CONNECTICUT AVENUE WIDENING
32ND STREET TO I-44 BRIDGE

MANDATORY PRE-BID MEETING:
JULY 27TH AT 10:30 AM

BID OPENING:
AUGUST 10TH AT 2:00 PM

CITY OF JOPLIN
PUBLIC WORKS DEPARTMENT
602 S. MAIN STREET
JOPLIN, MO 64801
(417) 624-0820 EXT 1543

BARTLETT & WEST, INC.
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167
1824 S. LONE PINE, SUITE F
SPRINGFIELD, MO 65804
(888) 200-6464

DATE PREPARED: JULY 2023
PROJECT NO. 17595.007

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Bartlett & West

SPECIFICATIONS AND CONTRACT DOCUMENTS

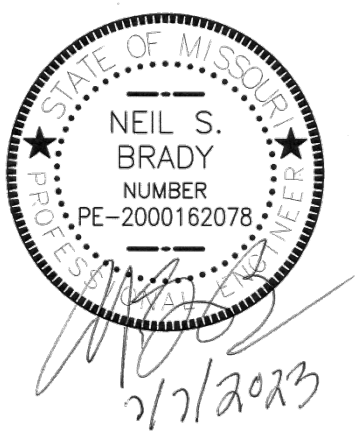
FOR

CITY OF JOPLIN

FOR

CONNECTICUT AVENUE WIDENING

Phone: (417) 624-0820



Bartlett & West, Inc.
1824 S. LONE PINE, SUITE F
SPRINGFIELD, MO 65804
Phone: (888) 200-6464

PROJECT NO. 17595.007

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GEOTECHNICAL REPORTS

TECHNICAL SPECIFICATIONS

City of Joplin Standard and Specifications latest edition shall be included by reference
City of Joplin Standard Details latest edition shall be included by reference

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ADVERTISEMENT FOR BIDS

Notice is hereby given that the Director of Public Works of the City of Joplin, Missouri, will accept sealed bids for the following improvements in the City of Joplin, Missouri:

CONNECTICUT AVENUE WIDENING
32ND STREET TO I-44 BRIDGE

The Project consists of re-constructing Connecticut Avenue between the I-44 bridge and 32nd Street. Project will include curb and gutter, storm sewer, 10-foot wide ADA-compliant trail on the west side, and a 6-foot wide ADA-compliant sidewalk on the east side of Connecticut Ave. The street will be constructed as a five-lane road. Driveways along the project will be reconstructed, as needed.

Bids must be in the hands of the City of Joplin Director of Public Works before 2:00 PM prevailing local time on August 10, 2023 at which time all bids will be opened by the Director of Public Works at the Joplin City Hall, 602 S. Main Street, Joplin MO 64801 in the 5th Floor Study.

Copies of the plans and specifications are on file and may be examined at the offices of the City of Joplin located at 602 S Main St. Joplin, Missouri 64801 or on the City's website (https://www.joplinmo.org/Bids.aspx?CatID=17).

Plans and Specifications must be secured at City of Joplin located at 602 S Main St. Joplin, Missouri 64801 or through the City of Joplin's website (https://www.joplinmo.org/Bids.aspx?CatID=17).

A MANDATORY Pre-bid Meeting will be held at 10:30 AM July 27, 2023 in Joplin City Hall, 5th Floor Study. All bidders are required to attend the Pre-Bid Meeting and sign the attendance sheet at the meeting. Bids received from bidders who have not attended the Pre-Bid Meeting and signed the attendance sheet at the meeting will be considered nonresponsive.

The wage rates applicable to this project have been predetermined as required by law and are set forth in the construction specifications and are to be considered as a part of this Notice to Contractors.

A detailed listing of all subcontractors shall be provided by the Bidder. In accordance with the Contract Documents, documentation that the prospective General Contractor and its subcontractors meet minimum qualifications shall be provided and submitted.

A bid bond or certified check for five percent (5%) of the total bid amount must accompany each bid. The successful bidder will be required to furnish a performance bond in the amount of his bid and shall, before entering on the work of said contract, be licensed as a contractor of the City of Joplin, Missouri. The Director of Public Works reserves the right to reject any or all bids.

The City of Joplin hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, Disadvantaged Business Enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award.

+ + END OF ADVERTISEMENT FOR BIDS ++

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INFORMATION FOR BIDDERS

1. Receipt and Opening of Bids:

   The City of Joplin (herein called the "Owner"), invites bids on the form attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner at the City Hall, 4th Floor, 602 S. Main Street, Joplin, Missouri, 64804 until 2:00 PM prevailing local time on August 10, 2023, and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to the City of Joplin, 602 S. Main Street, Joplin, Missouri, and designated as a bid for Connecticut Avenue Widening, 32nd Street To I-44 Bridge.

   The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within ninety (90) days after the actual date of the opening thereof.

2. Pre-Bid Conference: A mandatory pre-bid conference will be held at the time and location indicated in the Bid Advertisement / Notice to Contractors.

   a. Representatives of the Owner and Engineer will be present to discuss the Project. Proposals will not be accepted from Bidders who do not attend the conference. It is each Bidder's responsibility to sign in at the pre-bid conference to verify their participation. Bidders must sign in using the name of the organization that will be submitting a Bid. A list of qualified Bidders that attended the pre-bid conference and are eligible to submit a Bid for this Project will be issued in an Addendum.

   b. Information presented at the pre-Bid conference does not alter the Contract Documents. The Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

3. Preparation of Bid: Each bid must be submitted on the required BID form, included as part of these specifications. All blank spaces for bid prices must be filled in, in ink or typewritten and the foregoing Certifications must be fully completed and executed when submitted.

4. Subcontracts: The bidder is specifically advised that any person, or other party, to whom it is proposed to award a subcontract under this contract:

   a. Must be acceptable to the procurer; and

   b. Subcontractors must comply with all requirements related to this funding, including certifications, in the event the bidder is successful in obtaining this work.

5. Telegraphic Modification: Any bidder may modify his bid by telegraphic communication at any time prior to the scheduled closing time for receipt of bids, provided such telegraphic communication is received by the Owner prior to the closing time, and provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. The telegraphic communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the

Owner until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic modification.

6. Method of Bidding: The Owner invites the following bid(s): Unit Price submission for Connecticut Avenue Widening, 32nd Street To I-44 Bridge in compliance with project drawings, specifications, and contract documents. Award of the contract shall be based upon the lowest responsive, responsible bid submitted for the Total Base Bid Amount. The OWNER reserves the right to add or subtract quantities from the Project Contract at the Unit Prices submitted, as necessary.

7. Qualifications of Bidder: The Owner may make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

8. Bid Security: Each bid must be accompanied by a bid bond payable to the Owner for five percent (5%) of the total amount of the bid. As soon as the bid prices have been compared, the Owner will return all of the bonds except the three lowest responsible bidders. When the agreement is executed the bonds of the two remaining unsuccessful bidders will be returned. The bid bond of the successful bidder will be retained until the payment bond and performance bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a bid bond.

9. Liquidated Damages for Failure to Enter into Contract: The successful bidder, upon his failure or refusal to execute and deliver the contract and bonds required within 7 days after he received notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid.

10. Time of Completion and Liquidated Damages: Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within the Time of Completion and Liquidated Damages requirements listed in the Proposal.

11. Conditions of Work: Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract. Insofar as possible the contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of or interferencewith the work of any other contractor.

12. Addenda and Interpretations: No interpretation of the meaning of the plans, specifications, or other pre-bid documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to City Hall ATTN: Rob Beachner 4th Floor, 602 S. Main Street, Joplin, MO 64801 or emailed to RBeachne@joplinmo.org and to be given consideration must be received at least seven (7) days prior to the date fixed for the opening of bids. Interpretations, supplemental instructions, or clarifications considered necessary by the Engineer in response to such questions will be issued in the form of written addenda to the contract documents and specifications which, if issued, will be posted to the City of Joplin Website on the www.Joplinmo.org webpage, not later than three days prior to the date fixed for the opening of bids. Questions received less than (7)

days prior to the date for the opening of bids may not be answered. Only answers issued by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

13. Security for Faithful Performance: Simultaneously with the delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as a security for the faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

14. Power of Attorney: Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

15. Notice of Special Conditions: Attention is particularly called to those parts of the contract documents and specifications which deal with the following:

    a. Inspection and testing of materials.

    b. Insurance requirements.

    c. Wage rates.

    d. Stated allowances.

16. Laws and Regulations: The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over the construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

17. Method of Award - Lowest Qualified Bidder: If at the time this contract is to be awarded, the lowest Total Base Bid Amount for the Connecticut Avenue Widening, 32nd Street To I-44 Bridge project, submitted by a responsive, responsible bidder, does not exceed the amount of funds then estimated by the Owner as available to finance the contract; the contract will be awarded on the Total Base Bid Amount.

18. Obligation of Bidder: At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect of his bid.

    a. Bidders are informed that pursuant to Section 285.530, RSMo, as a condition of the award of any contract in excess of five thousand dollars ($5,000), the successful bidder shall, by sworn affidavit and provision of documentation, affirm its enrollment and participation if a federal work authorization program with respect to the employees working in connection to the contracted services. Successful bidders shall also sign an affidavit affirming that it does not knowingly employ any person who is an unauthorized alien in connection to the contracted services.

19. Safety Standards and Accident Prevention: With respect to all work performed under this contract, the contractor shall:

    a. Comply with the safety standards provisions of applicable laws, building and

construction codes, and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the "Federal Register", Volume 36, No. 75, Saturday, April 17, 1971.

b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.

c. Maintain at his office or other well-known place at the job site, all articles necessary for giving first aid to the injured, and shall make arrangements for the immediate removal to a hospital or a doctor's care of persons (including employees), who may be injured on the job site. In no case shall employees be permitted to work at a job site before the employer has made a standing arrangement for the removal of injured persons to a hospital or adoctor's care.

20. Bidders are informed that the Project is subject to the requirements of Section 292.675, RSMo, which requires all contractors or subcontractors doing work on the Project to provide, and require its on-site employees to complete, a ten (10) hour course in construction safety and health approved by the Occupational Safety and Health Administration ("OSHA") or a similar program approved by the Missouri Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. The training must be completed within sixty (60) days of the date of work on the Project commences. On-site employees found on the worksite without documentation of the required training shall have twenty (20) days to procure documentation or be subject to removal from the Project.

21. A contract award (see 2 CFR 180.220) must not be made to parties listed on the government-wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549. The Contractor represents and warrants that it and its subcontractors are not debarred, suspended, or placed in ineligibility status under the provisions of 2 CFR §2424 (government debarment and suspension regulations) or by the City of Joplin.

22. Contractor's Responsibility for Subcontractors:

a. The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for the acts and omissions of persons it directly employs.

b. Contractor shall cause appropriate provisions to be inserted in all subcontracts relating to this work, to bind all subcontractors to the Contractor by all the terms herein set forth, and insofar as applicable to the work of subcontractors and to give the Contractor the same power regarding termination of any subcontract as the City may exercise over Contractor under any provisions of this contract.

Nothing contained in this contract shall create any contractual relation between the subcontractor and the City or between any subcontractors.

SPECIAL CONDITIONS

Project:

CONNECTICUT AVENUE WIDENING
32ND STREET TO I-44 BRIDGE

1. Wage rates for this project shall be in accordance with wage rate determination made by the Missouri Department of Labor and Industrial Relations on file in the Department of Public Works. The wage rates applicable to this project have been predetermined as required by law and are set forth in the construction specifications and are to be considered as a part of this Notice to Contractors.

2. Contractors are cautioned that unbalanced bids can be rejected. The City reserves the right to reject or delete any part of the bid.

3. The City will issue a notice to proceed after the signing of the contract.

4. All work shall be in accordance with 2021 City of Joplin Standard Specifications that are in effect on the City of Joplin website on February 15, 2021. In occurrences where specification sections, drawings, drawing details or other notations address the same or similar items, methods or materials, the more stringent requirements shall govern.

5. Contractors shall abide by the requirements set by the United States Access Board for ADA guidelines and standards (ADAAG) by following the ADAAG standards for Public Right of Ways (PROWAG). The contractor is required to familiarize themselves with the PROWAG guidelines, latest edition. Details provided on the plans are designed to the new requirements but due to lack of survey information the contractor needs to verify in the field that all slope requirements can be met. If the requirements cannot be met, it is the responsibility to notify the City Engineer immediately for redesign or an alternative slope requirement within the PROWAG guidelines.

6. Bidder hereby agrees to commence work under this contract on or before a date to be specified in the Notice to Proceed, and to fully complete the project awarded to them within the contract time requirements listed in the Proposal Form

7. Sales Tax Exemption: Senate Bill 477 has expanded the provisions of Section 144.062 of the Revised Statutes of Missouri (RSMo) to allow contractors to make tax-free purchases of materials and equipment for projects owned by tax-exempt entities. This change in Section 144.062 RSMo became effective on August 28, 1994. Purchases of construction materials, by the Contractor, for this project are exempt from sales tax. Prior to being eligible for this exemption, the attached "Missouri Project Exemption Certificate" must be completed by the Owner and presented to the Contractor. For more information about this exemption, the bidder may contact the Missouri Department of Revenue, Technical Support Section, Jefferson City, Missouri (573-751-2836).

PROPOSAL

THE UNDERSIGNED hereby proposes to furnish the labor and material for:

CONNECTICUT AVENUE WIDENING
32ND STREET TO I-44 BRIDGE

in the City of Joplin, Missouri, according to the Drawings, Contract Documents, and general specifications for such work on file in the office of the City Engineer and Director of Public Works, together with the terms and conditions to be stipulated in the general contract forms, now adopted by the City of Joplin, as advertised to be let on August 10, 2023, at the following prices to-wit:

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost
	Roadway Items				
1	Mobilization	1	LS	$	$
2	Traffic Control	1	LS	$	$
3	Demolition and Removals	1	LS	$	$
4	Clearing and Grubbing	1	LS	$	$
5	Embankment	6,962	CY	$	$
6	Earth Excavation (Waste Haul Off)	1,100	CY	$	$
7	Silt Fence	1,167	LF	$	$
8	Inlet Protection	48	EA	$	$
9	Rock Ditch Check (4-inch Rock)	4	EA	$	$
10	Sandbag Ditch Check	19	EA	$	$
11	Temporary Seeding	0.4	AC	$	$
12	Permanent Seeding	0.5	AC	$	$
13	6" Solid White Pavement Marking (Preformed Thermoplastic)	5,060	LF	$	$
14	6" Broken White Pavement Marking (Preformed Thermoplastic)	2,110	LF	$	$
15	4" Solid Yellow Pavement Marking (Preformed Thermoplastic)	7,364	LF	$	$
16	4" Broken Yellow Pavement Marking (Preformed Thermoplastic)	1,020	LF	$	$
17	24" Solid White Pavement Marking (Preformed Thermoplastic)	57	LF	$	$
18	Left Turn Arrow Symbol (Preformed Thermoplastic)	24	EA	$	$
19	24" Solid Yellow Hash-Bar (Preformed Thermoplastic)	152	LF	$	$
20	30" Solid White Midblock Crossing Pavement Marking (Preformed Thermoplastic)	60	EA	$	$
21	Vinyl Fence	575	LF	$	$
22	Fencing with Concrete Footings	146	LF	$	$
23	15" dia. RCP	1,533	LF	$	$
24	18" dia. RCP	1,043	LF	$	$
25	21" dia. RCP	99	LF	$	$
26	24" dia. RCP	144	LF	$	$

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost
27	30" dia. RCP	674	LF	$	$
28	36" dia. RCP	238	LF	$	$
29	60"x38" RCPHE	197	LF	$	$
30	5'X3' RCB	49	LF	$	$
31	Endsection, RCP, 15"	2	EA	$	$
32	Endsection, RCPHE	1	EA	$	$
33	4' x 4' Area Inlet	9	EA	$	$
34	5' x 3' Type D Curb Inlet	35	EA	$	$
35	5' x 5' Area Inlet	2	EA	$	$
36	8' x 4' Type D Curb Inlet	11	EA	$	$
37	APWA Double Grate Inlet	1	EA	$	$
38	APWA Single Grate Inlet	2	EA	$	$
39	French Drain Connection	2	EA	$	$
40	Asphaltic Concrete Surface (2" thickness)	17,670	SY	$	$
41	Asphaltic Concrete Surface (3" thickness)	647	SY	$	$
42	Asphalt Black Base (8" thickness)	17,670	SY	$	$
43	Portland Cement Concrete Pavement (Driveways) (8" thickness)	2,583	SY	$	$
44	Type CG-1 Curb and Gutter	6,073	LF	$	$
45	Sidewalk Construction (4" thickness)	1,514	SY	$	$
46	ADA Ramps and Landings (6" thickness)	256	SY	$	$
47	Sidewalk Construction Shared Use Path (6" Thickness)	2,142	SY	$	$
48	2" Limestone Aggregate Base	3,823	SY	$	$
49	4" Limestone Aggregate Base	225	SY	$	$
50	8" Limestone Aggregate Base	17,670	SY	$	$
51	6" Limestone Aggragate Base	647	SY	$	$
52	Decorative Fence	1,045	LF	$	$
53	Concrete Lined Ditch	276	LF	$	$
54	Concrete 'U' Channel	530	LF	$	$
55	Construction Staking	1	LS	$	$
56	Permanent Signs	19	EA	$	$
57	Millbank Controller	1	EA	$	$
58	Cobra Head Light Fixtures	22	EA	$	$
59	30' Light Poles	22	EA	$	$
60	Pole Bases	22	EA	$	$
61	Junction Box	11	EA	$	$
62	2" Conduit	3300	LF	$	$
63	#10 Wire	3800	LF	$	$
64	#8 Wire	8500	LF	$	$
65	#6 Wire	3500	LF	$	$

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost
66	#1 Wire	500	LF	$	$
67	Conduit Trenching/Backfill	3300	LF	$	$
68	Ground Rods	23	EA	$	$
69	CMS Boards	2	EA	$	$
70	RRFB System	1	EA	$	$
71	Gaurdrail	187.5	LF	$	$
72	SoftStop Gaurdrail Anchor	1	EA	$	$
73	Removal of Brick Cluster Mailbox	2	EA	$	$
74	Removal of Gaurdrail	165	LF	$	$
75	Removal of Mailboxes	43	EA	$	$
76	Removal of Unsuitable Material	1228	CY	$	$
77	Removal of Pavement Markings (Symbols)	2	EA	$	$
78	Removal of Permanent Barrier	429	LF	$	$
79	Removal of Temporary Barrier	226	LF	$	$
80	Removal of Pavement Marking	2,616	LF	$	$
	(Base Bid) Total Cost				$

The undersigned agrees to enter into a contract within fifteen (15) days from notice of award should this proposal be accepted, and enter into bonds with good and sufficient securities, and to fully complete the by August 31, 2024. Should the undersigned fail to complete the work within the allowed completion date, a penalty of $4,000 per calendar day thereafter shall be instituted; the amount shall be deducted from the contract price.

In order to pay all labor employed and material used in connection with this work and to adjust all claims or liens that may arise in consequence of said work, to the satisfaction of the Director of Public Works, above said bonds shall also indemnify and save harmless the said City from all damages or injuries to any person or persons, either in the employ of the contractor, his agents, servants or employees. In the event of the failure of the undersigned to enter into such contract within ten (10) days of the award, then the deposit or certified check of five percent (5%) of the Total Contract Bid Amount as surety is therefore forfeited to the City of Joplin.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the Contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to his BID.

The low BIDDER shall supply the names and addresses of the major material SUPPLIERS AND SUBCONTRACTORS when requested to do so by the OWNER.

Dated _____ day of _____, 2023

Company _____

Address _____

Signature _____

(Print Name) _____

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BIDDER QUALIFICATIONS & CERTIFICATIONS

Firm Name: _____

(Company Name)

_____

(Address) (City, State, Zip)

_____

(Phone Number) (Fax Number) (E-mail)

Date: _____

Construction

- □ General Contracting
- □ Electrical
- □ Plumbing
- □ HVAC
- □ Demolition
- □ Earthmoving
- □ Asbestos Abatement
- □ Other: _____

For Corporations

Federal ID Number: _____

Name of State(s) in which incorporated: _____

Date(s) of incorporation: _____

If not incorporated in

1. Attach Certificate of Authority to do Business in Missouri Certificate
2. Number: _____ Date: _____

_____ _____

(President's Name) (Vice-President's Name)

_____ _____

(Secretary's Name) (Treasurer's Name)

For Partnerships Only: Date of Organization: _____

Type of Partnership: □ General □ Limited □ Association

Names and Addresses of all partners: (use additional sheet if necessary)

1. _____

(Name) (Address) (City, State, Zip Code)

2. _____

(Name) (Address) (City, State, Zip Code)

General

Federal ID Number: _____ or SSN: _____

Percent of work done by Contractor: _____ Number of Permanent Employees: _____

Number of years in business: _____

Geographical limits of operation: _____

If you have done business under a different name, please give name and location: _____

_____

Has firm ever failed to complete a project or defaulted on a contract? If so, state where and why:

_____

_____

Date: Dated this _____ day of _____ , ____.

Signatures:

☐ Individual ☐ Partnership ☐ Joint Venture ☐ Corporation

Business Name: _____

Address: _____

_____

Telephone: _____ Fax Number: _____

Federal ID Number: _____ or Social Security Number: _____

DUNS Number: _____

Incorporated under the laws of the State of: _____

(If a corporation is organized in a state other than Missouri, attach Certificate of Authority to do business in the State of Missouri.)

(Bidder's Signature) (Corporate Secretary's Signature and Seal)

(Typed or Printed Name of Signor)

(Seal)

(Partner/Joint Venture Signature)

(Typed or Printed Name of Signor)

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Bartlett & West

Contractor Past Performance Questionnaire

_____

Legal Name of the Corporation, Firm or Individual Contractor

P.O Box_____City & State_____Zip Code_____

Street Address _____

(If different from P.O. Box:) City & State _____Zip Code_____

Telephone No. _____ Fax No. _____

E-Mail Address_____Contact person: _____

Has this firm or organization (or in the case of a partnership or joint venture, has any contractor which is included within this firm or organization) performed any work as a contractor or subcontractor for the City of Joplin, in the last five (5) years?_Yes _____No

If yes, give complete details, descriptions and dates on additional sheets as needed.

This firm or organization has_____years experience as a general contractor and/or_____years as a subcontractor in the type of work designated in this RFP.

Has your firm or organization ever failed to complete any work awarded to you?____Yes_____No

If so, where and why? (Attach additional sheets as needed.) _____

_____

Has your firm or organization ever failed to complete any work in a timely manner?____Yes___No

If so, where and why? (Attach additional sheets as needed.) _____

Does your firm or organization currently possess a City of Joplin contractor license?_____Yes_____No

This organization has completed the following similar projects for the type(s) of work designated in this RFP within the last five years. (Attach additional sheets as needed.)

Contract Amount	Type of Work	Key Personnel	When Completed	Location: City and State	Project Owner's Name and Address

SUBCONTRACTOR DISCLOSURE FORM

CONTRACTOR:_____

PROJECT:_____

DATE: _____

SUBCONTRACTOR	CATEGORY OF WORK	DOLLAR VALUE
Name:		
Contact Name:		
Address:		
Phone Number:		
Fax Number:		
Email:		
Tax ID Number:	DUNS Number:	

Name:		
Contact Name:		
Address:		
Phone Number:		
Fax Number:		
Email:		
Tax ID Number:	DUNS Number:	

Name:		
Contact Name:		
Address:		
Phone Number:		
Fax Number:		
Email:		
Tax ID Number:	DUNS Number:	

Name:		
Contact Name:		
Address:		
Phone Number:		
Fax Number:		
Email:		
Tax ID Number:	DUNS Number:	

Name:		
Contact Name:		
Address:		
Phone Number:		
Fax Number:		
Email:		
Tax ID Number:	DUNS Number:	

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Bartlett & West

ANTI-COLLUSION STATEMENT

STATE OF MISSOURI

CITY/COUNTY OF _____

_____

_____being first duly sworn, deposes and says that he is

_____
Title of Person Signing

Of _____

_____
Name of Bidder

That all statements made and facts set out in the proposal for the above project are true and correct: and the bidder (The person, firm, association or corporation make said bid)
Has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the said bid or any contact which may result from its acceptance.

Affiant further certifies that bidder is not financially interested in, or financially affiliated with, any other bidder for the above project.

BY _____

BY _____

BY _____

Sworn to before me this _____day of _____20_____.

_____
Notary Public

My Commission Expires _____

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Bartlett & West

AGREEMENT
BETWEEN
CITY OF JOPLIN AND

CITY		CONTRACTOR	
CITY OF JOPLIN **602 S. MAIN STREET** **JOPLIN, MO 64801**		Name: Address:	
Attention:		Attention:	
Department:		Phone:	Fax:
Phone:	Fax:		

THIS AGREEMENT made and entered into this ____ day of _____, 20____, by the parties identified above.

WITNESSETH: That whereas, the Contractor has become the lowest responsible bidder for furnishing the supervision, labor, tools, equipment, materials and supplies and for constructing the following City improvements:

CONNECTICUT AVENUE WIDENING
32ND STREET TO I-44 BRIDGE
PROJECT NO. TC0606

The City and Contractor agree to the following:

1. Manner and Time for Completion. The Contractor will furnish all supervision, labor, tools, equipment, materials and supplies necessary to perform, and to perform said work at Contractor's own expense in accordance with the contract documents and any applicable City ordinances and state and federal laws within ___ calendar days from the date Contractor is ordered to proceed, which order shall be issued by the Director of Public Works within 30 days after the date of this contract.

2. Prevailing Wages. All labor utilized in the construction of the aforementioned improvements shall be paid a wage of no less than the "prevailing hourly rate of wages" for work of a similar character in this locality, as established and amended at any time by the Department of Labor and Industrial Relations of the State of Missouri. At any time, the contractor is found to not have paid prevailing wages, the contractor shall forfeit as a penalty to the city one hundred dollars for each underpaid worker employed, for each calendar day, or portion thereof such worker is paid less than the said stipulated rates for any work done under this contract.

3. Insurance Requirements. Without limiting any of the other obligations or liabilities of the Contractor, the Contractor shall secure and maintain at its own cost and expense, throughout the duration of this Contract and until the work is completed and accepted by the City of Joplin, insurance of such types and in such amounts as may be necessary to protect it and the interests of the

City of Joplin against all hazards or risks of loss as hereunder specified or which may arise out of the performance of the Contract Documents. The form and limits of such insurance, together with the underwriter thereof in each case, are subject to approval by the City of Joplin. Regardless of such approval, it shall be the responsibility of the contractor to always maintain adequate insurance coverage during the term of the Contract. Failure of the Contractor to maintain coverage shall not relieve it of any contractual responsibility or obligation or liability in general or under the Contract Documents.

The certificates of insurance, including evidence of the required endorsements hereunder or the policies, shall be filed with the City within ten (10) days after the date of the receipt of Notice of Award of the Contract to the Contractor and prior to the start of work. All insurance policies shall require that the insurance company in question provide thirty (30) days written notice prior to modification or cancellation of such insurance. Such notices shall be mailed, certified mail, return receipt requested, to:

City of Joplin - Public Works, 602 S. Main Street, Joplin, MO 64801

Such policies shall name the City as an additional insured, with limits of liability not less than the sovereign immunity limits for Missouri public entities calculated by the Missouri Department of Insurance as of January 1 each calendar year and published annually in the Missouri Register pursuant to Section 537.610, RSMo. (See, http://insurance.mo.gov/industry/sovimmunity.php)

As of January 1, 2023, the minimum coverage for the insurance referred to herein shall be as set out below:

a. Workers' Compensation…. Statutory coverage per RSMo 287.010 et seq

Employer's Liability……. $1,000,000.00

b. Commercial General Liability Insurance, including coverage for Premises, Operations, Products and Completed Operations, Contractual Liability, Broad Form Property Damage, Independent Contractors, Explosion, Collapse, and Underground Property Damage and endorsed for blasting if blasting required. Such coverage shall apply to bodily injury and property damage on an "Occurrence Form Basis" with limits of at least Three Million Two Hundred Fifty Eight Thousand Three Hundred Sixty Eight and no/100 Dollars ($3,258,368.00) for all claims arising out of a single accident or occurrence and at least Four Hundred Eighty Eight Thousand Seven Hundred Fifty Five and no/100 Dollars ($488,755.00) with respect to injuries and/or death of any one person in a single occurrence and an amount not less than at least $1,000,000 for all claims to property arising out of a single occurrence and at least $100,000 to any one owner with respect to damages to property. Contractor agrees that the proceeds of such insurance policy shall first be used to pay any award, damages, costs, and/or attorneys' fees incurred by or assessed against City, its employees, officers and agents, before payment of any award, damages, costs or attorneys' fees of Contractor, its employees, officers or agents. Contractor agrees to cause its insurer to name City as an additional insured on such insurance policy, including the City as an additional insured for coverage under its products-completed operations hazard, and said policy shall be primary and noncontributory.

c. Automobile Liability Insurance covering bodily injury and property damage for owned, non-owned and hired vehicles, with limits of at least Three Million Two Hundred Fifty Eight Thousand Three Hundred Sixty Eight and no/100 Dollars ($3,258,368.00) for all claims arising out of a single accident or occurrence and at least Four Hundred Eighty Eight Thousand Seven Hundred Fifty Five and no/100 Dollars ($488,755.00) with respect to injuries and/or death of any one person in a single accident or occurrence.

d. Owner's and Contractor's Protective Liability Insurance to protect the City, its agents, servants and employees from claims which may arise from the performance of this Contract, with limits of at least Three Million Two Hundred Fifty Eight Thousand Three Hundred Sixty Eight and no/100 Dollars ($3,258,368.00) for all claims arising out of a single accident or occurrence and at Four Hundred Eighty Eight Thousand Seven Hundred Fifty Five and no/100 Dollars ($488,755.00) with respect to injuries and/or death of any one person in a single accident or occurrence.

The Owner's and Contractor's Protective Liability Insurance must:

(1) Be a separate policy with the named insured being: The City of Joplin, and

(2) Contain an endorsement that disclaims coverage for any claim barred by the doctrines of sovereign immunity or official immunity, except attorney's fees and other litigation costs incurred in defending a claim. Nothing contained in this policy (or this endorsement thereto) shall constitute any waiver of whatever kind of these defenses or sovereign immunity or official immunity for any monetary amount whatsoever.

e. Builders Risk Insurance for contracts involving unoccupied structures. The Contractor shall secure All Risk Builder's Risk Insurance. Unless specifically authorized by the City, the amount of such insurance shall not be less than the total contract price.

f. Subcontracts. In case any or all of this work is sublet, the Contractor shall require the subcontractor to procure and maintain all insurance required in subparagraphs (a), (b) and (c) hereof and in like amounts. Contractor shall require any and all subcontractors with whom it enters into a contract to perform work on this project to protect the City of Joplin through insurance against applicable hazards or risks and shall, upon request of the City, provide evidence of such insurance.

g. Notice. The Contractor and/or subcontractor shall furnish the City prior to beginning the work, the policy as specified in subparagraph (d), and satisfactory proof of carriage of all the insurance required by this contract, with the provision that policies shall not be canceled, modified or non-renewed without thirty (30) days written notice to the City of Joplin.

h. Legislative or Judicial Changes. In the event the scope or extent of the City's tort liability as a governmental entity as described in Section 537.600 through 537.650 RSMo is broadened or increased during the term of this agreement by legislative or judicial action, the City may require Contractor, upon 10 days written notice, to execute a contract addendum whereby the Contractor agrees to provide, at a price not exceeding Contractor's actual increased premium cost, additional liability insurance coverage as the City may require to protect the City from increased tort liability exposure as the result of such legislative or judicial action. Any such additional insurance coverage shall be evidenced by an appropriate certificate of insurance and shall take effect within the time set forth in the addendum.

4. Performance, Labor, and Materials Payment Bond: The Contractor shall furnish a Performance Bond and a Labor and Materials Payment Bond with surety approved by the City and on the forms approved by the City, each bond shall be in the amount of $_____ (full amount of contract) conditioned upon the full and faithful performance of all major terms and conditions of this contract and payment of all labor and material suppliers. It is further mutually agreed between the parties hereto that if at any time after the execution of this agreement and the surety bond(s) hereto attached for its faithful performance and payment of labor and material suppliers, the City shall deem the surety or sureties upon such bond(s) to be unsatisfactory, or if, for any reason, such bond(s) ceases to be adequate to cover the performance of the work, the Contractor shall, at its expense, within five (5) days after the receipt of notice from the City to do so, furnish an additional bond or bonds, in such form and amount, and with such surety or sureties as shall be satisfactory to the City. In such event no further payment to the Contractor shall be deemed to be due under this contract until such new or additional security for the faithful performance of the work and the payment of labor and material suppliers shall be furnished in a manner and form satisfactory to the City. The corporate surety on any performance or payment bond must be licensed by the State of Missouri and if the required bond exceeds $25,000.00 must be listed in United States Treasury Circular 570.

5. Certification Regarding Disbarment, Eligibility, Indictments, Convictions or Civil Judgements for all Federal Aid Projects: By signing and submitting the bid, the president or authorized official of the bidder, under penalty of perjury under the laws of the USA, shall certify that, except as noted in the exceptions, the company or any person associated therewith in the capacity of owner, partner, director, officer, principal investor, project director, manager, auditor or any position involving the administration of federal funds:
(Reference can be made to "The System for Award Management" website as a helpful resource).

a. Is not currently under suspension, debarment, voluntary exclusion or determination of ineligibility by any federal agency.

b. Has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past three years.

c. Does not have a proposed debarment or suspension pending.

d. Has not been indicted, convicted or had a civil judgment rendered against any of the listed parties by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

5.1 If there are any exceptions, the bidder shall submit the exceptions on company letterhead, signed by the bidder and inserted inside the bid submitted. Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted, the bidder shall indicate to whom it applies, the

initiating agency, and dates of action. Providing false information may result in criminal prosecution or administrative sanctions.

5.2 By signing the contract, the contractor shall further certify that all related subcontracts of $25,000 shall comply with this requirement. This includes all subcontractors, material suppliers and vendors.

6. Contractor's responsibility for subcontractors. The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for the acts and omissions of persons it directly employs. Contractor shall cause appropriate provisions to be inserted in all subcontracts relating to this work, to bind all subcontractors to Contractor by all the terms herein set forth, and insofar as applicable to the work of subcontractors and to give Contractor the same power regarding termination of any subcontract as the City may exercise over Contractor under any provisions of this contract. Nothing contained in this contract shall create any contractual relation between the subcontractor and the City or between any subcontractors.

7. General Independent Contractor Clause. This agreement does not create an employee/employer relationship between the parties. It is the parties' intention that the Contractor will be an independent contractor and not the City's employee for all purposes, including, but not limited to, the application of the Fair Labor Standards Act minimum wage and overtime payments, Federal Insurance Contribution Act, the Social Security Act, the Federal Unemployment Tax Act, the provisions of the Internal Revenue Code, Missouri Revenue and Taxation laws, Missouri Workers' Compensation and Unemployment Insurance laws. The Contractor will retain sole and absolute discretion in the judgment of the manner and means of carrying out the Contractor's activities and responsibilities hereunder. The Contractor agrees that it is a separate and independent enterprise from the public employer, that it has a full opportunity to find other business, that it has made its own investment in its business, and that it will utilize a high level of skill necessary to perform the work. This agreement shall not be construed as creating any joint employment relationship between the Contractor and the City, and the City will not be liable for any obligation incurred by the Contractor, including but not limited to unpaid minimum wages and/or overtime premiums.

8. Liquidated Damages. Time of completion of work by the Contractor is of the essence. Should Contractor, or in the case of default, the surety, fail to complete the work within the time specified in the contract, or within such extra time as may be allowed in accordance with City of Joplin Standard Specifications, Division 0000, General Requirements and Provisions, Section 0400.19, (http://mo-joplin.civicplus.com/DocumentCenter/View/3460) Contractor (or surety) shall be liable to the City in the amount of $____ per day for each and every calendar day that the contract remains uncompleted after the time allowed for completion, as liquidated damages, and not as a penalty, it being stipulated that actual damages to the City and the public arising from Contractor's failure to timely complete the work would be difficult, if not impossible, to ascertain. The amount assessed as liquidated damages may be withheld from any moneys otherwise due to Contractor from the City.

9. Termination. The City reserves the right to terminate this contract by giving at least five (5) days prior written notice to the Contractor, without prejudice to any other rights or remedies of the City should the Contractor be adjudged a bankrupt, or if Contractor should make a general assignment for the benefit of its creditors, or if a receiver should be appointed for Contractor or for any of its property, or if Contractor should persistently or repeatedly refuse or fail to supply enough properly skilled workmen or proper material, or if Contractor should refuse or fail to make prompt payment to any person supplying labor or materials for the work under the contract, or persistently disregard instructions of the City or fail to observe or perform any provisions of the contract.

10. City's Right to Proceed. In the event this contract is terminated pursuant to Paragraph 8, then the City may take over the work and prosecute the same to completion, by contract or otherwise, and Contractor and its sureties shall be liable to the City for any costs over the amount of this contract thereby occasioned by the City. In any such case, the City may take possession of, and utilize in completing the work, such materials, appliances and structures as may be on the work site and are necessary for completion of the work. The foregoing provisions are in addition to, and not in limitation of, the rights of the City under any other provisions of the contract, city ordinances, and state and federal laws.

11. Termination for Convenience of City. The City shall have the right at any time by written notice to Contractor to terminate and cancel this contract, without cause, for the convenience of the City, and Contractor shall immediately stop work. In such event City shall not be liable to Contractor except for payment for actual work performed prior to such notice in an amount proportionate to the completed contract price and for the actual costs of preparations made by Contractor for the performance of the cancelled portions of the contract, including a reasonable allowance of profit applicable to the actual work performed and such preparations. Anticipatory profits and consequential damages shall not be recoverable by Contractor.

12. Guards and Lights. The Contractor agrees that during the performance of said work, adequate barricades, guards and warning signs, lights or devices consistent with the requirements contained in the Manual on Uniform Traffic Control Devices shall be provided by Contractor during construction.

13. Liability and Indemnity.

a. In no event shall the City be liable to the Contractor for special, indirect, or consequential damages, except those caused by the City's gross negligence or willful or wanton misconduct arising out of or in any way connected with a breach of this contract. The maximum liability of the City shall be limited to the amount of money to be paid or received by the City under this contract.

b. The Contractor shall defend, indemnify and save harmless the City, its elected or appointed officials, agents and employees from and against any and all liability, suits, damages, costs (including attorney fees), losses, outlays and expenses from claims in any manner caused by, or allegedly caused by, or arising out of, or connected with, this contract, or the work or any subcontract thereunder (the Contractor hereby assuming full responsibility for relations with subcontractors), including, but not limited to, claims for personal injuries, death, property damage, or for damages from the award of this contract to Contractor, notwithstanding any possible negligence, whether sole or concurrent, on the part of the City, its officials, agents and employees.

c. The Contractor shall indemnify and hold the City harmless from all wages or overtime compensation due any employees in rendering services pursuant to this agreement or any subcontract, including payment of reasonable attorneys' fees and costs in the defense of any claim made under the Fair Labor Standards Act, the Missouri Prevailing Wage Law or any other federal or state law.

d. The indemnification obligations of Contractor hereunder shall not be limited by any limitations as to the amount or type of damages, compensation or benefits payable by or for the Contractor, under any federal or state law, to any person asserting the claim against City, its elected or appointed officials, agents and employees, for which indemnification is sought.

e. The indemnification obligations herein shall not negate, abridge or reduce in any way any additional indemnification rights of the City, its elected or appointed officials, agents and employees, which are otherwise available under statute, or in law or equity.

f. Contractor affirms that it has had the opportunity to recover the costs of the liability insurance required in this agreement in its contract price. Contractor's obligation under this agreement to defend, indemnify, and hold harmless any person from that person's own negligence or wrongdoing is limited to the coverage and limits of the applicable insurance required of the Contractor under this agreement.

g. The Contractor shall indemnify and hold the City harmless for any penalties, fines, fees or costs, including costs of defense, which are charged or assessed by any Federal, state or local agency including, but not limited to, Environmental Protection Agency or Department of Natural Resources.

14. Payment for Labor and Materials. The Contractor agrees and binds itself to pay for all labor done, and for all the materials used in the construction of the work to be completed pursuant to this contract.

15. Payment. The City will pay the Contractor in accordance with the rate set forth in the contract documents on file in the Public Works Department and by this reference made a part hereof, which shall constitute full and complete compensation for the Contractor's work provided hereunder. Such compensation will be paid in progress payments (less five (5) percent retainage), as established by the City, subject to receipt of a requisition for payment and a statement of work provided by the Contractor and agreement by both the City and the Contractor that the Contractor has fully performed the work to be paid for in such progress payments in conformance with the contract. If the City or the architect or engineer determines that a higher rate of retainage is required to ensure performance of the contract, the City may withhold up to ten (10) percent retainage until the work is fully completed and accepted by the City.

16. Contract Documents. The contract documents shall consist of the following:

a. This Contract
b. All Change Orders
c. Bid Plans and Specifications
d. City of Joplin Standard Specifications (Latest Revised Edition)
e. Special Conditions & Provisions

f. Proposal
g. Statement of Bidder's Qualifications
h. Acknowledgment
i. Performance Bond
h. Payment and Material Bond
k. Instructions to Bidders
l. Non-collusion Affidavit
m. Notice to Proceed

Notice to Contractors: This contract, together with the other documents enumerated in this paragraph, forms the contract between the parties. These documents are as fully a part of the contract as if attached hereto or repeated herein. The Contractor agrees to perform all of the work described in the contract documents and to comply with the terms and conditions defined therein for a total sum of ORIGINAL CONTRACT AMOUNT WRITTEN OUT ($) dollars, said amount being subject to any approved addenda or change order.

17. Subsurface Conditions. Contractor agrees that information contained in the published reports and public actions of the Missouri Division of Geology and Land Survey shall be conclusive and binding upon the Contractor as to what subsurface conditions at the job site are reasonably anticipated or reasonably foreseeable. Contractor acknowledges and agrees that it shall not be entitled to any adjustment in the Contract Sum or Contract Times for any concealed condition of any nature, including but not limited to unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, in addition to the information contained in the published reports and public actions of the Missouri Division of Geology and Land Survey. Contractor recognizes that it has assumed the risks of concealed conditions and is being compensated for assuming these risks.

18. Conflict of Interest. In accepting this contract, Contractor certifies that no member or officer of its firm or corporation is an officer or employee of the City of Joplin, Missouri, or any of its boards or agencies, and further that no officer or employee of the City has any financial interest, direct or indirect, in this contract. All applicable federal regulations and provisions of R.S.Mo. Section 105.450 et seq. shall not be violated.

19. Assignment. The Contractor shall not assign any interest in this contract, and shall not transfer any interest in the same (whether by assignment or novation), without prior written consent of the City thereto, provided, however, that claims for money due or to become due to the Contractor from the City under this Contract may be assigned to a bank, trust company, or other financial institution without such approval. Notice of such assignment or transfer shall be furnished in writing promptly to the City and the bond surety. Any such assignment is expressly subject to all rights and remedies of the City under this agreement, including the right to change or delete activities from the Contract or to terminate the same as provided herein, and no such assignment shall require the City to give any notice to any such assignee of any actions which the City may take under this agreement.

20. Nondiscrimination. The Contractor agrees in the performance of this contract not to discriminate on the ground or because of race, creed, color, national origin or ancestry, sex, religion, handicap, age, status as a protected veteran or status as a qualified individual with a disability, or political opinion or affiliation, against any employee of Contractor or applicant for employment and shall include a similar provision in all subcontracts let or awarded hereunder. The parties hereby incorporate the requirements of 41 C.F.R. §§ 60-1.4(a)(7), 29 C.F.R. Part 471, Appendix A to Subpart A, 41 C.F.R. § 60-300.5(a)ii and 41 C.F.R. § 60-741.5(a), if applicable.

a. This contractor and subcontractor shall abide by the requirements of 41 C.F.R. § 60-300.5(a). This regulation prohibits discriminations against qualified protected veterans and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans.

b. This contractor and subcontractor shall abide by the requirements of 41 C.F.R. § 60-741.5(a). This regulation prohibits discrimination against qualified individuals on the basis of disability and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified individuals with disabilities.

21. Nonresident/Foreign Contractors. The Contractor shall procure and maintain during the life of this contract:

a. If the Contractor is a foreign corporation, a certificate of authority to transact business in the State of Missouri from the Secretary of State, unless exempt pursuant to the provisions of Section 351.570 R.S.Mo.

b. A certificate from the Missouri Director of Revenue evidencing compliance with the transient employer financial assurance law, unless exempt pursuant to the provisions of Section 285.230 RSMo.

22. Notices. All notices required or permitted hereinunder and required to be in writing may be given by FAX or by first class mail addressed to City and Contractor at the addresses shown above. The date of delivery of any notice given by mail shall be the date falling on the second full day after the day of its mailing. The date of delivery of notice by FAX transmission shall be deemed to be the date transmission occurs, except where the transmission is not completed by 5:00 p.m. on a regular business day at the terminal of the receiving party, in which case the date of delivery shall be deemed to fall on the next regular business day for the receiving party.

23. Records and Audits. The Contractor shall maintain accounts and records, including personnel, property, and financial records, adequate to identify and account for all costs pertaining to the Contract and such other records as may be deemed necessary by the City to assure proper accounting for all project funds. These records will be made available for audit purposes to the City or any authorized representative and will be retained for three years after the expiration of this Contract.

24. Authorized Employees. Contractor acknowledges that Section285.530, RSMo, prohibits any business entity or employer from knowingly employing, hiring for employment, or continuing to employ an unauthorized alien to perform work within the State of Missouri. Contractor therefore covenants that is not knowingly in violation of subsection 1 or Section 285.530, RSMo, and that it will not knowingly employ, hire for employment, or continue to employ any unauthorized aliens to perform work on the Project, and that its employees are lawfully to work in the United States.

25. Interest of Contractor and Employees. The Contractor covenants that he/she presently has no interest and shall not acquire interest, direct or indirect, in the study area or any parcels therein or any other interest which would conflict in any manner or degree with the performance of his services hereunder. The Contractor further covenants that in the performance of this Contract, no person having any such interest shall be employed.

26. Interest of Members of a City. No member of the governing body of the City and no other officer, employee, or agent of the City who exercises any functions or responsibilities in connection with the planning and carrying out of the program, shall have any personal financial interest, direct or indirect, in this Contract, and the Contractor shall take appropriate steps to assure compliance.

27. Interest of Other Local Public Officials. No member of the governing body of the locality and no other public official of such locality, who exercises any functions or responsibilities in connection with the planning and carrying out of the program, shall have any personal financial interest, direct or indirect, in this Contract, and the Contractor shall take appropriate steps to assure compliance.

28. Affidavit for Contracts Over $5,000.00. That pursuant to Missouri Revised Statute Sections 285.525 through 285.550, if this contract exceeds the amount of $5,000.00 and Contractor is associated with a business entity, Contractor shall provide an acceptable notarized affidavit stating that the associated business entity is enrolled in and participates in a federal work authorization program with respect to the employees working in connection with the contracted services, and that said business entity does not knowingly employ any person who is an unauthorized alien in connection with the contracted services. Additionally, Contractor must provide documentation for said business entity evidencing current enrollment in a federal work authorization program.

29. City Benefits. The Contractor shall not be entitled to any of the benefits established for the employees of the City nor be covered by the Worker's Compensation Program of the City.

30. Occupational License: The Contractor shall obtain and maintain an occupational license with the City of Joplin, Missouri, if required by city code and any required state or federal license. The cost for this occupational license shall be borne by the Contractor. No contract will be executed by the City until this occupational license has been obtained and that the Contractor is current on any City taxes is verified.

31. Safety Training. Pursuant to Missouri Revised Statute Section 292.675, Contractors and subcontractors who sign a contract to work on public works projects must provide a 10-hour OSHA construction safety program, or similar program approved by the Department of Labor and Industrial Relations, to be completed by their on-site employees within sixty (60) days of beginning work on the construction project. Contractors and subcontractors in violation of this provision will forfeit to the public body $2,500 plus $100 a day for each employee who is employed without training. Public bodies and contractors may withhold/assess these penalties from the payment due to those contractors and subcontractors if found to be in non-compliance.

32. Compliance with Laws. Contractor agrees to comply with all applicable federal, state and local laws or rules and regulations applicable to the provision of services and products hereunder. Contractor affirmatively states that payment of all local, state, and federal taxes and assessments owed by Contractor is current.

33. Entire Agreement. This agreement contains the entire agreement of the parties. No modification, amendment, or waiver of any of the provisions of this agreement shall be effective unless in writing specifically referring hereto, and signed by both parties.

34. Remedies. Except as may be otherwise found in the contract documents, all claims, disputes, counter-claims, and other matters in question between the Owner and Contractor arising out of or related to this agreement or the breech thereof, will be decided by arbitration if the parties hereto mutually agree, or in a court of competent jurisdiction within the state in which the Owner is located.

35. Jurisdiction. This agreement and every question arising hereunder shall be construed or determined according to the laws of the State of Missouri. Should any part of this agreement be adjudicated, venue shall be proper only in the Circuit Court of Jasper County, Missouri.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals on the day and year herein stated.

CERTIFICATE OF DIRECTOR OF FINANCE

I certify that the expenditure contemplated by this document is within the purpose of the appropriation to which it is to be charged and that there is an unencumbered balance of appropriated and available funds to pay therefor.

_____

Leslie Haase, Director of Finance

APPROVED AS TO FORM

_____

Peter Edwards, City Attorney

CONTRACTOR:

By: _____

Printed Name: _____

Title: _____

CITY OF JOPLIN, MISSOURI

By: _____

Daniel Johnson, P.E.
Public Works Director

CONTRACTOR'S BOND NO.
FOR CITY CONTRACTS

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: That

Contractor

a Corporation, hereinafter called Principal, and

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

THE CITY OF JOPLIN, MISSOURI
620 S. MAIN STREET, JOPLIN, MO 64801

hereinafter called OWNER, in the total aggregate penal sum of XXXXXXXXXXXXX and no/100 Dollars ($XXX,000.00) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part hereof for the construction of:

CONNECTICUT AVENUE WIDENING
32ND STREET TO I-44 BRIDGE
PROJECT NO. TC0606

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, or any extensions thereof, which may be granted by the OWNER, with or with-out notice to the SURETY and during the one year guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed

thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment of the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

IN WITNESS, whereof, this the _____ day of _____, 20____.

ATTEST: (SEAL)

_____ _____
Secretary Principal

Approved as to form this _____ day

of _____, 20____. By _____

_____ By _____
City Attorney

ATTEST: (SEAL)

_____ _____
Secretary Surety

Approved this _____ day of

_____, 20_____. By _____

_____ By _____
Director of Finance (Title)

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

CONTRACTOR'S BOND NO.
FOR CITY CONTRACTS

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That

Contractor

a Corporation, hereinafter called Principal, and

_____

(Name of Surety)

hereinafter called Surety, are held and firmly bound unto

THE CITY OF JOPLIN, MISSOURI
602 S. MAIN STREET, JOPLIN, MO 64801

hereinafter called OWNER, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns in the total aggregate penal sum of XXXXXXXXXXXXXXXXX and no/100 Dollars ($XXX,000.00)in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the principal entered into a certain contract with the OWNER, dated the _____ day of _____, 20___, a copy of which is hereto attached and made a part hereof for the construction of:

CONNECTICUT AVENUE WIDENING
32ND STREET TO I-44 BRIDGE
PROJECT NO. TC0606

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal or coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, all insurance premiums on said work, and for all labor cost incurred in such WORK including the stipulation in said contract requiring the payment of not less than the prevailing hourly rate of wages as found by the Department of Labor and Industrial Relations of the State of Missouri or by final judicial determination of the Courts of the State of Missouri, including that by a SUBCONTRACTOR, and to any mechanic or material man lien holder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, any persons, firms, and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no suit or action shall be commended hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL, shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need to be made by a public officer. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, it being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction thereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract or the loan documents shall include any alteration, addition, extension or modification of any character whatsoever.
PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS, whereof, this the _____ day of _____, 20____.

ATTEST: (SEAL)

_____ _____
Secretary Principal

Approved as to form this _____ day
of _____, 20____. By _____

_____ By _____
City Attorney

ATTEST: (SEAL)

_____ _____
Secretary Surety

Approved this _____ day of

_____, 20____. By _____

_____ By _____
Director of Finance (Title)

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

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Bartlett & West

STATE OF _____)
)SS
COUNTY OF _____)

AFFIDAVIT
(as required by Section 285.530, Revised Statues of Missouri)

As used in this Affidavit, the following terms shall have the following meanings:

EMPLOYEE: Any person performing work or service of any kind for hire within the State of Missouri.

FEDERAL WORK AUTHORIZATION PROGRAM: Any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or an equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, under the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603.

KNOWINGLY: A person acts knowingly or with knowledge,

(a) with respect to the person's conduct or to attendant circumstances when the person is aware of the nature of the person's conduct or that those circumstances exist; or
(b) with respect to a result of the person's conduct when the person is aware that the person's conduct is practically certain to cause that result.

UNAUTHORIZED ALIEN: An alien who does not have the legal right or authorization under federal law to work in the United States, as defined in 8 U.S.C. 1324a(h)(3).

BEFORE ME, the undersigned authority, personally appeared _____ _____, who, being duly sworn, states on his oath or affirmation as follows:

1. My name is _____ and I am currently the _____ of _____(hereinafter "Contractor", whose business address is _____ and I am authorized to make this Affidavit.

2. I am of sound mind and capable of making this Affidavit and am personally acquainted with the facts stated herein.

3. Contractor is enrolled in and participates in a federal work authorization program with respect to the employees working in connection with the following services contracted between Contractor and the City of Joplin.

4. Contractor does not knowingly employ any person who is an unauthorized alien in connection with the contracted services set forth above.

5. Attached hereto is documentation affirming Contractor's enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services.

Further, Affiant sayeth not.

Affiant

Subscribed and sworn to before me this _____ day of _____, 2023.

Commission #

CERTIFICATION BY PROPOSED BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS:

The certification is required pursuant to Executive Order 11246 (30 F.R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the subcontractor has not filed a compliance report due under applicable instructions, such subcontractor shall be required to submit a compliance report before the owner approves the subcontract or permits work to begin under the subcontract.

BIDDER'S CERTIFICATION

NAME AND ADDRESS OF SUBCONTRACTOR (Include ZIP Code):

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

   ☐YES ☐NO

2. Compliance reports were required to be filed in connection with such contract or subcontract.

   ☐YES ☐NO

3. Bidder has filed all compliance reports due under applicable instructions.

   ☐YES ☐NO

4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended?

   ☐YES ☐NO

NAME AND TITLE OF SIGNER (Please type):

SIGNATURE DATE

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Bartlett & West

CERTIFICATION REGARDING GOVERNMENT-WIDE
WAIVER AND RELEASE OF LIEN

WHEREAS, the undersigned, _____
(Name of Manufacturer, Materialman, or Subcontractor)

has furnished to _____ the following:
(Name of Contractor)

_____
(Kind of Material & Services Furnished)

_____ for use in the construction of a project

belonging to the City of Joplin, Missouri .

NOW, THEREFORE, the undersigned, _____
(Name of Manufacturer, Materialman, or Subcontractor)

_____ for and in consideration of $_____

and other good and valuable consideration, the receipt whereof is hereby acknowledged, do(es) hereby waive and release any and all liens or right to or claim of lien, on the above-described project and premises, under any law, common or statutory, on account of labor or materials, or both, heretofore or hereafter furnished by the undersigned to or for the account of said:

_____for said Project.
(Name of Contractor)

Given under my (our) hand(s) and seal(s) this ____ day of _____, 20_____.

_____
(Name of Manufacturer, Materialman, or Subcontractor)

By: _____
President, Vice President, Partner, or Owner, or, if signed by other than one of the foregoing, accompanied by Power of Attorney, signed by one of the foregoing in favor of the Signer. (Use designation applicable)

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Bartlett & West

CERTIFICATE OF CONTRACTOR

_____ certifies that he/she is the _____
(Title)

of _____, the Contractor,
(Name of Contractor) (Address)

in a Contract dated _____, 20____, entered into between the Contractor and

City of Joplin, Missouri 602 South Main Street, Joplin, Missouri 64801,
(Name of Owner) (Address)

the Owner for the construction of:

Project:
Connecticut Avenue Widening
32nd Street to I-44 Bridge
Project No. TC0606

and that he/she is legally authorized to and does make this certificate on behalf of said Contractor.

The undersigned, further certifies; (1) that all persons who have provided labor for the above-named Project, have been paid in full in accordance with rates for wages applicable to the Project, and (2) that the names of subcontractors and others providing labor for the Project, and the kind or kinds of services so provided are listed on the attached Subcontractor Disclosure Form and are attached hereto; and that a Final Waiver of Lien executed by each and all suppliers, materialmen, subcontractors and others providing materials and/or services has been obtained and delivered to the Owner.

By_____

Date_____

For_____

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Bartlett & West

STATE OF MISSOURI PREVAILING WAGE LAW AND RULES

Prevailing hourly rates of wages shown on the following annual wage order are hereby incorporated in the contract specifications and made a part thereof. Contractor's attention is particularly called to the Performance-Payment Bond form that includes provisions that will guarantee his faithful performance of the prevailing hourly wage requirements of the contract.

The Contractor shall be required to submit a certified copy of all weekly payrolls to the Owner and Engineer showing that the classification of workmen and the hourly wage rates being paid fully comply with the Wage Determination for the project.

The Contractor shall cause to be displayed a complete copy of the Wage Determination for the project as set forth in the Prevailing Wage Law.

Prior to Final Acceptance of the Project, the CONTRACTOR shall obtain and deliver in duplicate to the OWNER, through the ENGINEER, notarized Affidavits of Compliance With the Prevailing Wage Law, in the form attached hereto, from the CONTRACTOR and all subcontractors furnishing services for the Project.

AFFIDAVIT OF
COMPLIANCE WITH THE PREVAILING WAGE LAW

Before me, the undersigned Notary Public, in and for the County of _____ State of Missouri, personally came and appeared

_____
(Name) (Position)

of the _____
(Name of the Company)

(A corporation) (a partnership) (a proprietorship) and after being duly sworn, did depose and say that all provisions and requirements set out in Chapter 290, Sections 290.210 through and including 290.340, Missouri Revised Statutes, pertaining to the payment of wages to workmen employed on public works projects have been fully satisfied and there has been no exception to the full and complete compliance with said provisions and requirements with Wage Determination No(s). issued by the Division of Labor Standards on the day of _____, 20____. in carrying out the contract and work in connection with the construction of

Project:
Connecticut Avenue Widening
32nd Street to I-44 Bridge

in the City of Joplin, Missouri, in Jasper County, Missouri, and completed on the _____ day of _____, 20_____.

_____
(Signature)

Subscribed and sworn to me this _____ day of _____, 20____.

My Commission expires: _____.

_____
Notary Public

Missouri
Division of Labor Standards
WAGE AND HOUR SECTION

MICHAEL L. PARSON, Governor

Annual Wage Order No. 30

Section 073
NEWTON COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by
Todd Smith, Director
Division of Labor Standards

Filed With Secretary of State: **March 10, 2023**

Last Date Objections May Be Filed: **April 10, 2023**

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Asbestos Worker	$27.82
Boilermaker	$28.27*
Bricklayer	$50.94
Carpenter	$43.86
Lather	
Linoleum Layer	
Millwright	
Pile Driver	
Cement Mason	$34.46
Plasterer	
Communications Technician	$28.27*
Electrician (Inside Wireman)	$47.04
Electrician Outside Lineman	$28.27*
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Elevator Constructor	$28.27*
Glazier	$28.27*
Ironworker	$28.27*
Laborer	$39.33
General Laborer	
First Semi-Skilled	
Second Semi-Skilled	
Mason	$28.27*
Marble Mason	
Marble Finisher	
Terrazzo Worker	
Terrazzo Finisher	
Tile Setter	
Tile Finisher	
Operating Engineer	$45.58
Group I	
Group II	
Group III	
Group III-A	
Group IV	
Group V	
Painter	$28.27*
Plumber	$49.13
Pipe Fitter	
Roofer	$41.52
Sheet Metal Worker	$49.42
Sprinkler Fitter	$28.27*
Truck Driver	$28.27*
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. The public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.
**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title as defined in RSMO Section 290.210.

Heavy Construction Rates for
NEWTON County

Section 073

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Carpenter	$28.27*
Millwright	
Pile Driver	
Electrician (Outside Lineman)	$28.27*
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Laborer	$44.79
General Laborer	
Skilled Laborer	
Operating Engineer	$51.73
Group I	
Group II	
Group III	
Group IV	
Truck Driver	$28.27*
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title.

OVERTIME
and
HOLIDAYS

OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, **"overtime work"** shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

LAND DISTURBANCE
STORM WATER POLLUTION
PREVENTION PLAN
(SWPPP)

FOR
EARTHWORK CONSTRUCTION OF:

CITY OF JOPLIN
JOPLIN, MISSOURI

Prepared for:
CITY OF JOPLIN, MISSOURI

Original SWPPP Template Prepared
July 2009

Original SWPPP Template Prepared by:
ALLGEIER, MARTIN and ASSOCIATES, INC.
Consulting Engineers
Joplin, Missouri

LAND DISTURBANCE
STORM WATER POLLUTION
PREVENTION PLAN
(SWPPP)
FOR CONSTRUCTION OF:

Prepared for

CITY OF JOPLIN, MISSOURI

Original SWPPP Template Prepared
July 2009

Original SWPPP Template Prepared by

ALLGEIER, MARTIN and ASSOCIATES, INC.
Consulting Engineers
Joplin, Missouri

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)
FOR
LAND DISTURBANCE CONSTRUCTION OF:

_____

FOR THE
CITY OF JOPLIN
JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

I. SITE DESCRIPTION

Project Location – The project location governed by this SWPPP is: Approximately the public right of way of Connecticut Ave, between 32nd and I-44
Located in the City of Joplin, Missouri. The number and location of outfalls are: Refer to plans for outfalls

The receiving stream/streams are: Unnamed tributary to Shoal Creek

Project Owner – CITY OF JOPLIN
602 S Main Street
Joplin, Missouri, 64801

Site Area = The total project area is comprised of approximately 8.0 acres.

Proposed disturbed area = Approximately 8.0 acres.

Site Runoff Coefficients, C
Prior to Proposed Construction & Improvements = 0.50
Estimated Weighted Average After Improvements = 0.58

The site earthwork construction activities for the Connecticut Ave Widening Project project will consist of: Project will include curb and gutter, storm sewer, 10 foot wide ADA - compliant trail on the west side, and a 6 foot wide ADA - compliant sidewalk on the east side of Connecticut Ave.

Final grading and the preparation of the seedbed for vegetative restoration will follow these activities.

Prior to, and/or in conjunction with, the establishment of the construction site entrance and access roads will be the placement of the filter fabric silt fencing and/or straw bale barriers (as required) down gradient of those areas of vegetation and root zone disturbance activities. In addition, any areas of the site that pose a potential for off-site migration of sediment shall be protected with whatever means necessary to prevent sediment from leaving the site, as site-specific conditions may require. Inspection and maintenance of the filter fabric silt fences, any straw bale barriers and /or straw wattles, vegetated buffer areas, and any other Best Management Practices (BMPs) shall continue throughout the term of the project until a permanent vegetative cover is re-established (as defined) and the Notice of Termination (NOT) of the permit is received from the Missouri Department of Natural Resources (MDNR). Care shall be exercised to limit the disturbance of current vegetated areas to the smallest amount possible for the planned development of the site.

II. SEQUENCE OF CONSTRUCTION ACTIVITIES

The area of the proposed project will be excavated, graded, and constructed, per the plans and specifications. Prior to the initial soil disturbance activities, the installation of the temporary BMPs including installation of the filter fabric silt fencing, and any straw bale barriers (as may be required), will be installed at the location shown on the SWPPP drawing prior to major soil disturbance activities for storm water runoff sediment control, and to retain sediment on the site and out of the drainage structures and streams. Additional Temporary BMPs shall be installed, including, but not limited to, additional silt fencing, straw bale barriers and/or straw wattles, or possible check dams as site-specific conditions may require.

The proposed general sequence of construction activities for the project is as follows:

1. Establish the construction entrance/exit drive at the site with the location(s) to be determined by the contractor. Stabilize and maintain the construction entrance/exit drive with a minimum 50 ft long, minimum 6" thick layer of 3" to 5" clean, washed and graded, crushed rock, placed over a geotextile filter material, for control of vehicle tracking of sediments off-site and on to the public roadways as shown on the SWPPP drawing.

2. Removal of any trees as needed for the earthwork construction activities. Soil disturbances shall be minimized during this process.

3. Placement of filter fabric silt fencing, and/or straw bale barriers/straw wattles, as required, at the locations shown on the SWPPP drawing, and any other additional areas where site conditions may require to prevent erosion and sediment losses with storm water runoff from the site during the earthwork activities. Installation of these items shall be accomplished prior to, and during the turf and soil disruptions caused by the excavation, filling, grading and construction activities.

4. Clear and grub all areas as required for the earthwork construction of the site in preparation for the project, as shown on the construction drawings. Existing vegetation will be preserved wherever practical. Filter fabric silt fencing shall be installed at the locations shown on the SWPPP drawing prior to the initiation of earthwork construction of the site.

5. Project Construction.

6. Following seedbed preparation of disturbed areas, apply seed, fertilize, mulch, etc. in areas where final construction has been completed, and maintain until permanent vegetation is re-established per this SWPPP, and in compliance with the conditions of the Storm Water Discharge General Permit issued by the MDNR.

7. Temporary seeding and mulching of disturbed areas shall be performed, as necessary, to prevent erosion and sediment loss during the construction activities prior to permanent seeding of the disturbed areas.

All additional construction activities to be completed during this project are as follows:

_____

_____

_____

_____

_____

Best Management Practices (BMPs) including establishment of the rock stabilized construction equipment entrance/exit, placement of filter fabric silt fence, any straw bale silt barriers, temporary seeding and any other measures to prevent erosion of the soils and sediment movement off-site shall be implemented prior to the land disturbance activities. Inspection, maintenance, repair, and upkeep of all BMPs throughout the construction project to achieve compliance with the conditions of the National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit issued by the MDNR, and this SWPPP is, and will be, considered a major concern and part of the project. All conditions of the NPDES permit and this SWPPP shall be strictly adhered to throughout the project, as required.

III. POLLUTION CONTROL – BEST MANAGEMENT PRACTICES (BMPs)

1. Erosion and Sediment Abatement Control

A. Soil Stabilization Practices

1) Temporary Practices: Topsoil stockpiles and areas of the site where daily construction activities will temporarily cease for longer than 21 days will be stabilized using silt fencing, or covered to prevent erosion within 14 days. The contractor shall cause the location of topsoil stockpile to be noted and indicated on the SWPPP drawing.

2) Permanent Restoration: Disturbed portions of the site area affected by the construction shall be seeded for permanent vegetative restoration of turf per the contract plans and specifications or this SWPPP. All areas disturbed during construction shall be fertilized, seeded, and mulched.

Seeding/Fertilizer/Mulch – Light disking or other similar means shall properly prepare seedbeds. Disturbed portions of the site area affected by the improvements shall be seeded for vegetative restoration of turf per the specifications, or as follows. All areas disturbed during construction shall be fertilized, seeded, and mulched. Seed shall be as called for in the specifications, or a mixture of eighty percent (80%) K31 Fescue, fifteen percent (15%) Korean Lespedeza, and five percent (5%) wheat by weight applied at the rate of 130 pounds of seed mix per acre. Seed shall be applied by drilling or by broadcast application. Broadcast applications shall be lightly disked and rolled immediately following application of the seed. In either method, the seed shall be planted to the proper depth. Fertilizer shall be as called for in the specifications, or a commercial fertilizer, having an analysis of 12-12-12 (12 percent nitrogen, 12 percent phosphorous, and 12 percent potassium). Fertilizer shall be applied evenly and incorporated into the soil at the rate as called for in the specifications, or 20 pounds per 1,000 square feet, or per the manufactures instructions. The vegetative mulch shall be the cereal straw from oats, rye, wheat, or barley. The straw shall be free of prohibited weed seeds, as applicable under state seed law, and shall be relatively free of other noxious and undesirable seeds. The straw shall be clean and bright, relatively free of foreign material and applied at the rate of 2-1/2 tons per acre, or as called for in the specifications. The operation of seeding and mulch cover placement shall be accomplished not later than 14 days from the date final construction activities cease.

Erosion Control Mat – Biodegradable erosion control mats shall be installed (as needed) along steeper slopes, bottom of ditches, and elsewhere if shown on the SWPPP drawing and/or as needed, or as directed by the Resident Project Representative in accordance with the manufacturer's instructions. The mats shall be constructed with straw or recycled cellulose products and strengthened with a netting of polypropylene or natural fibers. Mats shall have a recommended life of at least ten months. Contractor shall apply fresh seed at above stated fescue seed mix rate prior to placement of the erosion control mats.

Slopes and seedbed areas shall be properly prepared, fertilized and seeded prior to installation of the mats. Mats shall be anchored with hardwood or biodegradable pins in accordance with the manufacturer's recommendations. (* Staple Pattern B minimum) Metal pins are not acceptable and shall not be used.

Erosion control mats shall be S150BN manufactured by North American Green or an approved equal.

B. Structural Element Practices

1) Filter Fabric Silt Fence: Temporary filter fabric silt fencing shall be installed along and downgradient of the disturbed areas as shown on the SWPPP drawing and in additional areas as needed, prior to and in conjunction with the construction of the improvements. The placement of the silt fencing shall be effective in the prevention of major sediment movement from the site. All filter fabric silt fencing shall be maintained throughout the construction and until final vegetation is restored, and Notice of Termination of the permit is received.

2) Straw Bale Barrier: Temporary straw bale barriers shall be strategically placed at the site as shown on the SWPPP drawing and at additional locations as necessary according to site specific terrain requirements, as a control measure to contain and prevent major sediment runoff from the project site as needed.

3) The construction entrance/exit drive shall be rock stabilized with a minimum 6" thick, 3" to 5" crushed rock over a geotextile filter material to prevent construction vehicles from transporting, tracking and/or dropping mud and/or sediment onto the public road as needed. Any and all other established entrance/exit roads on/site shall be kept clear and clean of any and all sediment to prevent tracking to public roads. This may require daily sweeping.

A descriptive reference for the proper installation of the filter fabric silt fences, straw bale barriers, and the construction entrance/exit is provided in the Appendices and on the drawing of this SWPPP.

2. Waste Disposal

A. Construction Waste/Trash/Solid Waste – Any and all waste materials (except hazardous waste–see paragraph III.2.B. below) generated during the project will be collected as needed and removed from the site daily or placed and stored in a metal dumpster rented from a solid waste management company licensed to operate in the City of Joplin or owned by the contractor or the owner. The dumpster(s) shall meet all local and State solid waste management regulations. The contractor shall cause the location of solid waste containers placed on the site to be noted and indicated on the SWPPP drawing. All trash and construction debris from the site will be deposited in the dumpster(s) as appropriate. The dumpster(s) will be emptied approximately once per week, or more often if necessary. No construction waste materials will be buried on site. All brush, trees and refuse shall be removed or disposed of by burning (if permitted). Open burning of tree trunks, tree limbs, and vegetation from land clearing operations is allowed only in the outstate area of Missouri if the burning takes place outside the city limits of any incorporated area or municipality. Materials such as tires or waste oil may not be used to start the fires or be burned in the fires. Missouri State Regulations prohibit open burning of any waste generated by a business, trade, industry, or any demolition operation including, but not limited to paper, cardboard boxes, pallets, tires, rubber products, hazardous materials, styrofoam, plastics, petroleum products, treated wood and any asbestos-containing material. Any burning operations shall be in strict compliance with the requirements of all applicable statutes and regulations. Prior to conducting any open burning, the contractor shall contact the appropriate city or county of jurisdiction for any local restrictions or permit requirements. Burning operations shall not constitute a nuisance to persons living nearby, shall be kept away from all property lines and at least 200 yards from the nearest inhabited dwelling, as well as transmission and distribution lines and shall be carefully controlled to prevent any damage to adjacent properties and facilities. Burn pit refuse shall be cleaned out and disposed of off-site. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted on site, as necessary. The contractor shall cause any and all burning locations to be shown on the SWPPP drawing.

B. Hazardous Waste – Any and all hazardous waste materials will be disposed of in the manner specified by local, state and/or federal regulations, or per instructions by the manufacturer. Site personnel will be instructed in these practices, and the individual who manages day-to-day site operations will be responsible for seeing that these practices are followed.

C. Sanitary Waste – The General Contractor is responsible for providing sanitary facilities on the site, as needed, should use of any permanent facilities not be available. The contractor shall cause the location of portable toilet facilities placed on the site to be noted and indicated on the SWPPP drawing. All sanitary waste will be collected from the portable units (if provided) a minimum of one time per week (or as needed) by a licensed sanitary waste management contractor, or as required by local regulation and disposed of only in locations having a State permit.

3. Offsite Vehicle Tracking

A stabilized construction site entrance/exit will be established and maintained to help reduce tracking of any sediment off-site and onto the adjacent and adjoining roadways. Care shall be taken to ensure that adequate rock aggregate is in place at all times at the entrance to minimize offsite tracking as discussed above in Section III.1.B.3 of this SWPPP.

IV. MAINTENANCE/INSPECTION PROCEDURES

1. Inspection Schedule

A. All control measures **SHALL** be inspected at least once a week, or as required by the issued storm water discharge permit, prior to a known major storm event, and within a reasonable time, not to exceed 24 hours, following any storm event of 0.5 inches or greater. The contractor is responsible for completing all inspection and maintenance forms, and providing same to the owner.

2. Maintenance of Sediment Control Measures

A. All storm water runoff sediment control measures will be maintained in good working order. Maintenance and repair (if necessary) shall be initiated within 24 hours of being reported.

B. Sediment built up shall be removed from the filter fabric silt fence barriers when it has reached one-third the height of the barrier or sooner.

C. All filter fabric silt fences will be inspected for depth of sediment and for fabric tears and to ensure the fabric is securely attached to the fence posts, and that the fence posts are firmly in the ground.

D. Any and all earthen berms and sedimentation basin dams shall be inspected for damage and erosion and repaired if necessary.

E. Any and all vegetation/rock check dams shall be replenished or replaced when the void space has become filled with silt and sediment to the point it is no longer functional.

F. Straw bales shall be inspected for damage and anchor integrity and replaced and/or re-anchored, if necessary. Sediment built up shall be removed from the straw bale barriers when it has reached one-third the height of the barrier or sooner, as required.

G. All temporary seeding shall be inspected for bare spots, washouts, and healthy growth. Re-seeding will be accomplished as necessary.

H. A maintenance inspection report shall be completed during each inspection. A copy of the inspection and report forms to be completed by the inspector is included in the Appendix.

I. The contractor will be responsible for inspections, completion of the inspection and maintenance reports, and all maintenance and repair activities. The contractor shall provide the owner with copies of all required reports in a timely manner.

J. The contractor shall name an individual as the Environmental Manager for the site for inspection and maintenance responsibilities. The individual shall be trained and knowledgeable in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls (BMPs) used on the site in good working order. The contractor shall cause the name of the Environmental Manager to be to be noted and indicated in the space provided on the SWPPP drawing.

3. Non-Storm Water Discharges

A. It is expected the following non-storm water discharges may occur from the site.

1) Wash waters from construction equipment and finished pavement (where no spills or leaks of toxic or hazardous materials have occurred.)
2) Water sprinkling for dust control.

V. SPILL PREVENTION - SITE MANAGEMENT BMPs/MMPs

The following are the material management practices (MMPs) that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.

1. Good Housekeeping Practices

A. The contractor shall make a concerted effort to store only enough of each product on site required to do the job. The contractor shall cause the location of storage areas on the site to be noted and indicated on the SWPPP drawing.

B. Any and all materials stored on site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a cover or other enclosure for protection from precipitation and located away from drainage courses and low areas.

C. Any and all materials and products will be stored and maintained in their original containers with the original manufacturer's label.

D. Substances will not be mixed with one another unless recommended by the manufacturer.

E. Whenever possible, all of a product will be used up before disposing of the container.

F. Manufacturers' recommendations for proper use and disposal will be followed at all times for all materials and products.

G. The contractors' site superintendent, or his designated appointee, will visually inspect the job site daily to ensure proper use and/or disposal of all materials on site.

2. Hazardous Products - Storage, Handling, Use, & Disposal Practices

The contractor shall cause the location of any and all hazardous materials/hazardous products placed on the site to be noted and indicated on the SWPPP drawing. These practices are used to reduce the risks associated with hazardous materials:

A. Any and all products will be kept in original containers unless they are not re-sealable. Otherwise they should be transferred to re-sealable containers for storage and properly marked, indicating the contents.

B. Original labels and material safety data sheets (MSDSs) will be retained on site, as they contain important product information.

C. If surplus product must be disposed of, manufacturers' and local, state and/or federal recommended methods for proper disposal will be followed.

D. Fuels, oils, lubricants, solvents, or other hazardous materials shall NOT be disposed of on the site. All hazardous material must be properly stored, used and disposed in accordance with State and Federal laws and regulations. Drip pans will be provided for any valves on storage containers, as appropriate. For further guidance, contact MDNR at 1-800-361-4827.

3. Product Specific Practices

The following product specific practices will be followed on site:

A. Petroleum Products - All on-site vehicles and equipment will be monitored for leaks, and will receive regular preventive maintenance to reduce the chance of leakage. Any and all petroleum products on site will be stored in tightly sealed containers that are clearly labeled and provided with drip pans, if appropriate. Any asphalt substances used on site will be applied according to the manufacturer's recommendations. Any fuel storage tanks located on-site shall be provided with adequate secondary containment. Drip pans will be provided for all valves. If greater than 1320 gallons of oil is stored on the site, the contractor is responsible for providing and maintaining a SPCC (Spill Prevention, Control, and Countermeasures) plan on site. The contractor shall cause the location of any petroleum product storage areas on the site to be noted and indicated on the SWPPP drawing.

B. Fertilizers - Fertilizers will be applied only in the minimum amounts previously stated. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage of fertilized will be inside or under cover. The contents of any partially used bags of fertilizer will be transferred to a properly labeled, sealable plastic bin or container to avoid spills. The contractor shall cause the location of any fertilizer product storage area on the site to be noted and indicated on the SWPPP drawing.

C. Paints/Solvents/Cleaning Compounds, Etc. - All containers will be tightly sealed and stored when not required for use. Drip pans will be provided, if appropriate. Excess materials will NOT be disposed or dumped on site, but will be properly disposed of according to manufacturer's instructions and/or Federal, State, and local regulations. The contractor shall cause the location of any paints/solvents/cleaning compounds, etc. storage areas on the site to be noted and indicated on the SWPPP drawing.

D. Concrete Trucks - Concrete trucks shall be allowed to wash out only in locations where the discharge will remain on-site, and in a manner that prevents contact with storm water runoff. It is not permissible to discharge concrete truck washout directly to streams or storm drains.

E. Mud/Sediment Offsite Tracking - Only the designated entrance(s) shall be used for contractor access to, and exit from, the site. The General Contractor will be responsible for keeping all mud and off-site tracking cleaned from the adjoining public road, on a daily basis if needed.

4. Spill Control Practices

The contractor is responsible for providing and maintaining a SPCC (Spill Prevention Control and Countermeasures) plan on site, as required by the regulations at 40 CFR 112. In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

A. Manufacturer's recommended methods for spill cleanup will be clearly posted, and site personnel will be made aware of the procedures and the location of the information and cleanup supplies. Refer to manufacturer's MSDSs.

B. Materials and equipment necessary for spill cleanup will be kept in a designated material storage area on site. The contractor shall cause the location of the spill clean up materials and equipment to be noted and indicated on the SWPPP drawing. Spill cleanup equipment and materials will include, but not be limited to, shovels, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and/or metal trash containers specifically for this purpose, as applicable.

C. All spills will be cleaned up immediately after discovery and properly containerized for proper disposal. Burial on site is not acceptable and shall not be allowed.

D. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

E. Reportable quantities for spills of toxic or hazardous material will be promptly reported to the appropriate Federal, State and local government agencies, as required, including the McDonald County Local Emergency Planning Committee (LEPC) and others listed on the enclosed "Spill/Release Information and Reporting Form". Reportable quantities for oil and hazardous substances are found at 40 CFR 110, 117, and 302, and as stated in the Appendix of this plan. When permits are applicable, the permittee or his/her authorized representative is required to notify the MDNR Environmental Emergency Response in accordance with 40 CFR 117 and 40 CFR 302 as soon as they have knowledge of the discharge of any hazardous substance or petroleum product in excess of the reportable quantity. The MDNR emergency spills hot line is 1-573-634-2436. Copies of any and all reporting forms shall be provided to the owner of the project as soon as is practical.

F. The spill prevention, control and countermeasures plan and/or practices will be adjusted to include measures to prevent a spill event of this type from recurring, and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures taken will also be included.

G. The Environmental Manager will also be the spill prevention and cleanup coordinator unless the contractor arranges otherwise. He will designate other site personnel who will receive spill prevention and cleanup training, as required. The names of responsible spill personnel will be posted in the material storage area and in the office trailer on site, if one so exists.

VI. AIR EMISSIONS

1. Burning: Any burning on the site may require a permit from the MDNR. For guidance, contact the MDNR Southwest Regional Office in Springfield at (417) 891-4300 or the MDNR Air Pollution Control Program, Jefferson City at (573) 751-4817. County and/or city ordinances may also apply. It is the responsibility of the contractor to contact these governing bodies for guidance. Refer to Section III.2.A of this SWPPP for additional information relative to open burning at the site. An MDNR fact sheet relative to open burning is included in the Appendix.

2. Dust Control: The contractor is required by State law to control fugitive dust blown from the site. Dust can be minimized by stabilizing areas with mulch as soon as possible. Watering should be provided in unstabilized areas as needed for dust control. Contact MDNR for guidance, as needed, at the numbers listed above.

VII. AMENDING THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

The permittee, CITY OF JOPLIN, and the Contractor shall amend and update the SWPPP, as appropriate, during the term of the land disturbance activities. The permittee/contractor shall amend the SWPPP, at a minimum, whenever the:

1. Design, operation, or maintenance of Best Management Practice (BMP) structures and/or controls is changed or is deemed inadequate in controlling sediment;

2. Design of the construction project is changed that could significantly affect the quality of the storm water discharges;

3. Inspections indicate deficiencies in the SWPPP or any BMP used at the site;

4. MDNR notifies the permittee of deficiencies in the SWPPP;

5. The SWPPP is determined to be ineffective in significantly minimizing or controlling erosion and off-site sedimentation (e.g., there is visual evidence, such as excessive site erosion or excessive sediment deposits in receiving streams);

6. Non-Filterable Residues (NFR) from a storm water outfall exceeds 45 mg/l;

7. Total Settleable Solids from a storm water outfall exceed 2.5 ml/L/hr, unless the disturbed area is defined under, "Applicability to Valuable Resource Water". Settleable Solids from a storm water outfall in areas near Valuable Resource Water shall not exceed 0.5 ml/L/hr, as indicated in the permit issued by MDNR and/or;

8. MDNR determines violations of Water Quality Standards may occur or have occurred.

Based on the results of an inspection, the SWPPP must be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP must be completed within seven (7) calendar days following the inspection. Implementation of these additional or modified BMPs must be accomplished as soon as possible.

VIII. RETENTION OF RECORDS

The permittee, CITY OF JOPLIN, shall retain copies of the SWPPP and all reports required by this permit, and records of all data used to comply with this permit, for a period of at least three years from the date that the site is finally stabilized and the Notice of Termination is received from the MDNR. This period may be extended by request of the Director of MDNR at any time.

The permittee shall retain a copy of the SWPPP from the date of project initiation to the date of final stabilization, as required by the permit (including a copy of the permit), at the construction site (or other local location), and made available upon request by the MDNR Director, or his representative; or other state or local agency approving or inspecting sediment and erosion control plans, grading plans, or storm water management plans to ensure implementation of the SWPPP, or the operator of a municipal separate storm sewer system, if any, receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. The Permittee, or Contractor(s) with day-to-day operational control over SWPPP implementation shall have a copy of the SWPPP on-site or locally available at all times. A copy of the SWPPP, in its entirety, must be made available to the MDNR staff for review and copying at the time of an on-site inspection. All SWPPPs must be signed and certified, as required.

If an on-site location is unavailable to store the SWPPP when no personnel are present, a sign or other notice of the plan's location must be conspicuously posted near the main entrance of the construction site. If not feasible, the notice can be posted in a local public building, or public library. The sign or other notice must contain the following information:

1) A copy of the completed Application, as submitted to the MDNR Water Pollution Control Program; and

2) If the location of the SWPPP or the name and telephone number of the contact person for scheduling SWPPP viewing times has changed, the current location of the SWPPP and the name and telephone number of the person for scheduling viewing times must be stated.

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI
STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

CERTIFICATION

OWNER'S CERTIFICATION

I certify that, being an authorized representative of CITY OF JOPLIN, owner of the site, the information contained herein is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting (if required) false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name:_____

Title:_____

Signature:_____

Date:_____

For: CITY OF JOPLIN
602 S Main Street
Joplin, Missouri, 64801
(417) 624-0820

CONTRACTOR'S CERTIFICATION

I certify under penalty of law, that I, being an authorized representative of the Contractor for the permittee, understand the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge General Permit issued by the Missouri Department of Natural Resources (MDNR) and this Storm Water Pollution Prevention Plan (SWPPP) and shall comply with all conditions of the SWPPP, and the Permit for authorized Storm Water Discharges Associated with Construction or Land Disturbance Activities as issued by the MDNR Water Pollution Control Program, and that any non-compliance with the general permit constitutes a violation of Chapter 644, Missouri Clean Water Law, and 10 CSR 20-6.200. Non-compliance may result in enforcement action, termination of this authorization, or denial of the permittee's request for renewal.

_____
Printed or Typed Name and Title

_____
Contractor's Representative Signature

_____
Date

For: _____
Contractor Name (Print)

_____
Contractor Address

_____
City/State

_____
Contractor Telephone Number

APPENDICES

A. BMP Examples

Construction Site Entrance/Exit Information

Filter Fabric Silt Fence Example

Straw Bale Barrier Example

Storm Drain Inlet Structure Protection Example

Storm Water Outlet Structure Protection Example

B. Inspection and Maintenance Report Forms and Inspection Log Sheet

C. Weather Information Form

D. Changes Required to the SWPPP

E. List of Stabilized Areas Form

F. Major Grading Activities Report

G. Spill/Release Information and Reporting Form

H. Subcontractor Certification List and Subcontractor Certification Form

I. MDNR Technical Bulletin – Response to Small Fuel Spills

J. MDNR Fact Sheet – Open Burning Under Missouri Regulations

K. Notice of Termination (NOT) Form H

L. City Wide National Pollutant Discharge Elimination System Storm Water Discharge General Permit

M. Drawing (Insert a copy into the back cover of this document)

APPENDIX A

BMP EXAMPLES

CONSTRUCTION SITE ENTRANCE/EXIT INFORMATION

FILTER FABRIC SILT FENCE EXAMPLE

STRAW BALE BARRIER EXAMPLE

STORM DRAIN INLET STRUCTURE PROTECTION EXAMPLE

STORM WATER OUTLET STRUCTURE PROTECTION EXAMPLE

4.3 MINIMIZING OFFSITE VEHICLE TRACKING OF SEDIMENTS

Day-to-day site practices can have a major impact on storm water contamination because of their potential for generating sediments. A common problem area is offsite vehicle tracking. Two practices are commonly used for minimizing offsite vehicle tracking of sediments: stabilized construction entrances and construction access road stabilization.

Q. What measures have you taken to prevent offsite vehicle tracking?

Controlling offsite tracking of sediments may require attention at most times when there is vehicle traffic at the construction site. The measures listed here are effective if used properly.

- A stabilized construction entrance and construction road are very effective methods for reducing offsite tracking of mud, dirt, and rocks
- Paved streets adjacent to the site should be swept to remove any excess mud, dirt, or rock tracked from the site
- Deliveries or other traffic should be scheduled at a time when you will have personnel available to provide cleanup if it is required.

4.3.1 Construction Road Stabilization

What Is It

A stabilized construction road is a road built to provide a means for construction vehicles to move around the site without causing significant erosion. A stabilized construction road is designed to be well drained so that water does not puddle or flood the road during wet weather. It typically will have a swale along one or both sides of the road to collect and carry away runoff. Stabilized construction roads should be have a layer of crushed stone or gravel which will cover and protect the soil below from erosion.

When and Where to Use It

A stabilized construction road should be installed in a disturbed area where there will be a high volume of construction traffic expected. A construction road should be stabilized at the beginning of construction and maintained throughout construction. Construction parking areas should be stabilized as well as the roads. A stabilized construction road should not be located in a cut or fill area until after grading has been performed.

What to Consider

Stabilized construction roads should be built to conform to the site grades; this will require a minimum amount of cut and fill. They should also be designed so that the side slopes and road grades are not excessively steep. Construction roads should not be constructed in areas which are wet, or on highly erodible soils.

Advantages of Construction Road Stabilization
• Reduces the amount of erosion, dust, and tracking of soil off of the site • Provides an effective way for vehicles to move around the construction site, even during wet weather
Disadvantages of Construction Road Stabilization
• Can be expensive • May require maintenance to replace gravel or repair ruts

4.3.2 Stabilized Construction Entrance

What Is It

A stabilized construction entrance is a portion of the construction road which is constructed with filter fabric and large stone. The primary purpose of a stabilized construction entrance is to reduce the amount of soil tracked off of the construction site by vehicles leaving the site. The rough surface of the stone will shake and pull the soil off of the vehicles tires as it drives over the entrance. The stone will also reduce erosion and rutting on the portion of the road where it is installed by protecting the soil below. The filter fabric separates the stone from the soil below, preventing the large stone from being ground into the soil. The fabric also reduces the amount of rutting caused by the vehicle tires by spreading the weight of the vehicles over a larger soil area than just the tire width.

When and Where to Use It

A stabilized construction entrance should be installed at every point where traffic leaves or enters a disturbed area before construction begins on the site. Typically, stabilized construction entrances are installed at the locations where the construction traffic enters or leaves an existing paved road; however, a stabilized construction entrance should not be installed over an existing pavement (except for a slight overlap as shown in Figure 4.1). Where the construction will require a permanent access road or driveway, it is recommended that a stabilized construction entrance be installed in this location prior to the permanent pavement.

What to Consider

Stabilized construction entrances should be wide enough and long enough so that the largest construction vehicle will fit in the entrance with room to spare. If a large amount of traffic is expected at an entrance, then the stabilized construction entrance should be wide enough to fit two vehicles across with room to spare.

If the stabilized construction entrance has to cross a swale or stream, then a stream crossing should be provided (see page 3-42).

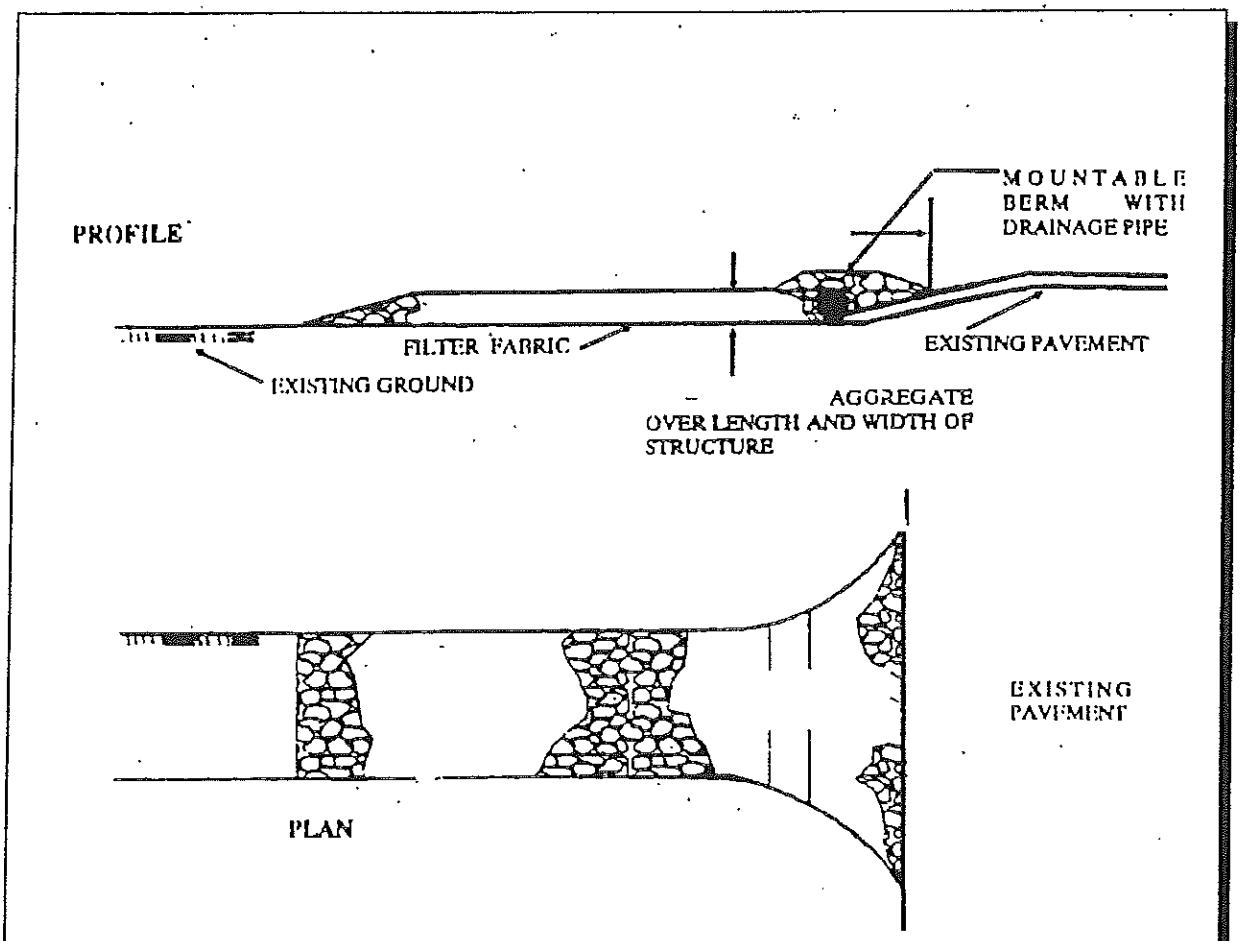


FIGURE 4.1 STABILIZED CONSTRUCTION ENTRANCE
(Modified from Maryland Department of the Environment, 1991)

Stone used for the construction entrance should be large enough so that it is does not get picked up and tracked off of the site by the vehicle traffic. Sharp edged stone should not be used to avoid puncturing tires.

If vehicles will be turning onto the paved road or drive from the stabilized construction entrance, then an apron should be provided as shown above so that vehicles do not go off of the stabilized construction entrance before they leave the site.

The temporary construction entrance may be provided with a vehicle wash rack which drains to a temporary sediment trap or other sediment removing measure. This will allow vehicle tires to be washed prior to leaving the site and ensure that wash water sediments are removed and can be properly disposed of.

Advantages of a Stabilized Construction Entrance
• Is an effective means for reducing the amount of soil tracked off of a construction site • Can improve the appearance of the construction site from the public's point of view
Disadvantages of a Stabilized Construction Entrance
• Only works if it is installed at every location where traffic leaves and enters the site • Cannot always remove all of the soil tracked off of the disturbed areas by vehicles; when soil is tracked onto a road, it should be cleaned up immediately • Stone may have to be added to keep it effective

STABILIZED CONSTRUCTION ENTRANCE

September 1992

Design Criteria

- A Stabilized Construction Entrance (SCE) is appropriate in the following locations:
  - Wherever vehicles are leaving a construction site and enter onto a public road
  - At any unpaved entrance/exit location where there is risk of transporting mud or sediment onto paved roads.
- The width should be at least 10 feet to 12 feet or the as wide as the entire width of the access. At sites where traffic volume is high the entrance should be wide enough for two vehicles to pass safely.
- The length should be between 50 to 75 feet in length.
- Flare the entrance where it meets the existing road to provide a turning radius.
- Runoff from a stabilized construction entrance should drain to a sediment trap or sediment basin.
- Pipe placed under the entrance to handle runoff should be protected with a mountable berm.
- Dust control should be provided in accordance with Section 3.2.1.

Materials

- Crushed stone 2-inches-4-inches in diameter
- Geotextile (filter fabric) with the properties listed in Table 3 below.

TABLE 3. GEOTEXTILE REQUIREMENTS

Physical Property	Requirements
Grab Tensile Strength	220 lbs. (ASTM D1682)
Elongation Failure	60 % (ASTM D1682)
Mullen Burst Strength	430 lbs. (ASTM D3768)
Puncture Strength	125 lbs. (ASTM D751) (modified)
Equivalent Opening	Size 40-80 (US std Sieve) (CW-02215)

Construction Specifications

- Clear all vegetation, roots and all other obstructions in preparation for grading.
- Prior to placing geotextile (filter fabric) make sure that the entrance is properly graded and compacted.

- To reduce maintenance and loss of aggregate place geotextile fabric (filter cloth) over the existing ground before placing the stone for the entrance.
- Stone should be placed to a depth of 6-inches or greater for the entire width and length of the SCE.

Maintenance

- Inspect the measure on a regular basis and after there has been a high volume of traffic or storm event.
- Apply additional stone periodically and when repair is required.
- Immediately remove sediments or any other materials tracked onto the public roadway.
- Ensure that associated sediment control measures are in good working condition.

Cost

- Stabilized construction entrances cost ranges from $1,500 to $5,000 to install.

Sources

- Commonwealth of Virginia - County of Fairfax, 1987. 1987 Check List For Erosion And Sediment Control - Fairfax County, Virginia.
- State of North Carolina, 1988. Erosion and Sediment Control Planning and Design Manual. North Carolina Sedimentation Control Commission, Department of Natural Resources and Community Development.
- Maryland Department of the Environment, 1991. 1991 Maryland Standards And Specifications For Soil Erosion And Sediment Control - Draft.
- Storm Water Management Manual for the Puget Sound Basin. State of Washington, Department of Ecology, 1991.
- Cost Data:
  - Draft Sediment and Erosion Control, An Inventory of Current Practices, April 20, 1990. Prepared by Kamber Engineering for the U.S. Environmental Protection Agency, Office of Water Enforcement and Permits, Washington, D.C. 20460.

Filter Fence

What Is It

A silt fence, also called a "filter fence," is a temporary measure for sedimentation control. It usually consists of posts with filter fabric stretched across the posts and sometimes with a wire support fence. The lower edge of the fence is vertically trenched and covered by backfill. A silt fence is used in small drainage areas to detain sediment. These fences are most effective where there is overland flow (runoff that flows over the surface of the ground as a thin, even layer) or in minor swales or drainageways. They prevent sediment from entering receiving waters. Silt fences are also used to catch wind blown sand and to create an anchor for sand dune creation. Aside from the traditional wooden post and filter fabric method, there are several variations of silt fence installation including silt fence which can be purchased with pockets presewn to accept use of steel fence posts.

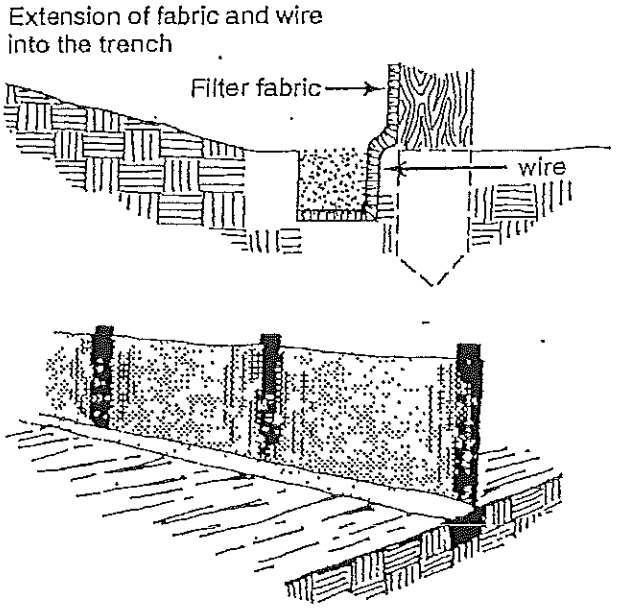


FIGURE 4.20 FILTER FENCE DETAILS
(Modified from State of North Carolina, 1988; and State of Wisconsin, 1988)

When and Where to Use It

A silt fence should be installed prior to major soil disturbance in the drainage area. Such a structure is only appropriate for drainage areas of 1 acre or less with velocities of 0.5 cfs or less (Washington State, 1992). The fence should be placed across the bottom of a slope or minor drainageway along a line of uniform elevation (perpendicular to the direction of flow). It can be used at the outer boundary of the work area. However, the fence does not have to surround the

work area completely. In addition, a silt fence is effective where sheet and rill erosion may be a problem. Silt fences should not be constructed in streams or swales.

What to Consider

A silt fence is not appropriate for a large area or where the flow rate is greater than 0.5 cfs. This type of fence can be more effective than a straw bale barrier if properly installed and maintained. It may be used in combination with other erosion and sediment practices.

The effective life span for a silt fence is approximately 6 months. During this period, the fence requires frequent inspection and prompt maintenance to maintain its effectiveness. Inspect the fence after each rainfall. Check for areas where runoff eroded a channel beneath the fence, or where the fence was caused to sag or collapse by runoff flowing over the top. Remove and properly dispose of sediment when it is one-third to one-half the height of the fence or after each storm.

Advantages of a Filter Fence
• Removes sediments and prevents downstream damage from sediment deposits
• Reduces the speed of runoff flow
• Minimal clearing and grubbing required for installation
• Inexpensive
Disadvantages of a Filter Fence
• May result in failure from improper choice of pore size in the filter fabric or improper installation
• Should not be used in streams
• Is only appropriate for small drainage areas with overland flow
• Frequent inspection and maintenance is necessary to ensure effectiveness

SILT FENCE

September 1992

Design Criteria

- Silt fences are appropriate at the following general locations:
  - Immediately upstream of the point(s) of runoff discharge from a site before flow becomes concentrated (maximum design flow rate should not exceed 0.5 cubic feet per second).
  - Below disturbed areas where runoff may occur in the form of overland flow.
- Ponding should not be allowed behind silt fences since they will collapse under high pressure; the design should provide sufficient outlets to prevent overtopping.
- The drainage area should not exceed 0.25 acre per 100 feet of fence length.
- For slopes between 50:1 and 5:1, the maximum allowable upstream flow path length to the fence is 100 feet; for slopes of 2:1 and steeper, the maximum is 20 feet.
- The maximum upslope grade perpendicular to the fence line should not exceed 1:1.
- Synthetic silt fences should be designed for 6 months of service; burlap is only acceptable for periods of up to 60 days.

Materials

- Synthetic filter fabric should be a pervious sheet of polypropylene, nylon, polyester, or polyethylene yarn conforming to the requirements in Table 1 below.

TABLE 1. SYNTHETIC FILTER FABRIC REQUIREMENTS

Physical Property	Requirements
Filtering Efficiency	75% - 85% (minimum)
Tensile Strength at 20% (maximum) Elongation	Standard Strength - 30 lb/linear inch (minimum)
	Extra Strength - 50 lb/linear inch (minimum)
Slurry Flow Rate	0.3 gal/ft^2/min (minimum)

- Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120°F.
- Burlap of 10 ounces per square yard of fabric can also be used.
- The filter fabric should be purchased in a continuous roll to avoid joints.
- While not required, wire fencing may be used as a backing to reinforce standard strength filter fabric. The wire fence (14 gauge minimum) should be at 22-48 inches wide and should have a maximum mesh spacing of 6 inches.
- Posts should be 2-4 feet long and should be composed of either 2" x 2-4" pine (or equivalent) or 1.00 to 1.33 lb/linear ft steel. Steel posts should have projections for fastening wire and fabric to them.

Construction Specifications

- The maximum height of the filter fence should range between 18 and 36 inches above the ground surface (depending on the amount of upslope ponding expected).

- Posts should be spaced 8 to 10 feet apart when a wire mesh support fence is used and no more than 6 feet apart when extra strength filter fabric (without a wire fence) is used. The posts should extend 12 to 30 inches into the ground.
- A trench should be excavated 4 to 8 inches wide and 4 to 12 inches deep along the upslope side of the line of posts.
- If standard strength filter fabric is to be used, the optional wire mesh support fence may be fastened to the upslope side of the posts using 1 inch heavy duty wire staples, tie wires, or hog rings. Extend the wire mesh support to the bottom of the trench. The filter fabric should then be stapled or wired to the fence, and 8 to 20 inches of the fabric should extend into the trench (Figure 1).
- Extra strength filter fabric does not require a wire mesh support fence. Staple or wire the filter fabric directly to the posts and extend 8 to 20 inches of the fabric into the trench (Figure 1).
- Where joints in the fabric are required, the filter cloth should be spliced together only at a support post, with a minimum 6-inch overlap, and securely sealed.
- Do not attach filter fabric to trees.
- Backfill the trench with compacted soil or 0.75 inch minimum diameter gravel placed over the filter fabric.

Maintenance

- Inspect filter fences daily during periods of prolonged rainfall, immediately after each rainfall event, and weekly during periods of no rainfall. Make any required repairs immediately.
- Sediment must be removed when it reaches one-third to one-half the height of the filter fence. Take care to avoid damaging the fence during cleanout.
- Filter fences should not be removed until the upslope area has been permanently stabilized. Any sediment deposits remaining in place after the filter fence has been removed should be dressed to conform with the existing grade, prepared, and seeded.

Cost

- Silt fence installation costs approximately $6.00 per linear foot.

Sources

- Commonwealth of Virginia - County of Fairfax, 1987. 1987 Check List For Erosion And Sediment Control - Fairfax County, Virginia.
- State of North Carolina, 1988. Erosion and Sediment Control Planning and Design Manual. North Carolina Sedimentation Control Commission, Department of Natural Resources and Community Development.
- Maryland Department of the Environment, 1991. 1991 Maryland Standards And Specifications For Soil Erosion And Sediment Control - Draft.

Straw Bale Barrier

What Is It

Straw bales can be used as a temporary sediment barrier. They are placed end to end in a shallow excavated trench (with no gaps in between) and staked into place. If properly installed, they can detain sediment and reduce flow velocity from small drainage areas. A straw bale barrier prevents sediment from leaving the site by trapping the sediment in the barrier while allowing the runoff to pass through. It can also be used to decrease the velocity of sheetflow or channel flows of low-to-moderate levels.

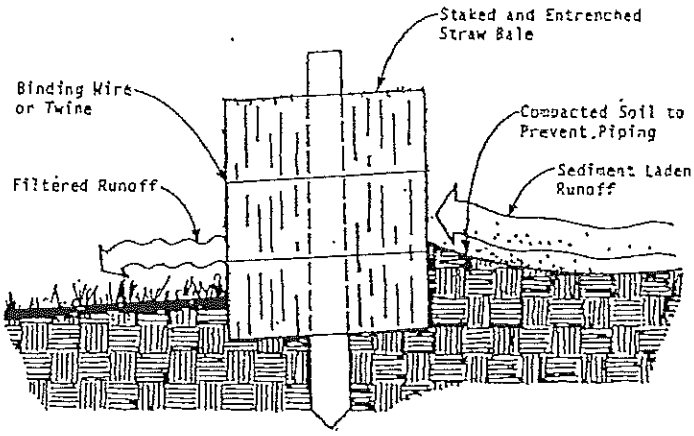


FIGURE 4.21 CROSS SECTION OF A PROPERLY INSTALLED STRAW BALE BARRIER
(Modified from State of Wisconsin, 1988)

When and Where to Use It

A straw bale barrier should be installed prior to major soil disturbance in the drainage area. This type of barrier is placed perpendicular to the flow, across the bottom of a slope or minor drainageway where there is sheetflow. It can be used at the perimeter of the work area, although is does not have to surround it completely. It can also be very effective when used in combination with other erosion and sediment control practices. A straw bale barrier may be used where the length of slope behind the barrier is less than 100 feet and where the slope is less than 2:1.

What to Consider

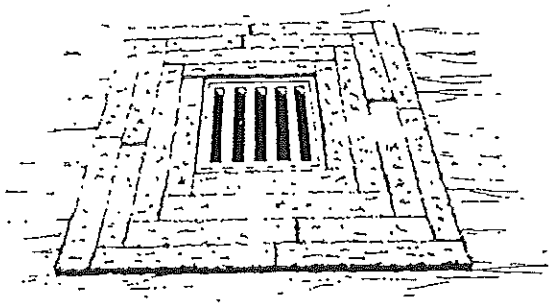
The success of a straw bale barrier depends on proper installation. The bales must be firmly staked into the entrenchment and the entrenchment must be properly backfilled. To function effectively, the bales must be placed end to end and there can be no gaps between the bales.

Straw bale barriers are useful for approximately 3 months. They must be inspected and repaired immediately after each rainfall or daily if there is prolonged rainfall. Damaged straw bales require

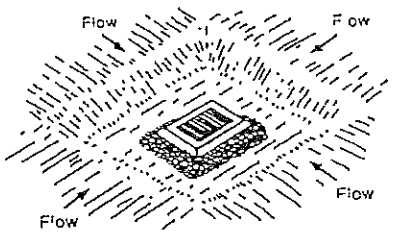
Storm Drain Inlet Protection

What Is It

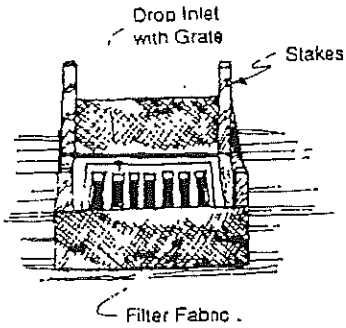
Storm drain inlet protection is a filtering measure placed around any inlet or drain to trap sediment. This mechanism prevents the sediment from entering inlet structures. Additionally, it serves to prevent the silting-in of inlets, storm drainage systems, or receiving channels. Inlet protection may be composed of gravel and stone with a wire mesh filter, block and gravel, filter fabric, or sod.



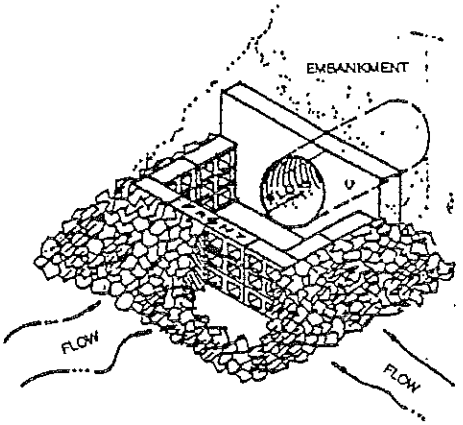
Sod Inlet Protection



Excavated Gravel Inlet Protection



Filter Fabric Inlet Protection



Block and Gravel Inlet Protection

FIGURE 4.24 EXAMPLES OF STORM DRAIN INLET PROTECTION
(Modified from State of North Carolina, 1988; Washington State, 1992; and County of Fairfax, 1987)

When and Where to Use It

This type of protection is appropriate for small drainage areas where storm drain inlets will be ready for use before final stabilization. Storm drain inlet protection is also used where a permanent storm drain structure is being constructed onsite. Straw bales are not recommended for this purpose. Filter fabric is used for inlet protection when storm water flows are relatively small with low velocities. This practice cannot be used where inlets are paved because the filter fabric should be staked. Block and gravel filters can be used where velocities are higher. Gravel and mesh filters

can be used where flows are higher and subject to disturbance by site traffic. Sod inlet filters are generally used where sediments in the storm water runoff are low.

What to Consider

Storm drain inlet protection is not meant for use in drainage areas exceeding 1 acre or for large concentrated storm water flows. Installation of this measure should take place before any soil disturbance in the drainage area. The type of material used will depend on site conditions and the size of the drainage area. Inlet protection should be used in combination with other measures, such as small impoundments or sediment traps, to provide more effective sediment removal. Inlet protection structures should be inspected regularly, especially after a rainstorm. Repairs and silt removal should be performed as necessary. Storm drain inlet protection structures should be removed only after the disturbed areas are completely stabilized.

Advantages of Storm Drain Inlet Protection
• Prevents clogging of existing storm drainage systems and the siltation of receiving waters • Reduces the amount of sediment leaving the site
Disadvantages of Storm Drain Inlet Protection
• May be difficult to remove collected sediment • May cause erosion elsewhere if clogging occurs • Is practical only for low sediment, low volume flows

FILTER FABRIC INLET PROTECTION

September 1992

Design Criteria

- Inlet protection is appropriate in the following locations:
  - In small drainage areas (less than 1 acre) where the storm drain inlet is functional before the drainage area has been permanently stabilized.
  - Where there is danger of sediment silting in an inlet which is in place prior to permanent stabilization.
- Filter fabric inlet protection is appropriate for most types of inlets where the drainage area is one acre or less.
- The drainage area should be fairly flat with slopes of 5% or less and the area immediately surrounding the inlet should not exceed a slope of 1%.
- Overland flow to the inlet should be no greater than 0.5 cfs.
- This type of inlet protection is not appropriate for use in paved areas because the filter fabric requires staking.
- To avoid failure caused by pressure against the fabric when overtopping occurs, it is recommended that the height of the filter fabric be limited to 1.5 feet above the crest of the drop inlet.
- It is recommended that a sediment trapping sump of 1 to 2 feet in depth with side slopes of 2:1 be provided.

Materials

- Filter fabric (see the fabric specifications for silt fence).
- Wooden stakes 2" x 2" or 2"x 4" with a minimum length of 3 feet.
- Heavy-duty wire staples at least ½ inch in length.
- Washed gravel ¾ inches in diameter.

Construction Specifications

- Place a stake et each corner of the inlet and around the edges at no more than 3 feet apart. Stakes should be driven into the ground 18 inches or at a minimum 8 inches.
- For stability a framework of wood strips should be installed around the stakes at the crest of the overflow area 1.5 feet above the crest of the drop inlet.
- Excavate a trench of 8 inches to 12 inches in depth around the outside perimeter of the stakes. If a sediment trapping sump is being provided then the excavation may be as deep as 2 feet.
- Staple the filter fabric to the wooden stakes with heavy-duty staples, overlapping the joints to the next stake. Ensure that between 12 inches to 32 inches of filter fabric extends at the bottom so it can be formed into the trench.
- Place the bottom of the fabric in the trench and backfill the trench all the way around using washed gravel to a minimum depth of 4 inches.

Maintenance

- Inspect regularly and after every storm. Make any repairs necessary to ensure the measure is in good working order.
- Sediment should be removed and the trap restored to its original dimensions when sediment has accumulated to ½ the design depth of the trap.
- If the filter fabric becomes clogged it should be replaced immediately.
- Make sure that the stakes are firmly in the ground and that the filter fabric continues to be securely anchored.
- All sediments removed should be properly disposed.
- Inlet protection should remain in place and operational until the drainage area is completely stabilized or up to 30 days after the permanent site stabilization is achieved.

Cost

- The cost of storm drain inlet protection varies dependent upon the size and type of inlet to be protected but generally is about $300.00 per inlet.

Sources

- Commonwealth of Virginia - County of Fairfax, 1987. 1987 Check List For Erosion And Sediment Control - Fairfax County, Virginia.
- State of North Carolina, 1988. Erosion and Sediment Control Planning and Design Manual. North Carolina Sedimentation Control Commission, Department of Natural Resources and Community Development.
- Maryland Department of the Environment, 1991. 1991 Maryland Standards And Specifications For Soil Erosion And Sediment Control - Draft.
- Storm Water Management Manual for the Puget Sound Basin. State of Washington, Department of Ecology, 1991.
- Cost Data:
  - Draft Sediment and Erosion Control, An Inventory of Current Practices, April 20, 1990. Prepared by Kamber Engineering for the U.S. Environmental Protection Agency, Office of Water Enforcement and Permits, Washington, D.C. 20460.

Outlet Protection

What Is It

Outlet protection reduces the speed of concentrated storm water flows and therefore it reduces erosion or scouring at storm water outlets and paved channel sections. In addition, outlet protection lowers the potential for downstream erosion. This type of protection can be achieved through a variety of techniques, including stone or riprap, concrete aprons, paved sections and settling basins installed below the storm drain outlet.

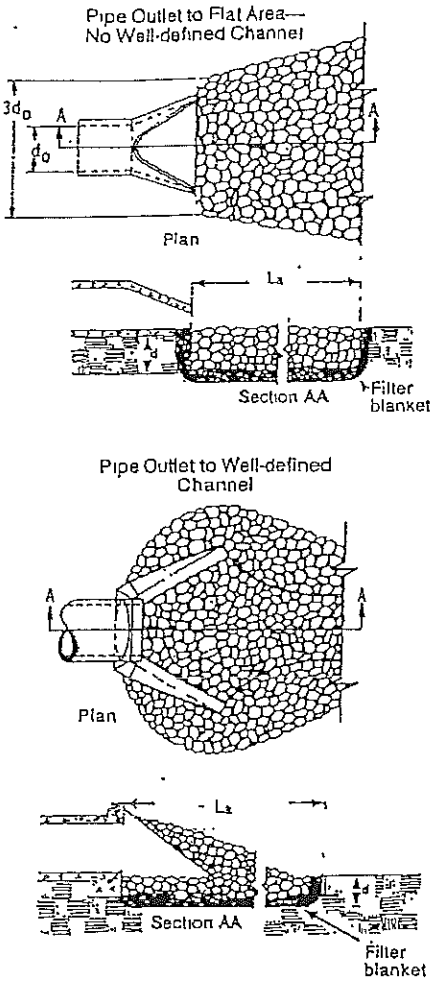


FIGURE 4.27 TYPICAL DETAILS FOR ROCK OUTLET PROTECTION
(Modified from State of North Carolina, 1988)

When and Where to Use It

Outlet protection should be installed at all pipe, interceptor dike, swale, or channel section outlets where the velocity of flow may cause erosion at the pipe outlet and in the receiving channel. Outlet protection should also be used at outlets where the velocity of flow at the design capacity may result in plunge pools (small permanent pools located at the inlet to or the outfall from BMPs). Outlet protection should be installed early during construction activities, but may be added at any time, as necessary.

What to Consider

The exit velocity of the runoff as it leaves the outlet protection structure should be reduced to levels that minimize erosion. Outlet protection should be inspected on a regular schedule to look for erosion and scouring. Repairs should be made promptly.

Advantages of Outlet Protection
• Provides, with riprap-line apron (the most common outlet protection), a relatively low cost method that can be installed easily on most sites
• Removes sediment in addition to reducing flow speed
• Can be used at most outlets where the flow speed is high
• Is an inexpensive but effective measure
• Requires less maintenance than many other measures
Disadvantages of Outlet Protection
• May be unsightly
• May cause problems in removing sediment (without removing and replacing the outlet protection structure itself)
• May require frequent maintenance for rock outlets with high velocity flows

APPENDIX B

INSPECTION AND MAINTENANCE REPORT FORM
and
INSPECTION LOG SHEET

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY

JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)
INSPECTION AND MAINTENANCE REPORT FORM
TO BE COMPLETED AT LEAST ONCE PER WEEK, PRIOR TO A KNOWN MAJOR STORM EVENT, AND WITHIN 24 HOURS OF A 0.5 INCH OR MORE RAINFALL EVENT

INSPECTOR: _____ DATE: _____

DAYS SINCE LAST RAINFALL: _____ AMOUNT OF THIS RAINFALL _____ INCHES

Storm Water Control (If applicable)	Condition	Repair Req'd		Comments (Attach additional Sheets if Necessary)	Date Repaired	Initials
		Yes	No			
Site Entrance/Exit(s)				See Below		
Filter Fabric Fences						
Straw Bales						
Seeded Areas						
Top Soil Stockpile(s)						
Material Storage Areas						
Portable Toilet(s)						
Waste Container(s)						
Fuel Storage						
Outfall #001						
Outfall #002						
Outfall #003						
Others-List on P. 4						

STABILIZED CONSTRUCTION SITE ENTRANCE

Does Sediment Get Tracked on to Road?	Is the Rock Clean or is it Filled with Sediment?	Does All Traffic Use the Stabilized Entrance to Enter and Leave the Site?	Is the Culvert (if installed) Beneath the Entrance Working?

Describe Maintenance Required to the Stabilized Construction Entrance: _____

_____

_____

_____

_____

_____

Continued on Reverse Side

SEDIMENT BASIN (S)

Depth of Sediment Basin	Condition of Basin Side Slopes	Any Evidence of Overtopping of the Embankment	Condition of Outfall from Sediment Basins
N/A			

Describe Maintenance Required for the Sediment Basins: _____

_____

☐ If this box is checked, I hereby certify that this inspection did not identify any incidents of non-compliance and that the facility is in compliance with the permit and the SWPPP.

CERTIFICATION:

Qualified personnel must conduct all inspections. "Qualified Personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity. I certify under penalty of law that I am qualified to properly gather and evaluate the information submitted and that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations.

Signature: _____ Date: _____

Printed Name: _____ Contractor: _____

Address: _____ City/State: _____

All Maintenance Items Required and Described above are:

To be performed by: _____ On or Before: _____

Signature: _____ Date: _____

Date Repaired: _____ By: _____

List of Items Repaired: _____

_____

Signature: _____ Contractor: _____

Printed Name: _____ Date: _____

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN (SWPPP) INSPECTION AND MAINTENANCE REPORT FORM

CERTIFICATION:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage this SWPPP system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations.

Signature: _____ Date: _____

Printed Name: _____ Phone: _____

Contractor: _____ Address: _____

City/State: _____

Report Submitted to and Received by Owner (Permittee), CITY OF JOPLIN, Joplin, Missouri.

Date: _____

Submitted by: _____
Printed Name – For the Contractor

Signature: _____

Contractor: _____

Date: _____

Received by: _____
Printed Name – CITY OF JOPLIN

Signature: _____

NOTE: All inspection and maintenance report forms shall be retained by the owner for at least three years from the date the site is finally and permanently stabilized, and permit coverage expires or is terminated. This period may be extended by the request of MDNR at any time.

# of additional sheets attached = _____

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)
INSPECTION LOG SHEET

REGULARLY SCHEDULED INSPECTIONS SHALL BE AT A MINIMUM OF ONCE PER WEEK, PRIOR TO A KNOWN MAJOR STORM EVENT, AND WITHIN 24 HOURS OF A 0.5 INCHES OR MORE RAINFALL EVENT

DATE OF INSPECTION	ANY BMPs NEED MAINTENANCE? YES/NO	INSPECTORS NAME

Note: To be completed along with each INSPECTION AND MAINTENANCE REPORT

APPENDIX C

WEATHER INFORMATION FORM

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)

CONSTRUCTION SITE WEATHER INFORMATION DATA

DATE	PRECIPITATION START TIME	PRECIPITATION END TIME	AMOUNT (INCHES)	DISCHARGE AT OUTFALLS? YES (#) / NO	INITIALS

Date: _____ Date: _____

Submitted by: _____
Printed Name – Contractor Representative

Received by: _____
Printed Name – CITY OF JOPLIN Representative

Signature: _____ Signature: _____

APPENDIX D

CHANGES REQUIRED TO THE SWPPP

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)

CHANGES REQUIRED TO THE SWPPP

CHANGES REQUIRED: _____

_____

_____

_____

_____

REASONS FOR CHANGES: _____

_____

_____

_____

_____

Date Changes Made to SWPPP: _____

Date Changes Implemented at the Site: _____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations.

Number of Additional Pages Attached: _____

Printed Name: _____ Company: _____

Signature: _____ Date: _____

Date Received by CITY OF JOPLIN: _____

Received by: _____ Signature: _____
Printed Name – CITY OF JOPLIN Representative

APPENDIX E

LIST OF STABILIZED AREAS

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)

LIST OF STABILIZED AREAS

DESCRIPTION OF AREA WHERE FINAL STABILIZATION HAS BEEN ACHIEVED	DATE STABILIZED /INITIALS

INITIALS _____ NAME _____
INITIALS _____ NAME _____

APPENDIX F

MAJOR GRADING ACTIVITIES REPORT FORM

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)

MAJOR GRADING ACTIVITIES REPORT

GRADING START DATE	GRADING END DATE	LOCATION ¼, ¼, SECTION, TWP, RGE or AREA DESCRIPTION	STABILIZATION MEASURES INITIATED YES/DATE ---------NO

Date: _____ Date: _____

Submitted by: _____ Received by: _____
Printed Name – Contractor Printed Name – CITY OF JOPLIN Representative

Signature: _____ Signature: _____

APPENDIX G

SPILL/RELEASE INFORMATION AND REPORTING FORM

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

SPILL/RELEASE INFORMATION AND REPORTING FORM

1. Basic description of the spill/release, including causes, if known:

_____
_____
_____
_____
_____
_____

(If additional space is required, attach additional sheets.)

2. Chemical Name of Material Spilled: _____
3. Listed CERCLA Hazardous Substance? Yes ___ No ___
4. Listed EPCRA Extremely Hazardous Substance? Yes ___ No ___
5. Oil? Yes ___ No ___
6. Quantity Spilled (exclude water): _____
7. Date and Time of Spill: _____
8. Duration of Spill: _____
9. Spill Went to: Water: _____ Land: _____ Air: _____
10. Any known or anticipated acute or chronic health risks associated with the spill and, where appropriate, advice regarding medical attention necessary for exposed individuals.

_____
_____
_____
_____

11. Proper precautions to take as a result of the release, including evacuation (unless such information is readily available to the community emergency coordinator pursuant to the emergency plan).

_____
_____
_____
_____

12. Spill Reported By: _____

    Date: _____

    Spill Reported to: _____
_____
_____

SEE REVERSE SIDE OF FORM FOR REPORTING REQUIREMENTS

REPORTABLE QUANTITIES FOR OIL
AND HAZARDOUS SUBSTANCES ARE FOUND AT
40 CFR Part 110, 40 CFR Part 117, & 40 CFR Part 302

In accordance with the Missouri Department of Natural Resources (MDNR), Division of Environmental Quality, a Release and a Reportable Release of Petroleum Products are defined as follows:

Release: Any loss of petroleum product to the environment is considered a release. This definition includes, but is not limited to, any spilling, leaking, emitting, discharging, escaping, leaching, or disposing from a storage tank into ground water, surface water, surface or subsurface soils.

Reportable Release: A petroleum product release greater than fifty (50) gallons, or spills and/or overfills of petroleum product from an underground storage tank that result in a release to the environment that exceeds twenty-five (25) gallons, or any release that causes a sheen on nearby surface water; and a spill or overfill of a hazardous substance that results in a release to the environment that equals or exceeds its reportable quantity under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 is a reportable release and must be reported to the MDNR within twenty-four (24) hours. Soil contamination levels of TPH =/>50 parts per million (ppm), BTEX =/>1.0 ppm, benzene =/>0.5 ppm, or MTBE =/>60 ppm is also considered to be evidence of a reportable "release" of petroleum products.

Formal reporting of a Reportable Release shall be as follows:

MDNR – Environmental Emergency Response Unit – (573) 634-2436 (Follow MDNR instructions)
National Response Center – 1-800-424-8802
MDNR – Southwest Regional Office – (417) 891-4300
MDNR – Jefferson City – (573) 751-3176
CITY OF JOPLIN – David Hertzberg, P.E., Public Works Director – 417-624-0820
McDonald County Local Emergency Planning Committee, Pineville, MO – 417-223-4319
White Rock Fire Protection District – Emergency 911 – Non-Emergency 417-223-4318

All spills reported by telephone shall be reported in writing within 24 hours by the responsible party, and submitted to the MDNR Environmental Emergency Response Unit, or as directed by the Agency, with copies submitted to Mr. David Hertzberg, P.E., Public Works Director, CITY OF JOPLIN.

Circumstances (causes) leading to the release:

_____

_____

_____

Steps taken to prevent recurrence of the release:

_____

_____

_____

Date SWPPP modified to reflect the release and prevent similar future release: _____

Printed Name: _____

Signature/Title: _____

Organization: _____

APPENDIX H

SUBCONTRACTOR CERTIFICATION LIST
and
SUBCONTRACTOR CERTIFICATION FORM

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)

SUBCONTRACTORS CERTIFICATION LIST

SUBCONTRACTOR	ADDRESS	DATE SIGNED

CITY OF JOPLIN

PROJECT NAME: _____

JASPER/NEWTON COUNTY
JOPLIN, MISSOURI

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

SUBCONTRACTORS CERTIFICATION

SUBCONTRACTORS CERTIFICATION

I certify under penalty of law, that I, being an authorized representative of the Subcontractor for the permittee, understand the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge General Permit issued by the Missouri Department of Natural Resources (MDNR) and this Storm Water Pollution Prevention Plan (SWPPP) and shall comply with all conditions of the SWPPP, and the Permit for authorized Storm Water Discharges Associated with Construction or Land Disturbance Activities as issued by the MDNR Water Pollution Control Program, and that any non-compliance with the general permit constitutes a violation of Chapter 644, Missouri Clean Water Law, and 10 CSR 20-6.200. Non-compliance may result in enforcement action, termination of this authorization, or denial of the permittee's request for renewal.

_____
Printed or Typed Name and Title

_____
Subcontractor's Representative Signature

_____
Date

For: _____
Subcontractor Name (Print)

_____
Subcontractor Address

_____
City/State

_____
Subcontractor Telephone Number

APPENDIX I

MDNR TECHNICAL BULLETIN

RESPONSE TO SMALL FUEL SPILLS

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Missouri
Department of Natural Resources
Department of Public Safety

Response to Small Fuel Spills

DNR Environmental Services Program/DPS Division of Fire Safety fact sheet 3/2009

Local fire departments often respond to releases of small amounts of petroleum products. This technical bulletin is intended to provide fire departments with information regarding responses to these types of releases.

Missouri state law requires the responsible party (spiller) to report petroleum product releases greater than 50 gallons to the Missouri Department of Natural Resources (DNR) at (573) 634-2436 at the earliest practical moment upon discovery. If the release is from an underground storage tank (UST) or piping, the reportable quantity is 25 gallons or more. Above ground storage tanks (AST) that have released 50 gallons or greater are also required to report. Further, federal law requires the responsible party to report any release of oil if the oil reaches or threatens any waterway. The definition of waterway includes sewers, groundwater, wetlands, lakes, creeks, streams, rivers and areas that may not have running water in them at the time, such as road ditches that drain into other waterways.

In the past, small fuel spills were routinely addressed by "flushing" with either foam or water. Unfortunately, this manner of response often resulted in the fuel reaching a waterway, potentially causing a greater problem than the initial spill itself. While many fire departments realize that flushing may cause more problems than it solves, information regarding alternative cleanup methods may not be readily available. The following information is provided by the Missouri Department of Public Safety (DPS) and DNR as possible alternative response actions to small fuel spills.

NOTE: It is understood that public safety must be the first consideration in a response and that the following actions may not be the most appropriate in certain situations.

1. If possible, the spill of fuel should be contained and the release stopped. Apply sand, gravel, soil, straw, sawdust, ground corn cobs, or commercial absorbents such as kitty litter or oil dry to absorb/contain petroleum residues rather than wash them away with water. Attempt to identify and take measures to protect any stormwater drains with absorbents. Absorbent materials used to clean up fuel spills may be disposed at a sanitary landfill with prior approval of the landfill operator.

2. If fire hazard reduction measures are necessary, use foam as appropriate. Do not over apply. Use as little water on the spill as necessary.

3. Pump, recover, and containerize as much free product as possible. In many cases, recovered product can be routed back to refineries for recycling, or used for other purposes such as fire department training exercises. Another method of disposal is use in fuel blending operations; however, this is not a viable alternative if the fuel has been contaminated with large amounts of water. If the spilled fuel contains too much water to lend itself as a usable resource, it may have to be tested and disposed as a regulated hazardous waste.

4. If flushing with water is the chosen option to mitigate hazards, runoff should be containerized and/or routed to a sanitary sewer **with the knowledge and approval of the wastewater treatment plant operator**.

5 .Treatment chemicals and agents should not be used except under special circumstances and with prior authorization obtained from the U.S. Environmental Protection Agency. A list of treatment chemicals and chemical countermeasures can be found at: http://www.epa.gov/emergencies/docs/oil/ncp/schedule.pdf.
If a fire department has questions as to the proper application of such agents, DNR may be contacted 24 hours a day at 573-634-2436 for technical assistance. As stated in Item 3, water contaminated with petroleum may be required by law to be tested and disposed as a hazardous waste.

According to Missouri Hazardous Waste Management Laws and Regulations, the responsibility for proper disposal of a hazardous waste is that of the owner of that waste (who could be the spiller, the owner of the shipment, or the owner of a facility where the spill occurred). Fire departments should exercise CAUTION; if the material is flushed to a waterway during a response, it could potentially cause water quality issues that would prolong the remediation of the spill.

Not all fire departments have financial resources to maintain stocks of absorbent materials, containers, and other related response equipment. Access to vacuum trucks, heavy equipment, and other necessary services may, likewise, be difficult for some jurisdictions to obtain. It is recommended that a fire department's contingency planning include identification of supply and service sources in order to be prepared for these types of releases.

Every response method has its own inherent advantages and disadvantages. Specific response methods must be evaluated and initiated on a case-by-case basis.

Questions about this guidance may be directed to DNR's Environmental Emergency Response Section at 573-526-3349 (non-emergency), or 573-634-2436 (emergency), or to DPS's Division of Fire Safety at 573-51-2930 (non-emergency).

On the Web:

www.dnr.mo.gov -- http://www.dnr.mo.gov/pubs/pub212.pdf, or
www.dfs.dps.mo.gov

PUB000212

APPENDIX J

MDNR FACT SHEET

OPEN BURNING UNDER MISSOURI REGULATIONS

Missouri Department of Natural Resources

Facts on Open Burning Under Missouri Regulations

Air Pollution Control Program fact sheet 1/2008

Open burning is the burning of any materials in which air contaminants are emitted directly into the air without first passing through a stack or chimney. This fact sheet summarizes allowable and prohibited open burning under Missouri regulations. It does not include open burning restrictions that city or county governments may impose in addition to Missouri's state regulations. Prior to conducting any open burning, businesses and citizens should contact the city or county of jurisdiction for any local restrictions.

The open burning of certain trade wastes and tires is prohibited because the toxic emissions that can be released are harmful to human health. Smoke from fires also typically produces large amounts of small particulate matter that can be inhaled, causing respiratory problems. The burning of common household trash, including paper products and food wastes, can also have severe consequences. Studies have indicated the open burning of an individual household's trash could release pollutants in higher levels than the burning of the trash of thousands of homes by a municipal waste incinerator because the lower combustion temperatures prevent complete incineration. These pollutants can include dioxins, volatile organic compounds, acetaldehyde, formaldehyde, hydrogen chloride and naphthalene. Open burning exposes individuals to toxic emissions that may irritate the eyes, skin and upper respiratory tract. The central nervous system can also be affected causing headaches, dizziness and fatigue.

Because of these potential dangers, the Missouri Department of Natural Resources strongly discourages open burning of any material prior to investigating alternatives. Some rural areas can participate in a "green box" service, which provides a trash collection point near a centrally located county road for local residents to use. Green boxes are usually picked up or emptied once a week. Other options include waste disposal services, waste diversion, recycling and composting. Contact your local Solid Waste Management District for assistance in implementing these safer alternatives to open burning.

Prohibited Open Burning Under State Regulation

Any waste generated by a business, trade, industry, salvage or demolition operation cannot be burned without a permit issued by the Department of Natural Resources or its delegated local agency. Permits will only be considered for untreated wood wastes. Wastes that may not be burned include but are not limited to tires, rubber products, hazardous materials, styrofoam, plastics, petroleum based products, demolition waste, treated wood and any asbestos-containing material.

Allowable Open Burning Under State Regulations

Note: Local governments may have stricter laws and policies

Open Burning of Household Refuse

General Provisions: Missouri allows open burning of household refuse from four dwelling units or less provided it originates and is burned on the same premises. This exemption does not apply to mobile home parks or apartment complexes. Residential waste is solid waste produced by routine household activities, such as paper waste and garbage from daily activities. This does not include home remodeling wastes, wastes from home businesses, durable goods such as old appliances, carpets or furniture, tires or other nonroutine household waste. Materials such as tires or used oil may not be used to start the fires or be burned in the fires.

Kansas City and St. Joseph metropolitan areas: Open burning is allowed provided it occurs within an area zoned for agricultural purposes and outside the portion of the metropolitan areas surrounding the corporate limits of Kansas City and St. Joseph and their bordering municipalities.

Outstate area: No special day, time or location restrictions.

Springfield-Greene County area: Open burning is allowed provided that burning takes place outside the corporate limits of Springfield and only within areas zoned A-1, Agricultural District.

St. Louis metropolitan area: Open burning of household refuse is prohibited in the St. Louis metropolitan area.

Open Burning of Yard Wastes

General Provisions: Missouri allows open burning of yard wastes from sites provided it originates and is burned on the same premises. Materials such as tires or used oil may not be used to start the fires or be burned in the fires. Yard waste includes trees, tree leaves, brush or other vegetation.

Kansas City metropolitan area: Open burning of trees, tree leaves, brush or any other type of vegetation requires an open burning permit.

St. Joseph metropolitan area: Open burning of residential yard wastes is allowed only during a three week period in spring and during a three-week period in fall between 10 a.m. and 3:30 p.m. The two, three-week periods are to be determined by the city along with state agencies and the state fire marshal.

Outstate area: No special day, time or location restrictions.

Springfield-Greene County area: Open burning of trees, brush or any other type of vegetation requires an open burning permit. The open burning of leaves is prohibited.

St. Louis metropolitan area: Open burning of trees, tree leaves or brush is allowed only in areas outside of incorporated municipalities from Sept. 16 to April 14 of each calendar year. These brush piles are limited to a base of 16 square feet and the burning is allowed from 10 a.m. through 4 p.m.

Open Burning for Fire Training Purposes

Missouri allows fires set for the purpose of training fire fighters provided they are conducted in accordance with National Fire Protection Association Standards 600 and 1403. Timely notification should be provided to the appropriate regional office or delegated local agency. All fire training exercises involving donated or acquired structures must be conducted in compliance with 40 CFR part 61 subpart M, *National Emission Standard for Hazardous Air Pollutants-Asbestos*. The use of donated or acquired structures for training is discussed in Publication 2029. All petroleum based products and asbestos containing materials must be removed from donated or acquired structures prior to any burning.

Open Burning in Agricultural, Natural Resource or Land Management Operations

Missouri allows agricultural burning throughout the state. However, several exceptions apply. Materials such as tires or used oil may not be used to start the fires or be burned in the fires. Any burning that creates a health hazard, nuisance or produces smoke that impairs visibility for those operating motor vehicles or airplanes is prohibited. Contact the St. Louis Regional Office before burning in the St. Louis metropolitan area from April 15 to Sept. 15. Botanical nursery operations (greenhouses) are not considered agricultural operations.

Open Burning in Land Clearing Operations

Open burning of tree trunks, tree limbs and vegetation from land clearing operations is allowed without an ACD or permit in the outstate area if the burning takes place outside the city limits of any incorporated area or municipality and at least 200 yards from the nearest inhabited dwelling. Materials such as tires or used oil may not be used to start the fires or be burned in the fires. Permits containing special conditions may be issued by regional offices or local agencies for sites unable to comply with the requirements above. See the Required Open Burning Permits section below for exceptions in the Springfield-Greene County area, and Kansas City and St. Louis Metropolitan areas.

Open Burning at Wood Processing Facilities

Open burning of untreated wood waste from wood processing facilities is allowed if production is less than 8,000 board-feet per day and the facility was in existence as of March 25, 1976, but has not relocated to a new site. The burning also must be done at least 200 yards from the nearest occupied structure.

Open burning of untreated wood waste from wood processing facilities is allowed if production is less than 8,000 board-feet per day and the facility has relocated or from new wood processing facilities not in existence as of Sept. 18, 1970, and the facility and the burning are at least one mile outside city limits. The burning also must be done at least 200 yards from the nearest occupied structure.

Open Burning for Recreational Purposes

Campfires and other fires used solely for recreational purposes, ceremonial occasions or for outdoor noncommercial preparation of food are allowed in Missouri. Fires shall include only vegetative woody materials or untreated wood products.

Required Open Burning Permits

The open burning of certain trade wastes, primarily untreated wood wastes such as pallets or crates, throughout the state, and vegetation from land clearing operations in the Springfield-Greene County area and the Kansas City and St. Louis Metropolitan areas, may be permitted only when it can be shown that open burning is the only feasible method of disposal and that disposal is in the public interest. In the St. Louis nonattainment area, permits will not be issued

unless it can be shown that emissions from open burning would be less than any other waste management or disposal method. The open burning permit requires the facility, in most cases, to use an air curtain destructor.

Commercial and municipal utility tree trimming operations must submit a request to the appropriate regional office for an annually renewable open burning permit. The request must describe the general size, condition and age of the tree trunks and tree limbs to be open burned. Air curtain destructors are generally required at dedicated sites where burning occurs.

Commercial and municipal utility tree trimming operations must submit an application for an open burning permit to the appropriate regional office or local agency.

The information provided in this fact sheet should not be construed to permit open burning that causes or constitutes a public health hazard, nuisance or a hazard to vehicular or air traffic or violates any other rule or statute.

Definitions

St. Louis metropolitan area: The geographical area comprising St. Louis, St. Charles, Jefferson and Franklin Counties and the city of St. Louis. These counties are also currently a nonattainment area for ground-level ozone.

Springfield-Greene County area: The geographical area contained within Greene County.

Kansas City metropolitan area: The geographical area comprising Jackson, Cass, Clay, Platte, Ray and Buchanan counties.

Outstate area: The geographical area comprising those counties not contained in the St. Louis metropolitan area, the Springfield-Greene County area or the Kansas City metropolitan area.

Air Curtain Destructor: An air pollution control device designed to increase burning efficienc, reducing air contaminant emissions during open burning.

Open Burning Permit: A permit that must be applied for and then granted in order to open burn or open burn with restrictions. Permit applications must be sent to the Regional Office or local agency that has jurisdiction over your area. Applications are available at www.dnr.mo.gov/forms or any regional or local agency office.

Untreated Wood: Lumber and other wooden materials that have not been chemically treated for resistance to moisture, fire, fungi, insects and other pests or has not otherwise been treated or manufactured with chemicals, or that does not contain adhesives or resins. Untreated wood does not include plywood, particleboard, chipboard or wood with other than minimal amounts of paint, coating or finish.

For More Information

Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 751-4817 office
(573) 751-2706 fax
www.dnr.mo.gov/env/apcp/index.html

Missouri Department of Natural Resources
Solid Waste Management Program
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 751-5401 office
(573) 526-3902 fax
www.dnr.mo.gov/env/swmp/index.html

APPENDIX K

NOTICE OF TERMINATION (NOT)

FORM H

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION BRANCH
(SEE MAP FOR APPROPRIATE REGIONAL OFFICE)

FORM H - REQUEST FOR TERMINATION OF A GENERAL PERMIT UNDER MISSOURI CLEAN WATER LAW

1.00 TYPE OF GENERAL PERMIT REQUESTED TO BE TERMINATED

1.10 PERMIT NUMBER

MO —

2.00 FACILITY

NAME		COUNTY	
ADDRESS	CITY	STATE	ZIP CODE

3.00 OWNER

NAME	E-MAIL	PHONE	
		FAX	
ADDRESS	CITY	STATE	ZIP

4.00 CONTINUING AUTHORITY

NAME		PHONE	
		FAX	
ADDRESS	CITY	STATE	ZIP

5.00 REASON FOR TERMINATION REQUEST: (CHECK ONE)

☐ For land disturbance sites, area is stabilized by seeding, mulching, sodding, paving, or other means, no further land disturbance activities are planned, all building construction (commercial or residential) is completed, and construction equipment removed.

☐ For industrial facilities, site activities have ceased and site closed and no significant materials remain exposed to storm water.

☐ For any type of site, a site specific permit was obtained.

☐ Other reason (specify) _____

_____

_____

6.00 I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION CONTAINED IN THE TERMINATION REQUEST, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF SUCH INFORMATION IS TRUE, COMPLETE AND ACCURATE.

NAME AND OFFICIAL TITLE (TYPE OR PRINT)	TELEPHONE NO. ( ) (AREA CODE)
SIGNATURE	DATE SIGNED

APPENDIX L

CITY WIDE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM STORM WATER DISCHARGE GENERAL PERMIT

CITY OF JOPLIN
MOR100050, Jasper

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

OCT 16 2014

City of Joplin
602 S. Main Street
Joplin, MO 64801

Dear City of Joplin:

Enclosed please find your Missouri State Operating Permit which authorizes land disturbance activities for City of Joplin. This permit has been issued at your request and is based upon information submitted in your application to the department.

Please note that prior to the beginning of land disturbance activities other permits may also be required. Especially note the requirements for a Missouri Department of Natural Resources 401 Water Quality Certification and the U.S. Army Corps of Engineers 404 permit. A 401 Certification is needed when placing material, or fill, into the jurisdictional waters of the Unites States. Examples are culverts under road crossings, riprap along stream banks and storm water outfall pipes. The term jurisdictional waters refers to large lakes, rivers, streams and wetlands, including those that don't always contain water.

The permitting and certification process is shared between the department and the U.S. Army Corps of Engineers. More details can be found at the US Army Corps of Engineer's Website at http://www.usace.army.mil/. Some of these activities are also described on page 2, item 3 of the enclosed permit.

This permit contains several requirements and should be thoroughly read and understood by you. If your permit requires environmental monitoring, copies of the necessary forms have been enclosed. In all future correspondence regarding your permit please reference your permit number as shown on page 1 of the permit.

Please contact the Water Pollution Enforcement and Compliance Unit if you would like to schedule an Environmental Assistance Visit (EAV) at 573-751-1300. During the visit, staff will review the requirements of the permit and answer any questions that you may have. Staff will also be available to walk the site to advise on Best Management Practices required by the permit. The department's regional office staff may also contact you to schedule an EAV.

If you were adversely affected by this decision, you may be entitled to an appeal before the administrative hearing commission pursuant to 10 CSR 20-1.020 and Sections 644.051.6 and 621.250, RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission. Contact information for the AHC is as follows: Administrative Hearing Commission, Truman State Office Building, Room 640, 301 W. High Street, P.O. Box 1557, Jefferson City, MO 65102, Phone: 573-751-2422, Fax: 573-751-5018, Website: www.oa.mo.gov/ahc.

Please be aware that this facility may also be subject to any applicable county or other local ordinances or restrictions.

Sincerely,

WATER PROTECTION PROGRAM

John Madras

John Madras
Director

JM/sm

Enclosure

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

General Operating Permit

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No:	MOR100050
Owner:	CITY OF JOPLIN
Address:	602 S. MAIN STREET JOPLIN, MO 64801
Continuing Authority:	CITY OF JOPLIN 602 S. MAIN STREET JOPLIN, MO 64801
Facility Name:	CITY OF JOPLIN
Facility Address:	602 S. MAIN STREET JOPLIN, MO 64801
Legal Description:	SE 1/4, SE 1/4, Sec. 03, T27N, R33W, Jasper County
UTM Coordinates:	365478.661/4105416.451
Receiving Stream:	Tributary to Joplin Creek (U)
First Classified Stream - ID#:	Turkey Cr. (P) 303(d) 3216.00
USGS# and Sub Watershed#:	11070207 - 0901

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein.

FACILITY DESCRIPTION All Outfalls SIC #1629

All Outfalls - Construction or land disturbance activity (e.g., clearing, grubbing, excavating, grading and other activity that results in the destruction of the root zone and/or land disturbance activity that is reasonably certain to cause pollution of waters of the state)

This permit authorizes only wastewater, including storm water, discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System, it does not apply to other regulated areas. This permit may be appealed in accordance with RSMo Section 644.051.6 and 621.250, 10 CSR 20-6.020, and 10 CSR 20-1.020.

October 16, 2014
Issue Date

Sara Parker Pauley
Sara Parker Pauley, Director
Department of Natural Resources

May 30, 2017
Expiration Date

John Madras
John Madras
Director, Water Protection Program

A. APPLICABILITY

1. This general permit authorizes the discharge of stormwater and certain non-stormwater discharges from land disturbance sites that disturb one or more acres of land or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project.

   This general permit also authorizes the discharge of stormwater and certain non-stormwater discharges from smaller projects where the Missouri Department of Natural Resources (Department) has exercised its discretion to require a permit [10 CSR 20-6.200 (1)(B)].

   This general permit is issued to a city, county, state or federal agency or other governmental jurisdiction for land disturbance projects performed by or under contract to the permittee. A stormwater control plan or stormwater pollution prevention plan (SWPPP) must be developed prior to issuance of this permit. These plans must include a narrative of the types and appropriate uses of Best Management Practices (BMPs) for erosion and sediment control and stormwater management.

   All water pollution controls on land disturbance sites shall conform to the storm water control program and/or SWPPP of the city, county or other governmental jurisdiction in which the land disturbance activity is occurring. These storm water control programs and/or SWPPPs shall be developed prior to permit issuance. The requirements of the stormwater control program and/or SWPPP must be at least as stringent as those described in this permit and 10 CSR 20-6.200. If the permittee is a regulated municipal separate stormwater system (MS4), the stormwater program and/or SWPPP must comply with the permittee's MS4 permit. The Department may enforce the requirements of the stormwater program and/or SWPPP.

   All projects covered under this permit must also be identified as part of the Missouri State Operating Permit covered area and must have a SWPPP developed specific to the project site. The site specific SWPPP shall be developed prior to removal of any vegetation or site disturbance. This SWPPP must contain all the SWPPP requirements of this permit.

   Any site owner/operator subject to these requirements for stormwater discharges and who disturbs land *prior* to permit issuance from the Department or prior to the development of the SWPPP is in violation of both State and Federal Laws.

   The legal owner of the property, the right-of-way or the easement on which the site is located and the operator are responsible for compliance with this permit.

2. This permit authorizes discharges from construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that appropriate stormwater controls are designed, installed, maintained and provided:
   a. The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
   b. The support activity is not a commercial operation; and
   c. The support activity does not continue to operate beyond the completion of the construction activity at the project it supports.

   It is the permittee that is responsible for compliance with this permit for any construction support activities.

3. This permit authorizes non-stormwater discharges from the following activities provided that these discharges are addressed in the SWPPP required by this general permit:
   a. De-watering activities if there are no contaminants other than sediment present in the discharge, and the discharge is treated as specified in Requirements, Section C.10.1. of this permit;
   b. Flushing water hydrants and potable water lines;
   c. Water only (i.e., without detergents or additives) rinsing of streets and buildings; and
   d. Site watering to establish vegetation.

4. This general permit does not authorize the placement of fill materials in flood plains, the obstruction of stream flow, directing stormwater across private property not owned or operated by the permittee, or changing the channel of a defined drainage course. This general permit addresses only the quality of the stormwater runoff and the minimization of off-site migration of sediments and other water contaminants.

5. This general permit does not authorize any discharge to waters of the state of sewage or pollutants including but not limited to:
   a. Any hazardous material, oil, lubricant, solid waste or other non-naturally occurring substance from the site, including fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
   b. Soaps or solvents used in vehicle and equipment washing;
   c. Hazardous substances or petroleum products from an on-site spill or handling and disposal practices,
   d. Wash and/or rinse waters from concrete mixing equipment including ready mix concrete trucks, unless managed by an appropriate control. Any such pollutants must be adequately treated and addressed in the SWPPP, and cannot be discharged to waters of the state;
   e. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
   f. Wastewater generated from air pollution control equipment or the containment of scrubber water in lined ponds;
   g. Domestic wastewaters, including gray waters; or
   h. Industrial stormwater runoff.

6. The Department reserves the right to revoke or deny coverage under this general permit to applicants for stormwater discharges from land disturbance activities at sites that have contaminated soils that will be disturbed by the land disturbance activity or where such materials are brought to the site to use as fill or borrow. A site-specific permit may be required to cover such activities.

7. If Department may require any person authorized by a general permit to apply for and obtain an individual operating permit [10 CSR 20-6.010 (13) (C)].

   The Department may require the permittee to apply for and obtain a site-specific or different general permit if:
   a. The permittee is not in compliance with the conditions of this general permit;
   b. The discharge no longer qualifies for this general permit due to changed site conditions and/or regulations; or
   c. Information becomes available that indicates water quality standards have been or may be violated.

8. The permittee will be notified in writing of the requirement to apply for a site-specific permit or a different general permit. When a site-specific permit or different general permit is issued to the authorized permittee, the applicability of this general permit to the permittee is automatically terminated upon the effective date of the site specific or different general permit.

9. Any owner/operator authorized by a general permit may request to be excluded from the coverage of the general permit and apply for a site-specific permit [10 CSR 20-6.010 (13)(D)].

10. This permit does not authorize land disturbance activity in jurisdictional waters of the United States as defined by the Army Corps of Engineers, unless the permittee has obtained the required 404/401 permit. Land disturbance activities may not begin in the affected portions of the site until the required 404/401 permits have been obtained.

11. This permit does not supersede compliance with the Historic Preservation Act or the Endangered Species Act.

12. This permit does not supersede any requirement for obtaining project approval under an established local authority.

13. This permit is not transferable to other owners or operators.

B. EXEMPTIONS FROM PERMIT REQUIREMENTS

1. Facilities that discharge all stormwater runoff directly to a combined sewer system are exempt from stormwater permit requirements.

2. Land disturbance activity as described in [10 CSR 20-6.200 (1) (B)] and [10 CSR 20-6.010 (1) (B)] where water quality standards are not exceeded.

3. Linear, strip, or ribbon construction (as described in [10 CSR 20-6.200 (1) (B) 8]) where water quality standards are not exceeded.

4. Sites that disturb less than one acre of total land area as described in [10 CSR20-6.200 (1)(B)7], that are not part of a common plan or sale and that do not cause any violations of water quality standards, and are not otherwise designated by the Department as requiring a permit.

5. Agricultural stormwater discharges and irrigation return flows as described in [10CSR 20-6.200 (1) (B) 6].

C. REQUIREMENTS

These requirements do not supersede nor remove any requirement to comply with county or other local ordinances [10 CSR20-6.010(14) (D)]:

1. This permit is to ensure the design, the installation and the maintenance of effective erosion controls and sediment controls to minimize the discharge of pollutants. At minimum, such controls must be designed, installed and maintained to:
   a. Control stormwater volume and velocity within the site to minimize soil erosion;
   b. Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion;
   c. Minimize the amount of soil exposed during construction activity;
   d. Minimize the disturbance of steep slopes;

e. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle size expected to be present on the site.;
f. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible; and
g. Minimize soil compaction and, unless infeasible, preserve topsoil.

2. The primary requirement of this permit is the development and implementation of a SWPPP which incorporates site specific practices to best minimize the soil exposure, soil erosion, and the discharge of pollutants. The permittee shall fully implement the provisions of the SWPPP required under this part as a condition of this general permit throughout the term of all land disturbance projects covered under this permit.

3. The permittee must inspect all land disturbance sites as described in C.13 of this permit.

4. The permittee shall provide a list of active land disturbance sites to the Department on a quarterly basis. The list shall contain the name of the project, location (including the County), name of the primary receiving water(s) for each project, description of the project, number of acres disturbed, percent completion of the project and projected date of completion. The permittee shall submit quarterly reports each January, April, July and October. The Department must receive reports by the end of the specified month.

5. The permittee is required to keep a current copy of the SWPPP at an easily accessible location so that it can be made available at the time of an onsite inspection by the Department or local agency approving stormwater management plans.

   The SWPPP must:
   a. List and describe all outfalls or primary receiving water(s) for the project;
   b. Incorporate required practices identified below;
   c. Incorporate erosion control practices specific to site conditions;
   d. Provide for maintenance and adherence to the plan;
   e. Discuss whether or not a 404/401 Permit is required for the project; and
   f. Name the person responsible for inspection, operation and maintenance of BMPs.

   The purpose of the SWPPP is to ensure; the design, implementation, management and maintenance of Best Management Practices (BMPs) in order to prevent sediment and other pollutants in stormwater discharges associated with the land disturbance activities; compliance with the Missouri Water Quality Standards; and compliance with the terms and conditions of this general permit.

   The permittee shall select, install, use, operate and maintain appropriate BMPs for the permitted site. The following manuals are acceptable resources for the selection of appropriate BMPs.

   Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Activities (Document number EPA 833-R-06-004) published by the United States Environmental Protection Agency (USEPA) in May 2007. This manual as well as other information, including examples of construction SWPPPs, is available at the USEPA internet site at http://cfpub1.epa.gov/npdes/stormwater/swppp.cfm; and

The latest version of *Protecting Water Quality: A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri,* published by the Missouri Department of Natural Resources. This manual is available on the Department's internet site at: http://www.dnr.mo.gov/env/wpp/wpcp-guide.htm.
The permittee is not limited to the use of these guidance manuals. Other guidance publications may be used to select appropriate BMPs. However, all BMPs should be described and justified in the SWPPP.

6. SWPPP Requirements: The following information and practices shall be provided for in the SWPPP:
   a. Nature of the Construction Activity: The SWPPP briefly must describe the nature of the construction activity, including:
      1) The function of the project (e.g., low density residential, shopping mall, highway, etc.);
      2) The intended sequence and timing of activities that disturb the soils at the site;
      3) Estimates of the total area expected to be disturbed by excavation, grading, or other construction activities including off-site borrow and fill areas; and
      4) A general map (e.g., United States Geological Survey quadrangle map, a portion of a city of county map, or other map) with enough detail to identify the location of the construction site and waters of the United States within one mile of the site.

   b. Site Map: The SWPPP must contain a legible site map showing the site boundaries and outfalls and identifying:
      1) Direction(s) of stormwater flow and approximate slopes anticipated after grading activities;
      2) Areas of soil disturbance and areas that will not be disturbed (or a statement that all areas of the site will be disturbed unless otherwise noted);
      3) Location of major structural and non-structural BMPs identified in the SWPPP;
      4) Locations where stabilization practices are expected to occur;
      5) Locations of off-site material, waste, borrow or equipment storage areas;
      6) Locations of all waters of the United States (including wetlands);
      7) Locations where stormwater discharges to a surface water; and
      8) Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

   c. Site Description: In order to identify the site, the SWPPP shall include facility and receiving water(s) information. The SWPPP shall have sufficient information to be of practical use to contractors and site construction workers to guide the installation and maintenance of BMPs.

   d. Effluent Limits: The permittee must select control measurements (e.g., BMPs, controls, practices, etc.) to meet effluent limits found in Section E.1. of this permit. All control measures must be properly selected, installed and maintained in accordance with any relevant manufacturer specifications and good engineering practices to ensure stormwater outfall discharges do not cause water quality problems. The permittee must implement the control measures from commencement of the construction activity until final stabilization is complete unless the exception noted in Section C.6.i. of this permit applies.

   e. Selection of Temporary and Permanent Non-Structural BMPs: The permittee shall select appropriate non-structural BMPs for use at the site and list them in the SWPPP. The SWPPP shall require existing vegetation to be preserved where practical. For surface waters located on or immediately adjacent to the site, the permittee must provide at minimum a 25-foot buffer of undisturbed natural vegetation between the disturbed portions of the site and the surface water unless infeasible or where there is a more stringent local requirement. The buffer is measured perpendicularly from the ordinary high water mark or the bank edge, whichever is further landward from the water. The time period for disturbed areas to be without vegetative cover is to be minimized to the maximum extent practicable.
   Examples of non-structural BMPs which the permittee should consider specifying in the SWPPP include preservation of trees and mature vegetation, protection of existing vegetation

for use as buffer strips, mulching, sodding, temporary seeding, final seeding, geotextiles, stabilization of disturbed areas, preserving existing stream channels as overflow areas when channel straightening or shortening is allowed, soil stabilizing emulsions and tackifiers, mulch tackifiers, stabilized site entrances/exits and other appropriate BMPs.

f. Selection of Temporary and Permanent Structural BMPs: The permittee shall select appropriate structural BMPs for use at the site and list them in the SWPPP. Examples of structural BMPs that the permittee should consider specifying in the SWPPP include diverting flows from undisturbed areas away from disturbed areas, silt (filter fabric and/or straw bale) fences, earthen diversion dikes, drainage swales, sediment traps, rock check dams, subsurface drains (to gather or transport water for surface discharge elsewhere), pipe slope drains (to carry concentrated flow down a slope face), level spreaders (to distribute concentrated flow into sheet flow), storm drain inlet protection and outlet protection, reinforced soil retaining systems, gabions, temporary or permanent sediment basins and other appropriate BMPs.

g. Description of BMPs: The SWPPP shall include a description of both structural and non-structural BMPs that will be used at the site.

The SWPPP shall provide the following general information for each BMP which will be used one or more times at the site:

1) Physical description of the BMP;
2) Site and physical conditions that must be met for effective use of the BMP;
3) BMP installation/construction procedures, including typical drawings; and
4) Operation and maintenance procedures for the BMP.

The SWPPP shall provide the following information for each specific instance where a BMP is to be installed:

1) Whether the BMP is temporary or permanent;
2) Where, in relation to other site features, the BMP is to be located;
3) When the BMP will be installed in relation to each phase of the land disturbance procedures to complete the project; and
4) Site conditions that must be met before removal of the BMP if the BMP is not a permanent BMP.

h. Disturbed Areas: Slopes for disturbed areas must be defined in the SWPPP. A site map or maps defining the sloped areas for all phases of the project must be included in the SWPPP.

Temporary stabilization is to take place where soil disturbing activities will cease on any portion of the site and are not planned to resume for a period exceeding 14 calendar days. Temporary stabilization must be initiated immediately upon knowing the duration is more than 14 days. Temporary stabilization must be completed within 7 calendar days. Temporary stabilization shall consist of well-established and maintained BMPs that are reasonably certain to protect waters of the state from sediment pollution over an extended period of time. This may require adding more BMPs to an area than is normally used during daily operations. These BMPs may include a combination of sediment basins, check dams, sediment fences and mulch. The types of BMPs used must be suited to the area disturbed, taking into account the number of acres exposed and the steepness of the slopes. If the slope of the area is greater than 3:1 (3 feet horizontal to one foot vertical) or if the slope is greater than 3% and greater than 150 feet in length, then the permittee shall establish temporary stabilization within seven days of ceasing operations on that part of the site.

Final stabilization of disturbed areas must be initiated immediately and completed within 7 calendar days whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site.

Allowances to the 7 day completion period for temporary and final stabilization may be made due to weather and equipment malfunctions. The use of allowances shall be documented in the SWPPP.

i. Installation: The permittee shall ensure the BMPs are properly installed at the locations and relative times specified in the SWPPP. Peripheral or border BMPs to control runoff from disturbed areas shall be installed or marked for preservation before general site clearing is started. Note that this requirement does not apply to earth disturbances related to initial site clearing and establishing entry, exit and access of the site, which may require that stormwater controls be installed immediately after the earth disturbance. Stormwater discharges from disturbed areas which leave the site shall pass through an appropriate impediment to sediment movement such as a sedimentation basin, sediment traps and silt fences prior to leaving the land disturbance site. A drainage course change shall be clearly marked on a site map and described in the SWPPP. The location of all BMPs must be indicated on a site map, included in the SWPPP.

j. Sedimentation Basins: The SWPPP shall include a sedimentation basin for each drainage area with ten or more acres disturbed at one time. The sedimentation basin shall be sized to contain a volume of at least 3,600 cubic feet per each disturbed acre draining thereto. Accumulated sediment shall be removed from the basin when basin is 50% full. When discharging from basins and impoundments, utilize outlet structures that withdraw water from the surface unless infeasible. Discharges from the basin shall not cause scouring of the banks or bottom of the receiving stream. The SWPPP shall require the basin be maintained until final stabilization of the disturbed area served by the basin.

Where use of a sediment basin is impractical, the SWPPP shall evaluate and specify other similarly effective BMPs to be employed to control erosion and sediment delivery. These similarly effective BMPs shall be based on good engineering practices. The BMPs must provide equivalent water quality protection to achieve compliance with this permit. The SWPPP shall require both temporary and permanent sedimentation basins to have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

k. Pollution Prevention Measures: The SWPPP shall include BMPs for pollution prevention measures. At minimum such measures must be designed, installed, implemented and maintained to:
   1) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge ;
   2) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
   3) Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures. Included but not limited to the installation of containment berms and use of drip pans at petroleum product and liquid storage tanks and containers.

l. Dewatering: Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls. The SWPPP shall include a description of any anticipated dewatering methods including the anticipated volume of water to be discharged and the anticipated maximum flow discharged from these dewatering activities expressed in gallons per minute. Maximum flow may be stated in the SWPPP as an estimate based on the type and capacity of equipment being used for dewatering. The SWPPP shall call for specific BMPs designed to treat water pumped from trenches and excavations and in no case shall this water be pumped off-site without being treated by the specified BMPs. When discharging from basins and impoundments utilize outlet structures that withdraw water from the surface, unless infeasible.

m. Roadways: Where applicable, upon installation of or connection to roadways, all efforts should be made to prevent the deposition of earth and sediment onto roadways through the use of proper BMPs. Stormwater inlets susceptible to receiving sediment from the permitted land disturbance site shall have curb inlet protection. Where stormwater will flow off the end of where a roadway terminates, a sediment catching BMP such as gravel berm or silt fence shall be provided. Roadways and curb inlets shall be inspected weekly or following a rainfall that generates a run-off and cleaned as necessary to maintain a clean roadway and drainage system. Where practicable, construction entrance BMP controls shall be used to prevent sediment track-out.

7. Good housekeeping practices shall be maintained at all times to keep waste from entry into waters of the state. Solid and hazardous waste management include providing trash containers and regular site clean-up for proper disposal of solid waste such as scrap building material, product/material shipping waste, food containers and cups, and providing containers and proper disposal of waste paints, solvents and cleaning compounds. The provision of portable toilets for proper disposal of sanitary sewage and the storage of construction materials should be kept away from drainage courses and low areas.

8. All fueling facilities present shall at all times adhere to applicable federal and state regulations concerning underground storage, above ground storage and dispensers.

9. Hazardous wastes that are transported, stored, or used for maintenance, cleaning, or repair shall be managed according to the provisions of the Missouri Hazardous Waste Laws and Regulations.

10. All paint, solvents, petroleum products, petroleum waste products and storage containers such as drums, cans, or cartons shall be stored according to BMPs. The materials exposed to precipitation shall be stored in watertight, structurally sound, closed containers. All containers shall be inspected for leaks or spillage during the once per week inspection of BMPs.

11. Amending/Updating the SWPPP: The permittee shall amend and update the SWPPP as appropriate during the term of the land disturbance activity. The permittee shall amend the SWPPP at a minimum whenever the:
    a. Design, operation, or maintenance of BMPs is changed;
    b. Design of the construction project is changed that could significantly affect the quality of the stormwater discharges;
    c. Permittee's inspections indicate deficiencies in the SWPPP or any BMP;
    d. The Department notifies the permittee in writing of deficiencies in the SWPPP;
    e. SWPPP is determined to be ineffective in minimizing or controlling erosion and sedimentation (e.g., there is visual evidence of excessive site erosion or excessive sediment deposits in streams or lakes);
    f. Settleable Solids from a stormwater outfall exceed 2.5 ml/L; and
    g. The Department determines violations of water quality standards may occur or have occurred.

12. An individual shall be designated by the permittee as responsible for environmental matters. The individual responsible for environmental matters shall have a thorough and demonstrable knowledge of the site's SWPPP and sediment and erosion control practices in general. The individual responsible for environmental matters or a designated inspector knowledgeable in erosion, sediment and stormwater control principles shall inspect all structures that function to prevent pollution of waters of the state including those for material, waste, borrow, or equipment storage and maintenance areas that are covered by this permit. These inspections shall be conducted in accordance with No. 13 of these requirements.

13. Site Inspection Reports: The permittee (or a representative of the permittee) shall conduct regularly scheduled inspections at least once per seven calendar days. These inspections shall be conducted by a qualified person, one who is responsible for environmental matters at the site, or a person trained by and directly supervised by the person responsible for environmental matters at the site. For disturbed areas that have not been finally stabilized, all installed BMPs and other pollution control measures shall be inspected for proper installation, operation and maintenance. All stormwater outfalls shall be inspected for evidence of erosion or sediment deposition. When practicable the receiving stream shall also be inspected for 50 feet downstream of the outfall. Any structural or maintenance problems shall be noted in an inspection report and corrected within seven calendar days of the inspection. If a rainfall causes stormwater runoff to occur on-site, the BMPs must be inspected. These inspections must occur within 48 hours after the rain event has ceased during a normal work day and within 72 hours on the next business day if the rain event ceases during a non-work day such as a weekends or holiday. The total rainfall measured for that day must be recorded. A properly maintained rain gauge must be kept on site or the storm event information may be obtained from a weather station that is representative of your location.

    The SWPPP must explain how the person responsible for erosion control will be notified when stormwater runoff occurs. If weather conditions prevent correction of BMPs within 7 calendar days, the reasons for the delay must be documented (including pictures) and there must be a narrative explaining why the work cannot be accomplished within the 7 day time period. The documentation must be filed with the regular inspection reports. The permittee shall correct the problem as soon as weather conditions allow.

    A log of each inspection and a current copy, of all the inspection reports shall be kept at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or at the request of the Department. The inspection report shall be signed by the permittee or by the person performing the inspection if duly authorized to do so. The inspection report is to include the following minimum information:
    a. Inspector's name;
    b. Date of inspection;
    c. Observations relative to the effectiveness of the BMPs;
    d. Actions taken or necessary to correct the observed problem; and
    e. Listing of areas where land disturbance operations have permanently or temporarily stopped.

14. Proper Operation and Maintenance: The permittee shall at all times maintain all pollution control measures and systems in good order to achieve compliance with the terms of this general permit.

15. Notification to All Contractors: The permittee shall be responsible for notifying each contractor or entity (including utility crews and city employees or their agents) that will perform work at the site of the existence of the SWPPP and what action or precautions shall be taken while on-site to minimize the potential for erosion and the potential for damaging any BMP. The permittee is responsible for any damage a subcontractor may do to established BMPs and any subsequent water quality violation resulting from the damage.

16. Public Notification: The permittee shall post a copy of the public notification sign described by the Department at the main entrance to the site. The public notification sign must be visible from the public road that provides access to the site's main entrance. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP. The public notification sign must remain posted at the site until the permit has been terminated.

D. OTHER DISCHARGES

1. Hazardous Substance and Oil Spill Reporting: Refer to Section B, #14 of Part I of the Standard Conditions that accompany this permit.

2. Removed substances: Refer to Section B, #6 of Part I of the Standard Conditions that accompany this permit.

3. Change in discharge: In the event soil contamination or hazardous substances are discovered at the site during land disturbance activities, the permittee shall notify the Department's regional office by telephone as soon as practicable but no later than 24 hours after discovery. The permittee must also notify the Department's regional office in writing no later than 14 calendar days after discovery.

E. SAMPLING REQUIREMENTS AND EFFLUENT LIMITATIONS

1. Settleable Solids discharging from a stormwater outfall shall not exceed 2.5 ml/L per Standard Method 2540 F for storm events up to but not exceeding the local 2-year, 24-hour storm. The Settleable Solids limit does not apply during storm events that exceed the local 2-year, 24-hour storm.

2. The Department may require sampling and reporting as a result of illegal discharges, compliance issues, complaint investigations, or other such evidence of contamination from activities at the site. If such an action is needed, the Department will specify in writing any sampling requirements, including such information as location, extent and parameters.

F. RECORDS

1. The permittee shall retain copies of this general permit, the SWPPP and all amendments for the site named in the State Operating Permit, results of any monitoring and analysis and all site inspection records required by this general permit. The records shall be accessible during normal business hours. The records shall be retained for a period of at least three years from the date of the Letter of Termination.

2. The permittee shall provide a copy of the SWPPP to the Department, USEPA, or any local agency or government representative if they request a copy in the performance of their official duties.

3. The permittee shall ensure a copy of the SWPPP to those who are responsible for installation, operation, or maintenance of any BMP. The permittee, their representative, and/or the contractor(s) responsible for installation, operation and maintenance of the BMPs shall have a current copy of the SWPPP with them when on the project site.

G. LAND PURCHASE AND CHANGE OF OWNERSHIP

1. Federal and Missouri stormwater regulations [10 CSR 20-6.200] require a stormwater permit and erosion control measures for all land disturbances of one or more acres. These regulations also require a permit for less than one acre lots if the lot is part of a common plan of development or sale where that plan is at least one acre in size. If the permittee sells less than one acre of the permitted site to an entity for, commercial, industrial, or residential use, (unless sold to an individual for the purpose of building his/her own private residence and in accordance with No. 3 of this section) this land remains a part of the common sale and regulated by this permit. Therefore, the permittee is still responsible for erosion control on the sold property until termination of the permit.

2. If the permittee sells one or more acres of the permitted site to an entity, the new owner of the property must obtain a land disturbance permit for the purchased property. The original permittee must amend the SWPPP to show that the property (one acre or more) has been sold and therefore no longer under the original permit jurisdiction.

3. If the permittee has stabilized the less than one acre lot which is part of a larger common plan of development and the lot is sold to an individual for purposes of building his/her own private residence, the permittee is no longer responsible for erosion control on the lot.

4. Property of any size which is part of a larger common plan of development where the property has been stabilized and the original permit terminated will require application of a new land disturbance permit for any future land disturbance activity.

5. If the entire tract is sold to a single entity, then this permit shall be terminated when the new owner obtains a new land disturbance permit for the site.

H. TERMINATION

This permit may be terminated when the project is stabilized. The project is considered to be stabilized when perennial vegetation, pavement, buildings, or structures using permanent materials cover all areas that have been disturbed. With respect to areas that have been vegetated, vegetation cover shall be at least 70% plant density over 100% of the site. In order to terminate the permit, the permittee shall notify the Department.

The Cover Page (Certificate Page) of the Master General Permit for Land Disturbance specifies the "effective date" and the "expiration date" of the Master General Permit. The "issued date" along with the "expiration date" will appear on the State Operating Permit issued to the applicant. This permit does not continue administratively beyond the expiration date.

If the project or development completion date will be after the expiration date of this general permit, then the permittee must reapply to the Department for a new permit. The applicant must file a request to the Department for a new permit 180 days prior to the expiration of this permit.

If the permittee has not terminated the permit and the permit expires, and the permittee has not applied for a new permit the permittee will be consider "operating without a permit" if the site does not meet the requirements for termination.

I. MODIFICATION, REVOCATION, AND REOPENING

1. The U.S. Environmental Protection Agency (EPA) has proposed stormwater requirements that may direct the State to reopen this permit. The EPA is proposing to change its construction general permit (CGP) with more prescriptive requirements and design standards for buffers to prevent stormwater runoff, increased monitoring requirements and more frequent inspections. While the EPA permit is only effective in areas where EPA has permitting authority these requirements are likely to act as a template, setting a baseline for the agency's approval of state plans for permitting sites.

2. If at any time the Missouri Department of Natural Resources determines that the quality of waters of the state may be better protected by reopening this permit, or revoking this permit and requiring the owner/operator of the permitted site to apply for a site-specific permit, the Department may revoke a general permit and require any person to obtain such an operating permit as authorized by 10 CSR 20-6.010 (13) and 10 CSR 20-6.200(5).

3. If this permit is re-opened, modified or revoked pursuant to this Section, the permittee retains all rights under Chapter 536 and 644 Revised Statutes of Missouri upon the Department's reissuance of the permit as well as all other forms of administrative, judicial, and equitable relief available under law.

J. DUTY TO COMPLY

The permittee must comply with all conditions of this general permit. Any noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION
Revised
October 1, 1980

PART I - GENERAL CONDITIONS
SECTION A - MONITORING AND REPORTING

1. **Representative Sampling**
   a. Samples and measurements taken as required herein shal be representative of the nature and volume, respectively, of the monitored discharge. All samples shall be taken at the outfall(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.
   b. Monitoring results shall be recorded and reported on forms provided by the Department, postmarked no later than the 28th dayof the month following the completed reporting period. Signed copies of these, and all other reports required herein, shal be submitted to the respective Department Regional Office, the Regional Office address is indicated in the cover letter transmitting the permit.

2. **Schedule of Compliance**
   No later than fourteen (14) calendar days following each date identified in the "Schedule of Compliance", the permittee shall submit to the respective Department Regional Office as required therein, either a repet of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements, or if there are no more scheduled requirements, when such noncompliance will be corrected. The Regional Office address is indicated in the cover letter transmitting he permit.

3. **Definitions**
   Definitions as set forth in the Missouri Clean Water Law and Missouri Clean Water Commission Definition Regulation 10 CSR 20-2.010 shall apply to terms used herein.

4. **Test Procedures**
   Test procedures for the analysis of pollutant shall be in accordance with the Missouri Clean Water Commission Effluent Regulation 10 CSR 20-7015.

5. **Recording of Results**
   a. For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:
      (i) the date, exact place, and time of sampling or measurements;
      (ii) the individual(s) who performed the sampling or measurements;
      (iii) the date(s) analyses were performed;
      (iv) the individual(s) who performed the analyses;
      (v) the analytical techniques or methods used; and
      (vi) the results of such analyses.
   b. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate anymonitoring device or method required to be maintained under this permit shall, upon conviction, be punished bya fine of not more than $10,000 per violation, or by imprisonment for not more than six (6) months per violation, or both.
   c. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

6. **Additional Monitoring by Permittee**
   If the permittee monitors any pollutant at the location(s) designated herein more frequently than required bythis permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Monitoring Report Form. Such increased frequencyshall also be indicated.

7. **Records Retention**
   The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recording for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

SECTION B - MANAGEMENT REQUIREMENTS

1. **Change in Discharge**
   a. All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant not authorized by this permit or any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.
   b. Any facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants shall be reported by submission of a new NPDES application at least sixty (60) days before each such changes, or, if they will not violate the effluent limitations specified in the permit, by notice to the Department at least thirty (30) days before such changes.

2. **Noncompliance Notification**
   a. If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Department with the following information, in writing within five (5) days of becoming aware of such conditions:
      (i) a description of the discharge and cause of noncompliance, and
      (ii) the period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps beingtaken to reduce, eliminate and prevent `recurrence of the noncomplying discharge.
   b. Twenty-four hour reporting. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally with 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided with five (5) days of the time the permittee becomes aware of the circumstances. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

3. **Facilities Operation**
   Permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions. Operators or supervisors of operations at publicly owned or publicly regulated wastewater treatment facilities shall be certified in accordance with 10 CSR 209.020(2) and any other applicable law or regulation. Operators of other wastewater treatment facilities, water contaminant source or point sources, shall, upon request by the Department, demonstrate that wastewater treatment equipment and facilities are effectively operated and maintained by competent personnel.

4. **Adverse Impact**
   The permittee shall take all necessary steps to minimize any adverse impact to waters of the state resulting from noncompliance with any effluent limitations specified in this permit or set forth in the Missouri Clean Water Law and Regulations (hereinafter the Law and Regulations), including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. **Bypassing**
   a. Any bypass or shut down of a wastewater treatment facility and tributary sewer system or any part of such a facility and sewer system that results in a violation of permit limits or conditions is prohibited except:
      (i) where unavoidable to prevent loss of life, personal injury, or severe property damages; and
      (ii) where unavoidable excessive storm drainage or runoff would catastrophically damage any facilities or processes necessary for compliance with the effluent limitations and conditions of this permit;
      (iii) where maintenance is necessary to ensure efficient operation and alternative measures have been taken to maintain effluent quality during the period of maintenance.
   b. The permittee shall notify the Department in writing of all bypasses or shut down that result in a violation of permit limits or conditions. This section does not excuse any person from liability, unless such relief is otherwise provided by the statute.

6. **Removed Substances**
   Solids, sludges, filter backwash, or any other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutants from entering waters of the state unless permitted by the Law, and a permanent record of the date and time, volume and methods of removal and disposal of such substances shall be maintained by the permittee.

7. **Power Failures**
   In order to maintain compliance with the effluent limitations and other provisions of this permit, the permittee shall either:
   a. in accordance with the "Schedule of Compliance", provide an alternative power source sufficient to operate the wastewater control facilities; or,
   b. if such alternative power source is not in existence, and no date for its implementation appears in the Compliance Schedule, halt or otherwise control production and all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

8. **Right of Entry**
   For the purpose of inspecting, monitoring, or sampling the point source, water contaminant source, or wastewater treatment facility for compliance with the Clean Water Law and these regulations, authorized representatives of the Department, shall be allowed by the permittee, upon presentation of credentials and at reasonable times;
   a. to enter upon permittee's premises in which a point source, water contaminant source, or wastewater treatment facility is located or in which any records are required to be kept under terms and conditions of the permit;
   b. to have access to, or copy, any records required to be kept under terms and conditions of the permit;
   c. to inspect any monitoring equipment or method required in the permit;
   d. to inspect any collection, treatment, or discharge facility covered under the permit; and
   e. to sample any wastewater at any point in the collection system or treatment process.

9. **Permits Transferable**
   a. Subject to Section (3) of 10 CSR 20-6.010 an operating permit may be transferred upon submission to the Department of an application to transfer signed by a new owner. Until such time as the permit is officially transferred, the original permittee remains responsible for complying with the terms and conditions of the existing permit.
   b. The Department, within thirty (30) days of receipt of the application shall notify the new permittee of its intent to revoke and reissue or transfer the permit.

10. **Availability of Reports**
    Except for data determined to be confidential under Section 308 of the Act, and the Law and Missouri Clean Water Commission Regulation for Public Participation, Hearings and Notice to Governmental Agencies 10 CSR 20-6.020, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. As required by statute, effluent data shall not be considered confidential. Knowingly making any false statement on any such report shall be subject to the imposition of criminal penalties as provided in Section 204.076 of the Law.

11. **Permit Modification**
    a. Subject to compliance with statutory requirements of the Law and Regulations and applicable Court Order, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
       (i) violation of any terms or conditions of this permit or the Law;
       (ii) having obtained this permit by misrepresentation or failure to disclose fully any relevant facts;
       (iii) a change in any circumstances or conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge, or
       (iv) any reason set forth in the Law and Regulations.
    b. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

12. **Permit Modification - Less Stringent Requirements**
    If any permit provisions are based on legal requirements which are lessened or removed, and should no other basis exist for such permit provisions, the permit shall be modified after notice and opportunity for a hearing.

13. **Civil and Criminal Liability**
    Except as authorized by statute and provided in permit conditions on "Bypassing" (Standard Condition B-5) and "Power Failures" (Standard Condition B-7) nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

14. **Oil and Hazardous Substance Liability**
    Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act, and the Law and Regulations. Oil and hazardous materials discharges must be reported in compliance with the requirements of the Federal Clean Water Act.

15. **State Laws**
    Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state statute or regulations.

16. **Property Rights**
    The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, no does it authorize any injury to private property or any invasion of personal rights, nor any infringement of or violation of federal, state or local laws or regulations.

17. **Duty to Reapply**
    If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for a new permit 180 days prior to expiration of this permit.

18. **Toxic Pollutants**
    If a toxic effluent standard, prohibition, or schedule of compliance is established, under Section 307(a) of the Federal Clean Water Act for a toxic pollutant in the discharge of permittee's facility and such standard is more stringent than the limitations in the permit, then the more stringent standard, prohibition, or schedule shall be incorporated into the permit as one of its conditions, upon notice to the permittee.

19. **Signatory Requirement**
    All reports, or information submitted to the Director shall be signed (see 40 CFR-122.6).

20. **Rights Not Affected**
    Nothing in this permit shall affect the permittee's right to appeal or seek a variance from applicable laws or regulations as allowed by law.

21. **Severability**
    The provisions of this permit are severable, and if any provisions of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Missouri
Department of
Natural Resources

STORMWATER DISCHARGES FROM THIS LAND DISTURBANCE SITE ARE AUTHORIZED BY THE MISSOURI STATE OPERATING PERMIT NUMBER:

_____

IF YOU HAVE QUESTIONS OR CONCERNS ABOUT STORMWATER DISCHARGES FROM THIS SITE, PLEASE CONTACT THE MISSOURI DEPARTMENT OF NATURAL RESOURCES AT

1-800-361-4827

FACT SHEET

MOR100000 LAND DISTURBANCE GENERAL PERMIT
2012 Reissue

The purpose of this fact sheet is for permit clarity. It is not an enforceable part of the permit.
The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.
As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Fact Sheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

PART I. NPDES Stormwater General Permit

The vast majority of discharges associated with construction activity are covered under NPDES general permits. General permits cover a group of similar dischargers under one permit. General permits simplify the process for dischargers to obtain authorization to discharge, provide permit requirements for any discharger that applies for coverage, and reduce the administrative workload for NPDES permitting authorities.

This General Permit is for regulating stormwater discharge at land disturbance construction sites in Missouri. This program requires the owner or operator of a construction site disturbing land of one acre or greater, or less than one acre but part of a larger common plan of development, to obtain this permit prior to conducting any land disturbance activity.

PART II. The Need for Stormwater Regulations at Construction Sites

Stormwater runoff is a major source of urban water pollution endangering humans by polluting the water resources used for drinking, household purposes, recreation and fishing. Stormwater discharges often contain pollutants in amounts that could reduce water quality. The primary pollutants of concern from construction activities are silt and sediment, but other pollutants such as oils and grease, vehicle fluids, and debris are present as well.

Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris, and chemicals and transport these to a nearby storm sewer system or directly to a river, lake, or coastal water. Polluted stormwater runoff can harm or kill fish and other wildlife. Sedimentation can destroy aquatic habitat, and high volumes of runoff can cause stream bank erosion. Debris can clog waterways and potentially reach the ocean where it can kill marine wildlife and impact habitat.
Construction activities increase pollutant loads in runoff. The volume and rate of runoff are typically increased, providing a larger capacity to transport pollutants to rivers and lakes. In addition, the removal of vegetation leaves bare soil which is much more vulnerable to erosion, resulting in sediment moving into receiving waters.

Additional stormwater information and requirements including application for a land disturbance permit can be found at http://dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm.

PART III. Key Component and Primary Requirement of this Permit

The key component of this permit are effluent limitations that require the permittee to minimize discharge of pollutants in stormwater by using control measures that reflect best engineering practices base on federal and state government best professional judgment. Dischargers must minimize their discharge of pollutants in stormwater using appropriate erosion and sediment controls and control measures for other pollutants such as litter, construction debris, and construction chemicals that could be exposed to stormwater and other wastewater. The primary requirement of this general permit is the development and implementation of a stormwater pollution prevention plan (SWPPP) to document the steps they will take to comply with the terms, conditions and effluent limitations of the permit. Note that the SWPPP is not an effluent limitation, nor does it include effluent limitations. Information including examples of a SWPPP can be found at the following http://cfpub.epa.gov/npdes/stormwater/swppp.cfm#model. These examples should be used for educational or training purposes only. Construction site SWPPPs must be developed following the requirements of Missouri's land disturbance permit and describe the specific conditions of the site and plans for development.

PART IV. Additional Information for the Purpose of Permit Clarity

Applicability

- **"Industrial stormwater run-off"** are activities that take place at industrial facilities, such as material handling and storage, that are often exposed to the weather. As runoff from rain or snowmelt comes into contact with these activities, it can pick up pollutants and transport them to a nearby storm sewer system or directly to a river, lake, or coastal water. To

  minimize the impact of stormwater discharges from industrial facilities, the NPDES program includes an industrial stormwater permitting component that covers 10 categories of industrial activity that require authorization under an NPDES industrial stormwater permit for stormwater discharges. More information on industrial permit requirements can be found at http://dnr.mo.gov/env/wpp/stormwater/sw-industrial-permits.htm.

- A **"larger common plan of development or sale"** is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan. For example, if a developer buys a 20-acre lot and builds roads, installs pipes, and runs electricity with the intention of constructing homes or other structures sometime in the future, this would be considered a larger common plan of development or sale. If the land is parceled off or sold, and construction occurs on plots that are less than one acre by separate, independent builders, this activity still would be subject to stormwater permitting requirements if the smaller plots were included on the original site plan. Other than the less than one acre property sold to the individual for construction of their personal residence, property of any size which is part of a larger common plan of development where the property has been stabilized and the original permit terminated will require application of a new land disturbance permit for any future land disturbance activity. The larger common plan of development or sale also applies to other types of land development such as industrial parks or well fields. A permit is required if one or more acres of land will be disturbed, regardless of the size of any of the individually-owned or developed sites.

- The **SWPPP** required for permit issuance is a general document written in a manner that can be utilized for any project throughout the governmental jurisdiction as each individual project is planned and designed. Individual projects covered under this permit must have a SWPPP developed specific to the project site prior to any remove of any vegetation or site disturbance. Individual projects must be identified in the quarterly report.

- Documentation of Permit Eligibility Related to **Endangered Species:** The SWPPP must include documentation supporting a determination of permit eligibility with regard to Endangered Species.
  For more information please visit the following links:

  For information on understand what critical habitat is, please go to the following link, www.fs.fed.us/r9/wildlife/tes/docs/esa_references/critical_habitat.pdf.

  For information on listed species by State & County, please go to the following link, http://cfpub.epa.gov/npdes/stormwater/esa.cfm.

  The Missouri Department of Conservation's internet site for the Natural Heritage Review may be very helpful and can be found at the following link, http://mdcgis.mdc.mo.gov/heritage/newheritage/heritage.htm. Also helpful are the local offices of the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), these centers often maintain lists of federally listed endangered or threatened species on their internet sites.

  If there are listed species in the county or township, check to see if critical habitat has been designated and if that area overlaps or is near the project area. Critical habitat designations and associated requirements may also be found at 50 CFR Parts 17 and 226. For additional information, use the mapview tool at http://criticalhabitat.fws.gov/crithab/ to find data specific to your state and county.

- A Clean Water Act **Section 404 Department of the Army Permit** and the Department's Clean Water Act Section 401 Water Quality Certification (certification) are needed when placing material or fill into jurisdictional waters of the United States. Any impacts to jurisdictional streams or wetlands would require an application to be sent to the appropriate US Army Corps of Engineers District Regulatory Branch. A map of the district offices and contact information can be located online at: http://www.dnr.mo.gov/env/wpp/401/corps-map3.gif). Not all land disturbance projects will require a 404 permit; however, if a 404 permit is required, land disturbance activities are not to be conducted in the jurisdictional area of the project until the 404 permit has been obtained. A discussion on the need for a 404/401 permit as a requirement of this permit and is to be included in the SWPPP.

Exemptions from Permit Requirements

- The USEPA defines **linear projects** to include the construction of roads, bridges, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area. Missouri regulation 10 CSR 20-6.200 (1)(B) 8 exempts linear project construction from stormwater permit regulations which meet one of the following: A. Grading of existing dirt or gravel roads which does not increase the runoff coefficient and the addition of an impermeable surface over an existing dirt or gravel road; B. Cleaning or routine maintenance of roadside ditches, sewers, waterlines, pipelines, utility lines or similar facilities; C. Trenches two (2) feet in width or less; or D. Emergency repair or replacement of existing facilities as long as best management practices are employed during the emergency repair.

Permit Requirements

- The permit requires that the **"sequence and timing"** of activities for disturbing soils at the site be addressed in the SWPPP. For purposes of this requirement and to allow flexibility for contractors, "sequence and timing" can be replaced with "intended start and completion date" of activities.

- The requirement of a **buffer area** applies only to surface water as defined by the Environmental Protection Agency. The Department does not consider stormwater control features (e.g. stormwater conveyance channels, storm drain inlets, sediment basins) to constitute "surface waters" for the purpose of triggering the buffer area requirement. Areas that the permittee does not own or that are otherwise outside operational control may be considered areas of undisturbed natural buffer for purposes of compliance with this requirement.

- Areas that are no longer being disturbed, **stabilization of the area must be initiated immediately**. For purposes of this permit the following types of activities will constitute the initiation of stabilization:
  a) prepping the soil for vegetative or non-vegetative stabilization;
  b) applying mulch or other non-vegetative product to the exposed area;
  c) seeding or planting the exposed area;
  d) starting any of the activities in # 1 – 3 on a portion of the area to be
  e) stabilized, but not on the entire area; and
  f) finalizing arrangements to have stabilization product fully installed in compliance with the applicable deadline for completing stabilization. This list of examples is not exhaustive.

  The term "immediately" is used to define the deadline for initiating stabilization measures. In the context of this requirement, "immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

- The permit requires the submittal of a **quarterly report**. The required quarterly report should be sent to the Department by post mail to P.O. Box 176, Jefferson City MO 65102, and/or by email to wpsc401cert@dnr.mo.gov.

- The permittee is required to conduct inspections of the site. The person(s) inspecting the site may be a staff person or a hired third party to conduct such inspections. The permittee is responsible for ensuring that the person who conducts inspections is a "qualified person or personnel." A **"qualified person"** is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected to control the quality of stormwater discharges from the construction activity.

- A sample **inspection report** has been developed as a helpful tool to aid in completing site inspections. This sample inspection report was created consistent with USEPA's Developing Your Stormwater Pollution Prevention Plan and can be found at http://www.epa.gov/npdes/pubs/sw_swppp_inspection_form.doc. Both the guide and the sample inspection report (formatted in Microsoft Word) can be found at http://cfpub.epa.gov/npdes/stormwater/swppp.cfm.

- For common drainage locations that serve an area with 10 or more acres disturbed at one time, a temporary (or permanent) **sediment basin** that provides storage for a calculated volume of runoff from the drainage area from a 2-year, 24-hour storm, or equivalent control measures, must be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, must be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location, it is not necessary to include flows from offsite areas and flows from on-site areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. In determining whether installing a sediment basin is attainable, the operator may consider factors such as site soils, slope, available area on-site, etc. In any event, the operator must consider public safety, especially as it relates to children, as a design factor for the sediment basin, and alternative sediment controls must be used where site limitations would preclude a safe design.
- Public Notification: A public notification sign has been added to the permit. If a different sign is to be used it should be one of the same size sign and lettering and containing the same information as that of the one supplied with the permit. The required information includes a statement for those with questions or concerns, the permit number and the Department's toll free phone number. The permittee shall post a copy of the public notification sign described by the Department at the main entrance to the site. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP. The public notification sign must remain posted at the site until the permit has been terminated.

Other Discharges

- Machinery should be kept out of the waterway as much as possible. Fuel, oil and other petroleum products, equipment and any solid waste should not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions are to be taken to avoid the release of wastes or fuel as a result of this operation. Petroleum products spilled should be immediately cleaned up and disposed of properly. Any such **spills of petroleum or other chemicals** are to be reported as soon as possible to the Department's 24-hour Environmental Emergency Response number at (573) 634-2436.

Sampling Requirements and Other Effluent Limitations

- 40 CFR 450.21 Subpart B - Construction and Development (C&D) Effluent Guidelines are **non-numeric effluent limits** and are structured to require construction operators to first prevent the discharge of sediment and other pollutants through the use of effective planning and erosion control measures; and second, to control discharges that do occur through the use of effective sediment control measures. Permittees are also required to implement a range of pollution prevention measures to limit or prevent discharges of pollutants including those from dry weather discharges. The C&D rule's non-numeric effluent limits are available at the following internet site: http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol29/xml/CFR-2010-title40-vol29-sec450-21.xml. The associated fact sheet can be found at: http://www.epa.gov/npdespub/pubs/cgp_proposedfs.pdf.

- The USEPA has proposed numeric **effluent limitation guidelines** (ELGs) to control the discharge of pollutants from construction sites of a certain size. The Department may modify this permit upon finalization of the USEPA effluent limitation guidelines. The proposed Effluent limitation guidelines can be view at the following website http://water.epa.gov/scitech/wastetech/guide/construction/.

Land Purchase and Change of Ownership

- A person having **operational control over only a portion of a larger project** (e.g., one of four homebuilders in a subdivision), is responsible for compliance with all applicable effluent limits, terms, and conditions of the permit as it relates to the activities on that portion of the construction site, including protection of endangered species, critical habitat, and historic properties, and implementation of control measures described in the SWPPP. This person must ensure either directly or through coordination with other permittees, that these activities do not render another party's pollutant discharge controls ineffective. This person must either implement their own portion of a common SWPPP or develop and implement their own SWPPP. For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required to, develop separate SWPPPs that cover only their portion of the project provided referenced is made to other operators at the site. In instances where there is more than one SWPPP for a site, cooperation between the permittees is encouraged to ensure stormwater discharge control measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).

- The Department does not allow the transfer of a land disturbance permit from one owner to another; however, to facilitate the change in the ownership status of a property the Department developed the "Application for Change of Ownership" form. This form will allow the new owner to receive a new permit and number. The form may also be used to terminate the original permit if all the property included in the original permit is no longer the responsibility of the original owner. The "Application for Change of Ownership" (form MO780-2051) can be found online at http://www.dnr.mo.gov/forms/#StormWater.

Termination

- To begin the process of terminating this permit, the permittee should submit Form H – "Request for Termination" (MO780-1409) to the Department. The form can be found at the following web location: http://www.dnr.mo.gov/forms/#StormWater.

PART V. Addendums to Fact Sheet

Addendum #1

Individual Lot Certification

This form is not a requirement of the permit, but may be used by the permittee when selling individual lots that are part of the property that has been authorized by a Missouri Water Pollution Control General Permit under the NPDES for stormwater discharged associated with construction activity. This is a certification between the purchaser and the seller to cooperatively implement the SWPPP and the conditions of the NPDES permit and does not constitute a transfer of the permit. The permittee shall maintain this form on-site, or in a readily available location. The permittee shall provide individual lot certification forms or a copy of the contract for land sale having the equivalent wording to the Missouri Department of Natural Resources.

Addendum #2

Response to Comments

The 30-day public notice period for this permit expired on May 30, 2012. These are the responses to comments received through the public notice comment process.

ADDENDUM #1
INDIVIDUAL LOT CERTIFICATION

For Storm Water Discharges Associated with Construction Activity Authorized by a Missouri Water Pollution Control General Permit under the National Pollutant Discharge Elimination System

TO BE COMPLETED BY THE NEW LOT OWNER

I certify, under penalty of law, that I have received a copy of the general NPDES permit referenced below, which authorized the original lot owner or developer to discharge storm water runoff from construction activities, and the Storm Water Pollution Prevention Plan (SWPPP) prepared by the original lot owner or developer. I have reviewed the terms and conditions of the general permit and the SWPPP. I accept responsibility for erosion and sediment control during construction of the home or building for each of the lot(s) listed below. In the event the Missouri Department of Natural Resources notifies the undersigned of water quality violations due to conditions at any lot listed below and I am unable or unwilling to take action within 30 days to further reduce erosion or control sediment, then I agree to allow the original lot owner or developer to have reasonable access to the site to implement erosion and sediment control measures. I understand this certification is an agreement between the purchaser and seller to cooperatively implement the SWPPP and the conditions of the general NPDES permit.

Facility Name:
(as listed on permit) _____

Permit Number: MOR _____

Lot Number(s): _____

New Owner's Signature: _____

Name (typed or printed): _____

Phone Number: _____

Complete Only if New Owner is a Corporation and not an Individual:

Company Name: _____

Company Address: _____

Company Phone #: _____

TO BE COMPLETED BY THE PERMIT HOLDER

As permittee for the overall tract wherein the above listed lot(s) are located, I certify that I have provided the above named lot purchaser with a copy of the general NPDES permit and the Storm Water Pollution Prevention Plan (SWPPP) for the project, and I have informed the lot purchaser of their responsibility to minimize erosion and control sedimentation. I understand this certification does not constitute a transfer of the permit and understand this certification is an agreement between the purchaser and seller to cooperatively implement the SWPPP and the conditions of the general NPDES permit.

Signature: _____

Name (typed or printed): _____

Phone Number: _____

The permittee shall maintain this form on-site, or in a readily available location. The permittee shall provide individual lot certifications forms or a copy of the contract for land sale having the equivalent wording to the Missouri Department of Natural Resources upon request.

Addendum #2

MOR100 Land Disturbance Permit
Response to Public Notice Comments

(The Missouri Department of Natural Resources' public notice comment period for this permit expired on May, 30, 2012.)

GENERAL COMMENT RESPONSES

STANDARD LAND DISTURBANCE PERMIT - MORA

The Department received comments related to earlier drafts of the Standard Land Disturbance Permit (MORA) and/or comparisons between the MORA and the current draft MOR100 permit. Until there is one land disturbance permit, the two permits will have differences. The Department will as much as possible keep the number of differences at a minimum. There has been no change to the permit as a result of these comments.

FEDERAL REGULATION 40 CFR 450.21

As the NPDES authorized permitting authority, the Department is required to incorporate into the permit the federal regulation 40 CRF 450.21. These are non-numeric effluent limitations reflecting the best practicable technology currently available (BPT). The Department received a few comments regarding these requirements. These requirements will remain stated in the permit as required by the Environmental Protection Agency (EPA). An additional comment was to replace the word "prevent" located throughout the permit with the word "minimize" in order to be consistent with federal regulation. The draft permit's use of the word "minimize" is consistent with the federal regulation. There has been no change to the permit as a result of these comments.

TYPOS/DEFINITIONS/REFERENCES

The Department received comments regarding typos and similar items in the proposed permit. These entries have been corrected in the final permit. The Department received comments suggesting definition and clarification to several areas of the proposed permit. All suggestions were considered and many have been added to the permit Fact Sheet.

SPECIFIC COMMENT RESPONSES

SECTION A. APPLICABILITY

PERMIT ISSUANCE REQUIRMENT - DEVELOPMENT OF SWPPP

Section A.1. - The Department received a comment on the development of a Stormwater Pollution Prevention Plan (SWPPP) prior to the issuance of the permit. The SWPPP required for permit issuance is a general document written in a manner that can be utilized for any project throughout the governmental jurisdiction as each individual project is planned and designed. Project specific plans, maps, etc. as part of the SWPPP must be developed prior to any land disturbance conducted at the site. The Permit Fact Sheet will include more clarity on this section of the permit. Language has been changed to clarify the requirements.

PERMIT LANGUAGE & STORMWATER REGULATION

Section A.1. - The Department received a few comments regarding the applicability of permit coverage when compared to state stormwater regulations. The Department understands the issue of varying language between the draft permit and the state stormwater regulations. The Department is currently reviewing the stormwater regulations for revision. There has been no change to the draft permit as a result of this comment.

PROJECTS COVERED UNDER THIS PERMIT

Section A.1. - The Department received comments that suggested revisions to paragraph five of this section of the draft permit. The Department has revised the draft permit as suggested in order to better clarify this requirement.

OWNER/OPERATOR

Section A.1. - The Department received comments regarding the owner/operator statement and asked for clarification of primary responsibility for compliance with the permit. All parties are responsible. If there are enforcement actions the Department has the authority to involve all parties as necessary and to the extent possible. There has been no change to the permit as a result of this comment.

SECTION C. REQUIREMENTS

STORMWATER VOLUME

Section C.1. - The Department received a comment regarding this section of the draft permit which requires the permittee to minimize soil erosion through control of stormwater volume. As the NPDES authorized permitting authority, the Department is required to incorporate into the permit the federal regulation 40 CFR 450.21. For additional related discussion please refer to the earlier section of this document titled "General Comment Responses". The commenter questions the maximizing of infiltration in order to control stormwater volume at a land disturbance site. There are ways to reduce volume other than infiltration. The regulation and the permit do not prescribe one BPT over another. The language and goal of these provisions are to reduce

erosion. For example, one way to minimize the stormwater volume at a site is to reduce or eliminate run on to the site from up-hill off-site sources. This effectively reduces the volume of stormwater to be managed on-site. Another example is to reduce volume at individual outlet structures by having multiple outlet structures. This effectively reduces the volume at each individual outlet structure. By managing/directing the flow of runoff at the site you can also reduce the volume of water at individual outlet points. There has been no change to the draft permit as a result of this comment.

QUARTERLY REPORT

Section C.4., - The Department received comments regarding the quarterly report. To accommodate the complexity and number of outfalls associated with transportation projects language was changed to simplify reporting requirements. Instead of identifying each individual outfall, reports can simply refer to the receiving water.

ACCESSIBILITY OF THE SWPPP

Section C.5. The Department received a comment regarding onsite accessibility of the SWPPP. The permit will be revised to include additional wording regarding the SWPPP availability for inspections.

RECEIVING STREAMS & OUTFALL INFORMATION

Section C.5.a., and C.6.c. – The Department received comments concerning the use of outfall as the primary reference point. Often projects have a multitude of outfalls, particularly projects related to road construction. In these cases most outfalls have very similar BMPs, so listing individual outfalls is often not necessary. It was suggested that the Department add the word "primary" when naming the receiving streams in the SWPPP and remove the outfall information from the SWPPP requirement. Language in the permit was changed to simplify the requirements.

SEQUENCING & TIMING

Section C.6.a.2. - The Department received a couple of comments regarding the requirement found in this section of the draft permit. There has been no change as a result of this comment; however the Department will add clarification in the Permit Fact Sheet that "sequencing and timing" can also mean start and completion dates of intended activities.

BUFFER AREA

Section C.6.e. – The Department received a request to define "infeasible" when requiring the construction of a buffer area. The commenter referred to EPA's Construct General Permit (CGP) as guidance. EPA's permit defines what is not considered "surface water" and therefore would not require a buffer area. If a buffer area is infeasible, EPA's permit requires the implementation of other sediment controls which must achieved the same sediment load reduction as a buffer area would have. The Department will add a similar note to the Permit Fact Sheet regarding what is not "surface water". There has been no change to the permit as a result of these comments.

DISTURBED AREAS

Section C.6.h. – The Department received a comment to remove the word "immediately" from the requirement to initiate temporary and final stabilization of disturbed areas. This requirement is part the federal regulation which are non-numeric effluent limitations reflecting the best practicable technology currently available (BPT). As the NPDES authorized permitting authority, the Department is required to incorporate into the permit the federal regulation 40 CFR 450.21. For additional related discussion please refer to the earlier section of this document titled "General Comment Responses". The Department also received a suggestion to include guidance as to what constitutes "initiation" of stabilization. The Department will include in the Permit Fact Sheet information similar to EPA's regarding the context of this provision. There has been no change to the draft permit as a result of this comment.

GOOD ENGINEERING PRACTICES

Section C.6.j. – The Department received a comment to reword this section of the draft permit to include "… similar effective BMPs shall be based on good engineering practices." The Department will revise the permit accordingly.

ROADWAYS & CURB INLETS

Section C.6.m. - The Department received a couple of comments regarding this section and has made a revision to the draft permit but did not include the additional language regarding the cleaning of inlet protection devices.

RESPONSBLE PERSON

Section C.12. – The department received a comment noting an incorrect reference, and the language was changed to point correctly to the requirements of paragraph 13.

SITE INSPECTION REPORTS

Section C.13. - It was suggested that the Department consider revising this section of the draft permit to include an inspection requirement following a rainfall event of 0.25 inches or greater. The Department currently requires an inspection of BMPs anytime rainfall causes stormwater runoff to occur onsite. Further discussion and review of any proposal to change this requirement will be needed before considering a change to permit. There has been no change to the permit as a result of this comment.

Section C.13. - The Department received a couple of comments regarding site inspection reports kept on site. The Department will include a similar option in the permit, just as EPA has with the GCP that all site inspection reports can be kept at the site or at an easily accessible location so that it can be made available at the time of an onsite inspection or upon request by the Department.

Section C.13. – The Department received a comment suggesting that language be changed so that inspections are only required to occur during a project's normal hours, so that inspections can occur on the next business day following a long holiday weekend. The language was changed to reflect this suggestion.

SECTION E. SAMPLING REQUIREMENTS AND EFFLUENT LIMITATIONS

Section E. - The Department received a couple of comments suggesting language to better clarify wording in Section E., 1 of the draft permit. The Department has revised the draft permit for better clarity. `

SECTION F. RECORDS

Section F.3. – The Department received a comment requesting that the word "provide" be replaced with the word "ensure" in this section of the permit. The Department has made this change to the permit.

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Bartlett & West

PROJECT SPECIAL PROVISIONS

The attached editions of the following specifications are hereby incorporated into the Contract Documents:

City of Joplin Standard and Specifications latest edition
City of Joplin Standard Details latest edition

Technical specifications for the work shall consist of the above referenced specifications, with such revisions, amendments, and supplements as are contained herein.

In addition, specifications for specific items, as noted, will refer to the 2022 version of the Missouri Standard Specifications for Highway Construction, and the KC Metro APWA Standard Specifications and Drawings. These specifications are not attached but will be incorporated by reference.

PSP1 Erosion and Sediment Control

1.0 Description. This work shall include all measures necessary including, but not limited to, the installation, maintenance, and removal of temporary erosion and pollution control as required during the construction of the project to prevent erosion and pollution on the project in accordance with federal, state, and City of Joplin requirements. The contractor shall utilize and comply with all requirements of the City of Joplin's Land Disturbance Storm Water Pollution Prevention Plan (SWPPP). All erosion and sediment control plans shall be incorporated in the SWPPP. Contractor shall maintain the SWPPP throughout the project and complete the required documentation until the site is stabilized and accepted by the Engineer.

Erosion control plans represent the least possible protection for the project. It is anticipated that additional BMPs will be required to complete the project.

The contractor shall be responsible for all fines associated with failure to comply with the City of Joplin, General Operating Permit, and Land Disturbance Storm Water Pollution Prevention Plan (SWPPP)

2.0 Basis of Payment and Measurement. Erosion and Sediment Control BMPs will be measured in accordance with the units listed in the Proposal. Measurement shall occur upon initial installation.

No separate measurement will be made for maintenance, replacement, or removal of Erosion and Sediment Control BMPs.

No separate measurement will be made for compliance with the City of Joplin's SWPPP.

The cost of furnishing all labor, equipment, tools, and materials, and the performance of all work necessary to complete erosion and sediment control shall be paid for at the contract unit prices listed in the Proposal. Payment for Erosion and Sediment Control BMPs shall be considered full compensation for a complete and functioning installation, including but not limited to, ongoing maintenance, repair, replacement, and removal upon final stabilization.

Separate payment shall not be made for compliance with the City of Joplin's standard SWPPP. All work required to comply with the City of Joplin's standard SWPPP shall be considered incidental to erosion and sediment control BMP pay items, including but not limited to, all inspections, record keeping, permitting, and documentation and ongoing maintenance and close-out.

PSP2 Modification of Section 1200 – Grading and Site Preparation of the City of Joplin Standard Specifications

1200.3 CONSTRUCTION DETAILS:

Add Clarification Paragraph at the end of 1200.3.1:

1200.3.1 Notification: The Contractor shall be responsible for obtaining locations for all existing utilities and facilities as shown on the plans, or as confirmed as a result of a preconstruction conference attended by contractor representatives, public utility organizations, and other interested persons and concerns. Having obtained such notification, the contractor shall be responsible for the protection and preservation or such utilities and facilities.

Grading, excavation and backfilling for roadways, roadway intersections, sidewalks, shoulders, parking areas, airports, playgrounds, or other such improvements shall be made to the lines, grades, and cross sections shown on the plans. During construction, the area shall be maintained in such condition that it will be well drained at all times.

Waste materials including organic material, trees, stumps, rubbish, and debris shall be removed from the site and disposed of as an incidental part of the grading work. Excess excavation material including muck, topsoil, and rocks larger than twenty-four (24) inches, maximum dimension, shall be paid for on the basis of the applicable unit bid price for excavation.

The contractor shall remove any excess fill and waste material for haul off. The contractor shall coordinate with the City of Joplin for the preferred placement and drop off location of the materials.

All other specifications for Grading and Site Preparation shall be found in the Standard Specifications.

PSP3 Modification of Section 2200 – Asphaltic Concrete Surface and Base of the City of Joplin Standard Specifications

2200.2 MATERIALS, DEFINITIONS AND EQUIPMENT:

Add Mix Design criteria reference to the end of Section 2200.2.2

2200.2.2 Surface Asphaltic Concrete Mix Design Criteria: All commercial streets, arterials and collectors shall conform MODOT Standard Mix BP-1,BP-2. Mix design criteria shall conform to Section 9.0 of the Geotechnical Report prepared by Palmerton & Parrish, Inc. on August 8, 2017. All other specifications for Asphaltic Concrete Surface and Base shall be found in the Standard Specifications.

PSP4 Shared Use Path- Sidewalk Construction

1.0 Description. This provision covers the construction of the concrete shared use path as noted in the contract plans and the special provisions.

1.1 All labor, materials, tools, and equipment required for construction of the shared use path shall be in accordance with Section 3300 of the City of Joplin Standard Specifications 2022.

2.0 Basis of Payment and Measurement. All costs associated with this work shall be considered completely covered with Item No. 47, "Sidewalk Construction Shared Use Path", per square yard in accordance with the City of Joplin Standard Specifications 2022. There shall be no payment difference between concrete poured as Item No. 45, "Sidewalk Construction" as noted in the contract plans and the special provisions.

PSP5 Private Property Fencing

1.0 Description. This provision covers the construction of private property fencing, as noted in the contract plans and the special provisions.

1.1 All private fencing shall be vinyl fencing. The contractor shall submit shop drawings or other literature for review and approval by the property owner and the engineer prior to purchase or fabrication of the fencing.

1.2 All labor, materials, tools, and equipment required for construction of the private property fencing shall be in accordance with Section 2307 of the City of Joplin Standard Specifications 2022.

2.0 Basis of Payment and Measurement. All costs associated with this work shall be considered completely covered by Item No. 21, "Vinyl Fence", per linear foot, in accordance with the City of Joplin Standard Specifications 2022.

PSP6 French Drain Connection

1.0 Description. This provision covers the construction of connecting existing French drains to proposed curb inlets, as noted in the contract plans and the special provisions.

1.1 All labor, materials, tools, and equipment required for construction of French drain connections shall be in accordance with Section 4200 and 4400 of the City of Joplin Standard Specifications 2022, and Section 605.50 of the 2022 version of the Missouri Standard Specifications for Highway Construction.

2.0 Basis of Payment and Measurement. All costs associated with this work shall be considered completely covered by Item No. 39 "French Drain Connection", at the unit price of each connection.

PSP7 Single and Double Grate Inlets

1.0 Description. This provision covers the construction of single and double grate inlets that are necessary for the proposed storm sewer system due to inlet capacities, as noted in the contract plans and the special provisions.

1.1 All labor, materials, tools, and equipment required for construction of single and double grate inlets shall be in accordance with KC Metro APWA Standard Specifications and Drawings, Section 4400 of the City of Joplin Standard Specifications 2022, and Section 614 of the 2022 version of the Missouri Standard Specifications for Highway Construction.

2.0 Basis of Payment and Measurement. All costs associated with this work shall be considered completely covered by each of the following bid items as appropriate:

- Item No. 38, "APWA Single Grate Inlet", per each.
- Item No. 37, "APWA Double Grate Inlet", per each.

PSP8 Concrete Lined Ditch

1.0 Description. This provision covers the construction of the concrete lined ditch extending east from Connecticut Avenue towards Hawthorn Drive and connecting to the proposed box culvert and existing headwalls, as noted in the contract plans and the special provisions.

1.1 All labor, materials, tools, and equipment required for construction of the concrete lined ditch shall be in accordance with Division 3000 of the City of Joplin Standard Specifications 2022, and STM-07 of the City of Joplin 2022 Standard Drawings.

2.0 Basis of Payment and Measurement. All costs associated with this work shall be considered completely covered by Item No. 53, "Concrete Lined Ditch", per linear foot.

PSP9 Concrete 'U' Channel

1.0 Description. This provision covers the construction of the concrete 'U' channel lining the west ditch south of 38th Street to the end of project, as noted in the contract plans and the special provisions.

1.1 All labor, materials, tools, and equipment required for construction of the concrete 'U' channel shall be in accordance with Division 3000 of the City of Joplin Standard Specifications 2022, and Section 609 of the 2022 version of the Missouri Standard Specifications for Highway Construction.

2.0 Basis of Payment and Measurement. All costs associated with this work shall be considered completely covered by Item No. 54, "Concrete 'U' Channel", per linear foot.

PSP10 Rectangular Rapid Flashing Beacons

1.0 Description. This work includes the installation of Rectangular Rapid Flashing Beacons (RRFB) as noted in the plans. These units shall be AC powered TAPCO RRFB or approved equal. All materials necessary for the installation and function of the product including but not limited to the mount, controller, enclosure, energy management system, on-board user interface and controllers shall be included with this work. This system shall conform to all provisions of the MUTCD.

2.0 Materials. Conform the RRFB to all applicable FHWA and MUTCD standards and guidelines and meet or exceed the requirements specified in FHWA Memorandum IA-11.

2.1 Furnish a crosswalk assembly with one light bar. See plans for locations of these units. Provide three LED light arrays with each light bar: two rapidly and alternately flashing rectangular amber (vehicle) indications and one amber side-mounted (pedestrian) indication. The lightbar housing shall be constructed from aluminum and shall have the approximate dimensions: 22" L x 1.5" D x 4" H.

2.2 Operate the system with one controller with remote hardwired light bars and pushbuttons such that both RRFB at the crosswalk location are activated when either pedestrian push button is activated.

2.3 The controller enclosure shall be constructed of aluminum with a lockable or tamper-proof hinged door. All electronics shall be mounted in the controller enclosure.

3.0 Requirements.

3.1 System

- Operate the system on AC power from an electrical service with an applicable circuit breaker and with lightning suppression.
- When activated, all indications associated with a given crosswalk shall simultaneously commence operation within 120 msec, and shall cease operation at a predetermined time (programmable timeout). The time shall reset after any pedestrian actuation.
- The duration of the flash cycle timeout) shall be programmable from a minimum of 5 seconds to 60 minutes, in increments of seconds.
- Individual components shall be independently replaceable, equipped with approved terminal strips or wire-end molded connectors.

3.2 RRFB Controller

- Solid-state, digital controller capable of operating the RRFB as specified.
- Capable of storing input count data in preset intervals, with downloadable capabilities.
- Replaceable independently of other components.
- Completely programmable, including but not limited to, flash pattern and duration.
- An on-board user interface that provides system diagnostics and allows system setting changes.

3.3 Enclosure

- An enclosure intended for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water and damage from ice formation.

- Of sufficient size to house all equipment furnished under this special provision and for future equipment for wireless operation.
- Constructed from type 5052-H32 aluminum with a minimum thickness of 0.080".
- Vented to promote airflow for internal components. All vents and drains shall include screening to deter insects and foreign matter.
- Utilize tamper-resistant stainless continuous steel hinges.
- Include a removable control panel to which all control circuit components mount.
- Utilize stainless steel mounting studs to accommodate bracket options

3.4 Power supply

- Powered by 120 VAC to 12 VDC.
- The input voltage ranges from 120 to 240 volts.
- Of sufficient size to power all equipment installed with this special provision and any future wireless communication.

3.5 Light Housing and Indications

- A black colored light bar housing constructed of durable, corrosion-resistant powder-coated aluminum with stainless steel fasteners.
- Enclosed components shall be modular in design whereby any component can be easily replaced using common hand tools, without having to remove the housing from the pole.
- All mounting hardware required for mounting the light bar housing shall be provided and universal to multiple poles.
- Yellow indications of a minimum size of approximately 7” wide x 3” high.
- The outside edges of the two indications, including any housing, shall not protrude beyond the outside edges of the integral signage of the assembly.
- The light intensity of the yellow indications shall meet the minimum specifications of the Society of Automotive engineers (SAE) standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005 for Class 1 peak luminous intensity (candelas).

3.6 Hardware

- Furnish all hardware, connections, and other miscellaneous items to make the RRFB system fully operational.

4.0 Construction. The RRFB system consists of multiple assemblies to be constructed by the contractor as shown on the plans. Assemble RRFB with pedestrian activation per the manufacturer’s recommendations. Mount the controller cabinet, signage, light bar, and push buttons to the traffic signal standards as shown on the plans and per the manufacturer’s requirements.

5.0 Method of Measurement. Measurement of the RRFB will not be made.

6.0 Basis of Payment. All costs associated with this work shall be considered completely covered by Item No. 59 “RRFB System”, per lump sum.

GEOTECHNICAL ENGINEERING REPORT

CONNECTICUT AVENUE WIDENING

32ND STREET TO I-44

JOPLIN, MISSOURI

Prepared for:

BARTLETT & WEST
1719 Southridge Drive
Jefferson City, Missouri

Prepared by:



Springfield, MO
4168 W. Kearney Springfield, MO 65803
Call 417.864.6000 Fax 417.864.6004
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PPI PROJECT NUMBER: 237724

August 8, 2017

PALMERTON & PARRISH, INC.

GEOTECHNICAL & MATERIALS ENGINEERS
MATERIALS TESTING LABORATORIES
ENVIRONMENTAL SERVICES

4168 W. Kearney Street.
Springfield, MO 65803
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August 8, 2017

Bartlett & West
1719 Southridge Drive
Jefferson City, MO 65109

Attn: Mr. Herb Bailey, P.E.
Herb.bailey@bartwest.com

RE: Geotechnical Engineering Report
Connecticut Ave. Widening – 32nd Street to I-44
Joplin, Missouri
PPI Project Number: 237724

Dear Mr. Bailey:

Attached, please find the report summarizing the results of the geotechnical investigation conducted for the above referenced project. We appreciate this opportunity to be of service. If you have any questions, please don't hesitate to contact this office.

PALMERTON & PARRISH, INC.
By:

Brandon R. Parrish P.E.
Vice-President

PALMERTON & PARRISH, INC.
By:

Brad R. Parrish, P.E.
President

STATE OF MISSOURI
BRANDON ROSS PARRISH
NUMBER PE-2010000852
PROFESSIONAL ENGINEER
8/8/17

Submitted: One (1) Electronic .pdf Copy

BRP/BRP/cmc

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EXECUTIVE SUMMARY

A Geotechnical Investigation was performed within and adjacent to the existing roadway along Connecticut Avenue between 32nd Street and Interstate 44 in Joplin, Missouri. Connecticut Avenue is currently a two-lane roadway with a parking shoulder along the west side of the proposed widening alignment. It is understood that improvements will include construction of two (2) additional 12-ft. wide lanes with curb/gutter and sidewalks. A new trunk sewer is also planned along the east side of the new widening area. The west curb line is understood to remain, with additional widening occurring to the east.

Depending upon current thickness, existing pavements may remain and receive an asphalt overlay while new full depth asphalt construction is anticipated in the widening areas and in areas of full depth replacement of the existing roadway. The new roadway will be constructed along the same approximate alignment as the existing Connecticut Avenue with widening occurring along the east side. A new southbound turn lane is also understood to be constructed at the intersection with 32nd Street. Cut and fill depths of less than 2 ft. are anticipated along the entire roadway alignment.

A total of thirteen (13) pavement cores and/or shallow borings were drilled within and adjacent to the existing pavement along Connecticut Avenue. The borings extended to a depth of approximately 10 ft. below the existing pavement or ground surface. Based upon the information obtained from the borings and subsequent laboratory testing, recommendations for roadway reconstruction/repair were developed. Important geotechnical considerations for the project are summarized below. However, users of the information contained in the report must review the entire report for specific details pertinent to geotechnical design considerations.

- Site reconnaissance and document research was performed prior to performing the field drilling. Several mining related features were documented within 200 ft. of the proposed widening alignment. However, no visual evidence of mine related subsidence was observed during the site reconnaissance or field drilling, as discussed further in Section 5.0 of this report;

EXECUTIVE SUMMARY (CONTINUED)

- The existing pavement along the proposed roadway alignment consists of asphalt ranging in thickness from 2.25 to 7 inches overlying aggregate baserock ranging in thickness from 3.25 to 20.25 inches;
- The soil subgrade underlying pavements typically consisted of a lean clay with varying gravel percentage oftentimes transitioning to a fat clay or clayey gravel extending to boring completion depth. Boring 3 contained probable existing fill material below the pavement section which transitions to natural overburden soil at a relatively shallow depth;
- Average minimum California Bearing Ratio (CBR) values correlated from Dynamic Cone Penetrometer (DCP) test data for all borings ranged from 2 to greater than 10 (primarily 6 to greater than 10);
- In general, medium stiff soil subgrade materials were encountered below the existing pavement section **with the exception of Boring 13**. However, shallow soils at the project site oftentimes contained little to no rock/sand content and may undergo loss of shear strength upon an increase in soil moisture or when disturbed by heavier construction equipment. Even though relatively high CBR values were obtained for this material in the field, **undercutting and/or subgrade stabilization should be anticipated due to the reasons mentioned above and reflected in project budgets and schedules, if complete reconstruction is chosen and in widening areas;**
- Based upon the existing pavement thickness, overlay of the roadway is considered to be a viable alternate to increase pavement life. However, due to the inconsistent pavement thickness, and sometimes poor to marginal subgrade stiffness, overlay as compared to complete reconstruction is anticipated to provide a decreased pavement life comparatively;

EXECUTIVE SUMMARY (CONTINUED)

- If overlay of the existing asphalt is selected, the potential for reflective crack development at the transition between the overlay and new pavement may be reduced by use of a geotextile. Recommended geotextile products include placement of Tensar GlasPave50 under the entire overlay and extending a couple feet past the overlay limits, or Tensar GlasGrid 8511 spanning each overlay/new pavement joint under the surface course/overlay. These materials should be placed following a light tack coat; and
- Palmerton & Parrish, Inc. should be retained for construction observation and construction materials testing. Close monitoring of subgrade preparation work is considered critical to achieve adequate subgrade performance.

GEOTECHNICAL ENGINEERING REPORT

CONNECTICUT AVENUE WIDEINING

32ND STREET TO INTERSTATE 44

JOPLIN, MISSOURI

1.0 INTRODUCTION

This is the report of the Geotechnical Investigation performed for the planned pavement improvement project along Connecticut Avenue between 32nd Street and I-44 in Joplin, Missouri. This investigation was authorized by a letter proposal dated January 30, 2017, performed under a Master Agreement for Professional Services between Bartlett & West and Palmerton & Parrish, Inc. (PPI). The approximate roadway improvement alignment is shown below.



The purpose of the Geotechnical Investigation was to provide information for design and construction planning, and to aid in site development. PPI's scope of services included field and laboratory investigation of the subsurface conditions in the vicinity of the proposed project site, engineering analysis of the collected data, development of recommendations for design and construction planning, and preparation of this engineering report.

2.0 PROJECT DESCRIPTION

Item	Description
Site Layout	See Figures 1A through 1D: Boring Location Plan.
Grading	Cut and/or fill depths along the planned improvement alignment are anticipated to be minimal to achieve top of pavement elevation, with exception to the proposed new fill slopes located at the south end of the alignment near I-44.
Planned Improvements	**Between 32nd St. and I-44:** Roadway Widening on the east side of the existing roadway to allow for construction of two (2) additional 12-ft. wide lanes with curb/gutter and sidewalks. Where full depth replacement is not performed, the existing pavement may be overlaid. **32nd Street & Connecticut Ave. Intersection:** New right hand turn lanes are understood to be constructed going south on Connecticut Ave. from 32nd Street and east on 32nd Street from Connecticut Ave.
Public Utilities	Both buried and aerial public utilities are present along this alignment of roadway, not only within the right-of-way, but also crossing Connecticut Avenue.

3.0 SITE DESCRIPTION

Item	Description
Physical Location	Connecticut Ave. between 32nd Street and I-44 in Joplin, Missouri.
Current Ground Cover	Asphalt within the existing roadway and grass/brush/tree cover within widening areas.
Existing Topography	Flat to Gently rolling terrain.
Drainage Characteristics	Poor to Fair.

4.0 SUBSURFACE INVESTIGATION

Subsurface conditions were investigated through completion of pavement coring and subsurface borings, as well as subsequent laboratory testing.

4.1 Subsurface Borings

Subsurface conditions at this site were investigated by drilling and sampling a total of thirteen (13) pavement cores/sample borings located within and adjacent to the existing roadway along the planned improvement alignment. Boring locations were selected and staked in the field by PPI. Several boring locations were originally planned to be drilled within the yards of the existing residences located on the east side of Connecticut Avenue. However, due to the difficult access caused by ditch lines and potential for subgrade rutting, these borings were shifted to the east edge of the existing roadway. Borings were identified as 1 through 13 and were drilled at the approximate boring locations shown on Figures 1A through 1D: Boring Location Plan.

Logs of the borings showing descriptions of soil and rock units encountered, as well as results of field and laboratory tests and a "Key to Symbols" are presented in Appendix I. A two-man flagging crew was mobilized during field drilling operations since the roadway alignment is currently two-lane only. Traffic control measures were in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). The traffic control plan was approved by the City of Joplin prior to mobilization. The Missouri One-Call System was also notified prior to the investigation to assist in locating buried public utilities.

The existing pavement section was removed at the boring locations using a 6-inch diameter diamond impregnated core barrel powered by a CME 75 truck-mounted drill rig. The pavement cores were obtained and sampling/drilling procedures were implemented. After pavement removal, the aggregate baserock thickness was measured and then a subgrade sample was obtained using a split spoon sampler while performing the Standard Penetration Test (SPT) in general accordance with ASTM D1586. Drilling and sampling procedures extended a depth of approximately 10 ft. below the existing pavement surface. Please refer to Appendix II for general notes regarding boring logs and additional soil sampling information. In addition, please refer to Appendix IV for pavement core photographs.

4.2 Dynamic Cone Penetrometer

Dynamic Cone Penetrometer (DCP) testing was performed within all boring locations, except Boring 12, at the ground surface after core removal and prior to drilling. A DCP test was attempted at Boring 12, but refusal at the surface was attained at the surface in several locations. The dual mass DCP is used to assess the in-situ strength of undisturbed soil and/or compacted materials. The operator drives the DCP tip into soil and/or compacted materials by lifting the sliding hammer to the handle then releasing it. The total penetration for a given number of blows is measured and recorded, which is then used to estimate the in-situ California Bearing Ratio (CBR) or shear strength from an appropriate correlation chart using equations recommended by the U.S. Army Corps of Engineers. Graphical results from DCP testing are presented in Appendix III.

4.3 Laboratory Testing

Collected samples were sealed and transported to the laboratory for further evaluation and visual examination. Laboratory soil testing included the following:

- Moisture Content (ASTM D2216); and
- Atterberg Limits (ASTM D4318).

Laboratory test results are shown on each boring log in Appendix I and are summarized in the following table.

Boring	Depth (ft.)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Moisture Content (%)	USCS Symbol
1	0.5 – 2.5	36	19	17	31.1	CL
4	2 – 4	27	17	10	24.4	CL
5	2.25 – 4.25	35	17	18	41.9	CL
9	1.75 – 3.75	41	17	24	21.7	CL
10	2 – 4	28	19	9	25.5	CL
13	1 – 3	32	20	12	38.8	CL

4.4 Pavement Thickness & DCP Results

As stated previously, the existing pavement and baserock thicknesses were determined by coring a total of twelve (12) pavement cores within the existing pavement. After removal of pavement, a DCP test was performed for determination of the in-situ CBR. Please refer to the following table for a summary of the pavement thickness and aggregate baserock thickness encountered and correlated CBR information obtained from the DCP data.

Core Number	Location	Asphalt Thickness (in.)	Baserock Thickness (in.)	Correlated Average Minimum CBR Value (above 24-inches)
1	See Figures 1A thru 1D: Boring Location Plan	2.25	3.75	6
2		2.75	3.25	6
3		5.75	6.25	>10
4		5.5	18.5	5
5		6.75	20.25	8
6		7	11	8
7		5.5	10.5	8
8		5.5	6.5	10
9		6.5	14.5	10
10		6	15	10
11		6.25	18.75	>10
12		-	-	>10*
13		2.25	4.75	2

*DCP Refusal at surface
Note: The increased chert content of the native soils within the general area have a profound impact on the computed CBR value presented above.

5.0 SITE GEOLOGY

The general site area is underlain at depth with Mississippian Age Limestone. The upper surface of this limestone is often irregular due to the effects of differential vertical weathering and solution activities. Limestone is often overlain by discontinuous beds of Pennsylvanian Shale. Overburden soils at the site are typically residual having developed through chemical and physical weathering of the underlying parent bedrock. The boundary between overburden soils and comparatively unweathered limestone is usually abrupt, while the boundary between overburden soils and shale is generally a more gradual transition.

5.1 Mining Activity

The project alignment is located with an area of previous intense lead and zinc mining activities, which occurred within the Joplin area, part of the Tri-State Lead Belt, from the mid-1800's to the 1950's. As previously stated, PPI performed mining related research prior to performing the subsurface investigation. The following records, maps and surveys were reviewed which document or indicate the possible presence of mines in the area of the project:

- Joplin East 7.5 Minute Topographic Quadrangle, 1978, United States Geological Survey;
- Google Earth, Historical Aerial Photos;
- USGS Earth Explorer, Historical Aerial Photos;
- CalTopo, Shaded Relief Map, http://caltopo.com/map.html;
- United States Department of Agriculture, Web Soil Survey, http://websoilssurvey.sc.egov.usda.gov/;
- University of Missouri, Digital Library, Tri-State Mining Map Collection, http://digital.library.umsystem.edu.cgi/i/image/image-idx?page=index;c=mssuic; and
- Missouri Department of Natural Resources, GeoStrat, http://dnr.no.gov/geostrat/.

Historical aerial photos and mining data indicate that the majority of the surrounding area is heavily impacted by historical mining activity. A total of eight (8) mapped mines, possibly more, are located within approximately 200 ft. or less from the project limits. A majority of these mapped mines are located at the north end of the alignment, north of 32nd street, with one (1) mine located along the east and south sides, each.

On July 3, 2017, Mr. Joshua Elson, R.G., of PPI performed a site reconnaissance to observe if any sinkholes, mines and other geological features may be apparent on

the surface along the existing and proposed alignment. No indication of the presence of any of these features was observed during the site reconnaissance. If a sinkhole or mine related feature is exposed during construction, PPI should be notified immediately to help provide remediation recommendations.

6.0 GENERAL SITE & SUBSURFACE CONDITIONS

Based upon subsurface conditions encountered within the borings drilled at the project site, generalized subsurface conditions are summarized in the table below. Soil stratification lines on the boring logs indicate approximate boundary lines between different types of soil and rock units based upon observations made during drilling. In-situ transitions between soil and some rock types are typically gradual.

Description	Borings	Approx. Depth to Bottom of Stratum	Material Encountered	Moisture	Consistency/ Density
Stratum 1A	All, Except 12	2.5 to 7.5 inches	Asphalt	-	-
Stratum 1B	All, Except 12	3 to 21 inches	Aggregate Baserock	Slightly Moist	Medium Dense
Stratum 2	All	2.5 ft. to Boring Completion	Lean Clay or Gravelly Lean Clay	Moist to Wet	Occasionally Soft to Medium Stiff to Stiff
Stratum 3	2, 4, 5, 6, 7, 10 thru 13	3 ft. to Boring Completion	Lean to Fat Clay, Fat Clay or Gravelly Fat Clay	Moist	Medium Stiff to Stiff
Stratum 4	2 & 3	Boring Completion	Clayey Sand w/ Gravel	Moist	Dense

6.1 Groundwater

Shallow groundwater was not observed within the borings on the date drilled. Groundwater levels should be expected to fluctuate with changes in site grading, precipitation, and regional groundwater levels. Groundwater may be encountered at shallower depths during wetter periods.

7.0 SUBGRADE PREPARATION & EARTHWORK

Minimal cut and fill depths ranging from 1 to 2 ft. are anticipated along the project alignment. The existing subgrade soils encountered below 2.3 to 7 inches of asphalt and 3.3 to 20.3 inches of aggregate baserock were primarily logged as medium stiff to stiff with primarily moderate to high average minimum CBR values correlated from field DCP testing. **However, soft subgrade areas were identified at Boring 13.** This area is understood to receive new full depth pavement as it is in the area of a new right hand turn lane which is currently an asphalt paved parking lot.

Although moderate to high CBR values were observed within most boring locations, the existing subgrade oftentimes consisted of a lean clay with a low chert percentage. If these subgrades are exposed, stabilization will most likely be required to achieve a stable subgrade if subjected to construction traffic or if the moisture content is increased. Subgrade preparation prior to pavement construction is considered essential to long term pavement performance. Please refer to the sections below for subgrade preparation alternates.

7.1 Subgrade Preparation – Widening Areas or Complete Reconstruction

In future widening areas where no pavements exist currently, or in areas where the existing pavement will be completely removed and reconstructed, the initial phase of subgrade preparation should include clearing/grubbing of all vegetative matter and topsoil stripping or removal of the existing pavement section. Topsoil stripping on the order of 6-inches should be anticipated in current grass covered areas. The second phase of subgrade preparation should include proof-rolling of the pavement subgrade, as well as other areas to receive controlled fill, if any, prior to fill placement and/or pavement construction in order to assure a stable subgrade. Proof rolling consists essentially of rolling the ground surface with a loaded tandem axle dump truck or similar heavy rubber tired construction equipment and noting any areas which rut or deflect during rolling. Proof rolling, undercutting and replacement should be monitored by a qualified representative of PPI. **Again, the stability of the exposed subgrade will be greatly influenced by the time of year and related soil moisture conditions, as well as provisions for drainage provided during**

construction. Any unstable subgrades should be stabilized using the methods outlined below in Section 7.3.

7.2 Subgrade Preparation – Filling on Existing Asphalt

In areas where the existing pavement is to be left in place and filled upon, but not overlaid, if applicable, pavements may be broken up with a large diameter vibratory compactor, pneumatic breaker, or any other means necessary to allow for downward migration of water and provide a suitable base for baserock/fill placement. Prior to fill placement, all areas should be proof-rolled and approved, as described above.

7.3 Structural Fill & Subgrade Stabilization

Widespread subgrade improvement is not anticipated at the project site. However, subgrade improvements may be desired prior to pavement construction within isolated areas of lower CBR values that do not pass a proof-rolling. Options for subgrade stabilization or improvement are presented in the sections below.

7.3.1 Removal & Replacement w/ Select Earth Fill

Although it is not anticipated, areas where deeper fill is required to achieve finish subgrade elevations, or after undercut of soft subgrade conditions, earth fill should be placed in no greater than 8-inch loose lifts and compacted to at least 98% of maximum density at a moisture content within 2% of optimum moisture content for CL soil types with a liquid limit less than 45 and between 0 and 4% above optimum for CH and CL-CH soil types with a liquid limit greater than or equal to 45, if utilized, as determined by Standard Proctor Procedures (ASTM D-698). This method of stabilization is typically the more expedient and economical method in the general site area. Adequate field density and moisture content tests should be performed to insure compliance with project specifications. A testing frequency of at least one field density test for each 5000 sq. ft. of fill lift, but no less than three (3) tests per lift is recommended within pavement areas unless project specifications require a more frequent interval.

7.3.2 Rock Fill

In areas of soft subgrade identified during proof-rolling, if any, removal of soft soils and replacement with select earth fill or rock fill is recommended. Rock fill is the recommended filling medium, if deeper soft soil conditions are present. Rock fill can be utilized to stabilize the subgrade so that proper compaction of overlying soil fill can be achieved. Rock fill used to stabilize undercut bottoms should consist of 4 to 6 inch top size stone. Rock material should be placed in horizontal layers having a maximum thickness of 12-inches and compacted with a minimum of three (3) passes with a large diameter self-propelled vibratory roller. Rock fill should not be dumped into place, but should be distributed in horizontal lifts by blading and dozing in such a manner as to ensure proper placement into final position. Finer material including rock fines and limited soil fines should be worked into the rock voids during this blading operation. Excessive soil and rock fine particles preventing aggregate interlock should be prohibited. The testing of rock fill quality should include the requirements that a representative of the Geotechnical Engineer be present daily, but not necessarily continuously during the placement of the fill to observe the placement of rock fill in order to determine fill quality and to observe that the contractor's work sequence is in compliance with this specification. Progress reports indicative of the quality of the fill should be made at regular intervals to the Owner. If improper placement procedures are observed during the placement of the fill, the Contractor should be informed, and no additional fill should be permitted on the affected area until the condition causing the low densities has been corrected and the fill has been reworked to obtain sufficient density.

7.3.3 Chemical Stabilization

If additional subgrade improvements are required even after scarifying and recompacting, another option for additional subgrade improvement in deeper, soft areas is chemical stabilization using fly ash, Portland cement, cement kiln dust, or lime. Additional recommendations regarding chemical stabilization can be provided, if desired.

7.3.4 Geogrid

In lieu of or in addition to the subgrade improvement methods discussed above, geogrid reinforcement may be used in areas with deeper soft subgrade to reduce the required baserock thickness. A geogrid reinforcement product typically specified on similar roadway projects is Tensar Triax TX-5, or equivalent. Geogrids are typically placed at the base of the baserock course, above the soil subgrade in pavement areas or at the bottom of undercuts is soft areas that have been removed. Additional computation is required to identify the cost savings associated with reduced baserock thickness using geogrid. However, once baserock thicknesses are computed in softer subgrade areas, PPI can help evaluate whether the use of geogrid on this project would be beneficial.

7.4 Fill Material Types

Fill Type[1]	USCS Classification	Acceptable Location for Placement
Low Volume Change (LVC) Engineered Fill[2]	Non-Shaley CL, GC, or SC (LL <45)	All locations and elevations
On-Site Natural Soils	Non-Shaley CL, CH, GC or CL-CH	All locations and elevations[3]
Uncontrolled Fill Material	CL	All locations and elevations
Rock Fill[4]	GW	All locations and elevations

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris and contain maximum rock size of 4 to 6 in. Frozen material should not be used and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to its use.
2. Non-shaley low plasticity cohesive soil or granular soil having at least 15% low plasticity fines.
3. CL-CH or CH clays with a Liquid Limit greater than or equal to 45 are considered suitable for use as controlled fill, only if the percentage of rock fragments exceeds 35% or if placed 2 ft. below pavements.
4. See Section 7.3.2 for additional information.

7.5 Compaction Requirements

Item	Description
Subgrade Scarification Depth	At least 8 inches
Fill Lift Thickness	8-inch (loose)
Compaction Requirements[1]	98% Standard Proctor Density (ASTM D-698)
Moisture Content	• ±2% optimum moisture for CL, GC & SC soil types; and • 0 to 4% above optimum for CL-CH & CH soil types
Recommended Testing Frequency	• One (1) field density test per 5,000 sq. ft. of fill lift; or • A minimum of three (3) field density tests per lift.

1. We recommend that engineered fill (including scarified compacted subgrade) be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

7.6 Existing Fill

Existing possible undocumented fill material was encountered within Boring 3 and extended to a depth 6 ft. below the existing ground surface. The undocumented fill classified as gravelly lean clay. Undocumented fill material below pavement areas may be left in place if proof-rolled and approved as described above. **Any soft or loose fill material identified by proof-rolling should be removed and replaced with controlled fill as outlined above.**

7.7 Inclement Weather

Again, if construction is initiated during wetter months and full depth reconstruction is selected, and in widening areas, the requirement for undercutting soft surficial soils below the existing pavement should be anticipated and reflected in contract documents. **Undercut depths on the order of 2 or more ft. are considered possible within the pavement area. Based upon past experience of this firm, the shallow lean clay subgrade at the site, when containing minimal gravel percentage, is known to significantly lose strength when saturated and disturbed by construction equipment. Further, material removed from undercuts may not be suitable for use as compacted fill due to high soil moisture if poor drying conditions (cool temperatures and/or frequent precipitation) occur during site grading. If the construction schedule will not**

permit delay for better drying conditions, the project budget should include an allowance for subgrade undercut and replacement soil material containing appreciable quantities of chert or sand and gravel from an off-site borrow area that meet the requirements above. As an alternate to select fill, rock fill subbase (4 to 6-inch top size stone) may be placed to improve subgrade stability.

7.8 Subgrade Support Parameters

At the time of this investigation, the aggregate baserock and soil subgrade primarily exhibited moderate to high CBR values. Please refer to the table in Section 4.4 above for the average minimum CBR value at each boring location. Existing pavement thicknesses have also been presented within this table. For on-site gravelly soils scarified and adjusted to within the specified soil moisture range and recompacted to at least 95% of Maximum Standard Proctor density (ASTM D 698), a minimum CBR value of 5.0 should be appropriate. However, low plasticity soils containing minimal gravel percentage should be modeled using a CBR equal to 3.0. Based upon previous knowledge of the soils in the general site area, the design CBR value may be increased to 8.0 using chemical stabilization and 12.0 for at least 24 inches of rock fill immediately below pavement sections. Benefits of chemical stabilization and rock fill are an increase in the design CBR value, as well as providing an all-weather working platform for pavement construction. Alternate subgrade improvement methods are discussed below, with associated Design CBR values for all subgrade stabilization methods presented in the table below.

Subgrade Improvement Methods & Associated CBR Values	
Subgrade Improvement Method	**Design CBR Value**
Scarify & Recompact Existing Stiff Gravelly Clay Subgrade & Evaluate By Proof-Rolling	5.0
Scarify & Recompact Existing Stiff Lean Clay Subgrade & Evaluate By Proof-Rolling	3.0
Remove & Replace (Select Earth Fill, i.e. containing at least 35% rock fragments retained on the No. 4 sieve)	6.0
Chemical Stabilization of Soil Subgrade using cement, flyash or hydrated lime	8.0
Remove & Replace (Rock Fill)	12.0

8.0 PAVEMENT OVERLAY

Due to the generally medium stiff to stiff subgrade soils encountered below existing pavements and 2.5 to 7.5-inch (typically 5 to 6.5-inch) thick existing asphalt, overlay is considered an option regarding pavement rehabilitation. This option is not considered equivalent to complete removal and replacement due to utilizing existing asphalt pavement with a reduced pavement life. In addition, the soil subgrade cannot be observed and repaired where needed when the existing asphalt is not completely removed. However, complete removal and replacement of existing pavement may not be economically feasible, and milling/overlay is a lower cost repair option, (but with a lesser design life as compared to complete reconstruction in these areas). Based upon similar projects, a 2-inch overlay was evaluated for all existing pavements that will not be completely reconstructed. A pavement analysis was performed to evaluate if a 2-inch overlay should be adequate for all the different pavement sections encountered. Results of this pavement analysis are summarized in in Section 9.3 below.

Based upon the information obtained during this study, as well as the understanding that the existing roadway was constructed many years ago, it is anticipated that isolated areas of deteriorated asphalt may be exposed. All highly deteriorated areas should be removed to stable subgrade soils and backfilled with asphalt pavement in accordance with the project asphalt specifications. A second alternative to reduce the potential for reflective crack development at the transition between the overlay and new pavement and in deteriorated areas is by using geotextile. Recommended geotextile products include placement of Tensar GlasPave50 under the entire overlay and extending a couple feet past the overlay limits, or Tensar GlasGrid 8511 spanning each overlay/new pavement joint under the surface course/overlay. These materials should be placed following a light tack coat. It is recommended that geotextile extend a minimum of 5 feet beyond the highly deteriorated areas in all directions.

9.0 PAVEMENT TYPE

Refer to Section 7.0 regarding subgrade preparation for pavements. It is anticipated that any new pavements associated with this project will be constructed of an asphaltic concrete wearing surface placed over a base over a granular base course.

9.1 Asphalt Pavement

If asphaltic paving is selected, the aggregate base may be a granular compacted crushed limestone with a gradation and quality conforming to the requirements of the Missouri Department of Transportation, Standard Specification 1007 for either Type 1 or Type 5 aggregates. The maximum lift thickness for the granular base is 4 inches. Granular base thicknesses in excess of 4 inches should be placed in multiple lifts with each lift being of approximate equal thickness. The granular base should be compacted to at least 100% of Standard Proctor Compaction (ASTM D698). The base may also be a bituminous base.

Asphaltic concrete, both base and surface, should conform to the applicable gradational requirements of MoDOT Standard Specification 401 or 403 except that sampling for testing compliance during laydown should be from hot mix samples taken behind the paver. Asphaltic concrete should be compacted to 92 to 96% of Maximum Theoretical Specific Gravity (ASTM D2041). 95% of 50-Blow Marshall compaction is also accepted as a minimum compaction if the void content (Va) is within the specification value range. Substitution of an appropriate Superpave Mix Design (MoDOT Section 403) is permitted. SP-190C or SP-250C can be used in place of the bituminous base. SP-190C or SP-125C may be used for the surface.

All asphalt mixes should comply with the following density, gradation, oil content and volumetric requirements during laydown. However, all Owners, Developers and Contractors should be aware that minor changes in conditions (environmental, materials or mechanical) during production can cause variations in the volumetric properties of an asphalt mix design. Volumetric properties which vary slightly from the requirements below should be reported to the producer to allow plant adjustments. Asphalt mix properties which consistently vary appreciably from the requirements in Table 1 below should be considered deficient. All bituminous mix designs should have been prepared or verified within six (6) months of the date of placement on this project and should recognize the tendency of the mineral aggregate to “fine up” in the mixer.

TABLE 1				
Tested Property	**Test Method**	**Testing Frequency**	**Sample Source or Test Location**	**Specification**
Mixture Temperature		As Needed	N/A	For Informational Purposes
Temperature of Base & Air		As Needed	N/A	For Informational Purposes
Mat Density (% of Theoretical Maximum Density)	AASHTO T166 or ASTM D2950	1 Test Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	Location selected by testing lab at least 2 ft. from joint	92 to 96%
Gradation	AASHTO T27	1 Sample Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	HMAC at Paver	[1]MoDOT 401.3
Combined Aggregate Asphalt Content	AASHTO T308	1 Sample Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	HMAC at Paver	± 0.3% from Mix Design
VMA @ N_{des} Gyrations (Voids in Mineral Aggregate)	AASHTO 312	1 Sample Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	HMAC at Paver	>13.0% for Base >13.5% for BP-1 >14.0% for BP-2 >15.0% for BP-3
V_a @ N_{des} Gyrations (Air Voids)	AASHTO 312	1 Sample Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	HMAC at Paver	± 1% From Mix Design
Percent Voids Filled	AASHTO 312	1 Sample Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	HMAC at Paver	60 – 80%
Theo. Max SG of the Mixture	AASHTO T209	1 Sample Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	HMAC at Paver	N/A
Thickness	AASHTO T148	1 Test Each 1,000 Tons per Day or Fraction Thereof or as directed by Engineer	As directed by Engineer	Total Asphalt Thickness to be No Less than 0.5" from Specified Thickness

1. See MoDOT 403.3.1 for SP Mixes

All bituminous mix designs should have been prepared or verified within six (6) months of the date of placement on this project and should recognize the tendency of the mineral aggregate to "fine up" in the mixer.

9.2 Asphalt Thickness – New Construction

A site specific pavement analysis was performed for the above project site for the new pavements constructed in widening and reconstruction areas. The pavement analysis was performed using WINPAS, a pavement design software following

AASHTO Guide for Pavement Structures, as well as traffic data provided by the City of Joplin. Assumptions used during this analysis included;

- Design Lane = 2,693 vehicles per day with 5% trucks (2016 values);
- Growth Rate = 2.5%
- Soil subgrade with a CBR of 5 corresponding to existing medium stiff to stiff gravelly clay subgrades passing proof-rolling;
- Design Life = 20 years;
- Initial serviceability = 4.2;
- Terminal serviceability = 2.5 (minor arterial);
- Reliability = 90%; and
- Overall deviation = 0.45.

Based upon the above traffic loading and assumed subgrade conditions, a required structural number of approximately 4.46 was computed. Based upon this structural number, a pavement section consisting of 2-inches of asphalt concrete wearing surface, over 8-inches of asphaltic base, over 6-inches of aggregate baserock is required. This pavement section is slightly less than the City of Joplin minimum standard pavement section for roadways classifying as an arterial, which requires 8-inches of aggregate baserock instead of 6-inches. **As a result, the standard City of Joplin pavement section is applicable for use in all complete reconstruction and widening areas.**

9.3 Asphalt Thickness – Overlays

An additional pavement analysis was performed for the sections of existing roadway where the asphalt may be overlaid. As presented in Section 7.3 above, existing pavement thicknesses vary considerably along the proposed project alignment. At the stations investigated, the required overlay thickness was computed using the pavement analysis assumptions presented above. It should be noted that the layer coefficient of the existing pavement was reduced, as compared to new asphalt, to

account for the age and deterioration of the existing asphalt. Refer to the following table for the computed overlay thickness at each station investigated where future overlay is anticipated. The values shown are the required overlay thicknesses to bring the existing pavement section equivalent to a new standard pavement section. It should be noted that these values utilize a CBR equal to 5.0.

Boring Location	Existing Asphalt (in.)	Existing Aggregate Baserock (in.)	Computed Required Asphalt Overlay (inches)
1	2.25	3.5	9
2	2.75	3	9
3	5.75	6	7.5
4	5.5	18.5	5.5
5	6.75	21	4.5
6	7	11	6
7	5.5	10	6.5
8	5.5	7	7.5
9	6.5	13.5	5.5
10	6	14.5	5.5
11	6.25	18.5	5
12	-	-	-
13	2.25	4	9

As shown in the table above, a 2-inch overlay is not considered equivalent to a full depth reconstruction using the City of Joplin standard pavement section for all of the areas investigated. Although a 2-inch overlay will improve the life of the existing pavement, it will not be equivalent to the new pavement, constructed using the standard City of Joplin arterial pavement section. It is assumed that project budget will dictate overlay thickness in the deficient areas computed.

10.0 EXCAVATIONS

Based upon the subsurface conditions encountered during this investigation, the on-site soils typically classify as Type B in accordance with OSHA regulations. Temporary excavations in soils classifying as Type B with a total height of less than 20 ft. should be cut no steeper than 1H:1V in accordance with OSHA guidelines. Confirmation of soil

classification during construction, as well as construction safety, including shoring, if required, is the responsibility of the contractor.

11.0 CUT & FILL SLOPES

Based upon the soil samples obtained during field drilling procedures, as well as previous knowledge of the general area overburden soil conditions, general cut and fill slopes may be designed with a grade of 2.5H:1V, or flatter. A steeper slope inclination of 2H:1V may be used if the residual soil contains at least 40-percent chert or rock fragments retained on the No. 10 sieve, as recommended by MoDOT. However, it should be noted that this recommendation is for slopes 20 ft. in height, or less. A more detailed analysis should be performed by PPI for slopes greater than 20 ft. in height. Earth cut or fill slopes designed as a 2.5H:1V, shall be constructed with properly compacted earth fill or natural existing soils classifying as a GC, CL, CL-CH and/or CH. Slopes constructed completely out of rock fill (not just the slope surface) may be designed using a grade of 2H:1V. Rock fill should consist primarily of particles with a diameter of 4-inches, or greater.

Although design of 2H:1V earth slopes are permissible depending on material gradation, these steeper slopes typically require more maintenance and erosion protection immediately following construction, and through the life of the slope, as compared to a flatter slope. Although design and construction of 2H:1V slopes are considered permissible, and consistently used on similar transportation projects in the area, care should be taken to reduce the potential surface erosion of these slopes, which may lead to shallow surface failures if left unattended. Vegetation on slopes should be established as soon as reasonable possible, or some type of erosion control product used on the slope surface to minimize erosion potential.

11.1 Benching

Any fill material placed on top of existing slopes, should be benched into the existing hillside to reduce the potential of a failure plane forming between the two materials. Per MoDOT Section 203.4.11 “Embankment on Hillsides or Against Existing Embankment,” any fill placed on existing hillsides or embankments (steeper than

6H:1V measured at a right angle to the roadway) shall be continuously benched into less than 12 inch rises over those areas receiving fill, as the embankment is constructed in lifts. Benching shall be of sufficient width to permit placing and compacting operations. Each horizontal cut shall begin at the intersection of the ground line and the vertical side of the previous bench. Existing slopes shall also be stepped to prevent any wedging action of the embankment against existing structures.

12.0 CONSTRUCTION OBSERVATION & TESTING

The construction process is an integral design component with respect to the geotechnical aspects of a project. Since geotechnical engineering is influenced by variable depositional and weathering processes and because we sample only a small portion of the soils affecting the performance of the proposed structures, unanticipated or changed conditions can be disclosed during grading. Proper geotechnical observation and testing during construction is imperative to allow the Geotechnical Engineer the opportunity to evaluate assumptions made during the design process. Therefore, we recommend that PPI be kept apprised of design modifications and construction schedule of the proposed project to observe compliance with the design concepts and geotechnical recommendations, and to allow design changes in the event that subsurface conditions or methods of construction differ from those assumed while completing this study. We recommend that during construction all earthwork be monitored by a representative of PPI, including site preparation, placement of all engineered fill and trench backfill, and all foundation excavations as outlined below.

- An experienced Geotechnical Engineer or Engineering Technician of PPI should observe the subgrade throughout the proposed project site immediately following stripping to evaluate the native clay, identify areas requiring additional undercutting, and evaluate the suitability of the exposed surface for fill placement;

- An experienced Engineering Technician of PPI should monitor and test all fill placed within the pavement areas to determine whether the type of material, moisture content, and degree of compaction are within recommended limits; and
- The condition of the subgrade should be evaluated immediately prior to construction of the building floor slabs to determine whether the moisture content and relative density of the subgrade soils are as recommended.

13.0 REPORT LIMITATIONS

This report has been prepared in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. Palmerton & Parrish, Inc. observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. Palmerton & Parrish's findings and conclusions must be considered not as scientific certainties, but as opinions based on our professional judgment concerning the significance of the data gathered during the course of this investigation. Other than this, no warranty is implied or intended.

FIGURES

S:_MASTER PROJECT FILE\2016_MO\B\Bartlett & West-237724-Connecticut Ave Widening Joplin, MO-Sub\Figures\Figures.d



SCALE
NTS

LEGEND

Boring Location

MDNR Mapped Mine Location

Project: Connecticut Ave. Widening - 32nd St. to I-44 - Joplin, Missouri
Client: Bartlett & West, Inc.

Boring Location Plan

DATE: July 31, 2017

Project Number: 237724

PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/
MATERIALS TESTING LABORATORIES / ENVIRONMENTAL SERVICES

FIGURE 1A

S:_MASTER PROJECT FILE\2016_MO\B\Bartlett & West-237724-Connecticut Ave Widening Joplin, MO-Sub\Figures\1B.dwg



SCALE
NTS

LEGEND

Boring Location

MDNR Mapped Mine Location

Project: Connecticut Ave. Widening - 32nd St. to I-44 - Joplin, Missouri
Client: Bartlett & West, Inc.

Boring Location Plan

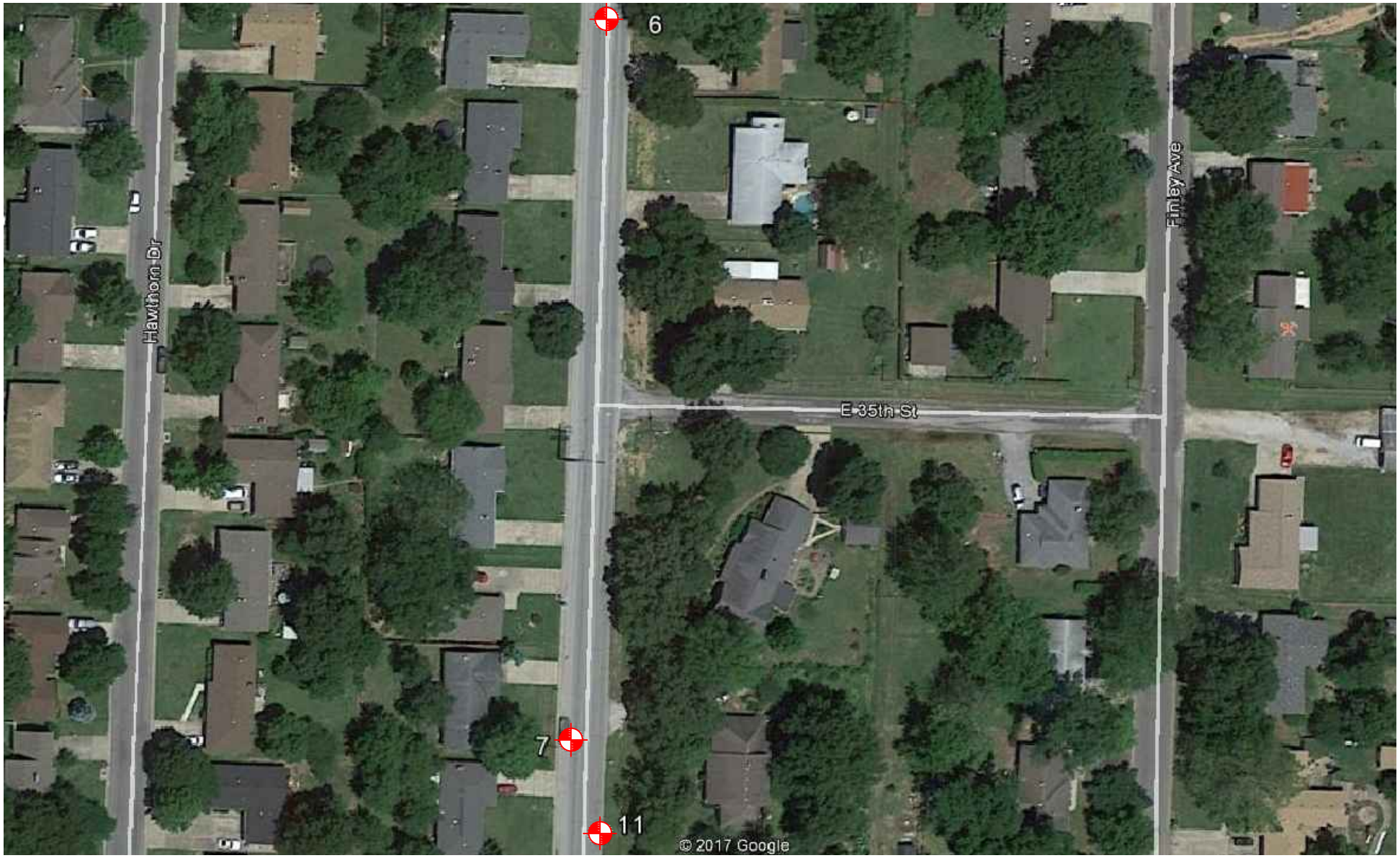
DATE: July 31, 2017

Project Number: 237724

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MATERIALS TESTING LABORATORIES / ENVIRONMENTAL SERVICES

FIGURE 1B

S:_MASTER PROJECT FILE\2016_MO\B\Bartlett & West-237724-Connecticut Ave Widening Joplin, MO-Sub\Figures\1C.dwg



SCALE
NTS

LEGEND

Boring Location

MDNR Mapped Mine Location

Project: Connecticut Ave. Widening - 32nd St. to I-44 - Joplin, Missouri
Client: Bartlett & West, Inc.

Boring Location Plan

DATE: July 31, 2017

Project Number: 237724

PALMERTON & PARRISH, INC.
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FIGURE 1C

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SCALE
NTS

LEGEND

Boring Location

MDNR Mapped Mine Location

Project: Connecticut Ave. Widening - 32nd St. to I-44 - Joplin, Missouri
Client: Bartlett & West, Inc.

Boring Location Plan

DATE: July 31, 2017

Project Number: 237724

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FIGURE 1D

APPENDIX I

BORING LOGS & KEY TO SYMBOLS

4168 W. Kearney St.
Springfield, MO 65803
Telephone: (417) 864-6000
Fax: (417) 864-6004

GEOTECHNICAL BORING LOG

BORING NUMBER 1

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/19/17 **COMPLETED** 7/19/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (2.25") 0.2 ft AGGREGATE BASEROCK (3.75") 0.5 ft LEAN CLAY, Trace Chert, Brown, Stiff to Medium Stiff, Very Moist to Wet (CL)	SPT 1		3-6-3-6 (9)	0.25		
2.5				SPT 2		3-3-3-3 (6)			
5.0									
7.5			9.0 ft LEAN CLAY, w/ Gravel, Brown, Medium Stiff to Stiff, Very Moist (CL) 10.0 ft	SPT 3		3-6-9-12 (15)			
10.0			Bottom of borehole at 10.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 8/7/17 12:35 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

4168 W. Kearney St.
Springfield, MO 65803
Telephone: (417) 864-6000
Fax: (417) 864-6004

GEOTECHNICAL BORING LOG

BORING NUMBER 2

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/19/17 **COMPLETED** 7/19/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (2.75") 0.2 ft AGGREGATE BASEROCK (3.25") 0.5 ft LEAN CLAY, Trace Chert, Brown, Medium Stiff to Stiff, Moist (CL)	SPT 1		6-3-6-6 (9)	3		
2.5			3.0 ft LEAN TO FAT CLAY, w/ Gravel, Gray, Stiff, Moist (CL-CH)	SPT 2		3-4-6-6 (10)	1.75		
5.0			7.0 ft CLAYEY SAND, w/ Gravel, Red Tan, Very Dense, Moist (SC)	SPT 3		13-26-25-28 (51)			
7.5			10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 8/7/17 12:35 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

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GEOTECHNICAL BORING LOG

BORING NUMBER 3

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/19/17 **COMPLETED** 7/19/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 / N VALUE 20 40 60 80 / PL MC LL 20 40 60 80 / SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (5.75")						
			0.5 ft AGGREGATE BASEROCK (6.25")						
			1.0 ft PROBABLE FILL - GRAVELLY LEAN CLAY, Brown, Very Stiff, Slightly Moist (CL)	SPT 1		15-19-4-6 (23)			
2.5			3.0 ft PROBABLE FILL - GRAVELLY LEAN CLAY, Brown Tan & Gray, Stiff, Moist (CL)	SPT 2		26-73/4"			
5.0			6.0 ft CLAYEY SAND, w/ Gravel, Red Tan, Very Dense, Moist (SC)						
7.5				SPT 3		18-57-54-73 (111)			
			10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

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GEOTECHNICAL BORING LOG

BORING NUMBER 4

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/19/17 **COMPLETED** 7/19/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (5.5") 0.5 ft						
			AGGREGATE BASEROCK (18.5") 2.0 ft						
2.5			LEAN CLAY, Trace Gravel, Brown, Medium Stiff, Moist (CL) 3.5 ft	SPT 1		4-4-3-4 (7)	2.25	▲ I ○	
5.0			FAT CLAY, Brown Tan & Red, Stiff, Moist (CH)	ST 2	63		2.25	○	
7.5				SPT 3		4-4-7-12 (11)	4	▲ ○	
10.0			10.0 ft Bottom of borehole at 10.0 feet.						

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GEOTECHNICAL BORING LOG

BORING NUMBER 5

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/19/17 **COMPLETED** 7/19/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (6.75") 0.6 ft						
			AGGREGATE BASEROCK (20.25") 2.3 ft						
2.5			LEAN CLAY, Gray, Stiff, Moist (CL) 3.5 ft	SPT 1		9-7-3-4 (10)	2		
			LEAN TO FAT CLAY, Dark Gray, Stiff, Moist (CL-CH)						
5.0			-Tan Below 5'	ST 2	79		1.75		
7.5				ST 3	83		2.5		
			10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 8/7/17 12:35 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

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GEOTECHNICAL BORING LOG

BORING NUMBER 6

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/19/17 **COMPLETED** 7/19/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION (Unified Soil Classification System)	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 / N VALUE 20 40 60 80 / PL MC LL 20 40 60 80 / SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0	CFA - 4.5" O.D.		ASPHALT (7")						
			0.6 ft						
			AGGREGATE BASEROCK (11")						
1			1.5 ft						
			GRAVELLY LEAN CLAY, Brown, Stiff, Moist (CL)	SPT 1		10-7-22-73/5"	3		
2			2.5 ft						
			LEAN TO FAT CLAY, Dark Gray, Stiff, Moist (CL-CH)						
			3.0 ft						
3			CHERT COBBLE/BOULDER	SPT 2		73/4"			
			3.8 ft						

Bottom of borehole at 3.8 feet.

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GEOTECHNICAL BORING LOG

BORING NUMBER 7

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/19/17 **COMPLETED** 7/19/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA		ASPHALT (5.5")						
			0.5 ft						
			AGGREGATE BASEROCK (10.5")						
			1.3 ft						
			LEAN CLAY, Trace Chert, Brown, Stiff, Moist (CL)	SPT 1		7-4-9-23 (13)	0.75		
2.5									
			3.5 ft						
			LEAN CLAY, w/ Gravel, Red Brown, Very Stiff, Moist (CL)						
				SPT 2		19-19-50 (69)			
5.0			6.0 ft						
			FAT CLAY, w/ Gravel, Red Brown, Stiff, Moist (CH)						
7.5				SPT 3		12-10-12-16 (22)	4.5		
			10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 8/7/17 12:35 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

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GEOTECHNICAL BORING LOG

BORING NUMBER 8

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/20/17 **COMPLETED** 7/20/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (5.5")						
			0.5 ft AGGREGATE BASEROCK (6.5")						
			1.0 ft LEAN CLAY, w/ Gravel, Brown, Stiff, Moist (CL)						
2.5				SPT 1		7-7-6-6 (13)			
			3.5 ft CLAYEY GRAVEL, Brown, Very Dense, Moist (GC)						
5.0				SPT 2		15-53-18-19 (71)			
			6.0 ft LEAN CLAY, w/ Gravel, Red Brown, Very Stiff, Moist (CL)						
7.5				SPT 3		7-10-39-29 (49)	2.25		
			10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 8/7/17 12:35 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

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GEOTECHNICAL BORING LOG

BORING NUMBER 9

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/20/17 **COMPLETED** 7/20/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (6.5")						
			0.5 ft						
			AGGREGATE BASEROCK (14.5")						
			1.8 ft						
2.5			LEAN CLAY, Scattered Gravel, Brown Gray, Stiff, Moist (CL)	SPT 1		4-4-7-7 (11)	3.5		
			3.5 ft						
5.0			LEAN CLAY, w/ Gravel, Red Brown, Very Stiff, Moist (CL)	SPT 2		9-9-13-10 (22)	2.25		
7.5				SPT 3		4-6-10-6 (16)			
			10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 8/7/17 12:35 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

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GEOTECHNICAL BORING LOG

BORING NUMBER 10

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/20/17 **COMPLETED** 7/20/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (6") 0.5 ft						
			AGGREGATE BASEROCK (15") 1.8 ft						
2.5			LEAN CLAY, Trace Sand, Brown Gray, Medium Stiff, Moist (CL) 3.5 ft	SPT 1		12-4-4-3 (8)	0.25		
5.0			LEAN TO FAT CLAY, Trace Gravel, Brown Tan, Stiff, Moist (CL-CH) 7.0 ft	ST 2	75		2		
7.5			FAT CLAY, Gray Tan, Stiff, Moist (CH) 10.0 ft	SPT 3		3-4-6-6 (10)	3		
10.0			Bottom of borehole at 10.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 8/7/17 12:35 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

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GEOTECHNICAL BORING LOG

BORING NUMBER 11

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/20/17 **COMPLETED** 7/20/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
0.0	CFA - 4.5" O.D.		ASPHALT (6.25")				
			0.5 ft AGGREGATE BASEROCK (18.75")				
			1.3 ft SANDY LEAN CLAY, Brown, Stiff, Very Moist (CL)	SPT 1		16-73/4"	
2.5			2.5 ft GRAVELLY LEAN CLAY, Red Brown, Very Stiff, Moist (CL)	SPT 2		12-20-18 (38)	3.5
5.0			6.0 ft FAT CLAY, Scattered Gravel, Red Brown, Very Stiff, Moist (CH)	SPT 3		4-9-10 (19)	3.5
7.5			10.0 ft				
10.0			Bottom of borehole at 10.0 feet.				

DRY UNIT WT (pcf) ◆ 20 40 60 80 100
▲ N VALUE ▲ 20 40 60 80
PL MC LL 20 40 60 80
SHEAR STRENGTH (ksf) ☐ 1 2 3 4

ELEVATION (ft)

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GEOTECHNICAL BORING LOG

BORING NUMBER 12

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/20/17 **COMPLETED** 7/20/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 / N VALUE 20 40 60 80 / PL MC LL 20 40 60 80 / SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		LEAN CLAY, w/ Chert Cobbles, Brown, Stiff, Dry (CL)						
			1.0 ft	SPT 1		12-9-7-9 (16)		▲	
			LEAN CLAY, w/ Sand & Gravel, Brown Tan, Very Stiff, Moist (CL)						
2.5			- Very Hard Below 3'						
				SPT 2		19-38-63-70 (101)		○ ▲	
5.0			5.5 ft						
			GRAVELLY FAT CLAY, Red Brown, Very Stiff, Moist (CH)						
7.5				SPT 3		19-15-18-19 (33)	2.5	▲	
			10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

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GEOTECHNICAL BORING LOG

BORING NUMBER 13

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO
DATE STARTED 7/20/17 **COMPLETED** 7/20/17
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP **DRILL RIG** CME 75
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY DH **CHECKED BY** BP
AT END OF DRILLING _____
NOTES _____

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION Unified Soil Classification System	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 N VALUE 20 40 60 80 PL MC LL 20 40 60 80 SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0.0	CFA - 4.5" O.D.		ASPHALT (2.25") 0.2 ft AGGREGATE BASEROCK (4.75") 0.6 ft LEAN CLAY, Brown, Soft, Very Moist (CL)	SPT 1		3-1-1-3 (2)	0.75		
2.5			2.5 ft LEAN TO FAT CLAY, Gray, Medium Soft, Moist (CL-CH) - Stiff Below 3'	ST 2	63		1.75		
5.0			7.0 ft FAT CLAY, Tan Brown, Stiff, Moist (CH)						
7.5				SPT 3		3-6-7-16 (13)	2		
			9.5 ft FAT CLAY, w/ Gravel, Red Tan, Very Stiff, Moist (CH) 10.0 ft						
10.0			Bottom of borehole at 10.0 feet.						

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KEY TO SYMBOLS

CLIENT Bartlett & West
PROJECT NAME Connecticut Ave. Widening - 32nd St. to I-44
PROJECT NO. 237724
PROJECT LOCATION Joplin, MO

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- ASPHALT: Asphalt
- BLDRCBBL: Boulders and cobbles
- CH: USCS High Plasticity Clay
- Gravelly Fat Clay: USCS High Plasticity Gravelly Clay
- CL: USCS Low Plasticity Clay
- CL-CH: USCS Low to High Plasticity Clay
- CLG: USCS Low Plasticity Gravelly Clay
- CLS: USCS Low Plasticity Sandy Clay
- FILL: Fill (made ground)
- GC: USCS Clayey Gravel
- GW: USCS Well-graded Gravel
- SC: USCS Clayey Sand

SAMPLER SYMBOLS

- Standard Penetration Test
- Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)
TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
Water Level at Time Drilling, or as Shown
Water Level at End of Drilling, or as Shown
Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - PPI STD TEMPLATE.GDT - 8/7/17 09:20 - S:_MASTER PROJECT FILE\2016_MO\BARTLETT & WEST-237724-CONNECTICUT AVE WIDENING JOPLIN, MO-SUB\BORING LOGS\BORING LOGS.GPJ

APPENDIX II

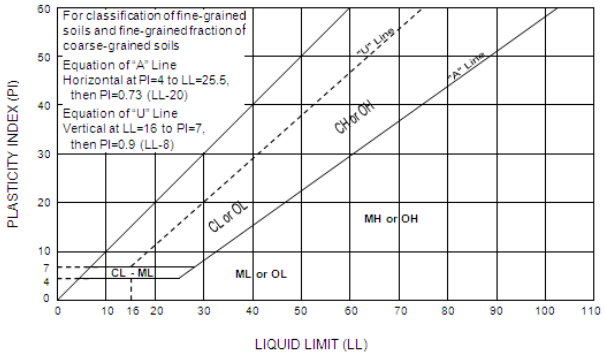
GENERAL NOTES

GENERAL NOTES

SOIL PROPERTIES & DESCRIPTIONS

COHESIVE SOILS

Consistency	Unconfined Compressive Strength (Qu)	Pocket Penetrometer Strength	N-Value
	(psf)	(tsf)	(blows/ft)
Very Soft	<500	<0.25	0-1
Soft	500-1000	0.25-0.50	2-4
Medium Stiff	1001-2000	0.50-1.00	5-8
Stiff	2001-4000	1.00-2.00	9-15
Very Stiff	4001-8000	2.00-4.00	16-30
Hard	>8000	>4.00	31-60
Very Hard			>60



Group Symbol	Group Name
CL –	Lean Clay
ML –	Silt
OL –	Organic Clay or Silt
CH –	Fat Clay
MH –	Elastic Silt
OH –	Organic Clay or Silt
PT –	Peat
CL-CH –	Lean to Fat Clay

Plasticity		Moisture	
Description	Liquid Limit (LL)	Descriptive Term	Guide
Lean	<45%	Dry	No indication of water
Lean to Fat	45-49%	Moist	Indication of water
Fat	≥50%	Wet	Visible water

Fine Grained Soil Subclassification	Percent (by weight) of Total Sample
Terms: SILT, LEAN CLAY, FAT CLAY, ELASTIC SILT	PRIMARY CONSTITUENT
Sandy,gravelly, abundant cobbles, abundant boulders	>30-50]
with sand, with gravel, with cobbles, with boulders	>15-30] – secondary coarse grained constituents
scattered sand, scattered gravel, scattered cobbles, scattered boulders	5-15]
a trace sand, a trace gravel, a few cobbles, a few boulders	<5]
The relationship of clay and silt constituents is based on plasticity and normally determined by performing index tests. Refined classifications are based on Atterberg Limits tests and the Plasticity Chart.	

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	N-VALUE
Very Loose	0-4
Loose	5-10
Medium Dense	11-24
Dense	25-50
Very Dense	≥51

MOISTURE CONDITION	
Descriptive Term	Guide
Dry	No indication of water
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table.

**GRAIN SIZE IDENTIFICATION		
Name	Size Limits	Familiar Example
Boulder	12 in. or more	Larger than basketball
Cobbles	3 in. to 12 in.	Grapefruit
Coarse Gravel	¾-in. to 3 in.	Orange or lemon
Fine Gravel	No. 4 sieve to ¾-in.	Grape or pea
Coarse Sand	No. 10 sieve to No. 4 sieve	Rock salt
Medium Sand	No. 40 sieve to No. 10 sieve	Sugar, table salt
Fine Sand*	No. 200 sieve to No. 40 sieve	Powdered sugar
Fines	Less than No. 200 sieve	
*Particles finer than fine sand cannot be discerned with the naked eye at a distance of 8 in.		

Coarse Grained Soil Subclassification	Percent (by weight) of Total Sample
Terms: GRAVEL, SAND, COBBLES, BOULDERS	PRIMARY CONSTITUENT
Sandy,gravelly, abundant cobbles, abundant boulders	>30-50]
with gravel, with sand, with cobbles, with boulders	>15-30] – secondary coarse grained constituents
scattered gravel, scattered sand, scattered cobbles, scattered boulders	5-15]
a trace gravel, a trace sand, a few cobbles, a few boulders	<5]
Silty (MH & ML)*, clayey (CL & CH)*	<15]
(with silt, with clay)*	5-15] – secondary fine grained constituents
(trace silt, trace clay)*	<5]
*Index tests and/or plasticity tests are performed to determine whether the term "silt" or "clay" is used.	

*Modified after Ref. ASTM D2487-93 & D2488-93
**Modified after Ref. Oregon DOT 1987 & FHWA 1997
***Modified after Ref. AASHTO 1988, DM 7.1 1982, and Oregon DOT 1987

GENERAL NOTES

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD)	
Description of Rock Quality	*RQD (%)
Very Poor	< 25
Poor	25-50
Fair	50-75
Good	75-90
Excellent	90-100

*RQD is defined as the total length of sound core pieces 4 in. or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

SCALE OF RELATIVE ROCK HARDNESS		
Term	Field Identification	Approx. Unconfined Compressive Strength (tsf)
Extremely Soft	Can be indented by thumbnail	2.6-10
Very Soft	Can be peeled by pocket knife	10-50
Soft	Can be peeled with difficulty by pocket knife	50-260
Medium Hard	Can be grooved 2 mm deep by firm pressure of knife	260-520
Moderately Hard	Requires one hammer blow to fracture	520-1040
Hard	Can be scratched with knife or pick only with difficulty	1040-2610
Very Hard	Cannot be scratched by knife or sharp pick	>2610

DEGREE OF WEATHERING	
Slightly Weathered	Rock generally fresh, joints stained and discoloration extends into rock up to 25mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered	Rock mass is decomposed 50% or less, significant portions of rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

GRAIN SIZE (TYPICALLY FOR SEDIMENTARY ROCKS)		
Description	Diameter (mm)	Field Identification
Very Coarse Grained	>4.76	
Coarse Grained	2.0-4.76	Individual grains can easily be distinguished by eye.
Medium Grained	0.42-2.0	Individual grains can be distinguished by eye.
Fine Grained	0.074-0.42	Individual grains can be distinguished by eye with difficulty.
Very Fine Grained	<0.074	Individual grains cannot be distinguished by unaided eye.

VOIDS	
Pit	Voids barely seen with naked eye to 6mm (¼-in)
Vug	Voids 6 to 50mm (¼ to 2 in) in diameter
Cavity	50 to 6000mm (2 to 24 in) in diameter
Cave	>600mm

BEDDING THICKNESS	
Very Thick Bedded	> 3' thick
Thick Bedded	1' to 3' thick
Medium Bedded	4" to 1' thick
Thin Bedded	1¼" to 4" thick
Very Thin Bedded	½" to 1¼" thick
Thickly Laminated	⅛" to ½" thick
Thinly Laminated	⅛" or less (paper thin)

DRILLING NOTES

Drilling and Sampling Symbols

NQ – Rock Core (2-in. diameter)
HQ – Rock Core (3 in. diameter)
HSA – Hollow Stem Auger
CFA – Continuous Flight (Solid Stem) Auger
SS – Split Spoon Sampler
ST – Shelby Tube
WB – Wash Bore or Mud Rotary
TP – Test-Pit
HA – Hand Auger

Soil Sample Types

Shelby Tube Samples: Relatively undisturbed soil samples were obtained from the borings using thin wall (Shelby) tube samplers pushed hydraulically into the soil in advance of drilling. This sampling, which is considered to be undisturbed, was performed in accordance with the requirements of ASTM D 1587. This type of sample is considered best for the testing of "in-situ" soil properties such as natural density and strength characteristics. The use of this sampling method is basically restricted to soil containing little to no chert fragments and to softer shale deposits.

Split Spoon Samples: The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot of an 18-in. long, 2-in. O.D. split-barrel sampler with a 140 lb. hammer falling a distance of 30 in. The Standard Penetration Test is carried out according to ASTM D-1586.

Water Level Measurements

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, shallow groundwater may indicate a perched condition. Caution is merited when interpreting short-term water level readings from open bore holes. Accurate water levels are best determined from piezometers.

Automatic Hammer

Palmerton and Parrish's CME's are equipped with automatic hammers. The conventional method used to obtain disturbed soil samples used a safety hammer operated by company personnel with a cat head and rope. However, use of an automatic hammer allows a greater mechanical efficiency to be achieved in the field while performing a Standard Penetration resistance test based upon automatic hammer efficiencies calibrated using dynamic testing techniques.

*Modified after Ref. ASTM D2487-93 & D2488-93
**Modified after Ref. Oregon DOT 1987 & FHWA 1997
***Modified after Ref. AASHTO 1988, DM 7.1 1982, and Oregon DOT 1987

APPENDIX III

DCP TEST RESULTS

DCP TEST DATA

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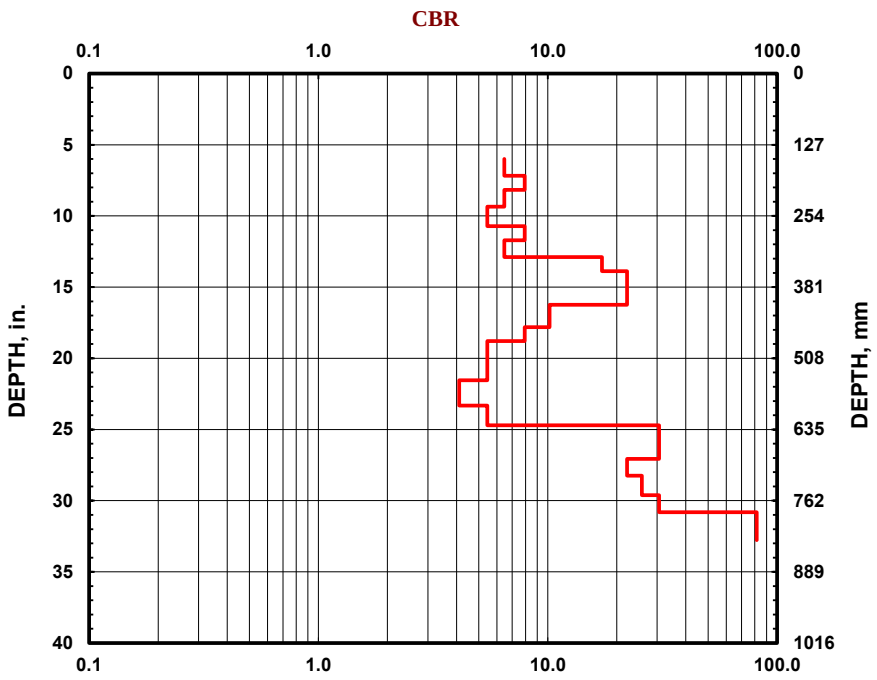
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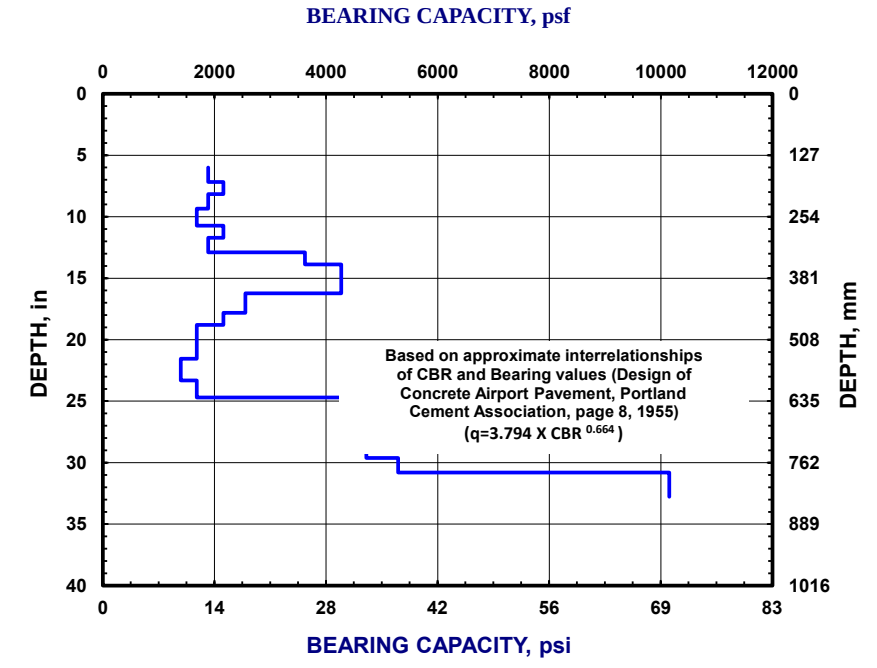
Location: Boring 1 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	152	1
1	182	1
1	207	1
1	237	1
1	272	1
1	297	1
1	327	1
2	352	1
3	382	1
3	412	1
2	452	1
1	477	1
1	512	1
1	547	1
1	592	1
1	627	1
4	657	1
4	687	1
3	717	1
4	752	1
4	782	1
8	807	1
8	832	1





DCP TEST DATA

Client Name: Bartlett & West

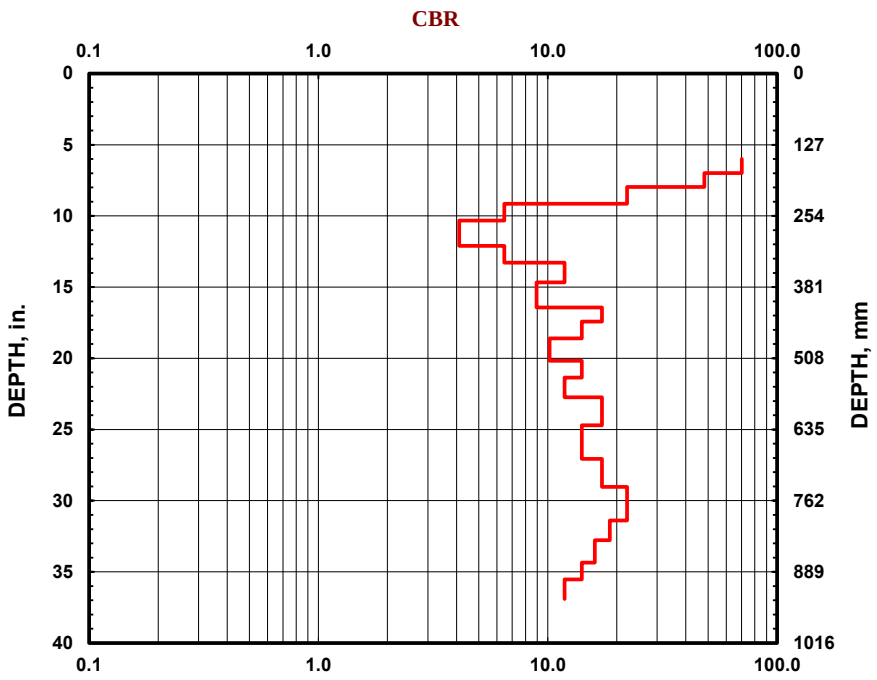
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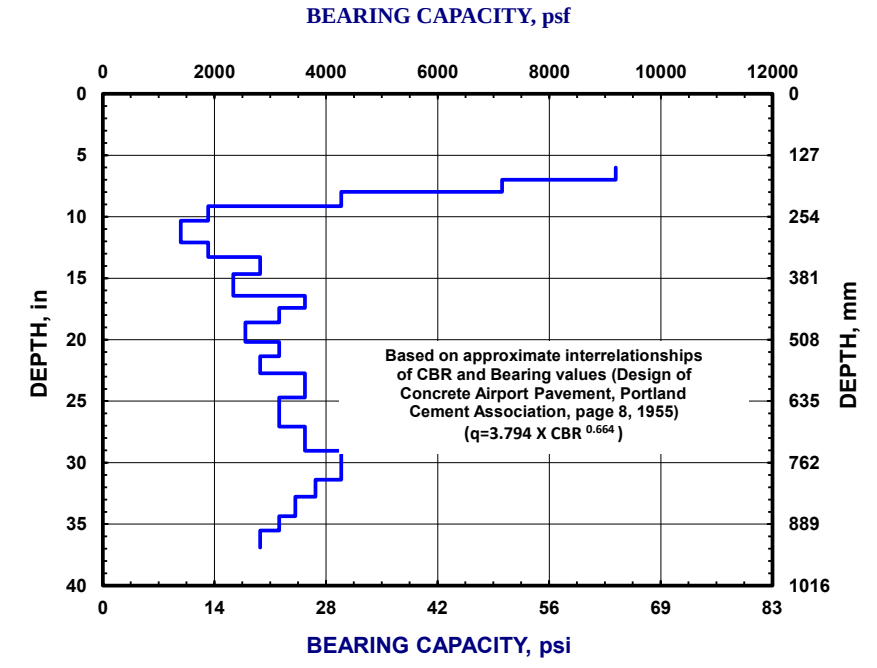
Location: Boring 2 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	152	1
7	177	1
5	202	1
3	232	1
1	262	1
1	307	1
1	337	1
2	372	1
2	417	1
2	442	1
2	472	1
2	512	1
2	542	1
2	577	1
2	602	1
2	627	1
2	657	1
2	687	1
2	712	1
2	737	1
3	767	1
3	797	1
3	832	1
3	872	1
2	902	1
2	937	1





DCP TEST DATA

Client Name: Bartlett & West

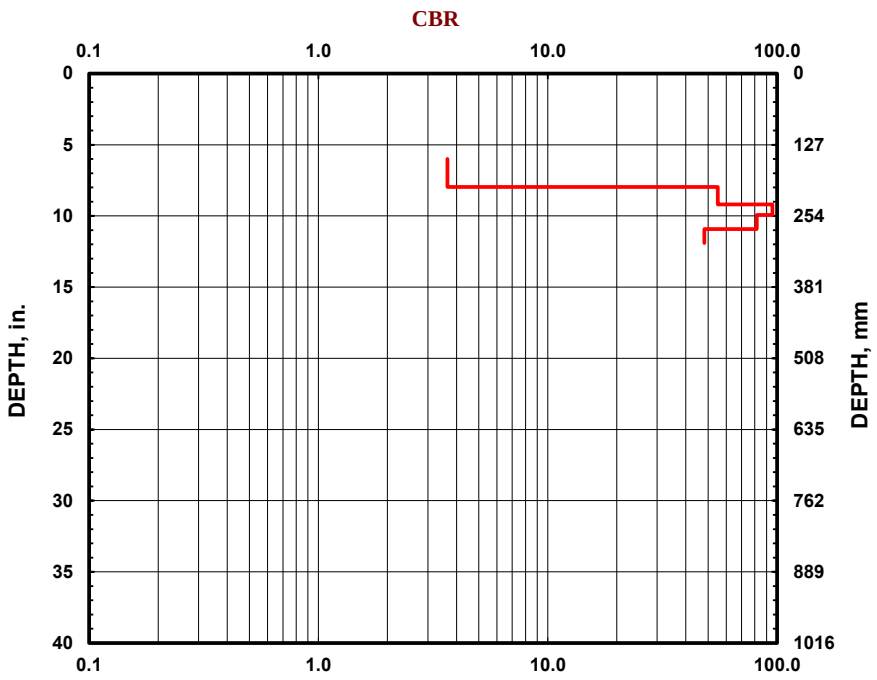
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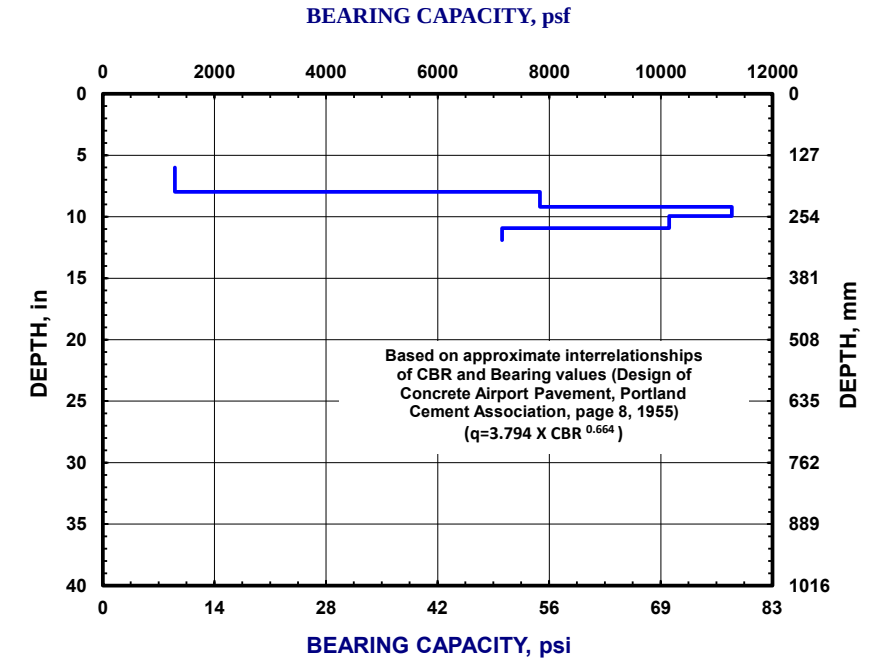
Location: Boring 3 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	152	1
1	202	1
7	233	1
7	252	1
8	277	1
5	302	1





DCP TEST DATA

Client Name: Bartlett & West

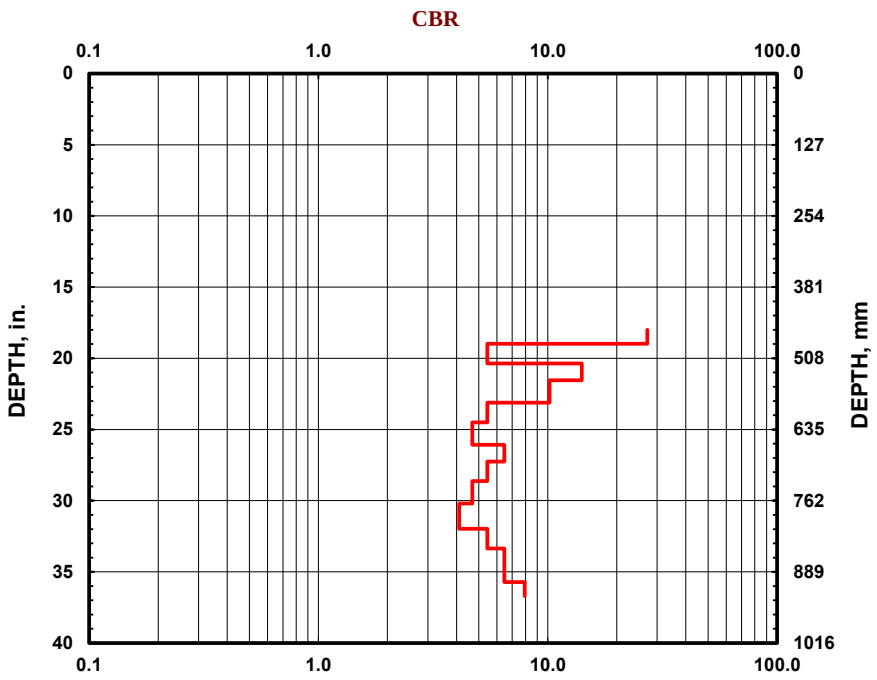
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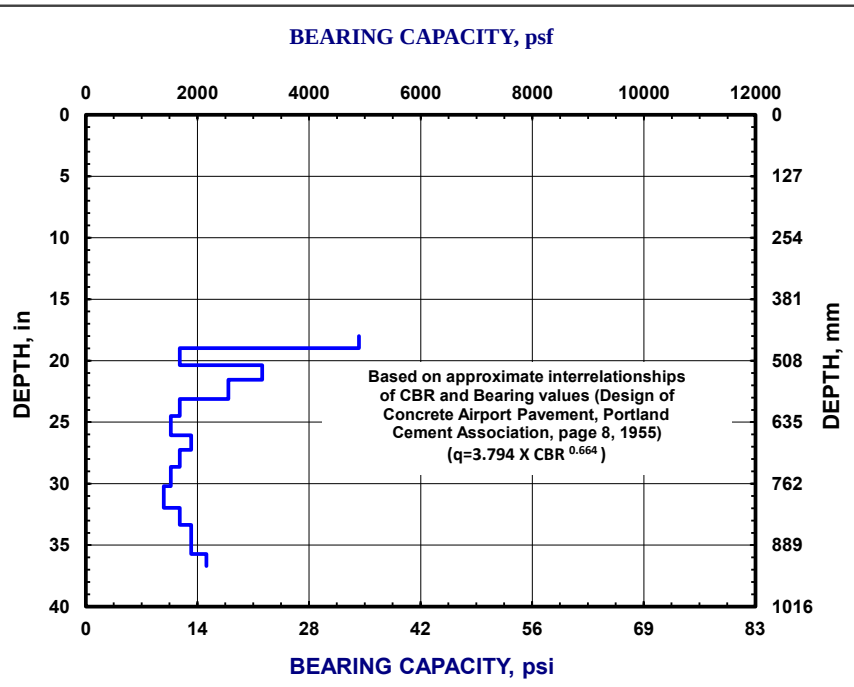
Location: Boring 4 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	457	1
3	482	1
1	517	1
2	547	1
2	587	1
1	622	1
1	662	1
1	692	1
1	727	1
1	767	1
1	812	1
1	847	1
1	877	1
1	907	1
1	932	1





DCP TEST DATA

Client Name: Bartlett & West

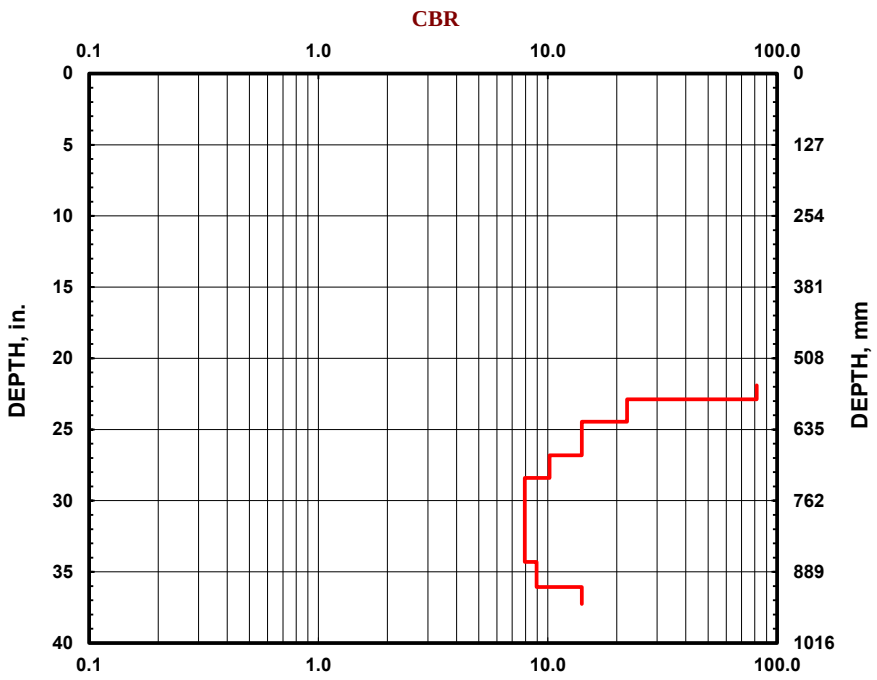
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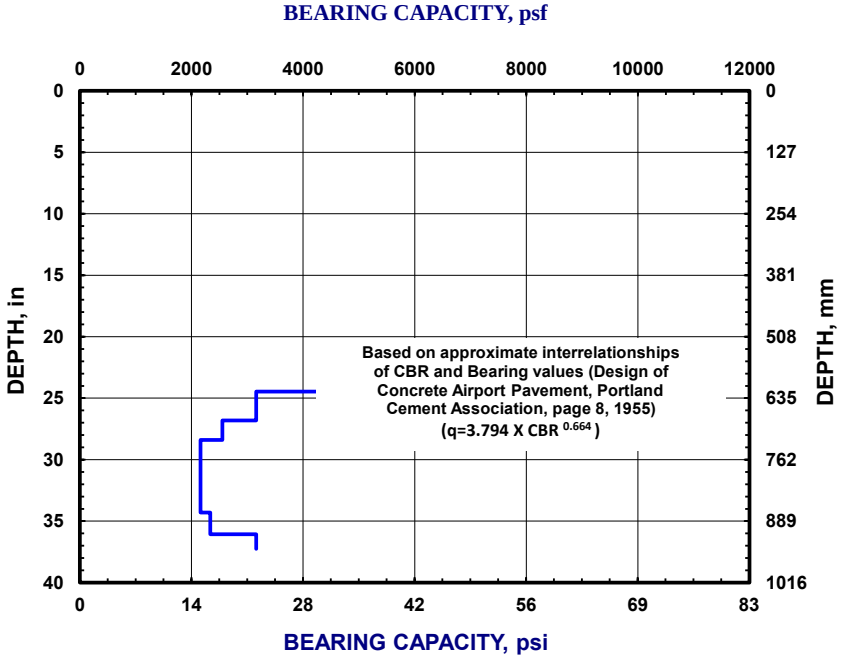
Location: Boring 5 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	556	1
8	581	1
4	621	1
2	651	1
2	681	1
2	721	1
2	771	1
2	821	1
2	871	1
2	916	1
2	946	1





DCP TEST DATA

Client Name: Bartlett & West

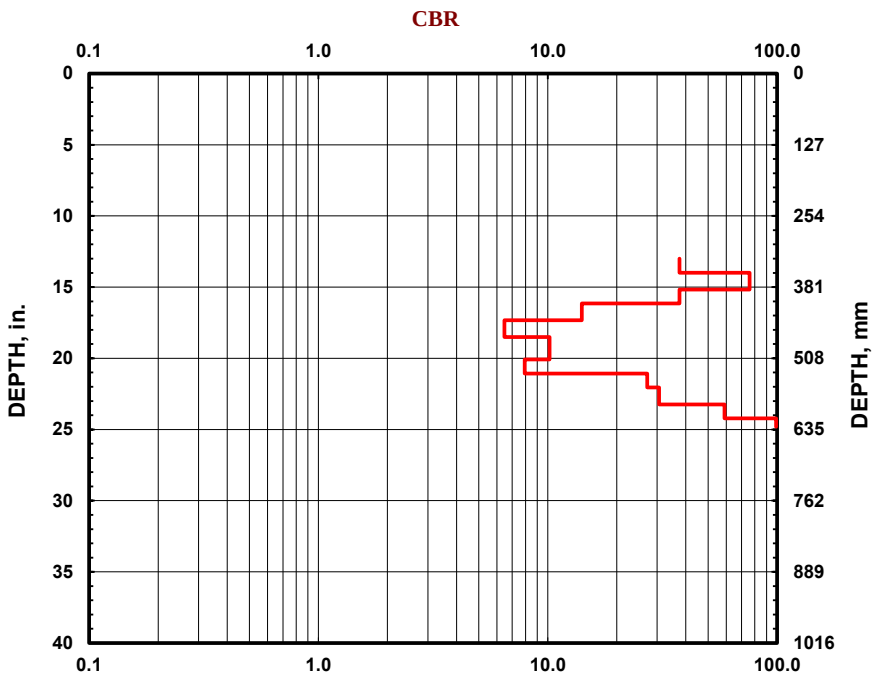
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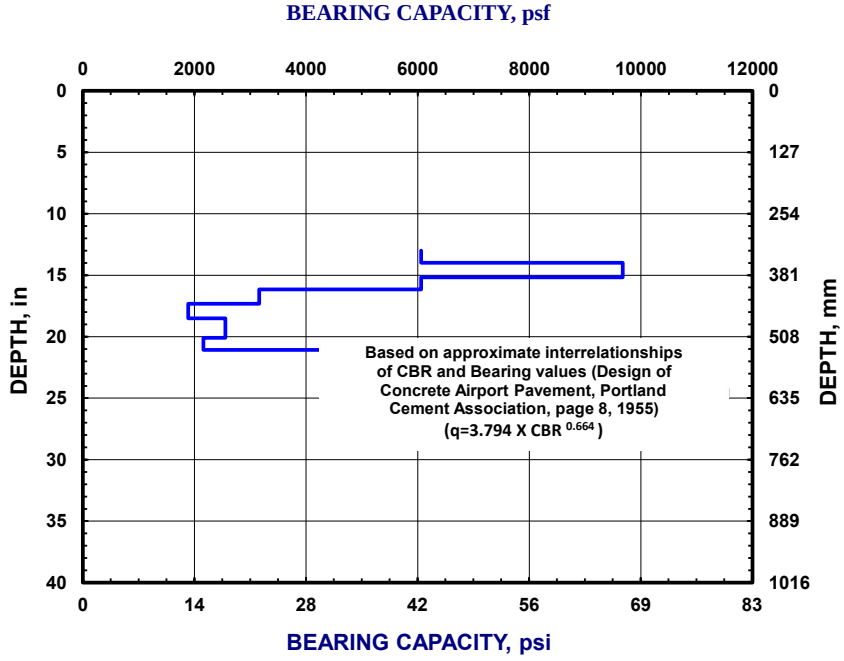
Location: Boring 6 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	330	1
4	355	1
9	385	1
4	410	1
2	440	1
1	470	1
2	510	1
1	535	1
3	560	1
4	590	1
6	615	1
10	630	1





DCP TEST DATA

Client Name: Bartlett & West

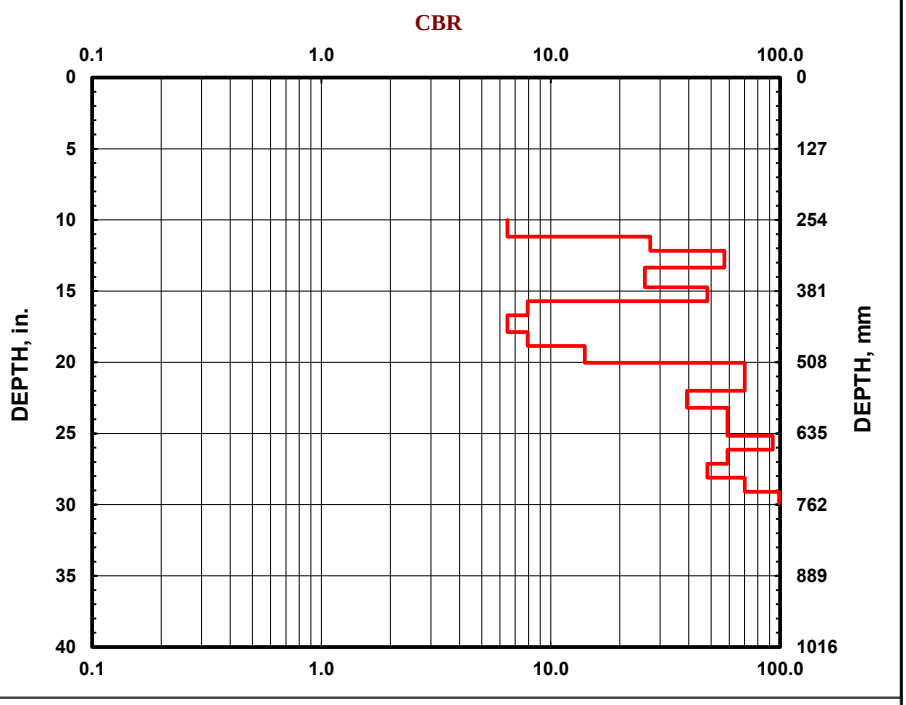
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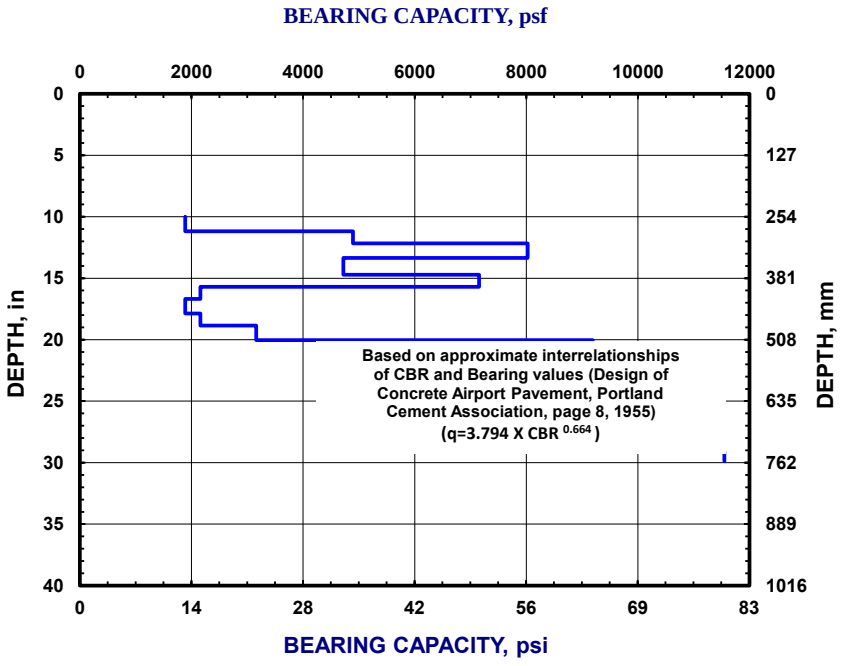
Location: Boring 7 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	254	1
1	284	1
3	309	1
7	339	1
4	374	1
5	399	1
1	424	1
1	454	1
1	479	1
2	509	1
7	534	1
7	559	1
5	589	1
6	614	1
6	639	1
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6	689	1
5	714	1
7	739	1
10	759	1





DCP TEST DATA

Client Name: Bartlett & West

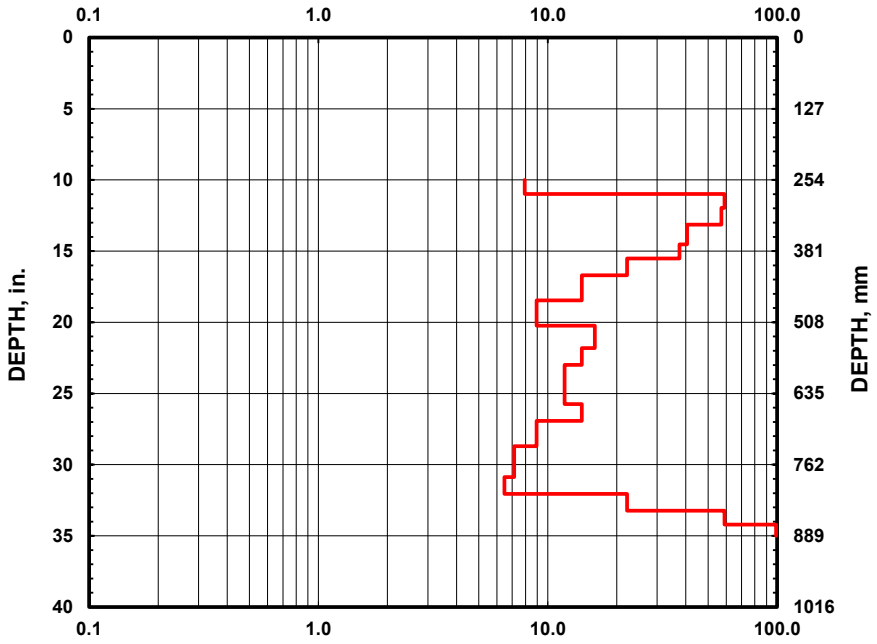
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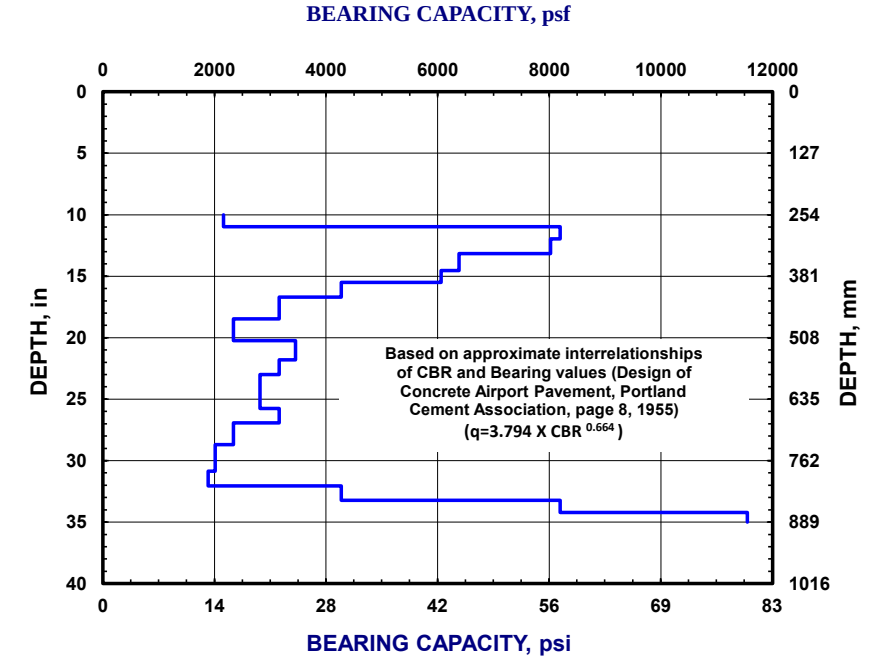
Location: Boring 8 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	254	1
1	279	1
6	304	1
7	334	1
6	369	1
4	394	1
3	424	1
3	469	1
2	514	1
3	554	1
2	584	1
2	619	1
2	654	1
2	684	1
2	729	1
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1	814	1
3	844	1
6	869	1
10	889	1





DCP TEST DATA

Client Name: Bartlett & West

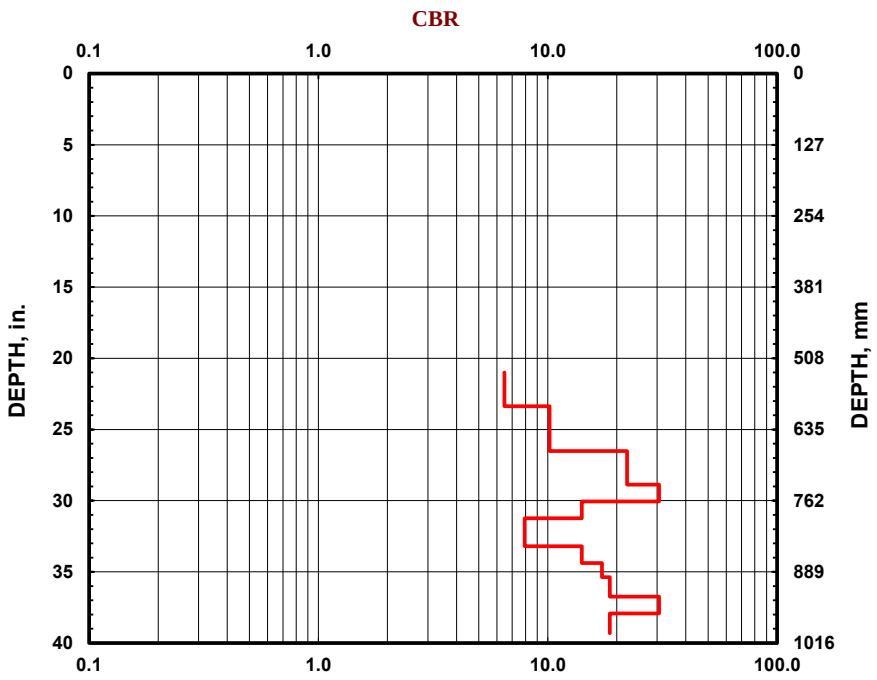
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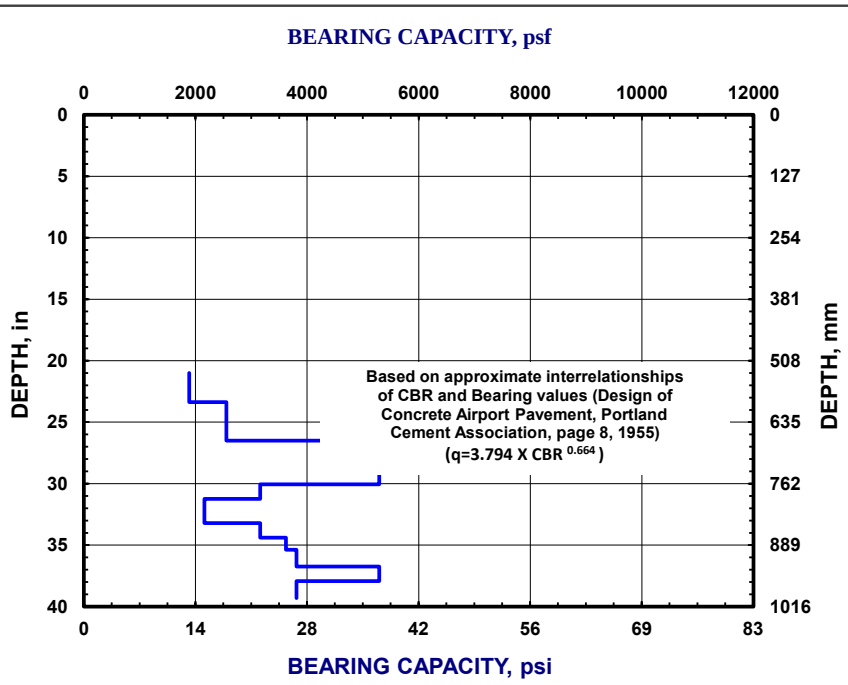
Location: Boring 9 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	533	1
2	593	1
2	633	1
2	673	1
3	703	1
3	733	1
4	763	1
2	793	1
2	843	1
2	873	1
2	898	1
3	933	1
4	963	1
3	998	1





DCP TEST DATA

Client Name: Bartlett & West

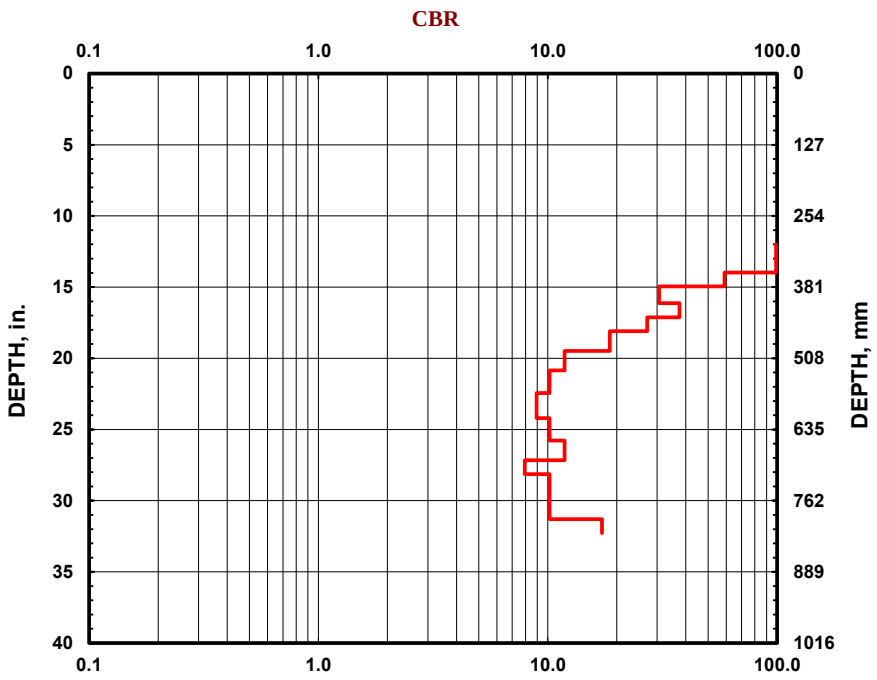
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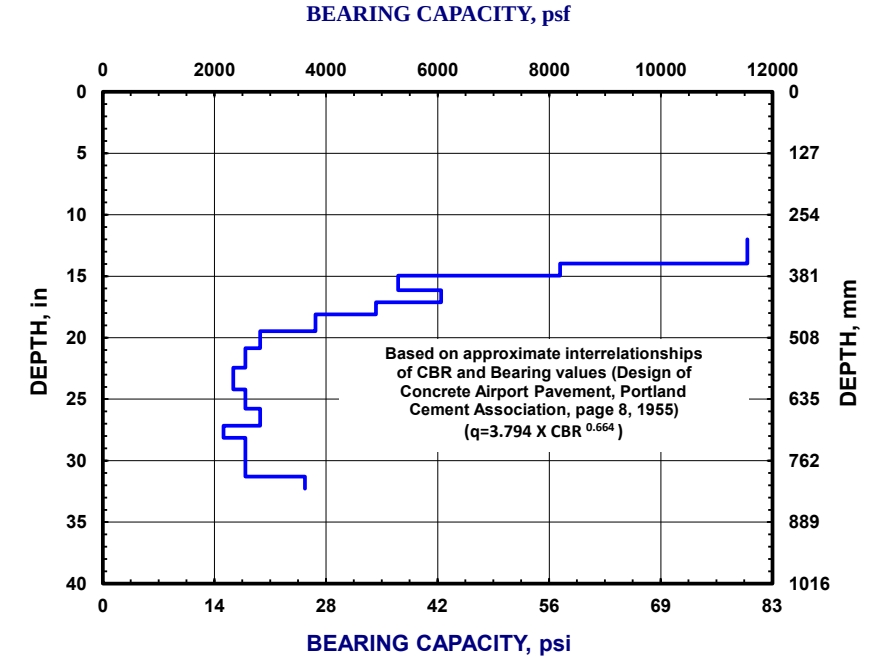
Location: Boring 10 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	305	1
11	330	1
10	355	1
6	380	1
4	410	1
4	435	1
3	460	1
3	495	1
2	530	1
2	570	1
2	615	1
2	655	1
2	690	1
1	715	1
2	755	1
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2	820	1





DCP TEST DATA

Client Name: Bartlett & West

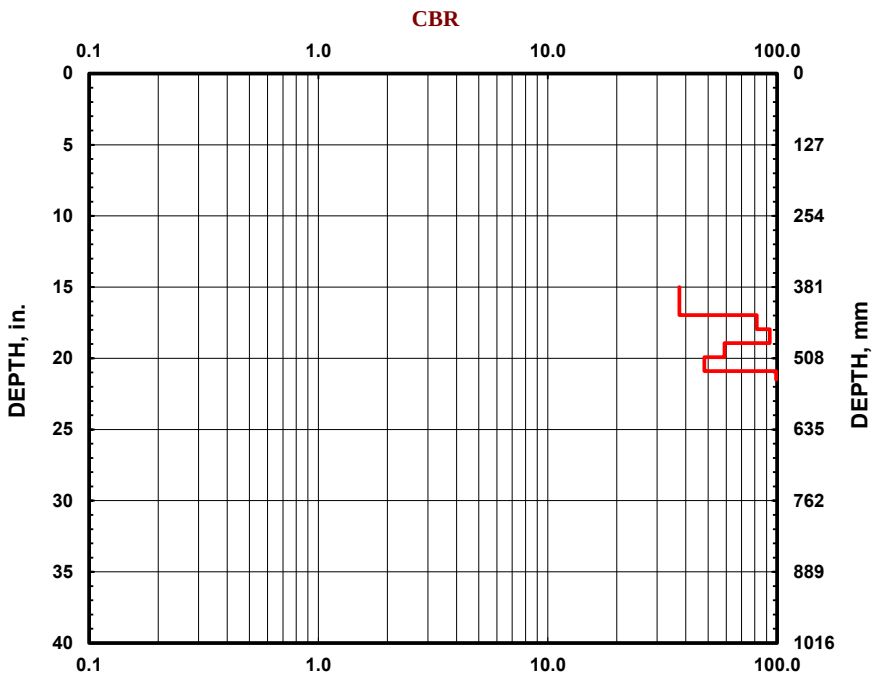
Project: *Connecticut Ave. - Between 32nd & I-44* **Date:** 24-Jul-17

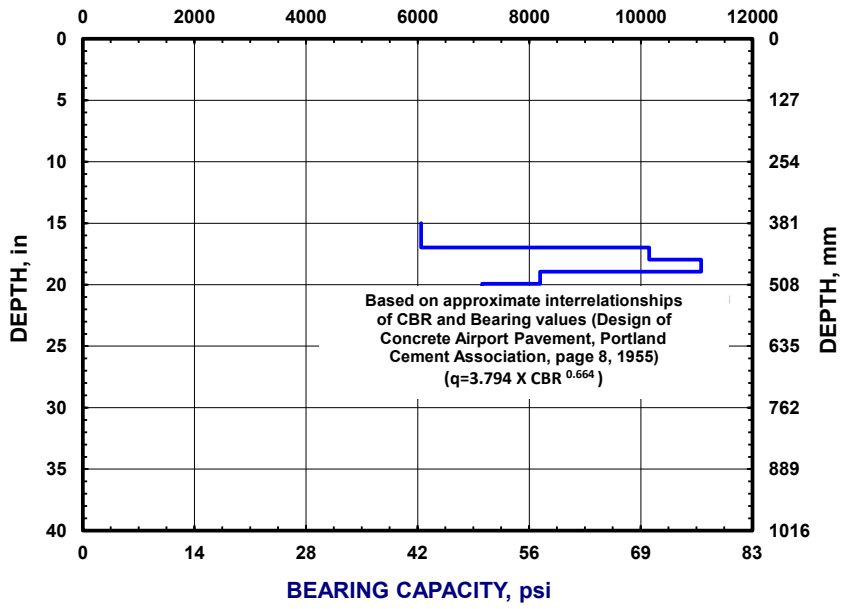
Location: Boring 11 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	381	1
4	406	1
4	431	1
8	456	1
9	481	1
6	506	1
5	531	1
10	546	1





DCP TEST DATA

Client Name: Bartlett & West

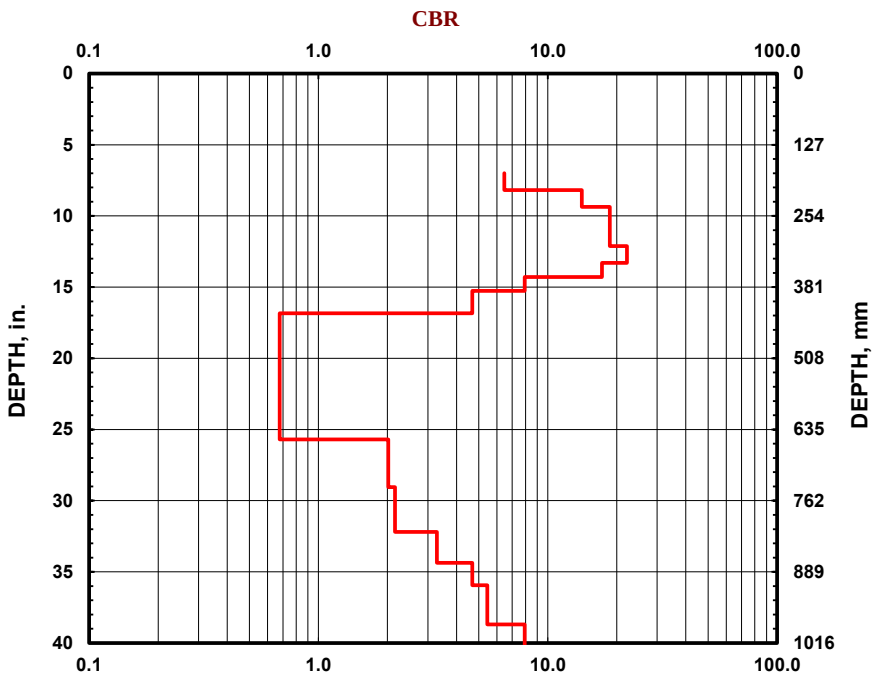
Project: *Connecticut Ave. - Between 32nd & I-44* **Date:** 24-Jul-17

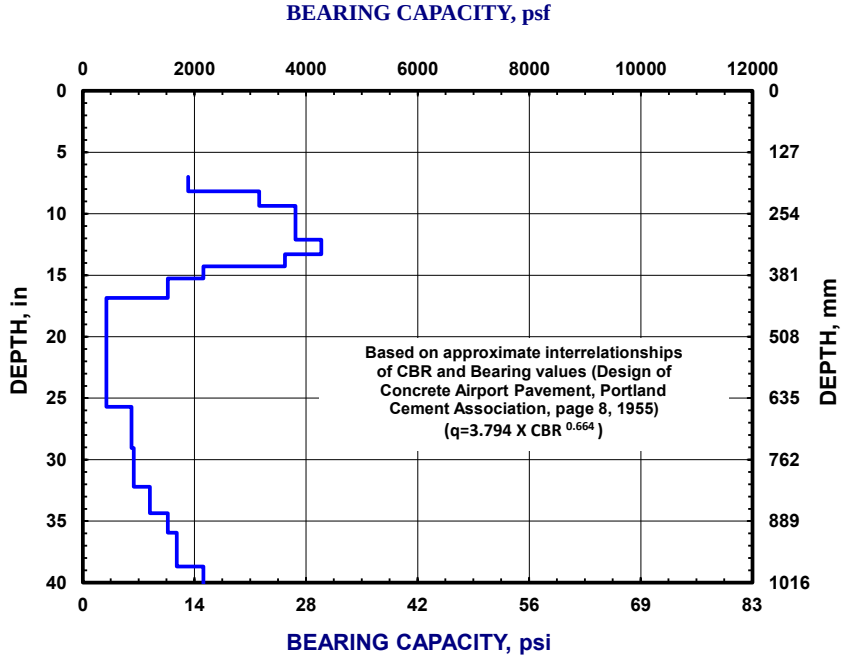
Location: Boring 13 **Soil Type(s):** CL

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	178	1
1	208	1
2	238	1
3	273	1
3	308	1
3	338	1
2	363	1
1	388	1
1	428	1
1	653	1
1	738	1
1	818	1
1	873	1
1	913	1
1	948	1
1	983	1
1	1008	1
1	1033	1





APPENDIX IV

CORE PHOTOGRAPHS

Pavement Core Log

TOP



• Geotechnical Services
• Environmental Services
• Material Testing Services

PALMERTON & PARRISH, INC.

Springfield, MO
4168 W. Kearney Springfield, MO 65803
Call 417.864.6000 Fax 417.864.6004
www.ppimo.com

Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	1

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	2.25”
Aggregate Base	3.75”

Total Pavement Thickness: 6.0”

Pavement Core Log

TOP



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www.ppimo.com

Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	2

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	2.75”
Aggregate Base	3.25”

Total Pavement Thickness: 6.0”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	3

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	5.75”
Aggregate Base	6.25”

Total Pavement Thickness: 12.0”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	4

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	5.5”
Aggregate Base	18.5”

Total Pavement Thickness: 24.0”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	5

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	6.75”
Aggregate Base	20.25”

Total Pavement Thickness: 27.0”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	6

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	7”
Aggregate Base	11”

Total Pavement Thickness: 18”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	7

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	5.5”
Aggregate Base	10.5”

Total Pavement Thickness: 16”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	8

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	5.5”
Aggregate Base	6.5”

Total Pavement Thickness: 12”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	9

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	6.5”
Aggregate Base	14.5”

Total Pavement Thickness: 21”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	10

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	6”
Aggregate Base	15”
Total Pavement Thickness:	21”

Pavement Core Log

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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	11

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	6.25”
Aggregate Base	18.75”

Total Pavement Thickness: 25”

Pavement Core Log

TOP



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Core Log

Project Number:	237724
Client:	Bartlett & West
Project:	Connecticut Ave. Widening
Location:	Joplin, Missouri
County:	Jasper County
Date:	8/3/2017
Boring Number:	13

Core Layer Data (From Top to Bottom)

LAYER TYPE	**LAYER THICKNESS (in.)**
Asphalt	2.25”
Aggregate Base	4.75”

Total Pavement Thickness: 7”

APPENDIX V

IMPORTANT INFORMATION REGARDING YOUR GEOTECHNICAL REPORT

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

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IIGER06075.0MRP

PALMERTON & PARRISH, INC.

GEOTECHNICAL & MATERIALS ENGINEERS
MATERIALS TESTING LABORATORIES
ENVIRONMENTAL SERVICES

4168 W. Kearney St.
Springfield, MO 65803
Ph: (417) 864-6000
www.ppimo.com

January 22, 2018

Bartlett & West
1719 Southridge Drive
Jefferson City, MO 65109

Attn: Mr. Herb Bailey, P.E.
Herb.bailey@bartwest.com

RE: Geotechnical Engineering Report – Addendum No. 1
Connecticut Ave. Widening – 32nd Street to I-44
Joplin, Missouri
PPI Project Number: 237724

Dear Mr. Bailey:

As you know, a Geotechnical Engineering Report for the above referenced project was prepared and submitted by PPI on August 8, 2017. At the time of the report, the final widening alignment and proposed grading had not been selected. As provided in Section 11.0 of the Geotechnical Report, general cut and fill slope recommendations were provided. These recommendations were in accordance with the slope recommendations as provided in Section 321.1.1 of the MoDOT Engineering Policy Guide (EPG).

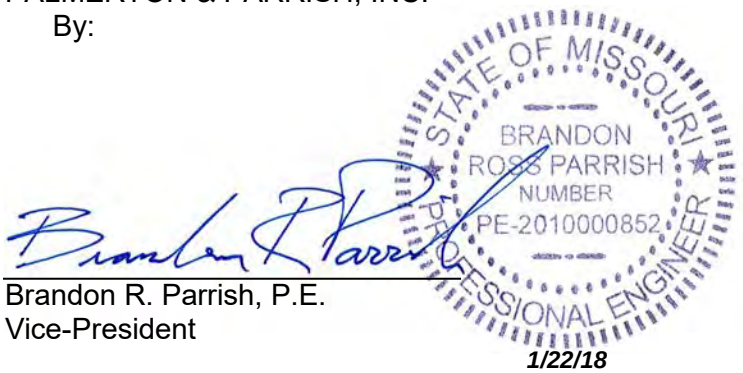
The project alignment extends from 32nd Street to the Connecticut Ave. Bridge over I-44. PPI also performed the Geotechnical Investigation for the new Connecticut Ave. Bridge over I-44, under sub-contract to HDR Engineering, Inc. Due to the narrow existing right-of-way limits, 1.5H:1V side slopes were designed by HDR at the bridge abutments. In order to achieve this steeper slope inclination, PPI performed a site specific global slope stability analysis and issued Geotechnical Engineering Report - Addendum No. 1, dated January 27, 2017, to HDR with recommendations for material type and earthwork procedures in order to achieve a satisfactory global stability safety factor.

Based on our conversations to date, PPI understands that Bartlett & West plans to follow the recommendations for 2.5H:1V and 2H:1V slopes (less than 20 feet in total height) that were included in PPI's August 8, 2017 Report for the majority of the Project Alignment. Bartlett & West will design a transition zone on the south end of their project to tie the slopes into the 1.5H:1V slopes designed by HDR for the Connecticut Ave. Bridge Project.

The recommendations included in PPI's January 27, 2017 Addendum No. 1 – Geotechnical Engineering Report for the Connecticut Ave. Bridge Project (copy attached to this Letter) may be utilized in this transition zone. The length of the transition from flatter slopes to 1.5H:1V slopes should occur over a minimum practical length with regard to constructability (minimum transition length approximately twice the slope height) but also one that is aesthetically pleasing.

It should be noted that PPI's recommendations to HDR for construction of 1.5H:1V slopes were based on site-specific subsurface investigation and slope stability analysis. In the event that Bartlett & West wishes to utilize steeper slope grades in an area beyond the transition zone between the two projects, PPI should be retained to perform additional studies of the site-specific subsurface conditions and geometry.

PALMERTON & PARRISH, INC.
By:



Brandon R. Parrish, P.E.
Vice-President

1/22/18

Attachments: HDR Geotech Addendum No. 1 dated January 27, 2017

PALMERTON & PARRISH, INC.

GEOTECHNICAL & MATERIALS ENGINEERS
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ENVIRONMENTAL SERVICES

4168 W. KEARNEY ST.
SPRINGFIELD, MO 65803
Ph: (417) 864-6000
www.ppimo.com

January 27, 2017

Mr. Brian Zeiger, P.E.
HDR Engineering, Inc.
4435 Main Street
Suite 100
Kansas City, Missouri 64111-1856

Email: Brian.Zeiger@hdrinc.com

RE: Geotechnical Engineering Report – Addendum #1
Recommendations for MSE Wall Design and Approach Abutment Fill Slopes
Connecticut Ave. Bridge over I-44
Joplin, Missouri
PPI Project Number: 236684

Dear Mr. Zeiger:

This Letter Report summarizes additional recommendations for MSE Wall Design and Approach Abutment Fill Slopes for the Connecticut Ave. Bridge over I-44 in Joplin, Missouri. Palmerton & Parrish, Inc. (PPI) issued a formal Geotechnical Engineering Report for the Project dated November 4, 2016.

This Letter Report is Addendum #1 to PPI's original Geotechnical Engineering Report, and is organized into two (2) sections: MSE Wall Design Recommendations and Approach Abutment Fill Slope Recommendations. Most of the information presented in this Report has been previously transmitted to HDR via email correspondence; this Letter Report consolidates PPI's previously provided recommendations into one document for our file records.

SECTION 1 – MSE WALL DESIGN RECOMMENDATIONS

HDR Engineering, Inc. (HDR) requested clarification and additional information for their use in preparation of the MSE Wall Design Plans via email on November 22, 2016 and December 5, 2016. PPI responded via email on December 5 and 6, 2016. PPI and HDR subsequently discussed PPI's recommendations. This Letter Report summarizes PPI's additional MSE Wall Design Recommendations and serves as the formal file record.

MSE Wall Design Parameters – Friction Angle (ϕ) and Unit Weight (γ): HDR requested PPI provide friction angle (ϕ) and unit weight (γ) for the following zones:

- Unimproved foundation ground (HDR nomenclature: ϕ_f and γ_f); and
- Retained backfill material (HDR nomenclature: ϕ_b and γ_b).

Soil shear strength and unit weight parameters are summarized on Page 6 of PPI's Geotechnical Engineering Report dated November 4, 2016. For the purposes of the MSE Wall Design Plans, the parameters listed in PPI's Report for "existing fill / possible fill" may be utilized for both zones, as summarized in the table below.

MSE Wall Design Parameters		
Zone	γ	ϕ
Unimproved Foundation Ground	120	24
Retained Backfill Material	120	24
Ref: PPI Geotechnical Engineering Report dated November 4, 2016, Table 7.2-1, parameters for "Existing Fill / Possible Fill (Lean Clay with Chert)"		

Minimum Reinforcement Length to Satisfy Global Slope Stability: The minimum reinforcement length required to satisfy global slope stability is 0.8H, where H is the total wall height. The minimum toe embedment should be 2 feet, in accordance with MoDOT Specifications.

MSE Wall Bearing Capacity: HDR requested the allowable bearing capacity for the MSE Wall if bearing on unimproved ground. *In PPI's experience, it is important that the Wall Design Plans present the measures required to achieve the required allowable bearing capacity for the MSE Wall.* The table below summarizes recommendations for foundation zone improvement depending on the required allowable bearing capacity for the MSE Wall.

MSE Wall Design – Allowable Bearing Capacity	
Foundation Preparation Measures	**Allowable Bearing Capacity (pcf)**
Stripping and Grubbing Only	2,500
See Section 7.3 of PPI's November 4, 2016 Geotechnical Engineering Report. In general: within the entire MSE Wall footprint area, and extending at least 5 feet in front of the wall, thorough clearing and grubbing, followed by proof-rolled. Soft or otherwise unsuitable areas identified during proof-rolling should be remediated on a case-by-case basis, most likely by undercutting and replacement with new controlled fill.	4,000[1]
[1]Site Preparation in general accordance with Section 7.3 of PPI's Geotechnical Engineering Report dated November 4, 2016 is required in order for these allowable bearing capacity values to apply.	

SECTION 2 – APPROACH ABUTMENT FILL RECOMMENDATIONS

The new bridge construction will require widening and enlargement of the existing Connecticut Avenue roadway section and embankment leading to the bridge overpass on both sides. PPI and HDR executed a Contract Addendum on November 22, 2016 that authorized PPI to complete a supplemental subsurface investigation in the area of the planned new fill placement. HDR's Design Plans call for placement of new fill with an exterior slope grade of 1.5 Horizontal to 1 Vertical (1.5H:1V).

Field Subsurface Investigation: PPI's planned scope of services included two (2) borings drilled on the shoulder of Connecticut Avenue. Due to steep slopes and inclement weather concerns, PPI was only able to complete one of the two borings, identified as Boring 2, on the south side of Connecticut Avenue. Boring 2 was drilled on December 14, 2016. PPI attempted to access Boring 1 on December 14 and 15, 2016, and again on January 9, 2017. The desired boring location was inaccessible due to the steepness of the slopes and recent wet weather that had softened the slopes. After several attempts to gain access with the drill rig, and then discussing with HDR, PPI elected to forgo completion of the second boring location.

PPI completed a utility locate request with the Missouri One Call System in advance of field mobilization, and provided our own traffic control in accordance with the Manual for Uniform Traffic Control Devices (MUTCD). Boring 2 was drilled with 4.25-inch inner diameter hollow stem augers. Soil sample types included thin-walled Shelby tubes pushed hydraulically in advance of drilling in general accordance with ASTM D 1587 and split spoon samples collected during performance of the Standard Penetration Test (SPT) in general accordance with ASTM D 1586.

The boring was logged by a Geologist from PPI's staff, Ms. Amber Morefield, G.R.I.T. Groundwater was not encountered during or upon completion of drilling, and the boring was backfilled with cuttings upon completion. The boring location was staked upon completion for future surveying by HDR.

Laboratory Testing Program: Collected soil samples were sealed and transported to PPI's Springfield, Missouri laboratory for further evaluation and completion of laboratory testing. Laboratory testing included the following:

- Moisture Content (ASTM D2216);
- Grain Size Analysis (ASTM D422);
- Atterberg Limits (ASTM D4318);
- Pocket Penetrometer Strength; and
- Multi-Stage Consolidated Undrained Triaxial Test (ASTM D 4767).

Encountered Subsurface Conditions: A Boring Log is included in Appendix I, and shows descriptions of soil and rock units encountered, as well as results of field and laboratory testing. General Notes pertaining to the sample types and nomenclature are presented in Appendix II.

In general, Boring 2 encountered fill to a depth of about 25.4 feet, where natural, dense clayey gravel soils were encountered. The boring was terminated at a depth of 30 feet on chert. Fill soils consisted of lean clay with gravel and gravelly clay. The existing fill was classified as medium dense to dense, or medium stiff to stiff based upon the results of field and laboratory testing.

However, evidence of organic material was encountered at a depth of about 5 feet, and at a depth of about 25.4 feet. The presence of organics at these depths indicates that

the previously existing ground surface was not properly cleared and grubbed prior to placement of new fill material.

Slope Stability Analysis: The subsections below discuss development of the critical geologic cross section, slope stability analysis, and the results of the analysis.

Critical Cross Section: PPI reviewed the design cross sections provided by HDR on December 29, 2016. The maximum fill slope height is around 23 feet, with an exterior slope grade of 1.5H:1V. The width of the new fill section is most typically 40 to 45 feet at the top of the slope and 30 feet at the bottom of the slope. PPI selected the cross section at Station 12+70 as the critical cross section. This cross section appears to be representative of the typical "worst case", or tallest, cross section on both sides of the new bridge.

Discussion of Laboratory Test Results: Laboratory test results are shown on the boring log in Appendix I. Selected laboratory test results are also presented graphically in Appendix III.

It should be noted that, in general, the gravel content of the fill soils prevented collection of quality thin-walled Shelby tube samples for completion of high end shear strength testing. Only one (1) of the Shelby tube samples was viable for completion of a multi-stage consolidated undrained triaxial test. The results of the multi-stage consolidated undrained triaxial test were utilized to develop the shear strength parameters that were used for completion of the slope stability analysis.

In PPI's opinion, this test result likely bounds the lower end of in situ shear strength parameters of the fill embankment mass. In general, the gravel content of the fill embankment mass is believed to be significantly more than the predominantly lean clay that was recovered in the Shelby tube sample from 3 feet 5 inches to 5 feet 2 inches. The results of the slope stability analysis are adequate, even with the, believed to be conservative, shear strength parameters that were assumed for the existing fill embankment.

Geologic Cross Section: PPI developed the geologic cross section for the Critical Cross Section using date collected during the field investigation, laboratory testing program, and published correlations between soil classification and strength parameters. Strength and unit weight parameters for the new fill material were approximated on the lower end of what PPI anticipates for fill material that is placed and compacted in accordance with the recommendations provided in this Letter Report.

Geologic strata are summarized in the table below, including effective and total stress shear strength parameters for each stratum.

Table 1: Geologic Strata and Soil Shear Strength Parameters					
		Shear Strength Parameters			
		Effective Stress		Total Stress	
Strata	γ_m (pcf)	c_{eff} (psf)	ϕ_{eff} (deg)	c_{tot} (psf)	ϕ_{tot} (deg)
New Fill: Gravelly Lean or Fat Clay, or Clayey Gravel; compacted to 98 percent maximum dry density	125	150	28	400	14
Fill – Lean Clay with Gravel	124	150	21	250	10
Fill – Clayey Gravel and Gravelly Clay	124	150	22	300	14
Fill and Natural Contact	124	150	21	250	10
Clayey Gravel and Gravelly Clay	125	150	28	300	14

Seismic Event: PPI utilized Probabilistic Seismic Hazard Analysis (PSHA) methods as outlined in USACE ER 1110-2-1806 for completion of seismic slope stability analysis. The PSHA was performed using the 2008 Interactive Deaggregation Program available on the United States Geological Survey (USGS) Earthquake Hazards Mapping website (http://earthquake.usgs.gov). PSHA output for the 2,475-year recurrence interval event is included in Appendix III and summarized in the table below.

Table 2: PSHA Output	
Earthquake Return Period	Peak Horizontal Ground Acceleration (pga) for BC rock
2,475-year (2% PE in 50 yr.)	0.05678g[1]
[1] g = gravity = 32.174 ft/sec^2	

Analysis Methodology: Conventional analysis procedures were utilized for computation of structural stability factors of safety. Slope stability analysis was performed using the computer program SLOPE/W, part of the GeoStudio software package published by GEO-SLOPE International. Within SLOPE/W, Spencer's method was specified for completion of the analysis. Spencer's method is a limit equilibrium method that utilizes the method of slices. Spencer's method satisfies both force and moment equilibrium.

Results: The table below summarizes the calculated Factors of Safety and the Factors of Safety that are commonly accepted as Standard of Practice.

Table 3: Calculated Factors of Safety			
Loading Condition[1]	Shear Strength Conditions	Req. Min. FS	Calculated FS
(1) End of Construction	Total stress for new fill; Effective Stress for existing embankment	1.3	1.5
(2) Static	Effective Stress	1.5	1.5
(3) Seismic	Total Stress[2]	1.1	1.2
(4) Seismic	Effective Stress[2]	1.1	1.3
[1] All cases modeled with a 250 psf surcharge load in accordance with AASHTO requirements. [2] Total Stress conditions are Standard of Practice for Seismic Analysis. PPI also checked seismic loading with effective stress conditions.			

Conclusions: Based on the results of the field and laboratory investigation, and the slope stability analysis, the in situ strength of the new fill mass controls the stability of the exterior embankment fill slope. The proposed 1.5H:1V slope grade is acceptable for use on the Project, contingent upon the recommendations in the following section being incorporated into a Job Special Provision for fill specification and fill placement.

Recommendations: A new fill slope grade of 1.5H:1V is acceptable for use only if the recommendations listed below are adhered to during construction. PPI should be retained for construction observation and testing.

1. The existing embankment slope should be cleared and grubbed of vegetation prior to placement of new fill.

2. New fill should be benched into the side of the existing fill slope. In general, the maximum vertical bench height should be on the order of 2 to 3 feet. Each bench "step" should have a minimum width of 5 feet to allow for good interlock between the new and existing fill zones.

3. The surface of the existing fill should be scarified and recompacted prior to placement of new fill. Soft or otherwise unsuitable zones should be evaluated and remediated on a case basis, likely by removal and replacement.

4. New fill material should classify as CL, CH, or GC, and should contain a minimum of 35 percent gravel retained on the No. 4 sieve and above. The new fill should have a maximum particle size of 4 inches. CL and GC soils should be placed at a moisture content within 2 percent of optimum moisture content (w_{opt} +/-2%). CH soils should be placed at a moisture content between optimum and 3 percent over optimum (w_{opt} + 3%).

5. New fill should be placed and compacted in maximum 8-inch thick loose lifts. Fill must be placed and compacted to a minimum of 98 percent of maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D 698).

6. The exterior surface of the new fill slope should be protected from erosion due to surface water and storm water runoff. PPI understands that the current Design calls for collection of all storm water from the roadway section, and that the only rainfall on the slope should be the rainfall directly on the slope itself. Establishment of good vegetation, or alternatively, installation of a rock fill blanket, is concerned critical to the long-term performance of the slope.

7. It is important that the Design Team remain involved during the construction phase. The Design Team needs to be notified of any unanticipated conditions that are encountered, or other conditions that could lead to changes in the Design. As previously stated, PPI should be retained for observation and testing during construction.

LIMITATIONS OF LETTER REPORT

This letter report has been prepared in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. Palmerton & Parrish, Inc. (PPI) observed that degree of care and

skill generally exercised by other consultants under similar circumstances and conditions. PPI's findings and conclusions must be considered not as scientific certainties, but as opinions based on our professional judgment concerning the significance of the data gathered during the course of this investigation. Other than this, no warranty is implied or intended.

CLOSURE

Please call our Springfield office at (417) 864-6000 if you have any questions regarding this letter report or if you need additional information.

PALMERTON & PARRISH, INC.
By:



Rachel J. Goeke, P.E.
Geotechnical Engineer

Attachments: Appendix I – Boring Log
Appendix II – General Notes
Appendix III – Laboratory Test Results
Appendix IV – PSHA Seismic Deaggregation Output
Appendix V – Slope Stability Analysis Output
Appendix VI – Important Information Regarding Your Geotechnical Engineering Report

Submitted: 1 Electronic (.pdf) Copy via Email (Brian.Zeiger@hdrinc.com)

Copy: Mr. Kurt Gribble, .pdf Copy via Email: Kurt.Gribble@hdrinc.com

BRP:BRP2:RJG/rjg

APPENDIX I

BORING LOG

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Springfield, Missouri 65803
Telephone: (417) 864-6000
Fax: (417) 864-6004

GEOTECHNICAL BORING LOG

BORING NUMBER 2-S

CLIENT HDR Engineering, Inc.
PROJECT NAME Connecticut Ave. Bridge over I-44
PROJECT NO. 236684
PROJECT LOCATION Joplin, Missouri
DATE STARTED 12/14/16 **COMPLETED** 12/14/16
SURFACE ELEVATION _____ **BENCHMARK EL.** _____
DRILLER EP/JS **DRILL RIG** 2000 CME
GROUND WATER LEVELS
HAMMER TYPE Auto
AT TIME OF DRILLING None
LOGGED BY AM **CHECKED BY** RG
AT END OF DRILLING _____
NOTES Located 1.5 ft. South of guardrail on East side

DEPTH (ft)	DRILLING METHOD	STRATA SYMBOL	MATERIAL DESCRIPTION (Unified Soil Classification System)	SAMPLE TYPE NUMBER	RECOVERY % (RQD %)	CORRECTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT (pcf) 20 40 60 80 100 / N VALUE 20 40 60 80 / PL MC LL 20 40 60 80 / SHEAR STRENGTH (ksf) 1 2 3 4	ELEVATION (ft)
0	CFA - 4.5" O.D.		FILL - Lean Clay with Gravel and Cobbles; Brown to Dark Brown, Medium Stiff to Stiff, Moist, Grass Covered, Trace Glass & Debris (CL)	SPT 1		3-10-13 (23)	1.5		
			4.0 ft						
			FILL - Lean Clay with Gravel; Gray to Brownish Gray, Medium Stiff to Stiff, Moist (CL)	ST 2	83		2		
5			5.8 ft						
			FILL - Clayey Gravel and Gravelly Clay; Red-Orange and Brown with Gray-Tan Mottling; Medium Dense / Medium Stiff to Stiff, Moist (GC / CH)	SPT 3		9-9-8 (17)	2.25		
				SPT 4		10-12-9 (21)	2		
10									
			14.3 ft						
			FILL - Clayey Gravel, w/ Cobbles, Brown Gray to Orange Brown, Dense, Moist (GC)	ST 5	100	19-15-18 (33)	4.25		
15				SPT 6					
			18.0 ft						
			FILL - Clayey Gravel and Gravelly Clay, Gray w/ Red-Brown & Black Mottling, Medium Dense / Stiff, Moist, Trace Organic Matter (GC / CH)	SPT 7		9-10-15 (25)	4.5		
			18.8 ft						
20			FILL - Clayey Gravel and Gravelly Clay, Red Bown w/ Orange Tan Yellow Mottling, Medium Stiff, Moist (GC / CH)						
			- White to Light Gray Mottling Below 24'	ST 8	100		4.5		
			25.4 ft	SPT 9		13-15-18 (33)	4.5		
25			CLAYEY GRAVEL, Red Brown w/ Orange Mottling, Dense, Moist (GC)						
			30.0 ft	SPT 10		10-37-19 (56)	2.25		
30			- Weathered Chert Layer Below 29.8'						
			Bottom of borehole at 30.0 feet.						

BORING LOG - PPI - PPI STD TEMPLATE.GDT - 1/27/17 17:06 - S:_MASTER PROJECT FILE\2016_MO\HDR-236684-CONNECTICUT AVE BRIDGE OVER I-44-SUB\BORING LOGS\BORING LOGS.GPJ

APPENDIX II

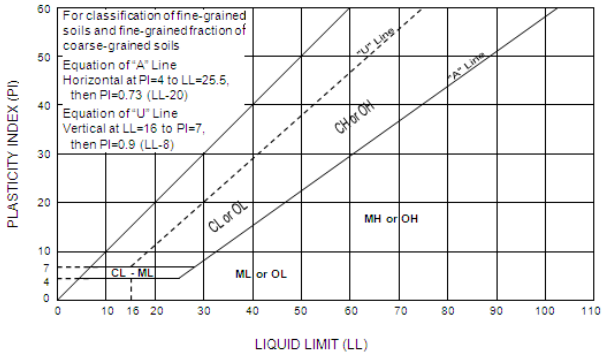
GENERAL NOTES

GENERAL NOTES

SOIL PROPERTIES & DESCRIPTIONS

COHESIVE SOILS

Consistency	Unconfined Compressive Strength (Qu)	Pocket Penetrometer Strength	N-Value
	(psf)	(tsf)	(blows/ft)
Very Soft	<500	<0.25	0-1
Soft	500-1000	0.25-0.50	2-4
Medium Stiff	1001-2000	0.50-1.00	5-8
Stiff	2001-4000	1.00-2.00	9-15
Very Stiff	4001-8000	2.00-4.00	16-30
Hard	>8000	>4.00	31-60
Very Hard			>60



Group Symbol	Group Name
CL –	Lean Clay
ML –	Silt
OL –	Organic Clay or Silt
CH –	Fat Clay
MH –	Elastic Silt
OH –	Organic Clay or Silt
PT –	Peat
CL-CH –	Lean to Fat Clay

Plasticity		Moisture	
Description	Liquid Limit (LL)	Descriptive Term	Guide
Lean	<45%	Dry	No indication of water
Lean to Fat	45-49%	Moist	Indication of water
Fat	≥50%	Wet	Visible water

Fine Grained Soil Subclassification	Percent (by weight) of Total Sample
Terms: SILT, LEAN CLAY, FAT CLAY, ELASTIC SILT	PRIMARY CONSTITUENT
Sandy,gravelly, abundant cobbles, abundant boulders	>30-50]
with sand, with gravel, with cobbles, with boulders	>15-30] – secondary coarse grained constituents
scattered sand, scattered gravel, scattered cobbles, scattered boulders	5-15]
a trace sand, a trace gravel, a few cobbles, a few boulders	<5]
The relationship of clay and silt constituents is based on plasticity and normally determined by performing index tests. Refined classifications are based on Atterberg Limits tests and the Plasticity Chart.	

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	N-VALUE
Very Loose	0-4
Loose	5-10
Medium Dense	11-24
Dense	25-50
Very Dense	≥51

MOISTURE CONDITION	
Descriptive Term	Guide
Dry	No indication of water
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table.

**GRAIN SIZE IDENTIFICATION		
Name	Size Limits	Familiar Example
Boulder	12 in. or more	Larger than basketball
Cobbles	3 in. to 12 in.	Grapefruit
Coarse Gravel	¾-in. to 3 in.	Orange or lemon
Fine Gravel	No. 4 sieve to ¾-in.	Grape or pea
Coarse Sand	No. 10 sieve to No. 4 sieve	Rock salt
Medium Sand	No. 40 sieve to No. 10 sieve	Sugar, table salt
Fine Sand*	No. 200 sieve to No. 40 sieve	Powdered sugar
Fines	Less than No. 200 sieve	
*Particles finer than fine sand cannot be discerned with the naked eye at a distance of 8 in.		

Coarse Grained Soil Subclassification	Percent (by weight) of Total Sample
Terms: GRAVEL, SAND, COBBLES, BOULDERS	PRIMARY CONSTITUENT
Sandy,gravelly, abundant cobbles, abundant boulders	>30-50]
with gravel, with sand, with cobbles, with boulders	>15-30] – secondary coarse grained constituents
scattered gravel, scattered sand, scattered cobbles, scattered boulders	5-15]
a trace gravel, a trace sand, a few cobbles, a few boulders	<5]
Silty (MH & ML)*, clayey (CL & CH)*	<15]
(with silt, with clay)*	5-15] – secondary fine grained constituents
(trace silt, trace clay)*	<5]
*Index tests and/or plasticity tests are performed to determine whether the term "silt" or "clay" is used.	

*Modified after Ref. ASTM D2487-93 & D2488-93
**Modified after Ref. Oregon DOT 1987 & FHWA 1997
***Modified after Ref. AASHTO 1988, DM 7.1 1982, and Oregon DOT 1987

GENERAL NOTES

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD)	
Description of Rock Quality	*RQD (%)
Very Poor	< 25
Poor	25-50
Fair	50-75
Good	75-90
Excellent	90-100

*RQD is defined as the total length of sound core pieces 4 in. or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

SCALE OF RELATIVE ROCK HARDNESS		
Term	Field Identification	Approx. Unconfined Compressive Strength (tsf)
Extremely Soft	Can be indented by thumbnail	2.6-10
Very Soft	Can be peeled by pocket knife	10-50
Soft	Can be peeled with difficulty by pocket knife	50-260
Medium Hard	Can be grooved 2 mm deep by firm pressure of knife	260-520
Moderately Hard	Requires one hammer blow to fracture	520-1040
Hard	Can be scratched with knife or pick only with difficulty	1040-2610
Very Hard	Cannot be scratched by knife or sharp pick	>2610

DEGREE OF WEATHERING	
Slightly Weathered	Rock generally fresh, joints stained and discoloration extends into rock up to 25mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered	Rock mass is decomposed 50% or less, significant portions of rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

GRAIN SIZE (TYPICALLY FOR SEDIMENTARY ROCKS)		
Description	Diameter (mm)	Field Identification
Very Coarse Grained	>4.76	
Coarse Grained	2.0-4.76	Individual grains can easily be distinguished by eye.
Medium Grained	0.42-2.0	Individual grains can be distinguished by eye.
Fine Grained	0.074-0.42	Individual grains can be distinguished by eye with difficulty.
Very Fine Grained	<0.074	Individual grains cannot be distinguished by unaided eye.

VOIDS	
Pit	Voids barely seen with naked eye to 6mm (¼-in)
Vug	Voids 6 to 50mm (¼ to 2 in) in diameter
Cavity	50 to 6000mm (2 to 24 in) in diameter
Cave	>600mm

BEDDING THICKNESS	
Very Thick Bedded	> 3' thick
Thick Bedded	1' to 3' thick
Medium Bedded	4" to 1' thick
Thin Bedded	1¼" to 4" thick
Very Thin Bedded	½" to 1¼" thick
Thickly Laminated	⅛" to ½" thick
Thinly Laminated	⅛" or less (paper thin)

DRILLING NOTES

Drilling and Sampling Symbols

NQ – Rock Core (2-in. diameter)
HQ – Rock Core (3 in. diameter)
HSA – Hollow Stem Auger
CFA – Continuous Flight (Solid Stem) Auger
SS – Split Spoon Sampler
ST – Shelby Tube
WB – Wash Bore or Mud Rotary
TP – Test-Pit
HA – Hand Auger

Soil Sample Types

Shelby Tube Samples: Relatively undisturbed soil samples were obtained from the borings using thin wall (Shelby) tube samplers pushed hydraulically into the soil in advance of drilling. This sampling, which is considered to be undisturbed, was performed in accordance with the requirements of ASTM D 1587. This type of sample is considered best for the testing of "in-situ" soil properties such as natural density and strength characteristics. The use of this sampling method is basically restricted to soil containing little to no chert fragments and to softer shale deposits.

Split Spoon Samples: The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot of an 18-in. long, 2-in. O.D. split-barrel sampler with a 140 lb. hammer falling a distance of 30 in. The Standard Penetration Test is carried out according to ASTM D-1586.

Water Level Measurements

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, shallow groundwater may indicate a perched condition. Caution is merited when interpreting short-term water level readings from open bore holes. Accurate water levels are best determined from piezometers.

Automatic Hammer

Palmerton and Parrish's CME's are equipped with automatic hammers. The conventional method used to obtain disturbed soil samples used a safety hammer operated by company personnel with a cat head and rope. However, use of an automatic hammer allows a greater mechanical efficiency to be achieved in the field while performing a Standard Penetration resistance test based upon automatic hammer efficiencies calibrated using dynamic testing techniques.

*Modified after Ref. ASTM D2487-93 & D2488-93
**Modified after Ref. Oregon DOT 1987 & FHWA 1997
***Modified after Ref. AASHTO 1988, DM 7.1 1982, and Oregon DOT 1987

APPENDIX III

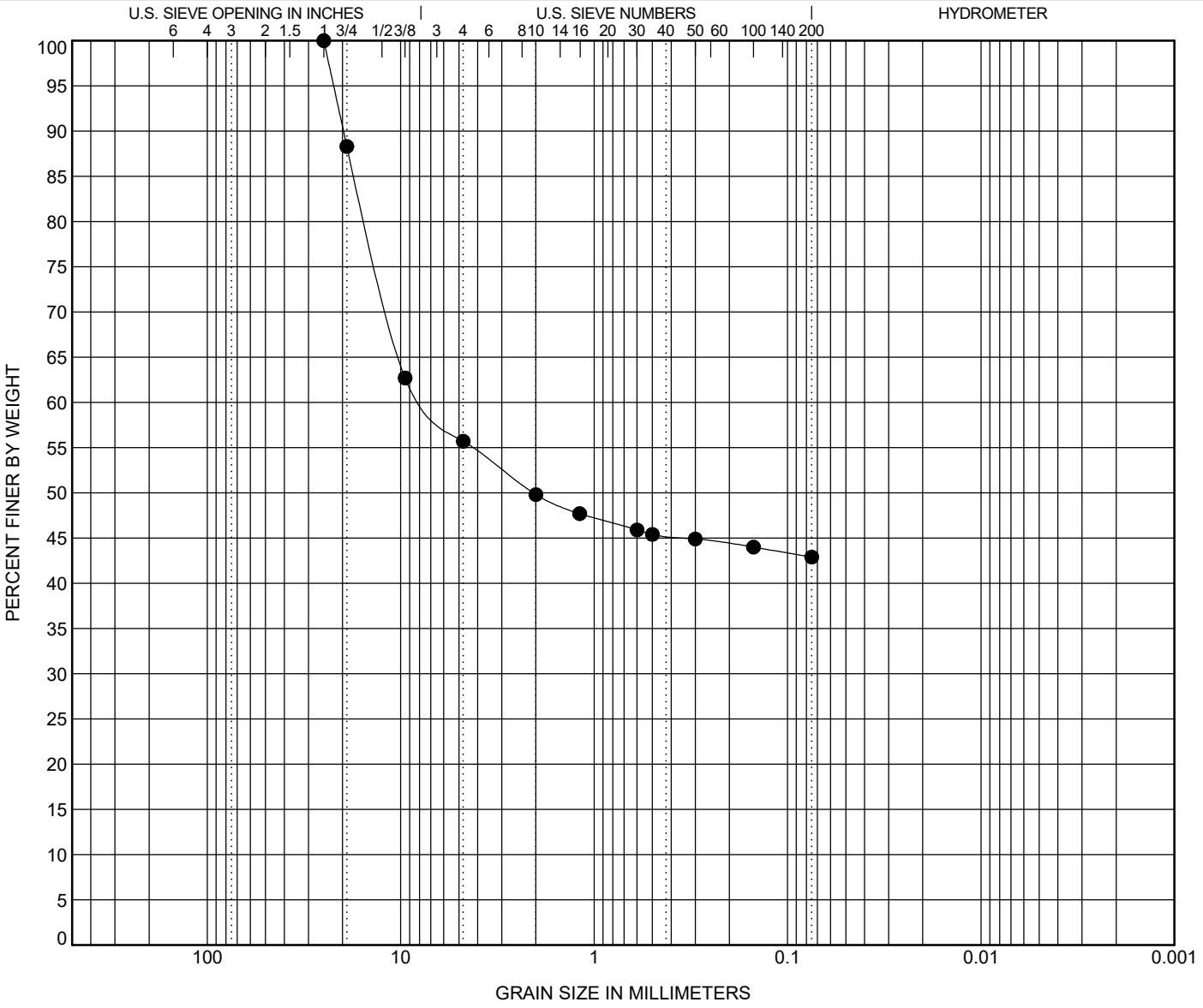
LABORATORY TEST RESULTS

4168 W. Kearney St.
Springfield, MO 65803
Telephone: (417) 864-6000
Fax: (417) 864-6004

GRAIN SIZE DISTRIBUTION

CLIENT HDR Engineering, Inc. **PROJECT NAME** Connecticut Ave. Bridge over I-44

PROJECT NO. 236684 **PROJECT LOCATION** Joplin, Missouri



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**2-S**	**5.5**	**CLAYEY GRAVEL(GC)**	**47**	**23**	**24**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**2-S**	**5.5**	**25**	**7.271**			**44.3**	**12.8**	**42.9**	

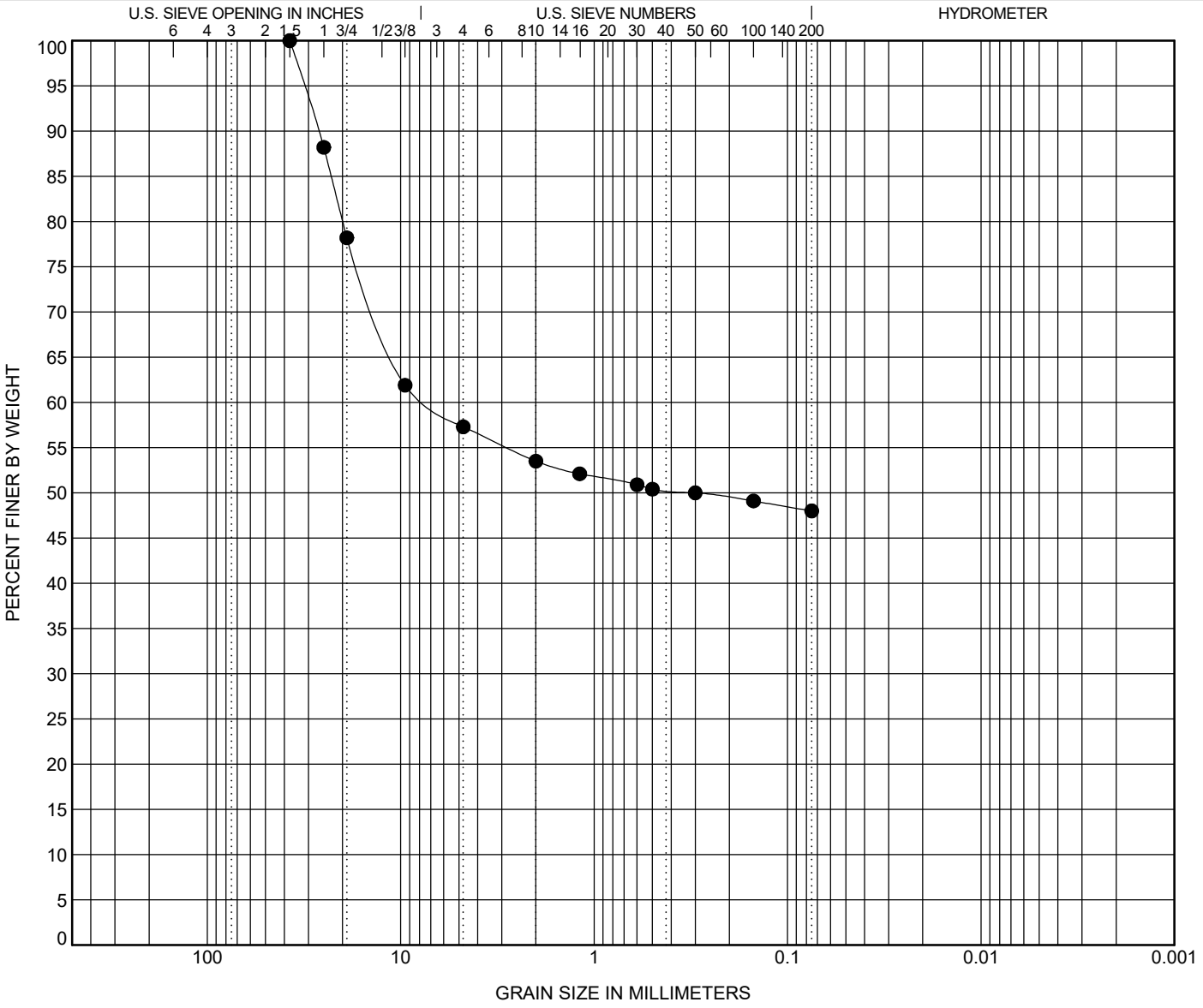
GRAIN SIZE - PPI STD TEMPLATE.GDT - 1/19/17 11:09 - S:_MASTER PROJECT FILE\2016_MO\HDR-236684-CONNECTICUT AVE BRIDGE OVER I-44-SUB\BORING LOGS\BORING LOGS.GPJ

4168 W. Kearney St.
Springfield, MO 65803
Telephone: (417) 864-6000
Fax: (417) 864-6004

GRAIN SIZE DISTRIBUTION

CLIENT HDR Engineering, Inc. **PROJECT NAME** Connecticut Ave. Bridge over I-44

PROJECT NO. 236684 **PROJECT LOCATION** Joplin, Missouri



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**2-S**	**18.5**	**CLAYEY GRAVEL(GC)**	**53**	**23**	**30**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**2-S**	**18.5**	**37.5**	**7.135**			**42.7**	**9.3**	**48.0**	

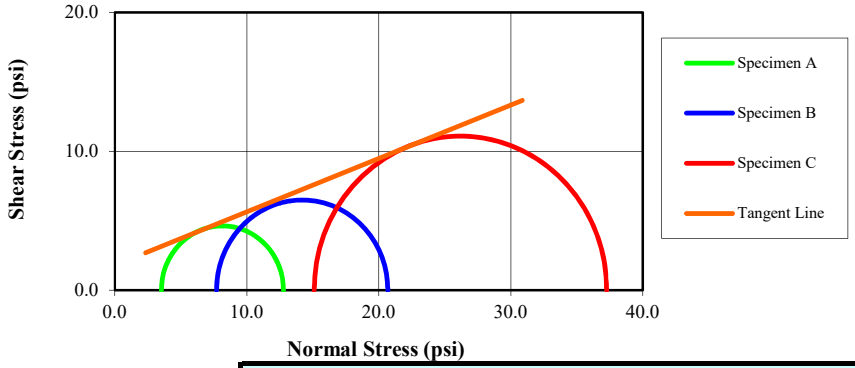
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Palmerton and Parrish, Inc.

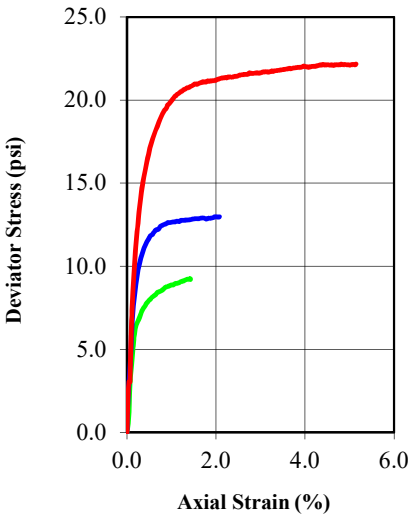
Consolidated Undrained Triaxial Test (ASTM D4767)

Date: 1/19/2017 Checked By: RG Date : 1/19/2017 Tested By: KG

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial	Specimen A	B	C	D
Water Content (%)	29.83	29.83	29.83	
Dry Density (pcf)	95.81	97.32	99.51	
Saturation (%)	108.79	112.95	119.33	
Void Ratio	0.724	0.697	0.660	
Diameter (in)	2.840	2.840	2.840	
Height (in)	5.680	5.592	5.469	
Specific Gravity	2.65	2.65	2.65	
Liquid Limit	74	74	74	
Plastic Limit	29	29	29	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	98.00	98.00	98.00	
Water Content (%)	28.05	28.05	28.05	
Dry Density (pcf)	95.81	97.32	99.51	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.727	0.700	0.662	
Effective Stress (psi)	6.8	13.9	28.0	
Back Press. (psi)	55.2	55.1	55.0	
Rate of Strain	0.001	0.001	0.001	

Maximium Deviator Stress Criterion	
C (psi)	2.0
C' (psi)	1.8
Ø (deg)	13.7
Ø' (deg)	21.0

After Shear	A	B	C	D
σ'1 at Failure (psi)	12.77	20.69	37.27	
σ'3 at Failure (psi)	3.52	7.70	15.10	

Project:	Connecticut Ave Bridge over I-44
Client:	HDR Engineering, Inc.
Project Number:	236684
Boring Number:	B-2
Sample Number:	
Depth:	3.42'-5.17'
Sample Type:	Undisturbed
Description:	
Test Type	Consolidated Undrained Triaxial
Remarks	

A	B	C	D
N/A	N/A	N/A	N/A

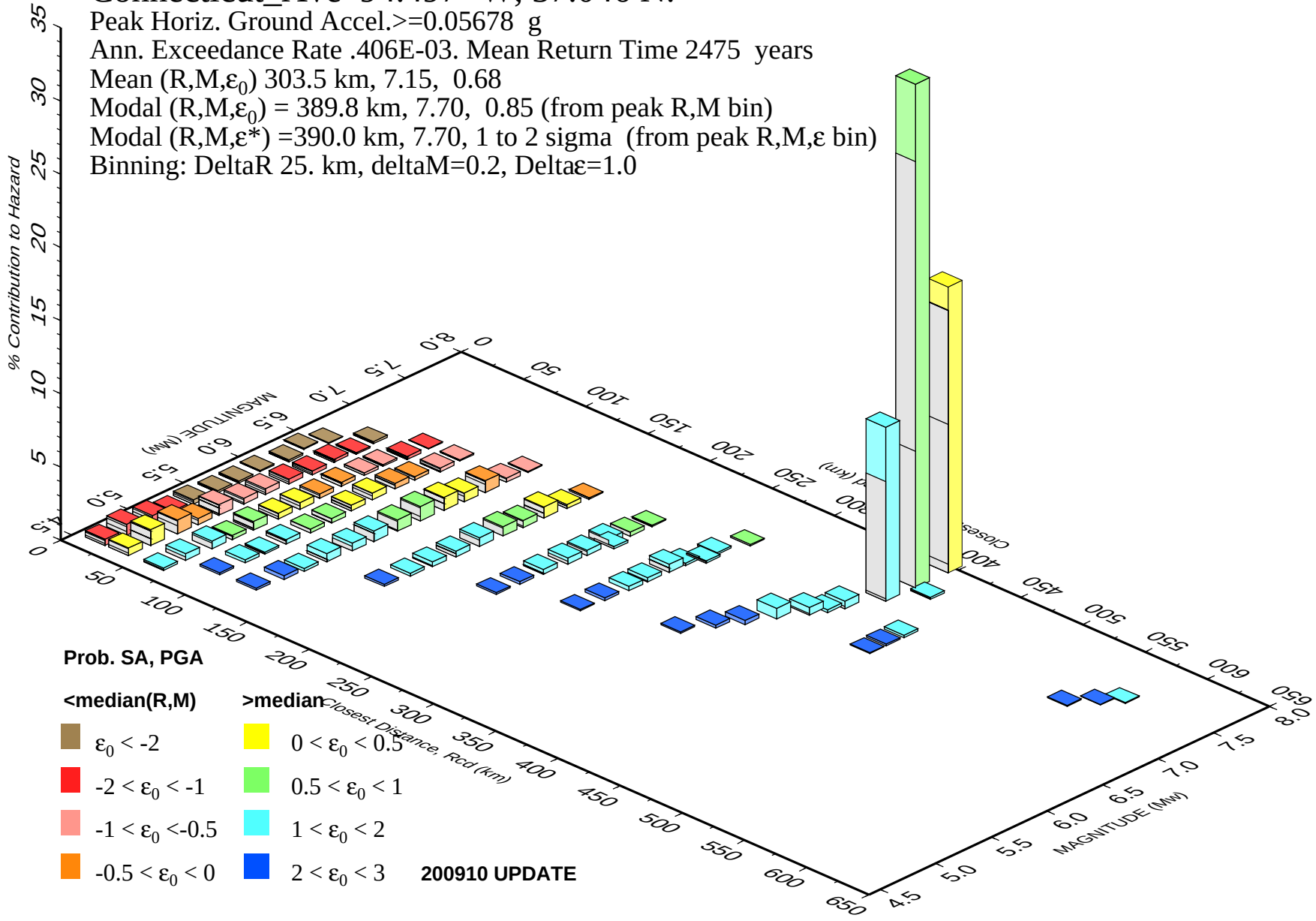
Failure Photographs

APPENDIX IV

PSHA SEISMIC DEAGGREGATION OUTPUT

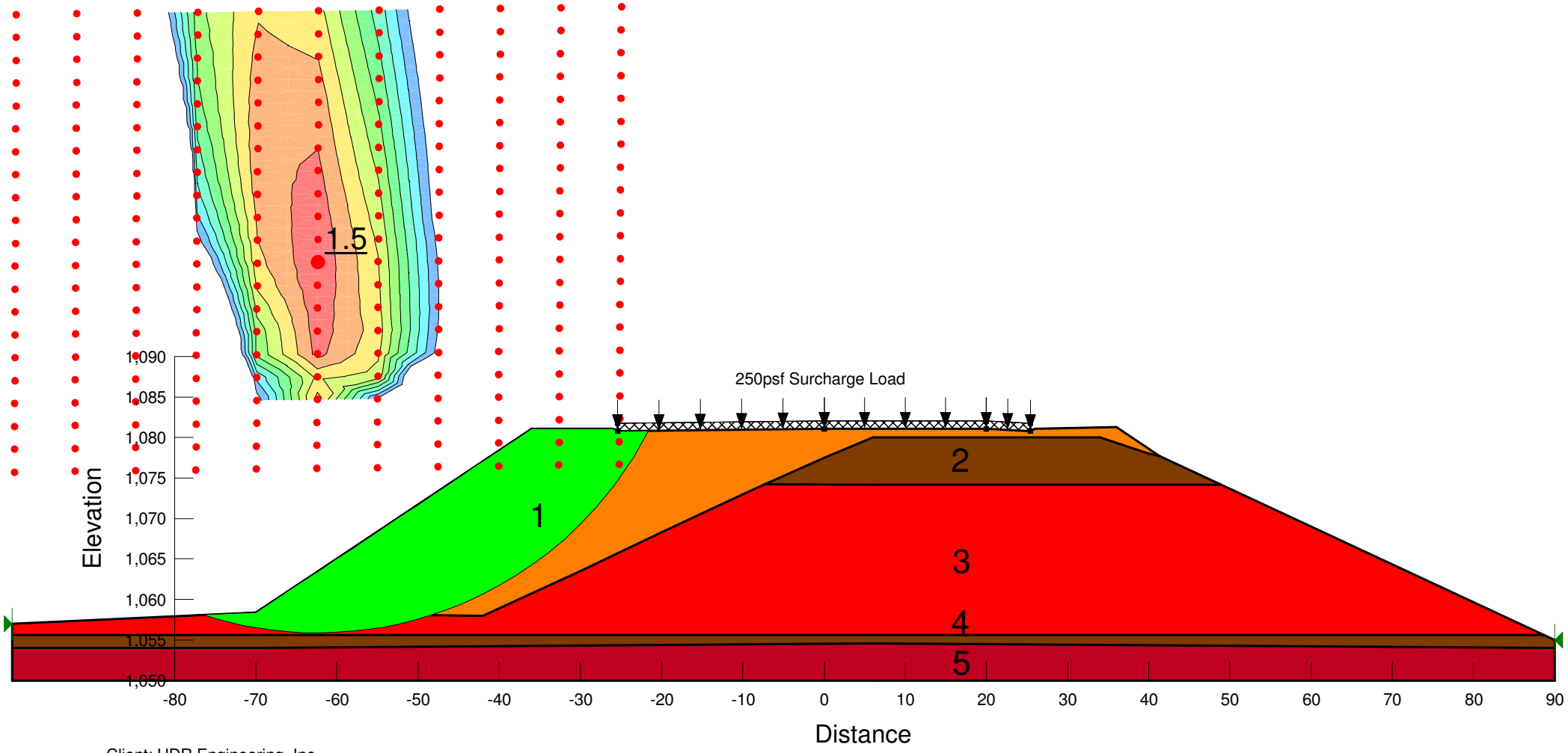
PSH Deaggregation on NEHRP BC rock
Connecticut_Ave 94.497º W, 37.046 N.

Peak Horiz. Ground Accel.>=0.05678 g
Ann. Exceedance Rate .406E-03. Mean Return Time 2475 years
Mean (R,M,ε_0) 303.5 km, 7.15, 0.68
Modal (R,M,ε_0) = 389.8 km, 7.70, 0.85 (from peak R,M bin)
Modal (R,M,ε*) =390.0 km, 7.70, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 25. km, deltaM=0.2, Deltaε=1.0



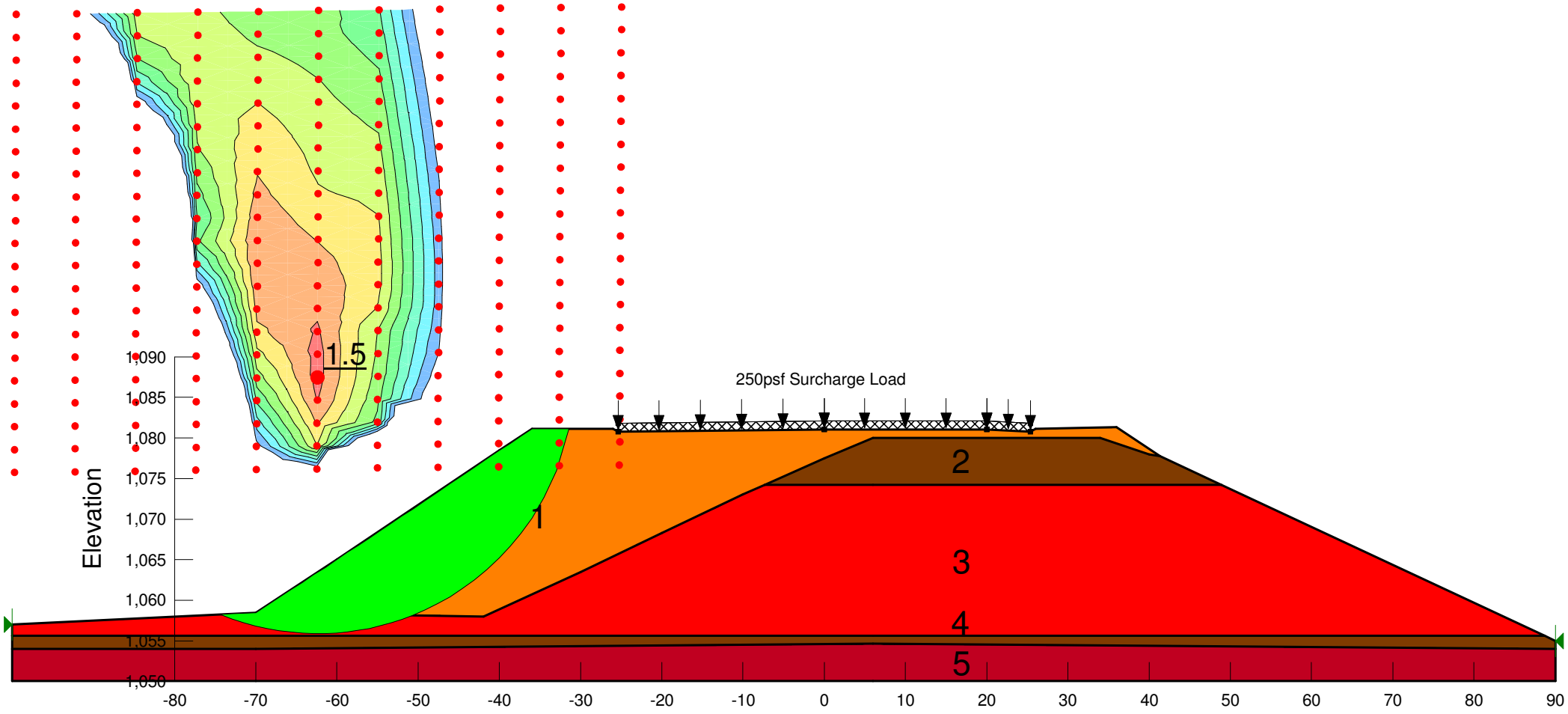
APPENDIX V

SLOPE STABILITY ANALYSIS OUTPUT



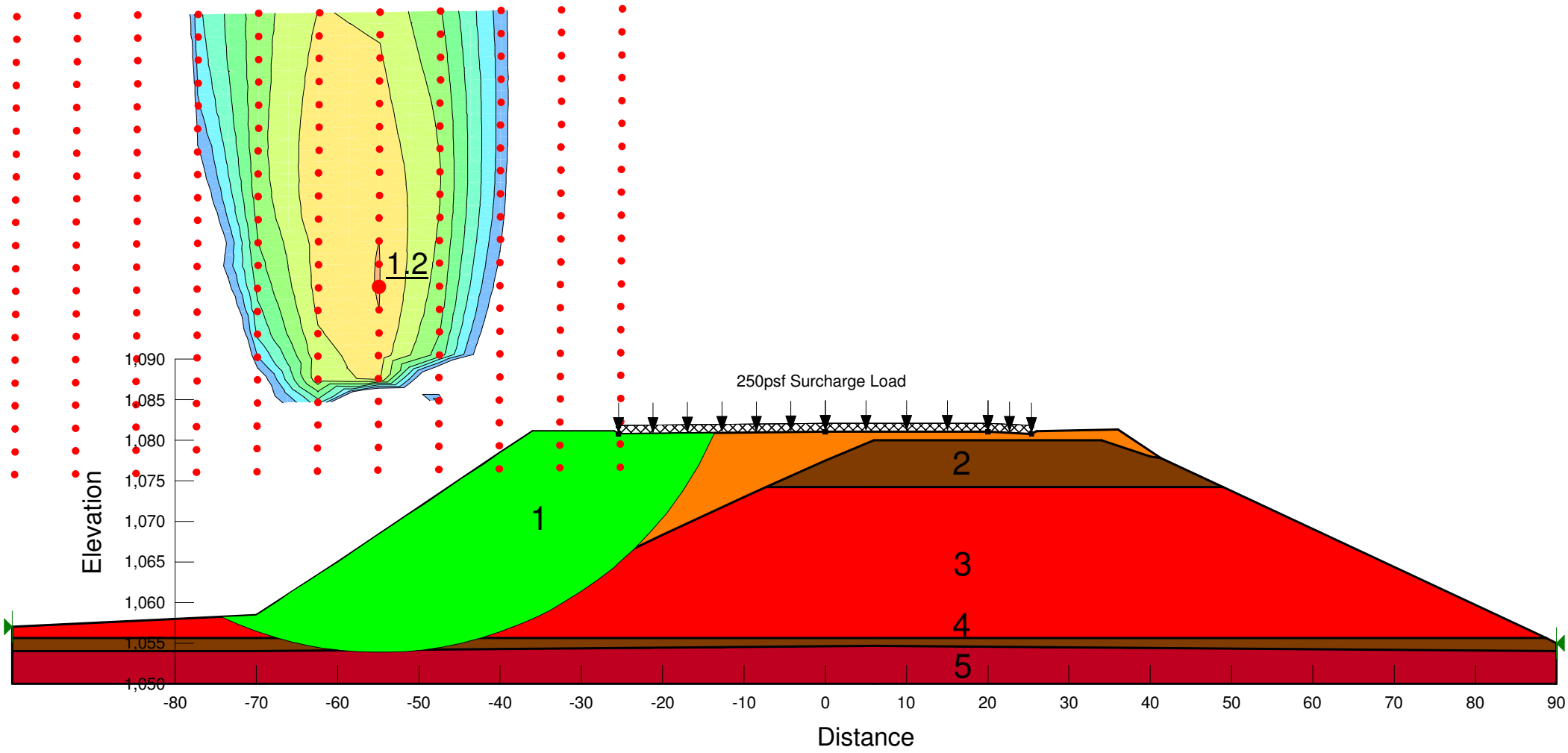
Client: HDR Engineering, Inc.
Project: Connecticut Ave Bridge Replacement
Project Number: 236684
Method: Spencer's Method
Case 1: End of Construction;
Undrained, Total Stress in New Fill
Drained, Effective Stress in Existing Embankment

Name: (1) New Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 400 psf Phi': 14 °
Name: (2) Fill - Lean Clay with Gravel Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 21 °
Name: (3) Fill - Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 22 °
Name: (4) Fill and Natural Contact Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 21 °
Name: (5) Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 150 psf Phi': 28 °



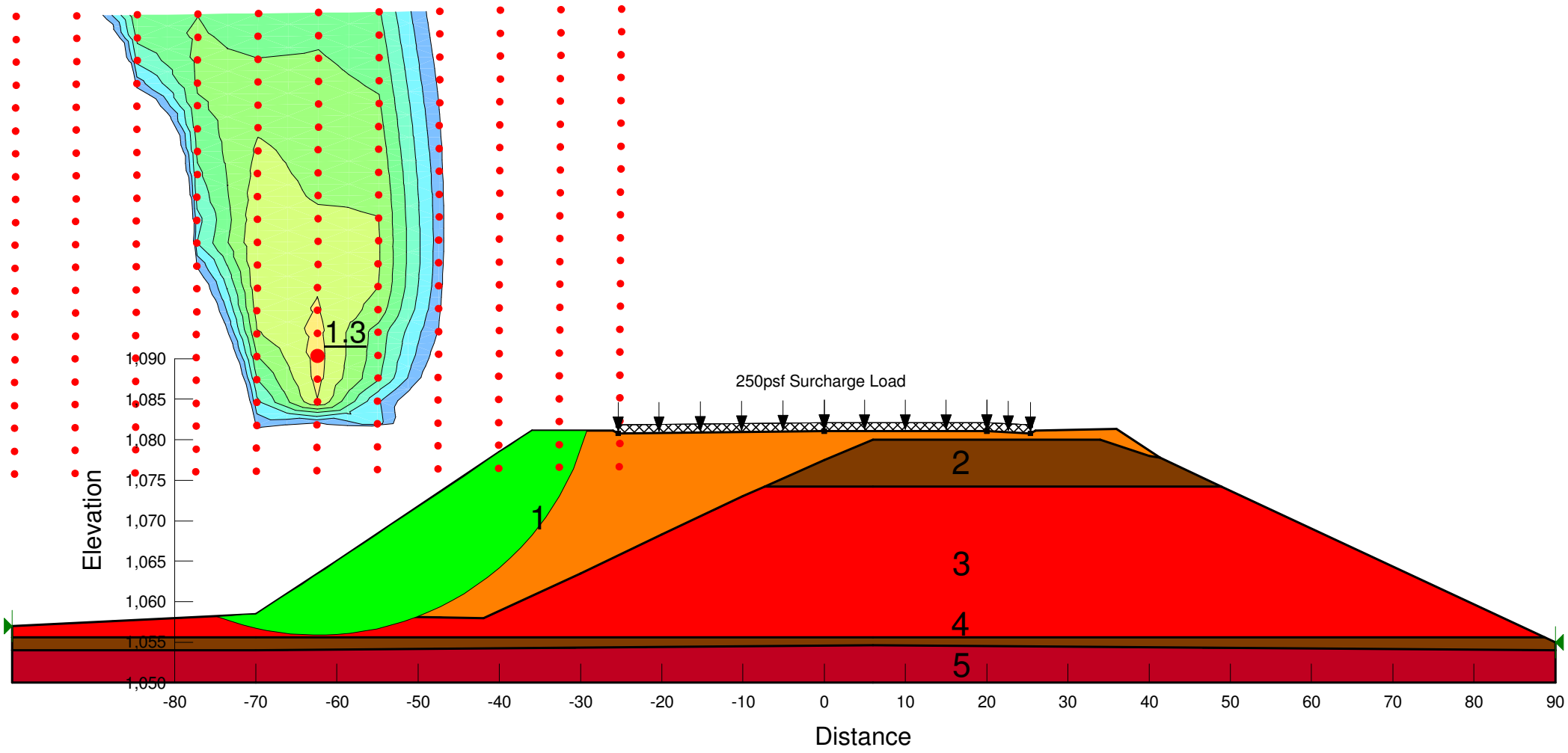
Client: HDR Engineering, Inc.
Project: Connecticut Ave Bridge Replacement
Project Number: 236684
Method: Spencer's Method
Case 2: Static
Steady State, Drained, Effective Stress

Name: (1) New Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 150 psf Phi': 28 °
Name: (2) Fill - Lean Clay with Gravel Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 21 °
Name: (3) Fill - Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 22 °
Name: (4) Fill and Natural Contact Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 21 °
Name: (5) Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 150 psf Phi': 28 °



Client: HDR Engineering, Inc.
Project: Connecticut Ave Bridge Replacement
Project Number: 236684
Method: Spencer's Method
Case 3: Seismic Loading, Undrained, Total Stress
Seismic Loading: pga = 0.05678g (2,475-yr. Event)

Name: (1) New Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 400 psf Phi': 14 °
Name: (2) Fill - Lean Clay with Gravel Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 250 psf Phi': 10 °
Name: (3) Fill - Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 300 psf Phi': 14 °
Name: (4) Fill and Natural Contact Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 250 psf Phi': 10 °
Name: (5) Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 300 psf Phi': 14 °



Client: HDR Engineering, Inc.
Project: Connecticut Ave Bridge Replacement
Project Number: 236684
Method: Spencer's Method
Case 4: Seismic Loading, Drained, Effective Stress
Seismic Loading: pga = 0.05678g (2,475-yr. Event)

Name: (1) New Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 150 psf Phi': 28 °
Name: (2) Fill - Lean Clay with Gravel Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 21 °
Name: (3) Fill - Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 22 °
Name: (4) Fill and Natural Contact Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion': 150 psf Phi': 21 °
Name: (5) Clayey Gravel and Gravelly Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 150 psf Phi': 28 °

APPENDIX VI

IMPORTANT INFORMATION REGARDING YOUR GEOTECHNICAL ENGINEERING REPORT

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
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