative at any time shall, prepare and maintain a schedule, which may also be preliminary and subject to change to the extent required, fixing the dates for the initial responses to requests for information or for detail drawings which will be required from the Architect/Engineer to allow the beginning of manufacture, installation of materials and for the completion of the various parts of the Work. The schedule shall be subject to review and approval by the Architect/Engineer. The Architect/Engineer shall, after review and agreement, furnish responses and detail drawings in accordance with that schedule. Any such schedule shall be prepared and approved in time to avoid delay, considering reasonable periods for review, manufacture or installation, but so long as the request for information schedule is being maintained, it shall not be deemed to transfer responsibility to the Contractor for errors or omissions in the Contract Documents where circumstances make timely review and performance impossible.

The Architect/Engineer shall not unreasonably withhold approval of the Contractor's schedules and shall inform the Contractor and the Principal Representative of the basis of any refusal to agree to the Contractor's schedules. The Principal Representative shall attempt to resolve any disagreements.

2. Schedule of Values

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and Principal Representative, for approval, and to the State Buildings Program when specifically requested, a complete itemized schedule of the values of the various parts of the Work, as estimated by the Contractor, aggregating the total price. The schedule of values shall be in such detail as the Architect/Engineer or the Principal Representative shall require, prepared on forms acceptable to the Principal Representative. It shall, at a minimum, identify on a separate line each division of the Specifications including the general conditions costs to be charged to the Project. The Contractor shall revise and resubmit the schedule of values for approval when, in the opinion of the Architect/Engineer or the Principal Representative, such resubmittal is required due to changes or modifications to the Contract Documents or the Contract sum.

The total cost of each line item so separately identified shall, when requested by the Architect/Engineer or the Principal Representative, be broken down into reasonable estimates of the value of:

- a. Material, which shall include the cost of material actually built into the Project plus any local sales or use tax paid thereon; and,
- b. Labor and other costs.

The cost of subcontracts shall be incorporated in the Contractor's schedule of values, and when requested by the Architect/Engineer or the Principal Representative, shall be separately shown as line items.

The Architect/Engineer shall review the proposed schedules and approve it after consultation with the Principal Representative, or advise the Contractor of any required revisions within ten (10) days of its receipt. In the event no action is taken on the submittal within ten days, the Contractor may utilize the schedule of values as its submittal for payment until it is approved or until revisions are requested.

When the Architect/Engineer deems it appropriate to facilitate certification of the amounts due to the Contractor, further breakdown of subcontracts, including breakdown by labor and materials, may be directed.

This schedule of values, when approved, will be used in preparing Contractor's applications for payment on State Form SC-7.2, Application for Payment.

3. Construction Schedules

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and the Principal Representative, and to the State Buildings Program when specifically requested, on a form acceptable to them, an overall timetable of the construction schedule for the Project. Unless the Supplementary General Conditions or the Specifications allow scheduling with bar charts or other less sophisticated scheduling tools, the Contractor's schedule shall be a critical-path method (CPM) construction schedule. The CPM schedule shall start with the date of the Notice to Proceed and include submittals activities, the various construction activities, change order Work (when applicable), close-out, testing, demonstration of equipment operation when called for in the Specifications, and acceptance. The CPM schedule shall at a minimum correlate to the schedule of values line items and shall be cost loaded if requested by the Architect/Engineer or Principal Representative. The completion time shall be the time specified in the Agreement and all Project scheduling shall allocate float utilizing the full period available for construction as specified in the Agreement on State Form SC 6.13, without indication of early completion, unless such earlier completion is approved in writing by the Principal Representative and State Building Programs.

The time shown between the starting and completion dates of the various elements within the construction schedule shall represent one hundred per cent (100%) completion of each element.

All other elements of the CPM schedule shall be as required by the Specifications. In addition, the Contractor shall submit monthly updates or more frequently, if required by the Principal Representative, updates of the construction schedule. These updates shall reflect the Contractor's "Work in place" progress.

When requested by the Architect/Engineer, the Principal Representative or the State Buildings Program, the Contractor shall revise the construction schedule to reflect changes in the schedule of values.

When the testing of materials is required by the Specifications, the Contractor shall also prepare and submit to the Architect/Engineer and the Principal Representative a schedule for testing in accordance with Article 14, Samples and Testing.

ARTICLE 13. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. SUBMITTAL PROCESS

The Contractor shall check and field verify all dimensions. The Contractor shall check, approve and submit to the Architect/Engineer in accordance with the schedule described in Article 12, Requests for Information and Schedules, all Shop Drawings, Product Data and Samples required by the specifications or required by the Contractor for the Work of the various trades. All Drawings and Product Data shall contain identifying nomenclature and each submittal shall be accompanied by a letter of transmittal identifying in detail all enclosures. The number of copies of Shop Drawings and Product Data to be submitted shall be as specified in the Specifications and if no number is specified then three copies shall be submitted.

The Architect/Engineer shall review and comment on the Shop Drawings and Product Data within the time provided in the agreed upon schedule for conformance with information given and the design concept expressed in, or reasonably inferred from, the Contract Documents. The nature of all corrections to be made to the Shop Drawings and Product Data, if any, shall be clearly noted, and the submittals shall be returned to the Contractor for such corrections. If a change in the scope of the Work is intended by revisions requested to any Shop Drawings and Product Data, the Contractor shall be requested to prepare a change proposal in accordance with Article 35, Changes In The Work. On resubmitted Shop Drawings, Product Data or Samples, the Contractor shall direct specific attention in writing on the transmittal cover to revisions other than those corrections requested by the Architect/Engineer on any previously checked submittal. The Architect/Engineer shall promptly review and comment on, and return, the resubmitted items.

The Contractor shall thereafter furnish such other copies in the form approved by the Architect/Engineer as may be needed for the prosecution of the Work.

B. FABRICATION AND ORDERING

Fabrication shall be started by the Contractor only after receiving approved Shop Drawings from the Architect/Engineer. Materials shall be ordered in accordance with approved Product Data. Work which is improperly fabricated, whether through incorrect Shop Drawings, faulty workmanship or materials, will not be acceptable.

C. **DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS**

The review and comments of the Architect/Engineer of Shop Drawings, Product Data or Samples shall not relieve the Contractor from responsibility for deviations from the Drawings or Specifications, unless he or she has in writing called the attention of the Architect/Engineer to such deviations at the time of submission, nor shall it relieve the Contractor from responsibility for errors of any sort in Shop Drawings or Product Data. Review and comments on Shop Drawings or Product Data containing identified deviations from the Contract Documents shall not be the basis for a Change Order or a claim based on a change in the scope of the Work unless Notice is given to the Architect/Engineer and Principal Representative of all additional costs, time and other impacts of the identified deviation by bring it to their attention in writing at the time the submittals are made, and any subsequent change in the Contract sum or the Contract time shall be limited to cost, time and impacts so identified.

D. **CONTRACTOR REPRESENTATIONS**

By preparing, approving, and/or submitting Shop Drawings, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto, and has checked and co-ordinated the information contained within each submittal with the requirements of the Work, the Project and the Contract Documents and prior reviews and approvals.

ARTICLE 14. SAMPLES AND TESTING

A. **SAMPLES**

The Contractor shall furnish for approval, with such promptness as to cause no delay in his or her Work or in that of any other Contractor, all Samples as directed by the Architect/Engineer. The Architect/Engineer shall check and approve such Samples, with reasonable promptness, but only for conformance with the design intent of the Contract Documents and the Project, and for compliance with any submission requirements given in the Contract Documents.

B. **TESTING - GENERAL**

The Contractor shall provide such equipment and facilities as the Architect/Engineer may require for conducting field tests and for collecting and forwarding samples to be tested. Samples themselves shall not be incorporated into the Work after approval without the permission of the Architect/Engineer.

All materials or equipment proposed to be used may be tested at any time during their preparation or use. The Contractor shall furnish the required samples without charge and shall give sufficient Notice of the placing of orders to permit the testing thereof. Products may be sampled either prior to shipment or after being received at the site of the Work.

Tests shall be made by an accredited testing laboratory. Except as otherwise provided in the Specifications, sampling and testing of all materials, and the laboratory methods and testing equipment, shall be in accordance with the latest standards and tentative methods of the American Society of Testing Materials (ASTM). The cost of testing which is in addition to the requirements of the Specifications shall be paid by the Contractor if so directed by the Architect/Engineer, and the Contract sum shall be adjusted accordingly by Change Order ; provided however, that whenever testing shows portions of the Work to be deficient, all costs of testing including that required to verify the adequacy of repair or replacement Work shall be the responsibility of the Contractor.

C. **TESTING - CONCRETE AND SOILS**

Unless otherwise specified or provided elsewhere in the Contract Documents, the Principal Representative will contract for and pay for the testing of concrete and for soils compaction testing through an independent laboratory or laboratories selected and approved by the Principal Representative. The Contractor shall assume the responsibility of arranging, scheduling and coordinating the concrete sample collection efforts and soils compaction efforts in an efficient and cost effective manner. Testing shall be performed in accordance with the requirements of the Specifications, and if no requirements are specified, the Contractor shall request instructions and testing shall be as directed by the Architect/Engineer or the soils engineer, as applicable, and in accordance with standard industry practices.

The Principal Representative and the Architect/Engineer shall be given reasonable advance notice of each concrete pour and reserve the right to either increase or decrease the number of cylinders or the frequency of tests.

Soil compaction testing shall be at random locations selected by the soils engineer. In general, soils compaction testing shall be as directed by the soils engineer and shall include all substrate prior to backfill or construction.

D. TESTING - OTHER

Additional testing required by the Specifications will be accomplished and paid for by the Principal Representative in a manner similar to that for concrete and soils unless noted otherwise in the Specifications. In any case, the Contractor will be responsible for arranging, scheduling and coordinating additional tests. Where the additional testing will be contracted and paid for by the Principal Representative the Contractor shall give the Principal Representative not less than one month advance written Notice of the date the first such test will be required.

ARTICLE 15. SUBCONTRACTS

A. CONTRACT PERFORMANCE OUTSIDE OF THE UNITED STATES OR COLORADO

After the contract is awarded, Contractor is required to provide written notice to the Principal Representative no later than twenty (20) days after deciding to perform services under this contract outside the United States or Colorado or to subcontract services under this contract to a subcontractor that will perform such services outside the United States or Colorado. The written notification must include, but need not be limited to, a statement of the type of services that will be performed at a location outside the United States or Colorado and the reason why it is necessary or advantageous to go outside the United States or Colorado to perform the services. All notices received by the State pursuant to outsourced services shall be posted on the Colorado Department of Personnel & Administration's website. If Contractor knowingly fails to notify the Principal Representative of any outsourced services as specified herein, the Principal Representative, at its discretion, may terminate this contract as provided in C.R.S. § 24-102-206 (4). (Does not apply to any project that receives federal moneys)

B. SUBCONTRACTOR LIST

Prior to the Notice to Proceed to commence construction, the Contractor shall submit to the Architect/Engineer, the Principal Representative and State Buildings Program a preliminary list of Subcontractors. It shall be as complete as possible at the time, showing all known Subcontractors planned for the Work. The list shall be supplemented as other Subcontractors are determined by the Contractor and any such supplemental list shall be submitted to the Architect/Engineer, the Principal Representative and State Buildings Program not less than ten (10) days before the Subcontractor commences Work.

C. SUBCONTRACTOR SUBSTITUTIONS

The Contractor's list shall include those Subcontractors, if any, which the Contractor indicated in its bid, would be employed for specific portions of the Work if such indication was requested in the bid documents issued by the State. The substitution of any Subcontractor listed in the Contractor's bid shall be justified in writing not less than ten (10) days after the date of the Notice to Proceed to commence construction, and shall be subject to the approval of the Principal Representative. For reasons such as the Subcontractor's refusal to perform as agreed, subsequent unavailability or later discovered bid errors, or other similar reasons, but not including the availability of a lower Subcontract price, such substitution may be approved. The Contractor shall bear any additional cost incurred by such substitutions.

D. CONTRACTOR RESPONSIBLE FOR SUBCONTRACTORS

The Contractor shall not employ any Subcontractor that the Architect/Engineer, within ten (10) days after the date of receipt of the Contractor's list of Subcontractors or any supplemental list, objects to in writing as being unacceptable to either the Architect/Engineer, the Principal Representative or State Buildings Program. If a Subcontractor is deemed unacceptable, the Contractor shall propose a

substitute Subcontractor and the Contract sum shall be adjusted by any demonstrated difference between the Subcontractor's bids, except where the Subcontractor has been debarred by the State or fails to meet qualifications of the Contract Documents to perform the Work proposed.

The Contractor shall be fully responsible to the Principal Representative for the acts and omissions of Subcontractors and of persons either directly or indirectly employed by them. All instructions or orders in respect to Work to be done by Subcontractors shall be given to the Contractor.

ARTICLE 16. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

The Contractor agrees to bind each Subcontractor to the terms of these General Conditions and to the requirements of the Drawings and Specifications, and any Addenda thereto, and also all the other Contract Documents, so far as applicable to the Work of such Subcontractor. The Contractor further agrees to bind each Subcontractor to those terms of the General Conditions which expressly require that Subcontractors also be bound, including without limitation, requirements that Subcontractors waive all rights of subrogation, provide adequate general commercial liability and property insurance, automobile insurance and workers' compensation insurance as provided in Article 25, Insurance.

Nothing contained in the Contract Documents shall be deemed to create any contractual relationship whatsoever between any Subcontractor and the State of Colorado acting by and through its Principal Representative.

ARTICLE 17. MUTUAL RESPONSIBILITY OF CONTRACTORS

Should the Contractor cause damage to any separate contractor on the Work, the Contractor agrees, upon due Notice, to settle with such contractor by agreement, if he or she will so settle. If such separate contractor sues the Principal Representative on account of any damage alleged to have been so sustained, the Principal Representative shall notify the Contractor, who shall defend such proceedings if requested to do so by Principal Representative. If any judgment against the Principal Representative arises there from, the Contractor shall pay or satisfy it and pay all costs and reasonable attorney fees incurred by the Principal Representative, in accordance with Article 52C, Indemnification, provided the Contractor was given due Notice of an opportunity to settle.

ARTICLE 18. SEPARATE CONTRACTS

The Principal Representative reserves the right to enter into other contracts in connection with the Project or the Contract. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate his or her Work with theirs. If any part of the Contractor's Work depends, for proper execution or results, upon the Work of any other contractor, the Contractor shall inspect and promptly report to the Architect/Engineer any defects in such Work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's Work as fit and proper for the reception of Work, except as to defects which may develop in the other Contractor's Work after the execution of the Contractor's Work.

To insure the proper execution of subsequent Work, the Contractor shall measure Work already in place and shall at once report to the Architect/Engineer any discrepancy between the executed Work and the Drawings.

ARTICLE 19. USE OF PREMISES

The Contractor shall confine apparatus, the storage of materials and the operations of workmen to limits indicated by law, ordinances, permits and any limits lines shown on the Drawings. The Contractor shall not unreasonably encumber the premises with materials.

The Contractor shall enforce all of the Architect/Engineer's instructions and prohibitions regarding, without limitation, such matters as signs, advertisements, fires and smoking.

ARTICLE 20. CUTTING, FITTING OR PATCHING

The Contractor shall do all cutting, fitting or patching of Work that may be required to make its several parts come together properly and fit it to receive or be received by Work of other Contractors shown upon, or reasonably inferred from, the Drawings and Specifications for the complete structure, and shall provide for such finishes to patched or fitted Work as the Architect/Engineer may direct. The Contractor shall not endanger any Work by cutting, excavating or otherwise altering the Work and shall not cut or alter the Work of any other Contractor save with the consent of the Architect/Engineer.

ARTICLE 21. UTILITIES

A. TEMPORARY UTILITIES

Unless otherwise specifically stated in the Specifications or on the Drawings, the Principal Representative shall be responsible for the locations of all utilities as shown on the Drawings or indicated elsewhere in the Specifications, subject to the Contractor's compliance with all statutory or regulatory requirements to call for utility locates. When actual conditions deviate from those shown the Contractor shall comply with the requirements of Article 37, Differing Site Conditions. The Contractor shall provide and pay for the installation of all temporary utilities required to supply all the power, light and water needed by him and other Contractors for their Work and shall install and maintain all such utilities in such manner as to protect the public and Workmen and conform with any applicable laws and regulations. Upon completion of the Work, he or she shall remove all such temporary utilities from the site. The Contractor shall pay for all consumption of power, light and water used by him or her and the other Contractors, without regard to whether such items are metered by temporary or permanent meters. The Superintendent shall have full authority over all trades and Subcontractors at any tier to prevent waste. The cut-off date on permanent meters shall be either the agreed date of the date of the Notice of Substantial Completion or the Notice of Approval of Occupancy/Use of the Project.

B. PROTECTION OF EXISTING UTILITIES

Where existing utilities, such as water mains, sanitary sewers, storm sewers and electrical conduits, are shown on the Drawings, the Contractor shall be responsible for the protection thereof, without regard to whether any such utilities are to be relocated or removed as a part of the Work. If any utilities are to be moved, the moving must be conducted in such manner as not to cause undue interruption or delay in the operation of the same.

C. CROSSING OF UTILITIES

When new construction crosses highways, railroads, streets, or utilities under the jurisdiction of State, city or other public agency, public utility or private entity, the Contractor shall secure proper written permission before executing such new construction. The Contractor will be required to furnish a proper release before final acceptance of the Work.

ARTICLE 22. UNSUITABLE CONDITIONS

The Contractor shall not Work at any time, or permit any Work to be done, under any conditions contrary to those recommended by manufacturers or industry standards which are otherwise proper, unsuited for proper execution, safety and performance. Any cost caused by ill-timed Work shall be borne by the Contractor unless the timing of such Work shall have been directed by the Architect/Engineer or the Principal Representative, after the award of the Contract, and the Contractor provided Notice of any additional cost.

ARTICLE 23. TEMPORARY FACILITIES

A. OFFICE FACILITIES

The Contractor shall provide and maintain without additional expense for the duration of the Project temporary office facilities, as required and as specified, for its own use and the use of the Architect/Engineer, representatives of the Principal Representative and State Buildings Program.

B. TEMPORARY HEAT

The Contractor shall furnish and pay for all the labor, facilities, equipment, fuel and power necessary to supply temporary heating, ventilating and air conditioning, except to the extent otherwise specified,

and shall be responsible for the installation, operation, maintenance and removal of such facilities and equipment. Unless otherwise specified, the permanent HVAC system shall not be used for temporary heat in whole or in part. If the Contractor desires to put the permanent system into use, in whole or in part, the Contractor shall set it into operation and furnish the necessary fuel and manpower to safely operate, protect and maintain that HVAC system. Any operation of all or any part of the permanent HVAC system including operation for testing purposes shall not constitute acceptance of the system, nor shall it relieve the Contractor of his or her one-year guarantee of the system from the date of the Notice of Substantial Completion of the entire Project, and if necessary due to prior operation, the Contractor shall provide manufacturers' extended warranties from the date of the Contractor's use prior to the date of the Notice of Substantial Completion.

C. WEATHER PROTECTION

The Contractor shall, at all times, provide protection against weather, so as to maintain all Work, materials, apparatus and fixtures free from injury or damages.

D. DUST PARTITIONS

If the Work involves Work in an occupied existing building, the Contractor shall erect and maintain during the progress of the Work, suitable dust-proof temporary partitions, or more permanent partitions as specified, to protect such building and the occupants thereof.

E. BENCH MARKS

The Contractor shall maintain any site bench marks provided by the Principal Representative and shall establish any additional benchmarks specified by the Architect/Engineer as necessary for the Contractor to layout the Work and ascertain all grades and levels as needed.

F. SIGN

The Contractor shall erect and permit one 4' x 8' sign only at the site to identify the Project as specified or directed by the Architect/Engineer which shall be maintained in good condition during the life of the Project.

G. SANITARY PROVISION

The Contractor shall provide and maintain suitable, clean, temporary sanitary toilet facilities for any and all workmen engaged on the Work, for the entire construction period, in strict compliance with the requirement of all applicable codes, regulations, laws and ordinances, and no other facilities, new or existing, may be used by any person on the Project. When the Project is complete the Contractor shall promptly remove them from the site, disinfect, and clean or treat the areas as required. If any new construction surfaces in the Project other than the toilet facilities provided for herein are soiled at any time, the entire areas so soiled shall be completely removed from the Project and rebuilt. In no event may present toilet facilities of any existing building at the site of the Work be used by employees of any contractor.

ARTICLE 24. CLEANING UP

The Contractor shall keep the building and premises free from all surplus material, waste material, dirt and rubbish caused by employees or Work, and at the completion of the Work shall remove all such surplus material, waste material, dirt, and rubbish, as well as all tools, equipment and scaffolding, and shall wash and clean all window glass and plumbing fixtures, perform cleanup and cleaning required by the Specifications and leave all of the Work clean unless more exact requirements are specified.

ARTICLE 25. INSURANCE

A. GENERAL

The Contractor shall procure and maintain all insurance requirements and limits as set forth below, at his or her own expense, for the length of time set forth in Contract requirements. The Contractor shall continue to provide evidence of such coverage to State of Colorado on an annual basis during the aforementioned period including all of the terms of the insurance and indemnification requirements of this agreement. All below insurance policies shall include a provision preventing cancellation without thirty (30) days' prior notice by certified mail. A completed Certificate of Insurance shall be filed with

the Principal Representative and State Buildings Program within ten (10) days after the date of the Notice of Award, said Certificate to specifically state the inclusion of the coverages and provisions set forth herein and shall state whether the coverage is "claims made" or "per occurrence".

B. COMMERCIAL GENERAL LIABILITY INSURANCE (CGL)

This insurance must protect the Contractor from all claims for bodily injury, including death and all claims for destruction of or damage to property (other than the Work itself), arising out of or in connection with any operations under this Contract, whether such operations be by the Contractor or by any Subcontractor under him or anyone directly or indirectly employed by the Contractor or by a Subcontractor. All such insurance shall be written with limits and coverages as specified below and shall be written on an occurrence form.

General Aggregate	\$2,000,000
Products – Completed Operations Aggregate	\$2,000,000
Each Occurrence	\$1,000,000
Personal Injury	\$1,000,000

The following coverages shall be included in the CGL:

1. Per project general aggregate (CG 25 03 or similar)
2. Additional Insured status in favor of the State of Colorado and any other parties as outlined in The Contract and must include both ONGOING Operations AND COMPLETED Operations per CG2010 10/01 and CG 2037 10/01 or equivalent as permitted by law.
3. The policy shall be endorsed to be **primary and non-contributory** with any insurance maintained by Additional Insureds.
4. A waiver of Subrogation in favor of all Additional Insured parties.
5. Personal Injury Liability
6. Contractual Liability coverage to support indemnification obligation per Article 53.I
7. Explosion, collapse and underground (xcu)

The following exclusionary endorsements are prohibited in the CGL policy:

1. Damage to Work performed by Subcontractor/Vendor (CG 22-94 or similar)
2. Contractual Liability Coverage Exclusion modifying or deleting the definition of an "insured contract" from the unaltered SO CG 0001 1001 policy from (CG 24 26 or similar)
3. If applicable to the Work to be performed: Residential or multi-family
4. If applicable to the Work to be performed: Exterior insulation finish systems
5. If applicable to the Work to be performed: Subsidence or Earth Movement

The Contractor shall maintain general liability coverage including Products and Completed Operations insurance, and the Additional Insured with primary and non-contributory coverage as specified in this Contract for three (3) years after completion of the project.

C. AUTOMOBILE LIABILITY INSURANCE and business auto liability covering liability arising out of any auto (including owned, hired and non-owned autos).

Combined Bodily Injury and Property Damage Liability
(Combined Single Limit): \$1,000,000 each accident

Coverages:
Specific waiver of subrogation

D. WORKERS' COMPENSATION INSURANCE

The Contractor shall procure and maintain Workers' Compensation Insurance at his or her own expense during the life of this Contract, including occupational disease provisions for all employees per statutory requirements. Policy shall contain a waiver of subrogation in favor of the State of Colorado.

The Contractor shall also require each Subcontractor to furnish Workers' Compensation Insurance, including occupational disease provisions for all of the latter's employees, and to the extent not furnished, the Contractor accepts full liability and responsibility for Subcontractor's employees.

In cases where any class of employees engaged in hazardous Work under this Contract at the site of the Project is not protected under the Workers' Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide, adequate and suitable insurance for the protection of employees not otherwise protected.

E. UMBRELLA LIABILITY INSURANCE (for construction projects exceeding \$10,000,000, provide the following coverage):

The Contractor shall maintain umbrella/excess liability insurance on an occurrence basis in excess of the underlying insurance described in Section B-D above. Coverage shall follow the terms of the underlying insurance, included the additional insured and waiver of subrogation provisions. The amounts of insurance required in Sections above may be satisfied by the Contractor purchasing coverage for the limits specified or by any combination of underlying and umbrella limits, so long as the total amount of insurance is not less than the limits specified in each section previously mentioned.

Each occurrence	\$5,000,000
Aggregate	\$5,000,000

F. BUILDER'S RISK INSURANCE

Unless otherwise expressly stated in the Supplementary General Conditions (e.g. where the State elects to provide for projects with a completed value of less than \$1,000,000), the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property, or the Date of Notice specified on the Notice of Acceptance, State Form SBP-6.27 or whichever is later.

This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project as named insureds.

All associated deductibles shall be the responsibility of the Contractor. Such policy may have a deductible clause but not to exceed ten thousand dollars (\$10,000.00).

Property insurance shall be on an "all risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, false Work, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

Contractor shall maintain Builders Risk coverage including partial use by Owner.

The Contractor shall waive all rights of subrogation as regards the State of Colorado and the Principal Representative, its officials, its officers, its agents and its employees, all while acting within the scope and course of their employment For damages caused by fire or thoeer causes of loss to the extent covered by property insurance obtained pursuant to this Section or other property insurance applicable to the Work. The Contractor shall require all Subcontractors at any tier to similarly waive all such rights of subrogation and shall expressly include such a waiver in all subcontracts.

Upon request, the amount of such insurance shall be increased to include the cost of any additional Work to be done on the Project, or materials or equipment to be incorporated in the Project, under other independent contracts let or to be let. In such event, the Contractor shall be reimbursed for this cost as his or her share of the insurance in the same ratio as the ratio of the insurance represented by such independent contracts let or to be let to the total insurance carried.

The Principal Representative, with approval of the State Controller, shall have the power to adjust and settle any loss. Unless it is agreed otherwise, all monies received shall be applied first on rebuilding or repairing the destroyed or injured Work.

G. POLLUTION LIABILITY INSURANCE

If Contractor is providing directly or indirectly Work with pollution/environmental hazards, the Contractor must provide or cause those conducting the Work to provide Pollution Liability Insurance coverage. Pollution Liability policy must include contractual liability coverage. State of Colorado must be included as additional insureds on the policy. The policy limits shall be in the amount of \$1,000,000 with maximum deductible of \$25,000 to be paid by the Subcontractor/Vendor.

H. ADDITIONAL MISCELLANEOUS INSURANCE PROVISIONS

Certificates of Insurance and/or insurance policies required under this Contract shall be subject to the following stipulations and additional requirements:

1. Any and all deductibles or self-insured retentions contained in any Insurance policy shall be assumed by and at the sole risk of the Contractor;
2. If any of the said policies shall fail at any time to meet the requirements of the Contract Documents as to form or substance, or if a company issuing any such policy shall be or at any time cease to be approved by the Division of Insurance of the State of Colorado, or be or cease to be in compliance with any stricter requirements of the Contract Documents, the Contractor shall promptly obtain a new policy, submit the same to the Principal Representative and State Building Programs for approval if requested, and submit a Certificate of Insurance as hereinbefore provided. Upon failure of the Contractor to furnish, deliver and maintain such insurance as provided herein, this Contract, in the sole discretion of the State of Colorado, may be immediately declared suspended, discontinued, or terminated. Failure of the Contractor in obtaining and/or maintaining any required insurance shall not relieve the Contractor from any liability under the Contract, nor shall the insurance requirements be construed to conflict with the obligations of the Contractor concerning indemnification;
3. All requisite insurance shall be obtained from financially responsible insurance companies, authorized to do business in the State of Colorado and acceptable to the Principal Representative;
4. Receipt, review or acceptance by the Principal Representative of any insurance policies or certificates of insurance required by this Contract shall not be construed as a waiver or relieve the Contractor from its obligation to meet the insurance requirements contained in these General Conditions.

ARTICLE 26. CONTRACTOR'S PERFORMANCE AND PAYMENT BONDS

The Contractor shall furnish a Performance Bond and a Labor and Material Payment Bond on State Forms SC-6.22, Performance Bond, and SC-6.221, Labor and Material Payment Bond, or such other forms as State Buildings Program may approve for the Project, executed by a corporate Surety authorized to do business in the State of Colorado and in the full amount of the Contract sum. The expense of these bonds shall be borne by the Contractor and the bonds shall be filed with State Buildings Program.

If, at any time, a Surety on such a bond is found to be, or ceases to be in strict compliance with any qualification requirements of the Contract Documents or the bid documents, or loses its right to do business in the State of Colorado, another Surety will be required, which the Contractor shall furnish to State Buildings Program within ten (10) days after receipt of Notice from the State or after the Contractor otherwise becomes aware of such conditions.

ARTICLE 27. LABOR AND WAGES

In accordance with laws of Colorado, C.R.S. § 8-17-101(1), as amended, Colorado labor shall be employed to perform at least eighty percent of the Work. If the Federal Davis-Bacon Act shall be applicable to the Project, as indicated in Article 6B (Design/Bid/Build Agreement SC-6.21), Modification of Article 27, the minimum wage rates to be paid on the Project will be specified in the Contract Documents.

ARTICLE 28. ROYALTIES AND PATENTS

The Contractor shall be responsible for assuring that all rights to use of products and systems have been properly arranged and shall take such action as may be necessary to avoid delay, at no additional charge to the Principal Representative, where such right is challenged during the course of the Work. The Contractor shall pay all royalties and license fees required to be paid and shall defend all suits or claims for infringement of any patent rights and shall save the State of Colorado harmless from loss on account thereof, in accordance with Article 52C, Indemnification; provided, however, the Contractor shall not be responsible for such loss or defense for any copyright violations contained in the Contract Documents prepared by the Architect/Engineer or the Principal Representative of which the Contractor is unaware, or for any patent violations based on specified processes that the Contractor is unaware are patented or that the Contractor should not have had reason to believe were patented.

ARTICLE 29. ASSIGNMENT

Except as otherwise provided hereafter the Contractor shall not assign the whole or any part of this Contract without the written consent of the Principal Representative. This provision shall not be construed to prohibit assignments of the right to payment to the extent permitted by C.R.S. § 4-9-406, et. seq., as amended, provided that written Notice of assignment adequate to identify the rights assigned is received by the Principal Representative and the controller for the agency, department, or institution executing this Contract (as distinguished from the State Controller). Such assignment of the right to payment shall not be deemed valid until receipt by the Principal Representative and such controller and the Contractor assumes the risk that such written Notice of assignment is received by the Principal Representative and the controller for the agency, department, or institution involved. In case the Contractor assigns all or part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to all claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract, whether said service or materials were supplied prior to or after the assignment. Nothing in this Article shall be deemed a waiver of any other defenses available to the State against the Contractor or the assignee.

ARTICLE 30. CORRECTION OF WORK BEFORE ACCEPTANCE

The Contractor shall promptly remove from the premises all Work or materials condemned or declared irreparably defective as failing to conform to the Contract Documents on receipt of written Notice from the Architect/Engineer or the Principal Representative, whether incorporated in the Work or not. If such materials shall have been incorporated in the Work, or if any unsatisfactory Work is discovered, the Contractor shall promptly replace and re-execute his or her Work in accordance with the requirements of the Contract Documents without expense to the Principal Representative, and shall also bear the expense of making good all Work of other contractors destroyed or damaged by the removal or replacement of such defective material or Work.

Should any defective Work or material be discovered during the process of construction, or should reasonable doubt arise as to whether certain material or Work is in accordance with the Contract Documents, the value of such defective or questionable material or Work shall not be included in any

application for payment, or if previously included, shall be deducted by the Architect/Engineer from the next application submitted by the Contractor.

If the Contractor does not perform repair, correction and replacement of defective Work, in lieu of proceeding by issuance of a Notice of intent to remove condemned Work as outlined above, the Principal Representative may, not less than seven (7) days after giving the original written Notice of the need to repair, correct, or replace defective Work, deduct all costs and expenses of replacement or correction as instructed by the Architect/Engineer from the Contractor's next application for payment in addition to the value of the defective Work or material. The Principal Representative may also make an equitable deduction from the Contract sum by unilateral Change Order, in accordance with Article 33, Payments Withheld and Article 35, Changes In The Work.

If the Contractor does not remove such condemned or irreparably defective Work or material within a reasonable time, the Principal Representative may, after giving a second seven (7) day advance Notice to the Contractor and the Surety, remove them and may store the material at the Contractor's expense. The Principal Representative may accomplish the removal and replacement with its own forces or with another Contractor. If the Contractor does not pay the expense of such removal and pay all storage charges within ten (10) days thereafter, the Principal Representative may, upon ten (10) days' written Notice, sell such material at auction or at private sale and account for the net proceeds thereof, after deducting all costs and expenses which should have been borne by the Contractor. If the Contractor shall commence and diligently pursue such removal and replacement before the expiration of the seven day period, or if the Contractor shall show good cause in conjunction with submittal of a revised CPM schedule showing when the Work will be performed and why such removal of condemned Work should be scheduled for a later date, the Principal Representative shall not proceed to remove or replace the condemned Work.

If the Contractor disagrees with the Notice to remove Work or materials condemned or declared irreparably defective, the Contractor may request facilitated negotiation of the issue and the Principal Representative's right to proceed with removal and to deduct costs and expenses of repair shall be suspended and tolled until such time as the parties meet and negotiate the issue

During construction, whenever the Architect/Engineer has advised the Contractor in writing, in the Specifications, by reference to Article 6, Architect/Engineer Decisions And Judgments, of these General Conditions or elsewhere in the Contract Documents of a need to observe materials in place prior to their being permanently covered up, it shall be the Contractor's responsibility to notify the Architect/Engineer at least forty-eight (48) hours in advance of such covering operation. If the Contractor fails to provide such notification, Contractor shall, at his or her expense, uncover such portions of the Work as required by the Architect/Engineer for observation, and reinstall such covering after observation. When a covering operation is continued from day to day, notification of the commencement of a single continuing covering operation shall suffice for the activity specified so long as it proceeds regularly and without interruption from day to day, in which event the Contractor shall coordinate with the Architect/Engineer regarding the continuing covering operation.

ARTICLE 31. APPLICATIONS FOR PAYMENTS

A. CONTRACTOR'S SUBMITTALS

On or before the first day of each month and no more than five days prior thereto, the Contractor may submit applications for payment for the Work performed during such month covering the portion of the Work completed as of the date indicated, and payments on account of this Contract shall be due per § 24-30-202(24) (correct notice of amount due), within forty-five (45) days of receipt by the Principal Representative of application for payments that have been certified by the Architect/Engineer. The Contractor shall submit the application for payment to the Architect/Engineer on State forms SBP-7.2, Certificate for Contractor's Payment, or such other format as the State Buildings Program shall approve, in an itemized format in accordance with the schedule of values or a cost loaded CPM schedule when required, supported to the extent reasonably required by the Architect/Engineer or the Principal Representative by receipts or other vouchers, showing payments for materials and labor, prior payments and payments to be made to Subcontractors and such other evidence of the Contractor's right to payments as the Architect/Engineer or Principal Representative may direct.

If payments are made on account of materials not incorporated in the Work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedure as will establish the Principal Representative's title to such material or otherwise adequately protect the Principal Representative's interests, and shall provide proof of insurance whenever requested by the Principal Representative or the Architect/Engineer, and shall be subject to the right to inspect the materials at the request of either the Architect/Engineer or the Principal Representative.

All applications for payment, except the final application, and the payments there under, shall be subject to correction in the next application rendered following the discovery of any error.

B. ARCHITECT/ENGINEER CERTIFICATION

In accordance with the Architect/Engineer's agreement with the Principal Representative, the Architect/Engineer after appropriate observation of the progress of the Work shall certify to the Principal Representative the amount that the Contractor is entitled to, and forward the application to the Principal Representative. If the Architect/Engineer certifies an amount different from the amount requested or otherwise alters the Contractor's application for payment, a copy shall be forwarded to the Contractor.

If the Architect/Engineer is unable to certify all or portions of the amount requested due to the absence or lack of required supporting evidence, the Architect/Engineer shall advise the Contractor of the deficiency. If the deficiency is not corrected at the end of ten (10) days, the Architect/Engineer may either certify the remaining amounts properly supported to which the Contractor is entitled, or return the application for payment to the Contractor for revision with a written explanation as to why it could not be certified.

C. RETAINAGE WITHHELD

Unless otherwise provided in the Supplementary General Conditions, an amount equivalent to five percent (5%) of the amount shown to be due the Contractor on each application for payment shall be withheld until the Work required by the Contract has been performed. The withheld percentage of the contract price of any such Work, improvement, or construction shall be administered according to § 24-91-101, et seq., C.R.S., as amended, and except as provided in § 24-91-103, C.R.S., as amended, and Article 31D, shall be retained until the Work or discrete portions of the Work, have been completed satisfactorily, finally or partially accepted, and advertised for final settlement as further provided in Article 41.

D. RELEASE OF RETAINAGE

The Contractor may, for satisfactory and substantial reasons shown to the Principal Representative's satisfaction, make a written request to the Principal Representative and the Architect/Engineer for release of part or all of the withheld percentage applicable to the Work of a Subcontractor which has completed the subcontracted Work in a manner finally acceptable to the Architect/Engineer, the Contractor, and the Principal Representative. Any such request shall be supported by a written approval from the Surety furnishing the Contractor's bonds and any surety that has provided a bond for the Subcontractor. The release of any such withheld percentage shall be further supported by such other evidence as the Architect/Engineer or the Principal Representative may require, including but not limited to, evidence of prior payments made to the Subcontractor, copies of the Subcontractor's contract with the Contractor, any applicable warranties, as-built information, maintenance manuals and other customary close-out documentation. Neither the Principal Representative nor the Architect Engineer shall be obligated to review such documentation nor shall they be deemed to assume any obligations to third parties by any review undertaken.

The Contractor's obligation under these General Conditions to guarantee Work for one year from the date of the Notice of Substantial Completion or the date of any Notice of Partial Substantial Completion of the applicable portion or phase of the Project, shall be unaffected by such partial

release; unless a Notice of Partial Substantial Completion is issued for the Work subject to the release of retainage.

Any rights of the Principal Representative which might be terminated by or from the date of any final acceptance of the Work, whether at common law or by the terms of this Contract, shall not be affected by such partial release of retainage prior to any final acceptance of the entire Project.

The Contractor remains fully responsible for the Subcontractor's Work and assumes any risk that might arise by virtue of the partial release to the Subcontractor of the withheld percentage, including the risk that the Subcontractor may not have fully paid for all materials, labor and equipment furnished to the Project.

If the Principal Representative considers the Contractor's request for such release satisfactory and supported by substantial reasons, the Architect/Engineer shall make a "final inspection" of the applicable portion of the Project to determine whether the Subcontractor's Work has been completed in accordance with the Contract Documents. A final punch list shall be made for the Subcontractor's Work and the procedures of Article 41, Completion, Final Inspection, Acceptance and Settlement, shall be followed for that portion of the Work, except that advertisement of the intent to make final payment to the Subcontractor shall be required only if the Principal Representative has reason to believe that a supplier or Subcontractor to the Subcontractor for which the request is made, may not have been fully paid for all labor and materials furnished to the Project.

ARTICLE 32. CERTIFICATES FOR PAYMENTS

State Form SBP-7.2, Certificate For Contractor's Payment, and its continuation detail sheets, when submitted, shall constitute the Certificate of Contractor's Application for Payment, and shall be a representation by the Contractor to the Principal Representative that the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and materials for which payment is requested have been incorporated into the Project except as noted in the application. If requested by the Principal Representative the Certificate of Contractor's Application for Payment shall be sworn under oath and notarized.

ARTICLE 33. PAYMENTS WITHHELD

The Architect/Engineer, the Principal Representative or State Buildings Program may withhold, or on account of subsequently discovered evidence nullify, the whole or any part of any application on account of, but not limited to any of the following:

1. Defective Work not remedied;
2. Claims filed or reasonable evidence indicating probable filing of claims;
3. Failure of the Contractor to make payments to Subcontractors for material or labor;
4. A reasonable doubt that the Contract can be completed for the balance of the contract price then unpaid;
5. Damage or injury to another contractor or any other person, persons or property except to the extent of coverage by a policy of insurance;
6. Failure to obtain necessary permits or licenses or to comply with applicable laws, ordinances, codes, rules or regulations or the directions of the Architect/Engineer;
7. Failure to submit a monthly construction schedule;
8. Failure of the Contractor to keep Work progressing in accordance with the time schedule;
9. Failure to keep a superintendent on the Work;
10. Failure to maintain as built drawings of the Work in progress;
11. Unauthorized deviations by the Contractor from the Contract Documents; or
12. On account of liquidated damages.

In addition, the Architect Engineer, Principal Representative or State Buildings Program may withhold or nullify the whole or any part of any application for any reason noted elsewhere in these General Conditions of the Contractor's Design/Bid/Build Agreement. Nullification shall mean reduction of amounts shown as previously paid on the application. The amount withheld or nullified may be in such amount as the

Architect/Engineer or the Principal Representative estimates to be required to allow the State to accomplish the Work, cure the failure and cover any damages or injuries, including an allowance for attorneys fees and costs where appropriate. When the grounds for such withholding or nullifying are removed, payment shall be made for the amounts thus withheld or nullified on such grounds.

ARTICLE 34. DEDUCTIONS FOR UNCORRECTED WORK

If the Architect/Engineer and the Principal Representative deem it inexpedient to correct Work damaged or not performed in accordance with the Contract Documents, the Principal Representative may, after consultation with the Architect/Engineer and ten (10) days' Notice to the Contractor of intent to do so, make reasonable reductions from the amounts otherwise due the Contractor on the next application for payment. Notice shall specify the amount or terms of any contemplated reduction. The Contractor may during this period correct or perform the Work. If the Contractor does not correct or perform the Work, an equitable deduction from the Contract sum shall be made by Change Order, in accordance with Article 35, Changes In The Work, unilaterally if necessary. If either party elects facilitation of this issue after Notice is given, the ten-day (10) notice period shall be extended and tolled until facilitation has occurred.

ARTICLE 35. CHANGES IN THE WORK

The Principal Representative may designate, without invalidating the Agreement, and with the approval of State Buildings Program and the State Controller, may order extra Work or make changes with or without the consent of the Contractor as hereafter provided, by altering, adding to or deducting from the Work, the Contract sum being adjusted accordingly. All such changes in the Work shall be within the general scope of and be executed under the conditions of the Contract, except that any claim for extension of time made necessary due to the change or any claim of other delay or other impacts caused by or resulting from the change in the Work shall be presented by the Contractor and adjusted by Change Order to the extent known at the time such change is ordered and before proceeding with the extra or changed Work. Any claims for extension of time or of delay or other impacts, and any costs associated with extension of time, delay or other impacts, which are not presented before proceeding with the change in the Work, and which are not adjusted by Change Order to the extent known, shall be waived.

The Architect/Engineer shall have authority to make minor changes in the Work, not involving extra cost, and not inconsistent with the intent of the Contract Documents, but otherwise, except in an emergency endangering life or property, no extra Work or change in the Contract Documents shall be made unless by 1) a written Change Order, approved by the Principal Representative, State Buildings Program, and the State Controller prior to proceeding with the changed Work; or 2) by an Emergency Field Change Order approved by the Principal Representative and State Buildings Program as hereafter provided in Article 35C, Emergency Field Ordered Changed Work; or 3) by an allocation in writing of any allowance already provided in the encumbered contract amount, the Contract sum being later adjusted to decrease the Contract sum by any unallocated or unexpended amounts remaining in such allowance. No change to the Contract sum shall be valid unless so ordered.

A. THE VALUE OF CHANGED WORK

1. The value of any extra Work or changes in the Work shall be determined by agreement in one or more of the following ways:
 - a. By estimate and acceptance of a lump-sum amount;
 - b. By unit prices specified in the Agreement, or subsequently agreed upon, that are extended by specific quantities;
 - c. By actual cost plus a fixed fee in a lump sum amount for profit, overhead and all indirect and off-site home office costs, the latter amount agreed upon in writing prior to starting the extra or changed Work.
2. Where the Contractor and the Principal Representative cannot agree on the value of extra Work, the Principal Representative may order the Contractor to perform the changes in the Work and a Change Order may be unilaterally issued based on an estimate of the change in the Work prepared by the Architect/Engineer. The value of the change in the Work shall be the Principal Representative's determination of the amount of equitable adjustment attributable to

the extra Work or change. The Principal Representative's determination shall be subject to appeal by the Contractor pursuant to the claims process in Article 36, Claims.

3. Except as otherwise provided in Article 35B, Detailed Breakdown, below, the Cost Principles of the Colorado Procurement Rules in effect on the date of this Contract, pursuant to § 24-107-101, C.R.S., as amended, shall govern all Contract changes.

B. DETAILED BREAKDOWN

In all cases where the value of the extra or changed Work is not known based on unit prices in the Contractor's bid or the Agreement, a detailed change proposal shall be submitted by the Contractor on a Change Order Proposal (SC-6.312), or in such other format as the State Buildings Program approves, with which the Principal Representative may require an itemized list of materials, equipment and labor, indicating quantities, time and cost for completion of the changed Work.

Such detailed change proposals shall be stated in lump sum amounts and shall be supported by a separate breakdown, which shall include estimates of all or part of the following when requested by the Architect/Engineer or the Principal Representative:

1. Materials, indicating quantities and unit prices including taxes and delivery costs if any (separated where appropriate into general, mechanical and electrical and/or other Subcontractors' Work; and the Principal Representative may require in its discretion any significant subcontract costs to be similarly and separately broken down).
2. Labor costs, indicating hourly rates and time and labor burden to include Social Security and other payroll taxes such as unemployment, benefits and other customary burdens.
3. Costs of project management time and superintendence time of personnel stationed at the site, and other field supervision time, but only where a time extension, other than a weather delay, is approved as part of the Change Order, and only where such project management time and superintendence time is directly attributable to and required by the change; provided however that additional cost of on-site superintendence shall be allowable whenever in the opinion of the Architect/Engineer the impact of multiple change requests to be concurrently performed will result in inadequate levels of supervision to assure a proper result unless additional superintendence is provided.
4. Construction equipment (including small tools). Expenses for equipment and fuel shall be based on customary commercially reasonable rental rates and schedules. Equipment and hand tool costs shall not include the cost of items customarily owned by workers.
5. Workers' compensation costs, if not included in labor burden.
6. The cost of commercial general liability and property damage insurance premiums but only to the extent charged the Contractor as a result of the changed Work.
7. Overhead and profit, as hereafter specified.
8. Builder's risk insurance premium costs.
9. Bond premium costs.
10. Testing costs not otherwise excluded by these General Conditions.
11. Subcontract costs.

Unless modified in the Supplementary General Conditions, overhead and profit shall not exceed the percentages set forth in the table below.

	OVERHEAD	PROFIT	COMMISSION
To the Contractor or to Subcontractors for the portion of Work performed with their own forces:	10%	5%	0%
To the Contractor or to Subcontractors for Work performed by others at a tier immediately below either of them:	5%	0%	5%

Overhead shall include: a) insurance premium for policies not purchased for the Project and itemized above, b) home office costs for office management, administrative and supervisory personnel and assistants, c) estimating and change order preparation costs, d) incidental job burdens, e) legal costs, f) data processing costs, g) interest costs on capital, h) general office expenses except those attributable to increased rental expenses for temporary facilities, and all other indirect costs, but shall not include the Social Security tax and other direct labor burdens. The term "Work" as used in the proceeding table shall include labor, materials and equipment and the "Commission" shall include all costs and profit for carrying the subcontracted Work at the tiers below except direct costs as listed in items 1 through 11 above if any.

On proposals for Work involving both additions and credits in the amount of the Contract sum, the overhead and profit will be allowed on the net increase only. On proposals resulting in a net deduct to the amount of the Contract sum, profit on the deducted amount shall be returned to the Principal Representative at fifty percent (50%) of the rate specified. The inadequacy of the profit specified shall not be a basis for refusal to submit a proposal.

Except in the case of Change Orders or Emergency Field Change Orders agreed to on the basis of a lump sum amount or unit prices as described in paragraphs 35A1 and 35A2 above, The Value of Changed Work, the Contractor shall keep and present a correct and fully auditable account of the several items of cost, together with vouchers, receipts, time cards and other proof of costs incurred, summarized on a Change Order form (SC-6.31) using such format for supporting documentation as the Principal Representative and State Buildings Program approve. This requirement applies equally to Work done by Subcontractors. Only auditable costs shall be reimbursable on Change Orders where the value is determined on the basis of actual cost plus a fixed fee pursuant to paragraph 35A3 above, or where unilaterally determined by the Principal Representative on the basis of an equitable adjustment in accordance with the Procurement Rules, as described above in Article 35A, The Value Of Changed Work.

Except for proposals for Work involving both additions and credits, changed Work shall be adjusted and considered separately for Work either added or omitted. The amount of adjustment for Work omitted shall be estimated at the time it is directed to be omitted, and when reasonable to do so, the agreed adjustment shall be reflected on the schedule of values used for the next Contractor's application for payment.

The Principal Representative reserves the right to contract with any person or firm other than the Contractor for any or all extra Work; however, unless specifically required in the Contract Documents, the Contractor shall have no responsibility without additional compensation to supervise or coordinate the Work of persons or firms separately contracted by the Principal Representative.

C. HAZARDOUS MATERIALS

1. The Principal Representative represents that it has undertaken an examination of the site of the Work and has determined that there are no hazardous substances, as defined below, which the Contractor could reasonably encounter in its performance of the Work. In the event the Principal Representative so discovers hazardous substances, the Principal Representative shall render harmless such hazards before the Contractor commences the Work.
2. In the event the Contractor encounters any materials reasonably believed to be hazardous substances which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Principal Representative, in writing. For purposes of this Agreement, "hazardous substances" shall include asbestos, lead, polychlorinated biphenyl (PCB) and any or all of those substances defined as "hazardous substance", "hazardous waste", or "dangerous or extremely hazardous wastes" as those terms are used in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), and shall also include materials regulated by the Toxic Substances Control Act (TSCA), the Clean Air Act, the Air

Quality Act, the Clean Water Act, and the Occupational Safety and Health Act. The Work in the affected area shall not therefore be resumed except by written agreement of the Principal Representative and the Contractor, if in fact materials that are hazardous substances have not been rendered harmless. The Work in the affected area shall be resumed only in the absence of the hazardous substances or when it has been rendered harmless or by written agreement of the Principal Representative and the Contractor.

- 3. The contractor shall not be required to perform Work without consent in any areas where it reasonably believes hazardous substances that have not been rendered harmless are present.**

D. EMERGENCY FIELD CHANGE ORDERED WORK

The Principal Representative, without invalidating the Agreement, and with the approval of State Buildings Program and without the approval of the State Controller, may order extra Work or make changes in the case of an emergency that is a threat to life or property or where the likelihood of delays in processing a normal Change Order will result in substantial delays and or significant cost increases for the Project. Emergency Field Orders are not to be used solely to expedite normal Change Order processing absent a clear showing of a high potential for significant and substantial cost or delay. Such changes in the Work may be directed through issuance of an Emergency Field Change Order signed by the Contractor, the Principal Representative (or by a designee specifically appointed to do so in writing), and approved by the Director of State Buildings Program or his or her delegate. The change shall be directed using an Emergency Field Change Order form (SC-6.31E).

If the amount of the adjustment of the Contract price and time for completion can be determined at the time of issuance of the Emergency Field Change Order, those adjustments shall be reflected on the face of the Emergency Field Change Order. Otherwise, the Emergency Field Change Order shall reflect a not to exceed (NTE) amount for any schedule adjustment (increasing or decreasing the time for completion) and an NTE amount for any adjustment to Contract sum, which NTE amount shall represent the maximum amount of adjustment to which the Contractor will be entitled, including direct and indirect costs of changed Work, as well as any direct or indirect costs attributable to delays, inefficiencies or other impacts arising out of the change. Emergency Field Change Orders directed in accordance with this provision need not bear the approval signatures of the State Controller.

On Emergency Field Change Orders where the price and schedule have not been finally determined, the Contractor shall submit final costs for adjustment as soon as practicable. No later than seven (7) days after issuance, except as otherwise permitted, and every seven days thereafter, the Contractor shall report all costs to the Principal Representative and the Architect/Engineer. The final adjustment of the Emergency Field Change Order amount and the adjustment to the Project time for completion shall be prepared on a normal Change Order from (SC-6.31) in accordance with the procedures described in Article 35A, The Value of Changed Work, and B, Detailed Breakdown, above. Unless otherwise provided in writing signed by the Director of State Buildings Program to the Principal Representative and the Contractor, describing the extent and limits of any greater authority, individual Emergency Field Change Orders shall not be issued for more than \$25,000, nor shall the cumulative value of Emergency Field Change Orders exceed an amount of \$100,000.

E. APPROPRIATION LIMITATIONS - § 24-91-103.6, C.R.S., as amended

The amount of money appropriated, as shown on the Contractor's Design/Bid/Build Agreement (SC 6.21), is equal to or in excess of the Contract amount. No Change Order, Emergency Field Change Order, or other type of order or directive shall be issued by the Principal Representative, or any agent acting on his or her behalf, which directs additional compensable Work to be performed, which Work causes the aggregate amount payable under the Contract to exceed the amount appropriated for the original Contract, as shown on the Agreement (SC-6.21), unless one of the following occurs: (1) the Contractor is provided written assurance from the Principal Representative that sufficient additional lawful appropriations exist to cover the cost of the additional Work; or (2) the Work is covered by a contractor remedy provision under the Contract, such as a claim for extra cost. By way of example only, no assurance is required for any order, directive or instruction by the Architect/Engineer or the

Principal Representative to perform Work which is determined to be within the performance required by the Contract Documents; the Contractor's remedy shall be as described elsewhere in these General Conditions.

Written assurance shall be in the form of an Amendment to the Contract reciting the source and amount of such appropriation available for the Project. No remedy granting provision of this Contract shall obligate the Principal Representative to seek appropriations to cover costs in excess of the amounts recited as available to pay for the Work to be performed.

ARTICLE 36. CLAIMS

It is the intent of these General Conditions to provide procedures for speedy and timely resolution of disagreements and disputes at the lowest level possible. In the spirit of on the job resolution of job site issues, the parties are encouraged to use the partnering processes of Article 2D, Partnering, Communications and Cooperation, before turning to the more formal claims processes described in this Article 36, Claims. The use of non-binding dispute resolution, whether through the formal processes described in Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, or through less formal alternative processes developed as part of a partnering plan, are also encouraged. Where such process cannot resolve the issues in dispute, the claims process that follows is intended to cause the issues to be presented, decided and where necessary, documented in close proximity to the events from which the issues arise. To that end, and in summary of the remedy granting process that follows commencing with the next paragraph of this Article 36, Claims, the Contractor shall 1) first, seek a decision by the Architect/Engineer, and 2) shall second, informally present the claim to Principal Representative as described hereafter, and 3) failing resolution in the field, give Notice of intent to exercise statutory rights of review of a formal contract controversy, and 4) seek resolution outside the Contract as provided by the Procurement Code.

If the Contractor claims that any instructions, by detailed drawings, or otherwise, or any other act or omission of the Architect/Engineer or Principal Representative affecting the scope of the Contractor's Work, involve extra cost, extra time or changes in the scope of the Work under this Contract, the Contractor shall have the right to assert a claim for such costs or time, provided that before either proceeding to execute such Work (except in an emergency endangering life or property), or filing a Notice of claim, the Contractor shall have obtained or requested a written decision of the Architect/Engineer following the procedures as provided in Article 6A and B, Architect/Engineer Decisions and Judgments, respectively; provided, however, that in the case of a directed change in the Work pursuant to Article 36A4, no written judgment or decision of the Architect/Engineer is required. If the Contractor is delayed by the lack of a response to a request for a decision by the Architect/Engineer, the Contractor shall give Notice in accordance with Article 38, Delays and Extensions of Time.

Unless it is the Architect/Engineer's judgment and determination that the Work is not included in the performance required by the Contract Documents, the Contractor shall proceed with the Work as originally directed. Where the Contractor's claim involves a dispute concerning the value of Work unilaterally directed pursuant to Article 35A3 the Contractor shall also proceed with the Work as originally directed while his or her claim is being considered.

The Contractor shall give the Principal Representative and the Architect/Engineer Notice of any claim promptly after the receipt of the Architect/Engineer's decision, but in no case later than three (3) business days after receipt of the Architect/Engineer's decision (or no later than ten (10) days from the date of the Contractor's request for a decision when the Architect/Engineer fails to decide as provided in Article 6). The Notice of claim shall state the grounds for the claim and the amount of the claim to the extent known in accordance with the procedures of Article 35, Changes In The Work. The period in which Notice must be given may be extended by the Principal Representative if requested in writing by the Contractor with good cause shown, but any such extension to be effective shall be in writing.

The Principal Representative shall respond in writing, with a copy to the Architect/Engineer, within a reasonable time, and except where a request for facilitation of negotiation has been made as hereafter provided, in no case later than seven (7) business days (or at such other time as the Contractor and

Principal Representative agree) after receipt of the Contractor's Notice of claim regarding such instructions or alleged act or omission. If no response to the Contractor's claim is received within seven (7) business days of Contractor's Notice (or at such other time as the Contractor and Principal Representative agree) and the instructions have not been retracted, it shall be deemed that the Principal Representative has denied the claim.

The Principal Representative may grant or deny the claim in whole or in part, and a Change Order shall be issued if the claim is granted. To the extent any portion of claim is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the Work be determined by any method allowed in Article 35A, The Value of Changed Work. Except in the case of a deemed denial, the Principal Representative shall provide a written explanation regarding any portion of the Contractor's claim that is denied.

If the Contractor disagrees with the Principal Representative's judgment and determination on the claim and seeks an equitable adjustment of the Contract sum or time for performance, he or she shall give Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy within ten (10) days of receipt of the Principal Representative's decision denying the claim. A "contract controversy," as such term is used in the Colorado Procurement Code, § 24-109-106, C.R.S., shall not arise until the initial claim process described above in this Article 36 has been properly exhausted by the Contractor. The Contractor's failure to proceed with Work directed by the Architect/Engineer or to exhaust the claim process provided above in this Article 36, shall constitute an abandonment of the claim by the Contractor and a waiver of the right to contest the decision in any forum.

At the time of filing the Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy, the Contractor may request that the Principal Representative defer a decision on the contract controversy until a later date or until the end of the Project. If the Principal Representative agrees, he or she shall so advise the Contractor in writing. If no such request is made, or if the Principal Representative does not agree to such a request, the Principal Representative shall render a written decision within twenty (20) business days and advise the Contractor of the reasons for any denial. Unless the claim has been decided by the Principal Representative (as opposed to delegates of the Principal Representative), the person who renders the decision on this statutory contract controversy shall not be the same person who decided the claim. To the extent any portion of the contract controversy is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the Work be determined by any method allowed in Article 35A, The Value of Changed Work. In the event of a denial the Principal Representative shall give Notice to the Contractor of his or her right to administrative and judicial reviews as provided in the Colorado Procurement Code, § 24-109-201 *et seq.*, C.R.S., as amended. If no decision regarding the contract controversy is issued within twenty (20) business days of the Contractor's giving Notice (or such other date as the Contractor and Principal Representative have agreed), and the instructions have not been retracted or the alleged act or omission have not been corrected, it shall be deemed that the Principal Representative has ruled by denial on the contract controversy. Except in the case of a deemed denial, the Principal Representative shall provide an explanation regarding any portion of the contract controversy that involves denial of the Contractor's claim.

Either the Contractor or the Principal Representative may request facilitation of negotiations concerning the claim or the contract controversy, and if requested, the parties shall consult and negotiate before the Principal Representative decides the issue. Any request for facilitation by the Contractor shall be made at the time of the giving of Notice of the claim or Notice of the contract controversy. Facilitation shall extend the time for the Principal Representative to respond by commencing the applicable period at the completion of the facilitated negotiation, which shall be the last day of the parties' meeting, unless otherwise agreed in writing.

Disagreement with the decision of the Architect Engineer, or the decision of the Principal Representative to deny any claim or denying the contract controversy, shall not be grounds for the Contractor to refuse to perform the Work directed or to suspend or terminate performance. During the period that any claim or contract controversy decision is pending under this Article 36, Claims, the Contractor shall proceed diligently with the Work directed.

In all cases where the Contractor proceeds with the Work and seeks equitable adjustment by filing a claim and or statutory appeal, the Contractor shall keep a correct account of the extra cost, in accordance with Article 35B, Detailed Breakdown supported by receipts. The Principal Representative shall be entitled to reject any claim or contract controversy whenever the foregoing procedures are not followed and such accounts and receipts are not presented.

The payments to the Contractor in respect of such extra costs shall be limited to reimbursement for the current additional expenditure by the Contractor made necessary by the change in the Work, plus a reasonable amount for overhead and profit, determined in accordance with Article 35B, Detailed Breakdown, determined solely with reference to the additional Work, if any, required by the change.

ARTICLE 37. DIFFERING SITE CONDITIONS

A. NOTICE IN WRITING

The Contractor shall promptly, and where possible before conditions are disturbed, give the Architect/Engineer and the Principal Representative Notice in writing of:

1. subsurface or latent physical conditions at the site differing materially from those indicated in or reasonably assumed from the information provided in the Contract Documents; and,
2. unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

The Architect/Engineer shall promptly investigate the conditions, and if it is found that such conditions do materially so differ and cause an increase or decrease in the Contractor's costs of performance of any part of the Work required by the Contract Documents, whether or not such Work is changed as a result of such conditions, an equitable adjustment shall be made and the Contract sum shall be modified in accordance with Article 35, Changes In The Work.

If the time required for completion of the Work affected by such materially differing conditions will extend the Work on the critical path as indicated on the CPM schedule, the time for completion shall also be equitably adjusted.

B. LIMITATIONS

No claim of the Contractor under this clause shall be allowed unless the Contractor has given the Notice required in Article 37A, Notice In Writing, above. The time prescribed for presentation and adjustment in Articles 36, Claims and 38, Delays And Extensions Of Time, shall be reasonably extended by the State to the extent required by the nature of the differing conditions; provided, however, that even when so extended no claim by the Contractor for an equitable adjustment hereunder shall be allowed if not quantified and presented prior to the date the Contractor requests a final inspection pursuant to Article 41A, Notice Of Completion.

ARTICLE 38. DELAYS AND EXTENSIONS OF TIME

If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the State of Colorado or the Architect/Engineer, or of any employee or agent of either, or by any separately employed Contractor or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or any other causes beyond the Contractor's control, including weather delays as defined below, the time of Completion of the Work shall be extended for a period equal to such portion of the period of delays directly affecting the completion of the Work as the Contractor shall be able to show he or she could not have avoided by the exercise of due diligence.

The Contractor shall provide Notice in writing to the Architect/Engineer, the Principal Representative and State Buildings Program within three (3) business days from the beginning of such delay and shall file a written claim for an extension of time within seven (7) business days after the period of such delay has ceased, otherwise, any claim for an extension of time is waived.

Provided that the Contractor has submitted reasonable schedules for approval when required by Article 12, Requests for Information and Schedules, if no schedule is agreed to fixing the dates on which the responses to requests for information or detail drawings will be needed, or Shop Drawings, Product Data or Samples are to be reviewed as required or allowed by Article 12B, Schedules, no extension of time will be allowed for the Architect/ Engineer's failure to furnish such detail drawings as needed, or for the failure to initially review Shop Drawings, Product Data or Samples, except in respect of that part of any delay in furnishing detail drawings or instructions extending beyond a reasonable period after written demand for such detailed drawings or instructions is received by the Architect/Engineer. In any event, any claim for an extension of time for such cause will be recognized only to the extent of delay directly caused by failure to furnish detail drawings or instructions or to review Shop Drawings, Product Data or Samples pursuant to schedule, after such demand.

All claims for extension of time due to a delay claimed to arise or result from ordered changes in the scope of the Work, or due to instructions claimed to increase the scope of the Work, shall be presented to the Architect/Engineer, the Principal Representative and State Buildings Program as part of a claim for extra cost, if any, in accordance with Article 36, Claims, and in accordance with the Change Order procedures required by Article 35, Changes In The Work.

Except as otherwise provided in this paragraph, no extension of time shall be granted when the Contractor has failed to utilize a CPM schedule or otherwise identify the Project's critical path as specified in Article 12, Requests for Information and Schedules, or has elected not to do so when allowed by the Supplementary General Conditions or the Specifications to use less sophisticated scheduling tools, or has failed to maintain such a schedule. Delay directly affecting the completion of the Work shall result in an extension of time only to the extent that completion of the Work was affected by impacts to the critical path shown on Contractor's CPM schedule. Where the circumstances make it indisputable in the opinion of the Architect/Engineer that the delay affected the completion of the Work so directly that the additional notice of the schedule impact by reference to a CPM schedule was unnecessary, a reasonable extension of time may be granted.

Extension of the time for completion of the Work will be granted for delays due to weather conditions only when the Contractor demonstrates that such conditions were more severe and extended than those reflected by the ten-year average for the month, as evidenced by the Climatological Data, U. S. Department of Commerce, for the Project area.

Extensions of the time for completion of the Work due to weather will be granted on the basis of one and three tenths (1.3) calendar days for every day that the Contractor would have Worked but was unable to Work, with each separate extension figured to the nearest whole calendar day.

For weather delays and delays caused by events, acts or omissions not within the control of the Principal Representative or any person acting on the Principal Representative's behalf, the Contractor shall be entitled to an extension of time only and shall not be entitled to recovery of additional cost due to or resulting from such delays. This Article does not, however, preclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS

The Contractor and Principal Representative agree to designate one or more mutually acceptable persons willing and able to facilitate negotiations and communications for the resolution of conflicts, disagreements or disputes between them at the specific request of either party with regard to any Project decision of either of them or any decision of the Architect/Engineer. The designation of such person(s) shall not carry any obligation to use their services except that each party agrees that if the other party requests the intervention of such person(s) with respect to any such conflict, dispute or disagreement, the non-requesting party shall participate in good faith attempts to negotiate a resolution of the issue in dispute. If the parties cannot agree on a mutually acceptable person to serve in this capacity one shall be so appointed; provided, however, that either party may request the director of State Buildings Program to appoint such a person, who, if appointed, shall be accepted for this purpose by both the Contractor and the Principal Representative.

The cost, if any, of the facilitative services of the person(s) so designated shall be shared if the parties so agree in any partnering plan; or in the absence of agreement the cost shall be borne by the party requesting the facilitation of negotiation.

Any dispute, claim, question or disagreement arising from or relating to the Contract or an alleged breach of the Contract may be subject to a request by either party for facilitated negotiation subject to the limitations hereafter listed, and the parties shall participate by consultation and negotiation with each other, as guided by the facilitator and with recognition of their mutual interests, in an attempt to reach an equitable solution satisfactory to both parties.

The obligation to participate in facilitated negotiations shall be as described above and elsewhere in these General Conditions, as by way of example in Article 36, Claims, or Article 34, Deductions for Uncorrected Work and to the extent not more particularly described or limited elsewhere, each party's obligations shall be as follows:

1. a party shall not initiate communication with the facilitator regarding the issues in dispute; except that any request for facilitation shall be made in writing with copies sent, faxed or delivered to the other party;
2. a party shall prepare a brief written description of its position if so requested by the facilitator (who may elect to first discuss the parties' positions with each party separately in the interest of time and expense);
3. a party shall respond to any reasonable request for copies of documents requested by the facilitator, but such requests, if voluminous, may consist of an offer to allow the facilitator access to the parties' documents;
4. a party shall review any meeting agenda proposed by a facilitator and endeavor to be informed on the subjects to be discussed;
5. a party shall meet with the other party and the facilitator at a mutually acceptable place and time, or, if none can be agreed to, at the time and place designated by the facilitator for a period not to exceed four hours unless the parties agree to a longer period;
6. a party shall endeavor to assure that any facilitation meeting shall be attended by any other persons in their employ that the facilitator requests be present, if reasonably available, including the Architect/Engineer;
7. each party shall participate in such facilitated face-to-face negotiations of the issues in dispute through persons fully authorized to resolve the issue in dispute;
8. each party shall be obligated to participate in negotiations requested by the other party and to perform the specific obligations described in paragraphs (1) through (10) this Article 39, Facilitated Negotiation, no more than three times during the course of the Project;
9. neither party shall be under any obligation to resolve any issue by facilitated negotiation, but each agrees to participate in good faith and the Principal Representative shall direct the Architect/Engineer to appropriately document any resolution or agreement reached and to execute any Amendment or Change Order to the Contract necessary to implement their agreement; and,
10. any discussions and documents prepared exclusively for use in the negotiations shall be deemed to be matters pertaining to settlement negotiations and shall not be subsequently available in further proceedings except to the extent of any documented agreement.

In accordance with State Fiscal Rules and Article 52F, Choice of Law; No Arbitration, nothing in this Article 39 shall be deemed to call for arbitration or otherwise obligate the State to participate in any form of binding alternative dispute resolution.

A partnering plan developed as described in Article 2D, Communications and Cooperation, may modify or expand the requirements of this Article but may not reduce the obligation to participate in facilitated negotiations when applicable. In the case of small projects estimated to be valued under \$500,000, the requirements of this Article may be deleted from this Contract, by modification in Article 7 (Contractor's Agreement SC-6.21), Optional Provisions And Elections. When so modified, the references to the parties' right to elect facilitated negotiation elsewhere in these General Conditions shall be deleted.

ARTICLE 40. RIGHT OF OCCUPANCY

The Principal Representative shall have the right to take possession of and to use any completed or partially completed portions of the Work, even if the time for completing the entire Work or portions of the Work has not expired and even if the Work has not been finally accepted, and the Contractor shall fully cooperate with the Principal Representative to allow such possession and use. Such possession and use shall not constitute an acceptance of such portions of the Work.

Prior to any occupancy of the Project, an inspection shall be made by the Principal Representative, State Buildings Program and the Contractor. Such inspection shall be made for the purpose of ensuring that the building is secure, protected by operation safety systems as designed, operable exits, power, lighting and HVAC systems, and otherwise ready for the occupancy intended and the Notice of Substantial Completion has been issued for the occupancy intended. The inspection shall also document existing finish conditions to allow assessment of any damage by occupants. The Contractor shall assist the Principal Representative in completing and executing State Form SBP-01, Approval of Occupancy/Use, prior to the Principal Representative's possession and use. Any and all areas so occupied will be subject to a final inspection when the Contractor complies with Article 41, Completion, Final Inspection, Acceptance and Settlement.

ARTICLE 41. COMPLETION, FINAL INSPECTION, ACCEPTANCE AND SETTLEMENT

A. NOTICE OF COMPLETION

When the Work, or a discrete physical portion of the Work (as hereafter described) which the Principal Representative has agreed to accept separately, is substantially complete and ready for final inspection, the Contractor shall file a written Notice with the Architect/Engineer that the Work, or such discrete physical portion, in the opinion of the Contractor, is substantially complete under the terms of the Contract. The Contractor shall prepare and submit with such Notice a comprehensive list of items to be completed or corrected prior to final payment, which shall be subject to review and additions as the Architect/Engineer or the Principal Representative shall determine after inspection. If the Architect/Engineer or the Principal Representative believe that any of the items on the list of items submitted, or any other item of Work to be corrected or completed, or the cumulative number of items of Work to be corrected or completed, will prevent a determination that the Work is substantially complete, those items shall be completed by the Contractor and the Notice shall then be resubmitted.

B. FINAL INSPECTION

Within ten (10) days after the Contractor files written Notice that the Work is substantially complete, the Architect/Engineer, the Principal Representative, and the Contractor shall make a "final inspection" of the Project to determine whether the Work is substantially complete and has been completed in accordance with the Contract Documents. State Buildings Program shall be notified of the inspection not less than three (3) business days in advance of the inspection. The Contractor shall provide the Principal Representative and the Architect/Engineer an updated punch list in sufficient detail to fully outline the following:

1. Work to be completed, if any; and
2. Work not in compliance with the Drawings or Specifications, if any.

A final punch list shall be made by the Architect/Engineer in sufficient detail to fully outline to the Contractor:

1. Work to be completed, if any;
2. Work not in compliance with the Drawings or Specifications, if any; and
3. unsatisfactory Work for any reason, if any.

The required number of copies of the final punch list will be countersigned by the authorized representative of the Principal Representative and will then be transmitted by the Architect/Engineer to the Contractor, the Principal Representative, and State Buildings Program. The Architect/Engineer's final punch list shall control over the Contractor's preliminary punch list.

C. NOTICE OF SUBSTANTIAL COMPLETION

Notice of Substantial Completion shall establish the date of substantial completion of the Project. The Contractor acknowledges and agrees that because the departments, agencies and institutions of the State of Colorado are generally involved with the business of the public at large, greater care must be taken in establishing the date of substantial completion than might otherwise be the case to ensure that a project or building or discrete physical portion of the Work is fully usable and safe for public use, and that such care necessarily raises the standard by which the concept of substantial completion is applied for a public building.

The Notice of Substantial Completion shall not be issued until the following have been fully established:

1. All required building code inspections have been called for and the appropriate code officials have affixed their signatures to the Building Inspection Record indicating successful completion of all required code inspections;
2. All required corrections noted on the Building Inspection Record shall have been completed unless the Architect/Engineer, the Principal Representative and State Buildings Program, in their complete and absolute discretion, all concur that the condition requiring the remaining correction is not in any way life threatening, does not otherwise endanger persons or property, and does not result in any undue inconvenience or hardship to the Principal Representative or the public;
3. The building, structure or Project can be fully and comfortably used by the Principal Representative and the public without undue interference by the Contractor's employees and Workers during the completion of the final punch list taking into consideration the nature of the public uses intended and taking into consideration any stage or level of completion of HVAC system commissioning or other system testing required by the Specifications to be completed prior to issuance of the Notice of Substantial Completion;
4. The Project has been fully cleaned as required by these General Conditions, and as required by any stricter requirements of the Specifications, and the overall state of completion is appropriate for presentation to the public; and
5. The Contractor has provided a schedule for the completion of each and every item identified on the punch list which specifies the Subcontractor or trade responsible for the Work, and the dates the completion or correction of the item will be commenced and finished; such schedule will show completion of all remaining final punch list items within the period indicated in the Contract for final punch list completion prior to Final Acceptance, with the exception of only those items which are beyond the control of the Contractor despite due diligence. The schedule shall provide for a reasonable punch list inspection process. Unless liquidated damages have been specified in Article 7.4 of the Contractor's Design/Bid/Build Agreement SC-6.21), the cost to the Principal Representative, if any, for re-inspections due to failure to adhere to the Contractor's proposed punch-list completion schedule shall be the responsibility of the Contractor and may be deducted by the Principal Representative from final amounts due to the Contractor.

Substantial completion of the entire Project shall not be conclusively established by a decision by the Principal Representative to take possession and use of a portion, or all of the Project, where portions of the Project cannot meet all the criteria noted above. Notice of Substantial Completion for the entire Project shall, however, only be withheld for substantial reasons when the Principal Representative has taken possession and uses all of the Project in accordance with the terms of Article 40, Right Of Occupancy. Failure to furnish the required completion schedule shall constitute a substantial reason for withholding the issuance of any Notice of Substantial Completion.

The Contractor shall have the right to request a final inspection of any discrete physical portion of the Project when in the opinion of the Principal Representative, The Architect/Engineer and State Buildings Program a final punch list can be reasonably prepared, without confusion as to which portions of the Project are referred to in any subsequent Notice of Partial Final Settlement which might be issued after such portion is finally accepted. Discrete physical portions of the Project may be, but

shall not necessarily be limited to, such portions of the Project as separate buildings where a Project consists of multiple buildings. Similarly, an addition to an existing building where the Project also calls for renovation or remodeling of the existing building may constitute a discrete physical portion of the Project. In such circumstances, when in the opinion of the Principal Representative, the Architect/Engineer and State Buildings Program, the requirements for issuance of a Notice of Substantial Completion can be satisfied with respect to the discrete portion of the Project, a partial Notice of Substantial Completion may be issued for such discrete physical portion of the Project.

D. NOTICE OF ACCEPTANCE

The Notice of Acceptance shall establish the completion date of the Project. It shall not be authorized until the Contractor shall have performed all of the Work to allow completion and approval of the Pre-Acceptance Checklist (SBP-05).

Where partial Notices of Substantial Completion have been issued, partial Notices of Final Acceptance may be similarly issued when appropriate for that portion of the Work. Partial Notice of Final Acceptance may also be issued to exclude the Work described in Change Orders executed during late stages of the Project where a later completion date for the Change Ordered Work is expressly provided for in the Contract as amended by the Change Order, provided the Work can be adequately described to allow partial advertisement of any Notice of Partial Final Settlement to be issued without confusion as to the Work included for which final payment will be made.

E. SETTLEMENT

Final payment and settlement shall be made on the date fixed and published for such payment except as hereafter provided. The Principal Representative shall not authorize final payment until all items on the Pre-Acceptance check list (SBP-05) have been completed, the Notice of Acceptance issued, and the Notice of Contractors Settlement published. If the Work shall be substantially completed, but Final Acceptance and completion thereof shall be prevented through delay in correction of minor defects, or unavailability of materials or other causes beyond the control of the Contractor, the Principal Representative in his or her discretion may release all amounts due to the Contractor except such amounts as may be in excess of three times the cost of completing the unfinished Work or the cost of correcting the defective Work, as estimated by the Architect/Engineer and approved by State Buildings Program. Before the Principal Representative may issue the Notice of Contractor's Settlement and advertise the Project for final payment, the Contractor shall have corrected all items on the punch list except those items for which delayed performance is expressly permitted, subject to withholding for the cost thereof, and shall have:

1. Delivered to the Principal Representative:
 - a. All guarantees and warranties;
 - b. All statements to support local sales tax refunds, if any;
 - c. Three (3) complete bound sets of required operating maintenance instructions; and,
 - d. One (1) set of hard copy as-built Contract Documents, and one (1) electronic copy showing all job changes.
2. Demonstrated to the operating personnel of the Principal Representative the proper operation and maintenance of all equipment.
3. Delivered to the State of Colorado Department of Personnel & Administration in accordance with C.R.S. § 24-103-210:
 - a. A written disclosure of the five most costly goods incorporated into the project, including iron, steel, or related manufactured goods and the total cost and country of origin of those five goods and whether the project was subject to any existing domestic content preferences.

Upon completion of the foregoing the Project shall be advertised in accordance with the Notice of Contractor's Settlement by two publications of Notice, the last publication appearing at least ten (10) days prior to the time of final settlement. Publication and final settlement should not be postponed or delayed solely by virtue of unresolved claims against the Project or the Contractor from Subcontractors, suppliers or materialmen based on good faith disputes; the resolution of the question of payment in such cases being directed by statute.

Except as hereafter provided, on the date of final settlement thus advertised, provided the Contractor has submitted a written Notice to the Architect/Engineer that no claims have been filed, and further provided the Principal Representative shall have received no claims, final payments and settlement shall be made in full. If any unpaid claim for labor, materials, rental machinery, tools, supplies or equipment is filed before payment in full of all sums due the Contractor, the Principal Representative and the State Controller shall withhold from the Contractor on the date established for final settlement, sufficient funds to insure the payment of such claim, until the same shall have been paid or withdrawn, such payment or withdrawal to be evidenced by filing a receipt in full or an order for withdrawal signed by the claimant or his or her duly authorized agent or assignee. The amount so withheld may be in the amount of 125% of the claims or such other amount as the Principal Representative reasonably deems necessary to cover expected legal expenses. Such withheld amounts shall be in addition to any amount withheld based on the cost to complete unfinished Work or the cost to repair defective Work. However, as provided by statute, such funds shall not be withheld longer than ninety (90) days following the date fixed for final settlement with the Contractor, as set forth in the published Notice of Contractor's Settlement, unless an action at law shall be commenced within that time to enforce such unpaid claim and a Notice of such action at law shall have been filed with the Principal Representative and the State Controller. At the expiration of the ninety (90) day period, the Principal Representative shall authorize the State Controller to release to the Contractor all other money not the subject of such action at law or withheld based on the cost to complete unfinished Work or the cost to repair defective Work.

Notices of Partial Final Settlement may be similarly advertised, provided all conditions precedent have been satisfied as though that portion of the Work affected stood alone, a Notice of Partial Acceptance has been issued, and the consent of surety to the partial final settlement has been obtained in writing. Thereafter, partial final payments may be made to the Contractor subject to the same conditions regarding unpaid claims.

ARTICLE 42. GENERAL WARRANTY AND CORRECTION OF WORK AFTER ACCEPTANCE

The Contractor warrants that the materials used and the equipment furnished shall be new and of good quality unless specified to the contrary. The Contractor further warrants that the Work shall, in all respects, be free from material defects not permitted by the Specifications and shall be in accordance with the requirements of the Contract Documents. Neither the final certificate for payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for defects or faulty materials or Workmanship. The Contractor shall be responsible to the Principal Representative for such warranties for the longest period permitted by any applicable statute of limitations.

In addition to these general warranties, and without limitation of these general warranties, for a period of one year after the date of any Notice of Substantial Completion, or any Notice of Partial Substantial Completion if applicable, the Contractor shall remedy defects, and faulty Workmanship or materials, and Work not in accordance with the Contract Documents which was not accepted at the time of the Notice of Final Acceptance, all in accordance with the provisions of Article 44, One-Year Guarantee And Special Guarantees And Warranties.

ARTICLE 43. LIENS

Colorado statutes do not provide for any right of lien against public buildings. In lieu thereof, § 38-26-107, C.R.S., provides adequate relief for any claimant having furnished labor, materials, rental machinery, tools, equipment, or services toward construction of the particular public Work in that final payment may not be made to a Contractor until all such creditors have been put on Notice by publication in the public press of

such pending payment and given opportunity for a period of up to ninety (90) days to stop payment to the Contractor in the amount of such claims.

ARTICLE 44. ONE-YEAR GUARANTEE AND SPECIAL GUARANTEES AND WARRANTIES

C. A. ONE-YEAR GUARANTEE OF THE WORK

The Contractor shall guarantee to remedy defects and repair or replace the Work for a period of one year from the date of the Notice of Substantial Completion or from the dates of any partial Notices of Substantial Completion issued for discrete physical portions of the Work. The Contractor shall remedy any defects due to faulty materials or Workmanship and shall pay for, repair and replace any damage to other Work resulting there from, which shall appear within a period of one year from the date of such Notice(s) of Substantial Completion. The Contractor shall also remedy any deviation from the requirements of the Contract Documents which shall later be discovered within a period of one year from the date of the Notice of Substantial Completion; provided, however, that the Contractor shall not be required to remedy deviations from the requirements of the Contract Documents where such deviations were obvious, apparent and accepted by the Architect/Engineer or the Principal Representative at the time of the Notice of Final Acceptance. The Principal Representative shall give Notice of observed defects or other Work requiring correction with reasonable promptness. Such Notice shall be in writing to the Architect/Engineer and the Contractor.

The one year guarantee of the Contractor's Work may run separately for discrete physical portions of the Work for which partial Notices of Substantial Completion have been issued, however, it shall run from the last Notice of Substantial Completion with respect to all or any systems common to the Work to which more than one Notice of Substantial Completion may apply.

This one-year guarantee shall not be construed to limit the Contractor's general warranty described in Article 42, General Warranty and Correction of Work After Acceptance, that all materials and equipment are new and of good quality, unless specified to the contrary, and that the Work shall in all respects be free from material defects not permitted by the Specifications and in accordance with the requirements of the Contract Documents.

B. SPECIAL GUARANTEES AND WARRANTIES

In case of Work performed for which product, manufacturers or other special warranties are required by the Specifications, the Contractor shall secure the required warranties and deliver copies thereof to the Principal Representative through the Architect/Engineer upon completion of the Work.

These product, manufacturers or other special warranties, as such, do not in any way lessen the Contractor's responsibilities under the Contract. Whenever guarantees or warranties are required by the Specifications for a longer period than one year, such longer period shall govern.

ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION

The Architect/Engineer, the Principal Representative and the Contractor together shall make at least two (2) complete inspections of the Work after the Work has been determined to be substantially complete and accepted. One such inspection, the "Six-Month Guarantee Inspection," shall be made approximately six (6) months after date of the Notice of Substantial Completion, unless in the case of smaller projects valued under \$500,000 this inspection is declined in Article 7A (Contractor's Agreement SC-6.21), Modification of Article 45, in which case the inspection to occur at six months shall not be required. Another such inspection, the "Eleven-Month Guaranty Inspection" shall be made approximately eleven (11) months after the date of the Notice of Substantial Completion. The Contractor shall schedule and so notify all parties concerned, and the Principal Representative shall so notify State Buildings Program, of these inspections. If more than one Notice of Substantial Completion has been issued at the reasonable discretion of the Principal Representative separate eleven month inspections may be required where the one year guarantees do not run reasonably concurrent.

Written punch lists and reports of these inspections shall be made by the Architect/Engineer and forwarded to the Contractor, the Principal Representative, State Buildings Program, and all other participants within ten (10) days after the completion of the inspections. The punch list shall itemize all guarantee items, prior

punch list items still to be corrected or completed and any other requirements of the Contract Documents to be completed which were not waived by final acceptance because they were not obvious or could not reasonably have been previously observed. The Contractor shall immediately initiate such remedial Work as may be necessary to correct any deficiencies or defective Work shown by this report, and shall promptly complete all such remedial Work in a manner satisfactory to the Architect/Engineer, the Principal Representative and State Buildings Program.

If the Contractor fails to promptly correct all deficiencies and defects shown by this report, the Principal Representative may do so, after giving the Contractor ten (10) days written Notice of intention to do so.

The State of Colorado, acting by and through the Principal Representative, shall be entitled to collect from the Contractor all costs and expenses incurred by it in correcting such deficiencies and defects, as well as all damages resulting from such deficiencies and defects.

ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

It is hereby understood and mutually agreed, by and between the parties hereto, that the date of beginning, rate of progress, and the time for completion of the Work to be done hereunder are ESSENTIAL CONDITIONS of this Agreement, and it is understood and agreed that the Work embraced in this Contract shall be commenced at the time specified in the Notice to Proceed (SC-6.26).

It is further agreed that time is of the essence of each and every portion of this Contract, and of any portion of the Work described on the Drawings or Specifications, wherein a definite and certain length of time is fixed for the performance of any act whatsoever. The parties further agree that where under the Contract additional time is allowed for the completion of the Work or any identified portion of the Work, the new time limit or limits fixed by such extension of the time for completion shall be of the essence of this Agreement.

The Contractor acknowledges that subject to any limitations in the Advertisement for Bids, issued for the Project, the Contractor's bid is consistent with and considers the number of days to substantially complete the Project and the number of days to finally complete the Project to which the parties may have stipulated in the Agreement, which stipulation was based on the Contractor's bid. The Contractor agrees that Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure the Project will be substantially complete, and fully and finally complete, as recognized by the issuance of all required Notices of Substantial Completion and Notices of Final Acceptance, within any times stipulated and specified in the Agreement, as the same may be amended by Change Order or other written modification, and that the Principal Representative will be damaged if the times of completion are delayed.

It is expressly understood and agreed, by and between the parties hereto, that the times for the Substantial Completion of the Work or for the final acceptance of the Work as may be stipulated in the Agreement, and as applied here and in Article 7.4 of the Contractor's Design/Bid/Build Agreement SC-6.21), Modifications of Article 46, are reasonable times for these stages of completion of the Work, taking into such consideration all factors, including the average climatic range and usual industrial conditions prevailing in the locality of the building operations.

If the Contractor shall neglect, fail or refuse to complete the Work within the times specified in the Agreement, such failure shall constitute a breach of the terms of the Contract and the State of Colorado, acting by and through the Principal Representative, shall be entitled to liquidated damages for such neglect, failure or refusal, as specified in Article 7.4 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46.

The Contractor and the Contractor's Surety shall be jointly liable for and shall pay the Principal Representative, or the Principal Representative may withhold, the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the entire Project is 1) substantially completed, and the Notice (or all Notices) of Substantial Completion are issued, 2) finally complete and accepted and the Notice (or all Notices) of Acceptance are issued, or 3) both. Delay in substantial completion shall be measured from the Date of the Notice to Proceed and delay in final completion and acceptance shall be measured from the Date of the Notice of Substantial Completion.

In the first instance, specified in Article 7.4.1 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46, liquidated damages, if any, shall be the amount specified therein, for each calendar day of delay beginning after the stipulated number of days for Substantial Completion from the date of the Notice to Proceed, until the date of the Notice of Substantial Completion. Unless otherwise specified in any Supplementary General Conditions, in the event of any partial Notice of Substantial Completion, liquidated damages shall accrue until all required Notices of Substantial Completion are issued.

In the second instance, specified in Article 7.4.2 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46, liquidated damages, if any, shall be the amount specified in Article 7.4.2 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46, for each calendar day in excess of the number of calendar days specified in the Contractor's bid for the Project and stipulated in the Agreement to finally complete the Project (as defined by the issuance of the Notice of Acceptance) after the final Notice of Substantial Completion has been issued.

In the third instance, when so specified in both Articles 7.4.1 and 7.4.2 of the Contractor's Agreement SC-6.21, both types of liquidated damages shall be separately assessed where those delays have occurred.

The parties expressly agree that said amounts are a reasonable estimate of the presumed actual damages that would result from any of the breaches listed, and that any liquidated damages that are assessed have been agreed to in light of the difficulty of ascertaining the actual damages that would be caused by any of these breaches at the time this Contract was formed; the liquidated damages in the first instance representing an estimate of damages due to the inability to use the Project; the liquidated damages in the second instance representing an estimate of damages due to the additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period including delivery of any or all guarantees and warranties, the submittals of sales and use tax payment forms, the calling for the final inspection and the completion of the final punch list.

The parties also agree and understand that the liquidated damages to be assessed in each instance are separate and distinct, although potentially cumulative, damages for the separate and distinct breaches of delayed substantial completion or final acceptance. Such liquidated damages shall not be avoided by virtue of the fact of concurrent delay caused by the Principal Representative, or anyone acting on behalf of the Principal Representative, but in such event the period of delay for which liquidated damages are assessed shall be equitably adjusted in accordance with Article 38, Delays And Extensions Of Time.

ARTICLE 47. DAMAGES

If either party to this Contract shall suffer damage under this Contract in any manner because of any wrongful act or neglect of the other party or of anyone employed by either of them, then the party suffering damage shall be reimbursed by the other party for such damage. Except to the extent of damages liquidated for the Contractor's failure to achieve timely completion as set forth in Article 46, Time of Completion and Liquidated Damages, the Principal Representative shall be responsible for, and at his or her option may insure against, loss of use of any existing property not included in the Work, due to fire or otherwise, however caused. Notwithstanding the foregoing, or any other provision of this Contract, to the contrary, no term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions of the Colorado Governmental Immunity Act, Section 24-10-101, *et seq.*, CRS, as now or hereafter amended. The parties understand and agree that liability for claims for injuries to persons arising out of negligence of the State of Colorado, its departments, institutions, agencies, boards, officials and employees is controlled and limited by the provisions of Section 24-101-101, *et seq.*, CRS, as now or hereafter amended and the risk management statutes, Section 24-30-1501, *et seq.*, CRS, as now or hereafter amended.

Notice of intent to file a claim under this clause shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except that in the case of claims by the Principal Representative involving warranties against faulty Work or materials Notice shall be required only to the extent stipulated elsewhere in these General Conditions. Claims made to the Principal Representative involving extra cost or extra time arising by virtue of instructions to the Contractor to which Article 36, Claims, applies shall be made in accordance with Article

36. Other claims arising under the Contract involving extra cost or extra time which are made to the Principal Representative under this clause shall also be made in accordance with the procedures of Article 36, whether or not arising by virtue of instructions to the Contractor; provided however that it shall not be necessary to first obtain or request a written judgment of the Architect/Engineer.

Provided written Notice of intent to file a claim is provided as required in the preceding paragraph, nothing in this Article shall limit or restrict the rights of either party to bring an action at law or to seek other relief to which either party may be entitled, including consequential damages, if any, and shall not be construed to limit the time during which any action might be brought. Nothing in these General Conditions shall be deemed to limit the period of time during which any action may be brought as a matter of contract, tort, warranty or otherwise, it being the intent of the parties to allow any and all actions at law or in equity for such periods as the law permits. All such rights shall, however be subject to the obligation to assert claims and to appeal denials pursuant to Article 36, Claims, where applicable.

ARTICLE 48. STATE'S RIGHT TO DO THE WORK; TEMPORARY SUSPENSION OF WORK; DELAY DAMAGES

A. STATE'S RIGHT TO DO THE WORK

If after receipt of Notice to do so, the Contractor should neglect to prosecute the Work properly or fail to perform any provision of the Contract, the Principal Representative, after a second seven (7) days' advance written Notice to the Contractor and the Surety may, without prejudice to any other remedy the Principal Representative may have, take control of all or a portion of the Work, as the Principal Representative deems necessary and make good such deficiencies deducting the cost thereof from the payment then or thereafter due the Contractor, as provided in Article 30, Correction Of Work Before Acceptance and Article 33, Payments Withheld, provided, however, that the Architect/Engineer shall approve the amount charged to the Contractor by approval of the Change Order.

B. TEMPORARY SUSPENSION OF WORK

The State, acting for itself or by and through the Architect/Engineer, shall have the authority to suspend the Work, either wholly or in part, for such period or periods as may be deemed necessary due to:

1. Unsuitable weather;
2. Faulty Workmanship;
3. Improper superintendence or project management;
4. Contractor's failure to carry out orders or to perform any provision of the Contract Documents;
5. Loss of, or restrictions to, appropriations;
6. Conditions, which may be considered unfavorable for the prosecution of the Work.

If it should become necessary to stop Work for an indefinite period, the Contractor shall store materials in such manner that they will not become an obstruction or become damaged in any way; and he or she shall take every precaution to prevent damage to or deterioration of the Work, provide suitable drainage and erect temporary structures where necessary.

Notice of suspension of Work shall be provided to the Contractor in writing stating the reasons therefore. The Contractor shall again proceed with the Work when so notified in writing.

The Contractor understands and agrees that the State of Colorado cannot predict with certainty future revenues and could ultimately lack the revenue to fund the appropriations applicable to this Contract. The Contractor further acknowledges and agrees that in such event that State may, upon Notice to the Contractor, suspend the Work in anticipation of a termination of the Contract for the convenience of the State, pursuant to Article 50, Termination For Convenience of State. If the Contract is not so terminated the Contract sum and the Contract time shall be equitably adjusted at the time the Principal Representative directs the Work to be recommenced and gives Notice that the revenue to fund the appropriation is available.

C. DELAY DAMAGES

The Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of any claim for extra costs, extra compensation or damages occasioned by hindrances or delays encountered in the Work only when and to the limited extent that such hindrance or delay is caused by an act or omission within the control of the Principal Representative, the Architect/Engineer or other persons or entities acting on behalf of the Principal Representative. Further, the Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of such a claim only if the Contractor has provided required Notice of the delay or impact, or has presented its claim for an extension of time or claim of other delay or other impact due to changes ordered in the Work before proceeding with the changed Work. Except as otherwise provided, claims for extension of time shall be Noticed and filed in accordance with Article 38, Delays and Extensions of Time, within three (3) business days of the beginning of the delay with any claim filed within seven (7) days after the delay has ceased, or such claim is waived. Claims for extension of time or for other delay or other impact resulting from changes ordered in the Work shall be presented and adjusted as provided in Article 35, Changes in the Work.

ARTICLE 49. STATE'S RIGHTS TO TERMINATE CONTRACT

A. GENERAL

If the Contractor should be adjudged bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed to take over his affairs, or if he or she should fail to prosecute his or her Work with due diligence and carry the Work forward in accordance with the construction schedule and the time limits set forth in the Contract Documents, or if he or she should fail to subsequently perform one or more of the provisions of the Contract Documents to be performed by him, the Principal Representative may serve written Notice on the Contractor and the Surety on performance and payment bonds, stating his or her intention to exercise one of the remedies hereinafter set forth and the grounds upon which the Principal Representative bases his or her right to exercise such remedy.

In such event, unless the matter complained of is satisfactorily cleared within ten (10) days after delivery of such Notice, the Principal Representative may, without prejudice to any other right or remedy, exercise one of such remedies at once, having first obtained the concurrence of the Architect/Engineer in writing that sufficient cause exists to justify such action.

B. CONDITIONS AND PROCEDURES

1. The Principal Representative may terminate the services of the Contractor, which termination shall take effect immediately upon service of Notice thereof on the Contractor and his or her Surety, whereupon the Surety shall have the right to take over and perform the Contract. If the Surety does not provide Notice to the Principal Representative of its intent to commence performance of the Contract within ten (10) days after delivery of the Notice of termination, the Principal Representative may take over the Work, take possession of and use all materials, tools, equipment and appliances on the premises and prosecute the Work to completion by such means as he or she shall deem best. In the event of such termination of his or her service, the Contractor shall not be entitled to any further payment under the Contract until the Work is completed and accepted. If the Principal Representative takes over the Work and if the unpaid balance of the contract price exceeds the cost of completing the Work, including compensation for any damages or expenses incurred by the Principal Representative through the default of the Contractor, such excess shall be paid to the Contractor. If, however, the cost, expenses and damages as certified by the Architect/Engineer exceed such unpaid balance of the contract price, the Contractor and his or her Surety shall pay the difference to the Principal Representative.
2. The Principal Representative may require the Surety on the Contractor's bond to take control of the Work and see to it that all the deficiencies of the Contractor are made good, with due diligence within ten (10) days of delivery of Notice to the Surety to do so. As between the Principal Representative and the Surety, the cost of making good such deficiencies shall all be borne by the Surety. If the Surety takes over the Work, either by election upon termination of the services of the Contractor pursuant to Section B(1) of this Article 49, State's Right To

Terminate Contract, or upon instructions from the Principal Representative to do so, the provisions of the Contract Documents shall govern the Work to be done by the Surety, the Surety being substituted for the Contractor as to such provisions, including provisions as to payment for the Work, the times of completion and provisions of this Article as to the right of the Principal Representative to do the Work or to take control of all or a portion of the Work.

3. The Principal Representative may take control of all or a portion of the Work and make good the deficiencies of the Contractor, or the Surety if the Surety has been substituted for the Contractor, with or without terminating the Contract, employing such additional help as the Principal Representative deems advisable in accordance with the provisions of Article 48A, State's Right To Do The Work; Temporary Suspension Of Work; Delay Damages. In such event, the Principal Representative shall be entitled to collect from the Contractor and his or her Surety, or to deduct from any payment then or thereafter due the Contractor, the costs incurred in having such deficiencies made good and any damages or expenses incurred through the default of Contractor, provided the Architect/Engineer approves the amount thus charged to the Contractor. If the Contract is not terminated, a Change Order to the Contract shall be executed, unilaterally if necessary, in accordance with the procedures of Article 35, Changes In The Work.

C. **ADDITIONAL CONDITIONS**

If any termination by the Principal Representative for cause is later determined to have been improper, the termination shall be automatically converted to and deemed to be a termination by the Principal Representative for convenience and the Contractor shall be limited in recovery to the compensation provided for in Article 50, Termination For Convenience Of State. Termination by the Contractor shall not be subject to such conversion.

ARTICLE 50. TERMINATION FOR CONVENIENCE OF STATE

A. **NOTICE OF TERMINATION**

The performance of Work under this Contract may be terminated, in whole or from time to time in part, by the State whenever for any reason the Principal Representative shall determine that such termination is in the best interest of State. Termination of Work hereunder shall be effected by delivery to the Contractor of a Notice of such termination specifying the extent to which the performance of Work under the Contract is terminated and the date upon which such termination becomes effective.

B. **PROCEDURES**

After receipt of the Notice of termination, the Contractor shall, to the extent appropriate to the termination, cancel outstanding commitments hereunder covering the procurement of materials, supplies, equipment and miscellaneous items. In addition, the Contractor shall exercise all reasonable diligence to accomplish the cancellation or diversion of all applicable outstanding commitments covering personal performance of any Work terminated by the Notice. With respect to such canceled commitments, the Contractor agrees to:

1. settle all outstanding liabilities and all claims arising out of such cancellation of commitments, with approval or ratification of the Principal Representative, to the extent he or she may require, which approval or ratification shall be final for all purposes of this clause; and,
2. assign to the State, in the manner, at the time, and to the extent directed by the Principal Representative, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the State shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.

The Contractor shall submit his or her termination claim to the Principal Representative promptly after receipt of a Notice of termination, but in no event later than three (3) months from the effective date thereof, unless one or more extensions in writing are granted by the Principal Representative upon written request of the Contractor within such three month period or authorized extension thereof. Upon failure of the Contractor to submit his or her termination claim within the time allowed, the Principal Representative may determine, on the basis of information available to him, the amount, if

any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

Costs claimed, agreed to, or determined pursuant to the preceding and following paragraph shall be in accordance with the provisions of § 24-107-101, C.R.S., as amended and associated Cost Principles of the Colorado Procurement Rules as in effect on the date of this Contract.

Subject to the preceding provisions, the Contractor and the Principal Representative may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the termination under this clause, which amount or amounts may include any reasonable cancellation charges thereby incurred by the Contractor and any reasonable loss upon outstanding commitments for personal services which he or she is unable to cancel; provided, however, that in connection with any outstanding commitments for personal services which the Contractor is unable to cancel, the Contractor shall have exercised reasonable diligence to divert such commitments to other activities and operations. Any such agreement shall be embodied in an Amendment to this Contract and the Contractor shall be paid the agreed amount.

The State may from time to time, under such terms and conditions as it may prescribe, make partial payments against costs incurred by the Contractor in connection with the termination portion of this Contract, whenever, in the opinion of the Principal Representative, the aggregate of such payments is within the amount to which the Contractor will be entitled hereunder.

The Contractor agrees to transfer title and deliver to the State, in the manner, at the time, and to the extent, if any, directed by the Principal Representative, such information and items which, if the Contract had been completed, would have been required to be furnished to the State, including:

- a. completed or partially completed plans, Drawings and information; and,
- b. materials or equipment produced or in process or acquired in connection with the performance of the Work terminated by the Notice.

Other than the above, any termination inventory resulting from the termination of the Contract may, with written approval of the Principal Representative, be sold or acquired by the Contractor under the conditions prescribed by and at a price or prices approved by the Principal Representative. The proceeds of any such disposition shall be applied in reduction of any payments to be made by the State to the Contractor under this Contract or shall otherwise be credited to the price or cost of Work covered by this Contract or paid in such other manners as the Principal Representative may direct. Pending final disposition of property arising from the termination, the Contractor agrees to take such action as may be necessary, or as the Principal Representative may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the State has or may acquire an interest.

Any disputes as to questions of fact, which may arise hereunder, shall be subject to the Remedies provisions of the Colorado Procurement Code, §§ 24-109-101, et seq., C.R.S., as amended.

ARTICLE 51. CONTRACTOR'S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT

If the Work shall be stopped under an order of any court or other public authority for a period of three (3) months through no act or fault of the Contractor or of any one employed by him, then the Contractor may on seven (7) days' written Notice to the Principal Representative and the Architect/Engineer stop Work or terminate this Contract and recover from the Principal Representative payment for all Work executed, any losses sustained on any plant or material, and a reasonable profit only for the Work completed. If the Architect/Engineer shall fail to issue or otherwise act in writing upon any certificate for payment within ten (10) days after it is presented and received by the Architect/Engineer, as provided in Article 31, Applications For Payments, or if the Principal Representative shall fail to pay the Contractor any sum certified that is not disputed in whole or in part by the Principal Representative in writing to the Contractor and the Architect/Engineer within thirty (30) days after the Architect/Engineer's certification, then the Contractor may

on ten (10) days' written Notice to the Principal Representative and the Architect/Engineer stop Work and/or give written Notice of intention to terminate this Contract.

If the Principal Representative shall thereafter fail to pay the Contractor any amount certified by the Architect/Engineer and not disputed in writing by the Principal Representative within ten (10) days after receipt of such Notice, then the Contractor may terminate this Contract and recover from the Principal Representative payment for all Work executed, any losses sustained upon any plant or materials, and a reasonable profit only for the Work completed. The Principal Representative's right to dispute an amount certified by the Architect/Engineer shall not relieve the Principal Representative of the obligation to pay amounts not in dispute as certified by the Architect/Engineer.

ARTICLE 52. SPECIAL PROVISIONS

- A. **CONTROLLER'S APPROVAL CRS 24-30-202(1)**
This Contract shall not be deemed valid until it has been approved by the Colorado State Controller or designee.
- B. **FUND AVAILABILITY CRS 24-30-202(5.5)**
Financial obligations of the State payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available
- C. **GOVERNMENTAL IMMUNITY**
No term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protections, or other provisions, of the Colorado Governmental Immunity Act, CRS §24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. §§1346(b) and 2671 et seq., as applicable now or hereafter amended.
- D. **INDEPENDENT CONTRACTOR 4 CCR 801-2**
Contractor shall perform its duties hereunder as an independent contractor and not as an employee. Neither Contractor nor any agent or employee of Contractor shall be deemed to be an agent or employee of the State. Contractor and its employees and agents are not entitled to unemployment insurance or workers compensation benefits through the State and the State shall not pay for or otherwise provide such coverage for Contractor or any of its agents or employees. Unemployment insurance benefits will be available to Contractor and its employees and agents only if such coverage is made available by Contractor or a third party. Contractor shall pay when due all applicable employment taxes and income taxes and local head taxes incurred pursuant to this contract. Contractor shall not have authorization, express or implied, to bind the State to any agreement, liability or understanding, except as expressly set forth herein. Contractor shall (a) provide and keep in force workers' compensation and unemployment compensation insurance in the amounts required by law, (b) provide proof thereof when requested by the State, and (c) be solely responsible for its acts and those of its employees and agents.
- E. **COMPLIANCE WITH LAW**
Contractor shall strictly comply with all applicable federal and State laws, rules, and regulations in effect or hereafter established, including, without limitation, laws applicable to discrimination and unfair employment practices.
- F. **CHOICE OF LAW**
Colorado law, and rules and regulations issued pursuant thereto, shall be applied in the interpretation, execution, and enforcement of this contract. Any provision included or incorporated herein by reference which conflicts with said laws, rules, and regulations shall be null and void. Any provision incorporated herein by reference which purports to negate this or any other Special Provision in whole or in part shall not be valid or enforceable or available in any action at law, whether by way of complaint, defense, or otherwise. Any provision rendered null and void by the operation of this provision shall not invalidate the remainder of this contract, to the extent capable of execution.

G. BINDING ARBITRATION PROHIBITED

The State of Colorado does not agree to binding arbitration by any extra-judicial body or person. Any provision to the contrary in this contract or incorporated herein by reference shall be null and void.

H. SOFTWARE PIRACY PROHIBITION. Governor's Executive Order D 002 00

State or other public funds payable under this contract shall not be used for the acquisition, operation, or maintenance of computer software in violation of federal copyright laws or applicable licensing restrictions. Contractor hereby certifies and warrants that, during the term of this contract and any extensions, Contractor has and shall maintain in place appropriate systems and controls to prevent such improper use of public funds. If the State determines that Contractor is in violation of this provision, the State may exercise any remedy available at law or in equity or under this contract, including, without limitation, immediate termination of this contract and any remedy consistent with federal copyright laws or applicable licensing restrictions.

I. EMPLOYEE FINANCIAL INTEREST/CONFLICT OF INTEREST CRS 24-18-201 & CRS 24-50-507

The signatories aver that to their knowledge, no employee of the State has any personal or beneficial interest whatsoever in the service or property described in this contract. Contractor has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance of Contractor's services and Contractor shall not employ any person having such known interests.

J. VENDOR OFFSET CRS 24-30-202(1) & CRS 24-30-202.4

Subject to CRS §24-30-202.4 (3.5), the State Controller may withhold payment under the State's vendor offset intercept system for debts owed to State agencies for: **(a)** unpaid child support debts or child support arrearages; **(b)** unpaid balances of tax, accrued interest, or other charges specified in CRS §39-21-101, et seq.; **(c)** unpaid loans due to the Student Loan Division of the Department of Higher Education; **(d)** amounts required to be paid to the Unemployment Compensation Fund; and **(e)** other unpaid debts owing to the State as a result of final agency determination or judicial action.

K. PUBLIC CONTRACTS FOR SERVICES. CRS §8-17.5-101.

[Not Applicable to agreements relating to the offer, issuance, or sale of securities, investment advisory services or fund management services, sponsored projects, intergovernmental agreements, or information technology services or products and services] Contractor certifies, warrants, and agrees that it does not knowingly employ or contract with an illegal alien who will perform Work under this contract and will confirm the employment eligibility of all employees who are newly hired for employment in the United States to perform Work under this contract, through participation in the E-Verify Program or the Department program established pursuant to CRS §8-17.5-102(5)(c), Contractor shall not knowingly employ or contract with an illegal alien to perform Work under this contract or enter into a contract with a subcontractor that fails to certify to Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform Work under this contract. Contractor **(a)** shall not use E-Verify Program or Department program procedures to undertake pre-employment screening of job applicants while this contract is being performed, **(b)** shall notify the subcontractor and the contracting State agency within three days if Contractor has actual knowledge that a subcontractor is employing or contracting with an illegal alien for Work under this contract, **(c)** shall terminate the subcontract if a subcontractor does not stop employing or contracting with the illegal alien within three days of receiving the notice, and **(d)** shall comply with reasonable requests made in the course of an investigation, undertaken pursuant to CRS §8-17.5-102(5), by the Colorado Department of Labor and Employment. If Contractor participates in the Department program, Contractor shall deliver to the contracting State agency, Institution of Higher Education or political subdivision a written, notarized affirmation, affirming that Contractor has examined the legal Work status of such employee, and shall comply with all of the other requirements of the Department program. If Contractor fails to comply with any requirement of this provision or CRS §8-17.5-101 et seq., the contracting State agency, institution of higher education or political subdivision may terminate this contract for breach and, if so terminated, Contractor shall be liable for damages.

- L. PUBLIC CONTRACTS WITH NATURAL PERSONS. CRS §24-76.5-101.
Contractor, if a natural person eighteen (18) years of age or older, hereby swears and affirms under penalty of perjury that he or she (a) is a citizen or otherwise lawfully present in the United States pursuant to federal law, (b) shall comply with the provisions of CRS §24-76.5-101 et seq., and (c) has produced one form of identification required by CRS §24-76.5-103 prior to the effective date of this contract.

ARTICLE 53. MISCELLANEOUS PROVISIONS

- A. CONSTRUCTION OF LANGUAGE
The language used in these General Conditions shall be construed as a whole according to its plain meaning, and not strictly for or against any party. Such construction shall, however, construe language to interpret the intent of the parties giving due consideration to the order of precedence noted in Article 2C, Intent of Documents.
- B. SEVERABILITY
Provided this Agreement can be executed and performance of the obligations of the Parties accomplished within its intent, the provisions hereof are severable and any provision that is declared invalid or becomes inoperable for any reason shall not affect the validity of any other provision hereof, provided that the Parties can continue to perform their obligations under this Agreement in accordance with its intent.
- C. SECTION HEADINGS
The captions and headings in this Agreement are for convenience of reference only, and shall not be used to interpret, define, or limit its provisions.
- D. AUTHORITY
Each person executing the Agreement and its Exhibits in a representative capacity expressly represents and warrants that he or she has been duly authorized by one of the parties to execute the Agreement and has authority to bind said party to the terms and conditions hereof.
- E. INTEGRATION OF UNDERSTANDING
This Contract is intended as the complete integration of all understandings between the parties and supersedes all prior negotiations, representations, or agreements, whether written or oral. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing. No subsequent novation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written Change Order or Amendment to this Contract.
- F. VENUE
All suits or actions related to this Agreement shall be filed and proceedings held in the State of Colorado and exclusive venue shall be in the City and County of Denver.
- G. NO THIRD PARTY BENEFICIARIES
Enforcement of this Agreement and all rights and obligations hereunder are reserved solely to the Parties. Any services or benefits which third parties receive as a result of this Contract are incidental to the Contract, and do not create any rights for such third parties.
- H. WAIVER
Waiver of any breach under a term, provision, or requirement of this Agreement, or any right or remedy hereunder, whether explicitly or by lack of enforcement, shall not be construed or deemed as a waiver of any subsequent breach of such term, provision or requirement, or of any other term, provision, or requirement.

I. INDEMNIFICATION

Contractor shall indemnify, save, and hold harmless the State, its employees and agents, against any and all claims, damages, liability and court awards including costs, expenses, and attorney fees , to the extent such claims are caused by any negligent act or omission of the Contractor, its employees, agents, subcontractors or assignees pursuant to the terms of this Contract, but not to the extent such claims are caused by any negligent act or omission of, or breach of contract by, the State, its employees, agents, other contractors or assignees, or other parties not under control of or responsible to the Contractor.

J. STATEWIDE CONTRACT MANAGEMENT SYSTEM

If the maximum amount payable to Contractor under this Contract is \$100,000 or greater, either on the Effective Date or at anytime thereafter, this section shall apply.

Contractor agrees to be governed, and to abide, by the provisions of CRS 24-102-205, 24-102-206, 24-103-601, 24-103.5-101, 24-105-101, and 24-105-102 concerning the monitoring of vendor performance on state contracts and inclusion of contract performance information in a statewide contract management system.

Contractor's performance shall be subject to Evaluation and Review in accordance with the terms and conditions of this Contract, State law, including C.R.S 24-103.5-101, and State Fiscal Rules, Policies and Guidance. Evaluation and Review of Contractor's performance shall be part of the normal contract administration process and Contractor's performance will be systematically recorded in the statewide Contract Management System. Areas of Evaluation and Review shall include, but shall not be limited to quality, cost and timeliness. Collection of information relevant to the performance of Contractor's obligations under this Contract shall be determined by the specific requirements of such obligations and shall include factors tailored to match the requirements of Contractor's obligations. Such performance information shall be entered into the statewide Contract Management System at intervals established herein and a final Evaluation, Review and Rating shall be rendered within 30 days of the end of the Contract term. Contractor shall be notified following each performance Evaluation and Review, and shall address or correct any identified problem in a timely manner and maintain Work progress.

Should the final performance Evaluation and Review determine that Contractor demonstrated a gross failure to meet the performance measures established hereunder, the Executive Director of the Colorado Department of Personnel and Administration (Executive Director), upon request by the Principal Representative, and showing of good cause, may debar Contractor and prohibit Contractor from bidding on future contracts. Contractor may contest the final Evaluation, Review and Rating by: (a) filing rebuttal statements, which may result in either removal or correction of the evaluation (CRS 24-105-102(6)), or (b) under CRS 24-105-102(6), exercising the debarment protest and appeal rights provided in CRS 24-109-106, 107, 201 or 202, which may result in the reversal of the debarment and reinstatement of Contractor, by the Executive Director, upon a showing of good cause.

K. CORA DISCLOSURE

To the extent not prohibited by federal law, this Agreement and the performance measures and standards under CRS §24-103.5-101, if any, are subject to public release through the Colorado Open Records Act, CRS §24-72-101, et seq.



STATE OF COLORADO
 OFFICE OF THE STATE ARCHITECT
 STATE BUILDINGS PROGRAMS

NOTICE OF SUBSTANTIAL COMPLETION

Date of Substantial Completion: _____
Date to be inserted by the Principal Representative

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

TO:

Principal Representative

and

Contractor

This is to advise you that the Work has been reviewed, inspected and determined, to the best knowledge, information and belief of the Architect/Engineer, to be substantially complete as of the date noted above in accordance with the criteria outlined in Article 41 of The General Conditions of the Contract in SC-6.23 and SC-8.1 or Article 17.3 in SC-6.4 and the Specifications, including without limitation a) suitable for occupancy, b) inspected for code compliance with Building Inspection Records signed by code officials for the State, c) determined to be fully and comfortably usable, and d) fully cleaned and appropriate for presentation to the public.

A punch list of work to be completed, work not in compliance with the Drawings or Specifications, and unsatisfactory work is attached hereto, along with the Contractor's schedule for the completion of each and every item identified on the punch list specifying the Subcontractor or trade responsible for the work, and the dates the completion or correction will be commenced and finished within any period indicated in the Agreement for punch list completion prior to Final Acceptance.

Except as stated on the reverse side of this Notice of Substantial Completion, all manufacturers' warranties, other special warranties and the Contractor's one-year obligation to perform remedial work, shall commence on the Date of Substantial Completion noted above.

This Notice of Substantial Completion shall be effective and establish the Date of Substantial Completion only when fully executed by the Contractor and the Principal Representative. The Principal Representative accepts the Work as substantially complete as of the Date of Substantial Completion herein noted. The Contractor agrees to complete or correct the Work identified on the attached punch list and to do so in accordance with attached punch list completion schedule

Architect/Engineer	Date	Contractor	Date
--------------------	------	------------	------

State Buildings Programs (or Authorized Delegate)	Date	Principal Representative (Institution or Agency)	Date
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The responsibilities of the Principal Representative and the Contractor for security, maintenance, heat, utilities, and insurance shall be as specified in the Contract Documents or as otherwise hereafter noted:

Exceptions, if any, to the commencement of warranties shall be:

The attached final punch list consists of _____ pages, and the attached Contractor's schedule showing the dates of commencement and completion of each punch list item consists of _____ pages.

When completely executed, this form shall be sent to the Contractor and the Principal Representative with a copy to State Buildings Programs.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF FINAL ACCEPTANCE

Date of Notice of Acceptance: _____

Date to be inserted by A/E after consultation with the Principal Representative

Institution/Agency: COLORADO STATE UNIVERSITY - PUEBLO

Project No./Name: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

TO:

Notice is hereby given that the State of Colorado, acting by and through the _____,
accepts as complete* the above numbered project.

_____	_____	_____	_____
State Buildings Programs (or Authorized Delegate)	Date	Principal Representative (Institution or Agency)	Date

*When completely executed, this form is to be sent by **certified mail** to the Contractor by the Principal Representative or delivered by any other means to which the parties agree.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF CONTRACTOR'S SETTLEMENT

Institution/Agency: _____
Notice Number: COLORADO STATE UNIVERSITY - PUEBLO
Project No./Title: BARTLEY BOULEVARD EXTENSION (2015-132M-15)

Notice is hereby given that on _____ *date* at _____ *address* _____ Colorado, final settlement will be made by the STATE OF COLORADO with _____ *vendor name* _____, hereinafter called the "CONTRACTOR", for and on account of the contract for the construction of a PROJECT as referenced above.

1. Any person, co-partnership, association or corporation who has an unpaid claim against the said project, for or on account of the furnishing of labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools, or equipment and other supplies used or consumed by such Contractor or any of his subcontractors in or about the performance of said work, may at any time up to and including said time of such final settlement, file a verified statement of the amount due and unpaid on account of such claim
2. All such claims shall be filed with the Authority for College, Institution, Department or Agency.
3. Failure on the part of a creditor to file such statement prior to such final settlement will relieve the State of Colorado from any and all liability for such claim

Authorized Facility Manager or Authorized Individual

Name: _____
Approval Date: _____
Agency: _____
Phone: _____
Fax: _____
Email: _____

MEDIA OF PUBLICATION:

PUBLICATION DATES:

First:

Second:

(At least ten (10) days prior to above settlement date)

NOTES TO EDITOR:

Transmit two (2) copies of the Affidavit of Publication, and invoice, to:

STANDARD SPECIFICATIONS

The "STANDARD SPECIFICATIONS" for this Project are the "Standard Construction Specifications and Standard Details for City of Pueblo, Colorado" City of Pueblo Department of Public Works dated March 28, 2005

The Contractor for the Project shall have a copy of the "Standard Specifications" and this Project Manual on the project site at all times during construction.

The following document, modified as indicated below, is hereby incorporated by reference. It shall have the same authority as if printed as modified and bound herein.

1. "Standard Construction Specifications and Standard Details for City of Pueblo, Colorado" City of Pueblo Department of Public Works dated March 28, 2005

Delete the following from the "Standard Construction Specifications and Standard Details":

1. Any reference to "Method of Measurement" and/or "Basis or Payment."

In general, these documents have been incorporated into this Project Manual for their technical requirements on materials and construction. The General Requirements for this Project shall be in complete accordance with the General Conditions of this Project Manual. Methods of measurement and payment shall be as set forth within the Procedural Documents, Contract Documents, and Special Specifications of this Project Manual.

When references in the "Standard Construction Specifications and Standard Details" are made to the Engineer or the City, these groups shall be redefined as the Engineer on the Project and/or the Owner.

SPECIAL SPECIFICATIONS

DIVISION 1
GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of this Contract generally includes the construction of the Bartley Boulevard Extension at Colorado State University – Pueblo including but not limited to:
 - a. Demolition and site preparation.
 - b. Cast-in-place concrete slabs, sidewalks, ramps, and foundations.
 - c. Miscellaneous utility improvements.
 - d. Subgrade excavation and preparation, aggregate base course, hot bituminous paving, striping, and signage.
 - e. Trees, plantings and irrigation system improvements.
 - f. Electrical/lighting system improvements.
- B. The work and the compensation therefore, shall be as covered by these Specifications consisting of furnishing all plant, labor, equipment, materials, supplies, testing, and appurtenances required to perform the work shown on the Drawings, specified, and listed in the Itemized Bid Form, unless otherwise stipulated or approved in writing by the Owner.
- C. Coordinate the progress of the Work including coordination between trades, subcontractors, suppliers, public utilities, and Owner (through Engineer) to ensure the progress of the Work.
- D. Furnish all construction related permits as required by the work activities of the Project.
- E. It is the intent of this Contract that the Work proceed in the most expeditious manner possible with a minimum amount of interference with public and private activities.
- F. The specifications included herein are the Specifications for this Project. If there should be a difference between the Specifications and the Drawings, the Specifications shall govern.

1.2 CONTRACTS

- A. Construct the work under a single prime contract.
- B. Liquidated damages for this Project shall be a daily charge, as listed in the Agreement, for each day work extends beyond the specified Contract times. This daily charge will be deducted from any money due the Contractor.
- C. The Project may include unanticipated extra work authorized by the Owner but and only after his approval in writing.

1.3 WORK BY OTHERS

- A. Owner
 - 1. Provide storage area for Contractor salvaged items for Owner including, but not limited to, street lights, electrical equipment, and sod.
 - 2. Furnish and install any Project Identification Signage required.
 - 3. Operate all utility control devices on Owner system.

1.4 WORK SEQUENCE

- A. The Contractor may begin construction upon receipt of the Notice to Proceed.
- B. Contractor shall obtain a discharge permit from the State of Colorado, Department of Public Health and Environment prior to the commencement of any temporary site dewatering operations.
 - 1. Contractor shall comply with all permit conditions.
 - 2. Contractor shall meet requirements of all state and federal regulatory agencies prior to discharge of such water.
- C. Coordinate Work with Engineer, Owner, other Prime Contractors, public utilities and adjacent property owners so as to minimize disruption to the activities of others.
 - 1. Set forth proposed work schedule in accordance with Section 01310.
- D. Procedures and methods other than those specified will be considered by Engineer and Owner, provided they afford equivalent continuity of operations.
- E. Discuss sequence of Work and notice required at progress meetings
 - 1. Review with and obtain Engineer's and Owner's input to Contractor's initial scheduling of Work and sequencing of Work during preconstruction conference.
 - 2. Review any changes in scheduling at regularly scheduled progress meetings.
 - 3. Schedule weekly construction progress meetings as required to discuss work sequence.
 - 4. Discuss any upcoming changes in Owners operation of facilities associated with Contractors work sequence.
- F. Submit and update progress schedules and subschedules in accordance with Specification Section 01310.
- G. Inspection by Public Agencies:
 - 1. Contractor shall provide access to the construction project for observation of work by appropriate governmental and permit-issuing agency representatives.

1.5 TENTATIVE PROJECT SCHEDULE

- A. The primary project goal of the Project is to have the new facilities in service prior to the commencement of the Fall 2016 school year.

1.6 CONTRACTOR'S USE OF PREMISES

- A. Refer to Section 01500 for additional requirements associated with Contractor's use of Owner's facilities.
- B. Assume full responsibility for the protection and safekeeping of products furnished under this Contract.
- C. Obtain and pay for use of additional storage or work areas needed for operations.
- D. Contractor may use on-site areas designated by the Owner for storage and staging.
- E. Move any stored products, under Contractor's control, which interfere with operations of the Owner or other Prime Contractors.
- F. Off-site storage arrangements shall be acceptable to Owner and Engineer.
 - 1. Requests for off-site storage arrangements presented in writing.
 - 2. Adequate and satisfactory security and protection.
 - 3. Accessible to Engineer.
- G. Refer to Section 01600 for additional requirements associated with storage of materials and equipment.

1.7 CONSTRUCTION LIMITS AND ACCESS

- A. Except as otherwise indicated on the Drawings, the limits of construction shall be established prior to the commencement of construction activities by the Owner and the Engineer. Restrict work to those designated areas. Any changes deemed necessary shall be discussed with and approved by the Owner and Engineer.
- B. Before occupying the sites, meet with the Owner and the Engineer to determine the marshalling area(s) and access points to be used to execute the work. Limit access and marshalling areas agreed to at that meeting. Obtain written permission from the Owner of any changes other than first agreed upon. Upon completion of all work, restore all areas to original or improved conditions.

1.8 EASEMENTS AND RIGHT-OF-WAY

- A. As indicated on Drawings.

- B. Owner will provide easements and right-of-ways for work activities and permanent improvements outside of existing CSU-Pueblo property, if any.
- C. Confine construction operations to the immediate vicinity of the location indicated on Drawings and use due care in placing construction tools, equipment, excavated materials, and materials and supplies, so as to cause the least possible damage to property and interference with traffic.
- D. On Private Property:
 - 1. As indicated on the Drawings, if any.
 - 2. If use of land outside Owner's ownership is desirable or necessary, obtain consent of and execute a written agreement with, the owner and tenant of the land.
 - 3. Do not enter for delivery or occupy for any purpose with men, tools, equipment, construction materials, or excavated materials, any private property outside the designated construction limits without written permission of the owner and tenant.

1.9 FENCES

- A. Maintain all fences affected by the Work until completion of the Work.
- B. Do not relocate or dismantle fences which interfere with construction operations before obtaining written permission from the fence owner with an agreement as to the length of time the fence may be left relocated or dismantled.
- C. Where fences must be maintained across the construction site, install adequate gates.
 - 1. Keep gates closed and locked when not in use.
 - 2. Provide Owner and Engineer with keys to each lock.
- D. At the completion of Work, restore fences to their original or better condition and to their original location unless otherwise indicated on Drawings or in Specifications.
- E. Refer to Section 01500 and Drawings for additional requirements on temporary fencing.

1.10 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

- A. All work shall be carried out in a safe manner in accordance with local codes and the safety requirements of the Colorado State Division of Labor.
- B. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by construction operations.
- C. Notify Owner, the Engineer, and the owning utility when working near utility lines or appurtenances.

- D. Restore to their original or better condition, pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations.
- E. Provide for surface drainage and erosion control during the construction period in a manner to avoid creating a nuisance to adjacent properties/areas.
- F. Use new materials for replacements.
- G. Carefully maintain and protect all benchmarks, corner monuments, and other points. If disturbed or destroyed, replace at no cost to the Project as directed by the Engineer.
- H. Contractor shall be responsible for all damage to streets, roads, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, which may be caused by transporting equipment, materials or men to or from the Work or any part or site thereof, whether by him or his subcontractors.
- I. Make satisfactory and acceptable arrangements with the owner of, or the agency or authority having jurisdiction over, any damaged property concerning its repair or replacement or payment of costs incurred in connection with the damage.
- J. Keep fire hydrants and water control valves free from obstruction and available for use at all times.

1.11 MAINTENANCE OF VEHICULAR AND PEDESTRIAN TRAFFIC

- A. Existing roads, sidewalks, and parking areas in the construction area shall be kept open to all vehicular and pedestrian traffic by the Contractor and maintained in a condition that will adequately accommodate traffic except as otherwise indicated. No work that interferes or conflicts with vehicular and pedestrian traffic or existing access to the roadway or sidewalk surface shall be performed until a "Traffic and Pedestrian Control Plan" and schedule for the satisfactory handling of traffic has been submitted by the Contractor and reviewed by the Owner and Engineer.
- B. Construction signing for traffic and pedestrian control shall conform to the Colorado Department of Highways Manual on Uniform Traffic Control Devices.
- C. The Contractor is solely responsible for all activities and costs associated with traffic and pedestrian control.

1.12 LINES AND GRADES

- A. Construct all work to the lines, grades, and elevations indicated on the Drawings.
 - 1. Remove and reconstruct improperly located work.

- B. Owner, through Engineer, will provide a limited amount of construction control staking at the Project site for the Contractor. Upon any survey discrepancy occurred by either the Contractor or Surveyor, the original hub must be intact and verified by Surveyor for location and information given, if destroyed, the Surveyor will not be responsible for said construction in question. Construction control staking provided by Owner includes the following:
 - 1. Two control points including vertical (benchmark) information.
 - 2. Verification of final, as installed quantities.

- C. Any stakes or control points which are lost or destroyed will be replaced by the Owner and the Contractor shall pay any charges of the Owner associated with said replacement.

- D. Contractor shall provide all other survey, layout, and measurement work required.
 - 1. Work performed by a licensed engineer or surveyor acceptable to Engineer.
 - 2. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.
 - a. Make no changes or relocations without prior written notice to Engineer.
 - b. Report to Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
 - c. Require surveyor to replace project control points which may be lost or destroyed.
 - 1) Establish replacements based on original survey control.
 - 3. Establish lines and levels, locate and layout, by instrumentation and similar appropriate means.
 - a. Site improvements and utilities:
 - 1) Stakes for grading, cuts, fills, basecourse, asphalt, and topsoil placement.
 - 2) Utility slopes and invert elevations.
 - b. Batter boards for structures.
 - c. Foundations with elevations.
 - d. Controlling lines and levels required for electrical trades.
 - 4. Periodically verify layouts by same methods.
 - 5. Maintain a complete, accurate log of all control and survey work as it appears.
 - 6. At request of Engineer, submit documentation to verify accuracy of field work.

1.13 UNDERGROUND OBSTRUCTIONS

- A. Protect from damage any underground pipes, utilities, or structures encountered during construction.
 - 1. Restore any damaged underground obstructions to their original condition at no cost to the Owner unless evidence of other arrangements satisfactory to all parties is presented to the Owner.

- B. Before commencing work, obtain information concerning location, type, and extent of concealed existing utilities and structures on the site and adjacent properties.
 - 1. Consult records and personnel of local utility companies, municipal utility departments, and telephone companies.
 - 2. Consult with Campus maintenance personnel.
 - 3. File "Notice of Excavation" with referenced agencies prior to commencing work.
 - 4. Include identified buried utility locations in Contractor supplied "Record" Drawings.

- C. Underground obstructions known to the Engineer are shown on the Drawings or otherwise referred to in the Specifications.
 - 1. Locations shown may prove to be inaccurate and other obstructions not shown may be encountered.
 - 2. Contractor's responsibility to verify actual locations and to protect or restore all underground obstructions encountered.

- D. Buried electric and irrigation system is known to exist around the site. Existing records on locations of buried electric and irrigation lines does not exist therefore, buried electric and irrigation lines shown on the Drawings is based strictly on best knowledge of Owner's maintenance staff. Contractor shall contact the electric utility and Owner staff to identify and locate buried electric and irrigation facilities prior to the commencement of construction activities.

END OF SECTION

SECTION 01023

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes a description of Additive and Deductive Bid Alternates.
- B. Related Requirements: The following Sections contain requirements that relate to this Section:
 - 1. SPB-6.12: Information for Bidders
 - 2. SPB-6.13: Specimen of Bid
 - 3. SPB-6.131: Bid Alternates
 - 4. SC6.23: General Conditions of the Contract

1.2 ADDITIVE ALTERNATES

- A. Furnish and Install Campus Monument Sign complete with concrete pad, electrical connections/service, and all incidentals of construction, complete in place.
- B. Furnish and Install Student Recreational Field Parking Lot Pavement Section (4" hot bituminous pavement placed on 9" of aggregate base course) complete with excavation, subgrade preparation, proof-rolling, compaction, tack coat, testing, and all incidental materials of construction, complete in place.

1.3 DEDUCTIVE ALTERNATES

- A. Furnish and install Type 1 (1 ½") Landscape Aggregate in all areas shown on the Drawings as receiving Type 2 (4" – 6") Landscape Aggregate complete in place with all incidentals of construction.
- B. Furnish and install 400 Watt Metal Halide Luminaires in lieu of the scheduled LED Luminaires complete in place with all incidentals of construction.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 GENERAL

- A. Prepare Contractor's Application for Payment in accordance with the General Conditions and the Agreement Between Owner and Contractor.
- B. Payment for construction shown on the Drawings and specified herein shall be made as noted in the Bid Schedules.
- C. Payment for measured quantities will be made based on unit prices "as-measured" regardless of how the actual installed quantity compares to the bid quantity except as otherwise indicated herein.
- D. Drawings may include a "Quantity Summary" which provides only a general estimation of major work item quantities on the individual sheet. Bid Schedule and field measured quantities take precedent over quantities in those schedules.

1.2 FORMAT AND DATA REQUIRED

- A. Blank Application for Contractor's Payment form and Schedule of Value sheets as provided in the "Contract Administration Forms" Section of these Specifications.
- B. Schedule of Values format, line items, schedules, and values per Section 01370 and Schedule of Values included with the Bid.

1.3 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form Prepared by Contractor
 - 1. Required information completed, including that for Change Orders executed prior to the date of submittal of application.
 - 2. Summary of dollar values to agree with the respective totals indicated on the continuation sheets.
- B. Schedule of Value Sheets
 - 1. Total list of all scheduled component items of Work, with item number and the scheduled dollar value for each item.
 - 2. Dollar value in each column for each scheduled line item when work has been performed.
- C. List each Change Order authorized prior to date of submission, at the end of the Schedule of Values. List by Change Order number and description.

- D. Contractor shall execute certification with the signature of a responsible officer of the Contractor's firm.
- E. Four original copies of each signed Payment Application to be submitted.

1.4 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When Owner or Engineer requires substantiating data, i.e. load tickets, Contractor shall submit suitable information with a cover letter identifying:
 - 1. Project name and number
 - 2. Application number and date
 - 3. Detailed list of enclosures
 - 4. For stored products
 - a. Item number and identification as shown on application
 - b. Description of specific material
- B. Submit one copy of data and cover letter for each copy of application.

1.5 SCHEDULE OF VALUES

- A. Refer to General Conditions for requirements.

1.6 LUMP SUM BID ITEMS

- A. Payment for bid items for which the contract amount is a lump sum amount:
 - 1. Based on the proportion of the Work satisfactorily accomplished to the date of the partial payment request.
 - 2. Partial payment request by Contractor subject to review and approval by the Engineer and Owner.
- B. Separate payment may be made for materials stored on-site and not incorporated into the permanent work only if detailed invoices for stored materials are submitted.
- C. The Bid Form and Schedules of Values may provide for separate payment for project mobilization, general requirements, project demolition and clean up. Total payment for this bid item shall not exceed 7% of the total Base Bid amount. A minimum of 30% of this bid item will be held until final demobilization and site cleanup are complete.

1.7 UNIT PRICE BID ITEMS

- A. Payment for work included in unit price bid items shall be based on the completed value of each unit in such quantity actually installed as measured and determined by the Engineer.
- B. Payment for work items for which no bid item specifically provides for separate measurement and payment shall be made as part of the price for the bid item such item most nearly accommodates.

- C. When payment for improvements is to be made at a unit price per lineal foot, payment shall be made horizontally along the centerline of the improvement.
- D. No payment shall be made for unit price bid items which exceed the limits indicated on the Drawings without prior written approval from the Engineer and Owner.

1.8 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Contractor shall complete Certificate form as specified for progress payments. All final punch list items must be completed and verified by the Engineer.
- B. Schedule of Value sheets used for presenting the final statement of accounting as specified in General Conditions.

1.9 SUBMITTAL PROCEDURE

- A. Submit Application for Payment to the Engineer at the times stipulated in the Contract Documents and during the preconstruction conference.
- B. Number: Four (4) copies of each signed Application for Payment.
- C. When Engineer finds Application properly completed and acceptable he/she will transmit the Application for Payment to the Owner.

END OF SECTION

SECTION 01041

PROJECT COORDINATION

1.1 GENERAL

- A. Work included in these Contract Documents is to be performed under the responsibility of a single prime contractor.
- B. Contractor will be responsible for the coordination of all the work whether performed by his own personnel or his subcontractors. Contractor will maintain such procedures as necessary to keep its workmen and suppliers as well as the Engineer, Owner, and Public Utilities informed of project progress so as not to unnecessarily delay completion of its work.
- C. Refer to Section 01010 -Summary of Work for information on work, if any, to be performed by the Owner, and/or public utilities.
- D. Refer to General Conditions for additional requirements.

END OF SECTION

SECTION 01045
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Contractor shall be responsible for all cutting, fitting, and patching including attendant excavation and backfill required to complete the work or to:
 - 1. Make its several parts fit together properly
 - 2. Uncover portions of the work to provide for installation of ill-timed work
 - 3. Uncover work for inspection or for correction of defective work
 - 4. Remove and replace work not conforming to requirements of Contract Documents
 - 5. Remove samples of installed work as specified for testing
- B. Additional Requirements Specified Elsewhere:
 - 1. General Conditions
 - 2. Quality Control: Section 01400
 - 3. Materials and Equipment: Section 01600
- C. Related Requirements Specified Elsewhere:
 - 1. Individual Sections of the Specifications

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Provide products as specified or as required to complete cutting and patching operations.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of the Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect the conditions affecting the installation of products, or performance of the work.

- C. Report unsatisfactory or questionable conditions to the Engineer in writing; do not proceed with the work until the Engineer has provided additional instructions in writing.

3.2 PREPARATION

- A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work.
- B. Provide devices and methods to protect other portions of the Project and existing improvements from damage.
- C. Provide protection from the elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from water.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- E. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 APPLICABLE CODES

- A. Contractor shall comply with the following, most recent issue of, applicable codes, standards, rules, and regulations of authorities having jurisdiction over the project sites or the Work to be performed.
 - 1. International Building Code (IBC)
 - 2. International Mechanical Code (IMC)
 - 3. National Electric Code (NEC)
 - 4. International Plumbing Code (IPC)
 - 5. National Fire Protection Association Standards
 - 6. Williams-Steiger Occupational Safety and Health Act
 - 7. Life Safety Code
 - 8. Americans with Disabilities Act
- B. Unless otherwise noted, utilize the code edition in effect at time of work.

1.2 NOTICE

- A. Protection of life, health, and public welfare as related to execution of this construction contract is the responsibility of the Contractor.
- B. Owner and Engineer will not provide observation, inspection, or supervision of procedures or actions employed by the Contractor which are related to safety of life, health, or public welfare which are solely the Contractor's responsibility.
- C. If conditions are imposed by Engineer or Owner which interfere with, or imply actions detrimental to safety, Contractor shall issue written notice and a decision for action shall be returned to the Contractor prior to affecting any unsafe procedure or condition.
- D. The Contractor has responsibility to assure that any and all materials handled and/or disposed of under the project contract are done so in compliance with local, state, and federal environmental laws.

1.3 CONFLICTS

- A. In case of conflict between referenced codes, the one having the more stringent requirements shall govern.
- B. Drawings and Specifications shall govern when their requirements are more stringent than code requirements.

1.4 APPLICABLE PERMITS

- A. Contractor shall be responsible for obtaining all permits and licenses required for this project including, but not limited to, permits and notifications for dust control, erosion control, and dewatering discharge.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Engineer and/or Owner shall schedule and administer preconstruction conference and weekly progress meetings. Any specially called meetings during the progress of the Work shall be scheduled and administered by the party requesting such meetings.
1. Requirements of meeting administrator
 - a. Prepare meeting agenda
 - b. Notify all required meeting attendees of each meeting a minimum of four days in advance of meeting date. Contractor to notify subcontractors and suppliers.
 - c. Make physical arrangements for meetings
 - 1) Preconstruction conference to be held at the Colorado State University – Pueblo, Physical Plant.
 - 2) Progress meetings to be held at the individual construction site.
 - d. Preside at meeting
 - e. Record the minutes; include all significant proceedings and decisions.
 - f. Reproduce and distribute copies of minutes within three days after each meeting.
 - 1) To all participants in the meetings
 - 2) Contractor to distribute minutes to parties affected by decisions made at the meetings.
- B. Responsibilities of meeting attendees
1. Thoroughly review minutes of meeting
 2. Promptly notify preparer of minutes, in writing, of any errors, omissions, etc.
- C. Representatives of contractors, subcontractors, and suppliers attending the meetings shall be qualified and authorized to act on behalf of the entity each represents.
- D. Engineer may attend specially called meetings to ascertain that Work is expedited consistent with Contract Documents and construction schedules.

1.2 PRECONSTRUCTION CONFERENCE

- A. Shall be scheduled within 10 days after the effective date of Agreement.
- B. Location: Colorado State University – Pueblo Physical Plant or other location designated by the Owner.
- C. Attendance
 - 1. Owner's representatives
 - 2. Engineer and his professional consultants
 - 3. Resident Project Representative
 - 4. Contractor's superintendent and project manager
 - 5. Major Subcontractors
 - 6. Major suppliers
 - 7. Representatives of public utilities as pertinent
 - 8. Others as appropriate
- D. Minimum Agenda Requirements
 - 1. Distribution and discussion of
 - a. List of subcontractors and suppliers
 - b. Projected construction schedules
 - 2. Critical work sequencing, Project Sequencing Plan, and scheduling of equipment and material deliveries
 - 3. Equipment deliveries and priorities
 - 4. Project coordination: Designation of responsible personnel
 - 5. Procedures and processing of
 - a. Proposal requests
 - b. Submittals
 - c. Field decisions and orders
 - d. Change Orders
 - e. Applications for Payment
 - 6. Adequacy of distribution of Contract Documents
 - 7. Procedures for maintaining project record documents
 - 8. Use of premises
 - a. Office, work, and storage and staging areas
 - b. Owner's requirements
 - c. Public utilities' requirements
 - 9. Construction facilities, controls, and construction aids
 - 10. Temporary utilities
 - 11. Housekeeping procedures
 - 12. Security procedures
 - 13. Responsibilities of the Owner
 - 14. Responsibilities of the Engineer
 - 15. Responsibilities of the Contractor
 - 16. Responsibilities of Public Utilities

1.3 PROGRESS MEETINGS

- A. Hold regularly scheduled meetings throughout the progress of the Work. This is expected to occur weekly.

- B. Location of meetings: Construction site followed by on-site walk-through.
- C. Attendance
 - 1. Engineer and his professional consultants as needed
 - 2. Resident Project Representative
 - 3. Owner's Representatives
 - 4. Contractor's Superintendent and Project Manager
 - 5. Subcontractors and Suppliers as appropriate to the agenda
 - 6. Others as appropriate
- D. Minimum Agenda Requirements
 - 1. Review of work progress
 - 2. Field observations, problems, conflicts
 - 3. Problems which may impede construction schedule
 - 4. Review of off-site fabrications, delivery schedule
 - 5. Corrective measures and procedures to regain projected schedule
 - 6. Revisions to construction schedule
 - 7. Planned progress, schedule during succeeding work period
 - 8. Coordination of schedules
 - 9. Review submittal schedules; expedite as required
 - 10. Maintenance of quality standards
 - 11. Review proposed changes for effect on construction schedule and on completion date
 - 12. Other business

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 GENERAL

- A. Within 5 days after the effective date of the Agreement, the Contractor shall prepare and submit to the Engineer estimated construction progress schedules for the Work, including related activities which are essential to the progress of the Work in accordance with the General Conditions.
 - 1. Shall meet the proposed substantial and final completion dates identified in the Bidding Documents and Section 01010.
- B. Submit revised progress schedules with each Application for Payment or as otherwise requested by the Engineer or Owner.
- C. Owner may require Contractor to add to his plant, equipment, or construction forces, as well as increase working hours in accordance with requirements of the Specifications if operations fall behind schedule at any time during the construction period.
- D. Related Requirements Specified Elsewhere
 - 1. General Conditions
 - 2. Section 01010: Summary of Work

1.2 FORM OF SCHEDULES

- A. Prepare schedules in the form of a horizontal bar chart
 - 1. Provide separate horizontal bar for each trade or operation
 - 2. Horizontal time scale: Identify the first work day of each week
 - 3. Maximum sheet size: 11"x17"
 - 4. Allow space for notations and future revisions
- B. Computer Generated Schedule
 - 1. Network analysis system may be utilized in lieu of bar chart.
- C. Format of Listings
 - 1. The table of contents of this Project Manual and items as identified on the various Bid Schedules of the Bid Form.
 - 2. The chronological order of the start of each item of work.

D. Identification of Listings

1. Bid Form line items.

1.3 CONTENT OF SCHEDULES

A. Construction progress schedules to include:

1. The complete sequence of construction by activity.
2. The dates for the beginning and completion of each major element in each major area of construction, including but not limited to:
 - a. Earthwork, demolition, and site preparation.
 - b. Cast-in-place concrete slabs, sidewalks, pans, foundations, etc.
 - c. Utility and drainage improvements.
 - d. Plantings and irrigation system improvements.
 - e. Asphalt paving, striping, and basecourse surfacing of streets and parking lots.
 - f. Electrical system improvements
 - g. Project cleanup and closeout
3. Projected percentage of completion for each item, as of the date on which each scheduled Application for Payment is due.
4. Complete projected progress payment schedule.

B. Schedule of submittals for shop drawings, product data, and samples to include:

1. The dates for Contractor's submittals.
2. The dates approved submittals will be required from the Engineer.
 - a. Extensions of time for delays in submittal review and distribution will only be allowed as provided for in Section 01340.

C. Product Delivery Schedule

1. Show delivery dates for all major items of equipment and materials.

D. Provide subschedules to define critical portions of prime schedules.

1.4 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

- B. Show changes occurring since previous submission of schedule
 - 1. Major changes in scope
 - 2. Activities modified since previous submission
 - 3. Revised projections of progress and completion
 - 4. Revisions to projected progress payment schedule
 - 5. Other identifiable changes
- C. Provide a narrative report as needed to define
 - 1. Problem areas, anticipated delays, and the impact on the schedule
 - 2. Corrective action recommended and its effect

1.5 SUBMISSIONS

- A. Submit initial schedules in accordance with paragraph 1.1 of this Section
 - 1. Engineer will review schedules and return review copy within 5 days after receipt with any changes.
 - 2. If required, resubmit within 5 days after return of review copy.
- B. Submit revised progress schedules as necessary due to changes or actual work. Submit revised progress schedules with each Application for Payment.
- C. Number of copies required at each submission:
 - 1. The number of opaque reproductions required by Contractor plus nine copies which will be retained or distributed by the Engineer.
 - 2. Do not submit fewer than four copies.

1.6 DISTRIBUTION

- A. After review, Engineer will distribute copies of schedules as follows:
 - 1. One copy to Owner
 - 2. One copy to resident project representative
 - 3. One copy to be retained in Engineer's file
 - 4. One copy to Contractor
 - 5. Remainder to Contractor for his distribution following modifications if required
- B. Schedule recipients will report promptly to Engineer and Contractor, in writing, any problems anticipated by the projections shown on the schedules.

END OF SECTION

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.1 GENERAL

- A. Submit shop drawings, product data, and samples as required by the Contract Documents for all materials and equipment to be furnished under this Contract.
- B. Related Requirements Specified Elsewhere
 - 1. General Conditions
- C. Designate in the construction schedule, or in a separate coordinated shop drawing schedule, the dates for submission and the dates that reviewed shop drawings and product data will be needed.

1.2 SHOP DRAWINGS

- A. Drawings shall be presented in a clear and thorough manner.
 - 1. Drawings shall have sufficient detail to show the kind, size, arrangement, and function of component materials and devices.
- B. Minimum sheet size: 8 1/2"x 11"
- C. Maximum sheet size: 24" x 36"

1.3 PRODUCT DATA

- A. Preparation
 - 1. Clearly mark each copy to identify pertinent products or models
 - 2. Show performance characteristics and capacities
 - 3. Show dimensions and clearances required
 - 4. Show external connections, anchorages and support required
 - 5. Show wiring diagrams and controls
- B. Manufacturer's standard schematic drawings and diagrams
 - 1. Modify drawings and diagrams to delete information which is not applicable to the Work
 - 2. Supplemental standard information to provide information specifically applicable to the Work
 - 3. Plot performance points specified

1.4 SAMPLES

- A. Office samples shall be of sufficient size and quantity to clearly illustrate
 - 1. Functional characteristics of the product, with integrally related parts and attachment devices.
 - 2. Full range of color, texture, and pattern.
- B. Field Samples and Mock-Ups
 - 1. Contractor shall erect, at the project site, at a location acceptable to the Engineer and Owner.
 - 2. Size of area: That specified in the respective specification section.
 - 3. Fabricate each sample and mock-up complete and finished.
 - 4. Remove mock-ups at completion of Work or when acceptable to the Engineer.

1.5 CONTRACTOR RESPONSIBILITIES

- A. Review shop drawings and product data prior to submission.
- B. Determine and verify
 - 1. Catalog numbers and similar data
 - 2. Conformance with Specifications
 - 3. Field measurements
 - 4. Field construction criteria
- C. Coordinate each submittal with requirements of the Work and the Contract Documents.
- D. Notify the Engineer in writing at the time of submission, of any deviations in the submittals from requirements of the Contract Documents.
- E. Include certification of Contractor review and conformity to Contract requirements per General Conditions.

1.6 SUBMISSION REQUIREMENTS

- A. Submittals shall be made with a letter of transmittal to the Engineer by the Contractor and not by subcontractors, suppliers or manufacturers.
- B. Make submittals promptly in accordance with construction schedule and in such sequence as to cause no delay in the Work or in the work of any other contractor.
- C. Number of submittals required
 - 1. Shop drawings and product data
 - a. Submit the number of copies which Contractor requires plus three copies which will be distributed by Engineer.

- b. Do not submit less than four copies
 - 2. Product data
 - a. Submit the number of copies which Contractor requires plus three copies which will be distributed by Engineer.
 - b. Do not submit less than four copies
 - 3. Samples
 - a. Do not submit less than four copies of each
- D. Submittals shall contain
 - 1. The date of submission and the dates of any previous submissions.
 - 2. The project title and number
 - 3. Contract identification where applicable
 - 4. The names of
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 - 5. Identification of the product, with the Specification section number.
 - 6. Field dimensions, clearly indicated
 - 7. Relation to adjacent or critical features of the Work or materials.
 - 8. Applicable standards such as ASTM or Federal Specification numbers.
 - 9. Identification of deviations from Contract Documents
 - 10. Identification of revisions on resubmittals
 - 11. An 8"x3" blank space for Contractor's and Engineer's stamps.
 - 12. Contractor's stamp, signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and Contract Documents.
- E. Enumeration of Submittal and Resubmittals
 - 1. Combine all information on materials and equipment which are components of a system into one submittal.
 - 2. Number each submittal sequentially: 1,2,3,4, etc.
 - 3. Groups of submittals transmitted under one submittal number will not be accepted unless all submittals are for components of an individual system.
 - 4. Resubmittals shall bear the number of the original submittal followed by a letter (A,B, etc.) indicating the order of the resubmittal.

1.7 DISPOSITION OF SUBMITTALS

- A. No Exception Taken, Do Not Resubmit
 - 1. One copy sent to Owner
 - 2. One copy sent to resident project representative

3. One copy retained in Engineer's files
4. One copy sent to Contractor
5. Remaining copies, if any, returned to Contractor for his use

B. Make Corrections Noted, Do Not Resubmit

1. One copy sent to Owner
2. One copy sent to resident project representative
3. One copy retained in Engineer's files
4. One copy sent to Contractor
5. Remaining copies, if any, returned to Contractor for his use
6. Work performed or products furnished to comply with exceptions noted on submittal
7. Copies of submittal data in Operating and Maintenance Manuals to be revised according to exceptions

C. Revise and Resubmit, Resubmittal Required

1. One copy sent to resident project representative
2. One copy retained in Engineer's files
3. Three marked copies, maximum, returned to Contractor for revision and resubmittal
4. Remaining unmarked copies returned to Contractor
5. Copy of transmittal letter to Owner

1.8 DISPOSITION OF SAMPLES

A. No Exceptions Noted

1. One sample to Owner
2. One sample to resident project representative
3. One sample retained in Engineer's file
4. Acknowledgement to Contractor
5. Copy of transmittal letter to Owner

B. Make Corrections Noted, Do No Resubmit

1. One sample to Owner
2. One sample to resident project representative
3. One sample retained in Engineer's file
4. Acknowledgement to Contractor: Work performed or products furnished to comply with exceptions noted in acknowledgement
5. Copy of transmittal letter to Owner

C. Revise and Resubmit, Resubmittal Required

1. One sample to resident project representative
2. One sample retained in Engineer's file
3. One sample to Contractor for revision and resubmittal
4. Copy of transmittal letter to Owner

1.9 RESUBMISSION REQUIREMENTS

- A. Thoroughly review Engineer's comments and make any corrections or changes in the submittals required by Engineer and resubmit until accepted.
- B. The Engineer may, at his discretion, require the Contractor to reimburse the Owner for costs associated with review of shop drawings and/or product data and/or samples which require more than one resubmittal.
 - 1. Engineer's decision shall be based on thoroughness of submittals
 - 2. Costs not to exceed \$200 per submittal
 - 3. Execute a Change Order to the Contract deducting the cost paid by the Owner for review of more than one resubmittal of shop drawings, product data and/or samples.
 - 4. Refer to Section 01700 – Contract closeout for additional requirements
- C. Shop Drawings and Product Data
 - 1. Revise initial drawings or data and resubmit as specified for the initial submittal.
 - 2. Indicate any changes which have been made other than those requested by Engineer.
- D. Samples: Submit new samples as required for initial submittal.

1.10 ENGINEER'S RESPONSIBILITIES

- A. Review submittals with reasonable promptness and in accordance with schedule
 - 1. No extensions of time are allowed due to Engineer's delay in reviewing submittals unless all the following criteria are met
 - a. Contractor has notified Engineer in writing that timely review of the particular submittal in question is critical to the progress of the Work.
 - b. Engineer has failed to return submittal within 14 days of receipt of the submittal or said notice, whichever is later.
 - c. Contractor demonstrates that the delay in the progress of the Work was directly attributable to Engineer's failure to return the submittal within 14 days.
 - d. Acceptable schedule of submittals submitted per Section 01310.
 - 2. No extensions of time are allowed due to delays in the progress of the Work caused by rejection and subsequent resubmission of data, including multiple resubmissions.

- B. Review drawings and data submitted only for general conformity with the Contract Documents
 - 1. Engineer's review of drawings and data returned marked "No Exception Taken" or "Exceptions Noted" does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, devices, or items shown.
 - 2. Engineer's review does not relieve Contractor of responsibility for errors, omissions, deviations, or responsibility for compliance with the Contract Documents.
- C. Consider and review only those deviations from the Contract Documents clearly identified as such in the submittals.
- D. Affix stamp and indicate requirements for resubmittal or acceptance of submittal.
- E. Return submittals to Contractor for distribution or for modifications and resubmissions.
- F. Transmit, unreviewed to Contractor, all copies of submittals received directly from suppliers, manufacturers, and/or subcontractors or submitted without Contractor's certification of review.

1.11 OWNER'S RESPONSIBILITIES

- A. Thoroughly review all shop drawings, product data, transmittal letters, etc. forwarded to Owner by Engineer.
- B. Promptly notify Engineer of any exceptions, comments, or questions.

1.12 ADDITIONAL SUBMITTALS

- A. Insurance Certificates
 - 1. Refer to the General Conditions
 - 2. Submit updated certificates as necessary to verify current coverage
- B. Warranties and Bonds
 - 1. Refer to the General Conditions
- C. Temporary Facilities and Controls
 - 1. Submit the following detailed information to the Engineer for review prior to commencement of any construction activities
 - a. Regulatory Permits as indicated in Section 01060-Regulatory Requirements
 - b. "Dewatering Plans"

2. Submit information as required by Section 01700-Contract Closeout
- D. Quality Assurance Submittals
1. Submit quality control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
 2. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
 - a. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
 3. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Section 01400: Quality Control.

END OF SECTION

SECTION 01370

SCHEDULE OF VALUES

1.1 GENERAL

- A. Submit to Engineer a Schedule of Values allocated to the various portions of the Work, within 5 days after the effective date of the Agreement.
- B. Upon request of Engineer, support the values with data which will substantiate their correctness.
- C. An unbalanced Schedule of Values providing for over-payment of Contractor on items of the Work which will be performed early will not be accepted.
- D. Revise and resubmit the Schedule of Values until acceptable to Engineer and Owner. No Applications for Payment shall be submitted until the Schedule of Values is accepted.
- E. The Schedule of Values, when accepted by the Engineer and Owner shall be used only as the basis for the Contractor's Applications for Payment.
- F. Coordinate with the construction schedule to provide a projected progress payment schedule. Estimate anticipated monthly payments for each month during the life of the Project.
- G. Additional Requirements Specified Elsewhere
 - 1. Section 01025: Measurement and Payment
 - 2. Section 01200: Project Meetings
 - 3. Section 01310: Construction Schedules

1.2 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Use continuation sheets of the "Contractor's Application for Payment" included with Contract Administration Forms. Identify schedule with:
 - 1. Title of project and location
 - 2. Engineer and project number
 - 3. Name, address, and phone number of Contractor
 - 4. Name of Owner
 - 5. Contract designation where applicable
 - 6. Date of submission
- B. Schedule shall list the values for materials or equipment and installation for the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. Follow the table of contents of this Project Manual and the line items of each Bid Schedule in the Bid Form as the format for listing component items.

1. Identify each line item with the number and title of the respective section of the Specifications.
- D. For each major line item, list sub-values of major products or operations under the item.
- E. Such items as bond and insurance premiums, temporary construction facilities, job mobilization, and plant shall be listed separately.
- F. For the various portions of the work:
 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 2. For items on which progress payments will be requested for stored materials, breakdown the value into:
 - a. The cost of the materials, delivered and unloaded at the site.
 - b. The total installed value, including Contractor's overhead and profit.
- G. The sum of all values listed in the schedule shall equal the total contract sum.

1.3 SUBSCHEDULE OF UNIT MATERIAL VALUES

- A. Submit a Subschedule of Unit Costs and Quantities for
 1. Products on which progress payments will be requested for stored products.
- B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.
- C. The unit quantities for bulk materials shall include an allowance for normal waste.
- D. The unit values for the materials shall be broken down into:
 1. Cost of the material, delivered and unloaded at the site.
 2. Installation costs, including Contractor's overhead and profit.
- E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - LABORATORY TESTS

1.1 GENERAL

- A. The Owner will employ and pay for the services of an independent testing laboratory to perform specified laboratory testing of materials during and after incorporation in the Work.
 - 1. Contractor shall cooperate with the laboratory to facilitate the execution of its required services and shall take samples as required.
 - 2. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.
 - 3. Refer to schedule 5.1 in this Section.
- B. Contractor shall employ and pay for the services of an independent testing laboratory to perform specified services and testing related to the design of mixes, materials, and products and to prepare reports and other submittals for review of proposed materials and to retest materials failing initial Owner furnished tests.
- C. Related Requirements Specified Elsewhere
 - 1. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities: General Conditions.
 - 2. Certification of products: The respective sections of Specifications.
 - 3. Testing, adjusting and balancing of equipment and systems: The respective sections of Specifications.
 - 4. Laboratory tests required and standards for testing: Each Specification section.

1.2 QUALIFICATIONS OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification" published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials Used in Construction" as applicable.
- C. Authorized to operate in the state in which the Project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies report by the inspection if requested by Engineer.

E. Testing Equipment

1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
 - a. National Bureau of Standards
 - b. Accepted values of natural physical constants

1.3 LABORATORY DUTIES

- A. Cooperate with Engineer and Contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling, and testing of materials and methods of construction.
 1. Comply with specified standards
 2. Ascertain compliance of materials with requirements of Contract Documents
- C. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit four copies of written report of each test and inspection to Engineer and one copy to Contractor. Each report shall include:
 1. Date issued
 2. Project title and number
 3. Testing laboratory name, address, and telephone number
 4. Name and signature of laboratory inspector
 5. Date and time of sampling or inspection
 6. Record of temperature and weather conditions
 7. Date of test
 8. Identification of product and Specification section
 9. Location of sample or test in the Project
 10. Type of inspection or test
 11. Applicable standard(s) for compliance
 12. Interpretation of test results, when requested by Engineer

1.4 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 1. Release, revoke, alter, or enlarge requirements of Contract Documents
 2. Approve or accept any portion of the Work
 3. Perform any duties of the Contractor

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel and provide access to Work.

- B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, asphalt, and other material mixes which require control by the testing laboratory.
- D. Furnish copies of all product test reports to the Owner and Engineer.
- E. Furnish incidental labor and facilities
 - 1. To provide access to work to be tested
 - 2. To obtain and handle samples at the project site or at the source of the product to be tested
 - 3. To facilitate inspections and tests
 - 4. For storage and curing of test samples
- F. Notify Engineer and Laboratory 24 hours in advance of operations to allow sufficient time to schedule laboratory.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and expenses incurred due to Contractor's failure to meet schedule.
- G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required.
 - 1. For the Contractor's convenience
- H. Execute a change order to the Contract deducting the cost of retests paid by the Owner where initial testing indicated work does not comply with Contract Documents.

PART 2 - SHOP TESTS

2.1 GENERAL

- A. Contractor shall pay all costs associated with specified shop tests of materials and equipment, including retesting of items which fail original tests.
 - 1. Refer to Schedule 5.2
- B. Related Requirements Specified Elsewhere
 - 1. Inspections and testing required by laws, ordinances, rules, regulations, orders, or approvals of public authorities: General Conditions
 - 2. Certification of products: The respective sections of Specifications
 - 3. Shop tests required and standards for testing: Each Specification section listed

4. Testing, adjusting and balancing of equipment: The respective sections of Specifications

2.2 SHOP TEST RESULTS

- A. Submit four copies of certified test results to Engineer, through Contractor, a minimum of 5 days prior to shipment of material or equipment.
- B. Certify, in writing, that materials or equipment comply with all specification requirements.

PART 3 – MANUFACTURER’S FIELD SERVICES

3.1 GENERAL

- A. Contractor shall provide and pay for the services of manufacturer’s representatives to perform the specified services.
 1. Refer to Schedule 5.3
- B. Related Requirements Specified Elsewhere
 1. Inspections and testing required by laws, ordinances, rules, regulations, orders, or approvals, of public authorities: General Conditions
 2. Certification of Products: The respective sections of Specifications
 3. Shop tests required and standards for testing: Each Specification section listed
 4. Testing, adjusting, and balancing of equipment: The respective sections of Specifications
 5. Operating and Maintenance Data: Section 01730

3.2 QUALIFICATION OF MANUFACTURER’S REPRESENTATIVE

- A. Authorized representative of the Manufacturer.
- B. Experienced in the application and installation of the subject material or equipment.

3.3 SERVICES PROVIDED BY REPRESENTATIVE

- A. Visit the Site
 1. Inspect, check, and adjust material and equipment as required and approve installations.
 2. Be present when equipment is placed in operation.
 3. Revisit the site as often as required to correct all problems and until material or equipment installation and operation are acceptable to Engineer and Owner.

- B. Instruct Owner's personnel in the operation and maintenance of the material or equipment.
- C. Furnish four (4) copies of a written report to Engineer, through Contractor, certifying that:
 - 1. Materials and equipment are properly installed and lubricated
 - 2. Materials and equipment are in accurate alignment and balance
 - 3. Materials and equipment are free from any undue stress
 - 4. Materials and equipment has operated satisfactorily under full load conditions

PART 4 – FIELD TESTING

4.1 GENERAL

- A. Contractor shall pay all costs associated with field testing of materials and equipment.
 - 1. Refer to Schedule 5.4
- B. Related Requirements Specified Elsewhere:
 - 1. Inspection and testing required by laws, ordinances, rules, regulations, orders, or approvals of public authorities: General Conditions
 - 2. Certification of Products: The respective sections of Specifications
 - 3. Testing, adjusting, and balancing of equipment: The respective sections of Specifications
 - 4. Field tests required and standards for testing: The respective sections of Specifications
 - 5. Operating and Maintenance Date: Section 01730

4.2 TESTING

- A. Provide all required materials, labor, equipment, water, and power required for testing.
- B. Perform all tests in presence of Engineer.
- C. Prepare and submit to Engineer four (4) copies of written reports detailing the results of the tests and identifying corrective action for materials or equipment which failed to pass field tests.
- D. Repair, with no additional compensation, all materials or equipment, which fail during testing.

PART 5 - SCHEDULES

5.1 TESTING LABORATORY SERVICES

- A. Testing laboratory services shall be provided for the following:
01400-5

Type of Material or System

Earthwork
Asphalt Paving and Striping including Basecourse
Plants
Cast-in-Place Concrete

5.2 SHOP TESTING

- A. Shop testing shall be provided for the following:

Type of Equipment or System

Electrical and Lighting

5.3 MANUFACTURER'S FIELD SERVICES

- A. Manufacturer's Field Services shall be provided for the following:

Type of Equipment or System

Asphalt Paving and Striping
Electrical and Lighting

5.4 FIELD TESTING

- A. Field Testing services shall be provided for the following:

Type of Equipment or System

Earthwork
Asphalt Paving and Striping including Basecourse
Cast-In-Place Concrete
Irrigation System
Electrical and Lighting

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish, install, and maintain all temporary utilities required for the Work, except as allowed herein, and remove upon completion of Work.
2. Furnish, install, and maintain all construction aids required for the Work, except as allowed herein, and remove upon completion of Work.
3. Furnish, install, and maintain fences and barriers as required for protection of the public, property, and Work.
4. Contractor may use existing roadways for access as specified. Provide any additional access roads and parking required for Contractor's personnel or operations.
5. At Contractor's option, provide a field office for use by the Contractor's superintendent and Engineer.
6. Provide storage sheds as required for storage of materials and equipment.
7. Provide detailed construction traffic and pedestrian control plans as required at each project site.
8. Provide dewatering plan for control of all surface and ground waters.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies

1. Comply with applicable federal, state, and local laws, codes, regulations, and ordinances.
2. Comply with utility company requirements.
3. Refer to Section 01060 - Regulatory Requirements for additional requirements.
4. Comply with provisions of all Owner and Contractor furnished permits.

PART 2 - PRODUCTS

2.1 GENERAL

- ###### A.
- Temporary products may be new or used, but must be serviceable, adequate for the intended purpose, and must not violate the requirements of any applicable codes or standards.

2.2 TEMPORARY UTILITIES

A. Power

1. Contractor shall arrange for and pay all costs associated with temporary power service either from the local utility or a portable engine-generator.
 - a. Contractor may use existing receptacle outlets where available for small power tools with 120V, single phase, 15 amp and grounding connection plugs at no charge for power where use will not inconvenience Owner.
2. Pay all costs for installation and removal of temporary service and power used.
3. Temporary electrical work shall meet the requirements of the National Electric Code.

B. Water

1. Provide all water required for construction and testing purposes.
2. Provide all drinking water required by construction personnel.
3. Pay all costs.

C. Sanitary Facilities

1. Provide sanitary facilities
 - a. As required by laws and regulations
 - b. Not less than one facility
 - c. Not less than one facility for every 20 employees of Contractor and subcontractors at the site
2. Service, clean and maintain facilities and enclosures

D. Temporary Heating and Ventilation

1. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.
2. Provide adequate forced ventilation of enclosed areas for curing of installed materials and to disperse humidity.
3. Do not use or leave unattended any equipment or apparatus which might create an unsafe condition.
4. Portable heaters shall be standard approved units complete with controls.
 - a. Do not use solid fuel burning space heaters.
5. Pay all costs of installation, maintenance, operation, removal, and for fuel consumed.

E. Stormwater Management

1. Provide temporary devices and controls for stormwater management.
2. Prevent erosion of trenches and fills prior to surface replacement/revegetation.
3. Contractor to obtain all required permits.

2.3 FENCING AND BARRIERS

- A. Refer to General Conditions for responsibilities with respect to protection of persons and property.
- B. Provide and maintain temporary fences, barricades, lights, and guardrails as indicated in the Contract Documents or as necessary to regulate vehicular and pedestrian traffic, to secure the Work and adjacent property, and to protect persons and property.
 1. Obtain necessary approvals and provide temporary expedients as necessary to accommodate controls.
 2. All barricading and traffic controls shall be in accordance with permits issued by regulatory agencies.
- C. Portions of the work sites may not be fenced. Provide temporary fencing as required. Keep existing or new fencing system in place at all times around the site of new improvements.

2.4 CONSTRUCTION AIDS

- A. Provide construction aids and equipment required to facilitate the execution of the Work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railways, hoists, cranes, chutes, and other such facilities and equipment.

2.5 FIELD OFFICE AND STORAGE SHEDS

- A. Furnished at Contractors option with approval of Engineer and Owner.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as Work progress requires.
 1. Power available at working area for use by all trades with no more than 100-foot extension.
- C. Completely remove temporary materials and equipment when their use is no longer required.

- D. Clean and repair damage caused by temporary installations and use of temporary facilities.

3.2 CONSTRUCTION AIDS

- A. Relocate construction aids as required by progress of construction, by storage or work requirements, and to accommodate legitimate requirements of Owner.
- B. Completely remove temporary materials, equipment, and services at completion of the project.
- C. Clean and repair damage caused by installation or by use of temporary facilities.
 - 1. Remove foundations and underground installations for construction aids.
 - 2. Grade the areas of the site affected by temporary installations to required elevations and slopes and clean the area.

3.3 BARRIERS

- A. Install facilities of a neat and uniform appearance, structurally adequate for the required purposes, relocate as required by construction progress.
- B. Completely remove barriers when construction has progressed to the point that they are no longer needed.
- C. Clean and repair damage caused by installation.

3.4 FIELD OFFICE AND STORAGE SHEDS

- A. Fill and grade sites for temporary structures to provide surface drainage and minimize to the fullest extent possible, collection of surface drainage in trenches or other excavations.
- B. Construct temporary facilities on adequate foundations with approved utility services.
- C. Provide periodic maintenance and cleaning.
- D. Remove temporary field offices, storage sheds, contents, services, and foundations at the time when they are no longer needed.

3.6 TRAFFIC CONTROL PLANS

- A. Traffic and pedestrian control through construction areas is solely the contractors responsibility.
- B. Refer to Section 01010.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. General

1. This section applies to all materials and equipment provided under this contract.
2. The requirements of detailed specifications take precedence over this section in the event of an apparent conflict.
3. Provide all new materials and equipment except as specified or required by testing. Models of equipment which are no longer being manufactured are not acceptable.
4. Except as specifically indicated or specified, materials and equipment removed from the existing facilities shall not be used in the completed Work.
5. Contractor to coordinate materials with other parts of the Work, including verification of compatibility of structures, piping, and components.
6. Contractor is responsible for all alternations in the Work to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.
7. Do not use any material or equipment for any purpose other than that for which it is designed, specified, or intended.

B. Reference Standards

1. Reference in the Specifications to standard specifications or publications or technical societies or governmental agencies such as ASTM, ASNI, AISC, AASHTO, ACI, AWS, Federal Specifications, Commercial Standards and the like shall refer to the latest edition adopted and published at the time of receiving bids.
2. All manufacturers, producers, and their agents of materials required shall have reference standards available for reference and shall be fully familiar with their requirements as pertains to their product, material, or equipment.
3. In case of conflict between reference standards and project specifications, project specifications shall govern.
4. In case of conflict between reference standards and codes, the one having the more stringent requirements shall govern.

1.2 QUALITY ASSURANCE

- A. Observation of Performance Tests
 - 1. Where specifications require the presence of Engineer for testing, Owner is to pay for all costs of Engineers first visit.
 - 2. If subsequent visits by Engineer are required because of incomplete tests, retesting, or subsequent tests, Contractor shall reimburse Owner for all costs.

- B. Installer's Qualifications
 - 1. Equipment and material shall be installed and placed in service by, or under the guidance of, qualified personnel having the knowledge and experience necessary for proper results. Where Contractor's or subcontractor's employees are not properly qualified, such personal shall be authorized field representative of the equipment supplier or manufacturer.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Arrange deliveries of products in accordance with construction schedules; coordinate to avoid conflict with Work and conditions at the site.
 - 1. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible.
 - 2. Immediately upon delivery, inspect shipments to assure compliance with requirements of Contract Documents and submittals, and that products are properly protected and undamaged.

- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

- C. Deliver anchor bolts together with templates sufficiently early to permit setting when structural concrete is placed.

- D. Preparation for Shipment
 - 1. Package materials and equipment to facilitate handling and protect against damage during transit, handling, and storage.
 - 2. Protect painted surfaces against impact, abrasion, discoloration, or other damage.
 - 3. Box, crate, or otherwise completely enclose and protect all material and equipment.
 - 4. Protect material and equipment from exposure to the elements and keep thoroughly dry and dust free at all times.
 - 5. Tag or mark each item per the delivery schedule or the Shop Drawings.

6. Include complete packing lists and bills of material with each shipment.

E. Storage and Protection

1. Store immediately upon delivery to site or elsewhere.
2. Store fabricated products above the ground, on blocking or skids, to prevent damage to coatings.
3. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
4. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions and free from damage or deterioration.
5. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
6. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.
7. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.
8. Store electrical equipment and equipment with bearings in weathertight structures maintained above 60 degrees F.
9. Protect electrical equipment, controls, and insulation against moisture, water, and dust damage.
10. Connect and operate continuously all space heaters furnished in electrical equipment.
11. Provide permanent, labeled packing for spare parts.

F. Materials and Equipment Stored Off Project Site

1. Store in accord with requirements of these specifications.
2. Covered by Contractor's insurance.
3. Allow access by Engineer and/or Owner to verify the materials and equipment stored and that they are stored in accordance with these Specifications.
4. Submit invoices with monthly Application for Payment if payment is to be requested for materials or equipment stored off site.
 - a. Refer to Section 01370-Schedule of Values for additional requirements.
5. Once payment is made for stored materials and equipment such becomes the property of the Owner but are to remain covered by Contractors insurance.

1.4 GUARANTEE

- A. Guarantee all materials and equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, leakage, breakage, or other failure.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General

1. Suitable for the service conditions.
2. Structural and miscellaneous fabricated steel in equipment shall conform to AISC standards, except as otherwise specified.

B. Shop Painting

1. Shop primer for steel and iron surfaces: Cook "391-R-259 Clorocon Barrier Coat," Mobil "13-R-50 Chromox QD Primer," Tnemec "77 Chem Prime," or equivalent to be compatible with finish coating.
2. Rust preventative coating for machined, polished, and nonferrous surfaces not to be painted: Houghton "Rust-Veto 344," Rust-Oleum "R-9," or equivalent.
3. Paint for self contained or enclosed components such as motors, speed reducers and starters: High grade oil-resistance enamel.

C. Safety Guards

1. Guards: 16 USS gauge or heavier galvanized or aluminum coated steel or 1/2" mesh expanded metal.
2. Accessories and supports, including bolts: Galvanized steel unless otherwise specified.

D. Baseplates

1. Cast iron or welded steel.

2.2 FABRICATION AND MANUFACTURE

A. General

1. Design, fabricate, and assemble in accordance with the best modern manufacturing and shop practices.
2. Manufacture all products in accordance with referenced standards.
3. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
4. Manufacture parts to standard sizes and gauges.
5. Design structural members for shock and vibratory loads.
6. Use 1/4" minimum thickness for all steel which will be submerged, wholly or partially, during normal operation.

B. Lubrication System

1. Require no more than weekly attention during continuous operation.
2. Require no attention during equipment startup and shutdown.
3. No lubricant wasting.
4. Convenient and accessible
 - a. Oil drains and fill plugs easily accessible from the normal operating area or platform.
 - b. Drains located to allow convenient collection of oil during oil changes without removing the equipment from its installed position.
5. Provide constant level oilers or oil level indicators for oil lubrication systems.

C. Electric Motors

1. General
 - a. Designed and applied in accordance with NEMA, ANSI, IEEE, AFBMA, and NEC standards for the duty imposed by the driven equipment.
 - b. If driven equipment is subject to frequent starting duty, provide motors suitable for that duty.
 - c. Nameplate horsepower based on continuous duty at 40°C ambient, unless recognized and defined by the standards and codes for intermittent duty as a standard industry practice. Temperature rise above 40° C ambient on continuous operation not to exceed the NEMA limit for 1.0 service factor and Class B insulation, or class A insulation if used.
 - d. Designed for satisfactory operation at any voltage within plus or minus 10% of rated voltage.
 - e. Motors rated at ten (10) horsepower or more shall be designed for reduced voltage starting.
 - f. Bearing life based on the actual operating load conditions imposed by driven equipment.
 - g. Sized for the altitude at which the equipment is installed.

D. Safety Guards

1. Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts.
2. Cover rotating parts on all sides.
3. Designed for easy installation and removal.
4. Provided with all necessary supports and accessories.
5. If outdoors, designed to prevent the entrance of rain and dripping water.

- E. Equipment Anchor Bolts
 - 1. Furnish with equipment.
 - 2. Provided with at least 2 nuts per bolt.
 - 3. 3/4" minimum diameter, stainless steel.
 - 4. Long enough to permit 1" of grout below baseplate, if equipment is baseplate mounted, and to provide adequate anchorage into structural concrete.

- F. Baseplates
 - 1. Provide for pumps, compressors, and similar equipment.
 - 2. Neat design.
 - 3. Pads for anchoring.
 - 4. Adequate grout holes.
 - 5. Provide pump bases with a means for collecting leakage and a threaded drain connection.

- G. Special Tools and Accessories
 - 1. Provide all special tools, instruments, and accessories required for proper maintenance.
 - 2. Provide all special lifting, handling, and operating devices required.

- H. Shop Painting
 - 1. Coat all steel and iron surfaces.
 - 2. Protect surfaces which will be inaccessible after assembly for the life of the equipment.
 - 3. Provide a smooth, uniform base for painting of exposed surfaces by finishing smooth, cleaning thoroughly, and filling as necessary.
 - 4. Apply shop primer to protect equipment to be field painted.
 - 5. Shop finish self-contained or enclosed components.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust, decay, or other deleterious effects of storage. Do not install any materials or equipment showing such effects. Replace damaged materials or equipment with identical new materials or equipment.

3.2 PREPARATION

- A. Install equipment anchor bolts or sleeves during placement of structural concrete.

3.3 INSTALLATION

- A. Install all equipment on bases 4" high minimum unless otherwise indicated.
- B. Anchor baseplates to the concrete base and fill space beneath with grout, 1" thickness minimum.
- C. Provide lubricants as recommended by the equipment manufacturer in sufficient quantity to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation prior to acceptance of equipment by the Owner.
- D. For material and equipment specifically indicated or specified to be reused in the work.
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed work.
 - 2. Arrange for transportation, storage, and handling of products which require off-site storage, restoration, or renovation. Pay all costs for such work.
- E. Recoat all coated surfaces which are damaged prior to product acceptance, to Engineer's and Owner's satisfaction.
- F. Handle, install, connect, clean, condition, and adjust products in strict accordance with manufacturer's instructions and in conformity with specified requirements.
 - 1. Obtain and distribute copies of such instructions to parties involved in the installation in the manner detailed in the submittal section.
 - 2. Maintain one set of complete instructions at the jobsite during installation and until completion.
 - 3. Perform Work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedures unless specifically modified or exempted by Contract Documents.
 - 4. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.
 - 5. Do not proceed with Work without clear instructions.

3.4 FIELD QUALITY CONTROL

- A. Manufacturers Field Representative
 - 1. Provide qualified manufacturer's field representative when specified in the detailed specifications, to provide the services specified.

2. Where installation assistance is specified, manufacturer's representative is to observe, guide, instruct, and direct contractors erection or installation procedures.
3. Where an installation check and/or certification of compliance is specified, manufacturer's representative is to verify if material or equipment is properly installed.
4. Field representatives are to revisit the site as often as necessary to attain installation satisfactory to Engineer and Owner.
5. Acceptance of the work in connection with the installation of materials or equipment furnished by others is subject to acceptance by the manufacturer's field representative. Such acceptance by the field representative or Engineer does not relieve the Contractor of responsibility for planning, supervising, and executing the installation of work or of responsibility for defective work.

3.4 ADJUSTMENT AND CLEANING

- A. Perform all required adjustments, tests, operation checks, and other start-up activities required.
- B. Refer to Section 01710 - Cleaning for additional requirements.

END OF SECTION

SECTION 01631
SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
 - 1. Refer to Section 01041 for additional requirements.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01060: Regulatory Requirements.
 - 2. Section 01310: Construction Schedules.
 - 3. Section 01340: Shop Drawings, Product Data, and Samples.
 - 4. Section 01600: Materials and Equipment.

1.2 RELATED DOCUMENTS

- A. General Conditions and other Division 1 Specification Sections.

1.3 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Changes in products, materials, equipment, and/or methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
 - 1. "or equivalents" requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to the Contract Documents requested by the Owner or Engineer.
 - 3. Specified options of products and construction methods included in the Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: The Engineer and Owner may consider requests for substitution if received within 15 days after Award of a Construction Contract. Requests received more than 15 days after Award of a Construction Contract may be considered or rejected at the discretion of the Engineer and Owner.
1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Prime Contractors, that will be necessary to accommodate the proposed substitution.
 - b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
 - c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

4. Engineer's Action: If necessary, the Engineer will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Engineer will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.
 - a. Use the product specified if the Engineer cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 – PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Engineer and Owner will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Engineer. If the following conditions are not satisfied, the Engineer will return the requests without action except to record noncompliance with these requirements.
 1. Extensive revisions to the Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of the Contract Documents.
 3. The request is timely, fully documented, and properly submitted.
 4. The specified product or method or construction cannot be provided within the Contract Time. The Engineer will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 5. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
 6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
 7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 8. The specified product or method or construction cannot be provided in a manner that is compatible with other materials and where the contractor certifies that the substitution will overcome the incompatibility.

9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
 11. Where a proposed substitution involves more than one prime contractor, each contractor shall cooperate with the other contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.
- B. The Contractor's submittal and the Engineer's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - ADMINISTRATIVE PROCEDURES

1.1 GENERAL

- A. Comply with requirements stated in General Conditions and in Specifications for administrative procedures in closing out the Work.
- B. Additional Requirements Specified Elsewhere
 - 1. Fiscal provisions, legal submittals, and additional administrative requirements: General Conditions.
 - 2. Section 01025: Measurement and Payment.
 - 3. Section 01400: Quality Control.
 - 4. Section 01730: Operating and Maintenance Data.

1.2 SUBSTANTIAL COMPLETION

- A. When Contractor considers the Work is substantially complete, he shall submit to Engineer
 - 1. A written notice that the Work is substantially complete.
 - 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, Engineer will make an inspection to determine the status of completion.
- C. Should Engineer determine that the Work is not substantially complete
 - 1. Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
 - 2. Contractor shall remedy the deficiencies in the Work and send a second written notice of substantial completion to Engineer.
 - 3. Engineer will re-inspect the Work.
- D. When Engineer finds that the Work is substantially complete, he will
 - 1. Prepare and deliver to Owner a tentative Notice of Substantial Completion with a tentative list of items to be completed or corrected before final payment.
 - 2. After consideration of any objections made by the Owner as provided in General Conditions and when Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Notice of Substantial Completion with a revised list of items to be completed or corrected.

1.3 FINAL INSPECTION

- A. When Contractor considers the work is complete, he shall submit written certification that
 - 1. Contract Documents have been reviewed.
 - 2. Work has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. Systems have been tested and are operational.
 - 5. Work is completed and ready for final inspection.
- B. Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should Engineer consider that the Work is incomplete or defective
 - 1. Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to Engineer that the Work is complete.
 - 3. Engineer will re-inspect the Work.
- D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.4 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Project Record Documents
- B. Spare parts and maintenance materials: As specified in individual sections and herein.
- C. Operating and Maintenance Data, Instructions to Owner's Personnel, and Certificates of Compliance as specified in individual sections, Section 01730, and herein.
- D. Evidence of Payment and Release of Liens: As specified in the General and Supplementary Conditions.
- E. Two copies of each specified special bond, warranty, and service contract.

1.5 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a Final Statement of Accounting to Engineer
 - 1. Refer to Section 01025 – Measurement and Payment, for additional requirements.
- B. Statement shall reflect all adjustments to the contract sum:
 - 1. The original contract sum

2. Additions and deductions resulting from
 - a. Previous Change Orders
 - b. Deductions for uncorrected work
 - c. Deductions for liquidated damages
 - d. Deduction for retesting payment, Section 01400
 - e. Deduction for additional reviews of Shop Drawing or Product Data Submittals, Section 01340
 - f. Deduction for re-observation of performance testing, Section 01600
 - g. Other adjustments
3. Total contract sum, as adjusted
4. Previous payments
5. Sum remaining due

1.6 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit and certify the final Application for Payment in accordance with procedures and requirements stated in the General Conditions and Section 01025 - Measurement and Payment.

PART 2 - RECORD DOCUMENTS

2.1 GENERAL

- A. Maintain at the site for the Owner one record copy of
 1. Drawings
 2. Specifications
 3. Addenda
 4. Change Orders and other modifications to the Contract
 5. Engineer Field Orders or written instructions
 6. Approved shop drawings and product data
 7. Field test records
 8. Construction photographs
 - a. Preconstruction
 - b. Progress
- B. Related Requirements Specified Elsewhere
 1. General and Supplementary Conditions
 2. Section 01340: Shop Drawings, Product Data, and Samples

2.2 RECORDING

- A. Label each document "PROJECT RECORD" in neat, large printed letters.
- B. Record information concurrently with construction progress.
 1. Do not conceal any work until required information is recorded.
- C. Drawings: Legibly mark to record actual construction

1. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements and project survey control.
2. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
3. Field changes of dimensions and detail.
4. Changes made by Field Order or Change Order.
5. Details not on original Contract Drawings.

D. Specifications and Addenda: Legibly mark each section to record

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or Change Order.

2.3 SUBMITTAL

- A. At Contract closeout, deliver record documents to Engineer for the Owner.
- B. Accompany submittal with transmittal letter in duplicate, containing
 1. Date
 2. Project title and number
 3. Contractor's name and address
 4. Title and number of each record document
 5. Signature of Contractor or his authorized representative

PART 3 - SPARE PARTS AND MAINTENANCE MATERIALS

3.1 GENERAL

- A. Provide spare parts, maintenance materials, and special tools as specified in the individual specification sections.
- B. Store the items in a clean, dry, heated, storage shed or bonded warehouse.
- C. Protect all items from damage during storage.

3.2 DELIVERY TO OWNER

- A. At or prior to the time of the inspection for substantial completion, deliver all required items to Owner at the place on site designated by the Owner.
 1. Contractor and representatives of Owner and Engineer shall inspect and inventory all items delivered.
- B. Submit to Engineer a detailed invoice of all items delivered.
 1. Organize invoice by specification sections.

2. Indicate on invoice any items delivered which were damaged or defective.
 3. Contractor and Owner's representative shall sign invoice certifying that all items listed were delivered and that, unless otherwise noted on the invoice, all items were in good condition at the time of delivery to Owner.
- C. Engineer will review invoice for completeness and inform Contractor promptly of any deficiencies therein.
 - D. Contractor shall deliver all additional items identified by Engineer and replace all damaged and defective items noted on the original invoice before requesting final inspection.
 - E. Invoices for additional replacement items, signed by the Contractor and Owner's representatives, shall be submitted.

PART 4 - FINAL PAYMENT

4.1 GENERAL

- A. No Certificate of Substantial Completion will be issued by Engineer until required invoices for spare parts, maintenance materials, and special tools are submitted for review.
- B. Final payment will not be made until all specified spare parts, maintenance materials and data, and special tools have been delivered to Owner in acceptable condition.
- C. Final payment will not be made until the Owner has completed the statutorily required public advertisement of a notice of final payment and any claims filed with the Owner have been resolved to the satisfaction of the Owner and the applicable governing agency.

PART 5 - POST-CONSTRUCTION INSPECTION

5.1 GENERAL

- A. Prior to expiration of one year from Date of Substantial Completion, Engineer will make visual inspection of project site in company with the Owner to determine whether correction work is required.
- B. Contractor to attend inspection if requested by the Engineer or Owner.

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Maintain premises and public properties free from accumulations of waste and debris caused by work on this project.
2. At project completion, leave all new and existing facilities affected by the Work clean, ready for occupancy, and in a condition equal to or better than that which existed prior to construction.

B. Related Requirements Specified Elsewhere

1. Cleaning of certain parts of the Work described in various sections of the Specifications.

C. Failure by Contractor to maintain project site and facilities in a state of cleanliness shall be adequate reason for Engineer to recommend that Owner withhold any present and future progress payments until Contractor complies with Specification requirements.

1.2 STIPULATIONS

A. Hazard Control: As required by regulatory agencies.

B. Conduct cleaning and disposal operations in compliance with laws and safety orders of governing authorities including all Federal, State, and Local environmental laws.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned or finish to be applied.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 DURING CONSTRUCTION

- A. Prevent dust nuisance attributable to this work.
- B. Provide trash receptacles at strategic locations around the site.
- C. At reasonable intervals during progress of work, legally dispose of waste materials, debris, and rubbish off the site.
 - 1. Waste materials shall not be burned or buried on-site or disposed of into storm drains, sanitary sewers, or waterways.
- D. Handle materials in a controlled manner with as few handlings as possible.
- E. Neatly stack construction materials, such as concrete forms, when not in use.

3.2 FINAL CLEANING

- A. Repair, patch, and touch-up marred surfaces to specified finish to match adjacent surfaces.
- B. Broom clean paved surfaces, rake clean other surfaces of grounds.
- C. Replace all air filters on units operated during construction. Clean ducts, blowers, coils, etc. of any equipment operated without filters during construction.
- D. Restore site to condition equal to or better than that which existed prior to commencement of Work.

END OF SECTION

SECTION 01730

OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.
- B. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of the Specifications.
- C. Instruct Owner's personnel in maintenance of products and in the operation of equipment and systems.
- D. Additional Requirements Specified Elsewhere
 - 1. Section 01010: Summary of Work
 - 2. Section 01340: Shop Drawings, Product Data, and Samples
 - 3. Section 01400: Quality Control
 - 4. Section 01700: Contract Closeout

1.2 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
 - 1. Trained and experienced in maintenance and operation of the described products.
 - 2. Completely familiar with requirements of this Section.
 - 3. Skilled as technical writers to the extent required to communicate essential data.
 - 4. Skilled as draftsmen competent to prepare required drawings.
- B. Manuals for equipment or materials shall be prepared by the equipment or material manufacturer.

1.3 SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by Owner's personnel.
- B. Format
 - 1. Size: 8-1/2"x11"
 - 2. Paper: 20 lb. minimum, white, for typed pages

3. Text: Manufacturer's printed data or neatly typewritten
4. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text
 - b. Reduced to 8-1/2"x11" or 11"x17" and folded to 8-1/2"x11"
 - c. Where reduction is impractical, folded and placed in 8-1/2"x11" envelopes bound in text
 - d. Suitably identified on drawings and envelopes
5. Provide fly-leaf for each separate product, or each piece of equipment.
 - a. Provide typed description of product, and major component parts of equipment.
 - b. Provide indexed tabs
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS."

List:

 - a. Title of Project
 - b. Identity of separate location as applicable.
 - c. Identity of general subject matter covered in manual.
7. To the extent possible, assemble and bind material in the same order as specified.

C. Binders

1. Preliminary materials: Heavy paper covers
2. Final manuals: Commercial quality, substantial, permanent 3-ring or 3-post binders with durable, cleanable, plastic covers.

1.4 CONTENT OF MANUALS

- A. Neatly typewritten table of contents for each volume, arranged in a systematic order.
 1. Contractor, name of responsible principal, address and telephone number.
 2. A list of each product required to be included, indexed to the content of the volume.
 3. List with each product, the name, address, and telephone number of:
 - a. Subcontractor or installer
 - b. Maintenance contractor, as appropriate
 - c. Identify the area of responsibility of each
 - d. Local source of supply for parts and replacement
 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data

1. Include only those sheets which are pertinent to the specific product.
 2. Annotate each sheet to:
 - a. Clearly identify the specific product or part installed.
 - b. Clearly identify the data applicable to the installation.
 - c. Delete references to inapplicable information.
- C. Drawings
1. Supplemental product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and system.
 - b. Control and flow diagrams.
 2. Coordinate drawings with information in project record documents to assure correct illustration of completed installation.
 3. Do not use project record documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation.
1. Organize in a consistent format under separate headings for different procedures.
 2. Provide a logical sequence of instructions for each procedure.
- E. Copy of each warranty, bond, and service contract issued.
1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in the event of failure.
 - b. Instances which might affect the validity of warranties or bonds.

1.5 MANUALS FOR MATERIALS, EQUIPMENT, AND SYSTEMS

- A. Provide an operation and maintenance manual for each item of equipment, materials, or system listed in the schedule of manuals, in the quantity listed in the submittal schedule.
- B. Content, for each unit of equipment and system, as appropriate.
 1. Description of unit and component parts
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, and tests.
 - c. Complete nomenclature and commercial number of all replaceable parts.

2. Operating procedures
 - a. Startup, routine, and normal operating instructions.
 - b. Regulation, control, stopping, shutdown, and emergency instructions.
 - c. Summer and winter operating instruction, as applicable.
 - d. Special operating instructions
 3. Maintenance procedures
 - a. Routine operations
 - b. Guide to "trouble-shooting"
 - c. Disassembly, repair, and reassembly
 - d. Alignment, adjusting, and checking
 4. Servicing schedule
 5. Manufacturer's printed operating and maintenance instructions
 6. Each contractor's coordination drawings
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage
 - a. List of spare parts currently furnished
 8. Other data as required under pertinent sections of the specifications
- C. Content for each electric and electronic item or system, as appropriate.
1. Description of system and component parts
 - a. Function, normal operating characteristics, and limiting condition.
 - b. Performance curves, engineering data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 2. As-installed color coded wiring diagrams.
 3. Operating procedures
 - a. Routine and normal operating instructions
 - b. Sequences required
 - c. Special operating instructions
 4. Maintenance procedures
 - a. Routine operations
 - b. Guide to "trouble-shooting"
 - c. Adjustment and checking
 - d. Servicing schedule
 5. Manufacturer's printed operating and maintenance instructions.
 6. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 - a. List of spare parts currently furnished
 7. Other data as required under pertinent sections of specifications.

- D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
- E. Additional requirement for operating and maintenance data: The respective sections of specifications.

1.6 SUBMITTAL SCHEDULE

- A. Submit three preliminary copies a minimum of 10 days prior to the date of shipment of the material, equipment, or system.
 - 1. Engineer will review
 - 2. If acceptable, one copy will be returned to Contractor, one copy sent to Resident Project Representative, and one copy retained in Engineer's file.
 - 3. If unacceptable, two copies will be returned to Contractor with Engineer's comments for revision and one copy retained in Engineer's file. Resubmit three revised preliminary copies for Engineer's review.
 - 4. No partial payments will be made for material, equipment, and systems on hand or installed until preliminary manuals are accepted.
- B. Submit six final copies no less than 10 days prior to placing the material, equipment, or system in service. If final manuals differ from accepted preliminary manuals, submit two copies of any necessary supplemental material, with instructions for insertion, for conforming Engineer's and resident project representative's copies of preliminary manuals to final manuals.
 - 1. Engineer will compare with accepted preliminary manual.
 - 2. If identical, or otherwise acceptable, Contractor will be so notified. Five copies will be held for later transmittal to Owner.
 - 3. If not acceptable, all six copies will be returned to Contractor for revision or retained by Engineer and the necessary revision data requested from the Contractor, at Engineer's option.
 - 4. No portion of the Work is substantially complete until final material, equipment, and systems manuals relating to that portion of the Work are accepted by Engineer.
 - 5. Submit eight copies of any revisions found desirable during instruction of Owner's personnel, with instructions for insertion, for revising Owner's, Engineer's, and resident project representative's copies of manual.

1.7 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment, and maintenance of all products, equipment, and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction.
 - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.
- C. Scheduling.
 - 1. Do not commence instruction of Owner's personnel until manufacturer's field services specified in Section 01400 are complete and equipment is operating within specification tolerances.
 - 2. Contractor shall schedule one week in advance at a time acceptable to Owner
 - 3. Confirm 48 hours in advance.
- D. Additional requirements for specialized instruction of Owner's personnel are given in the detailed equipment specifications.

PART 2 – SCHEDULES

2.1 SCHEDULE OF OPERATION AND MAINTENANCE MANUALS

- A. Submit operation and maintenance manuals on the following products, equipment, and systems.

<u>SPECIFICATION SECTION</u>	<u>PRODUCT, EQUIPMENT, OR SYSTEM</u>
32 84 00	Landscape Irrigation
32 93 00	Plants
	Electrical and Lighting

END OF SECTION

DIVISION 32
LANDSCAPING

SECTION 32 94 00 LANDSCAPE ACCESSORIES

PART 1: GENERAL

1.01 WORK INCLUDED

- A. Work under this Section shall include but not be limited to provision of all labor and material for:
 - 1. Organic wood mulch in soil rings for plantings in seeded turf areas only as indicated on the Drawings.
 - 2. Decorative aggregate groundcovers and boulders in planter beds as indicated on the Drawings.
 - 3. Steel Maintenance Edging as indicated on the Drawings.
 - 4. Fabric underlayment under decorative aggregate groundcovers.

1.02 QUALITY ASSURANCE/SUBMITTALS

- A. The Contractor shall submit package label from pre-packaged organic mulch along with product sample of bulk mulch and decorative aggregate ground covers to the Architect for approval.
 - 1. Sample shall be representative of materials proposed for installation
- B. Current printed catalog cut-sheets of all manufactured miscellaneous site furnishings and products as indicated on the Drawings shall be submitted for use under this Section.
 - 1. Failure for Contractor to provide submittals on all required products shall not preclude responsibility to provide and install these products. The Architect may reject any portion of the work at any time up until Final Acceptance if it has been determined that any required product has not been installed.

1.03 DELIVERY AND PRODUCT HANDLING

- A. Pre-packaged products approved for use on this jobsite shall be delivered to the jobsite in original unopened bags and containers.
 - 1. The Contractor is to retain all shipping invoices, delivery receipts, and purchase order receipts as provided by the Supplier of each product delivered for use on the jobsite.
 - a) The Contractor shall be requested to produce original invoices, receipts, and purchase order confirmation at any time up until Final Acceptance of all work under this Section.
 - 2. The Contractor is responsible for providing secured storage until final use of products.
- B. Bulk items shall be delivered to the jobsite and stored in areas designated by the General Contractor.

1.04 PRODUCTS

- A. Products indicated on the Drawings generally will be the only products considered or accepted for use on the jobsite by the Architect.
- B. Use of alternate products without prior approval shall result in rejection of Final Acceptance of work.
- C. Unless otherwise indicated, products for use under this Section shall be equal to:
 - 1. Organic groundcovers for use in tree rings around trees in seeded areas and as indicated elsewhere on the drawings to be equal to '*Gorilla Hair Shredded Cedar Wood Mulch*' installed in tree rings to a depth of 3 inches.
 - 2. Decorative aggregate groundcover for use where noted on the Drawings, to be equal to that indicated on the Drawings. Contractor to submit samples prior to installation.
 - 3. Steel Maintenance Edging to be galvanized 1/8" x 4 inch steel where noted on the Drawings.
 - 4. Fabric Underlayment/Weed Barrier; for use beneath all cobble groundcovers and shrub beds, DeWitt *Weed Barrier*, *Mirafi-140S*, *Geoscape*, or approved equal. Fabric

SECTION 32 94 00 LANDSCAPE ACCESSORIES

underlayment is not required beneath organic mulch in tree rings.

PART 2: EQUIPMENT

2.01 GENERAL REQUIREMENT

- A. This Contractor shall be responsible for providing whatever equipment is needed for proper installation of products under this Section.

PART 3: EXECUTION OF WORK

3.01 JOBSITE CONDITIONS

- A. The Contractor shall inspect and verify all jobsite conditions that exist, and shall verify actual field dimensions and situations that affect work under this Section prior to commencing any work.
 - 1. The Contractor shall notify the Architect in the event of conflict prior to commencing work. Should the Contractor fail to notify the Architect and resolve all conflicts completely prior to commencing work under this Section, they shall be resolved afterward in favor of the Owner.
- B. The Contractor shall control traffic and coordinate work of other trades to avoid conflict of installation of work under this section.

3.02 INSTALLATION

- A. The Contractor shall schedule and coordinate installation of work under this Section with related landscape work.
- B. Unless specified otherwise:
 - 1. Organic mulch in tree rings in seeded turf areas shall be installed to a consistent 3 inch depth.
 - 2. Fabric underlayment to be installed on finish grade prior to aggregate placement. Underlayment to be installed with edges folded up a minimum of two-inches where adjacent to maintenance edges, concrete pavements and curbs. Pin underlayment to soilbed with twelve-inch steel pins as required.
 - 3. Aggregate areas shall be installed to a uniform depth as indicated on the Drawings with no underlayment visible beneath. Top of decorative rock shall be kept to a uniform one-half inch to one inch below all adjacent pavements, curbing, and edging.
- C. It is the Contractor's responsibility to schedule, procure, coordinate, and install all miscellaneous and incidental equipment and services that may be required for proper use and operation of manufactured site furnishings as intended by design.
- D. All installations shall be performed in accordance with applicable local and state codes and the Manufacturer's recommendations.
 - 1. Demonstration of operability of all equipment provided and installed under this Section, as intended by design is a condition of Final Acceptance.

PART 4: MAINTENANCE OF NEW AMENITIES

4.01 GENERAL REQUIREMENT

- A. It is this Contractor's responsibility to maintain all work provided and installed under this Section until Final Acceptance.
 - 1. The Contractor shall replace/restore any installation that is disturbed or damaged prior to Final Acceptance at his expense.

PART 5: CLEANUP AND ARCHITECT'S INSPECTION

5.01 CLEANUP

- A. After completion of all work under this Section and prior to Contractor's request for Architect's inspection for Substantial Completion, Contractor is responsible for thoroughly cleaning all areas on jobsite in which work has occurred.
 - 1. All unused products are to be removed completely from the jobsite.
 - 2. All pavements are to be swept clean and pressure washed with water to remove all dirt

SECTION 32 94 00 LANDSCAPE ACCESSORIES

and debris and tire marks.

5.02 ARCHITECT'S INSPECTION

- A. Work completed under this section is scheduled for Architect's inspection for Substantial Completion. Actual inspection shall be made concurrent with inspection of work completed in other related Sections.

PART 6: WARRANTY

6.01 CONDITIONAL REQUIREMENTS

- A. Work under this Section shall be warranted by the Contractor for a period of not less than one-year from date of Final Acceptance.
 - 1. Products that become objectionable in appearance shall be restored at the Contractor's expense to the condition approved by the Architect at inspection for Final Acceptance.

PART 7: GUARANTEE

7.01 INSTALLER'S ASSURANCE OF COMPLIANCE

- A. Upon entering into an Agreement to provide labor and material to complete all work described under this Section, the Contractor hereby guarantees to the Owner and Architect that he will execute to the best of his ability all provisions required in Section 32-94-00.
 - 1. The Contractor shall not qualify any term, condition, or requirement stated herein at any time prior to, during or after execution of Agreement to provide work under this Section.
 - 2. The Contractor shall have certain rights pertaining to this guarantee, as described in the General Conditions of the Agreement between the Owner, Contractor and/or Architect.

END OF SECTION 32-94-00

SECTION 32 93 00 PLANTS

PART 1: GENERAL

1.01 WORK INCLUDED

- A. Work under this Section to include but may not be limited to providing and installing all trees, shrubs, and perennial grasses as indicated on the Drawings.
 - 1. Related work to include providing and installing fertilizers/absorbent polymers, planting soils, and guying & staking of trees.

1.02 QUALITY ASSURANCE

- A. All plant material to be prime representatives, as defined by *AAN Standards for Nursery Stock*, of the required species indicated on the Drawings.
 - 1. Plants grown in a controlled nursery environment from sources located within *USDA Hardiness Zones 3, 4, and 5* will only be accepted for use on this project.
- B. Plant material quantities shall be as determined graphically from the Drawings. In the event of a conflict between any scheduled, bid, or other quantity stated or implied, those quantities which can be determined graphically from the Drawings will prevail in any case.
- C. Plant material sizes shall be as determined from the Drawings.
 - 1. Sizes listed in the Planting Schedule are minimum acceptable sizes; in no case shall installed plant sizes be less than the minimum size specified.
 - a) The Contractor may provide sizes which exceed the minimum required size at no additional cost to the Owner.
 - 2. Minimum branching height for all deciduous trees shall be six feet or greater.
 - a) All deciduous trees, with exception of clump form as indicated on the Drawings, shall have single straight leaders, uniformly branched canopies, and be uniform in appearance.
 - b) All clump form deciduous trees shall be proportionately shaped and uniform in appearance.
 - 3. All evergreen trees shall be fully branched and uniform in appearance.
 - a) All evergreen trees shall have one single leader.
 - 4. All container grown shrubs and grasses shall be prime representatives of the species, with uniform branching structure and appearance.
 - a) The Drawings indicate the minimum shrub and grass height or width to be provided and the preferred container size.
 - b) No bare-root nursery stock is acceptable.
- D. The Architect reserves the right to tag plant material considered to be representative of acceptable quality and size for the work at the nursery of his choice. The quality and size of plant material supplied by the Contractor shall be equal to or exceed quality and size of plant material tagged by the Architect.
- E. Generally, all plant material shall have been produced in a culturally controlled environment in full accordance with recognized practices of the *American Association of Nurserymen (AAN)*.
- F. Entering into an Agreement to complete work under this Section shall be construed as evidence that the Contractor has already successfully located all plant material required on the Drawings and can successfully procure material at the time of installation.
 - 1. The Architect reserves the right to inspect plant material at the nursery source prior to delivery to jobsite.
 - 2. The Architect reserves the right to reject at any time and place prior to Final Acceptance any plant material that in his opinion does not conform to the standards of this Section.

SECTION 32 93 00 PLANTS

- G. Plant material provided for completion of work under this Section may exceed the size indicated on the Drawings. In no case shall the Architect accept plant material that does not meet the minimum required plant size indicated on the Drawings.
 - 1. Shrubs may be provided containerized or balled in burlap as available. Container sizes that are indicated on the Drawings may be exceeded as required to satisfy stated minimum size of any plant item. In no case shall container size be less than the minimum size indicated on the Drawings.
 - 2. Deciduous trees are to be provided balled in burlap. Evergreen trees may be provided balled in burlap or mechanically spade transplanted.

1.03 SUBMITTALS

- A. The Contractor shall provide written confirmation on letterhead or invoice from nursery sources providing plant material information including type of plant material, size, grade, and scheduled time and method of shipping.
- B. The Contractor shall provide manufacturer's printed cut sheets, packaging labels, and printed literature for all products to be provided and installed as required under this Section.
 - 1. Failure for Contractor to provide submittals on all required products shall not preclude responsibility to provide and install these products. The Architect may reject any portion of the work at any time up until Final Acceptance if it has been determined that any required product has not been installed.

1.04 DELIVERY AND HANDLING OF PLANT MATERIAL

- A. All plant material provided and installed under this Section to be delivered directly to the jobsite or to the Contractor's holding yard.
 - 1. Method of shipping shall insure that all plant material arrives at the jobsite in optimum condition.
 - a) All plant material shall be shipped covered with tarps, or in enclosed trailers to prevent stress from wind, sun, and temperature.
 - b) Branches shall be bound during shipping and handling to prevent breakage.
- B. All plant material is to be handled during unloading and transport on the jobsite in a manner which does not break branches, puncture or loosen rootballs, or cause damage of any sort.
 - 1. This Contractor shall provide all tree spades, cranes, hoisting equipment, or any machinery required to properly handle plant material at all times.
- C. Temporary holding yard shall be equipped for plant material storage, proper watering, and security until Final Acceptance of all work under this Section.
 - 1. Temporary holding yards shall be maintained by the Contractor to keep all plant material in optimum condition at all times.
 - a) Plant material that becomes damaged, insect infested, stressed, or objectionable in appearance for any reason shall be removed from the jobsite immediately.

1.05 PRODUCTS

- A. All trees shall be prime representatives of the species and varieties indicated on the Drawings.
 - 1. Branching to be proportionate to width and height indicated on the Drawings.
 - 2. Trees grown in USDA Plant Hardiness Zones 3, 4, and 5 only will be accepted. Plants which have not sufficiently hardened-off or which are root-bound in their container will not be accepted.
 - 3. Ball and container sizes of all plant material, including "collected" material shall strictly conform to recognized AAN standards.
 - 4. All plant material is to be transplanted in strict compliance with recognized AAN standards, and at seasons generally considered favorable for transplanting.
 - 5. All plant material is to be provided balled in burlap, containerized, or spade-transplanted as indicated on the Drawings.

SECTION 32 93 00 PLANTS

- B. Planting backfill; provide and install a uniformly blended backfill mix of screened topsoil and organic matter.
 - 1. Excavated soil from the planting pit shall not comprise more than one-third of the backfill mix in any planting pit.
 - 2. Plant material that is planted with improper backfill shall be excavated and re-planted with proper backfill at Contractor's expense.
- C. Fertilizer; provide and install fertilizer equal to *Spring Valley Plant Establisher 8-12-8* with Gelscape and Hydrowet added to the planting backfill mix at the application rate recommended by the manufacturer for new planting of all containerized, balled in burlap, and groundcover plantings [*Spring Valley Turf Products, 1891 Spring Valley Road, Jackson, WI 53037, 1-800-635-2123*] or as approved by Architect prior to use.
- D. Guying and staking; all deciduous trees 1.5" size caliper and larger and evergreen trees six feet and taller are to be guyed and staked per the Drawings.
 - 1. Deciduous tree stakes to be six-foot long round cedar posts.
 - a) Provide and install two stakes for each deciduous tree up to three-inch caliper and three stakes for each deciduous tree larger than three-inch caliper as indicated on the Drawings.
 - b) All tree stakes to be placed in undisturbed soil around the outside circumference of the planting pit.
 - 2. Evergreen tree stakes to be six-foot long round cedar posts.
 - a) Provide and install two posts for each evergreen tree, as indicated on the Drawings.
 - 3. Rebar is not to be used for evergreen tree stakes.
- E. Guy wires; guy all staked trees with fourteen gauge-galvanized wire. All guy wire to be double stranded and wound to proper tension.
 - 1. Guy wires for deciduous and evergreen trees are to be perpendicular to the tree trunk.
- F. Guy wire loops; commercially manufactured nylon guy straps with metal eyelets equal to DeWitt Tree Strap [www.dewittcompany.com] or as approved by Architect prior to installation.
 - 1. Sections of rubber hose, burlap strips, or other material shall not be used as guy wire loops.
- G. Tree Ring Mulch topdressing; exposed soil in tree rings of all trees in seeded areas shall be top dressed with wood mulch, as specified in Section 32-94-00, placed to a uniform three inch depth. All mulched tree rings shall be a uniform 36" Diameter with the tree centered in each ring.
 - 1. Mulched tree rings are not required in aggregate planter beds.
 - 2. Underlayment is not required beneath mulch in tree rings.
 - 3. A soil water retention ring is to be constructed around the perimeter of the tree ring.

PART 2: **2.01** **EQUIPMENT** **REQUIREMENT**

- A. This Contractor is responsible for providing all machinery, tools, and equipment necessary to complete all work required under this Section.
- B. Equipment required for application of proper uniform rates of fertilizer and other commercially prepared products shall have been specifically designed and intended for use in application of a particular product.
- C. Mechanical tree spade equipment shall be capable of digging root balls of the quality and size in complete accordance with recognized AAN standards and practice, and shall have been expressly manufactured for the purpose of tree transplanting.

SECTION 32 93 00 PLANTS

- D. Under no circumstances shall the Contractor use equipment which is not designed or intended for transplanting or transporting any plant material, or which has the potential for damaging plant material.

PART 3: EXECUTION OF WORK **3.01 JOBSITE CONDITIONS**

- A. This Contractor shall become completely familiar with all jobsite conditions that may affect completion of work under this Section.
- B. Verify all jobsite conditions for accuracy in dimension and placement with those conditions indicated on the Drawings.
 - 1. In the event of conflict between actual jobsite conditions and the Drawings, it is the Contractor's responsibility to report conflicts to the Architect and resolve conflicts entirely prior to commencing any work under this Section.
 - a) Should the Contractor fail to resolve conflicts prior to commencing work they shall be resolved afterward by the Architect in favor of the Owner.
- C. The Contractor shall coordinate and instruct other trades to avoid work conflicts in the planting areas.
 - 1. Existing trees within the work area, if any, that are to remain undisturbed are as indicated on the Landscape Planting Drawings. These trees shall be protected from damage throughout the duration of the work.
 - a) It is the Contractor's responsibility to flag, fence off, and/or identify all existing trees that are to be protected. Failure to protect any existing tree that is to remain which is subsequently removed or damaged may result in assessed penalties to the Contractor including but not limited to replacement of the tree with comparable material as determined by the Architect.
 - b) Existing trees that are to remain shall be protected from damage at the drip line of the tree. Encroachment into the drip line of any tree which disturbs or destroys the root zone may be considered damage by the Architect which results in assessed penalties and/or replacement of the tree.
 - c) Four foot height temporary plastic orange safety fence or equal shall be used to fence trees to be protected.
- D. Locations for all proposed plantings shall be determined prior to excavating any planting pit.
 - 1. The Contractor is responsible for coordinating and locating any utilities in planting areas, and to protect existing utilities from all damage as a result of work under this Section.
 - 2. The Contractor is responsible for locating and protecting any work that may have been previously installed under any other Section.
 - 3. Wood lathe or survey flags shall be labeled with the plant code indicated on the Drawings and installed at the on-center location of proposed planting pits prior to excavating any planting pit.

3.02 INSTALLATION

- A. Circular shaped planting pits shall be hand or machine dug with vertical sides and flat bottoms.
 - 1. Planting pit depth for all trees and shrubs shall be equal to depth of root ball of material being installed.
 - a) When set in pit, top of root ball of all deciduous and evergreen trees shall generally sit two inches above surrounding finish grade. No root ball shall sit at or below any adjacent finish grade.
 - b) When set in pit, top of root ball of all deciduous and evergreen shrubs and ornamental grasses shall generally sit one inch above surrounding finish grade. No root ball shall sit at or below any adjacent finish grade.
 - c) Planting pit widths shall be not less than two times greater than the width of the

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- rootball to be installed. Under no circumstances shall any rootball be forced into an undersized planting pit.
- d) Planting pits that are undersized shall be re-excavated to the proper size at Contractor's expense.
 - e) Plant material with root balls that are found to be at an improper height above surrounding finish grade shall be re-excavated and reinstalled to the proper height.
- B. Trees and shrubs shall be carefully lowered into the center of each planting pit to avoid rootball breakage and damage to branches and scarring of trunks.
- 1. The Contractor shall "face" all trees and shrubs in pits for maximum affect toward visually prominent views.
 - a) Do not pull or yank any plant material into place by the trunk or branches.
 - b) Improperly planted trees and shrubs shall be reinstalled by the Contractor as directed by the Architect at no additional expense to the Owner.
- C. Staking posts shall be installed equidistant and equilateral from all evergreen and deciduous tree trunks in the undisturbed soil around planting pit circumference prior to backfilling.
- 1. All cedar posts for deciduous and evergreen trees to be installed to a minimum two-foot depth.
 - 2. Post placement shall be located along the circumference of the mulch ring, uniform in appearance (i.e. same distance from tree trunk & parallel to trunks) and be functional for protection from direction of most frequent prevalent wind if possible.
- D. Guy wire loops shall be installed at one uniform height for all trees.
- 1. After guy wire installation, trees are to be brought to a plumb upright condition prior to backfilling planting pits.
 - 2. Guy wires shall be double stranded and wound to achieve a consistent one half-inch slack for all trees.
 - 3. Guy wires to be perpendicular to tree trunk.
 - 3. Coordinate and install twelve inch sections of one inch white PVC 12 inch pipe over guy wires during guy wire installation.
 - a) Flagging tape may also be used to mark guy wires.
- E. Binder twine, wire baskets, and other root binding material which can safely be removed from the root ball shall be removed from the planting pit. Twine and other binding material shall be cut and loosened from around all trunks prior to backfilling.
- 1. Any tree or shrub with a root ball that crumbles or deteriorates so as not to permit intact transport and planting shall be removed from the jobsite immediately.
 - 2. Containers of all types, including biodegradable "peat pots" shall be completely removed from rootballs prior to planting.
- F. Approved backfill mix, made uniformly damp prior to use shall be placed in planting pit.
- 1. A soaker hose shall run water into the planting pit during installation of backfill. No planting operations shall occur when supplemental watering is not available.
 - 2. Tamp backfill in lifts to eliminate air pockets.
 - 3. Required fertilizer/absorbent polymer to be installed and applied per manufacturer's recommendations.
- G. Pruning shall be performed primarily to remove branches damaged in transport, suckers from trunks and bases, and dead wood. In no case shall pruning be done on primary leaders or which objectionably affects appearance of any plant.
- 1. Pruning shall be done as needed by the Contractor through the end of the warranty period.
 - a) Pruning performed throughout the one year warranty period which results in the removal of ten percent or more of overall branching structure will qualify plant for

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replacement under warranty provisions described under this Section.

- H. Provide and install shredded bark mulch in soil rings for all plantings in seeded areas as described elsewhere under this Section prior to inspection of Substantial Completion.
- I. The Contractor shall completely remove nursery labels, flagging tape, binder twine, and other similar material from all plant material prior to inspection for Substantial Completion.
- J. Provide and install a commercially manufactured biodegradable tree wrap for all deciduous single-leader trees.
 - 1. Securely tape tree wrap at top and bottom of wrap with weather resistant tape.
 - a) Burlap, cardboard, or other material not specifically intended for use as tree wrap shall not be used.
 - b) Wrapping of clump and multi-stemmed deciduous trees is not required.

3.03 ALTERNATE PLANT MATERIAL

- A. Only those trees and shrubs indicated on the Drawings shall be considered or accepted by the Architect for use on this jobsite.
 - 1. Alternate plant types or sizes that are smaller from those indicated on the Drawings shall not be used without prior Architect approval.
 - 2. Should required plant material become unavailable at the time of installation for any reason, the Contractor may be responsible for added costs to:
 - a) Procure the required plant material from other nursery sources.
 - b) Procure Architect-approved alternate plant material that is comparable to the specified plant material and which maintains the original design intent.
 - c) Compensate the Architect to locate acceptable plant material.
- B. Alternate plant material that is provided and installed without Architect's prior approval shall result in rejection of Final Acceptance of work under this Section.

3.04 SEASONAL CONSIDERATIONS

- A. Planting operations shall not be performed at any time deemed unfavorable by the Contractor.
 - 1. In no case shall frozen or saturated soil be planted in, or used as backfill.
 - 2. Planting shall be avoided during periods of excessive drought, heat, or high winds.
- B. It is the Contractor's responsibility to provide the Architect with written advisement in the event scheduling of work under this Section does not permit completion of work during conditions recognized as favorable.
 - 1. Should the Contractor fail to advise the Architect as required and planting occurs after October 15th or prior to March 1st the Contractor is responsible for additional costs to provide any maintenance procedures deemed necessary to keep plant material in optimum condition.
 - 2. Should the Owner require work under this Section to be completed after the Contractor has provided written advisement to the Architect that it is not recommended, the Owner assumes responsibility.

PART 4: MAINTENANCE OF NEW PLANTINGS

4.01 THIRTY-DAY MAINTENANCE PERIOD

- A. The Contractor shall provide a thirty-day maintenance period of all work under this Section commencing on the date of Substantial Completion.
- B. Maintenance may include but is not be limited to providing all labor and material for:
 - 1. Supplemental watering as the Contractor determines necessary to sustain optimum appearance and promote growth.
 - 2. Monitoring and adjustment of guy wires for proper tension.

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3. Monitoring and control of insects and diseases.
 4. Immediate removal of dead or dying plant material, and prompt replacement with material equal to size and quality originally provided.
 5. Retaping of tree wrap that becomes loose.
- C. Final Acceptance of work under this Section is subject to successful completion of the thirty-day maintenance requirement starting from the date of accepted Substantial Completion.

4.02 SEASONAL QUALIFICATION OF THIRTY-DAY MAINTENANCE REQUIREMENT

- A. It is the Contractor's responsibility to provide whatever plant maintenance is required to sustain optimum appearance and promote growth and to protect his warranty interests.

PART 5: CLEANUP AND ARCHITECT'S INSPECTION

5.01 CLEANUP

- A. Prior to Architect's inspection for Substantial Completion, all areas on the jobsite which work under this Section has occurred shall be thoroughly cleaned.
1. The Contractor shall sweep all pavements clean of dirt, debris, and tire markings and power wash all pavements with water.
 2. Unused materials and equipment shall be removed from the jobsite.
 3. Flags, flagging tape, nursery labels, binder twine, plant containers, etc., shall be removed from all plant material and the jobsite.
 4. The Contractor's dumpsters and trashcans shall be removed from the jobsite.
 5. Temporary fencing used to protect existing site areas and trees that are to be undisturbed shall be removed.

5.02 ON-SITE HOLDING YARDS

- A. Holding yards constructed on site to be completely dismantled and restored prior to Architect's inspection for Substantial Completion.
1. Holding yards are to be restored to their original condition.

5.03 ARCHITECT'S INSPECTION

- A. When all work required under this Section has been completed the contractor shall request that an on-site inspection be made by the Architect for Substantial Completion, giving at least two working day's notice.

PART 6: WARRANTY

6.01 REQUIREMENT

- A. Upon satisfactory completion of any/all punchlist items and Final Acceptance is given by the Architect for all work provided and installed under this Section, the Contractor shall provide a three hundred sixty-five day conditional warranty on all plant material and workmanship.
- B. At Final Acceptance the Contractor shall provide the Architect with the following:
1. Written warranty statement on Contractor's letterhead clearly indicating the Project name and address, Contractor's contact name, phone number, and email address for warranty claims and commencement date of warranty (i.e. date of inspection for scheduled Final Acceptance).
 2. Written maintenance instructions for all types of plantings provided, including data on watering, fertilizing, pruning, pesticides, and routine care that the Owner/Property Manager shall provide to ensure optimum growth.
 - a) Pre-printed data published by local extension services, nurseries, trade journals, and manufacturers of horticulture products may be included.
 3. Typed and published data shall be provided in a one inch size three ring binder with a typed label on the front cover and binding indicating the Project name, contractor's name, "Landscape Warranty" and date of submittal.

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- C. Plant material that becomes objectionable in appearance for any reason or fails to live within the one year conditional warranty period shall be removed by the Contractor from the jobsite immediately and replaced promptly with new plant material equal in variety, size, and quality to that originally installed and accepted by the Architect.
 - 1. The Contractor shall be responsible for any costs for providing and installing warranty replacement plant material.
 - 2. The Contractor shall be responsible for restoring jobsite appearance after completing warranty-related work.
 - 3. Replacement plant material is subject to a second sixty-day conditional warranty period.

- D. Any plant material that stresses, dies, or becomes objectionable in appearance as a direct result of the Owner's failure to implement a professional maintenance program, effective at the expiration of the Contractor's thirty-day maintenance period and Final Acceptance, may not be considered a valid warranty claim under this Section. Also excluded from the warranty are:
 - 1. Annual bedding plants.
 - 2. Vandalism.
 - 3. Damage from tornadoes, hurricanes, verifiable hail and sandstorms, winds in excess of forty miles per hour, landslides, and earthquakes.
 - 4. Flood damage, with exception of flooding as a result of malfunctioning underground sprinkler systems installed under this Agreement.
 - 5. Animal damage (rodents, deer, and domestic pets).

PART 7: GUARANTEE

7.01 CONTRACTOR'S ASSURANCE OF COMPLIANCE

- A. Upon entering into an Agreement to provide labor and material to complete all work described under this Section, the Contractor hereby guarantees to the Owner and Architect that he shall execute to the best of his ability all provisions required in Section 32-93-00.
 - 1. The Contractor shall not qualify any term, condition, or requirement stated herein at any time prior to, during, or after execution of Agreement to provide work under this Section.
 - 2. The Contractor may have certain rights pertaining to this guarantee, as described in the General Conditions of the Agreement between Owner, Contractor and/or Architect.

END OF SECTION 32-93-00

SECTION 32 92 00 TURF GRASSES

PART 1: GENERAL

1.01 WORK INCLUDED

- A. Work under this Section includes but shall not be limited to provision of all labor and material of all of the following:
 - 1. Grubbing and clearing of existing vegetation and removal of strippings/debris from jobsite in areas indicated on the Drawings.
 - 2. Overseeding and mulching of existing turfgrass areas adjacent to the project site which are damaged or destroyed as a result of new construction in areas immediately adjacent to the jobsite.
 - 3. Cleanup.
 - 4. Seed bed establishment and maintenance.
 - 5. Soil guard erosion control.

1.02 QUALITY ASSURANCE

- A. Areas that are to be seeded and mulched shall be verified on the jobsite by the Contractor for accuracy in dimensioning and grading.
 - 1. The Architect shall be notified in the event of conflict between actual jobsite conditions and the Drawings, and conflicts shall be completely resolved by the Contractor prior to commencing work under this Section.
- B. Only certified seed as described elsewhere under this Section shall be used.

1.03 SUBMITTALS

- A. Prior to commencing work under this Section, the Contractor shall provide the Architect with:
 - 1. Certified seed tags provided by the seed supplier that indicate the type and variety of each seed being supplied, purity, germination percentage, and origin as indicated on the Drawings.
 - a) The seed supplier shall also provide test data for weed seed, inert material, and name of lab responsible for test data.
 - 2. Packaging label of commercially produced cellulose fiber mulch (if applicable) with recommended rate of application.
 - 3. Failure for Contractor to provide submittals on all required products, including miscellaneous and incidental equipment required for a complete project, shall not preclude responsibility to provide and install these products. The Architect may reject any portion of the work at any time up until Final Acceptance if it has been determined that any required product has not been installed.

1.04 PRODUCT DELIVERY AND HANDLING

- A. All seed and commercially produced cellulose fiber mulch shall be delivered to the jobsite in their original unopened bags or containers.
 - 1. The Contractor shall be responsible for providing storage of products that are resistant to elements that may be detrimental to normal use of products.

1.05 PRODUCTS

- A. **Seed Mixes:**
 - 1. Shall be a pre-blended mix equal to 'LOW GROW SEED MIX' [Arkansas Valley Seed Co., 4300 Monaco Street, Denver, CO 80216 (303) 907-3337] installed where indicated on the Drawings or as required to revegetate existing turf areas disturbed by new construction and installed at the Supplier's recommended application rate.
- B. Wood fiber mulch (Hydro-Mulching); shall be equal to Conwed Fibers HydroMulch 1000 with SlikShot fiber and have an integral green color monitoring agent and Soil Guard tackifier.

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[Profile Products LLC, 750 Lake Cook Road, Ste. 400, Buffalo Grove, IL 60089, 1-800-366-1180.]

PART 2: EQUIPMENT

2.01 SEEDING EQUIPMENT

- A. Mechanical seeding equipment shall be capable of broadcasting seed at a uniform application rate.
 - 1. Broadcasted seed shall be hand raked or chain dragged into top half inch of prepared soil bed immediately after seed application.

2.02 MULCHING EQUIPMENT

- A. Cellulose fiber mulch (i.e. hydromulch) shall be sprayed onto seedbed with mechanical equipment specifically intended for use in applying cellulose fiber mulch.

2.03 WATERING EQUIPMENT

- A. Watering equipment shall be provided as needed by the Contractor for the duration of the maintenance requirement in providing supplemental irrigation to seedbeds that are not adequately covered by the existing automatic sprinkler system.
 - 1. Watering equipment shall be capable of providing adequate quantities of water at a uniform rate that does not cause erosion and washouts of seedbeds.

PART 3: EXECUTION OF WORK

3.01 JOBSITE CONDITIONS

- A. The Contractor shall examine all jobsite areas that are to be seeded and mulched prior to commencing work under this Section to evaluate which methods of seed and mulch installation will be used.
- B. Work limits of proposed seedbeds to be defined with flags, chalk lines, etc.
- C. Erosion channels shall be repaired prior to commencing work.

3.02 INSTALLATION

- A. After completion of related work commence work required under this Section.
- B. No work shall be attempted on frozen or saturated soils or during periods of excessive drought, heat, and high winds.
- C. Seed application shall be performed with mechanical seeding equipment capable of uniformly broadcasting seed at the Supplier's recommended application rate.
 - 1. Seed shall not be hand broadcasted.
- D. Mulch application shall be performed only when wind conditions are favorable for precise installation.
 - 1. Cellulose fiber mulch shall be applied at the rate of two thousand pounds per acre.
 - 2. Contractor shall be responsible for re-mulching areas in which mulch blows or washes, exposing bare soil surface.

3.03 SEASONAL CONSIDERATIONS

- A. Generally, work under this Section shall be performed only during seasons recognized as favorable for seed application and germination.
 - 1. The Contractor shall advise the Architect in writing in the event project-scheduling conflicts with favorable seasonal conditions for seeding. Written advisement shall be provided no later than October 15th.

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2. Should the Contractor fail to advise the Architect in writing as required, he shall assume all liability and costs for sustaining seedbed conditions which are favorable for optimum seed germination until all work under this Section is accepted, including but not limited to watering, erosion and traffic control, and re-seeding all areas that fail to germinate satisfactorily.

PART 4: MAINTENANCE OF SEEDBED 4.01 GENERAL REQUIREMENTS

- A. The Contractor is responsible for providing maintenance to newly installed seedbeds until the end of the maintenance period and Final Acceptance.
- B. Satisfactory germination of irrigated native seed stands shall be as determined by the Architect, with seed supplier's test germination percentage data submittal being the basis for acceptance.
 1. Any area greater than one square foot which has not fully germinated within the thirty day Maintenance Period will be over seeded and mulched at the Contractor's expense.
- C. Maintenance within the thirty-day maintenance period shall include but not be limited to providing supplemental irrigation and traffic control to ensure optimum conditions to achieve acceptable germination.
- D. The required period of maintenance for work under this Section shall commence on the date of Final Acceptance of all landscape related work and shall continue for a period of not less than thirty days.
- E. Throughout the required maintenance period, this Contractor shall be responsible for correction of any deficiencies as determined by the Architect, including but not limited to supplemental watering, re-seeding of deficiently germinated areas, repair of normal soil erosion from wind and water, repair of erosion control blankets, etc.

4.02 SEASONAL QUALIFICATION OF MAINTENANCE PERIOD

- A. In the event Substantial Completion of all work under this Section occurs after October 15th, the required thirty-day maintenance shall commence on or about May 1st of the following year.
 1. The Contractor shall notify the Architect as to the date he intends to commence required maintenance so that the Architect can monitor maintenance operations for consideration of Final Acceptance.

PART 5: CLEANUP AND ARCHITECT'S INSPECTION 5.01 CLEANUP

- A. All areas adjacent to the jobsite over which work under this Section has occurred shall be thoroughly cleaned by the Contractor prior to Architect's inspection for Substantial Completion and consideration for Final Acceptance.
 1. Pavements, sodded areas, shrub beds, and all other areas shall be completely free of any mulch or seed material used.
 2. Unopened bales of hydromulch, seed, fertilizer, etc., shall be removed from the jobsite.
 3. The installer's seeding and mulching equipment shall be removed from the jobsite.
 4. Pavements over which work occurred to be swept clean of mulch material, seed, dirt, tire marks, etc., and pressure washed with water.

5.02 ARCHITECT'S INSPECTION

- A. Upon completion of all work under this Section, the Contractor shall give the Architect two

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days notice that an inspection is requested for Substantial Completion.

1. The required thirty-day maintenance period commences upon the Architect's inspection and Final Acceptance of all landscape-related work, or per the alternate seasonal consideration defined elsewhere under this Section.

PART 6: 6.01 WARRANTY REQUIREMENT

- A. At Substantial Completion the Contractor shall commence the required thirty-day maintenance period of work completed under this Section.
- B. After successful completion of the thirty-day maintenance period, as determined by the Architect, the Contractor shall extend a thirty-day conditional warranty on all work completed under this Section.
 1. Irrigated seedbeds that stress, die, or erode within the warranty period shall be restored completely at this Contractor's expense.

PART 7: 7.01 GUARANTEE CONTRACTOR'S ASSURANCE OF COMPLIANCE

- A. Upon entering into an Agreement to provide labor and material to complete all work described under this Section, the Contractor guarantees to the Owner and Architect that he will execute to the best of his ability all provisions required in Section 32-92-00.
 1. The Contractor shall not qualify any term, condition, or requirement stated herein at any time prior, during, or after execution of Agreement to provide work under this Section.
 2. The Contractor shall have certain rights pertaining to this guarantee, as described in the General Conditions of the Agreement between the Owner, General Contractor and/or Architect.

END OF SECTION 32-92-00

SECTION 32 84 00 LANDSCAPE IRRIGATION

PART 1: GENERAL

1.01 CONTRACTUAL REQUIREMENTS

- A. Refer to prevailing local and state Public Works General Provisions that govern work under this Section.
- B. The irrigation system is designed as a battery operated remote control valve and controller irrigation system. Equipment installation is to be per manufacturer's specifications.

1.02 SCOPE OF WORK

- A. The work consists of installing a new underground automatic landscape irrigation system. Included is provision and installation of all labor, equipment, tools and materials necessary for the construction of the irrigation system per specifications and Drawings approved by planning agencies having jurisdiction over the work, and any miscellaneous incidental material required whether specifically identified or not to result in a complete and operable system.
- B. Water Development charges and water facility distribution charges (tap fees) are not within this scope of work.
 - 1. Two points-of connection off the existing CSU 4.00" PVC mainline as indicated on the drawings are required to extend service to newly landscaped area.
 - 2. Contractor shall coordinate with Owner the location of the existing CSU 4.00" PVC mainline and temporarily shutting off existing mainline and installing fittings and isolation valves for new system.

1.03 WORK INCLUDED

- A. Work under this Section to include provision of all labor, material, permits, and services needed to complete the underground sprinkler system in accordance with the Contract Documents.
 - 1. Provision and installation of incidental equipment for point of connection as required on the Drawings.
 - 2. Provision and installation of all subsurface sleeves as needed.
 - 3. Provision and installation of miscellaneous incidental equipment not indicated on the Drawings but which may be required to result in a complete and operable system.
 - 4. Preparation and provision of professionally drafted reproducible full scale as-built Drawings in electronic format (CAD).

1.04 QUALITY ASSURANCE

- A. Comply with the following codes, ordinances, regulations, and standards in effect at time of installation:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. National Plumbing Code (NPC).
 - 3. Federal Specifications (FS).
 - 4. Plastic Pipe Institute (PPI).
 - 5. National Electric Code (NEC).
 - 6. National Sanitation Code (NSC).
 - 7. All State and Local codes for cross connection of potable water systems.
 - 8. All cut-sheets, catalogs, and current published data of the manufacturers whose equipment is scheduled for use under this contract.
- B. In the event of a conflict between requirements the most stringent requirement will prevail in any case.
- C. All work under this Section shall be performed by qualified personnel who have previously completed comparable projects successfully, and who are knowledgeable and familiar with irrigation system hydraulics.

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1. On-site personnel shall be capable of determining feasibility of proposed installations (with regard to hydraulics).
 - a) Failure to be familiar with hydraulic feasibility of the proposed irrigation system will not preclude Contractor's responsibility for accidental or deliberate installation of incompatible equipment, pipe sizes, etc., which do not permit operation of system as intended by design.
 2. The Contractor shall field verify static pressure at the two points of connection and determine its suitability prior to commencing any work downstream of the backflow preventer.
 - a) Failure to test and verify adequate static pressure prior to constructing the sprinkler system shall not relieve the Contractor from providing adequate operating pressure to provide coverage as intended by design.
 - b) It is the Contractor's responsibility to report inadequate static pressure to the Architect and to correct the problem prior to commencing work downstream of the point of connection.
 - c) It is this Contractor's responsibility to provide irrigation coverage of all landscaped areas as intended by design.
- D. All material for use under this Section to be new and previously unused.
- E. The Contractor shall be responsible for verifying accuracy of field dimensions versus drawing dimensions. All discrepancies shall be reported to the Architect and resolved prior to commencing work.
 1. Conflicts, which are not fully resolved by the Contractor prior to commencing work under this Section, shall be resolved per the Architect's direction at the Contractor's expense.

1.05 SUBMITTALS

- A. Professionally prepared CADD Shop Drawings which clearly indicate changes proposed by the Contractor to pipe routing, valve placement, zone sequencing, etc., which, in the opinion of the Architect, improve operation and serviceability of the system may be provided.
 1. Shop Drawings are not required if the Contractor intends to install work as indicated on the Construction Drawings.
 2. Shop Drawings for the purpose of specifying alternate equipment preferred by the Contractor or for redesigning the Construction Drawings will not be accepted or reviewed by the Architect.
- B. Manufacturer's cut-sheets of equipment specified on the Drawings and herein.
 1. Contractor shall highlight specific model numbers and sizes to be provided and installed on all cut-sheet submittals.
 2. Failure for the Contractor to provide submittals of all required products, including miscellaneous and incident equipment required to result in a complete and operable system, shall not preclude responsibility to provide and install these products. The Architect may reject any portion of the work at any time up until Final Acceptance if it has been determined that any required product has not been installed.

1.06 ALTERNATE EQUIPMENT

- A. Only the equipment appearing on the Drawings will be considered or accepted for installation.
 1. Installation of alternate equipment without prior approval by the Architect will result in rejection of work up until inspection for Final Acceptance.

1.07 PRODUCTS

- A. Furnish all products to complete the sprinkler system per the Drawings and Specifications.

PART 2: EQUIPMENT

SECTION 32 84 00 LANDSCAPE IRRIGATION

2.01 PIPE

- A. All piping for mainlines and lateral lines shall be of the size and classification stated on the Drawings.
 - 1. All piping shall be new and NSF approved.
 - 2. Pipe shall equal Schedule 200, Type 1120-1220, SDR 21 PVC pipe and shall conform to CS-150, 200psi PVC.
 - 3. PVC pipe 1-inch to 3-inch diameter shall be BOE solvent weld type.
 - 4. PVC pipe 4 inch diameter and larger shall be ring-tight gasketed.
 - 5. SLxSLxFT PVC mainline tees shall be installed for all valves. Lateral PVC pipefittings shall be socket type, NSF approved Schedule 40.
 - 6. Solvent weld and gasketed PVC pipe shall meet ASTM requirements.
 - 7. Teflon tape shall be used on all threaded joints.
 - 8. Sleeving as indicated on the drawings shall be Schedule 200 PVC Piping, 200 PSI plastic pipe.

2.02 ELECTRIC CONTROL VALVES

- A. Electric remote and master control valves shall be of the type, size and manufacturer indicated on the Drawings.
 - 1. Electric control valves shall be capable of adjusting flow over a range of 0-400psi.
 - 2. All electric control valves shall be installed with PVC union joints and ball valves as indicated per the Drawings.
 - 3. All electric solenoid remote control valves shall be installed in a globe configuration.
 - 4. A ball valve for servicing control valve, equal to the size of control valve, shall be installed immediately upstream of all control valves as indicated on the Drawings.
 - 5. All electric control valves shall be installed with a 2-wire field decoder as indicated on the drawings.

2.03 AUTOMATIC CONTROLLER

- A. The battery operated automatic sprinkler control sensors shall be of the type, size, and manufacturer indicated on the Drawings.
 - 1. Installation of the battery operated control sensors shall be as indicated on the drawings and in accordance with manufacturer's recommendations.

2.04 CONTROL WIRING, MARKERS, AND CONNECTORS

- A. Control wire shall be UF-UL listed, color coded PVC insulated copper conductor direct burial Use only insulated 14 AWG and 12 AWG color coded wire. Do not use green color coded wire.
 - 1. Common wire shall be white in color.
 - 2. Waterproof Wire Connectors (*DBY-R* or equal) shall be used for all wire connections.
- B. The Contractor shall furnish and install indelible wire markers at the end of each control wire inside the controller cabinet.
 - 1. Wire identification labels (*T. Christy Enterprises, Inc., Anaheim, CA. (800-258-4583)* or equal) as approved by Architect.
- C. The Contractor to include Valve ID Tag at each control valve location with corresponding controller zone number.
 - 1. Valve identification labels (*T. Christy Enterprises, Inc., Anaheim, CA. (800-258-4583)* or equal) as approved by Architect.
- D. All wiring splices shall be made with a watertight connector with a silicon sealant as approved by Architect.

2.05 VALVE BOXES

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- A. Control valves shall be housed in poly-iron valve boxes as indicated on the Drawings.
 - 1. Provide and install manufactured valve box extensions as needed to result in box cover being precisely one inch above adjacent finish grades, or flush with top of planter bed aggregate or wood mulches.
 - 2. All control valve boxes to be equipped with manufactured covers that are integrally hinged to the control valve box with bolt-down feature.
 - a) Non-bolted or snap-tight covers are unacceptable.
 - b) Valve box covers in aggregate planter bed areas to be brown in color; green valve box covers in aggregate areas are not acceptable.
 - 3. Install all control valve boxes above aggregate drainage sumps that are approximately 6 to 8 inches deep as indicated on the Drawings.
 - a) Use a fabric soil separator to line drainage sumps prior to adding aggregate material.
 - b) Do not attempt to fill sumps with aggregate after installation of valve box and control valve.
 - c) Top of aggregate sumps shall be a uniform 3 inches below control valve to permit servicing of valve without removal of aggregate.

2.06 OTHER EQUIPMENT

- A. Other equipment to be provided and installed, including but not limited to quick coupling valves, manual drain valves, valve caps, etc., needed to result in a complete and operable sprinkler system shall be provided and installed under this Section.
 - 1. Installation of all other equipment shall be as indicated on Drawings, and/or per manufacturer's recommendations.
- B. Manual drain valves (1 inch straight valve assemblies), shall be installed at all mainline low points, whether specifically indicated on the Drawings or not, to permit complete mainline drainage via gravity.
 - 1. Install mainline piping to slope toward manual drain valves whenever possible.
 - 2. Install all manual drain valve boxes above aggregate drainage sumps that are approximately 6 to 8 inches deep as indicated on the Drawings.
 - a) Use a fabric soil separator to line drainage sumps prior to adding aggregate material.
 - b) Do not attempt to fill sumps with aggregate after installation of valve box and drain valve.
 - c) Top of aggregate sumps shall be 3 inches below control valve to permit servicing of valve without removal of aggregate.
- C. Quick Coupling valves shall be installed as indicated on the Drawings.
 - 1. Quick coupling valves shall be bronze one-piece with lock, size as indicated on the Drawings. Provide quick coupling valve key in accordance with submittal requirements at project closeout.
 - a) Quick-coupling valves shall not be installed in valve boxes with control valves.
 - b) Quick-coupling valves shall be equipped with manufacturer's purple color hinged covers for non-potable irrigation systems.

PART 3: EXECUTION OF WORK

3.01 JOBSITE CONDITIONS

- A. The Contractor shall be completely familiar with all existing jobsite conditions that shall affect the work prior to commencing any work under this Section.
 - 1. No work shall be commenced until unsatisfactory jobsite conditions have been brought to the Architect's attention or otherwise resolved.

3.02 UTILITIES AND PROTECTION

- A. Prior to commencing any work under this Section, it shall be this Contractor's responsibility for scheduling and coordinating the locations of all existing utilities on the jobsite that affect the

SECTION 32 84 00 LANDSCAPE IRRIGATION

work.

1. All existing utilities shall be clearly indicated on field Drawings and shall be flagged or otherwise marked on the jobsite.
2. Failure to locate existing utilities and provide adequate protection to them during the work shall not preclude responsibility for repair of subsequent damage.
3. Costs for repair to existing utilities as a result of failure to properly locate and protect utilities shall be this Contractor's responsibility.
4. "Utility" shall include but shall not be limited to gas, electric, sewer and water, telephone, and cablevision lines.

3.03 OTHER TRADES

- A. Contractor shall make all reasonable efforts to coordinate work of other trades within the work area to avoid damage to work installed under this Section.
 1. This Contractor shall maintain a daily log of work completed under this Section and make it available upon request of the Architect.

3.04 FIELD VERIFICATION

- A. All control valve locations, and pipeline locations are to be flagged prior to commencing excavation.
 - a) Minor relocation of equipment to facilitate the installation, serviceability and operation of the irrigation system shall be made and documented on as-built Drawings.
- B. All rough grades established by the General Contractor shall be verified as being within a tolerance of plus or minus two inches by the Contractor prior to commencement of work under this Section.
 - a) Commencement of work under this Section shall be construed as acceptance of all grades established by others.
- C. All piping and trenching shall be a minimum of 12 inches deep and a maximum of 36 inches deep.
- D. Parallel piping may be combined in common trenches with a minimum of 6 inches between parallel pipe lines.
- E. Pipe indicated as adjacent to backside of curbing or pavement shall not be installed farther than six inches away from curbing/pavement.

3.05 EXCAVATION

- A. The Contractor shall provide all necessary excavation required for proper installation of work under this Section.
- B. Mechanical trenchers used for excavation shall be capable of digging smooth, flat bottom trenches regardless of slope conditions.
- C. Trenches for mainlines shall be excavated to a uniform minimum depth of twenty four inches.
- D. Trenches for lateral pipelines shall be excavated to a uniform minimum depth of twelve inches.
- E. Sumps for manual drains and control valves shall be over-excavated to facilitate valve installation.
- F. Sleeves crossing beneath parking lots, driveways, roadways, sidewalks, and domestic water lines shall be installed to the depth of either the mainline or lateral pipeline to be installed inside sleeve and are to be extended six inches beyond edge of pavement. All sleeves for control

SECTION 32 84 00 LANDSCAPE IRRIGATION

wiring to be installed to a uniform depth not less than twenty-four inches.

1. Sleeve sizes shall be a minimum of twice the diameter of the lateral or mainline pipe size to be installed in it or as indicated on the Drawings.
 - a) Increase sleeve size by one inch if control wiring is also to be installed in it or provide sleeve size indicated on the Drawings.
- G. Concrete pavement above sleeve locations shall be stamped or etched with an "S" to permanently mark locations.
- H. Sleeves crossing beneath sidewalks shall be installed to depth indicated on Drawings prior to installation of pavement.
- I. In the event the Contractor is required to reroute pipe, or relocate sprinkler heads as a result of encountering consolidated rock or debris, and additional material/labor is required to complete installation, the Architect shall issue a change order for additional material and labor costs.
 1. Consolidated material shall be defined as any obstruction occurring in an area normally scheduled to be excavated which runs five feet or longer in any trench, or is greater than twenty five square feet in area, both at depths less than thirty inches for irrigation pipelines.
 - a) The Contractor shall provide a unit cost per linear foot for excavation through consolidated material in his bid to be used in determining change order value.

3.06 INSTALLATION

- A. All installations are to be made in full accordance with the Drawings, Specifications, local and state Codes and Ordinances, etc., with the most stringent requirement prevailing at all times in the event of conflict.
 1. Generally no deviations from the layout of pipelines, sprinkler heads, control valves, point of connection, controller location, or other scheduled installations shall be considered or accepted by the Architect from that indicated on the Drawings.
 - a) Changes that alter the intent of the Drawings shall not be made without prior Architect's approval.
- B. No contact between any equipment installed under this Section and other utilities or structures is permitted.
- C. Open pipe ends are to be taped or plugged closed at all times to keep out dirt and debris during installation.
- D. All mainline and lateral pipe is to be flushed with clean water to remove all dirt and debris prior to installing drip emitters.
- E. All valve boxes shall be installed so they are parallel and perpendicular to curbs, maintenance edging, structures, and sidewalks; top of all box lids shall be one inch above finish grade in turf areas or flush with top of aggregate or wood mulch in planter beds.
- F. All drip irrigation components including lateral lines and flushing end caps shall be buried and not exposed.
 1. Drip emitters shall be placed and pinned at the base of shrubs and on all tree drip emitter drip rings as indicated on the drawings so as to permit visual operation of all emitters.

3.07 BACKFILL AND COMPACTION

- A. Provide clean backfill soil free of clods and rocks greater than one inch in size, and debris that could puncture and damage pipelines and equipment installed under this Section.

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- B. Clean sand shall be provided and installed as bedding material beneath pipelines to facilitate installation.
- C. Backfilling to be done when pipelines are cool to avoid excessive contraction.
- D. Frozen or saturated soil is not to be used as backfill at any time.
- E. Open trenches and other excavations are to be backfilled with suitable material and compacted to density of adjacent undisturbed soil in six-inch increments.
 - 1. Compaction shall be done with a vibratory plate. Other methods of compaction are not acceptable.
 - 2. After compaction, backfill in trenches and around control valves and sprinkler heads shall be flush with surrounding finish grades.
- F. The Contractor is responsible for the repair to damaged equipment, finish grades, undermined pavements, sod, mulches and underlayments, etc., from settling of one inch or more in any trench or excavation for a period of not less than three hundred sixty five days from date of final Acceptance.
 - 1. Repair/replacement of sodded turfgrass as a result of repair to trench settling shall be at this Contractor's expense.

PART 4: TESTING AND OPERATION **4.01 TESTING AND ARCHITECT'S INSPECTION**

- A. After completion of all work under this Section the Contractor shall activate the water source and pressurize the mainline to not less than 100psi, or maximum available pressure if less than 100psi.
 - 1. The mainline shall remain closed and pressurized for not less than twenty-four hours prior to operation of the completed system.
- B. After successful completion of the pressurized period and repair to any leaks, and the system can be operated at the pressure intended by design, the Contractor shall adjust and fine-tune all equipment for optimum performance and coverage as intended by design.
- C. Architect shall be given not less than two day's notice that an inspection for Substantial Completion is requested.
 - 1. The entire installed system shall have been allowed to operate automatically via the controller through entire cycles prior to request for inspection.
- D. The Architect's inspection for Substantial Completion shall include visually observing the operation of all work provided and installed under this Section.
 - 1. The Architect shall document any installation in a written punchlist that does not comply entirely with any part of this Section.
 - 2. All punchlist items are to be completely corrected by the Contractor prior to re-inspection by Architect.
 - a) The Contractor shall incur backcharges for any additional inspections that must be made by Architect to verify complete correction of deficiencies subsequent to second inspection.

4.02 SYSTEM OPERATION

- A. The Contractor is responsible for initial programming of battery operated control sensors and the hand held remote transmitter/receiver to operate automatically at frequencies deemed necessary to sustain and promote vigorous growth of all landscaped areas to which work under this Section provides coverage.

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- B. The operating sequence, frequency, and duration of operation of all zones shall be per the Drawings.
 - 1. The Contractor may alter the frequency and duration of operation of zones to compensate for weather conditions.
- C. During and up until Final Acceptance, the Contractor is responsible for making any adjustment required to equipment installed under this Section.
 - 1. The Contractor shall include in his base contract cost adequate time to permit him to make jobsite visits as necessary subsequent to Final Acceptance to perform minor field adjustments to flow controls, nozzles, and controller program to maintain optimum appearance of landscaping for a period of not less than thirty days from date of Final Acceptance.

4.03 CLEANUP AND JOBSITE RESTORATION

- A. Prior to Final Acceptance, all areas on the jobsite in which work under this Section has occurred shall be thoroughly cleaned of dirt, unused material, and the Contractor's installation equipment.
 - 1. All pavements in the work area shall be swept clean of dirt and debris and power washed with water. Tire marks on all pavements from equipment used under this Section shall be cleaned
 - 2. Remove all flags used to locate sprinkler head and valve placement.
- B. Work by other trades that is damaged or destroyed as a result of work under this Section shall be fully restored by this Contractor as a condition of Final Acceptance.

PART 5: WARRANTY ENACTMENT

5.01

- A. A three hundred sixty-five-day warranty for all material and workmanship provided under this Section shall commence on the date of Final Acceptance of all work.
- B. During the warranty period, the Contractor is responsible for all of the following:
 - 1. Winterization; shut off all water sources to system, manually drain all pipelines, and provide cold air injection as required to prevent freeze damage to all equipment.
 - 2. Activation; turn on all water sources to system, pressurize all pipelines, repair damaged equipment not caused by vandalism, snow removal, or unauthorized winter-use of system, adjust and fine tune all equipment to provide optimum performance.
 - 3. Controller programming; program controller at frequencies deemed necessary to sustain and promote establishment of landscaping at time of Final Acceptance, shut down controller at Winterization, re-program controller at time of activation.
 - a) It is this Contractor's responsibility to perform seasonal service at the time deemed appropriate to protect warranty interests.
 - b) The Contractor is responsible for damage caused to equipment installed under this Section as a result of his failure to provide proper seasonal maintenance at the appropriate times.
 - c) The Contractor shall be backcharged if the services of others must be employed to perform seasonal maintenance.
- C. During the warranty period, the Contractor is responsible for providing labor and material as needed to keep the system completely operable as intended by design.
 - 1. Equipment that fails to operate as intended by design shall be repaired and/or replaced by the Contractor at his expense within twenty-four hours after Owner's notice.
 - 2. Equipment that is removed from the system for repair shall be replaced immediately with equal equipment capable of providing uninterrupted operation of the system as intended by design.

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5.02 EXCLUSIONS FROM WARRANTY

- A. The following do not constitute valid warranty claims:
 - 1. Vandalism.
 - 2. Damage to the installed system as a result of work by others in the work area after Final Acceptance.
 - 3. Unauthorized use of the system after Contractor's completion of Winterization.

PART 6: SPARE EQUIPMENT AND CLOSEOUT MATERIAL 6.01 REQUIREMENTS AT SUBSTANTIAL COMPLETION

- A. At inspection for Substantial Completion the Contractor shall provide Architect with all of the following:
 - 1. (1) Full-scale Mylar as-built drawing.
 - 2. (1) CD with electronic pdf format of as-built irrigation system plan.
 - 3. (1) Black one-inch size three-ringed binders, indexed with divider tabs and including the following type written data:
 - a) Warranty statement on Contractor's letterhead, including date of enactment, emergency contact name, phone number, FAX telephone number, and email address.
 - b) Recommended routine and seasonal maintenance procedures.
 - c) Operating instructions for automatic controller.
 - d) Operating Schedule for the initial program entered into the controller at the time of inspection for Substantial Completion.
 - e) Copies of equipment warranties provided by manufacturers of products installed, which are transferable to the Owner.
 - f) Names and addresses of all suppliers local to the project from which replacement equipment can be obtained.
 - 5. (2) spare sprinkler emitters of each type installed.
 - 6. (2) quick coupler valve keys.
 - a) All spare equipment to be new and unused.
 - b) All spare equipment to be provided in a new sealed cardboard box clearly labeled with the job name and "Spare Irrigation Equipment."
 - 7. Provide spare equipment and closeout material in the format and at the time required as a condition of Final Acceptance.

PART 7: GUARANTEE 7.01 CONTRACTOR'S ASSURANCE OF COMPLIANCE

- A. Upon entering an Agreement to provide labor and material to complete all work described under this Section the Contractor hereby guarantees to the Owner and the Architect that he shall execute to the best of his ability all provisions required under this Section.
 - 1. The Contractor shall not qualify any term, condition, or requirement stated herein at any time during or after execution of Agreement to provide work under this Section.

END OF SECTION 32-84-00

APPENDIX A

EROSION AND SEDIMENT CONTROL PLAN

**EROSION AND SEDIMENT CONTROL PLAN
FOR
CSU-PUEBLO
BARTLEY BOULEVARD EXTENSION**

Prepared For:

Colorado State University - Pueblo
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NorthStar Job No. 1403601

April 2016



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PROJECT DESCRIPTION

CSU-Pueblo Bartley Boulevard is a proposed 1200 linear feet of a new four lane roadway with landscaped median and street lighting extending from south of Fowler Drive, north to Walking Stick Boulevard. The Site is located in the Northwest quadrant of City of Pueblo.

The total area of the site is 1.21 acres. Construction activities will disturb 90% of the area.

The approximate center of the site is at 38°18'44" North Latitude, 104°34'38" West Longitude.

EXISTING SITE CONDITIONS

Slopes range between 1% and 10%. A drainage swale runs from south to north along the Board of Water Works easement east of the site. Generally, the site slopes gently from the south to the north towards Walking Stick Boulevard.

Existing vegetation is sparse, consisting primarily of native grasses that cover an estimated 15% of the ground surface. Revegetation of disturbed areas is feasible for this soil type.

There are no wetlands on the site.

ADJACENT AREAS

The Site is bound to the north by existing Walking Stick Boulevard, CSU-Pueblo Intramural Field on the west, childcare center and student housing on the southwest, Montrose Drive on the south and Board of Water Works property on the east. (See Figure 1 – Site Location Map).

SOILS

According to the Natural Resources Conservation Service (NRCS) soils report for the site, two types of soils were identified. Soils are classified hydrologically into four groups by the NRCS as A, B, C, and D. Soils classified as "A" generate the least runoff and soils classified as "D" generate the most runoff. The soils on the project site, Fort Loam (FtB) and Midway-Shale Outcrop Complex (MsD), are hydrologically classified as "C" and "D".

Fort Loam (FtB) are well drained soils. This soil is a loamy eolian deposit derived from sedimentary rock. The soil is classified as Hydrologic Group C. Midway-Shale Outcrop Complex (MsD) are also well drained soils. This soil is a clayey slope alluvium over residuum weathered from shale. The soil is classified as Hydrological Group D.

AREAS AND VOLUMES

Construction activities are estimated to disturb 1 acre of the area with installation of roadway, parking lot and landscaping.

EROSION AND SEDIMENT CONTROL MEASURES

Erosion control measures will need to be implemented for the site development. A brief description of the minimum erosion control measures proposed by this plan is as follows:

1. Clearing and Stripping - Perimeter Controls
 - a) Install erosion control barriers along the perimeter of the Site, which has the potential for discharging, flows off-site. The preferred barrier style is a temporary diversion swale.
 - b.) Install movable erosion control barriers as follows:
 - 1.) Across the openings of all existing storm culverts curb inlets.
 - 2.) Across all site access points. This control measure shall remain in place until construction is completed.
 - 3.) If a barrier is removed during working hours for site access insure that it is reinstalled at the end of the workday. Reinstall during all events that cause runoff to be discharged into the existing developed areas.
2. Establish temporary stockpile for strippings. If the stockpile is located where upstream runoff is conveyed cut temporary swales to divert these flows around the stockpile.
3. Establish stabilized staging area for construction material storage and vehicle maintenance. If the staging area is located where upstream runoff is conveyed cut temporary swales to divert these flows around the area.
4. Refer to the Erosion and Sediment Control Site Plan located in the Map Pocket for detailed information.
5. Final Clearing and Stripping
 - a.) Strip remainder of site as required. Stockpile strippings and topsoil per Section 2 above.
 - b.) No additional measures are necessary unless soil erosion becomes evident, either on site or at the stockpile location. Repair eroded areas and implement control measures as required.
6. Site Grading

- a.) Complete grading of areas to be disturbed by cutting, filling, compacting as required. All fills shall be properly compacted. Deep, loosely placed fills that can erode easily are not acceptable.
- b.) Overlot areas shall be overcut or underfilled by approximately 3 inches. To bring surfaces to final proposed grades place 3+ inches of strippings on all overlot areas. Surfaces shall then be crusted or mulched and seeded at Permittee's option. Mulching with a minimum of 2 tons of straw/acre should be considered whether seeding is undertaken or not. Mulch shall be anchored with mechanical crimpers, 4 inches deep. If seeding is planned, permittee shall obtain seeding recommendations from the Soil Conservation Service (SCS). Follow SCS recommendations for planting methods, mulching, watering, etc. All drainage channels and detention basins shall be revegetated immediately after completion.
- c.) If erosion of slopes occurs, consider the use of terracing or install a biodegradable revegetation fabric to encourage revegetation. Fabric, if used, shall be as manufactured by North American Green or other alternative as approved by the Owner.
- d.) No other control measures are needed at this time unless soil erosion becomes evident either on site or at the stockpile location. Repair eroded areas and implement control measures as required.

7. Utility Installations

- a.) Establish a concrete washout area for disposal of extra concrete materials. Refer to Appendix "C" for typical details.
- b.) Divert storm flows around the work as required to prevent loss of stockpiled or loose soils in the work area during storm events.
- c.) Install storm drain culverts and inlets. Install filter barriers around inlet openings following their construction. Refer to Appendix "C" for typical details. Divert storm flows around the installation work as required to prevent loss of stockpiled or loose soils in the work area during storm events.

8. Paving/road and parking lot surfacing

- a.) Following construction of roads and/or parking lot and adjacent roadside swales, install inlet protection around all road culverts and install strawbale barriers the swales at a regular interval to prevent sediment transport. Refer to Appendix "C" for typical details. Maintain barriers in place to the greatest extent possible. Perform maintenance on barriers as required to prevent buildup of silts. Keep barriers in place throughout the first spring and summer season or until vegetation is re-established.

b.) Following construction of curb and gutter, install gravel filters around inlets. Refer to Appendix "C" for typical details. Maintain filter barriers in place to the greatest extent possible. Remove filter barriers as required to facilitate preparation of subgrade and placement of asphalt. Reinstall barriers as soon as possible after paving operation adjacent to the inlet is complete. Perform maintenance on barriers as required to prevent buildup of silts in the street. Keep barriers in place throughout the first spring and summer season if possible.

c.) Road surfacing materials lost, dropped from equipment or tracked by equipment to unpaved areas of the site shall be cleaned up and removed from the site.

9. Final Grading, Maintenance

a.) Insure the establishment of vegetation on disturbed areas.

b.) Erosion control measures around inlets and outlet structures should be maintained in place throughout the first full growing season or until vegetative cover is established. Since these filters could pose driver or pedestrian safety hazards, they may need to be removed at permittee's option. If inlet filters are removed from these locations, any subsequent construction must provide erosion control protection. This can be accomplished by installing warning barricades and a temporary gravel filter at the inlet concerned or by installing filter barriers on site that help prevent discharge of silts to the street

c.) Any loss of silts to the adjacent streets or downstream culverts shall be cleaned up immediately.

d.) Offsite soil tracking during site development construction activities will be kept to a minimum by limiting site access to essential vehicles and equipment. The permittee shall also limit site access during construction by requiring parking on stabilized surfaces except for essential equipment, deliveries, etc. Streets shall be cleaned of any accumulation of mud or silt on a daily basis during construction activity.

TIMING SCHEDULE

Because proposed contractor(s) and timing of the construction has not been identified for this project, a specific schedule can not be determined. However, a typical sequence of work might be as follows for the 2016 calendar year:

1. Clearing and stripping for installation of perimeter controls.
2. Construction of perimeter controls.
3. Remainder of clearing, stripping of topsoil and temporary stockpile.
4. Grading of roadways.

5. Construction of utilities.
6. Construction of curb and gutter.
7. Installation of roadway and parking surfacing.
8. Final stabilization and site cleanup.

PERMANENT STABILIZATION

In accordance with the permit, "final stabilization is reached when all soil disturbing activities at the site have been completed, and uniform vegetative cover has been established with a density of at least 70% of pre-disturbance levels or equivalent permanent, physical erosion reduction methods have been employed."

Final stabilization for this project will be achieved when construction activities are completed and the site is fully landscaped.

STORM WATER MANAGEMENT CONSIDERATIONS

Storm water management considerations shall include the following:

- The usage of perimeter fencing of the street improvements where there is the potential for off-site discharge.
- Moveable erosion control barriers across inlets and site access points.
- The diversion of flows around temporary stockpile locations.

Post-construction Best Management Practices (BMPs) shall include the following:

- Revegetation of disturbed areas.

MAINTENANCE

The permit requires that "the permittee shall make a thorough inspection of their stormwater management system at least every 14 days and after precipitation or snowmelt event that causes surface erosion". The permittee will make these required inspections and shall log pertinent information on inspection forms. Erosion control measures shall be observed to insure proper operation. Any measure that is not operating properly shall be noted for maintenance, repair, or modification as required to insure proper operation. Areas showing evidence of erosion shall be repaired and evaluated for measures that should be utilized to prevent re-occurrence. Repairs, maintenance, or modifications to the erosion control system that are identified in the inspection log shall be undertaken as soon as possible "but in no case more than 7 calendar days after the inspection log." Refer to Appendix D for sample inspection report.

The permittee shall keep a record of all inspections. Mud or measurable quantities of silt or other pollutants found off the site shall be noted and shall include a brief explanation of the cause along with measures taken to prevent future releases. Measures taken to clean up offsite "spills" shall be recorded.

The permit requires that "If construction activity lasts more than 12 months, a copy of the inspection record shall be sent to CDPHE by May 1 of each year, covering April 1 to March 31 of each year".

APPENDIX A

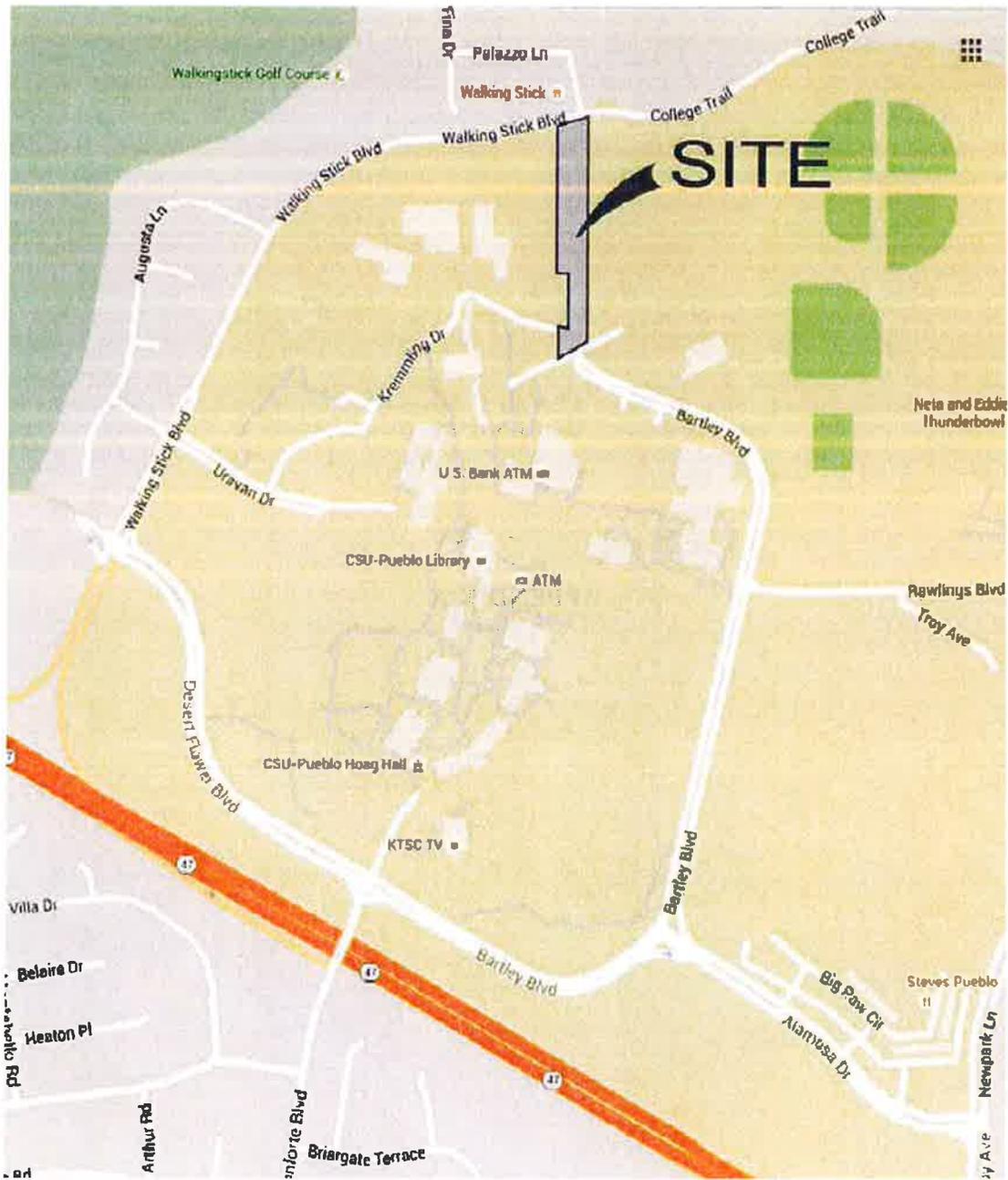


Figure 1 - Site Location Map

(Not to Scale)

APPENDIX B



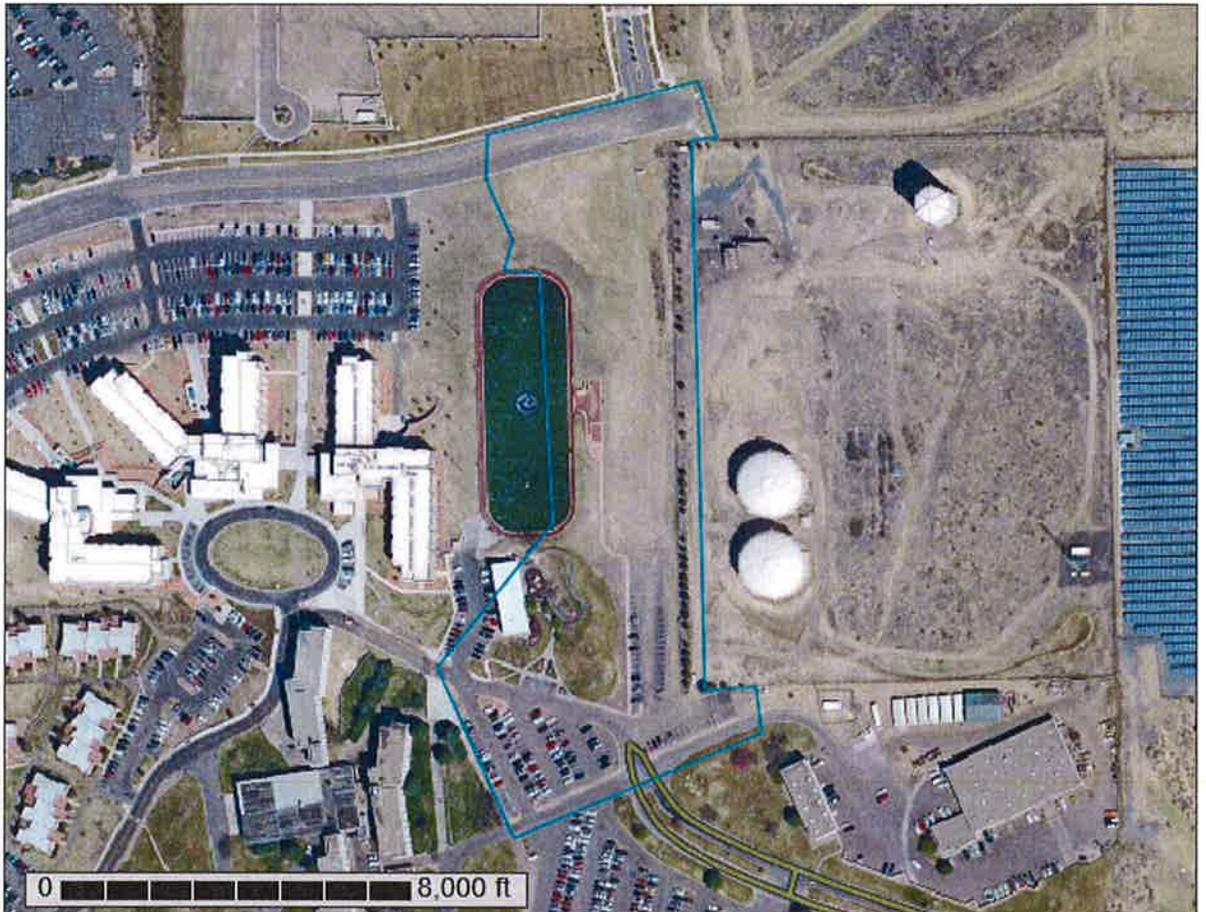
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Pueblo Area, Colorado, Parts of Pueblo and Custer Counties



February 15, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

Custom Soil Resource Report

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:2,090 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

- Area of Interest (AOI)
 - Area of Interest (AOI)
- Soils
 - Soil Map Unit Polygons
 - Soil Map Unit Lines
 - Soil Map Unit Points
- Special Point Features
 - Blowout
 - Borrow Pit
 - Clay Spot
 - Closed Depression
 - Gravel Pit
 - Gravelly Spot
 - Landfill
 - Lava Flow
 - Marsh or swamp
 - Mine or Quarry
 - Miscellaneous Water
 - Perennial Water
 - Rock Outcrop
 - Saline Spot
 - Sandy Spot
 - Severely Eroded Spot
 - Sinkhole
 - Slide or Slip
 - Sodic Spot
- Water Features
 - Streams and Canals
- Transportation
 - Rails
 - Interstate Highways
 - US Routes
 - Major Roads
 - Local Roads
- Background
 - Aerial Photography
- Other
 - Spoil Area
 - Stony Spot
 - Very Stony Spot
 - Wet Spot
 - Other
 - Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pueblo Area, Colorado, Parts of Pueblo and Custer Counties
 Survey Area Data: Version 15, Sep 22, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 15, 2011—Apr 22, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Pueblo Area, Colorado, Parts of Pueblo and Custer Counties (CO626)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FtB	Fort loam, dry, 0 to 3 percent slopes	4.7	63.4%
MsD	Midway-Shale outcrop complex, 1 to 9 percent slopes	2.7	36.6%
Totals for Area of Interest		7.5	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

Custom Soil Resource Report

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Pueblo Area, Colorado, Parts of Pueblo and Custer Counties

FtB—Fort loam, dry, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2rgr5
Elevation: 3,800 to 5,500 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fort, dry, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort, Dry

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 4 inches: loam
Bt - 4 to 14 inches: sandy clay loam
Btk - 14 to 31 inches: clay loam
Bk1 - 31 to 51 inches: loam
Bk2 - 51 to 79 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C
Ecological site: Loamy Plains, LRU's A & B 10-14 inches, P.Z. (R069XY006CO)
Other vegetative classification: Loamy (G069XW017CO)

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Minor Components

Vonid

Percent of map unit: 8 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Sandy Plains (R069XY026CO)
Other vegetative classification: Loamy (G069XW017CO)

Wilid

Percent of map unit: 7 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Plains, LRU's A & B 10-14 Inches, P.Z. (R069XY006CO)
Other vegetative classification: Loamy (G069XW017CO)

MsD—Midway-Shale outcrop complex, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 36d2
Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 11 to 14 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 145 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

Midway and similar soils: 50 percent
Shale outcrop: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Midway

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey slope alluvium over residuum weathered from shale

Typical profile

A - 0 to 2 inches: silty clay
C - 2 to 9 inches: silty clay

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Cr - 9 to 13 inches weathered bedrock

Properties and qualities

Slope 1 to 9 percent

Depth to restrictive feature: 5 to 20 inches to paralithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile 5 percent

Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: Shaly Plains (R069XY046CO)

Description of Shale Outcrop

Typical profile

Cr - 0 to 60 inches unweathered bedrock

Properties and qualities

Slope: 1 to 9 percent

Depth to restrictive feature: 0 inches to paralithic bedrock

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)

Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydrologic Soil Group: D

Minor Components

Razor

Percent of map unit: 10 percent

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APPENDIX C

Description

Surface roughening is an erosion control practice that involves tracking, scarifying, imprinting, or tilling a disturbed area to provide temporary stabilization of disturbed areas. Surface roughening creates variations in the soil surface that help to minimize wind and water erosion. Depending on the technique used, surface roughening may also help establish conditions favorable to establishment of vegetation.



Photograph SR-1. Surface roughening via imprinting for temporary stabilization.

Appropriate Uses

Surface roughening can be used to provide temporary stabilization of disturbed areas, such as when revegetation cannot be immediately established due to seasonal planting limitations. Surface roughening is not a stand-alone BMP, and should be used in conjunction with other erosion and sediment controls.

Surface roughening is often implemented in conjunction with grading and is typically performed using heavy construction equipment to track the surface. Be aware that tracking with heavy equipment will also compact soils, which is not desirable in areas that will be revegetated. Scarifying, tilling, or ripping are better surface roughening techniques in locations where revegetation is planned. Roughening is not effective in very sandy soils and cannot be effectively performed in rocky soil.

Design and Installation

Typical design details for surfacing roughening on steep and mild slopes are provided in Details SR-1 and SR-2, respectively.

Surface roughening should be performed either after final grading or to temporarily stabilize an area during active construction that may be inactive for a short time period. Surface roughening should create depressions 2 to 6 inches deep and approximately 6 inches apart. The surface of exposed soil can be roughened by a number of techniques and equipment. Horizontal grooves (running parallel to the contours of the land) can be made using tracks from equipment treads, stair-step grading, ripping, or tilling.

Fill slopes can be constructed with a roughened surface. Cut slopes that have been smooth graded can be roughened as a subsequent operation. Roughening should follow along the contours of the slope. The tracks left by truck mounted equipment working perpendicular to the contour can leave acceptable horizontal depressions; however, the equipment will also compact the soil.

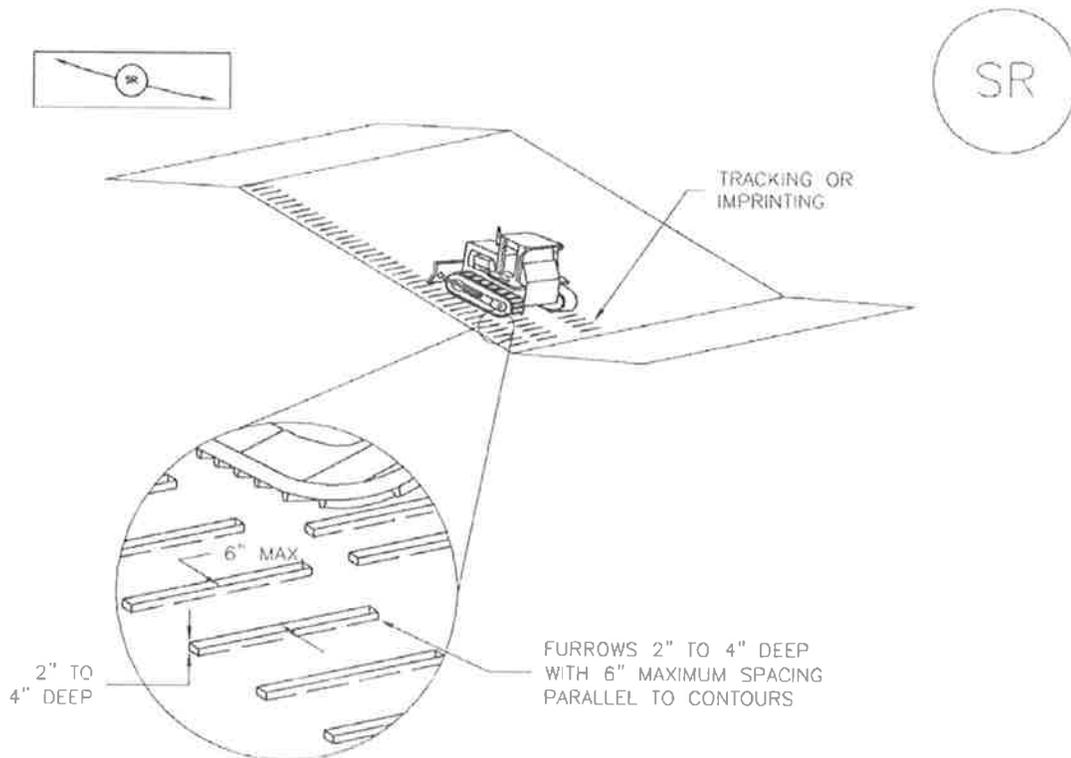
Surface Roughening	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

Maintenance and Removal

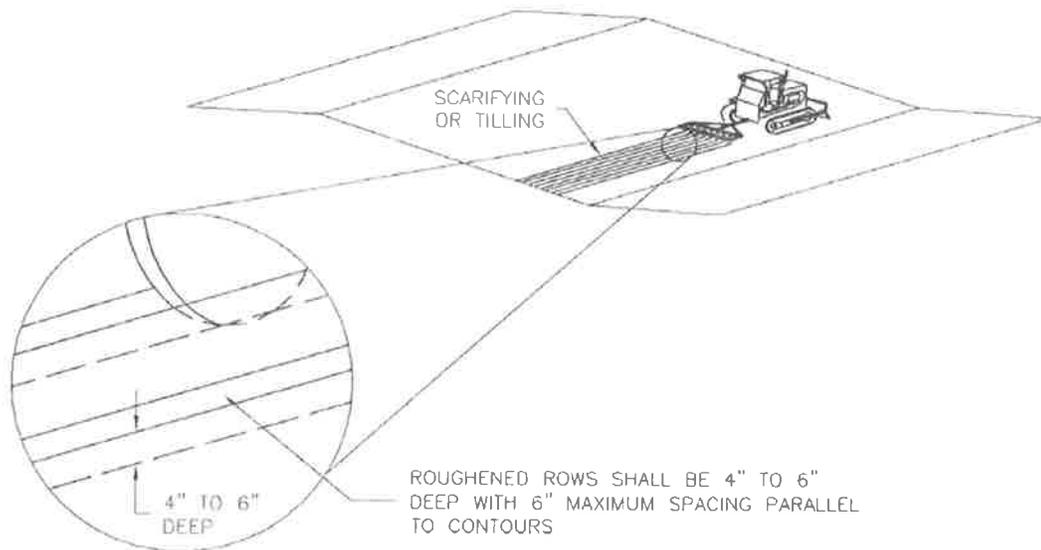
Care should be taken not to drive vehicles or equipment over areas that have been surface roughened. Tire tracks will smooth the roughened surface and may cause runoff to collect into rills and gullies.

Because surface roughening is only a temporary control, additional treatments may be necessary to maintain the soil surface in a roughened condition.

Areas should be inspected for signs of erosion. Surface roughening is a temporary measure, and will not provide long-term erosion control.



SR-1. SURFACE ROUGHENING
FOR STEEP SLOPES (3:1 OR STEEPER)



SR-2. SURFACE ROUGHENING
FOR LOW SLOPES (LESS THAN 3:1)

SURFACE ROUGHENING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
-LOCATION(S) OF SURFACE ROUGHENING.
2. SURFACE ROUGHENING SHALL BE PROVIDED PROMPTLY AFTER COMPLETION OF FINISHED GRADING (FOR AREAS NOT RECEIVING TOPSOIL) OR PRIOR TO TOPSOIL PLACEMENT OR ANY FORECASTED RAIN EVENT.
3. AREAS WHERE BUILDING FOUNDATIONS, PAVEMENT, OR SOD WILL BE PLACED WITHOUT DELAY IN THE CONSTRUCTION SEQUENCE, SURFACE ROUGHENING IS NOT REQUIRED.
4. DISTURBED SURFACES SHALL BE ROUGHENED USING RIPPING OR TILLING EQUIPMENT ON THE CONTOUR OR TRACKING UP AND DOWN A SLOPE USING EQUIPMENT TREADS.
5. A FARMING DISK SHALL NOT BE USED FOR SURFACE ROUGHENING.

SURFACE ROUGHENING MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACE UPON DISCOVERY OF THE FAILURE.
4. VEHICLES AND EQUIPMENT SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SURFACE ROUGHENED.
5. IN NON-TURF GRASS FINISHED AREAS, SEEDING AND MULCHING SHALL TAKE PLACE DIRECTLY OVER SURFACE ROUGHENED AREAS WITHOUT FIRST SMOOTHING OUT THE SURFACE.
6. IN AREAS NOT SEEDED AND MULCHED AFTER SURFACE ROUGHENING, SURFACES SHALL BE RE-ROUGHENED AS NECESSARY TO MAINTAIN GROOVE DEPTH AND SMOOTH OVER RILL EROSION.

(DETAILS ADAPTED FROM TOWN OF PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.



Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period (typically 30 days or longer), proactive stabilization measures should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

Typically, local governments have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selection of an appropriate seed mixture, use of appropriate seeding equipment to ensure proper coverage and density, and protection with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mix, soil preparations, and seeding and mulching recommendations that may be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality subsoils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms, rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

EC-2 Temporary and Permanent Seeding (TS/PS)

soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period (typically 30 days or more), plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment.

If desired for wildlife habitat or landscape diversity, shrubs such as rubber rabbitbrush (*Chrysothamnus nauseosus*), fourwing saltbush (*Atriplex canescens*) and skunkbrush sumac (*Rhus trilobata*) could be added to the upland seedmixes at 0.25, 0.5 and 1 pound PLS/acre, respectively. In riparian zones, planting root stock of such species as American plum (*Prunus americana*), woods rose (*Rosa woodsii*), plains cottonwood (*Populus sargentii*), and willow (*Populus spp.*) may be considered. On non-topsoiled upland sites, a legume such as Ladak alfalfa at 1 pound PLS/acre can be included as a source of nitrogen for perennial grasses.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well. See Table TS/PS-3 for appropriate seeding dates.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species ^a (Common name)	Growth Season ^b	Pounds of Pure Live Seed (PLS)/acre ^c	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5-10	½ - ¾
7. Sorghum	Warm	5-10	½ - ¾
8. Winter wheat	Cool	20-35	1 - 2
9. Winter barley	Cool	20-35	1 - 2
10. Winter rye	Cool	20-35	1 - 2
11. Triticale	Cool	25-40	1 - 2

^a Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

^b See Table TS/PS-3 for seeding dates. Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

^c Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

EC-2 Temporary and Permanent Seeding (TS/PS)

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses

Common ^a Name	Botanical Name	Growth Season ^b	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Alakali Soil Seed Mix					
Alkali sacaton	<i>Sporobolus airoides</i>	Cool	Bunch	1,750,000	0.25
Basin wildrye	<i>Elymus cinereus</i>	Cool	Bunch	165,000	2.5
Sodar streambank wheatgrass	<i>Agropyron riparium 'Sodar'</i>	Cool	Sod	170,000	2.5
Jose tall wheatgrass	<i>Agropyron elongatum 'Jose'</i>	Cool	Bunch	79,000	7.0
Arriba western wheatgrass	<i>Agropyron smithii 'Arriba'</i>	Cool	Sod	110,000	5.5
Total					17.75
Fertile Loamy Soil Seed Mix					
Ephriam crested wheatgrass	<i>Agropyron cristatum 'Ephriam'</i>	Cool	Sod	175,000	2.0
Dural hard fescue	<i>Festuca ovina 'duriuscula'</i>	Cool	Bunch	565,000	1.0
Lincoln smooth brome	<i>Bromus inermis leyss 'Lincoln'</i>	Cool	Sod	130,000	3.0
Sodar streambank wheatgrass	<i>Agropyron riparium 'Sodar'</i>	Cool	Sod	170,000	2.5
Arriba western wheatgrass	<i>Agropyron smithii 'Arriba'</i>	Cool	Sod	110,000	7.0
Total					15.5
High Water Table Soil Seed Mix					
Meadow foxtail	<i>Alopecurus pratensis</i>	Cool	Sod	900,000	0.5
Redtop	<i>Agrostis alba</i>	Warm	Open sod	5,000,000	0.25
Reed canarygrass	<i>Phalaris arundinacea</i>	Cool	Sod	68,000	0.5
Lincoln smooth brome	<i>Bromus inermis leyss 'Lincoln'</i>	Cool	Sod	130,000	3.0
Pathfinder switchgrass	<i>Panicum virgatum 'Pathfinder'</i>	Warm	Sod	389,000	1.0
Alkar tall wheatgrass	<i>Agropyron elongatum 'Alkar'</i>	Cool	Bunch	79,000	5.5
Total					10.75
Transition Turf Seed Mix^c					
Ruebens Canadian bluegrass	<i>Poa compressa 'Ruebens'</i>	Cool	Sod	2,500,000	0.5
Dural hard fescue	<i>Festuca ovina 'duriuscula'</i>	Cool	Bunch	565,000	1.0
Citation perennial ryegrass	<i>Lolium perenne 'Citation'</i>	Cool	Sod	247,000	3.0
Lincoln smooth brome	<i>Bromus inermis leyss 'Lincoln'</i>	Cool	Sod	130,000	3.0
Total					7.5

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses (cont.)

Common Name	Botanical Name	Growth Season ^b	Growth Form	Seeds/Pound	Pounds of PLS/acre
Sandy Soil Seed Mix					
Blue grama	<i>Bouteloua gracilis</i>	Warm	Sod-forming bunchgrass	825,000	0.5
Camper little bluestem	<i>Schizachyrium scoparium</i> 'Camper'	Warm	Bunch	240,000	1.0
Prairie sandreed	<i>Calamovilfa longifolia</i>	Warm	Open sod	274,000	1.0
Sand dropseed	<i>Sporobolus cryptandrus</i>	Cool	Bunch	5,298,000	0.25
Vaughn sideoats grama	<i>Bouteloua curtipendula</i> 'Vaughn'	Warm	Sod	191,000	2.0
Arriba western wheatgrass	<i>Agropyron smithii</i> 'Arriba'	Cool	Sod	110,000	5.5
Total					10.25
Heavy Clay, Rocky Foothill Seed Mix					
Ephriam crested wheatgrass ^d	<i>Agropyron cristatum</i> 'Ephriam'	Cool	Sod	175,000	1.5
Oahe Intermediate wheatgrass	<i>Agropyron intermedium</i> 'Oahe'	Cool	Sod	115,000	5.5
Vaughn sideoats grama ^e	<i>Bouteloua curtipendula</i> 'Vaughn'	Warm	Sod	191,000	2.0
Lincoln smooth brome	<i>Bromus inermis leys</i> 'Lincoln'	Cool	Sod	130,000	3.0
Arriba western wheatgrass	<i>Agropyron smithii</i> 'Arriba'	Cool	Sod	110,000	5.5
Total					17.5
<p>^a All of the above seeding mixes and rates are based on drill seeding followed by crimped straw mulch. These rates should be doubled if seed is broadcast and should be increased by 50 percent if the seeding is done using a Brillion Drill or is applied through hydraulic seeding. Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1. If hydraulic seeding is used, hydraulic mulching should be done as a separate operation.</p> <p>^b See Table TS/PS-3 for seeding dates.</p> <p>^c If site is to be irrigated, the transition turf seed rates should be doubled.</p> <p>^d Crested wheatgrass should not be used on slopes steeper than 6H to 1V.</p> <p>^e Can substitute 0.5 lbs PLS of blue grama for the 2.0 lbs PLS of Vaughn sideoats grama.</p>					

EC-2 Temporary and Permanent Seeding (TS/PS)

Table TS/PS-3. Seeding Dates for Annual and Perennial Grasses

Seeding Dates	Annual Grasses (Numbers in table reference species in Table TS/PS-1)		Perennial Grasses	
	Warm	Cool	Warm	Cool
January 1–March 15			✓	✓
March 16–April 30	4	1,2,3	✓	✓
May 1–May 15	4		✓	
May 16–June 30	4,5,6,7			
July 1–July 15	5,6,7			
July 16–August 31				
September 1–September 30		8,9,10,11		
October 1–December 31			✓	✓

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

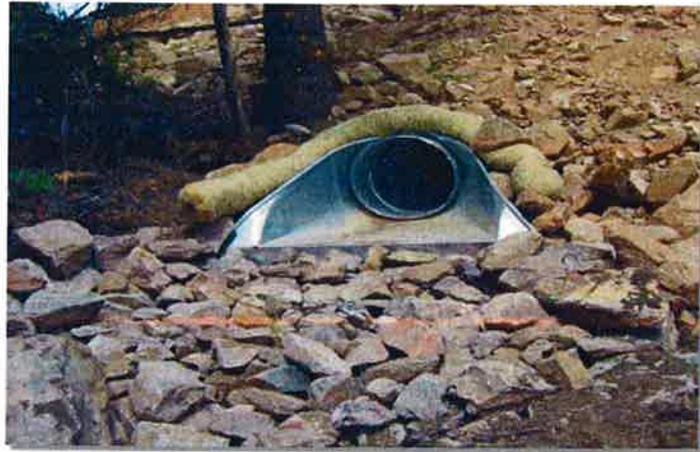
An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

Description

Outlet protection helps to reduce erosion immediately downstream of a pipe, culvert, slope drain, rundown or other conveyance with concentrated, high-velocity flows. Typical outlet protection consists of riprap or rock aprons at the conveyance outlet.



Photograph TOP-1. Riprap outlet protection.

Appropriate Uses

Outlet protection should be used when a conveyance discharges onto a disturbed area where there is potential for accelerated erosion due to concentrated flow. Outlet protection should be provided where the velocity at the culvert outlet exceeds the maximum permissible velocity of the material in the receiving channel.

Note: This Fact Sheet and detail are for temporary outlet protection, outlets that are intended to be used for less than 2 years. For permanent, long-term outlet protection, see the *Major Drainage* chapter of Volume 1.

Design and Installation

Design outlet protection to handle runoff from the largest drainage area that may be contributing runoff during construction (the drainage area may change as a result of grading). Key in rock, around the entire perimeter of the apron, to a minimum depth of 6 inches for stability. Extend riprap to the height of the culvert or the normal flow depth of the downstream channel, whichever is less. Additional erosion control measures such as vegetative lining, turf reinforcement mat and/or other channel lining methods may be required downstream of the outlet protection if the channel is susceptible to erosion. See Design Detail OP-1 for additional information.

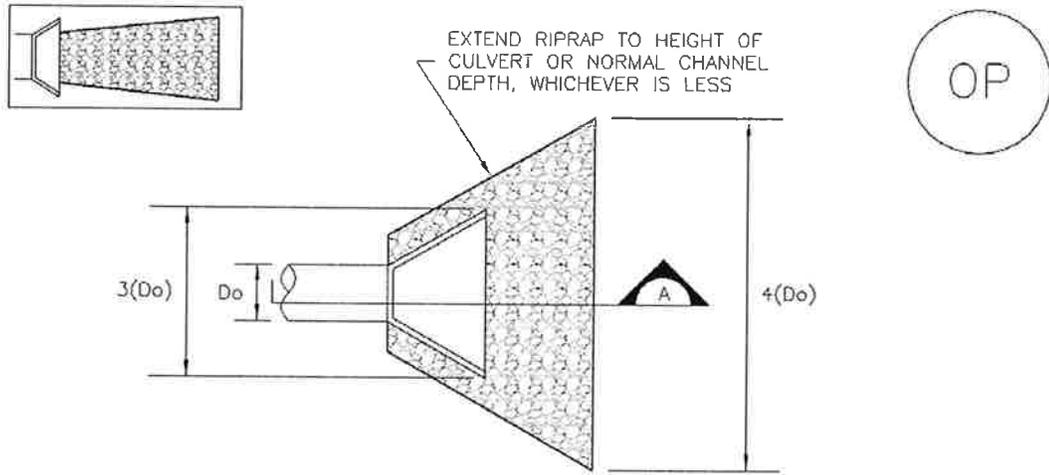
Maintenance and Removal

Inspect apron for damage and displaced rocks. If rocks are missing or significantly displaced, repair or replace as necessary. If rocks are continuously missing or displaced, consider increasing the size of the riprap or deeper keying of the perimeter.

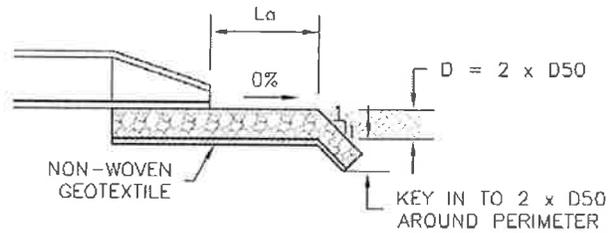
Remove sediment accumulated at the outlet before the outlet protection becomes buried and ineffective. When sediment accumulation is noted, check that upgradient BMPs, including inlet protection, are in effective operating condition.

Outlet protection may be removed once the pipe is no longer draining an upstream area, or once the downstream area has been sufficiently stabilized. If the drainage pipe is permanent, outlet protection can be left in place; however, permanent outlet protection should be designed and constructed in accordance with the requirements of the *Major Drainage* chapter of Volume 2.

Outlet Protection	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No



TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE

PIPE DIAMETER, D_o (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, L_a (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5	5	4
	5	10	6
12	5	10	4
	10	13	6
18	10	10	6
	20	16	9
	30	23	12
24	40	26	16
	30	16	9
	40	26	9
	50	26	12
	60	30	16

OP-1. TEMPORARY OUTLET PROTECTION

TEMPORARY OUTLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
 - LOCATION OF OUTLET PROTECTION.
 - DIMENSIONS OF OUTLET PROTECTION.
2. DETAIL IS INTENDED FOR PIPES WITH SLOPE \leq 10%. ADDITIONAL EVALUATION OF RIPRAP SIZING AND OUTLET PROTECTION DIMENSIONS REQUIRED FOR STEEPER SLOPES
3. TEMPORARY OUTLET PROTECTION INFORMATION IS FOR OUTLETS INTENDED TO BE UTILIZED LESS THAN 2 YEARS.

TEMPORARY OUTLET PROTECTION INSPECTION AND MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED

(DETAILS ADAPTED FROM AURORA, COLORADO AND PREVIOUS VERSION OF VOLUME 3, NOT AVAILABLE IN AUTOCAD)

Description

Earth dikes and drainage swales are temporary storm conveyance channels constructed either to divert runoff around slopes or to convey runoff to additional sediment control BMPs prior to discharge of runoff from a site. Drainage swales may be lined or unlined, but if an unlined swale is used, it must be well compacted and capable of resisting erosive velocities.

Appropriate Uses

Earth dikes and drainage swales are typically used to control the flow path of runoff at a construction site by diverting runoff around areas prone to erosion, such as steep slopes. Earth dikes and drainage swales may also be constructed as temporary conveyance features. This will direct runoff to additional sediment control treatment BMPs, such as sediment traps or basins.



Photograph ED/DS-1. Example of an earth dike used to divert flows at a construction site. Photo courtesy of CDOT.

Design and Installation

When earth dikes are used to divert water for slope protection, the earth dike typically consists of a horizontal ridge of soil placed perpendicular to the slope and angled slightly to provide drainage along the contour. The dike is used in conjunction with a swale or a small channel upslope of the berm to convey the diverted water. Temporary diversion dikes can be constructed by excavation of a V-shaped trench or ditch and placement of the fill on the downslope side of the cut. There are two types of placement for temporary slope diversion dikes:

- A dike located at the top of a slope to divert upland runoff away from the disturbed area and convey it in a temporary or permanent channel.
- A diversion dike located at the base or mid-slope of a disturbed area to intercept runoff and reduce the effective slope length.

Depending on the project, either an earth dike or drainage swale may be more appropriate. If there is a need for cut on the project, then an excavated drainage swale may be better suited. When the project is primarily fill, then a conveyance constructed using a berm may be the better option.

All dikes or swales receiving runoff from a disturbed area should direct stormwater to a sediment control BMP such as a sediment trap or basin.

Earth Dikes and Drainage Swales	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

EC-10 Earth Dikes and Drainage Swales (ED/DS)

Unlined dikes or swales should only be used for intercepting sheet flow runoff and are not intended for diversion of concentrated flows.

Details with notes are provided for several design variations, including:

ED-1. Unlined Earth Dike formed by Berm

DS-1. Unlined Excavated Swale

DS-2. Unlined Swale Formed by Cut and Fill

DS-3. ECB-lined Swale

DS-4. Synthetic-lined Swale

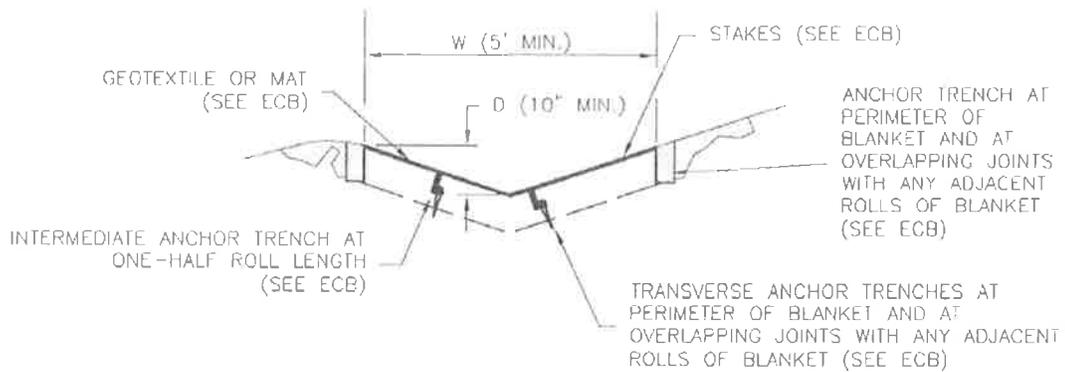
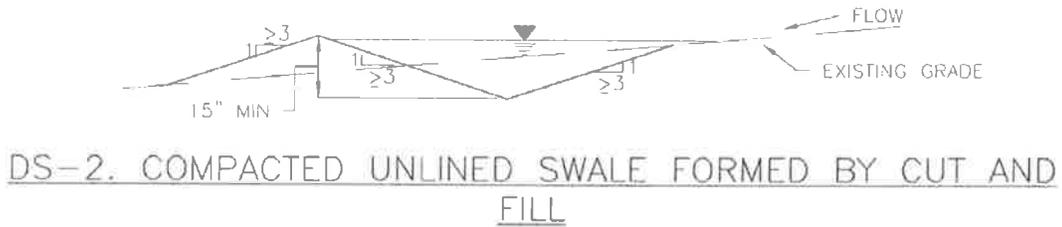
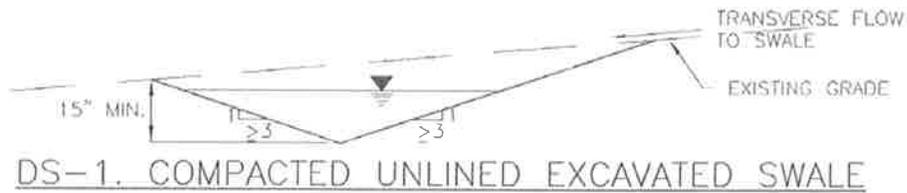
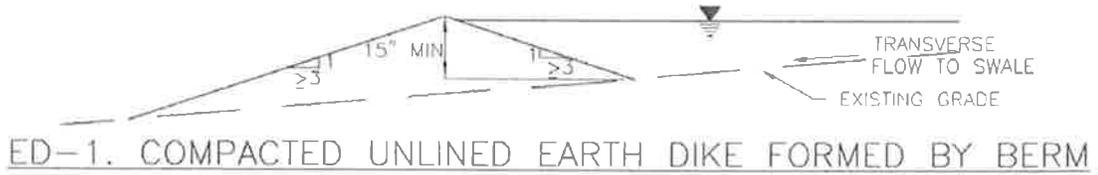
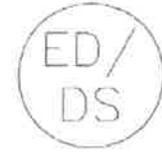
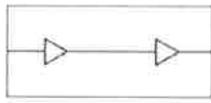
DS-5. Riprap-lined Swale

The details also include guidance on permissible velocities for cohesive channels if unlined approaches will be used.

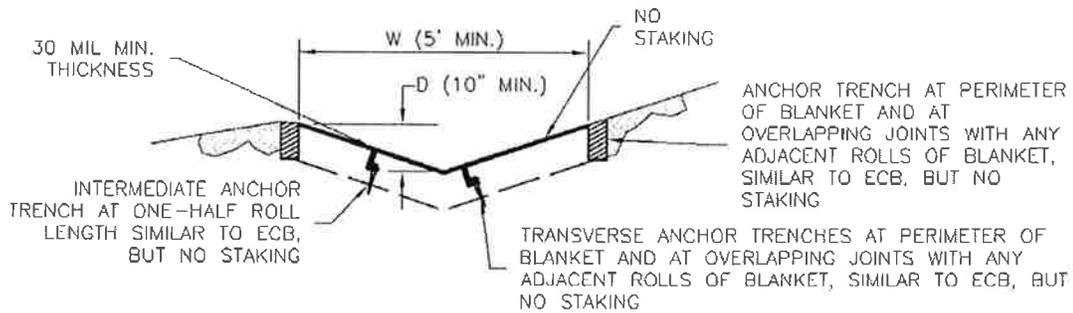
Maintenance and Removal

Inspect earth dikes for stability, compaction, and signs of erosion and repair. Inspect side slopes for erosion and damage to erosion control fabric. Stabilize slopes and repair fabric as necessary. If there is reoccurring extensive damage, consider installing rock check dams or lining the channel with riprap.

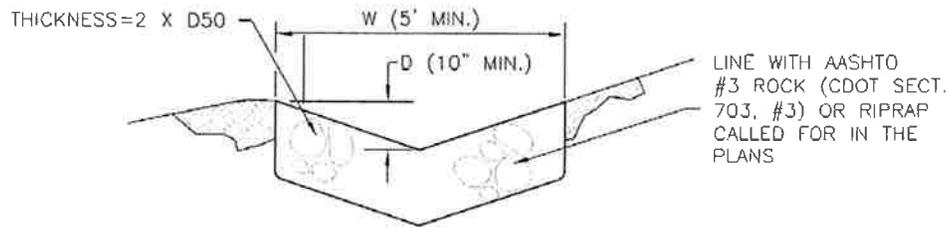
If drainage swales are not permanent, remove dikes and fill channels when the upstream area is stabilized. Stabilize the fill or disturbed area immediately following removal by revegetation or other permanent stabilization method approved by the local jurisdiction.



EC-10 Earth Dikes and Drainage Swales (ED/DS)



DS-4. SYNTHETIC LINED SWALE



DS-5. RIPRAP LINED SWALE

EARTH DIKE AND DRAINAGE SWALE INSTALLATION NOTES

1. SEE SITE PLAN FOR:
 - LOCATION OF DIVERSION SWALE
 - TYPE OF SWALE (UNLINED, COMPACTED AND/OR LINED).
 - LENGTH OF EACH SWALE.
 - DEPTH, D, AND WIDTH, W DIMENSIONS.
 - FOR ECB/TRM LINED DITCH, SEE ECB DETAIL.
 - FOR RIPRAP LINED DITCH, SIZE OF RIPRAP, D50.
2. SEE DRAINAGE PLANS FOR DETAILS OF PERMANENT CONVEYANCE FACILITIES AND/OR DIVERSION SWALES EXCEEDING 2-YEAR FLOW RATE OR 10 CFS.
3. EARTH DIKES AND SWALES INDICATED ON SWMP PLAN SHALL BE INSTALLED PRIOR TO LAND-DISTURBING ACTIVITIES IN PROXIMITY.
4. EMBANKMENT IS TO BE COMPACTED TO 90% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT ACCORDING TO ASTM D698.
5. SWALES ARE TO DRAIN TO A SEDIMENT CONTROL BMP.
6. FOR LINED DITCHES, INSTALLATION OF ECB/TRM SHALL CONFORM TO THE REQUIREMENTS OF THE ECB DETAIL.
7. WHEN CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION SWALE, INSTALL A TEMPORARY CULVERT WITH A MINIMUM DIAMETER OF 12 INCHES.

EARTH DIKE AND DRAINAGE SWALE MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SWALES SHALL REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION; IF APPROVED BY LOCAL JURISDICTION, SWALES MAY BE LEFT IN PLACE.

5. WHEN A SWALE IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM DOUGLAS COUNTY, COLORADO AND THE CITY OF COLORADO SPRINGS, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

Check dams are temporary grade control structures placed in drainage channels to limit the erosivity of stormwater by reducing flow velocity. Check dams are typically constructed from rock, gravel bags, sand bags, or sometimes, proprietary devices. Reinforced check dams are typically constructed from rock and wire gabion. Although the primary function of check dams is to reduce the velocity of concentrated flows, a secondary benefit is sediment trapping upstream of the structure.



Photograph CD-1. Rock check dams in a roadside ditch. Photo courtesy of WWE.

Appropriate Uses

Use as a grade control for temporary drainage ditches or swales until final soil stabilization measures are established upstream and downstream. Check dams can be used on mild or moderately steep slopes. Check dams may be used under the following conditions:

- As temporary grade control facilities along waterways until final stabilization is established.
- Along permanent swales that need protection prior to installation of a non-erodible lining.
- Along temporary channels, ditches or swales that need protection where construction of a non-erodible lining is not practicable.
- Reinforced check dams should be used in areas subject to high flow velocities.

Design and Installation

Place check dams at regularly spaced intervals along the drainage swale or ditch. Check dam heights should allow for pools to develop upstream of each check dam, extending to the downstream toe of the check dam immediately upstream.

When rock is used for the check dam, place rock mechanically or by hand. Do not dump rocks into the drainage channel. Where multiple check dams are used, the top of the lower dam should be at the same elevation as the toe of the upper dam.

When reinforced check dams are used, install erosion control fabric under and around the check dam to prevent erosion on the upstream and downstream sides. Each section of the dam should be keyed in to reduce the potential for washout or undermining. A rock apron upstream and downstream of the dam may be necessary to further control erosion.

Check Dams	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

Design details with notes are provided for the following types of check dams:

- Rock Check Dams (CD-1)
- Reinforced Check Dams (CD-2)

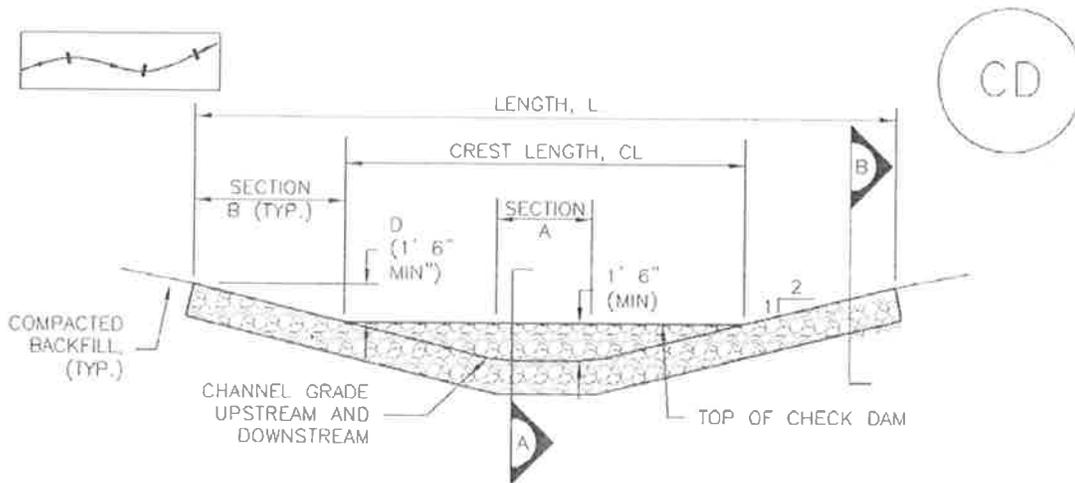
Sediment control logs may also be used as check dams; however, silt fence is not appropriate for use as a check dam. Many jurisdictions also prohibit or discourage use of straw bales for this purpose.

Maintenance and Removal

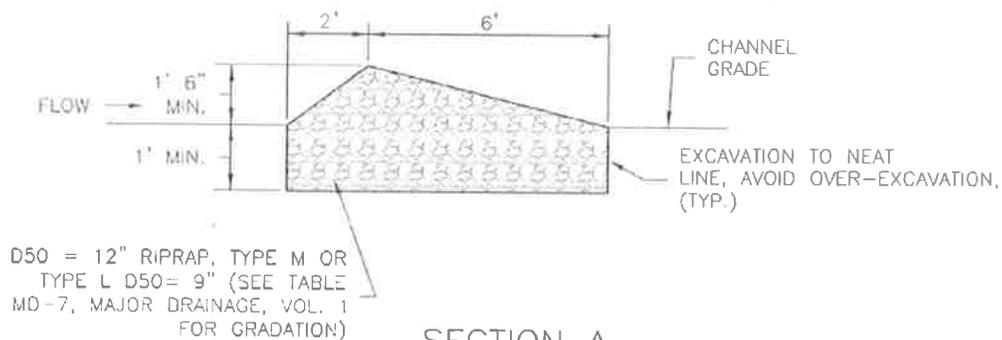
Replace missing rocks causing voids in the check dam. If gravel bags or sandbags are used, replace or repair torn or displaced bags.

Remove accumulated sediment, as needed to maintain BMP effectiveness, typically before the sediment depth upstream of the check dam is within $\frac{1}{2}$ of the crest height. Remove accumulated sediment prior to mulching, seeding, or chemical soil stabilization. Removed sediment can be incorporated into the earthwork with approval from the Project Engineer, or disposed of at an alternate location in accordance with the standard specifications.

Check dams constructed in permanent swales should be removed when perennial grasses have become established, or immediately prior to installation of a non-erodible lining. All of the rock and accumulated sediment should be removed, and the area seeded and mulched, or otherwise stabilized.

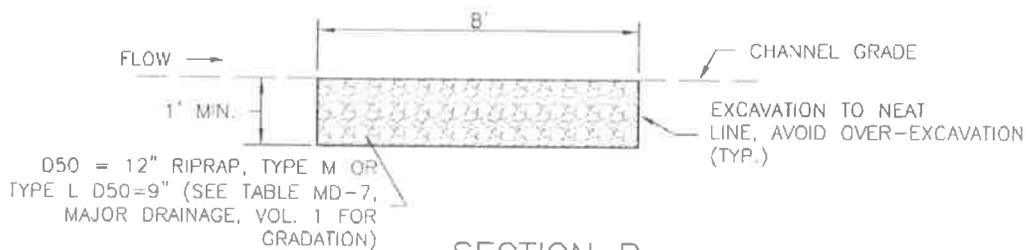


CHECK DAM ELEVATION VIEW



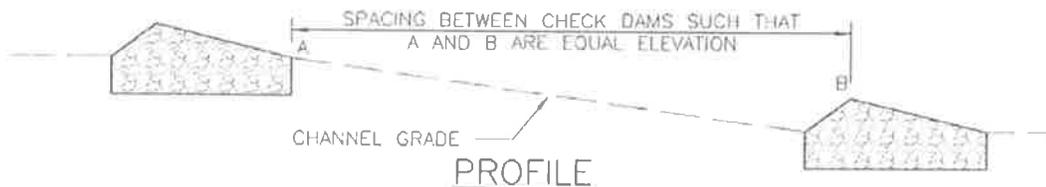
D50 = 12" RIPRAP, TYPE M OR TYPE L D50= 9" (SEE TABLE MD-7, MAJOR DRAINAGE, VOL. 1 FOR GRADATION)

SECTION A



D50 = 12" RIPRAP, TYPE M OR TYPE L D50=9" (SEE TABLE MD-7, MAJOR DRAINAGE, VOL. 1 FOR GRADATION)

SECTION B



PROFILE

CD-1. CHECK DAM

CHECK DAM INSTALLATION NOTES

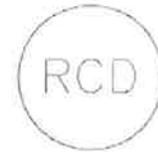
1. SEE PLAN VIEW FOR:
 - LOCATION OF CHECK DAMS.
 - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
 - LENGTH (L), CREST LENGTH (CL), AND DEPTH (D).
2. CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.
3. RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (D50 12") OR TYPE L (D50 9").
4. RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.
5. THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1' 6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

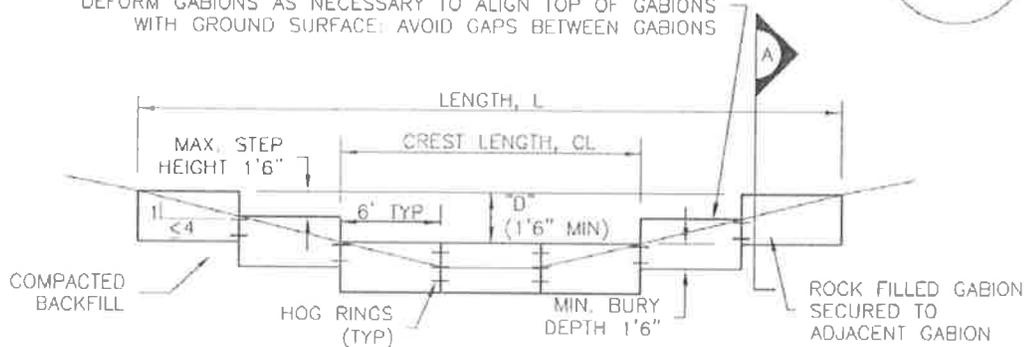
1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN ½ OF THE HEIGHT OF THE CREST.
5. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
6. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

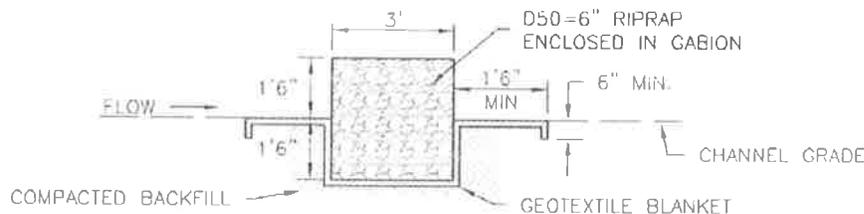
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.



ALTERNATIVE TO STEPS ON BANKS ABOVE CREST:
DEFORM GABIONS AS NECESSARY TO ALIGN TOP OF GABIONS
WITH GROUND SURFACE; AVOID GAPS BETWEEN GABIONS



REINFORCED CHECK DAM ELEVATION VIEW



SECTION A

REINFORCED CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
 - LOCATIONS OF CHECK DAMS.
 - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
 - LENGTH (L), CREST LENGTH (CL), AND DEPTH (D).
2. CHECK DAMS INDICATED ON THE SWMP SHALL BE INSTALLED PRIOR TO AN UPSTREAM LAND-DISTURBING ACTIVITIES.
3. REINFORCED CHECK DAMS, GABIONS SHALL HAVE GALVANIZED TWISTED WIRE NETTING WITH A MAXIMUM OPENING DIMENSION OF 4½" AND A MINIMUM WIRE THICKNESS OF 0.10". WIRE "HOG RINGS" AT 4" SPACING OR OTHER APPROVED MEANS SHALL BE USED AT ALL GABION SEAMS AND TO SECURE THE GABION TO THE ADJACENT SECTION.
4. THE CHECK DAM SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1' 6".
5. GEOTEXTILE BLANKET SHALL BE PLACED IN THE REINFORCED CHECK DAM TRENCH EXTENDING A MINIMUM OF 1' 6" ON BOTH THE UPSTREAM AND DOWNSTREAM SIDES OF THE REINFORCED CHECK DAM.

CD-2. REINFORCED CHECK DAM

REINFORCED CHECK DAM MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. SEDIMENT ACCUMULATED UPSTREAM OF REINFORCED CHECK DAMS SHALL BE REMOVED AS NEEDED TO MAINTAIN THE EFFECTIVENESS OF BMP, TYPICALLY WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN ½ THE HEIGHT OF THE CREST.
5. REPAIR OR REPLACE REINFORCED CHECK DAMS WHEN THERE ARE SIGNS OF DAMAGE SUCH AS HOLES IN THE GABION OR UNDERCUTTING.
6. REINFORCED CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
7. WHEN REINFORCED CHECK DAMS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED, AND COVERED WITH A GEOTEXTILE BLANKET, OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM DOUGLAS COUNTY, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

Wind erosion and dust control BMPs help to keep soil particles from entering the air as a result of land disturbing construction activities. These BMPs include a variety of practices generally focused on either graded disturbed areas or construction roadways. For graded areas, practices such as seeding and mulching, use of soil binders, site watering, or other practices that provide prompt surface cover should be used. For construction roadways, road watering and stabilized surfaces should be considered.



Photograph DC-1. Water truck used for dust suppression. Photo courtesy of Douglas County.

Appropriate Uses

Dust control measures should be used on any site where dust poses a problem to air quality. Dust control is important to control for the health of construction workers and surrounding waterbodies.

Design and Installation

The following construction BMPs can be used for dust control:

- An irrigation/sprinkler system can be used to wet the top layer of disturbed soil to help keep dry soil particles from becoming airborne.
- Seeding and mulching can be used to stabilize disturbed surfaces and reduce dust emissions.
- Protecting existing vegetation can help to slow wind velocities across the ground surface, thereby limiting the likelihood of soil particles to become airborne.
- Spray-on soil binders form a bond between soil particles keeping them grounded. Chemical treatments may require additional permitting requirements. Potential impacts to surrounding waterways and habitat must be considered prior to use.
- Placing rock on construction roadways and entrances will help keep dust to a minimum across the construction site.
- Wind fences can be installed on site to reduce wind speeds. Install fences perpendicular to the prevailing wind direction for maximum effectiveness.

Maintenance and Removal

When using an irrigation/sprinkler control system to aid in dust control, be careful not to overwater. Overwatering will cause construction vehicles to track mud off-site.

Wind Erosion Control/ Dust Control	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	Moderate

Description

Concrete waste management involves designating and properly managing a specific area of the construction site as a concrete washout area. A concrete washout area can be created using one of several approaches designed to receive wash water from washing of tools and concrete mixer chutes, liquid concrete waste from dump trucks, mobile batch mixers, or pump trucks. Three basic approaches are available: excavation of a pit in the ground, use of an above ground storage area, or use of prefabricated haul-away concrete washout containers. Surface discharges of concrete washout water from construction sites are prohibited.



Photograph CWA-1. Example of concrete washout area. Note gravel tracking pad for access and sign.

Appropriate Uses

Concrete washout areas must be designated on all sites that will generate concrete wash water or liquid concrete waste from onsite concrete mixing or concrete delivery.

Because pH is a pollutant of concern for washout activities, when unlined pits are used for concrete washout, the soil must have adequate buffering capacity to result in protection of state groundwater standards; otherwise, a liner/containment must be used. The following management practices are recommended to prevent an impact from unlined pits to groundwater:

- The use of the washout site should be temporary (less than 1 year), and
- The washout site should be not be located in an area where shallow groundwater may be present, such as near natural drainages, springs, or wetlands.

Design and Installation

Concrete washout activities must be conducted in a manner that does not contribute pollutants to surface waters or stormwater runoff. Concrete washout areas may be lined or unlined excavated pits in the ground, commercially manufactured prefabricated washout containers, or aboveground holding areas constructed of berms, sandbags or straw bales with a plastic liner.

Although unlined washout areas may be used, lined pits may be required to protect groundwater under certain conditions.

Do not locate an unlined washout area within 400 feet of any natural drainage pathway or waterbody or within 1,000 feet of any wells or drinking water sources. Even for lined concrete washouts, it is advisable to locate the facility away from waterbodies and drainage paths. If site constraints make these

Concrete Washout Area	
Functions	
Erosion Control	No
Sediment Control	No
Site/Material Management	Yes

setbacks infeasible or if highly permeable soils exist in the area, then the pit must be installed with an impermeable liner (16 mil minimum thickness) or surface storage alternatives using prefabricated concrete washout devices or a lined aboveground storage area should be used.

Design details with notes are provided in Detail CWA-1 for pits and CWA-2 for aboveground storage areas. Pre-fabricated concrete washout container information can be obtained from vendors.

Maintenance and Removal

A key consideration for concrete washout areas is to ensure that adequate signage is in place identifying the location of the washout area. Part of inspecting and maintaining washout areas is ensuring that adequate signage is provided and in good repair and that the washout area is being used, as opposed to washout in non-designated areas of the site.

Remove concrete waste in the washout area, as needed to maintain BMP function (typically when filled to about two-thirds of its capacity). Collect concrete waste and deliver offsite to a designated disposal location.

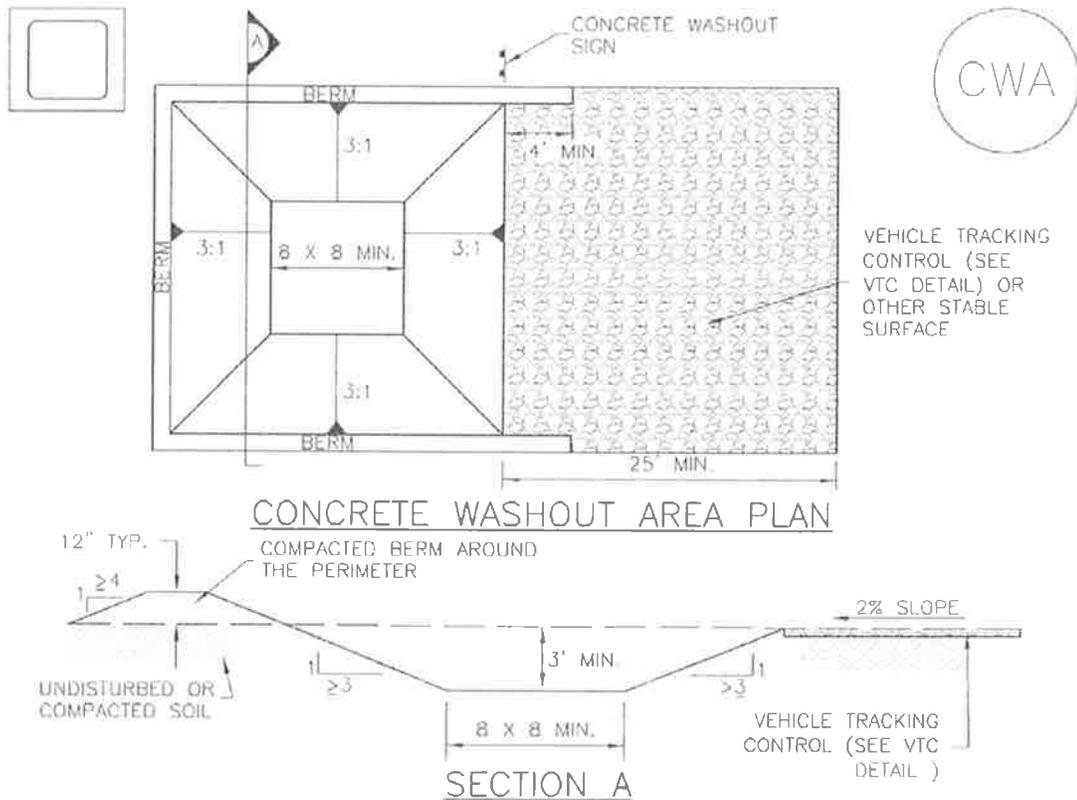
Upon termination of use of the washout site, accumulated solid waste, including concrete waste and any contaminated soils, must be removed from the site to prevent on-site disposal of solid waste. If the wash water is allowed to evaporate and the concrete hardens, it may be recycled.



Photograph CWA-2. Prefabricated concrete washout. Photo courtesy of CDOT.



Photograph CWA-3. Earthen concrete washout. Photo courtesy of CDOT.



CWA-1. CONCRETE WASHOUT AREA

CWA INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
-CWA INSTALLATION LOCATION
2. DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1,000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (16 MIL MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A LINED ABOVE GROUND STORAGE ARE SHOULD BE USED.
3. THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
4. CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8' BY 8' SLOPES LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER THE PIT SHALL BE AT LEAST 3' DEEP.
5. BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.
6. VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
7. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
8. USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

CWA MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE. CONCRETE MATERIALS, ACCUMULATED IN PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2'.
5. CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
6. THE CWA SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.
7. WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAIL ADAPTED FROM DOUGLAS COUNTY, COLORADO AND THE CITY OF PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD).

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

Stockpile management includes measures to minimize erosion and sediment transport from soil stockpiles.

Appropriate Uses

Stockpile management should be used when soils or other erodible materials are stored at the construction site. Special attention should be given to stockpiles in close proximity to natural or manmade storm systems.



Photograph SP-1. A topsoil stockpile that has been partially revegetated and is protected by silt fence perimeter control.

Design and Installation

Locate stockpiles away from all drainage system components including storm sewer inlets. Where practical, choose stockpile locations that that will remain undisturbed for the longest period of time as the phases of construction progress. Place sediment control BMPs around the perimeter of the stockpile, such as sediment control logs, rock socks, silt fence, straw bales and sand bags. See Detail SP-1 for guidance on proper establishment of perimeter controls around a stockpile. For stockpiles in active use, provide a stabilized designated access point on the upgradient side of the stockpile.

Stabilize the stockpile surface with surface roughening, temporary seeding and mulching, erosion control blankets, or soil binders. Soils stockpiled for an extended period (typically for more than 60 days) should be seeded and mulched with a temporary grass cover once the stockpile is placed (typically within 14 days). Use of mulch only or a soil binder is acceptable if the stockpile will be in place for a more limited time period (typically 30-60 days). Timeframes for stabilization of stockpiles noted in this fact sheet are "typical" guidelines. Check permit requirements for specific federal, state, and/or local requirements that may be more prescriptive.

Stockpiles should not be placed in streets or paved areas unless no other practical alternative exists. See the Stabilized Staging Area Fact Sheet for guidance when staging in roadways is unavoidable due to space or right-of-way constraints. For paved areas, rock socks must be used for perimeter control and all inlets with the potential to receive sediment from the stockpile (even from vehicle tracking) must be protected.

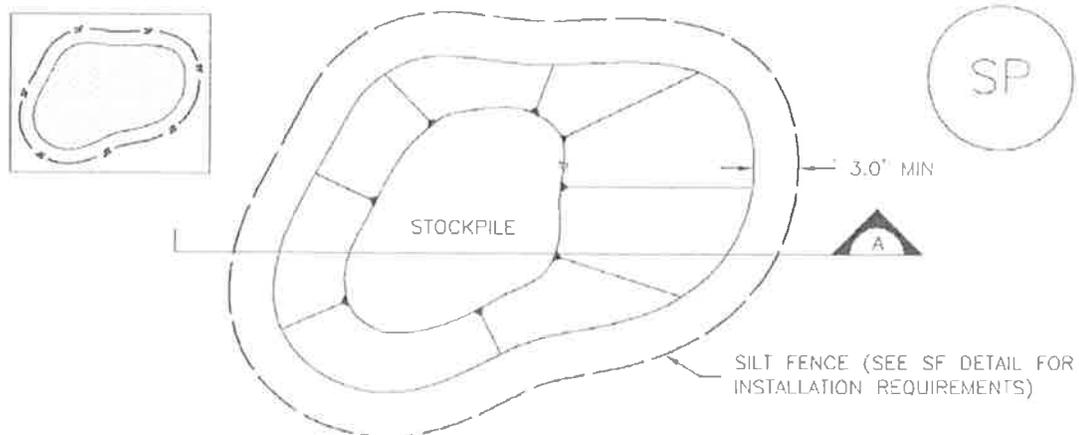
Maintenance and Removal

Inspect perimeter controls and inlet protection in accordance with their respective BMP Fact Sheets. Where seeding, mulch and/or soil binders are used, reseeding or reapplication of soil binder may be necessary.

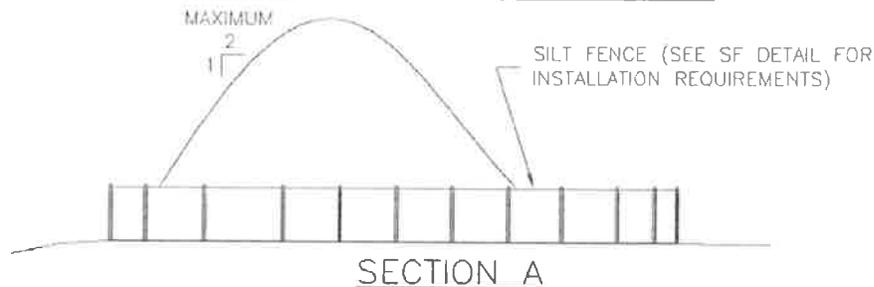
When temporary removal of a perimeter BMP is necessary to access a stockpile, ensure BMPs are reinstalled in accordance with their respective design detail section.

Stockpile Management	
Functions	
Erosion Control	Yes
Sediment Control	Yes
Site/Material Management	Yes

When the stockpile is no longer needed, properly dispose of excess materials and revegetate or otherwise stabilize the ground surface where the stockpile was located.



STOCKPILE PROTECTION PLAN



SP-1. STOCKPILE PROTECTION

STOCKPILE PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
 - LOCATION OF STOCKPILES
 - TYPE OF STOCKPILE PROTECTION
2. INSTALL PERIMETER CONTROLS IN ACCORDANCE WITH THEIR RESPECTIVE DESIGN DETAILS. SILT FENCE IS SHOWN IN THE STOCKPILE PROTECTION DETAILS; HOWEVER, OTHER TYPES OF PERIMETER CONTROLS INCLUDING SEDIMENT CONTROL LOGS OR ROCK SOCKS MAY BE SUITABLE IN SOME CIRCUMSTANCES. CONSIDERATIONS FOR DETERMINING THE APPROPRIATE TYPE OF PERIMETER CONTROL FOR A STOCKPILE INCLUDE WHETHER THE STOCKPILE IS LOCATED ON A PERVIOUS OR IMPERVIOUS SURFACE, THE RELATIVE HEIGHTS OF THE PERIMETER CONTROL AND STOCKPILE, THE ABILITY OF THE PERIMETER CONTROL TO CONTAIN THE STOCKPILE WITHOUT FAILING IN THE EVENT THAT MATERIAL FROM THE STOCKPILE SHIFTS OR SLUMPS AGAINST THE PERIMETER, AND OTHER FACTORS.
3. STABILIZE THE STOCKPILE SURFACE WITH SURFACE ROUGHENING, TEMPORARY SEEDING AND MULCHING, EROSION CONTROL BLANKETS, OR SOIL BINDERS. SOILS STOCKPILED FOR AN EXTENDED PERIOD (TYPICALLY FOR MORE THAN 60 DAYS) SHOULD BE SEEDED AND MULCHED WITH A TEMPORARY GRASS COVER ONCE THE STOCKPILE IS PLACED (TYPICALLY WITHIN 14 DAYS). USE OF MULCH ONLY OR A SOIL BINDER IS ACCEPTABLE IF THE STOCKPILE WILL BE IN PLACE FOR A MORE LIMITED TIME PERIOD (TYPICALLY 30-60 DAYS).
4. FOR TEMPORARY 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.

STOCKPILE PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

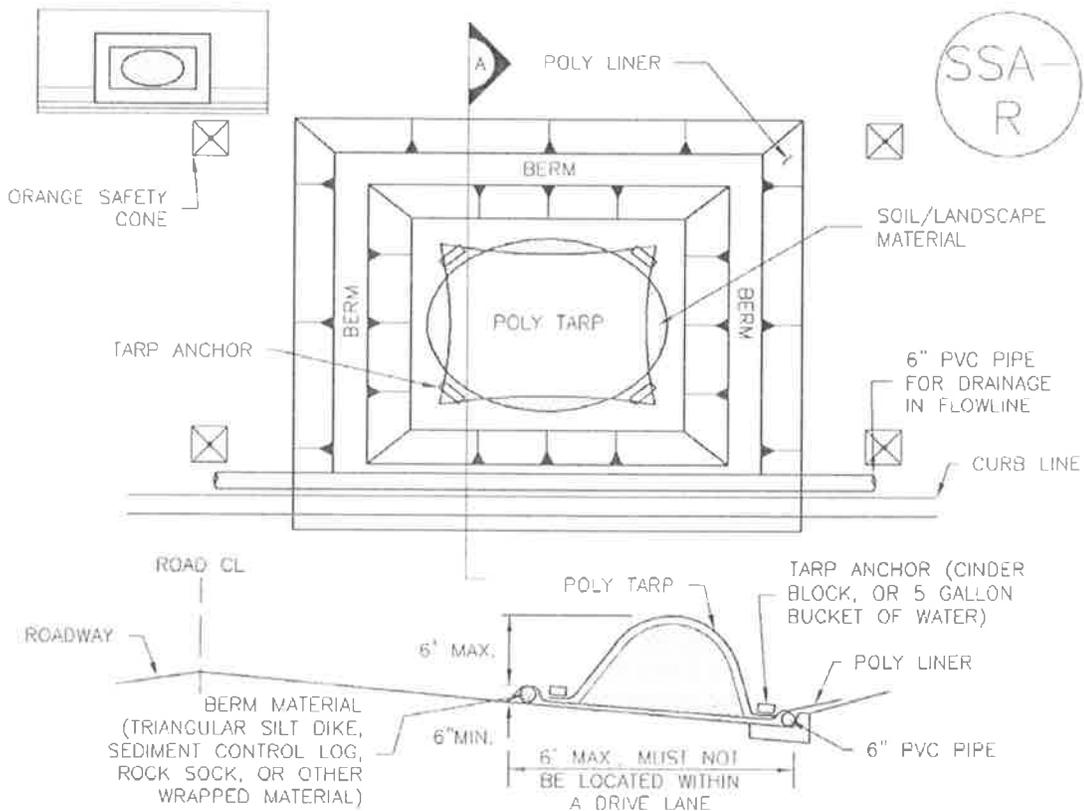
STOCKPILE PROTECTION MAINTENANCE NOTES

4. IF PERIMETER PROTECTION MUST BE MOVED TO ACCESS SOIL STOCKPILE, REPLACE PERIMETER CONTROLS BY THE END OF THE WORKDAY.

5. STOCKPILE PERIMETER CONTROLS CAN BE REMOVED ONCE ALL THE MATERIAL FROM THE STOCKPILE HAS BEEN USED.

(DETAILS ADAPTED FROM PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.



SP-2. MATERIALS STAGING IN ROADWAY

MATERIALS STAGING IN ROADWAYS INSTALLATION NOTES

- 1 SEE PLAN VIEW FOR
 - LOCATION OF MATERIAL STAGING AREA(S)
 - CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION
- 2 FEATURE MUST BE INSTALLED PRIOR TO EXCAVATION, EARTHWORK OR DELIVERY OF MATERIALS.
- 3 MATERIALS MUST BE STATIONED ON THE POLY LINER. ANY INCIDENTAL MATERIALS DEPOSITED ON PAVED SECTION OR ALONG CURB LINE MUST BE CLEANED UP PROMPTLY.
- 4 POLY LINER AND TARP COVER SHOULD BE OF SIGNIFICANT THICKNESS TO PREVENT DAMAGE OR LOSS OF INTEGRITY.
- 5 SAND BAGS MAY BE SUBSTITUTED TO ANCHOR THE COVER TARP OR PROVIDE BERMING UNDER THE BASE LINER.
- 6 FEATURE IS NOT INTENDED FOR USE WITH WET MATERIAL THAT WILL BE DRAINING AND/OR SPREADING OUT ON THE POLY LINER OR FOR DEMOLITION MATERIALS.
- 7 THIS FEATURE CAN BE USED FOR:
 - UTILITY REPAIRS
 - WHEN OTHER STAGING LOCATIONS AND OPTIONS ARE LIMITED.
 - OTHER LIMITED APPLICATION AND SHORT DURATION STAGING.

MATERIALS STAGING IN ROADWAY MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. INSPECT PVC PIPE ALONG CURB LINE FOR CLOGGING AND DEBRIS. REMOVE OBSTRUCTIONS PROMPTLY.
5. CLEAN MATERIAL FROM PAVED SURFACES BY SWEEPING OR VACUUMING.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM AURORA, COLORADO)

Description

Implement construction site good housekeeping practices to prevent pollution associated with solid, liquid and hazardous construction-related materials and wastes. Stormwater Management Plans (SWMPs) should clearly specify BMPs including these good housekeeping practices:

- Provide for waste management.
- Establish proper building material staging areas.
- Designate paint and concrete washout areas.
- Establish proper equipment/vehicle fueling and maintenance practices.
- Control equipment/vehicle washing and allowable non-stormwater discharges.
- Develop a spill prevention and response plan.

Acknowledgement: This Fact Sheet is based directly on EPA guidance provided in *Developing Your Stormwater Pollution Prevention Plan* (EPA 2007).

Appropriate Uses

Good housekeeping practices are necessary at all construction sites.

Design and Installation

The following principles and actions should be addressed in SWMPs:

- **Provide for Waste Management.** Implement management procedures and practices to prevent or reduce the exposure and transport of pollutants in stormwater from solid, liquid and sanitary wastes that will be generated at the site. Practices such as trash disposal, recycling, proper material handling, and cleanup measures can reduce the potential for stormwater runoff to pick up construction site wastes and discharge them to surface waters. Implement a comprehensive set of waste-management practices for hazardous or toxic materials, such as paints, solvents, petroleum products, pesticides, wood preservatives, acids, roofing tar, and other materials. Practices should include storage, handling, inventory, and cleanup procedures, in case of spills. Specific practices that should be considered include:

Solid or Construction Waste

- Designate trash and bulk waste-collection areas on-site.



Photographs GH-1 and GH-2. Proper materials storage and secondary containment for fuel tanks are important good housekeeping practices. Photos courtesy of CDOT and City of Aurora.

Good Housekeeping	
Functions	
Erosion Control	No
Sediment Control	No
Site/Material Management	Yes

- Recycle materials whenever possible (e.g., paper, wood, concrete, oil).
- Segregate and provide proper disposal options for hazardous material wastes.
- Clean up litter and debris from the construction site daily.
- Locate waste-collection areas away from streets, gutters, watercourses, and storm drains. Waste-collection areas (dumpsters, and such) are often best located near construction site entrances to minimize traffic on disturbed soils. Consider secondary containment around waste collection areas to minimize the likelihood of contaminated discharges.
- Empty waste containers before they are full and overflowing.

Sanitary and Septic Waste

- Provide convenient, well-maintained, and properly located toilet facilities on-site.
- Locate toilet facilities away from storm drain inlets and waterways to prevent accidental spills and contamination of stormwater.
- Maintain clean restroom facilities and empty portable toilets regularly.
- Where possible, provide secondary containment pans under portable toilets.
- Provide tie-downs or stake-downs for portable toilets.
- Educate employees, subcontractors, and suppliers on locations of facilities.
- Treat or dispose of sanitary and septic waste in accordance with state or local regulations. Do not discharge or bury wastewater at the construction site.
- Inspect facilities for leaks. If found, repair or replace immediately.
- Special care is necessary during maintenance (pump out) to ensure that waste and/or biocide are not spilled on the ground.

Hazardous Materials and Wastes

- Develop and implement employee and subcontractor education, as needed, on hazardous and toxic waste handling, storage, disposal, and cleanup.
- Designate hazardous waste-collection areas on-site.
- Place all hazardous and toxic material wastes in secondary containment.



Photograph GH-3. Locate portable toilet facilities on level surfaces away from waterways and storm drains. Photo courtesy of WWE.

- Hazardous waste containers should be inspected to ensure that all containers are labeled properly and that no leaks are present.
- **Establish Proper Building Material Handling and Staging Areas.** The SWMP should include comprehensive handling and management procedures for building materials, especially those that are hazardous or toxic. Paints, solvents, pesticides, fuels and oils, other hazardous materials or building materials that have the potential to contaminate stormwater should be stored indoors or under cover whenever possible or in areas with secondary containment. Secondary containment measures prevent a spill from spreading across the site and may include dikes, berms, curbing, or other containment methods. Secondary containment techniques should also ensure the protection of groundwater. Designate staging areas for activities such as fueling vehicles, mixing paints, plaster, mortar, and other potential pollutants. Designated staging areas enable easier monitoring of the use of materials and clean up of spills. Training employees and subcontractors is essential to the success of this pollution prevention principle. Consider the following specific materials handling and staging practices:
 - Train employees and subcontractors in proper handling and storage practices.
 - Clearly designate site areas for staging and storage with signs and on construction drawings. Staging areas should be located in areas central to the construction site. Segment the staging area into sub-areas designated for vehicles, equipment, or stockpiles. Construction entrances and exits should be clearly marked so that delivery vehicles enter/exit through stabilized areas with vehicle tracking controls (See Vehicle Tracking Control Fact Sheet).
 - Provide storage in accordance with Spill Protection, Control and Countermeasures (SPCC) requirements and plans and provide cover and impermeable perimeter control, as necessary, for hazardous materials and contaminated soils that must be stored on site.
 - Ensure that storage containers are regularly inspected for leaks, corrosion, support or foundation failure, or other signs of deterioration and tested for soundness.
 - Reuse and recycle construction materials when possible.
- **Designate Concrete Washout Areas.** Concrete contractors should be encouraged to use the washout facilities at their own plants or dispatch facilities when feasible; however, concrete washout commonly occurs on construction sites. If it is necessary to provide for concrete washout areas on-site, designate specific washout areas and design facilities to handle anticipated washout water. Washout areas should also be provided for paint and stucco operations. Because washout areas can be a source of pollutants from leaks or spills, care must be taken with regard to their placement and proper use. See the Concrete Washout Area Fact Sheet for detailed guidance.

Both self-constructed and prefabricated washout containers can fill up quickly when concrete, paint, and stucco work are occurring on large portions of the site. Be sure to check for evidence that contractors are using the washout areas and not dumping materials onto the ground or into drainage facilities. If the washout areas are not being used regularly, consider posting additional signage, relocating the facilities to more convenient locations, or providing training to workers and contractors.

When concrete, paint, or stucco is part of the construction process, consider these practices which will help prevent contamination of stormwater. Include the locations of these areas and the maintenance and inspection procedures in the SWMP.

- Do not washout concrete trucks or equipment into storm drains, streets, gutters, uncontained areas, or streams. Only use designated washout areas.
- Establish washout areas and advertise their locations with signs. Ensure that signage remains in good repair.
- Provide adequate containment for the amount of wash water that will be used.
- Inspect washout structures daily to detect leaks or tears and to identify when materials need to be removed.
- Dispose of materials properly. The preferred method is to allow the water to evaporate and to recycle the hardened concrete. Full service companies may provide dewatering services and should dispose of wastewater properly. Concrete wash water can be highly polluted. It should not be discharged to any surface water, storm sewer system, or allowed to infiltrate into the ground in the vicinity of waterbodies. Washwater should not be discharged to a sanitary sewer system without first receiving written permission from the system operator.
- **Establish Proper Equipment/Vehicle Fueling and Maintenance Practices.** Create a clearly designated on-site fueling and maintenance area that is clean and dry. The on-site fueling area should have a spill kit, and staff should know how to use it. If possible, conduct vehicle fueling and maintenance activities in a covered area. Consider the following practices to help prevent the discharge of pollutants to stormwater from equipment/vehicle fueling and maintenance. Include the locations of designated fueling and maintenance areas and inspection and maintenance procedures in the SWMP.
 - Train employees and subcontractors in proper fueling procedures (stay with vehicles during fueling, proper use of pumps, emergency shutoff valves, etc.).
 - Inspect on-site vehicles and equipment regularly for leaks, equipment damage, and other service problems.
 - Clearly designate vehicle/equipment service areas away from drainage facilities and watercourses to prevent stormwater run-on and runoff.
 - Use drip pans, drip cloths, or absorbent pads when replacing spent fluids.
 - Collect all spent fluids, store in appropriate labeled containers in the proper storage areas, and recycle fluids whenever possible.
- **Control Equipment/Vehicle Washing and Allowable Non-Stormwater Discharges.** Implement practices to prevent contamination of surface and groundwater from equipment and vehicle wash water. Representative practices include:
 - Educate employees and subcontractors on proper washing procedures.
 - Use off-site washing facilities, when available.
 - Clearly mark the washing areas and inform workers that all washing must occur in this area.
 - Contain wash water and treat it using BMPs. Infiltrate washwater when possible, but maintain separation from drainage paths and waterbodies.

- Use high-pressure water spray at vehicle washing facilities without detergents. Water alone can remove most dirt adequately.
- Do not conduct other activities, such as vehicle repairs, in the wash area.
- Include the location of the washing facilities and the inspection and maintenance procedures in the SWMP.
- **Develop a Spill Prevention and Response Plan.** Spill prevention and response procedures must be identified in the SWMP. Representative procedures include identifying ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and response. The plan should also specify material handling procedures and storage requirements and ensure that clear and concise spill cleanup procedures are provided and posted for areas in which spills may potentially occur. When developing a spill prevention plan, include the following:
 - Note the locations of chemical storage areas, storm drains, tributary drainage areas, surface waterbodies on or near the site, and measures to stop spills from leaving the site.
 - Provide proper handling and safety procedures for each type of waste. Keep Material Safety Data Sheets (MSDSs) for chemical used on site with the SWMP.
 - Establish an education program for employees and subcontractors on the potential hazards to humans and the environment from spills and leaks.
 - Specify how to notify appropriate authorities, such as police and fire departments, hospitals, or municipal sewage treatment facilities to request assistance. Emergency procedures and contact numbers should be provided in the SWMP and posted at storage locations.
 - Describe the procedures, equipment and materials for immediate cleanup of spills and proper disposal.
 - Identify personnel responsible for implementing the plan in the event of a spill. Update the spill prevention plan and clean up materials as changes occur to the types of chemicals stored and used at the facility.

Spill Prevention, Control, and Countermeasure (SPCC) Plan

Construction sites may be subject to 40 CFR Part 112 regulations that require the preparation and implementation of a SPCC Plan to prevent oil spills from aboveground and underground storage tanks. The facility is subject to this rule if it is a non-transportation-related facility that:

- Has a total storage capacity greater than 1,320 gallons or a completely buried storage capacity greater than 42,000 gallons.
- Could reasonably be expected to discharge oil in quantities that may be harmful to navigable waters of the United States and adjoining shorelines.

Furthermore, if the facility is subject to 40 CFR Part 112, the SWMP should reference the SPCC Plan. To find out more about SPCC Plans, see EPA's website on SPPC at www.epa.gov/oilspill/spcc.htm.

Reporting Oil Spills

In the event of an oil spill, contact the National Response Center toll free at 1-800-424- 8802 for assistance, or for more details, visit their website: www.nrc.uscg.mil.

Maintenance and Removal

Effective implementation of good housekeeping practices is dependent on clear designation of personnel responsible for supervising and implementing good housekeeping programs, such as site cleanup and disposal of trash and debris, hazardous material management and disposal, vehicle and equipment maintenance, and other practices. Emergency response "drills" may aid in emergency preparedness.

Checklists may be helpful in good housekeeping efforts.

Staging and storage areas require permanent stabilization when the areas are no longer being used for construction-related activities.

Construction-related materials, debris and waste must be removed from the construction site once construction is complete.

Design Details

See the following Fact Sheets for related Design Details:

MM-1 Concrete Washout Area

MM-2 Stockpile Management

SM-4 Vehicle Tracking Control

Design details are not necessary for other good housekeeping practices; however, be sure to designate where specific practices will occur on the appropriate construction drawings.

Description

Spills and leaks of solid and liquid materials processed, handled or stored outdoors can be a significant source of stormwater pollutants. Spilled substances can reach receiving waters when runoff washes these materials from impervious surfaces or when spills directly enter the storm sewer system during dry weather conditions.



Photograph SPCC-1. Use of secondary containment around supplies stored outside helps to reduce the likelihood of spill and leaks reaching the storm sewer system in runoff. Photo courtesy of Tom Gore.

Effective spill control includes both spill prevention and spill response measures and depends on proper employee training for spill response measures and may also include structural spill containment, particularly at industrial locations. Structural spill containment measures typically include temporary or permanent curbs or berms that surround a potential spill site. Berms may be constructed of concrete, earthen material, metal, synthetic liners, or other material that will safely contain the spill. Spill control devices may also include valves, slide gates, or other devices that can control and contain spilled material before it reaches the storm sewer system or receiving waters.

Appropriate Uses

Implement spill prevention, containment and control measures at municipal, commercial and industrial facilities in areas where materials may be spilled in quantities that may adversely impact receiving waters when discharged directly or through the storm sewer system. Check local, state, and/or federal regulations to determine when spill containment and control measures are required by law. Spill Prevention, Control and Countermeasures Plans may be required for certain facilities handling oil and hazardous substances under Section 311(j)(1)(C) of the federal Clean Water Act.

Practice Guidelines

Spill Prevention Measures

- Train employees on potential sources of pollution on-site and provide clear, common-sense spill prevention practices. Require that these practices be strictly followed.
- Identify equipment that may be exposed to stormwater, pollutants that may be generated and possible sources of leaks or discharges.
- Perform regular inspection and preventative maintenance of equipment to ensure proper operation and to check for leaks or evidence of discharge (stains). Provide clear procedures to ensure that needed repairs are completed and provide temporary leak containment until such repairs can be implemented.

Also See These BMP Fact Sheets

- Covering Storage/Handling Areas
- Good Housekeeping
- Vehicle Fueling, Maintenance, Washing & Storage
- Preventative Maintenance

- Drain or replace motor oil and other automotive fluids in a designated area away from storm sewer inlets. Collect spent fluids and recycle or dispose of properly. Never dispose of these fluids in the storm sewer or sanitary sewer.
- In fueling areas, clean up spills with dry methods (absorbents) and use damp cloths on gas pumps and damp mops on paved surfaces. Never use a hose to “wash down” a fuel spill.
- Where practical, reduce stormwater contact with equipment and materials by implementing indoor or covered storage, implementing stormwater run-on control measures and following good housekeeping practices.

Identification of Spill Areas

Identify potential spill areas, potential spill volumes, material types, frequency of material use, and drainage paths from spill areas with relation to storm sewer inlets, adjacent waterbodies, structural BMPs, and containment structures. Use this information to determine the types of spill prevention and control measures needed specific to the site conditions. Examples of potential spill locations include:

- Loading and unloading areas
- Outdoor storage areas
- Outdoor manufacturing or processing activities
- Waste disposal/storage areas
- Areas that generate significant dust or particulates (that may be subsequently deposited on the ground)
- Salt piles
- Areas prone to spills based on past experience at the site
- Locations where other routine maintenance activities occur such as equipment maintenance and cleaning, pesticide/fertilizer application, etc.

Additionally, areas where smaller leaks may occur such as parking should also have basic spill cleanup procedures.

Material Handling Procedures

From a water quality perspective, the primary principle behind effective material handling practices is to minimize exposure to stormwater. This can be accomplished by storing the material indoors under weather-resistant covering, elevating the material off the ground by using pallets, and diverting stormwater around materials storage areas. Representative outdoor materials handling procedures include:

- Keep bulk solid materials such as raw materials, sand, gravel, topsoil, compost, concrete, packing materials, metal products and other materials covered and protected from stormwater.
- When practical, store materials on impermeable surfaces.
- Store hazardous materials according to federal, state, and local hazardous materials requirements.

- Adopt procedures that reduce the chance of spills or leaks during filling or transfer of materials.
- Substitute less toxic or non-toxic materials for toxic materials.
- Store containers that are easily punctured or damaged away from high traffic areas (i.e., adopt a materials flow/plant layout plan).
- Add waste-capture containers such as collection pans for lubricating fluids.
- Store drums and containers with liquid materials on impermeable surfaces and provide secondary containment where appropriate. Drums stored outdoors should be located on pallets to minimize contact with runoff.

Spill Response Procedures and Equipment

Spill response procedures should be tailored to site-specific conditions and industry-specific regulatory requirements. General spill response procedures include:

- Containment and cleanup of spills should begin promptly after the spill is observed.
- Sweep up small quantities of dry chemical or solids to reduce exposure to runoff. Shoveling may be used for larger quantities of materials.
- Absorbents should be readily accessible in fueling areas or other areas susceptible to spills.
- Wipe up small spills with a shop rag, store shop rags in appropriate containers, dispose of rags properly or use a professional industrial cleaning service.
- Contain medium-sized spills with absorbents (e.g., kitty litter, sawdust) and use inflatable berms or absorbent “snakes” as temporary booms for the spill. Store and dispose of absorbents properly. Wet/dry vacuums may also be used, but not for volatile fluids.
- Develop procedures and locations for containing and storing leaking containers.
- Install drip pans below minor equipment leaks and properly dispose of collected material until a repair can be made.
- For large spills, first contain the spill and plug storm drain inlets where the liquid may migrate off-site, then clean up the spill.
- Excavation of spill areas to removed contaminated material may be required where large liquid spills occur on unpaved surfaces.
- An inventory of cleanup materials should be maintained onsite and strategically located based on the types and quantities of chemicals present.

Structural Spill Containment Measures

Two general approaches are often used when implementing spill containment measures. The first approach is designed to contain the entire spill. The second approach uses curbing to route spilled material to a collection basin. Both containment berming and curbing should be sized to safely contain or convey to a collection basin a spill from the largest storage tank, rail car, tank truck, or other containment device in the possible spill area. The spill containment area must have an impermeable surface (e.g.,

impermeable liner, asphalt or concrete) to prevent groundwater contamination. The containment system must be designed to enable collection and removal of spilled material through a pump or vacuum trucks, use of sorbent or gelling material, or other measures. Material removed from the spill area must be disposed of or recycled according to local, state, and federal standards.

If the capacity of the containment berming or the collection basin is exceeded, supplemental spill control measures should be available such as a portable containment device, sorbent materials, or gelling agents that eventually solidify the material. Water that collects within containment areas due to rainfall or snowmelt must be appropriately treated before release from the spill area.

Spill Plan Development

Many industries are required by federal law to have a Spill Prevention, Control and Countermeasures Plan (SPCC) that meets specific regulatory criteria when certain types and quantities of materials are used or processed at a site. These plans can be instrumental in developing a spill control plan for stormwater management purposes. Even if an SPCC plan is not legally required at a site, a spill control plan for stormwater management purposes may be necessary. Representative information appropriate for a spill control plan, building on concepts previously introduced in this Fact Sheet, includes:

- Site plan showing where materials are stored and handled, and where associated activities occur.
- Notification procedures to be used in the event of an accident
- Instructions for clean-up procedures.
- A designated person with spill response and clean-up authority.
- Training of key personnel in plan and clean-up procedures.
- Signs posted at critical locations providing a summary of SPCC plan information, phone numbers, contacts, equipment locations, etc.
- Provisions requiring spills to be cleaned up, corrective actions taken, or countermeasures implemented immediately.
- Provisions for absorbents to be made available for use in fuel areas, and for containers to be available for used absorbents.
- Prohibition on washing absorbents into the storm drainage system or into the sanitary sewer system via floor drains.
- Provision for emergency spill containment and clean-up kits in accessible and convenient locations. Kits should contain the appropriate clean-up materials applicable to the materials stored at the site.

Key Spill Notification Contacts in Colorado

- Colorado Department of Public Health and Environment Toll-Free 24-hour Environmental Emergency Spill Reporting Line: 1-877-518-5608
- National Response Center: 1-800-424-8802 (24-hour)
- Local Emergency Planning Committee (OEM): 303-273-162
- Division of Oil & Public Safety-Storage Tanks: 303-318-8547
- Oil and Gas Conservation Commission: 303-894-2100 or 1-888-235-1101 (toll-free spill/complaint line)

Description

A silt fence is a woven geotextile fabric attached to wooden posts and trenched into the ground. It is designed as a sediment barrier to intercept sheet flow runoff from disturbed areas.

Appropriate Uses

A silt fence can be used where runoff is conveyed from a disturbed area as sheet flow. Silt fence is not designed to receive concentrated flow or to be used as a filter fabric. Typical uses include:

- Down slope of a disturbed area to accept sheet flow.
- Along the perimeter of a receiving water such as a stream, pond or wetland.
- At the perimeter of a construction site.



Photograph SF-1. Silt fence creates a sediment barrier, forcing sheet flow runoff to evaporate or infiltrate.

Design and Installation

Silt fence should be installed along the contour of slopes so that it intercepts sheet flow. The maximum recommended tributary drainage area per 100 lineal feet of silt fence, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient not steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to silt fence installed along the contour. Silt fence installed for other uses, such as perimeter control, should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the silt fence.

See Detail SF-1 for proper silt fence installation, which involves proper trenching, staking, securing the fabric to the stakes, and backfilling the silt fence. Properly installed silt fence should not be easily pulled out by hand and there should be no gaps between the ground and the fabric.

Silt fence must meet the minimum allowable strength requirements, depth of installation requirement, and other specifications in the design details. Improper installation of silt fence is a common reason for silt fence failure; however, when properly installed and used for the appropriate purposes, it can be highly effective.

Silt Fence	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

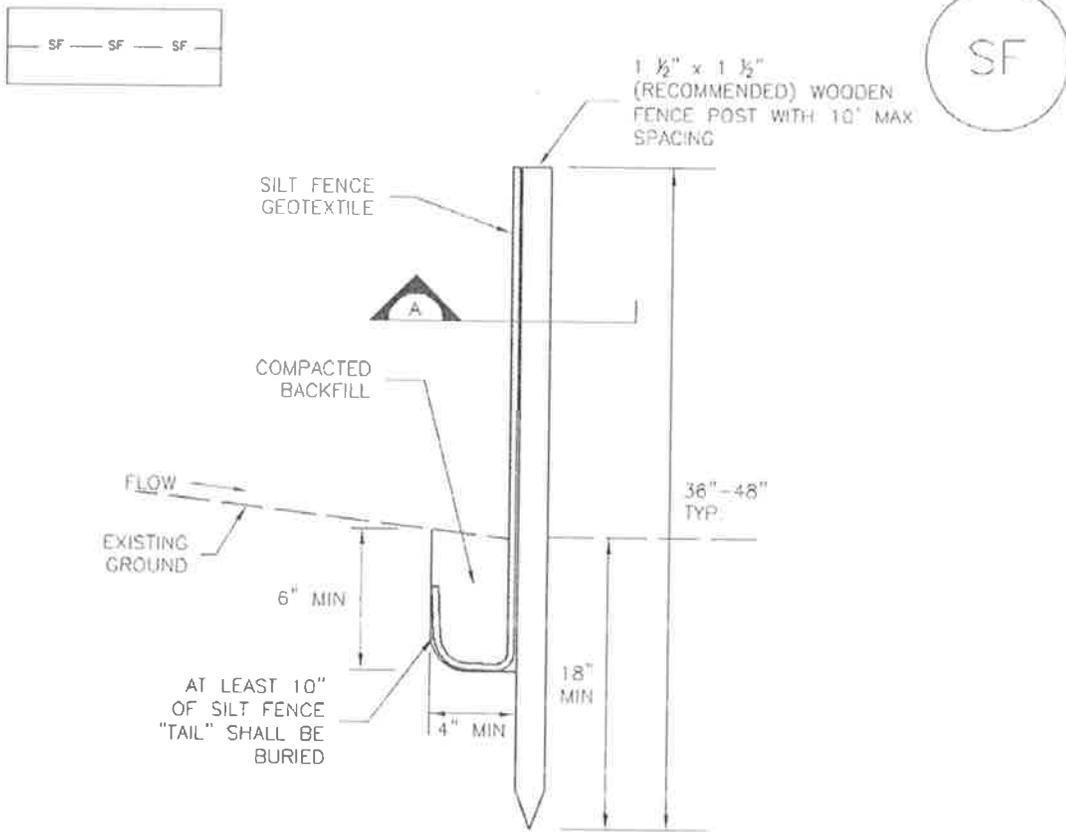
Maintenance and Removal

Inspection of silt fence includes observing the material for tears or holes and checking for slumping fence and undercut areas bypassing flows. Repair of silt fence typically involves replacing the damaged section with a new section. Sediment accumulated behind silt fence should be removed, as needed to maintain BMP effectiveness, typically before it reaches a depth of 6 inches.

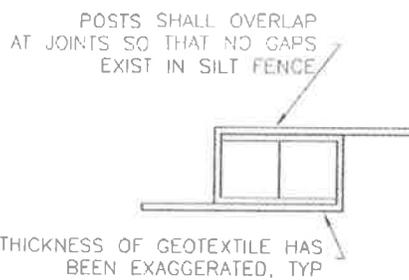
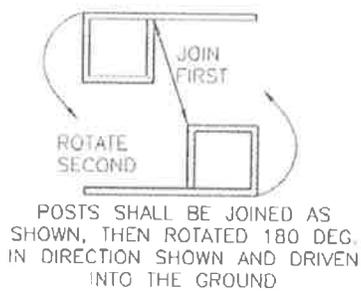
Silt fence may be removed when the upstream area has reached final stabilization.



Photograph SF-2. When silt fence is not installed along the contour, a "J-hook" installation may be appropriate to ensure that the BMP does not create concentrated flow parallel to the silt fence. Photo courtesy of Tom Gore.



SILT FENCE



SECTION A

SF-1. SILT FENCE

SILT FENCE INSTALLATION NOTES

1. SILT FENCE MUST BE PLACED AWAY FROM THE TOE OF THE SLOPE TO ALLOW FOR WATER PONDING. SILT FENCE AT THE TOE OF A SLOPE SHOULD BE INSTALLED IN A FLAT LOCATION AT LEAST SEVERAL FEET (2-5 FT) FROM THE TOE OF THE SLOPE TO ALLOW ROOM FOR PONDING AND DEPOSITION.
2. A UNIFORM 6" X 4" ANCHOR TRENCH SHALL BE EXCAVATED USING TRENCHER OR SILT FENCE INSTALLATION DEVICE. NO ROAD GRADERS, BACKHOES, OR SIMILAR EQUIPMENT SHALL BE USED.
3. COMPACT ANCHOR TRENCH BY HAND WITH A "JUMPING JACK" OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
4. SILT FENCE SHALL BE PULLED TIGHT AS IT IS ANCHORED TO THE STAKES. THERE SHOULD BE NO NOTICEABLE SAG BETWEEN STAKES AFTER IT HAS BEEN ANCHORED TO THE STAKES.
5. SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH 1" HEADS. STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC DOWN THE STAKE.
6. AT THE END OF A RUN OF SILT FENCE ALONG A CONTOUR, THE SILT FENCE SHOULD BE TURNED PERPENDICULAR TO THE CONTOUR TO CREATE A "J-HOOK." THE "J-HOOK" EXTENDING PERPENDICULAR TO THE CONTOUR SHOULD BE OF SUFFICIENT LENGTH TO KEEP RUNOFF FROM FLOWING AROUND THE END OF THE SILT FENCE (TYPICALLY 10' - 20').
7. SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. SEDIMENT ACCUMULATED UPSTREAM OF THE SILT FENCE SHALL BE REMOVED AS NEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 6".
5. REPAIR OR REPLACE SILT FENCE WHEN THERE ARE SIGNS OF WEAR, SUCH AS SAGGING, TEARING, OR COLLAPSE.
6. SILT FENCE IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION, OR IS REPLACED BY AN EQUIVALENT PERIMETER SEDIMENT CONTROL BMP.
7. WHEN SILT FENCE IS REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDING AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

A sediment control log is a linear roll made of natural materials such as straw, coconut fiber, or other fibrous material trenched into the ground and held with a wooden stake. Sediment control logs are also often referred to as "straw wattles." They are used as a sediment barrier to intercept sheet flow runoff from disturbed areas.



Appropriate Uses

Sediment control logs can be used in the following applications to trap sediment:

- As perimeter control for stockpiles and the site.
- As part of inlet protection designs.
- As check dams in small drainage ditches. (Sediment control logs are not intended for use in channels with high flow velocities.)
- On disturbed slopes to shorten flow lengths (as an erosion control).
- As part of multi-layered perimeter control along a receiving water such as a stream, pond or wetland.



Photographs SCL-1 and SCL-2. Sediment control logs used as 1) a perimeter control around a soil stockpile; and, 2) as a "J-hook" perimeter control at the corner of a construction site.

Sediment control logs work well in combination with other layers of erosion and sediment controls.

Design and Installation

Sediment control logs should be installed along the contour to avoid concentrating flows. The maximum allowable tributary drainage area per 100 lineal feet of sediment control log, installed along the contour, is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1. Longer and steeper slopes require additional measures. This recommendation only applies to sediment control logs installed along the contour. When installed for other uses, such as perimeter control, it should be installed in a way that will not produce concentrated flows. For example, a "J-hook" installation may be appropriate to force runoff to pond and evaporate or infiltrate in multiple areas rather than concentrate and cause erosive conditions parallel to the BMP.

Sediment Control Log	
Functions	
Erosion Control	Moderate
Sediment Control	Yes
Site/Material Management	No

Although sediment control logs initially allow runoff to flow through the BMP, they can quickly become a barrier and should be installed is if they are impermeable.

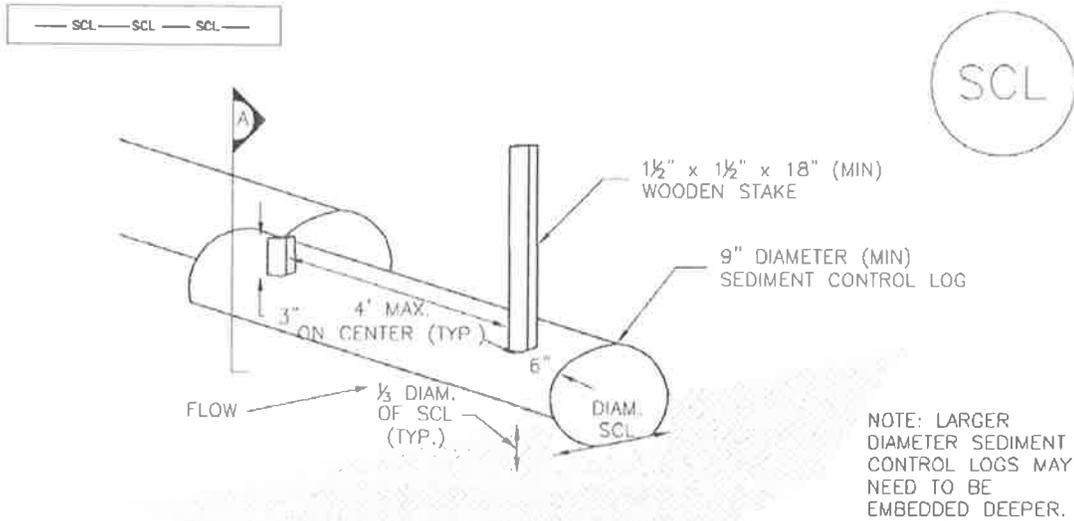
Design details and notes for sediment control logs are provided in Detail SCL-1. Sediment logs must be properly trenched and staked into the ground to prevent undercutting, bypassing and displacement. When installed on slopes, sediment control logs should be installed along the contours (i.e., perpendicular to flow).

Improper installation can lead to poor performance. Be sure that sediment control logs are properly trenched, anchored and tightly jointed.

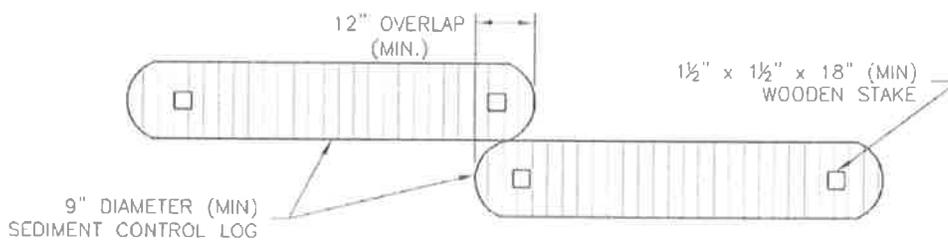
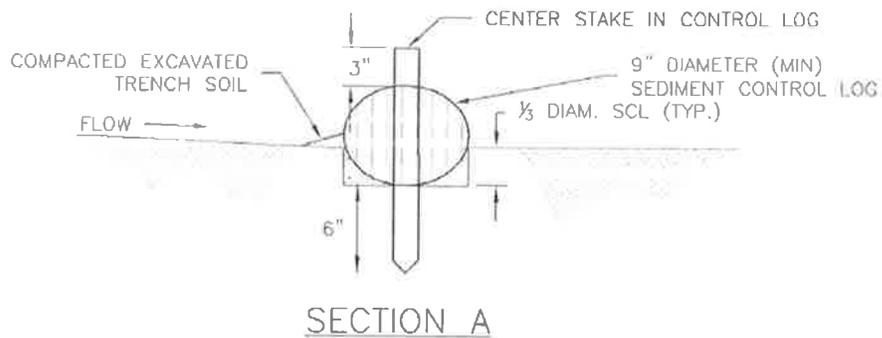
Maintenance and Removal

Be aware that sediment control logs will eventually degrade. Remove accumulated sediment before the depth is one-half the height of the sediment log and repair damage to the sediment log, typically by replacing the damaged section.

Once the upstream area is stabilized, remove and properly dispose of the logs. Areas disturbed beneath the logs may need to be seeded and mulched. Sediment control logs that are biodegradable may occasionally be left in place (e.g., when logs are used in conjunction with erosion control blankets as permanent slope breaks). However, removal of sediment control logs after final stabilization is typically recommended when used in perimeter control, inlet protection and check dam applications.

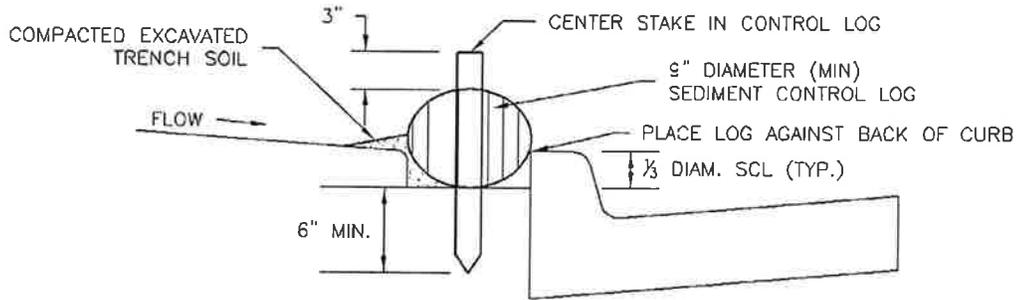


SEDIMENT CONTROL LOG

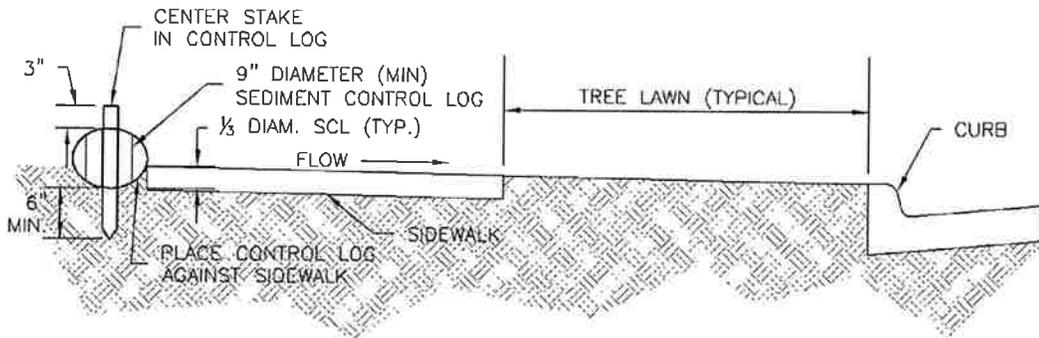


SEDIMENT CONTROL LOG JOINTS

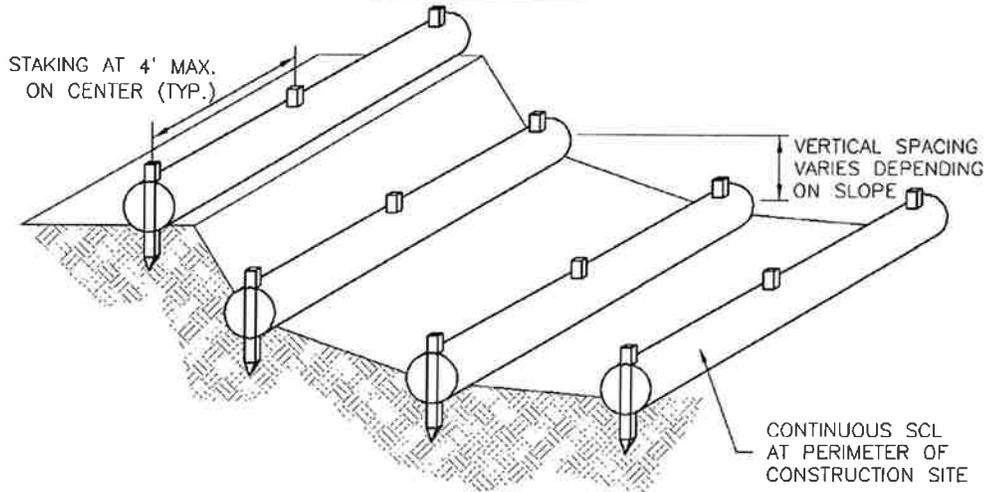
SCL-1. SEDIMENT CONTROL LOG



SCL-2. SEDIMENT CONTROL LOG AT BACK OF CURB



SCL-3. SEDIMENT CONTROL LOG AT SIDEWALK WITH TREE LAWN



SCL-4. SEDIMENT CONTROL LOGS TO CONTROL SLOPE LENGTH

SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION AND LENGTH OF SEDIMENT CONTROL LOGS.
2. SEDIMENT CONTROL LOGS THAT ACT AS A PERIMETER CONTROL SHALL BE INSTALLED PRIOR TO ANY UPGRADIENT LAND-DISTURBING ACTIVITIES.
3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR OR COCONUT FIBER, AND SHALL BE FREE OF ANY NOXIOUS WEED SEEDS OR DEFECTS INCLUDING RIPS, HOLES AND OBVIOUS WEAR.
4. SEDIMENT CONTROL LOGS MAY BE USED AS SMALL CHECK DAMS IN DITCHES AND SWALES. HOWEVER, THEY SHOULD NOT BE USED IN PERENNIAL STREAMS OR HIGH VELOCITY DRAINAGE WAYS.
5. IT IS RECOMMENDED THAT SEDIMENT CONTROL LOGS BE TRENCHED INTO THE GROUND TO A DEPTH OF APPROXIMATELY $\frac{1}{3}$ OF THE DIAMETER OF THE LOG. IF TRENCHING TO THIS DEPTH IS NOT FEASIBLE AND/OR DESIRABLE (SHORT TERM INSTALLATION WITH DESIRE NOT TO DAMAGE LANDSCAPE) A LESSER TRENCHING DEPTH MAY BE ACCEPTABLE WITH MORE ROBUST STAKING.
6. THE UPHILL SIDE OF THE SEDIMENT CONTROL LOG SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ROCKS AND DEBRIS. THE SOIL SHALL BE TIGHTLY COMPACTED INTO THE SHAPE OF A RIGHT TRIANGLE USING A SHOVEL OR WEIGHTED LAWN ROLLER.
7. FOLLOW MANUFACTURERS' GUIDANCE FOR STAKING. IF MANUFACTURERS' INSTRUCTIONS DO NOT SPECIFY SPACING, STAKES SHALL BE PLACED ON 4' CENTERS AND EMBEDDED A MINIMUM OF 6" INTO THE GROUND. 3" OF THE STAKE SHALL PROTRUDE FROM THE TOP OF THE LOG. STAKES THAT ARE BROKEN PRIOR TO INSTALLATION SHALL BE REPLACED.

SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOG SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY $\frac{1}{2}$ OF THE HEIGHT OF THE SEDIMENT CONTROL LOG.
5. SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF DISTURBED AREAS EXIST AFTER REMOVAL, THEY SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM TOWN OF PARKER, COLORADO, JEFFERSON COUNTY, COLORADO, DOUGLAS COUNTY, COLORADO, AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

A straw bale barrier is a linear wall of straw bales designed to intercept sheet flow and trap sediment before runoff exits a disturbed area.



Photograph SBB-1. Straw bale barrier used for perimeter control. Photo courtesy of Tom Gore.

Appropriate Uses

Appropriate uses of properly installed straw bale barriers may include:

- As a perimeter control for a site or soil stockpile.
- As a sediment control at the toe of an erodible slope.
- Along the edge of a stream or drainage pathway to reduce sediment laden runoff from entering the waterway.
- As part of an inlet protection design in sump conditions (See Inlet Protection BMP).

Do not use straw bale barriers in areas of concentrated flow or in areas where ponding is not desirable. Straw bales tend to degrade quickly, so they should generally not be used in areas where longer term disturbance is expected.

Due to a history of inappropriate placement, poor installation, and short effective lifespan, the use of straw bales is discouraged or prohibited by some communities.

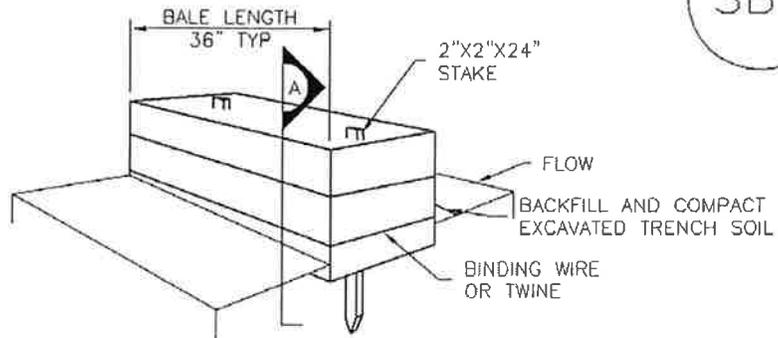
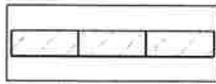
Design and Installation

The maximum recommended tributary drainage area per 100 lineal feet of straw bale barrier is 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1; longer and steeper slopes require additional measures. Design details with notes are provided in Detail SBB-1. To be effective, bales must be installed in accordance with the design details with proper trenching, staking, and binding. Jute and cotton string must not be used to bind the straw bale. The bales should be certified weed-free prior to use.

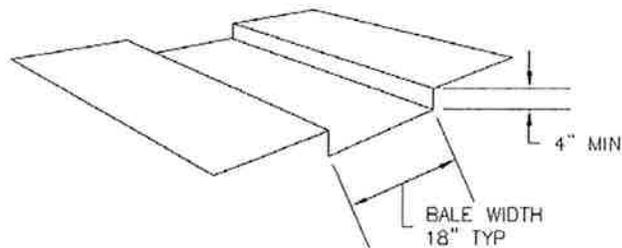
Maintenance and Removal

Check bales for rotting and replace as necessary. Straw bales degrade, and rotting bales require replacement on a regular basis (as often as every three months) depending on environmental conditions. Check for undercutting, bypassed flows, and displacement. Repair by properly re-installing the straw bale barrier and repairing washouts around the bales. Remove sediment accumulated behind the bale when it reaches one-quarter of the bale height. Remove and properly dispose of the straw bale once the upstream area has been stabilized. Areas of disturbance beneath the bale should be seeded and mulched when the bale is removed.

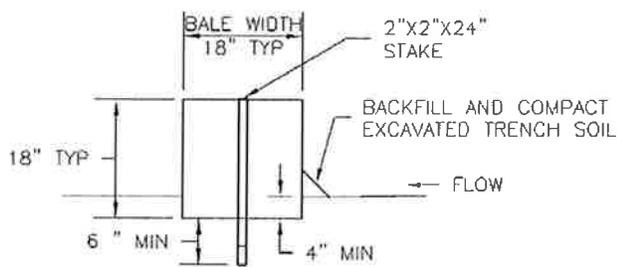
Straw Bale Barrier	
Functions	
Erosion Control	No
Sediment Control	Moderate
Site/Material Management	No



STRAW BALE



TRENCH FOR STRAW BALE



SECTION A

SBB-1. STRAW BALE

STRAW BALE INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
-LOCATION(S) OF STRAW BALES.
2. STRAW BALES SHALL CONSIST OF CERTIFIED WEED FREE STRAW OR HAY. LOCAL JURISDICTIONS MAY REQUIRE PROOF THAT BALES ARE WEED FREE.
3. STRAW BALES SHALL CONSIST OF APPROXIMATELY 5 CUBIC FEET OF STRAW OR HAY AND WEIGH NOT LESS THAN 35 POUNDS.
4. WHEN STRAW BALES ARE USED IN SERIES AS A BARRIER, THE END OF EACH BALE SHALL BE TIGHTLY ABUTTING ONE ANOTHER.
5. STRAW BALE DIMENSIONS SHALL BE APPROXIMATELY 36"X18"X18".
6. A UNIFORM ANCHOR TRENCH SHALL BE EXCAVATED TO A DEPTH OF 4". STRAW BALES SHALL BE PLACED SO THAT BINDING TWINE IS ENCOMPASSING THE VERTICAL SIDES OF THE BALE(S). ALL EXCAVATED SOIL SHALL BE PLACED ON THE UPHILL SIDE OF THE STRAW BALE(S) AND COMPACTED.
7. TWO (2) WOODEN STAKES SHALL BE USED TO HOLD EACH BALE IN PLACE. WOODEN STAKES SHALL BE 2"X2"X24". WOODEN STAKES SHALL BE DRIVEN 6" INTO THE GROUND.

STRAW BALE MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. STRAW BALES SHALL BE REPLACED IF THEY BECOME HEAVILY SOILED, ROTTEN, OR DAMAGED BEYOND REPAIR.
5. SEDIMENT ACCUMULATED UPSTREAM OF STRAW BALE BARRIER SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY $\frac{1}{4}$ OF THE HEIGHT OF THE STRAW BALE BARRIER.
6. STRAW BALES ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
7. WHEN STRAW BALES ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAILS ADAPTED FROM TOWN OF PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE. MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet. Inlet protection can be constructed from rock socks, sediment control logs, silt fence, block and rock socks, or other materials approved by the local jurisdiction. Area inlets can also be protected by over-excavating around the inlet to form a sediment trap.



Photograph IP-1. Inlet protection for a curb opening inlet.

Appropriate Uses

Install protection at storm sewer inlets that are operable during construction. Consider the potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and should be used in conjunction with other upgradient BMPs.

Design and Installation

To function effectively, inlet protection measures must be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs must also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding. When selecting the type of inlet protection, consider factors such as type of inlet (e.g., curb or area, sump or on-grade conditions), traffic, anticipated flows, ability to secure the BMP properly, safety and other site-specific conditions. For example, block and rock socks will be better suited to a curb and gutter along a roadway, as opposed to silt fence or sediment control logs, which cannot be properly secured in a curb and gutter setting, but are effective area inlet protection measures.

Several inlet protection designs are provided in the Design Details. Additionally, a variety of proprietary products are available for inlet protection that may be approved for use by local governments. If proprietary products are used, design details and installation procedures from the manufacturer must be followed. Regardless of the type of inlet protection selected, inlet protection is most effective when combined with other BMPs such as curb socks and check dams. Inlet protection is often the last barrier before runoff enters the storm sewer or receiving water.

Design details with notes are provided for these forms of inlet protection:

- IP-1. Block and Rock Sock Inlet Protection for Sump or On-grade Inlets
- IP-2. Curb (Rock) Socks Upstream of Inlet Protection, On-grade Inlets

Inlet Protection (various forms)	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

IP-3. Rock Sock Inlet Protection for Sump/Area Inlet

IP-4. Silt Fence Inlet Protection for Sump/Area Inlet

IP-5. Over-excavation Inlet Protection

IP-6. Straw Bale Inlet Protection for Sump/Area Inlet

CIP-1. Culvert Inlet Protection

Proprietary inlet protection devices should be installed in accordance with manufacturer specifications.

More information is provided below on selecting inlet protection for sump and on-grade locations.

Inlets Located in a Sump

When applying inlet protection in sump conditions, it is important that the inlet continue to function during larger runoff events. For curb inlets, the maximum height of the protective barrier should be lower than the top of the curb opening to allow overflow into the inlet during larger storms without excessive localized flooding. If the inlet protection height is greater than the curb elevation, particularly if the filter becomes clogged with sediment, runoff will not enter the inlet and may bypass it, possibly causing localized flooding, public safety issues, and downstream erosion and damage from bypassed flows.

Area inlets located in a sump setting can be protected through the use of silt fence, concrete block and rock socks (on paved surfaces), sediment control logs/straw wattles embedded in the adjacent soil and stacked around the area inlet (on pervious surfaces), over-excavation around the inlet, and proprietary products providing equivalent functions.

Inlets Located on a Slope

For curb and gutter inlets on paved sloping streets, block and rock sock inlet protection is recommended in conjunction with curb socks in the gutter leading to the inlet. For inlets located along unpaved roads, also see the Check Dam Fact Sheet.

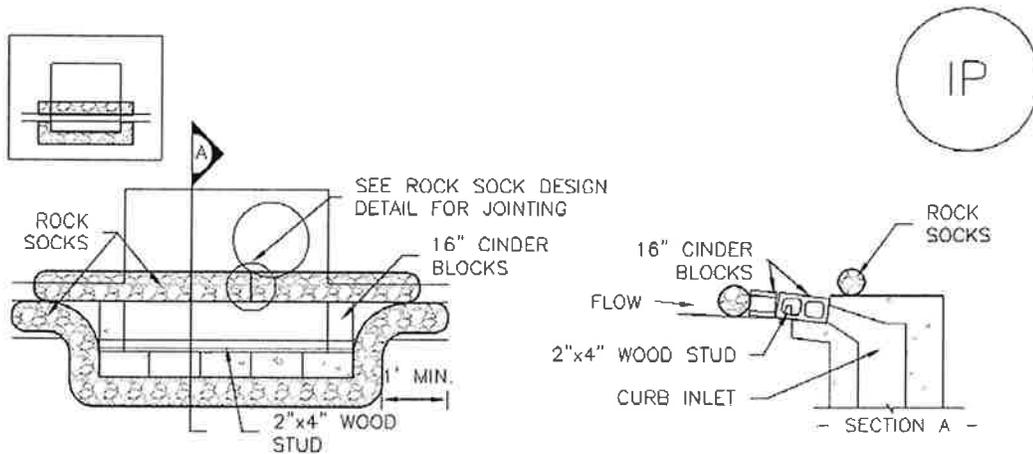
Maintenance and Removal

Inspect inlet protection frequently. Inspection and maintenance guidance includes:

- Inspect for tears that can result in sediment directly entering the inlet, as well as result in the contents of the BMP (e.g., gravel) washing into the inlet.
- Check for improper installation resulting in untreated flows bypassing the BMP and directly entering the inlet or bypassing to an unprotected downstream inlet. For example, silt fence that has not been properly trenched around the inlet can result in flows under the silt fence and directly into the inlet.
- Look for displaced BMPs that are no longer protecting the inlet. Displacement may occur following larger storm events that wash away or reposition the inlet protection. Traffic or equipment may also crush or displace the BMP.
- Monitor sediment accumulation upgradient of the inlet protection.

- Remove sediment accumulation from the area upstream of the inlet protection, as needed to maintain BMP effectiveness, typically when it reaches no more than half the storage capacity of the inlet protection. For silt fence, remove sediment when it accumulates to a depth of no more than 6 inches. Remove sediment accumulation from the area upstream of the inlet protection as needed to maintain the functionality of the BMP.
- Propriety inlet protection devices should be inspected and maintained in accordance with manufacturer specifications. If proprietary inlet insert devices are used, sediment should be removed in a timely manner to prevent devices from breaking and spilling sediment into the storm drain.

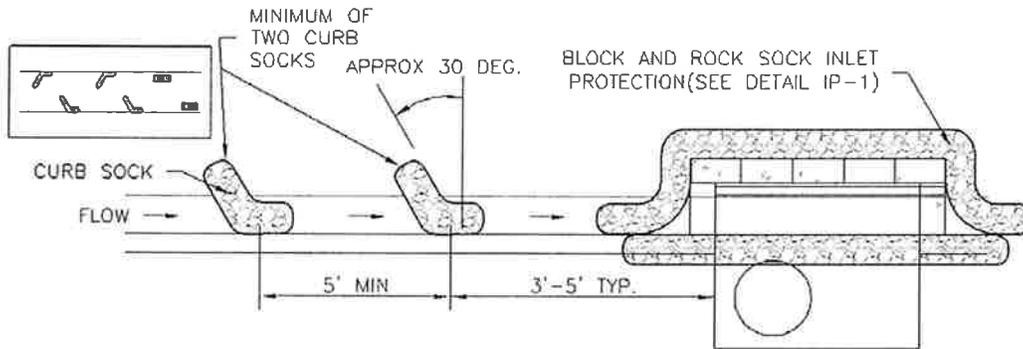
Inlet protection must be removed and properly disposed of when the drainage area for the inlet has reached final stabilization.



IP-1. BLOCK AND ROCK SOCK SUMP OR ON GRADE INLET PROTECTION

BLOCK AND CURB SOCK INLET PROTECTION INSTALLATION NOTES

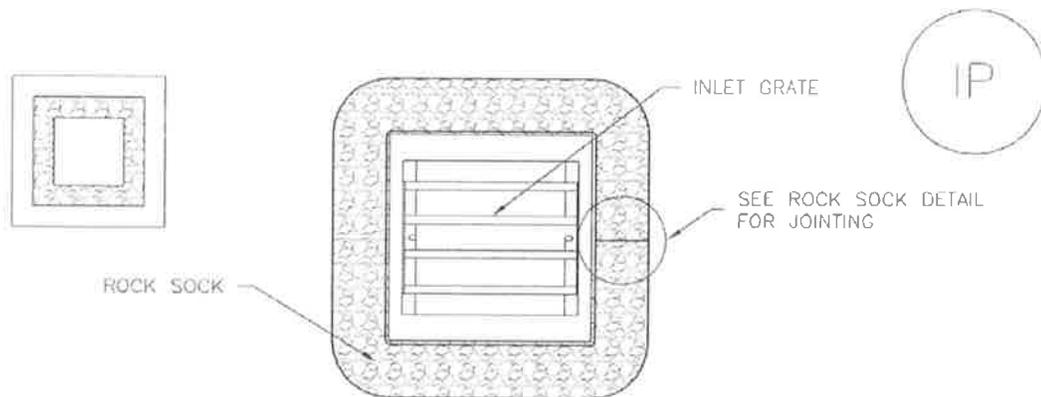
1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
2. CONCRETE "CINDER" BLOCKS SHALL BE LAID ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW, ABUTTING ONE ANOTHER WITH THE OPEN END FACING AWAY FROM THE CURB.
3. GRAVEL BAGS SHALL BE PLACED AROUND CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINTED TOGETHER IN ACCORDANCE WITH ROCK SOCK DESIGN DETAIL.



IP-2. CURB ROCK SOCKS UPSTREAM OF INLET PROTECTION

CURB ROCK SOCK INLET PROTECTION INSTALLATION NOTES

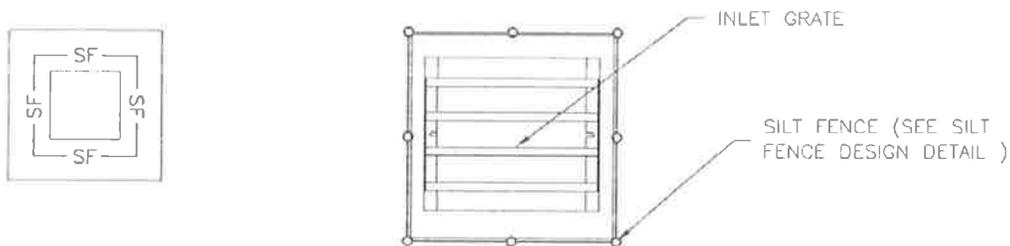
1. SEE ROCK SOCK DESIGN DETAIL INSTALLATION REQUIREMENTS.
2. PLACEMENT OF THE SOCK SHALL BE APPROXIMATELY 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.
3. SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED A MINIMUM OF 5 FEET APART.
4. AT LEAST TWO CURB SOCKS IN SERIES ARE REQUIRED UPSTREAM OF ON-GRADE INLETS.



IP-3. ROCK SOCK SUMP/AREA INLET PROTECTION

ROCK SOCK SUMP/AREA INLET PROTECTION INSTALLATION NOTES

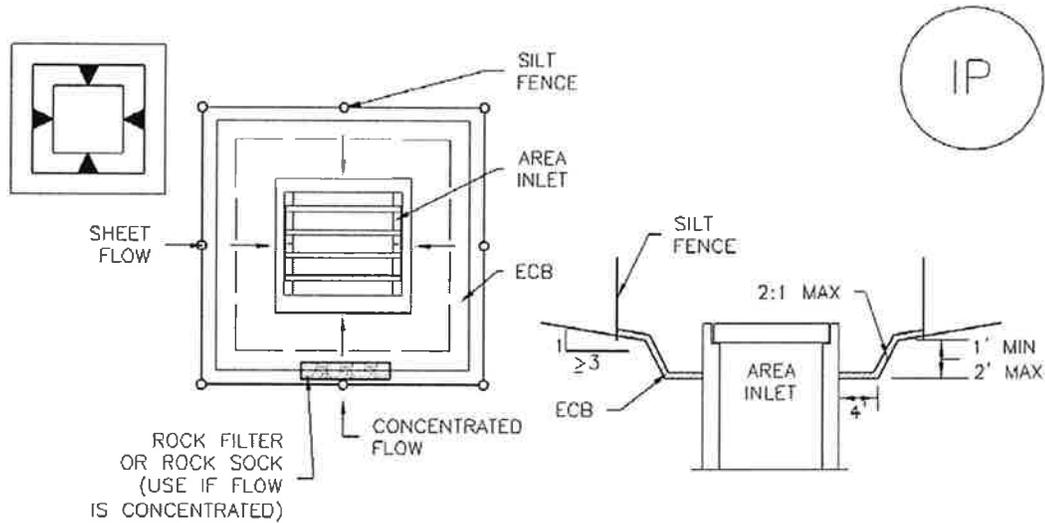
1. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
2. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF ROCK SOCKS FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.



IP-4. SILT FENCE FOR SUMP INLET PROTECTION

SILT FENCE INLET PROTECTION INSTALLATION NOTES

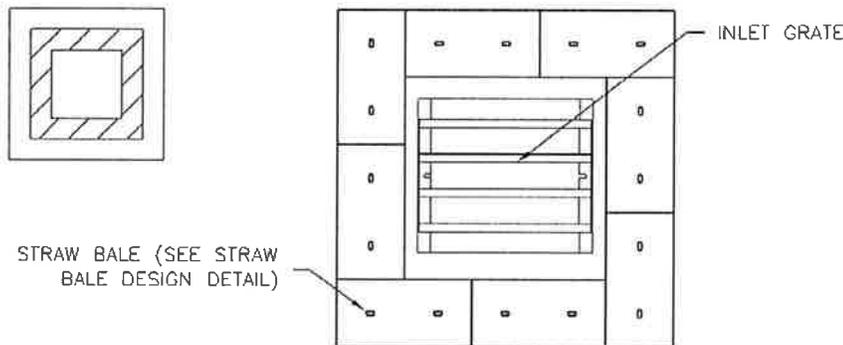
1. SEE SILT FENCE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
2. POSTS SHALL BE PLACED AT EACH CORNER OF THE INLET AND AROUND THE EDGES AT A MAXIMUM SPACING OF 3 FEET.
3. STRAW WATTLES/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF SILT FENCE FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.



IP-5. OVEREXCAVATION INLET PROTECTION

OVEREXCAVATION INLET PROTECTION INSTALLATION NOTES

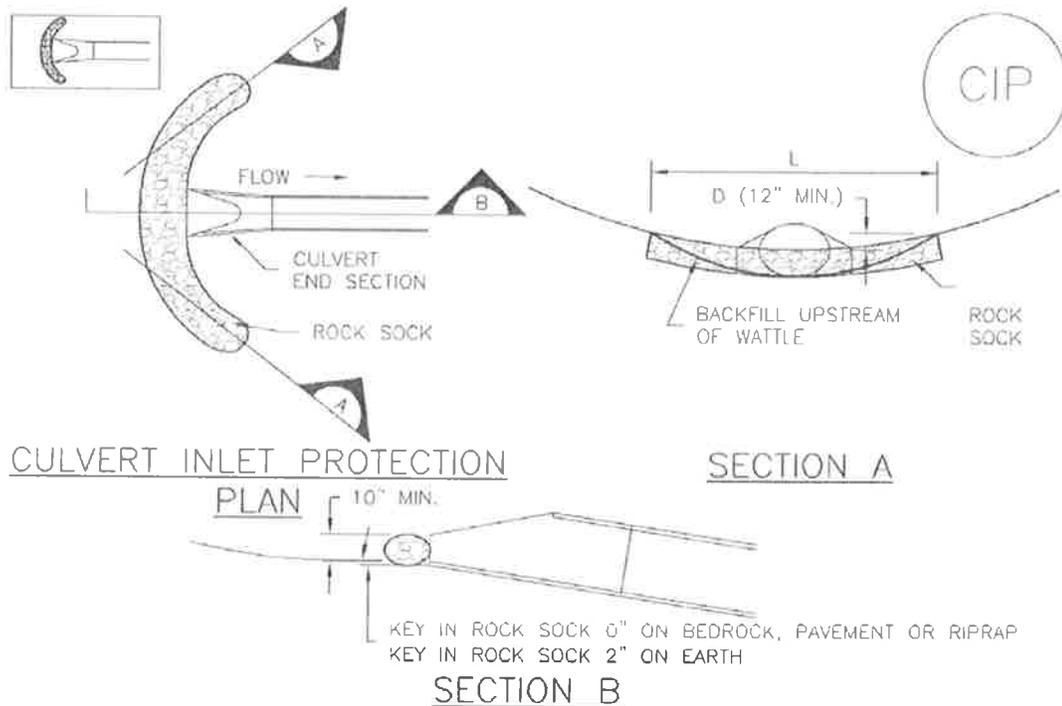
1. THIS FORM OF INLET PROTECTION IS PRIMARILY APPLICABLE FOR SITES THAT HAVE NOT YET REACHED FINAL GRADE AND SHOULD BE USED ONLY FOR INLETS WITH A RELATIVELY SMALL CONTRIBUTING DRAINAGE AREA.
2. WHEN USING FOR CONCENTRATED FLOWS, SHAPE BASIN IN 2:1 RATIO WITH LENGTH ORIENTED TOWARDS DIRECTION OF FLOW.
3. SEDIMENT MUST BE PERIODICALLY REMOVED FROM THE OVEREXCAVATED AREA.



IP-6. STRAW BALE FOR SUMP INLET PROTECTION

STRAW BALE BARRIER INLET PROTECTION INSTALLATION NOTES

1. SEE STRAW BALE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
2. BALES SHALL BE PLACED IN A SINGLE ROW AROUND THE INLET WITH ENDS OF BALES TIGHTLY ABUTTING ONE ANOTHER.



CIP-1. CULVERT INLET PROTECTION

CULVERT INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR
-LOCATION OF CULVERT INLET PROTECTION.
2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL.

CULVERT INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS $\frac{1}{2}$ THE HEIGHT OF THE ROCK SOCK.
5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

GENERAL INLET PROTECTION INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
 - LOCATION OF INLET PROTECTION.
 - TYPE OF INLET PROTECTION (IP.1, IP.2, IP.3, IP.4, IP.5, IP.6)
2. INLET PROTECTION SHALL BE INSTALLED PROMPTLY AFTER INLET CONSTRUCTION OR PAVING IS COMPLETE (TYPICALLY WITHIN 48 HOURS). IF A RAINFALL/RUNOFF EVENT IS FORECAST, INSTALL INLET PROTECTION PRIOR TO ONSET OF EVENT.
3. MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

INLET PROTECTION MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED AS NECESSARY TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN STORAGE VOLUME REACHES 50% OF CAPACITY, A DEPTH OF 6" WHEN SILT FENCE IS USED, OR ¼ OF THE HEIGHT FOR STRAW BALES.
5. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED, UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.
6. WHEN INLET PROTECTION AT AREA INLETS IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, SEEDED AND MULCHED, OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF INLET PROTECTION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY PROPRIETARY INLET PROTECTION METHODS ON THE MARKET. UDFCD NEITHER ENDORSES NOR DISCOURAGES USE OF PROPRIETARY INLET PROTECTION; HOWEVER, IN THE EVENT PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWMP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN IN THE MANUFACTURER'S DETAILS.

NOTE: SOME MUNICIPALITIES DISCOURAGE OR PROHIBIT THE USE OF STRAW BALES FOR INLET PROTECTION. CHECK WITH LOCAL JURISDICTION TO DETERMINE IF STRAW BALE INLET PROTECTION IS ACCEPTABLE.

Description

Sediment traps are formed by excavating an area or by placing an earthen embankment across a low area or drainage swale. Sediment traps are designed to capture drainage from disturbed areas less than one acre and allow settling of sediment.



Photograph ST-1. Sediment traps are used to collect sediment-laden runoff from disturbed area. Photo courtesy of EPA Menu of BMPs.

Appropriate Uses

Sediment traps can be used in combination with other layers of erosion and sediment controls to trap sediment from small drainage areas (less than one acre) or areas with localized high sediment loading. For example, sediment traps are often provided in conjunction with vehicle tracking controls and wheel wash facilities.

Design and Installation

A sediment trap consists of a small excavated basin with an earthen berm and a riprap outlet. The berm of the sediment trap may be constructed from the excavated material and must be compacted to 95 percent of the maximum density in accordance with ASTM D698. An overflow outlet must be provided at an elevation at least 6 inches below the top of the berm. See Detail ST-1 for additional design and installation information.

Maintenance and Removal

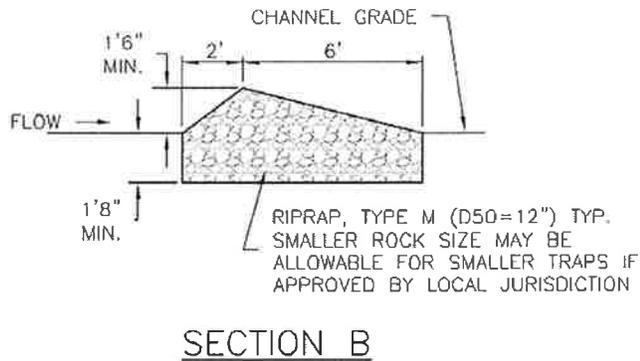
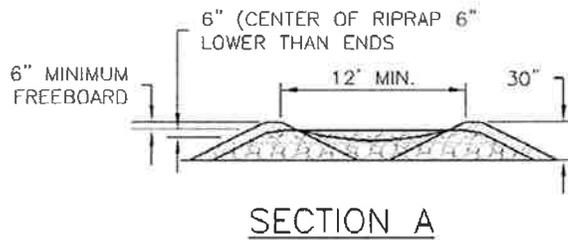
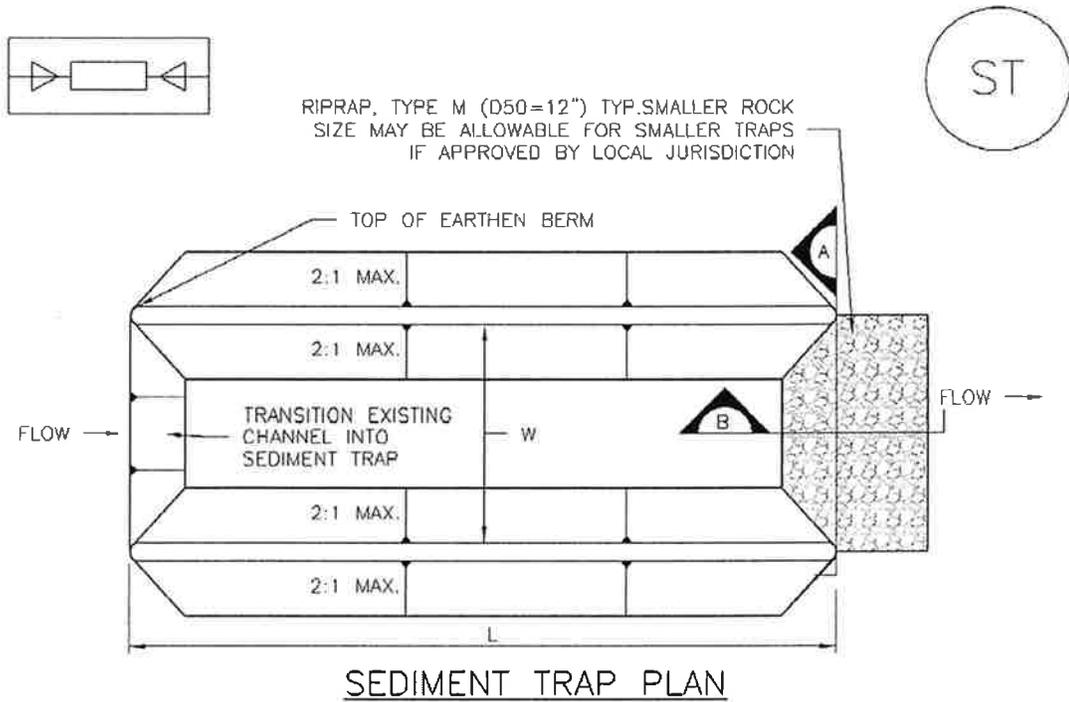
Inspect the sediment trap embankments for stability and seepage.

Remove accumulated sediment as needed to maintain the effectiveness of the sediment trap, typically when the sediment depth is approximately one-half the height of the outflow embankment.

Inspect the outlet for debris and damage. Repair damage to the outlet, and remove all obstructions.

A sediment trap should not be removed until the upstream area is sufficiently stabilized. Upon removal of the trap, the disturbed area should be covered with topsoil and stabilized.

Sediment Trap	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No



ST-1. SEDIMENT TRAP

SEDIMENT TRAP INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
-LOCATION, LENGTH AND WIDTH OF SEDIMENT TRAP
2. ONLY USE FOR DRAINAGE AREAS LESS THAN 1 ACRE.
3. SEDIMENT TRAPS SHALL BE INSTALLED PRIOR TO ANY UPGRADIENT LAND-DISTURBING ACTIVITIES.
4. SEDIMENT TRAP BERM SHALL BE CONSTRUCTED FROM MATERIAL FROM EXCAVATION. THE BERM SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
5. SEDIMENT TRAP OUTLET TO BE CONSTRUCTED OF RIPRAP, TYPE M (D50=12") TYP. SMALLER ROCK SIZE MAY BE ALLOWABLE FOR SMALLER TRAPS IF APPROVED BY LOCAL JURISDICTION.
6. THE TOP OF THE EARTHEN BERM SHALL BE A MINIMUM OF 6" HIGHER THAN THE TOP OF THE RIPRAP OUTLET STRUCTURE.
7. THE ENDS OF THE RIPRAP OUTLET STRUCTURE SHALL BE A MINIMUM OF 6" HIGHER THAN THE CENTER OF THE OUTLET STRUCTURE.

SEDIMENT TRAP MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. REMOVE SEDIMENT ACCUMULATED IN TRAP AS NEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BMP, TYPICALLY WHEN THE SEDIMENT DEPTH REACHES $\frac{1}{2}$ THE HEIGHT OF THE RIPRAP OUTLET.
5. SEDIMENT TRAPS SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
6. WHEN SEDIMENT TRAPS ARE REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

Description

Effective construction site management to minimize erosion and sediment transport includes attention to construction phasing, scheduling, and sequencing of land disturbing activities. On most construction projects, erosion and sediment controls will need to be adjusted as the project progresses and should be documented in the SWMP.

Construction phasing refers to disturbing only part of a site at a time to limit the potential for erosion from dormant parts of a site. Grading activities and construction are completed and soils are effectively stabilized on one part of a site before grading and construction begins on another portion of the site.



Photograph CP-1. Construction phasing to avoid disturbing the entire area at one time. Photo courtesy of WWE.

Construction sequencing or scheduling refers to a specified work schedule that coordinates the timing of land disturbing activities and the installation of erosion and sediment control practices.

Appropriate Uses

All construction projects can benefit from upfront planning to phase and sequence construction activities to minimize the extent and duration of disturbance. Larger projects and linear construction projects may benefit most from construction sequencing or phasing, but even small projects can benefit from construction sequencing that minimizes the duration of disturbance.

Typically, erosion and sediment controls needed at a site will change as a site progresses through the major phases of construction. Erosion and sediment control practices corresponding to each phase of construction must be documented in the SWMP.

Design and Installation

BMPs appropriate to the major phases of development should be identified on construction drawings. In some cases, it will be necessary to provide several drawings showing construction-phase BMPs placed according to stages of development (e.g., clearing and grading, utility installation, active construction, final stabilization). Some municipalities in the Denver area set maximum sizes for disturbed area associated with phases of a construction project. Additionally, requirements for phased construction drawings vary among local governments within the UDFCD boundary. Some local governments require separate erosion and sediment control drawings for initial BMPs, interim conditions (in active construction), and final stabilization.

Construction Scheduling	
Functions	
Erosion Control	Moderate
Sediment Control	Moderate
Site/Material Management	Yes

Typical construction phasing BMPs include:

- Limit the amount of disturbed area at any given time on a site to the extent practical. For example, a 100-acre subdivision might be constructed in five phases of 20 acres each.
- If there is carryover of stockpiled material from one phase to the next, position carryover material in a location easily accessible for the pending phase that will not require disturbance of stabilized areas to access the stockpile. Particularly with regard to efforts to balance cut and fill at a site, careful planning for location of stockpiles is important.

Typical construction sequencing BMPs include:

- Sequence construction activities to minimize duration of soil disturbance and exposure. For example, when multiple utilities will occupy the same trench, schedule installation so that the trench does not have to be closed and opened multiple times.
- Schedule site stabilization activities (e.g., landscaping, seeding and mulching, installation of erosion control blankets) as soon as feasible following grading.
- Install initial erosion and sediment control practices before construction begins. Promptly install additional BMPs for inlet protection, stabilization, etc., as construction activities are completed.

Table CP-1 provides typical sequencing of construction activities and associated BMPs.

Maintenance and Removal

When the construction schedule is altered, erosion and sediment control measures in the SWMP and construction drawings should be appropriately adjusted to reflect actual "on the ground" conditions at the construction site. Be aware that changes in construction schedules can have significant implications for site stabilization, particularly with regard to establishment of vegetative cover.

Table CP-1. Typical Phased BMP Installation for Construction Projects

Project Phase	BMPs
Pre-disturbance, Site Access	<ul style="list-style-type: none"> ▪ Install sediment controls downgradient of access point (on paved streets this may consist of inlet protection). ▪ Establish vehicle tracking control at entrances to paved streets. Fence as needed. ▪ Use construction fencing to define the boundaries of the project and limit access to areas of the site that are not to be disturbed. <p>Note: it may be necessary to protect inlets in the general vicinity of the site, even if not downgradient, if there is a possibility that sediment tracked from the site could contribute to the inlets.</p>
Site Clearing and Grubbing	<ul style="list-style-type: none"> ▪ Install perimeter controls as needed on downgradient perimeter of site (silt fence, wattles, etc). ▪ Limit disturbance to those areas planned for disturbance and protect undisturbed areas within the site (construction fence, flagging, etc). ▪ Preserve vegetative buffer at site perimeter. ▪ Create stabilized staging area. ▪ Locate portable toilets on flat surfaces away from drainage paths. Stake in areas susceptible to high winds. ▪ Construct concrete washout area and provide signage. ▪ Establish waste disposal areas. ▪ Install sediment basins. ▪ Create dirt perimeter berms and/or brush barriers during grubbing and clearing. ▪ Separate and stockpile topsoil, leave roughened and/or cover. ▪ Protect stockpiles with perimeter control BMPs. Stockpiles should be located away from drainage paths and should be accessed from the upgradient side so that perimeter controls can remain in place on the downgradient side. Use erosion control blankets, temporary seeding, and/or mulch for stockpiles that will be inactive for an extended period. ▪ Leave disturbed area of site in a roughened condition to limit erosion. Consider temporary revegetation for areas of the site that have been disturbed but that will be inactive for an extended period. ▪ Water to minimize dust but not to the point that watering creates runoff.

Project Phase	BMPs
Utility And Infrastructure Installation	<p>In Addition to the Above BMPs:</p> <ul style="list-style-type: none"> ▪ Close trench as soon as possible (generally at the end of the day). ▪ Use rough-cut street control or apply road base for streets that will not be promptly paved. ▪ Provide inlet protection as streets are paved and inlets are constructed. ▪ Protect and repair BMPs, as necessary. ▪ Perform street sweeping as needed.
Building Construction	<p>In Addition to the Above BMPs:</p> <ul style="list-style-type: none"> ▪ Implement materials management and good housekeeping practices for home building activities. ▪ Use perimeter controls for temporary stockpiles from foundation excavations. ▪ For lots adjacent to streets, lot-line perimeter controls may be necessary at the back of curb.
Final Grading	<p>In Addition to the Above BMPs:</p> <ul style="list-style-type: none"> ▪ Remove excess or waste materials. ▪ Remove stored materials.
Final Stabilization	<p>In Addition to the Above BMPs:</p> <ul style="list-style-type: none"> ▪ Seed and mulch/tackify. ▪ Seed and install blankets on steep slopes. ▪ Remove all temporary BMPs when site has reached final stabilization.

Description

Vehicle tracking controls provide stabilized construction site access where vehicles exit the site onto paved public roads. An effective vehicle tracking control helps remove sediment (mud or dirt) from vehicles, reducing tracking onto the paved surface.



Photograph VTC-1. A vehicle tracking control pad constructed with properly sized rock reduces off-site sediment tracking.

Appropriate Uses

Implement a stabilized construction entrance or vehicle tracking control where frequent heavy vehicle traffic exits the construction site onto a paved roadway. An effective vehicle tracking control is particularly important during the following conditions:

- Wet weather periods when mud is easily tracked off site.
- During dry weather periods where dust is a concern.
- When poorly drained, clayey soils are present on site.

Although wheel washes are not required in designs of vehicle tracking controls, they may be needed at particularly muddy sites.

Design and Installation

Construct the vehicle tracking control on a level surface. Where feasible, grade the tracking control towards the construction site to reduce off-site runoff. Place signage, as needed, to direct construction vehicles to the designated exit through the vehicle tracking control. There are several different types of stabilized construction entrances including:

VTC-1. Aggregate Vehicle Tracking Control. This is a coarse-aggregate surfaced pad underlain by a geotextile. This is the most common vehicle tracking control, and when properly maintained can be effective at removing sediment from vehicle tires.

VTC-2. Vehicle Tracking Control with Construction Mat or Turf Reinforcement Mat. This type of control may be appropriate for site access at very small construction sites with low traffic volume over vegetated areas. Although this application does not typically remove sediment from vehicles, it helps protect existing vegetation and provides a stabilized entrance.

Vehicle Tracking Control	
Functions	
Erosion Control	Moderate
Sediment Control	Yes
Site/Material Management	Yes

VTC-3. Stabilized Construction Entrance/Exit with Wheel Wash. This is an aggregate pad, similar to VTC-1, but includes equipment for tire washing. The wheel wash equipment may be as simple as hand-held power washing equipment to more advance proprietary systems. When a wheel wash is provided, it is important to direct wash water to a sediment trap prior to discharge from the site.

Vehicle tracking controls are sometimes installed in combination with a sediment trap to treat runoff.

Maintenance and Removal

Inspect the area for degradation and replace aggregate or material used for a stabilized entrance/exit as needed. If the area becomes clogged and ponds water, remove and dispose of excess sediment or replace material with a fresh layer of aggregate as necessary.

With aggregate vehicle tracking controls, ensure rock and debris from this area do not enter the public right-of-way.

Remove sediment that is tracked onto the public right of way daily or more frequently as needed. Excess sediment in the roadway indicates that the stabilized construction entrance needs maintenance.

Ensure that drainage ditches at the entrance/exit area remain clear.

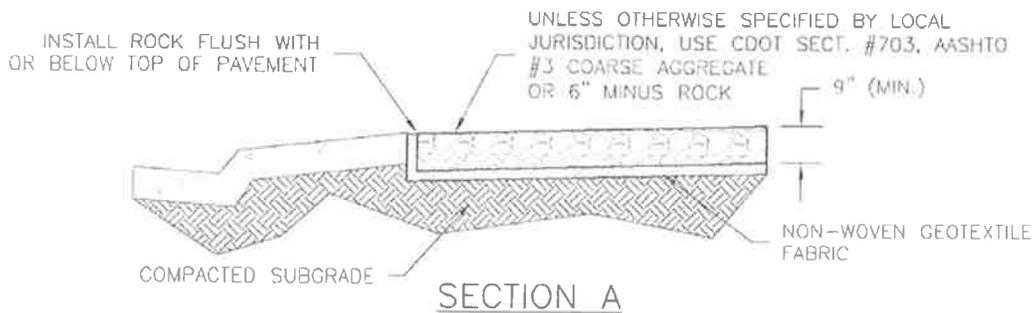
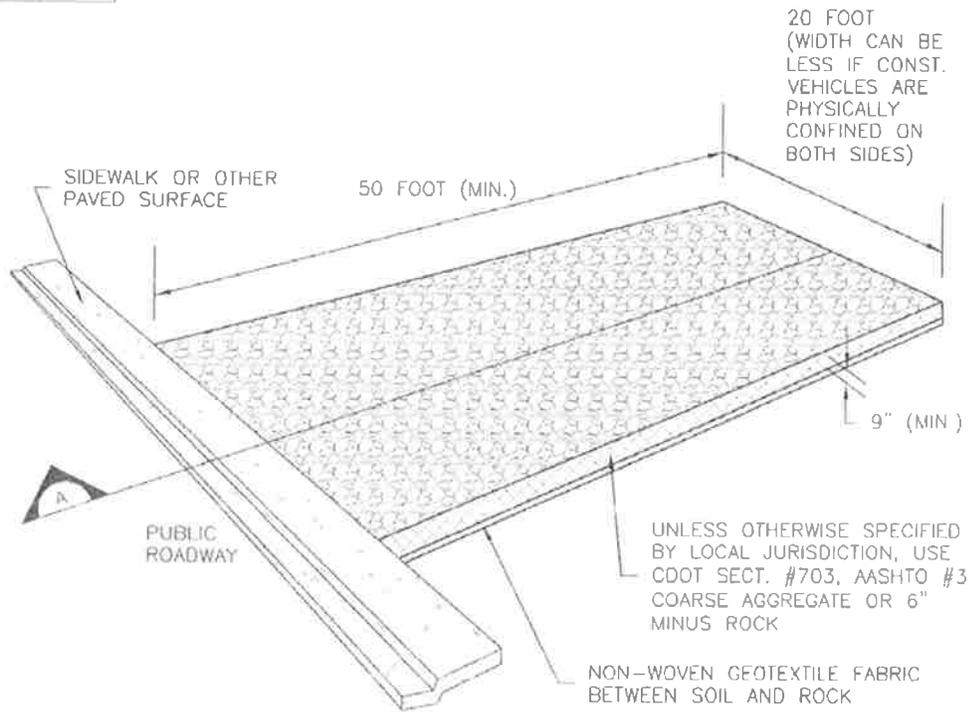
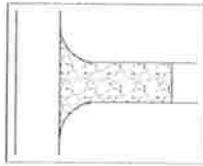
A stabilized entrance should be removed only when there is no longer the potential for vehicle tracking to occur. This is typically after the site has been stabilized.

When wheel wash equipment is used, be sure that the wash water is discharged to a sediment trap prior to discharge. Also inspect channels conveying the water from the wash area to the sediment trap and stabilize areas that may be eroding.

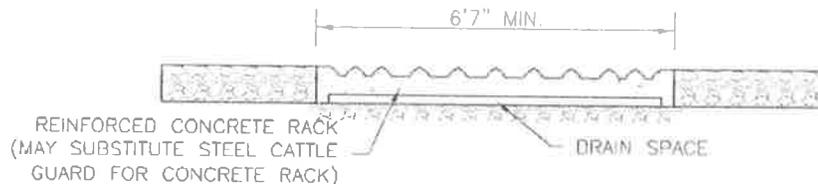
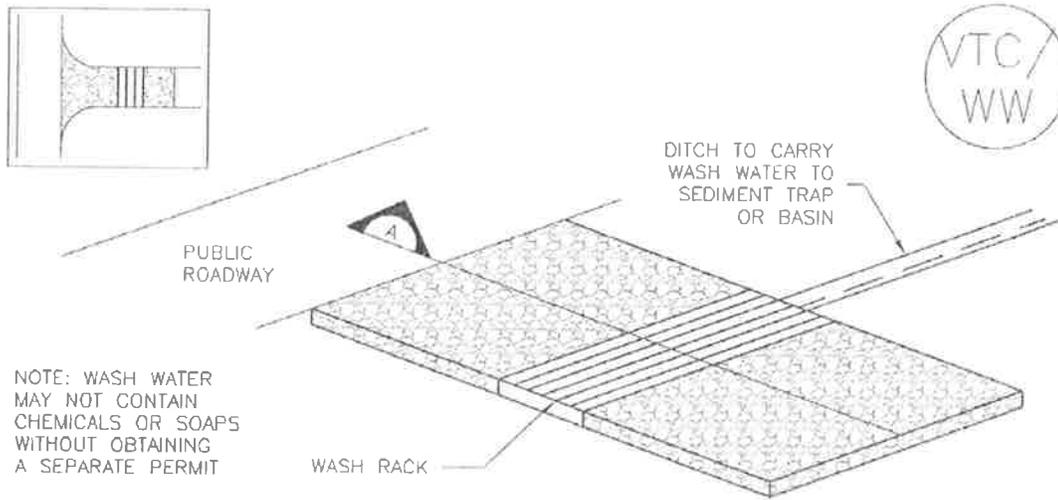
When a construction entrance/exit is removed, excess sediment from the aggregate should be removed and disposed of appropriately. The entrance should be promptly stabilized with a permanent surface following removal, typically by paving.



Photograph VTC-2. A vehicle tracking control pad with wheel wash facility. Photo courtesy of Tom Gore.

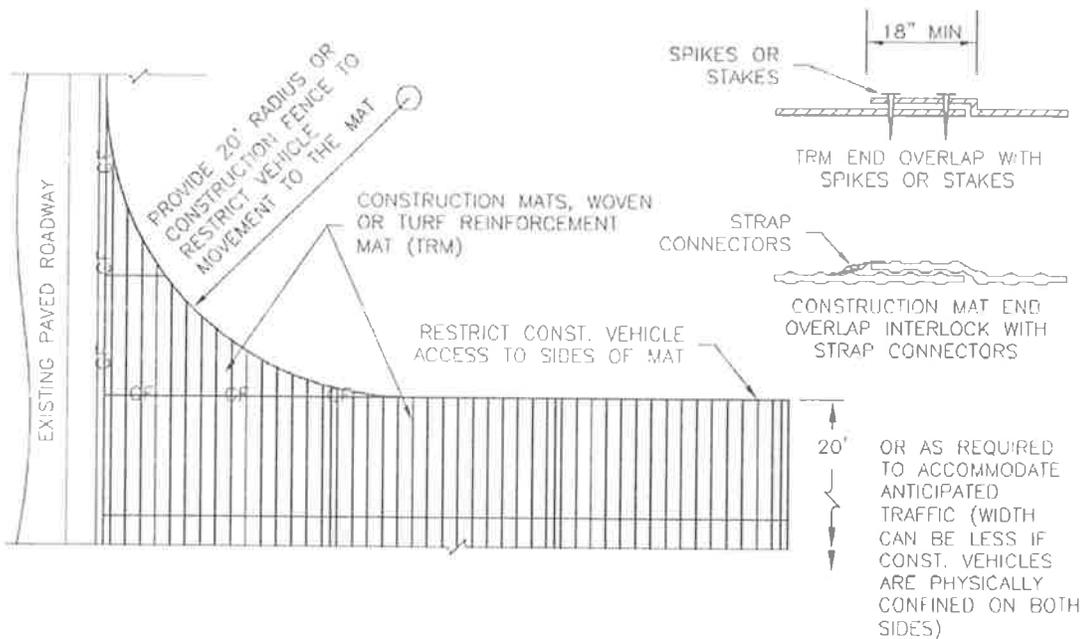
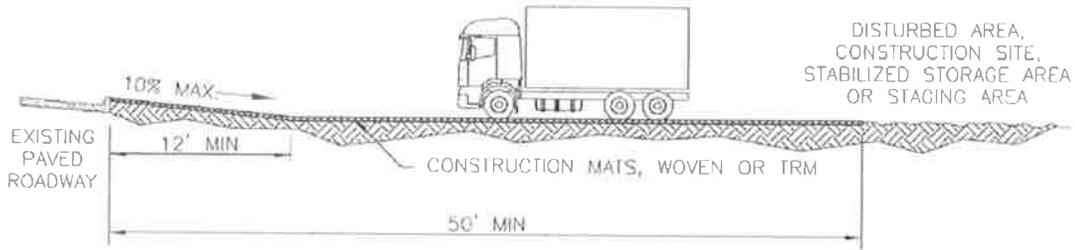
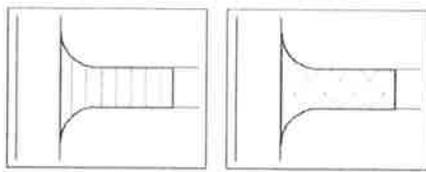


VTC-1. AGGREGATE VEHICLE TRACKING CONTROL



SECTION A

VTC-2. AGGREGATE VEHICLE TRACKING CONTROL WITH WASH RACK



VTC-3. VEHICLE TRACKING CONTROL W/ CONSTRUCTION MAT OR TURF REINFORCEMENT MAT (TRM)

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

1. SEE PLAN VIEW FOR
 - LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S)
 - TYPE OF CONSTRUCTION ENTRANCE(S)/EXITS(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM).
2. CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.
3. A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT-OF-WAYS.
4. STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
5. A NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.
6. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.
5. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM CITY OF BROOMFIELD, COLORADO. NOT AVAILABLE IN AUTOCAD)

Description

A stabilized staging area is a clearly designated area where construction equipment and vehicles, stockpiles, waste bins, and other construction-related materials are stored. The contractor office trailer may also be located in this area. Depending on the size of the construction site, more than one staging area may be necessary.



Photograph SSA-1. Example of a staging area with a gravel surface to prevent mud tracking and reduce runoff. Photo courtesy of Douglas County.

Appropriate Uses

Most construction sites will require a staging area, which should be clearly designated in SWMP drawings. The layout of the staging area may vary depending on the type of construction activity. Staging areas located in roadways due to space constraints require special measures to avoid materials being washed into storm inlets.

Design and Installation

Stabilized staging areas should be completed prior to other construction activities beginning on the site. Major components of a stabilized staging area include:

- Appropriate space to contain storage and provide for loading/unloading operations, as well as parking if necessary.
- A stabilized surface, either paved or covered, with 3-inch diameter aggregate or larger.
- Perimeter controls such as silt fence, sediment control logs, or other measures.
- Construction fencing to prevent unauthorized access to construction materials.
- Provisions for Good Housekeeping practices related to materials storage and disposal, as described in the Good Housekeeping BMP Fact Sheet.
- A stabilized construction entrance/exit, as described in the Vehicle Tracking Control BMP Fact Sheet, to accommodate traffic associated with material delivery and waste disposal vehicles.

Over-sizing the stabilized staging area may result in disturbance of existing vegetation in excess of that required for the project. This increases costs, as well as requirements for long-term stabilization following the construction period. When designing the stabilized staging area, minimize the area of disturbance to the extent practical.

Stabilized Staging Area	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material	Yes

Minimizing Long-Term Stabilization Requirements

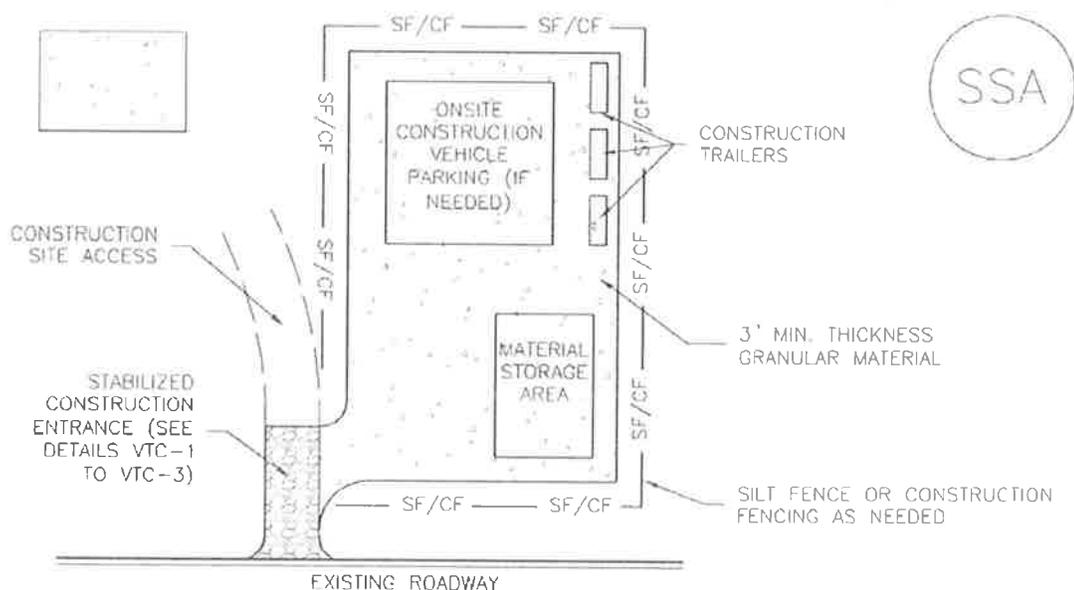
- Utilize off-site parking and restrict vehicle access to the site.
- Use construction mats in lieu of rock when staging is provided in an area that will not be disturbed otherwise.
- Consider use of a bermed contained area for materials and equipment that do not require a stabilized surface.
- Consider phasing of staging areas to avoid disturbance in an area that will not be otherwise disturbed.

See Detail SSA-1 for a typical stabilized staging area and SSA-2 for a stabilized staging area when materials staging in roadways is required.

Maintenance and Removal

Maintenance of stabilized staging areas includes maintaining a stable surface cover of gravel, repairing perimeter controls, and following good housekeeping practices.

When construction is complete, debris, unused stockpiles and materials should be recycled or properly disposed. In some cases, this will require disposal of contaminated soil from equipment leaks in an appropriate landfill. Staging areas should then be permanently stabilized with vegetation or other surface cover planned for the development.



SSA-1. STABILIZED STAGING AREA

STABILIZED STAGING AREA INSTALLATION NOTES

- 1 SEE PLAN VIEW FOR
 - LOCATION OF STAGING AREA(S).
 - CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
- 2 STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
- 3 STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
- 4 THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL
- 5 UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK
- 6 ADDITIONAL PERIMETER BMPs MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

STABILIZED STAGING AREA MAINTENANCE NOTES

- 1 INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
- 2 FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- 3 WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE
- 4 ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED

STABILIZED STAGING AREA MAINTENANCE NOTES

5. STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING/LOADING OPERATIONS.

6. THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA COVERED WITH TOPSOIL, SEEDS AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

NOTE: MANY MUNICIPALITIES PROHIBIT THE USE OF RECYCLED CONCRETE AS GRANULAR MATERIAL FOR STABILIZED STAGING AREAS DUE TO DIFFICULTIES WITH RE-ESTABLISHMENT OF VEGETATION IN AREAS WHERE RECYCLED CONCRETE WAS PLACED.

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

APPENDIX D

Pueblo County Stormwater Management Plan Field Inspection Report	(4) Project Name & Location:
(1) Date of Inspection:	(5) Stormwater Permit Number:
(2) Permittee's Name & Address:	(6) Reason for Inspection: <input type="checkbox"/> Required Maximum 14 Calendar Day Inspection - Active Construction <input type="checkbox"/> Required Maximum 30 Calendar Day Inspection - Completed Projects <input type="checkbox"/> Required Rainfall or Snowmelt Event Inspection <input type="checkbox"/> Complaint (CRS Number) _____ <input type="checkbox"/> Other _____
(3) Permittee's Inspector:	

(7) Construction Site Assessment

- Construction site perimeter contained/offsite tracking minimized? Yes No N/A
- Estimate disturbed area at time of inspection - _____ acres Yes No N/A
- Disturbed area contained? Yes No N/A
- Areas used for Material & waste storage and fueling contained? Yes No N/A

(8) SWMP Management

- Changes made to SWMP during or after construction? Yes No
- Changes approved and noted on plans? Yes No
- BMP details included with SWMP for all BMP's used? Yes No
- All BMP's installed as shown and specified on details? Yes No

Best Management Practices (BMP's)

(9) BMP Type	(10) Practice Req/Used	(11) Reason	(12) Maintenance Required? Yes/No	(13) Course of Action	(14) Date for Completion of Action
EROSION CONTROL					
Seeding	<input type="checkbox"/> <input type="checkbox"/>				
Mulching	<input type="checkbox"/> <input type="checkbox"/>				
Blankets	<input type="checkbox"/> <input type="checkbox"/>				
Check Dams	<input type="checkbox"/> <input type="checkbox"/>				
Earth Berms	<input type="checkbox"/> <input type="checkbox"/>				
Diversion	<input type="checkbox"/> <input type="checkbox"/>				
Embankment Protection	<input type="checkbox"/> <input type="checkbox"/>				
Outlet Protection	<input type="checkbox"/> <input type="checkbox"/>				

SEDIMENT CONTROL

(9) BMP Type	(10) Practice Req/Used	(11) Reason	(12) Maintenance Required? Yes/No	(13) Course of Action	(14) Date for Completion of Action
Inlet Protection	<input type="checkbox"/> <input type="checkbox"/>				
Erosion Bales	<input type="checkbox"/> <input type="checkbox"/>				
Straw Logs	<input type="checkbox"/> <input type="checkbox"/>				
Silt Fence	<input type="checkbox"/> <input type="checkbox"/>				
Sediment Trap/Basin	<input type="checkbox"/> <input type="checkbox"/>				
Construction Entrance	<input type="checkbox"/> <input type="checkbox"/>				
Dewatering Structure	<input type="checkbox"/> <input type="checkbox"/>				
Other	<input type="checkbox"/> <input type="checkbox"/>				

MATERIALS HANDLING, SPILL PREVENTION, WASTE MANAGEMENT, AND GENERAL POLLUTION PREVENTION

Stockpile Management	<input type="checkbox"/> <input type="checkbox"/>				
Materials Delivery & Storage	<input type="checkbox"/> <input type="checkbox"/>				
Spill Prevention & Control	<input type="checkbox"/> <input type="checkbox"/>				
Concrete Washout	<input type="checkbox"/> <input type="checkbox"/>				
Concrete Saw Water Containment	<input type="checkbox"/> <input type="checkbox"/>				
Solid Waste	<input type="checkbox"/> <input type="checkbox"/>				
Sanitary Waste	<input type="checkbox"/> <input type="checkbox"/>				
Maintenance & Fueling	<input type="checkbox"/> <input type="checkbox"/>				

(9) BMP Type	(10) Practice Req/Used	(11) Reason	(12) Maintenance Required? Yes/No	(13) Course of Action	(14) Date for Completion of Action
Street Sweeping & Vacuuming	<input type="checkbox"/> <input type="checkbox"/>				
Other	<input type="checkbox"/> <input type="checkbox"/>				
Other	<input type="checkbox"/> <input type="checkbox"/>				

Comments:

(15) Inspection and Maintenance	
<input type="checkbox"/> Inspection occurring at least every 14 calendar days.	Course of Action:
<input type="checkbox"/> Inspection occurring after precipitation or snowmelt event that causes surface erosion.	Course of Action:
<input type="checkbox"/> Inspection occurring at least every 30 calendar days since project completion.	Course of Action:
<input type="checkbox"/> Inspection reports retained on construction project site.	Course of Action:
<input type="checkbox"/> Corrective measures completed within 7 calendar days of inspection.	Course of Action:
<p>Certification:</p> <p>I certify this Stormwater Management Plan Field Inspection report is complete and accurate.</p> <p>Permittee's Inspector Signature: _____ Date: _____</p>	

Stormwater Management Plan Inspection Requirements

Inspections shall be completed on a [form](#) prescribed by the County and faxed to (719) 583-4944 or delivered to Pueblo County Public Works, 33601 United Avenue, Pueblo, CO 81001 in a timely manner, but in no case more than 3 days after the inspection.

Active Sites: For sites where construction has not been completed, the permittee shall make a thorough inspection of their stormwater management system at least every 14 days and after any precipitation or snow-melt event that causes surface erosion.

1. The construction site perimeter, disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWMP shall be observed to ensure that they are operating correctly.
2. Based on the results of the inspection, the description of potential pollutant sources, and the pollution prevention and control measures that are identified in the SWMP shall be revised and modified as appropriate as soon as practicable after such inspection. Modifications to control measures shall be implemented in a timely manner, but in no case more than 7 calendar days after the inspection.
3. The operator shall keep a record of inspections. Any incidence of non-compliance, such as uncontrolled releases of mud or muddy water or measurable quantities of sediment found off the site, shall be recorded with a brief explanation as to the measures taken to prevent future violations, as well as any measure taken to clean up the sediment that has left the site. After adequate measures have been taken to correct any problems, or where a report does not identify any incidents of non-compliance, the report shall contain a signed certification indicating the site is in compliance. This record shall be made available to the State of Colorado Water Quality Control Division upon request.

Completed Sites: For sites where all construction activities are completed but final stabilization has not been achieved due to a vegetative cover that has been planted but has not become established, the permittee shall make a thorough inspection of their stormwater management system at least once every month. When site conditions make this schedule impractical, permittees may petition the State of Colorado Water Quality Control Division to grant an alternate inspection schedule. These inspections must be conducted in accordance with paragraphs 1), 2), and 3) above.

Winter Conditions: Inspections, as described above, will not be required at sites where snow cover exists over the entire site for an extended period, and melting conditions do not exist. This exemption is applicable only during the period where melting conditions do not exist. Regular inspections, as described above, are required at all other times.

Stormwater Management Plan Field Inspection Report Instructions:

1. *Date of Inspection*
 2. *Permittee's Name*
 3. *Permittee's Inspector Name*
 4. *Project Name*
 5. *Stormwater Quality Permit Number*
 6. *Reason for Inspection*
- The types of inspections include the following:
 - [Required 14 Calendar Day Inspection](#) - These inspections are required at least every 14 calendar days during the life of the construction project.
 - [Required 30 Day Inspection for Completed Projects](#)-These inspections are required at least every 30 calendar days following the completion of the construction project where final stabilization has not been achieved.
 - [Required Rainfall or Snow-melt Event Inspection](#) - These inspections are required after any rainfall or snow-melt event that causes surface erosion.
 - [Complaint](#)-Inspection as a response to a complaint.
 - [Other](#)-Inspection for any other reason.

7. Construction Site Assessment

- Inspect the noted areas of the construction site and indicate with a checkmark the items which apply:
 - **Construction site perimeter contained** - Are appropriate BMPs in place and off-site sediment tracking minimized? Is there evidence of pollutants entering a storm drainage system or receiving waters?
 - **Disturbed areas contained** - Are appropriate BMPs implemented to minimize erosion or sediment tracking? Is there evidence of pollutants entering the storm drainage system or receiving waters? Estimate the disturbed area at the time of the inspection.
 - **Areas used for material and waste storage and fueling contained** - Are appropriate BMPs implemented to prevent and contain spills? Are wastes removed and disposed of properly? Are the storage areas located at least 50 feet from a watercourse? Is there evidence of pollutants entering a storm drainage system or receiving water?

8. SWMP Management

Indicate whether changes have been made to the SWMP during construction, if the changes have been approved by the permittee or permittee's representative and documented, whether details are included with SWMP for all BMPs used, and whether BMPs are installed as specified in the details.

9. BMP

The BMPs shown may not be a complete list of what is required by the SWMP. Cross out the BMPs not required by the SWMP and add the BMPs that are required. Additional sheets can be inserted to show all the BMPs required by the SWMP.

10. Practice Req/Used

This column can be used as follows:

- If the BMP is required by the SWMP and implemented, place a checkmark in both the "Req" and "Used" columns.
- If the BMP is required by the SWMP, but not implemented, place a checkmark in the "Req" column. Indicate the reason for the change in column (11), "Reason."
- If the BMP has been added to the SWMP, place a checkmark in the "Used" column. Indicate the reason for the change in column (11), "Reason."

11. Reason

Indicate the reason(s) for the deletion, addition and modification of BMP(s) to the SWMP.

12. Maintenance Required

Indicate whether maintenance and sediment removal are required with a Yes or No. If they are required, indicate what the action plan is in column (13), "Course of Action."

13. Course of Action if they are required, describe the action plan.

14. Date for Action to be Completed

Indicate the date the course of action will be completed. It must be completed in a timely manner, but in no case more than 7 days after the inspection.

15. Inspections and Maintenance

Evaluate the inspection and maintenance aspect of the construction project and check all that applies with a checkmark. To comply with County of Pueblo Stormwater Quality Permit System requirements, all of the items identified must be adhered to.

APPENDIX E

**COLORADO DEPARTMENT OF TRANSPORTATION
STORMWATER FIELD INSPECTION REPORT - ACTIVE CONSTRUCTION**

(1) Project Name:	(2) Project Contractor:	(3) Erosion Control Supervisor/SWMP Administrator:	
(4) CDOT Project Engineer/Representative:	(5) Inspector(s) (Name and Title):	(6) CDOT Project Number:	
(7) Project Code (Sub Account #):	(8) CDPS-SCP Certification#:	(9) CDOT Region:	(10) Date of Project Inspection:
(11) Weather at Time of Inspection:			

(12) REASON FOR INSPECTION / EXCLUSION

Routine Inspection: (minimum every 14 Calendar Days)

Runoff Event: (Post-storm event inspections must be conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosion. If no construction activities will occur following a storm event, post-storm event inspections shall be conducted prior to re-commencing construction activities, but no later than 72 hours following the storm event. The occurrence of any such delayed inspection must be documented in the inspection record.) Routine inspections still must be conducted every 14 calendar days.
 Storm Start Date: _____ Approximate End Time of Storm (hrs): _____

Third Party Request:

Winter Conditions Inspections Exclusion: Inspections are not required at sites where construction activities are temporarily halted, snow cover exists over the **entire site** for an extended period, **and melting conditions posing a risk of surface erosion do not exist**. This exception is applicable **only** during the period where **melting conditions do not exist**, and applies to the routine 14-day inspections, as well as the post-storm-event inspections. If **visual inspection** of the site verifies that all of these conditions are satisfied, document the conditions in section 18 (General Notes) and proceed to section 19 (Inspection Certification). Documentation must include: dates when snow cover occurred, date when construction activities ceased, and date when melting conditions began.

Other:

(13) SWMP MANAGEMENT

(14) CURRENT CONSTRUCTION ACTIVITIES:

	Yes	No	NA	
(a) Is the SWMP notebook located on site?				Estimate of disturbed area at the time of the inspection: _____ Acres
(b) Are changes to the SWMP documents noted and approved?				
(c) Are the inspection reports retained in the SWMP notebook?				
(d) Are corrective actions from the last inspection completed?				
(e) Is a Spill Prevention Control and Countermeasure Plan retained at the project site?				
(f) Is a list of potential pollutants retained at the site?				

(15) BMPs ON SITE AT TIME OF INSPECTION *See Inspection Report Instructions for more detail.

	In SWMP	Used	Not Needed at this time		In SWMP	Used	Not Needed at this time
(a) EROSION CONTROL BMPs ON SITE				(b) SEDIMENT CONTROL BMPs ON SITE			
Seeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stabilized Const. Entrance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mulching/Mulch Tackifier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sediment Trap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil Binder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inlet Protection*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil Retention Blankets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sediment Basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Embankment Protector*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Perimeter Control*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grading Techniques*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Berm/Diversion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(d) MATERIALS HANDLING, SPILL PREVENTION, WASTE MANAGEMENT AND GENERAL POLLUTION PREVENTION			
Check Dams*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stockpile Management*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outlet Protection*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Materials Management*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Concrete Waste Management*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) BMPs FOR SPECIAL CONDITIONS				Saw Water Management*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dewatering Structure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Solid Waste/Trash Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temp. Stream Crossing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Street Sweeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clear Water Diversion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sanitary Facility*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sensitive Area Fencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vehicle and Equip. Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stormwater Management Field Inspection Report Instructions

State waters are defined to be any and all surface and subsurface waters which are contained in or flow through the state, including, streams, rivers, lakes, drainage ditches, storm drains, ground water, and wetlands, but not including waters in sewage systems, waters in treatment works or disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed. (Per subsection 107.25 and 25-8-103 (19) CRS)

(3) Erosion Control Supervisor/SWMP Administrator: Indicate the name of the individual responsible for implementing, maintaining and revising the SWMP.

(4) CDOT Project Engineer/Representative: Indicate the name of the CDOT representative performing the inspection with the ECS/SWMP Administrator. This person should be the Project Engineer or an authorized representative.

(9) CDPS-SCP Certification #: Indicate the Colorado Discharge Permit System (CDPS) Stormwater Construction Permit (SCP) (for Stormwater Discharges Associated with Construction Activities) certification number, issued by CDPHE, for the project which the report is being completed. Certification number can be found on the first page of the SCP.

(12) Reason(s) for Inspection / Exclusion: Indicate the purpose for the inspection or exclusion. These inspections are required to comply with the CDOT Specifications and the CDPS-SCP.

Routine Inspections. These inspections are required at least every 14 calendar days during active construction. Suspended projects require the 14 calendar day inspection unless snow cover exists over the entire site for an extended period of time, and melting conditions do not exist (see, Winter Conditions Inspections Exclusions).

Runoff Event Inspection for Active Sites. See page 1 for definition.

Third Party Request. Indicate the name of the third party requesting the inspection and, if known, the reason the request was made.

Winter Conditions Inspections Exclusions. See page 1 for definition. An inspection does not need to be completed, but use this form to document the conditions that meet the Exclusion.

Other. Specify any other reason(s) that resulted in the inspection.

(13) SWMP Management: Review the SWMP records and documents and use a ✓ to answer the question. To comply with CDOT Standard Specifications and the CDPS-SCP, all of the items identified must be adhered to. If No is checked, document the reason and indicate the necessary corrective action in section 16 (Construction Site Assessment & Corrective Actions). If NA is checked, indicate why in the space provided or indicate in section 18 (General Notes).

(a) Is the SWMP notebook located on site? A copy of the SWMP notebook must be retained on site, unless another location, specified by the permit, is approved by the Division.

(b) Are changes to the SWMP documents noted and approved? Indicate all changes that have been made to any portion of the SWMP notebook documents during construction. Changes shall be dated and signed at the time of occurrence. Amendments may include items listed in subsection 208.03(c).

(c) Are the inspection reports retained in the SWMP notebook? The ECS/Engineer shall keep a record of inspections. Inspection reports must identify any incidents of non-compliance with the terms and conditions of the CDOT specifications or the CDPS-SCP. Inspection records must be retained for three years from expiration or inactivation of permit coverage.

(d) Are corrective actions from the last inspection completed? Have corrective actions from the last inspection been addressed? Is a description of the corrective action(s), the date(s) of the corrective action(s), and the measure(s) taken to prevent future violations (including changes to the SWMP, as necessary) documented?

(e) Is a Spill Prevention Control and Countermeasure (SPCC) Plan retained in the SWMP notebook? Subsection 208.06(c) requires that a SPCC plan be developed and implemented to establish operating procedures and that the necessary employee training be provided to minimize accidental releases of pollutants that can contaminate stormwater runoff. Records of spills, leaks or overflows that result in the discharge of pollutants must be documented and maintained. Information that should be recorded for all occurrences include the time and date, weather conditions, reasons for spill, etc. Some spills may need to be reported to the Water Quality Control Division immediately.

(f) Is a list of potential pollutants retained at the site? Subsection 107.25(b)6 requires the Erosion Control Supervisor to identify and describe all potential pollutant sources, including materials and activities, and evaluate them for the potential to contribute pollutants to stormwater discharge.

(14) Current Construction Activities: Provide a short description of the current construction activities/phase at the project site; include summary of grading activities, installation of utilities, paving, excavation, landscaping, etc.

- Estimate the acres of disturbed area at the time of the inspection. Include clearing, grading, excavation activities, areas receiving overburden (e.g. stockpiles), demolition areas and areas with heavy equipment/vehicle traffic, installation of new or improved haul roads and access roads, staging areas, borrow areas and storage that will disturb existing vegetative cover.

(15) BMPs On Site at Time of Inspection: Indicate the BMPs that are installed on-site at the time of inspection. All BMP details (e.g., Standard Plan M-208-1) shall be included with the SWMP documents.

Stormwater Management Field Inspection Report Instructions (continued)

BMPs In SWMP/Used/Not Needed at this Time. This section can be used as follows:

- If the BMP is required by the SWMP and implemented, indicate by placing a ✓ in both the "In SWMP" and "Used" columns.
- If the BMP is required by the SWMP, but not implemented, indicate by placing a ✓ in the "In SWMP" and "Not Needed at this Time" columns.

(a) Erosion Control BMPs On Site

- Embankment Protector (e.g., temporary slope drains, open-chute drains, etc.)
- Grading Techniques (e.g., vertical tracking, scarifying, or disking the surface on the contour, etc.)
- Check Dams (e.g., rock check, erosion logs, erosion bales, silt berms, etc.)
- Outlet Protection (e.g., riprap, erosion log around top of headwall, etc.)

(b) Sediment Control BMPs On Site

- Inlet Protection (e.g., erosion logs, erosion bales, sand bags, gravel bags, etc.)
- Perimeter Control (e.g., silt fence, erosion logs, berms, etc.)

(d) Materials Handling, Spill Prevention, Waste Management and General Pollution Prevention

- Stockpile Management. Stockpiles shall be located away from sensitive areas. All erodible stockpiles (including topsoil) shall be contained by silt fence, berms or other sediment control devices throughout construction (also see subsection 208.07).
- Materials Management. Material that could contribute pollutants to stormwater shall have secondary containment or other equivalent protection (also see subsection 208.06(a)).
- Concrete Waste Management. All concrete residue shall be contained in a signed structure as designed per subsection 208.02(j) and subsection 208.05(n). It shall be located a minimum of 50 feet from state waters.
- Saw Water Containment (e.g., pick-up broom or vacuum). Street washing is *not* allowed.
- Sanitary Facility. Temporary sanitary facilities shall be located 50 feet away from drainage ways, inlets, receiving waters, and located away from areas of high traffic, and areas susceptible to flooding or damage by construction equipment.

(16) Construction Site Assessment & Corrective Actions: Inspect the construction site and indicate where BMP feature(s) identified in section 15 (BMPs On Site at Time of Inspection), require corrective action. Erosion and sediment control practices identified in the SWMP shall be evaluated to ensure that they are operating correctly.

- Location. Site location (e.g., project station number, mile marker, intersection quadrant, etc.).
- BMP. Indicate the type of BMP at this location that requires corrective action (e.g., silt fence, erosion logs, soil retention blankets, etc.).
- Condition. Identify the condition of the BMP, using more than one letter (identified in section 16) if necessary.
- Description of Corrective Action and Preventative Measure Taken. Provide the proposed corrective action needed to bring the area or BMP into compliance. Once corrective actions are completed, state the measures taken to prevent future violations and ensure that the BMPs are operating correctly, including the required changes made to the SWMP.
- Date Completed & Initials. Date and initial when the corrective action was completed and the preventative measure statement finished.

(17) Construction Site Assessment: Was there any off site discharge of sediment at this site since the last inspection?

(a) Is there evidence of discharge of sediment or other pollutants from the site? Off site pollutant discharges are a violation of the permit. The construction site perimeter, all disturbed areas, material and/or waste storage areas that are exposed to precipitation, discharge locations, and locations where vehicles access the site shall be inspected for evidence of, or the potential for, pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to state water.

(b) Has sediment or other pollutants discharging from the site reached state waters? Off site pollutant discharges are a violation of the permit. If off site discharge has occurred, explain the discharge and the corrective actions in section 16 (Construction Site Assessment & Corrective Actions) or section 18 (General Notes).

(18) General Notes: Indicate any additional notes that add detail to the inspection; this may include positive practices noted on the project.

(19) Inspection Certification: In accordance with Part I, F.1.c of the CDPS-SCP, all reports for submittal shall be signed and certified for accuracy.

(20) Compliance Certification: In accordance with Part I, D.6.b.2.viii of the CDPS-SCP, compliance shall be certified through signature.

**NorthStar Engineering
and Surveying, Inc.**

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