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**SPECIFICATIONS**

**FOR**

***OLIPHANT STREET SIDEWALK IMPROVEMENTS***

***WEST BRANCH, IOWA***

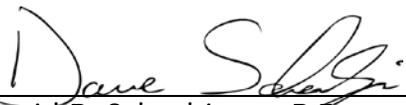


SPECIFICATIONS  
FOR  
OLIPHANT STREET SIDEWALK IMPROVEMENTS  
WEST BRANCH, IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signed:

Date:

  
\_\_\_\_\_  
David R. Schechinger, P.E.

7/23/12



Iowa License No. 16538

My license renewal date is December 31, 2012

Detailed parts covered by this seal:

ALL

Prepared by  
VEENSTRA & KIMM, INC.  
West Des Moines,  
Iowa



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OLIPHANT STREET SIDEWALK IMPROVEMENTS  
WEST BRANCH, IOWA

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## SOLICITATION FOR QUOTATION

### SOLICITATION FOR QUOTATION FOR THE OLIPHANT STREET SIDEWALK IMPROVEMENTS, WEST BRANCH, IOWA.

Quotations will be received by the City of West Branch, Iowa, hereinafter referred to as "Owner" or "City", at the Council Chambers in the West Branch City Hall, 110 North Poplar Street, West Branch, Iowa, until 2:00 P.M. on the 6<sup>th</sup> day of August 2012. Quotations may be mailed or faxed (319-643-2305) to City Hall. It is expected the City will accept a quotation or reject all quotations August 6<sup>th</sup> at the City Council meeting and issue a Notice to Proceed by August 20, 2012.

The work to be done at the locations shown on the plans includes construction of approximately 130 square yards of 6-inch PCC driveway, 440 square yards of 4-inch PCC sidewalk, 57 square yards of 6-inch PCC sidewalk, 92 linear feet of 6-inch PCC curb and gutter, curb ramps with detectable warnings, excavation, grading, seeding, traffic control and miscellaneous associated work including cleanup.

The person, firm or corporation submitting the successful quotation, hereinafter referred to as the "Contractor", will be notified on or before the 7<sup>th</sup> day of August, 2012 that his quotation has been accepted. The work shall be completed on or before October 3, 2012.

The Contractor submitting the successful quotation will be required to furnish bond in an amount equal to one hundred percent (100%) of the contract price, said bond to be issued by a responsible surety approved by the City Council and shall guarantee the faithful performance of the contract and the terms and conditions therein contained and shall guarantee the prompt payment for all materials and labor and protect and save harmless the City from claims and damages of any kind caused by the operations of the Contractor, and shall guarantee the work against faulty workmanship and materials for a period of two (2) years after its completion and acceptance by the City Council.

The Contractor will be paid ninety-five percent (95%) of the Owner's final estimate of the value of acceptable work completed. Final payment will be made no earlier than thirty-one (31) days after completion of the work and acceptance by the Owner. No such final payment will be due until the Contractor has certified to the Owner that the materials, labor and services involved in the final estimate have been paid for in full.



QUOTATION

OLIPHANT STREET SIDEWALK IMPROVEMENTS  
WEST BRANCH, IOWA

Name of Firm: \_\_\_\_\_

Address of Firm: \_\_\_\_\_

To: City Council  
City of West Branch  
110 Poplar Street  
P.O. Box 218  
West Branch, IA 52358

The undersigned, having examined the plans and having familiarized himself with the nature and location of the work to be done and the conditions under which the work will be performed, hereby proposes to provide the required labor, services and materials and to perform the work described on the plans, within the time and for the sums stated hereinafter on attached Quotation Schedule; which Quotation Schedule is hereby made a part of this Quotation.

The undersigned certifies that this Quotation is offered in good faith, without collusion or connection with any other persons quoting on the work.

The undersigned states that this Quotation is offered in conformity with the plans and scope of work and agrees that in the event of any discrepancies or differences between any conditions of his quotation and the scope of work prepared by VEENSTRA & KIMM, INC. that the provisions of the latter shall prevail.

Name of Firm \_\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_



QUOTATION SCHEDULE

1. Construct Oliphant Street Sidewalk Improvements for the following unit and lump sum prices:

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Extended Price</u>
1.1	Mobilization	LS	xxxxx	xxxxx	\$ _____
1.2	Traffic Control	LS	xxxxx	xxxxx	_____
1.3	Construction Staking	LS	xxxxx	xxxxx	_____
1.4	Excavation	CY	110	\$ _____	_____
1.5	Pavement Removal				
	1.5.1 PCC Driveway	SY	187	_____	_____
	1.5.2 PCC Curb & Gutter	LF	92	_____	_____
1.6	Pavement Replacement				
	1.6.1 PCC	SY	130	_____	_____
	1.6.2 PCC Curb & Gutter	LF	92	_____	_____
1.7	PCC Sidewalk				
	1.7.1 4"	SY	440	_____	_____
	1.7.2 6"	SY	57	_____	_____
1.8	Detectable Warnings	SF	60	_____	_____
1.9	Silt Fence	LF	100	_____	_____
1.10	Drain Line	LF	20	_____	_____
1.11	Seeding	LS	xxxxx	xxxxx	_____

Total Quotation \$ \_\_\_\_\_  
(Items 1.1 - 1.11)

- 2. The work will be started on the date set forth in written Notice to Proceed. All work shall be completed as outlined in the Solicitation for Quotation.
- 3. Liquidated damages in the amount of Two Hundred Dollars (\$200.00) per calendar day will be assessed for each day the work shall remain uncompleted after the end of the contract period with due allowance for extensions of the contract period due to conditions beyond the control of the Contractor.



CONTRACT

THIS AGREEMENT, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 2012, by and between the City of West Branch, Iowa, party of the first part, hereinafter referred to as the "Owner", and \_\_\_\_\_, party of the second part, hereinafter referred to as the "Contractor".

WITNESSETH: THAT WHEREAS, the Owner has heretofore caused to be prepared certain specifications and proposal blanks, dated the \_\_\_\_\_ day of \_\_\_\_\_, 2012, for Oliphant Street Sidewalk Improvements, under the terms and conditions therein fully stated and set forth, and,

WHEREAS, said plans, specifications and quotation blanks accurately and fully describe the terms and conditions upon which the Contractor is willing to perform the work specified:

NOW, THEREFORE, IT IS AGREED:

1. That the Owner hereby accepts the Quotation of the Contractor for the work, as follows:



2. That this contract consists of the following component parts which are made a part of this agreement and contract as fully and absolutely as if they were set out in detail in this contract:

A. Contract Documents, including:

1. Solicitation for Quotation
2. Quotation
3. Bond
4. Detailed Plans and Specifications
5. Addenda issued to the foregoing.

B. This Instrument.

C. The above components are complementary and what is called for by one shall be as binding as if called for by all.

3. That payments are to be made to the Contractor in accordance with and subject to the provisions embodied in the documents made a part of this contract.

4. That this contract is executed in triplicate.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hand and seal the date first written above.

**CONTRACTOR**

**CITY OF WEST BRANCH, IOWA**

By \_\_\_\_\_

\_\_\_\_\_  
Mayor

Title \_\_\_\_\_

ATTEST:

ATTEST:

\_\_\_\_\_

\_\_\_\_\_  
City Administrator

Title \_\_\_\_\_



BOND

KNOW ALL MEN: That we, \_\_\_\_\_,  
of \_\_\_\_\_, hereinafter called the Principal, and  
\_\_\_\_\_,  
hereinafter called the surety, are held and firmly bound unto the City of West Branch,  
Iowa, hereinafter called the Owner in the sum of \_\_\_\_\_  
Dollars (\$ \_\_\_\_\_), for the payment whereof the Principal and Surety bind  
themselves, their heirs, executors, administrators, successors and assigns, jointly and  
severally, firmly, by these presents.

WHEREAS, the principal has, by means of a written Agreement dated \_\_\_\_\_,  
2012, entered into a Contract with the Owner for Oliphant Street Sidewalk Improvements  
Project, which Agreement includes a guarantee of all work against defective workmanship  
and materials for a period of four (4) years from the date of final acceptance of the work by  
the Owner, a copy of which Agreement is by reference made a part hereof;

NOW, THEREFORE, the condition of this Obligation is such that, if the Principal shall  
faithfully perform the Contract on his part and shall fully indemnify and save harmless the  
Owner from all costs and damage which he may suffer by reason of failure so to do and  
shall fully reimburse and repay the Owner all outlay and expense which the Owner may  
incur in making good any such default,

And Further, that if the Principal shall pay all persons who have contracts directly with the  
Principal for labor or materials, failing which such persons shall have a direct right of  
action against the Principal and Surety under this Obligation, subject to the Owner's  
priority,

Then this Obligation shall be null and void, otherwise it shall remain in full force and  
effect.

Provided, however, that no suit, action or proceeding by reason of any default whatever  
shall be brought on this Bond after five (5) years from the date of final acceptance of the  
work.

And Provided, that any alterations which may be made in the terms of the Contract, or in  
the work to be done under it, or the giving by the Owner of any extension of time for the  
performance of the Contract, or any other forbearance on the part of either the Owner or  
the Principal to the other shall not in any way release the Principal and the Surety, or  
either of them, their heirs, executors, administrators, successors or assigns from their  
liability hereunder, notice to the Surety of any such alteration, extension or forbearance  
being hereby waived.

And Further Provided, the Principal and Surety on this Bond hereby agree to pay all  
persons, firms, or corporations having contracts directly with the Principal or with  
subcontractors all just claims due them for labor performed or material furnished, in the  
performance of the Contract on account of which this Bond is given, when the same are  
not satisfied out of the portion of the contract price which the Owner shall retain until  
completion of the improvements, but the Principal and Surety shall not be liable to said  
persons, firms, or corporations unless the claims of said complaints against said portions of  
the contract price shall have been established as provided by law.



The Surety on this Bond shall be deemed and held, any contract to the contrary notwithstanding, to consent without notice:

- a. To the extension of time to the Principal in which to perform the Contract.
- b. To changes in the plans, specifications, or Contract, when such changes do not involve an increase of more than twenty percent (20%) of the total contract price, and shall then be released only as to such excess increase.
- c. That no provision of this Bond or of any other contract shall be valid which limits to less than five (5) years from the date of final acceptance of the work the right to sue on this Bond for defects in workmanship or materials not discovered or known to the Owner at the time such work was accepted.

The Bond is executed in triplicate.

Signed and Sealed this \_\_\_\_ day of \_\_\_\_\_, 2012.

PRINCIPAL:

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

SURETY:

\_\_\_\_\_  
Surety Company

\_\_\_\_\_  
Signature, Attorney-in-Fact

\_\_\_\_\_  
Name of Attorney-in-Fact

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Company Address (Including Zip Code)

\_\_\_\_\_  
Company Telephone Number



DETAILED SPECIFICATIONS

OLIPHANT STREET SIDEWALK IMPROVEMENTS  
WEST BRANCH, IOWA

PART 1 – GENERAL REQUIREMENTS

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1. FORM

- A. Detailed specifications are in outline form and include incomplete sentences. Omission of words or phrases is intentional. Supply omitted words or phrases by inference.

2. INTENT

- A. To set forth requirements of performance, type of equipment or structure desired, and standards of materials and construction.
- B. To describe work set out in Contract Documents, unless otherwise specifically indicated.
- C. To require performance of complete work in spite of omission of specific reference to any minor component parts.
- D. To provide for new materials and equipment, unless otherwise indicated.

3. INTERPRETATION

- A. Report errors or ambiguities in specifications to Engineer as soon as detected; Engineer will answer questions regarding and interpret intended meaning of specifications; Engineer's interpretation shall be accepted as final.

4. WORK INCLUDED

- A. Furnish all materials, labor and equipment to construct Oliphant Street Sidewalk Improvements as set out in Solicitation for Quotations.

5. STARTING AND COMPLETION TIME

- A. Start work within 10 calendar days after date set forth in written Notice to Proceed. It is anticipated that Notice to Proceed will be issued within 30 calendar days after date of receiving bids. Complete work within the times set out in Solicitation for Quotations.

6. INFORMATION FOR ENGINEER

- A. After award of contract submit following information for Engineer's review. Total number of review copies required for distribution: 4 plus copies required by Contractor.
  - 1. Purchase orders and subcontracts without prices.
  - 2. Shipping papers for all materials.
  - 3. All materials test reports.
  - 4. Portland cement concrete mix design; submit 8 days before proposed mix is to be used.
    - a. Include certified gradation of aggregates to be used.
  - 5. Details of proposed method of sheeting, shoring and bracing.
  - 6. Manufacturer's specifications and catalog data for manholes, intakes, pipe, castings and other special items.
  - 7. Such other information as Engineer may request.
- B. Within 15 days after award of contract, provide construction schedule showing dates of starting and completing various portions of work.

7. SHOP DRAWINGS

- A. Intent of Engineer's review: to assist Contractor in interpreting plans and specifications.
- B. Contractor's responsibility: to check drawings prior to submission of coordination and conformance with contract; do not submit without checking.

## General Requirements

- C. Engineer's review is only for general conformance with design concept of project and general compliance with information given in contract documents; any action shown is subject to requirements of plans and specifications; Contractor responsible for dimensions which must be confirmed and correlated at job site; fabrication processes and techniques of construction; coordination of work with that of all other trades and satisfactory performance of work.
- D. Prior to submission of shop drawings and catalog data to Engineer: affix Contractor's stamp with signature of responsible person to show material submitted has been checked and approved by Contractor; shop drawings submitted without appropriate stamp and signature will be returned without Engineer's review.

### 8. PLANS AND SPECIFICATIONS

- A. Engineer will furnish up to 5 sets of plans and specifications after award of contract. Contractor shall compensate Engineer for printing costs for additional copies required.
- B. Subcontractors will be furnished copies only at request of Contractor. Engineer will be compensated for printing costs.
- C. Provide one set of plans and specifications for each foreman or superintendent in charge of each crew on job.

### 9. STANDARDS AND CODES

- A. Do work in accordance with best present-day installation and construction practices.
- B. Conform to and test materials in accordance with applicable sections of latest revisions or tentative revisions of following codes and standards unless specifically noted to contrary.
  - 1. American Association of State Highway and Transportation Officials (AASHTO).
  - 2. American Concrete Institute (ACI).
  - 3. American Institute of Steel Construction (AISC).
  - 4. American National Standards Institute (ANSI).
  - 5. American Society for Testing and Materials (ASTM).
  - 6. American Standards Association (ASA).
  - 7. American Water Works Association (AWWA).
  - 8. American Welding Society (AWS).
  - 9. Current Iowa Manual on Uniform Traffic Control Devices (MUTCD).

10. Federal Specifications (FS).
11. Iowa Department of Transportation (IDOT); latest edition of standard specifications and addenda.
12. Iowa Occupational Safety and Health Act of 1972 (Chapter 88, Code of Iowa 2011) (IOSHA).
13. Manual of Accident Prevention in Construction by Associated General Contractors of America, Inc. (AGC).
14. National Institute for Occupational Safety and Health (NIOSH).
15. National Safety Council (NSC).
16. Occupational Safety and Health Act of 1970 (Public Law 91-596) (OSHA).
17. Standards and codes of the State of Iowa, Cedar County and applicable local standards and codes of the City of West Branch.
18. Other standards and codes which may be applicable to acceptable standards of the industry for equipment, materials and installation under the contract.

10. TESTS

- A. Includes all material tests or tests specified hereinafter.
- B. Owner shall employ and pay for approved testing laboratory for tests required to show compliance with specifications.
- C. Provide samples of materials required for laboratory tests.
- D. Incorporate no materials in work until laboratory tests have been furnished which show compliance of materials with the specifications.
- E. All materials subject to sampling, testing, inspection and rejection at site by Engineer.
- F. Laboratory tests include the following:
  1. Ductile iron pipe: certify that pipe conforms to ANSI A21.51.
  2. Closed profile wall pipe: certify that pipe conforms to ASTM D1784.
  3. Cement: bin sample for entire requirement, ASTM C150.
  4. Concrete aggregates: one (1) sample of each, ASTM C33.
  5. Reinforced concrete pipe: test one (1) piece of each diameter of each class furnished; check reinforcing size and placement; ASTM C76.
  6. Other pipe: certify that pipe conforms to applicable specifications.
- G. Provide samples of excavated materials to determine moisture-density relations of soils and perform moisture and density tests during construction as specified in EARTHWORK AND INCIDENTALS FOR PAVEMENT; Contractor is to hire independent testing company to perform tests.

- H. Compaction tests on trench backfill: ASTM D1557; three (3) tests per 200 LF of embankment where compacted or ordinary backfill is specified; at each location two (2) tests at intermediate depths as directed by Engineer and one (1) test at surface; cooperate with Engineer and provide necessary excavations to allow compaction tests to be taken; Contractor is to hire independent testing company to perform tests.

11. RESPONSIBILITY OF CONTRACTOR

- A. Protection of his work.
- B. Protection of all property from injury or loss resulting from his operations.
- C. Replace or repair objects sustaining any such damage, injury or loss to satisfaction of Owner and Engineer.
- D. Cooperation with Owner, Engineer and representatives of utilities in locating underground utility lines and structures. Incorrect, inaccurate or inadequate information concerning location of utilities or structures shall not relieve Contractor of responsibility for damage thereto caused by his operation.
- E. Keep cleanup current with construction operations.
- F. Maintain set of record drawings of any changes made as work progresses which may vary from contract drawings.
- G. Comply with all Federal, State of Iowa, Cedar County and City of West Branch, Iowa laws and ordinances.
- H. Contractor responsible for filing notice of intent with the Iowa Department of Natural Resources and preparing and maintaining Stormwater Pollution Control Plan for NPDES Permit No. 2 Stormwater Discharge Associated with industrial activity for construction activities if more than 1 acre is disturbed by construction.

12. TEMPORARY WORK

- A. Make all temporary connections necessary for maintaining utility service during course of work.
- B. Construct temporary drains or bulkheads to keep work in the dry.

13. BARRICADES AND LIGHTS

- A. Erect and maintain barricades and lights in conformance with current Manual of Uniform Traffic Control Devices (MUTCD) for protection and warning of pedestrians and vehicles. All barricades, lights and/or watchmen at expense of Contractor.
- B. Engineer will not allow work to proceed until all signs, barricades and lights are in place; requirements for type of signs and number of signs will be strictly enforced; improper signing during construction will constitute "improper work" and Engineer will cause Contractor to suspend work.
- C. All signs, barricades, and other traffic control devices used on the project shall be furnished, installed and maintained by Contractor; all traffic control devices shall be maintained in a state of good repair and shall be cleaned and washed periodically as needed.
- D. Certain sections of public streets, sidewalks and trails can be closed with the following restrictions:
  - 1. Adequate protection shall be provided for pedestrians; if a section of sidewalk or trail is closed, appropriate signing and barricading shall be utilized; signing and barricading shall remain in place until sidewalk or trail is opened for pedestrian use.
  - 2. Notify City 48 hrs. prior to street or trail closing.
- E. At the end of each working day place barricades and lights as required; maintain barricades and lights at all times including non-working hours; maintain lights in operable condition at all times.

14. FINAL REVIEW AND ACCEPTANCE

- A. Notify Engineer when installation is considered complete and ready for final review.
- B. Owner will accept work and make final payment to Contractor:
  - 1. When Engineer has certified that he has reviewed the work of the Contractor and stated that the work is complete and in conformance with the plans and specifications.
  - 2. When Contractor has filed with Owner or Engineer documents called for in specifications.
  - 3. When all government agencies involved have indicated, in writing, work is complete and acceptable.

## PART 2 – SPECIAL CONSTRUCTION

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#### 1. GENERAL

- A. Procedures outlined below are not intended to fully cover all special procedures or emergencies which may arise during construction but are offered as an aid to Contractor in planning work; Contractor will cooperate with Owner and Engineer to minimize inconvenience and construction delays.
- B. Determine location of underground utilities and piping before starting work; locations of underground appurtenances are approximate and not guaranteed by Owner or Engineer.
- C. Remove and replace all signs, mail boxes, fences and other appurtenances which interfere with construction operations; replace damaged items at no cost to Owner.
  - 1. Maintain mail service to residents and businesses at all times.
- D. Remove and replace culverts as required for construction; if damaged, replace in kind with new culvert at no cost to Owner.
- E. Limit construction operations to property, right-of-way and easements provided by Owner; provide barricades, lights, signs and detours as necessary to reroute traffic around construction areas.
- F. Arrange with operating utilities for relocation or temporary removal of utilities in conflict with construction and for services needed during construction.
- G. Dispose of materials removed during construction at locations approved by Owner or Engineer.
  - 1. Dispose of waste products containing putrescible materials at approved landfill.
  - 2. Dispose of surfacing, broken concrete or rubble, brush, trees, excess excavated materials or spoil not suitable for backfill at site obtained by Contractor.

## Special Construction

- H. Notify residents or businesses 2 days in advance when construction will disrupt or block access to property. Provide door hangers with notification.
- I. Remove, stockpile and replace fencing where required for construction as shown on plans; replace fences as work progresses.
- J. Provide snowfence along boundaries of construction area as specified hereinafter and as directed by Engineer.
  - 1. Install snowfence when area is prepared for excavation; install on steel posts with maximum spacing of 8'; maintain until work is completed.
  - 2. Provide snowfence around all open trenches or open structures when left unattended.
  - 3. Provide snowfence along boundaries of construction area in developed areas to prevent access of unauthorized persons to construction area.
- K. Clean up and provide surface restoration as construction progresses.
- L. Submit complete detailed construction procedure schedule after award of contract for planning, scheduling and controlling construction of project.
- M. Contractor will be expected to provide adequate personnel and equipment to perform work within specified time of construction.
- N. If delays in delivery of materials become apparent, notify Owner and Engineer promptly; take action to accomplish one of the following:
  - 1. Substitute alternate materials with approval of Owner and Engineer.
  - 2. Expedite delivery of materials.
- O. Extensions of contract period will be given consideration upon written request of Contractor; request must include valid supporting data and bona fide reasons for requesting extension; Owner expects work to be complete and ready for final acceptance within completion time specified.
- P. Maintain reasonable access to private properties along route of sidewalk unless property owners agree to other arrangements and Owner approves; provide temporary granular surfacing for access to private properties; cost of maintaining access is incidental to construction.

## 2. COOPERATION WITH OTHERS

- A. Advise all utilities prior to excavating in area where construction might affect gas, electrical, telephone or water service.

## Special Construction

1. Advise telephone company of proposed construction schedule as it relates to telephone service.
  2. Advise power company of proposed construction schedule as it relates to electrical power.
  3. Advise gas company of proposed construction schedule as it relates to gas service.
  4. Advise Owner of proposed construction schedule as it relates to water and sewer mains including services.
  5. Advise cable television of proposed construction schedule as it relates to cable television service.
- B. Cooperate with State and Federal regulatory agencies in matters under their jurisdiction over construction operations.
- C. Cooperate with local governmental agencies; secure necessary building permits and arrange for inspections at proper time.
3. SURVEY MARKERS
- A. Contractor responsible for hiring registered land surveyor to inventory existing pipe, pins and registered survey lot corners disturbed by construction; land surveyor responsible for setting reference markers required to re-establish location of existing pipe, pins and registered survey lot corners. Replace in Accordance with Chapter 355 of the Iowa Code. Work is incidental to construction.
4. CONTAMINATED SOIL FINDS
- A. If during course of construction evidence of deposits of contaminated soils are found, cease operations affecting find and notify Owner who will notify Iowa Department of Natural Resources; no further disturbance of deposits will ensue until notification by Owner that work may proceed; Owner will issue notice to proceed only after contaminated soils have been identified and procedures for remediating contaminated soils have been identified and procedures for remedial action have been determined and approved by Iowa Department of Natural Resources and Owner; compensation to Contractor, if any, for lost time or changes in construction due to changed conditions will be in accordance with change order provisions of specifications.

5. WEATHER LIMITATIONS

- A. Owner will not pay extra for surfacing replaced prior to winter shutdown and removed at beginning of next construction season to expose temporary end of construction.
- B. Owner expects paving of improvements during suitable weather within contract time period; contract time period includes calendar days for inclement weather; contract time period will not be extended for claims of wet weather or freezing weather; Owner will consider suspension of contract time period for winter months only after completion of cleanup.

6. CONSTRUCTION STAKING

- A. Contractor responsible for providing all necessary construction staking to allow for project construction; Contractor must stake line and grade hubs at 25' intervals for entire project.
- B. Contractor responsible for accuracy and completeness of all construction staking.
- C. Owner or Engineer may review accuracy of construction staking at its own discretion at any time.

7. TRAFFIC CONTROL

- A. Provide barricades, signs and lights to protect vehicular and pedestrian traffic during construction; comply with GENERAL REQUIREMENTS; see plans for details.
- B. Conform to requirements of MUTCD and Iowa DOT.

8. PAYMENT

- A. No separate payment will be made for work covered under this part of the specifications except as set forth below. Include all costs in appropriate unit prices.
- B. Construction Staking, LS: Lump sum price includes all costs for labor, equipment and material to provide all construction staking and re-staking necessary for the complete construction of the project.

- C. Traffic Control, LS: Lump sum price includes furnishing signs, flagmen, barricades, flashers, channelizing devices, detour markers, and other miscellaneous traffic control items specified or required by City of West Branch during construction; includes set up, removal and miscellaneous associated work.
  
- D. Mobilization, LS: Lump sum price includes:
  - 1. Partial Payment
    - a. For projects exceeding \$500,000, a partial payment of mobilization will be made after receipt of a signed contract. This partial payment will be either 10% of the contract price for this item or 1% of the original project sum, whichever is less.
    - b. When 5% of the original project sum is earned, either 25% of the contract price for this item or 2.5% of the original project sum, whichever is less, will be paid.
    - c. When 10% of the original project sum is earned, either 50% of the contract price for this item or 5% of the original project sum, whichever is less, will be paid.
    - d. When 25% of the original project sum is earned, either 100% of the contract price for this item or 10% of the original project sum, whichever is less, will be paid.
  - 2. Full Payment
    - a. Upon completion of all work on the project required by the contract, full payment will be made for this contract item, including any amount not paid as a partial payment.



## PART 3 – EARTHWORK AND INCIDENTALS FOR PAVEMENT

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| 5. SUBGRADE PREPARATION | 11. SILT FENCE          |
| 6. SUBGRADE TREATMENTS  | 12. PAYMENT             |

#### 1. GENERAL

- A. This part of the specifications includes earthwork and incidentals to complete grading for placement of pavement.
- B. Reference to percent maximum density shall mean a soil density not less than the stated percent of maximum density of optimum moisture content for soils as determined by ASTM D698 Moisture-Density Relations of Soils using 5.5-lb. Rammer and 12-in. Drop. (Standard Proctor Method).
- C. Do work in accordance with best present-day installation and construction practices.

#### 2. STRIPPING

- A. Strip vegetation and organic materials within construction limits; remove from project site and dispose of removed materials at site obtained by Contractor.
- B. Grade and shape earth surfaces within construction limits to specified cross section; finish earth surfaces as specified hereinafter.
- C. Grade and shape borrow site earth surfaces to drain; finish earth surfaces as specified hereinafter.
- D. Stockpile excess on-site excavated materials at location as directed by Engineer; stockpile excess topsoil in segregated stockpile; excess excavated materials remain property of Owner.
- E. Include costs associated with stripping and grading in unit price for excavation.

3. SURFACE REMOVAL

- A. Remove existing surfacing to limits shown on plans.
  - 1. Cut vertically and horizontally on straight lines; saw cut full depth of surfacing.
  - 2. Portland cement concrete pavement: remove to nearest joint or as directed by Engineer and as shown on plans; cut steel as necessary.
  - 3. Asphalt pavement: cut to a neat line. Mill or grind asphalt paving to break up surface into particles that can be blended with granular subbase. Asphalt shall be processed such that 100% of the material is a nominal 2" maximum size. Material shall be of sufficiently stable quality to resist distortion during pavement construction.
  - 4. Milling of existing surfacing can include 2" asphalt surfacing and any depth of granular base material beneath paving that is required to facilitate milling operation. Milled pavement is to be blended evenly with existing granular base material and stockpiled for reuse beneath new paving.
  - 5. If remaining surfacing along saw cut line becomes cracked or broken during construction, provide additional saw cuts, surface removal and surface replacement as directed by Engineer at no cost to Owner.
- B. Dispose of waste and excess material not suitable for reuse at acceptable disposal area.

4. EXCAVATION

- A. Excavate all materials encountered to depth indicated or specified; comply with safety rules of state and federal governments. Excavate to subgrade required for pavement construction.
- B. Schedule work to keep streets, roads and utilities in usable condition; avoid inconvenience to property owners insofar as practicable during construction.
- C. Remove, replace and repair items such as fences, culverts, signs, hanging wires, shrubbery, flowers, trees and other obstructions to accommodate construction equipment or to facilitate excavation.
- D. Remove trees, plantings and shrubbery where shown on plans; remove other plantings only with written authorization of Engineer; any plantings removed or damaged for convenience of Contractor: replace with equal plantings at no cost to Owner.
- E. Dispose surplus excavated material as directed.

## Earthwork and Incidentals for Pavement

- F. Provide temporary drainage facilities to prevent damage to public or private interests when necessary to interrupt natural drainage or flow of artificial drains.
  - G. Restore original drains as soon as work will permit.
  - H. Contractor liable for damage resulting from neglect to provide for interrupted natural or artificial drainage.
  - I. Do not damage pavement or disturb subgrade beneath existing pavement which will not be removed.
  - J. Grade and shape earth surfaces within grading limits to specified cross section; finish earth surfaces as specified hereinafter.
  - K. Install signing and barricades for traffic control in accordance with Manual on Uniform Traffic Control Devices; include cost in appropriate unit or lump sum Price.
  - L. Include all earthwork cost in lump sum price for Excavation.
5. SUBGRADE PREPARATION
- A. Provide uniform composition at least 6" below pavement subbase for full width of pavement plus 2' beyond edge of pavement; roll and scarify materials, mix and re-compact, or otherwise treat to produce a uniform condition.
  - B. Remove and dispose of stones over 4" in size from loosened portion of subgrade.
  - C. Construct subgrade with uniform density for a width of proposed pavement plus 2' beyond edge of pavement; density: not less than 95% maximum density.
  - D. In areas where roller cannot compact; provide approved selected material; 12" minimum thickness; compact to 95% maximum density with vibrator tamper.
  - E. Construct subgrade such that after rolling, surface will be at required grade and cross section.
  - F. Fill depressions that develop during rolling with suitable material; continue rolling until subgrade is uniformly firm, properly shaped and true to grade and cross section.
    - 1. Maintain until pavement is placed.

2. Remove materials which will not compact readily under roller; replace with materials which will compact readily; again roll that portion of subgrade.
- G. If ruts or other objectionable irregularities form in subgrade during construction, reshape and re-roll subgrade before placing pavement; fill ruts or other depressions with material similar to other subgrade material.

6. SUBGRADE TREATMENTS

- A. Use only to correct subgrade condition where specified density cannot be obtained by other methods prior to placement of pavement.
- B. Granular subbase for pavement: use uniform mixture of granular material, uniformly moistened, placed on prepared subgrade; Contractor may use as suitable material to fill depressions in subgrade, such use considered incidental to construction at Contractor's expense.
  1. Use crusher run limestone, crusher run sandstone, limestone screenings, soil aggregate, pit run gravel or a mixture of sand or pit run gravel with crushed limestone or limestone screenings.
  2. Use mixture uniform in composition, with no visible segregation of constituent materials.
  3. If constituent materials are proportioned, blend to homogeneous mixture before placing on subgrade.
  4. Not more than 5% of finished mixture shall be retained on sieve having square openings equal to one-third nominal thickness of subbase and not more than 25% shall pass No. 200 sieve.
- C. Lime subgrade treatment for concrete pavement:
  1. Provide lime, 20 lbs. per square yard, in top 6" of subgrade.
  2. Mix until uniform consistency is obtained; add water as required for optimum moisture content and compact to specified density.
  3. Lime: use hydrated lime: ASTM C207, Type N.

7. ABUTTING PAVEMENTS

- A. Drill into existing portland cement concrete slabs abutting new portland cement concrete construction and install dowels as detailed in IDOT Standard Road joint detail PV-101; dowels 18" long at 12" centers; ¾" dowels for 7" thick pavement; cost is incidental to pavement construction.

8. DRAIN LINE

- A. Provide sump pump drain line.
  - 1. Polyethylene Tubing: AASHTO M252, Type C, corrugated exterior and smooth interior; Type CP or SP; use for drain line, 2" dia."

9. EXISTING UTILITIES

- A. Locations of utility lines, mains, cables and appurtenances are in accordance with information provided by utility companies and from records of Owner; confirm locations of underground utilities by excavating ahead of work; Contractor fully responsible for damage to utilities during construction.
- B. Conflicting utilities not shown on plans, except services: notify Engineer immediately.
- C. Utility services are not generally shown on plans; protect services during construction.
- D. Water main and sanitary sewer conflicts: notify Owner and Engineer immediately; provide all necessary shut-down, repair and relocation where conflicts occur; furnish labor, equipment, pipe and fittings; when broken due to carelessness, repair is incidental to construction.
- E. Utility lines, poles and appurtenances, except water mains and sewer lines, in direct conflict with line and grade of work will be relocated by utility company before or during construction at no expense to Contractor unless plans direct Contractor to perform work; Owner will advise utility companies of lines, poles and appurtenances to be moved after award of contract; cooperate with utility companies in relocation of lines, poles and appurtenances.
- F. Support and protect, by timbers or other means, all utility pipes, conduits, poles, wires or other apparatus not to be moved; protective measures subject to approval of Engineer.
- G. No utility or utility service will be moved to accommodate equipment, method of operation or for convenience of Contractor when utility or utility services does not conflict directly with line and grade of work; arrange with utility company for relocation with approval of new location by Owner and Engineer; relocation is incidental to construction.

10. SURFACE RESTORATION

- A. Parks, parkings, lawns, street and railroad rights-of-way, pastures and farm fields: replace 18" of topsoil removed during excavation.
- B. Replace damaged flowers, shrubbery and trees with new plantings of equal type and quality at no cost to Owner; trees removed because of conflict with alignment of pipe shall not be replaced, except where shown on plans.
- C. Grade tops of trenches to smooth, uniform lines without large lumps, clods or debris.
- D. Dispose of all brush and rubbish as directed by Engineer.
- E. Seed all areas disturbed by construction unless otherwise shown on plans directed by Engineer.
- F. Prepare site for seeding by discing, harrowing and hand raking or other means following site grading; work soil to depth of 3".
- G. Precede seeding with uniform application of commercial grade fertilizer at rate per acre of 20 lbs. of nitrogen, 40 lbs. of phosphorous and 20 lbs. of potassium (400 lbs. of fertilizer grade 5-10-5 per acre, or approved equal); cultivate area 3" deep and work with harrow within 24 hours before seeding; smooth surface to eliminate clods and lumps before seeding.
- H. Seeding in street parkings, lawns and developed areas, (Type 1):
  - 1. Seed at rate of 4 lbs. per 1,000 SF with following mixture proportioned by weight:

<u>Seed</u>	<u>Percent</u>
Kentucky Bluegrass	35
Annual Rye	25
Perennial Rye	20
Creeping Red Fescue	10
Chewing Fescue	10

- I. Cover seed by rolling with cultipacker, or by dragging or hand raking.

## Earthwork and Incidentals for Pavement

- J. Mulch all seeded areas; mulch: dry oat straw at rate of 4,000 lbs. per acre; stabilize mulch with tiller designed to anchor mulch to soil.
- K. Water seeded area sufficiently to saturate seed bed; continue watering all areas until growth is established; City will furnish water at no cost to Contractor.
- L. Contractor responsible for turning over to Owner full stand of grass; replant or redevelop bare spots or areas not attaining full stand of grass during first growing season.
- M. Provide topsoil backfill behind curbs unless specified otherwise.

### 11. SILT FENCE

- A. Install silt fences to keep soil from migrating off-site until grass has been established. Location as noted on plans. Contractor responsible for removal of silt fences. Comply with IDOT standard detail for silt fences.

### 12. PAYMENT

- A. No separate payment will be made for work covered in this part of the specifications. Include all costs in appropriate unit price.
- B. Pavement Removal / Milling, SY or LF: Unit price includes full depth sawing, removal, trucking, salvage or disposal and miscellaneous associated work. Includes removal of PCC pavement, and curb and gutter. Does not include sidewalk removal. Sidewalk removal is incidental to unit price for new sidewalk.
- C. Excavation, CY: Unit price includes includes all labor, materials and equipment necessary to excavate, haul, compact, and grade areas in vicinity of sidewalk improvements as shown on plans.
  - 1. Estimated quantity based on average end area method. Contractor shall assure himself as to the accuracy of estimated quantities.
- D. Silt Fence, LF: Unit price includes cost of equipment, labor, materials and incidentals necessary to install silt fences at locations determined in the field by Engineer and as required to comply with Contractors erosion control plan and miscellaneous associated work.
  - 1. Silt fence necessary to be removed and reinstalled because silt fence is full will be measured and paid for at the unit bid price for linear feet of silt fence.

## Earthwork and Incidentals for Pavement

- E. Seeding, LS: Lump price includes furnishing all labor, materials and equipment necessary for site preparation, fertilizing, seeding, straw mulch, watering and miscellaneous associated work.
  
- F. Drain Line in Place, LF: Unit price includes all labor, material and equipment for furnishing and installation of 2" drain line, connection to existing sump pump discharge line, bends, curb penetration and repair, excavation, backfill and miscellaneous associated work.

## PART 4 – PORTLAND CEMENT CONCRETE PAVEMENT

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#### 1. GENERAL

- A. This part of the specifications includes construction of portland cement concrete pavement, curb and gutter, and sidewalks, using preset forms on prepared subgrade or subbase.
  - 1. Prepare subgrade or subbase as specified in EARTHWORK AND INCIDENTALS FOR PAVEMENT.
  - 2. Construct curb and gutter as specified hereinafter.
- B. Non-reinforced portland cement concrete pavement includes deformed tie bars and joints as shown on plans.

#### 2. MATERIALS

- A. Portland cement: ASTM C150, Type I.
- B. Admixtures:
  - 1. Air entraining: ASTM C260; no admixtures containing chlorides will be permitted.
  - 2. Retarding: a suitable retarding admixture may be used during hot weather, with approval of Engineer.
  - 3. Calcium chloride not permitted.
- C. Fine aggregate:
  - 1. Clean, hard, durable particles of natural sand, free from injurious amounts of silt, shale, coal, organic matter or other deleterious substances.
  - 2. Deleterious substances: not more than 2.0% shale and coal by weight retained on No. 16 sieve.
  - 3. Organic matter: other than coal, not more than standard reference color; ASTM C40.

Portland Cement Concrete Pavement

4. Conform to following sieve analysis:

<u>Sieve Size</u>	<u>% Passing</u>
3/8"	100
No. 4	90-100
No. 8	70-100
No. 200	0-1.5

5. Percent passing one sieve and retained on next higher number sieve not more than 40% when sieved through 4 and 8 numbered sieves.
6. Mortar strength at 7 days not less than 1.5 times standard sand strength when tested in accordance with IDOT Laboratory Test Method 212.

D. Coarse aggregate:

1. Clean, hard, durable particles of crushed limestone free from injurious amounts of objectionable materials.
2. Objectionable materials not more than:

	<u>Percent</u>
Clay lumps	0.5
Coal and carbonaceous shale	0.5
Sticks (wet weight)	0.1
Total of all shale and coal combined	1.0
Organic material other than coal and sticks	0.0
Unsound chert particles retained on 3/8" sieve	3.0

- a. Chert particles breaking into three or more pieces in freezing and thawing test, IDOT Laboratory Test Method 211, Method A, are considered unsound.
3. Conform to following sieve analysis:

<u>Sieve Size</u>	<u>% Passing</u>
1-1/2"	100
1"	50-90
3/4"	30-80
1/2"	20-75
3/8"	5-55
No. 4	0-10
No. 8	0-5
No. 200	0-1.5

## Portland Cement Concrete Pavement

4. Percent of wear, AASHTO T96, Grading A or B, not to exceed 35 for gravel, 50 for crushed stone which contains 90% or more calcium carbonate or 45 for all other crushed stone.
  5. Particle durability: IDOT Section 4115.04, Class 2 or Class 3.
- E. Water: clean and clear, free from salt, oil, acid, strong alkalis, vegetable matter or other substances injurious to concrete.
1. Water may be heated for cold weather paving operations; anti-freezing agents not permitted.
- F. Reinforcing steel:
1. Deformed bars: billet steel; ASTM A615, Grade 40 or 60; epoxy coated.
  2. Plain and smooth dowel bars: carbon steel; ASTM A615, Grade 40 or 60; epoxy coated.
  3. Welded wire fabric: ASTM A185.
- G. Metal expansion tubes:
1. Fabricated steel tubes; conform to requirements of IDOT; provide tubes with internal diameter 1/16" larger than dowel bar; bar stop capable of withstanding 20 lb. push, minimum.
- H. Metal keyways:
1. Fabricated 24 gauge sheet steel; conform to requirements of IDOT; provide lengths in multiples of tie bar spacing; punch to receive tie bars.
- I. Supports for reinforcing steel:
1. Support tie bars as required to place and maintain correct location during construction.
  2. Welded wire fabric supports: heavy gauge wire, welded or bent to form four-legged chair.
  3. Support dowel bars at expansion and contraction joints.
- J. Joints:
1. Bituminous joint filler and sealer: hot poured joint filler: ASTM D3405; use with backer rope; comply with IDOT 2301.25.
  2. Preformed expansion joint filler: asphalt saturated fiber strips; AASHTO M213; furnish in strips of plan dimensions; use IDOT preformed joint seal.
- K. Liquid curing compound: IDOT 4105.05; do not use in areas to receive asphalt overlay; use plastic or burlap.
- L. Plastic film: opaque, white pigmented polyethylene plastic, 0.00085" minimum thickness, use only once if less than 0.0034" thick.

M. Fly ash: permitted as substitute for portland cement when source and mix design is in conformance with Iowa DOT Standard Specifications and Supplemental Specifications.

3. STORAGE AND PROTECTION OF MATERIALS

A. Aggregates:

1. Store fine and coarse aggregate in separate stockpile; avoid contamination of aggregates; place fine aggregate with more than 5.0% moisture in separate stockpile and allow to drain.
2. Stockpile coarse aggregate and unscreened gravel in horizontal layers; maximum depth: 4'.
3. Handle aggregates to avoid frequent variations in specific gravity, sieve analysis or moisture content; prevent variations of more than 0.5% in moisture content of aggregates in successive batches.
4. Coarse aggregate having absorption greater than 0.5%: wet 1 hr. before use.
5. Place fine aggregate in proportioning bin only when uniform moisture content can be maintained in successive batches for one day's run.

B. Cement:

1. Store cement in suitable weatherproof structure; prevent loss of cement during handling.
2. Use cement containing lumps only after careful screening through 20 mesh screen; retest in accordance with ASTM C150 before use.

4. PROPORTIONS FOR MIX

A. Mix proportions for street pavement, curb and gutter, drive approaches and sidewalks adjacent to street pavement:

1. Basic absolute volumes of materials per unit volume of concrete as per IDOT Section 2301.04:

	<u>M-4</u>	<u>C-4</u>
Cement Minimum	0.156	0.118
Water	0.160	0.160
Entrained Air	0.06	0.06
Fine Aggregate	0.312	0.331
Coarse Aggregate	0.312	0.331

2. Above quantities based on specific gravity of cement: 3.14; specific gravity of aggregates: 2.65; air voids: 6.0%.

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3. Air entraining admixture: produce  $6.5\% \pm 1.5\%$  air voids in fresh concrete measured by pressure method.
  4. Use C-4 mix except use M-4 mix where shown on plans.
- B. Proportion adjustments:
1. Basis: when actual quantity of concrete is more than 101% or less than 99% of calculated quantity or if combination of materials does not produce quality of concrete specified.
    - a. Fine aggregate shall not exceed 50% of total aggregate in any adjustment.
    - b. Do not exceed maximum water-cement ratio specified.
- C. Water quantity and concrete consistency:
1. Use proper amount of mixing water to produce concrete of uniform consistency; adapt to mix, characteristics of materials used, methods of consolidation, weather conditions and slope of finished surface.
  2. Modify proportion if maximum water-cement ratio does not produce workability; increase cement to aggregate proportion to produce specified degree of workability without exceeding maximum water-cement ratio.
- D. Tests on trial batches and concrete placed at project site:
1. Slump: ASTM C143; 1-1/2" to 3" for machine finished concrete; 4", maximum, for hand finished concrete.
  2. Air voids, of fresh concrete, by pressure method: ASTM C231;  $6.5\% \pm 1.5\%$ .
  3. Minimum compressive strength: ASTM C39; 3,100 psi when tested at 3 days and 4,000 psi when tested at 28 days.
  4. Quantity of compression cylinders as specified in GENERAL REQUIREMENTS; cast, protect and cure cylinders in accordance with ASTM C31.
5. MIXING
- A. Batch mix:
1. Handle batches and charge mixer to insure complete introduction of batches separately without loss of materials; add water with other materials.
  2. Do not allow batch volume of mixed concrete to exceed mixer size designation number.
  3. Size designations: as shown in Concrete Mixer Standards of Mixer Manufacturers Bureau of Associated General Contractors of America, Inc. in effect at time of manufacture of mixer.
  4. If uniform concrete cannot be produced with maximum batch volume; reduce batch volume and/or increase mixing time.

- B. Ready-mix:
  - 1. Applies to either central plant-mixed concrete or central plant-proportioned, truck-mixed concrete.
  - 2. Time lapse from addition of water until placing on subgrade: not to exceed 30 min. when concrete is hauled in non-agitating trucks; 1-1/2 hrs. when hauled in truck mixers or agitating trucks; provide reliable re-set revolution counter on truck mixer.
  - 3. Place concrete in plastic and workable condition; do not re-temper partially hardened concrete.

6. EQUIPMENT REQUIREMENTS FOR PAVEMENT CONSTRUCTION

- A. Batch or ready-mix plant: IDOT 2001.06, 2001.20 and 2001.21.
  - 1. Automatic cut-off gates at cement batching scale not required.
  - 2. Scales and measuring devices certified at Contractor's expense.
- B. Concrete mixing equipment: IDOT 2001.21.
- C. Forms: IDOT 2301.07 A1 and A2.
- D. Form-line excavating machine: IDOT 2301.07 A5 or B1.
- E. Steel-shod template: IDOT 2301.07 A6 or B2.
- F. Consolidating and finishing equipment: IDOT 2301.07 A7 or B3.
- G. Equipment for hand methods: IDOT 2301.07 D and E.
- H. Alternate equipment and methods for finishing and consolidating pavement may be permitted by Engineer if satisfactory operation and construction on previous projects can be demonstrated.

7. PAVEMENT CONSTRUCTION

- A. Setting and removing forms:
  - 1. Set forms accurately to required grade and alignment on properly compacted subgrade or subbase; for forms to support mechanical subgrader, mechanical spreader, mechanical finisher or other similar heavy equipment, excavate with machine designed to shape subgrade for forms.
  - 2. Set base of form at or below subgrade elevation and with top of form at pavement surface elevation at edge of slab.
    - a. Extra height forms may be used to back up integral curb; set base at or below subgrade elevation and top of form at top of curb elevation.

## Portland Cement Concrete Pavement

- b. Comply with IDOT 2301.9A if base of form is set below subgrade elevation; additional excavation and concrete at no cost to Owner.
  3. Secure forms in place to maintain grade and alignment while concrete is placed and finished.
    - a. If voids occur under forms, remove forms and bring special backfill to proper elevation as specified in EARTHWORK AND INCIDENTALS FOR PAVEMENT.
    - b. Check form joints with 10' straight edge; adjust forms to proper grade and alignment.
  4. If supporting soil becomes softened by rain or standing water so form is inadequately supported, reset form on suitable material before placing concrete.
  5. Oil forms before concrete is placed; prevent adherence of concrete.
  6. Leave side forms in place not less than 6 hours after concrete is placed; if form removal causes damage to concrete, leave remaining forms in place longer than 6 hours, as required.
  7. Remove forms with care to prevent cracking, spalling or overstressing concrete; remove form stakes prior to raising forms.
  8. Clean forms before resetting.
  9. Forms not required where abutting existing pavement.
- B. Concrete and steel placement:
  1. Uniformly moisten subgrade or place plastic film, specified hereinbefore, on prepared subgrade or subbase; lap plastic film 12", minimum.
  2. Adjust manhole and other castings within area to be paved to conform to finished surface; clean outside of casting.
  3. Place dowel and tie bars as shown on plans or specified; secure in position by approved method.
  4. Place concrete to full depth of pavement in single operation; do not pile concrete more than 8" above design elevation of surface; allow no segregation of material when concrete is deposited on subgrade.
  5. Carefully place concrete and subgrade to require minimum re-handling; minimize disturbance of reinforcement.
  6. Vibrate and consolidate to prevent formation of voids; do not displace or distort reinforcement.
- C. Finishing:
  1. Begin finishing operations promptly after concrete has been placed and consolidated.
  2. Screed surface to grade and crown shown on plans.
  3. Finish surface with 10' long lightweight float; finish from both sides simultaneously if pavement is placed to full width of street with one pass of paving machine.

## Portland Cement Concrete Pavement

4. Provide uniformly gritty surface with Astroturf drag; round edges of pavement to 1/8" radius.
  5. Check pavement surface with 10' long straightedge; maximum permissible deviation: 1/8"; grind high spots, over 1/8", with carborundum grinding wheel.
- D. Construct joints as shown on plans and specified; seal as specified hereinafter.
1. Provide transverse contraction joints every 15 LF of portland cement concrete pavement.
  2. Round edges of concrete adjacent to header boards and expansion joint material to 1/8" radius.
  3. Provide supplemental vibration adjacent to header boards and expansion joint material as required.
  4. Begin saw cutting as soon as concrete can be sawed without objectionable tearing of sawed edges; complete such work within 24 hours after concrete is placed.
  5. For weather conditions, end of day's work, or when 30 min. elapse between concrete placement, install header board and 3/4" smooth dowels 1'-3" long at 1'-6" spacing through header board; grease protruding ends prior to next concrete placement.
- E. Seal all joints before pavement is opened to Contractor's forces and general traffic; seal only dry and clean joint surfaces; slightly under-fill joints, keep sealer off of adjacent pavement.
1. Heat joint sealer to required temperature in thermostatically controlled heating kettle approved by Engineer; do not overheat.

### 8. CURING AND PROTECTION

- A. Apply liquid curing compound in fine spray to form continuous, uniform film on surface and vertical edges of pavement and curbs.
1. Apply compound with power sprayer, operating at 40 psi or less; rate of application: 0.03 gal. per square yard (1 gal. per 300 SF); do not dilute compound.
  2. Apply to pavement surface after finishing and after surface moisture has disappeared; apply to pavement edges within 30 min. after forms are removed.
- B. Apply plastic or burlap cover where liquid curing compound not permitted; keep continuously damp for 48 hours after placement of concrete.
- C. Concrete pavement in place for less than 36 hours shall be protected during cold weather as follows:

## Portland Cement Concrete Pavement

<u>Forecast or Actual Temperature</u>	<u>Protection</u>
35° to 32°F.	One layer of burlap for concrete placed after October 1.
31° to 25°F.	Two layers burlap or one layer plastic film on one layer burlap.
Below 25°F.	One layer burlap or plastic film and 6" layer of straw or hay.

1. Burlap: AASHTO M182, Class 3.
2. Commercial insulation may be substituted for straw or hay, when approved by Engineer.
3. Protect straw, hay or insulation from disturbance by wind; leave in place for 5 days, minimum, or until pavement is opened to traffic.
4. Lap plastic film 18" at junctions.

D. Concrete damaged by rain or freezing shall be removed and replaced at Contractor's expense.

### 9. RESTRICTIONS

#### A. Weather:

1. Place no concrete when stormy or inclement weather prevents good workmanship, when subgrade is frozen or if air temperature is 38°F. or below; use no aggregates containing frozen lumps.
2. With favorable weather conditions, start paving operations when temperature of concrete delivered to subgrade is 40°F. or higher.
3. Continue paving operations as long as concrete temperature requirement is met and air temperature remains above 38°F.

#### B. Night operation:

1. Place no concrete when darkness prevents good workmanship in placing and finishing.
2. Do not place or finish concrete under artificial light.

#### C. Use of pavement:

1. Time for opening pavement for use will be determined by results of tests on cylinders taken during concrete placement.

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2. Pavement may be opened to Contractor's forces after 2 days for purpose of removing coverings if tests of cylinders from section show compressive strength of 2,750 psi or higher.
3. Open pavement to general traffic when authorized by Engineer.
4. Concrete placed in cold weather may require additional curing time, as directed by Engineer; keep all vehicles off pavement until such curing time has been completed.

10. DEFECTS

- A. Pavement containing fractures, spalls, more than one random crack per panel or other defects: remove and replace at no cost to Owner; rout and seal random cracks including placement of saw cut and epoxy cemented tie bars at 30" centers transverse to crack where crack is 1/8" or wider.
- B. Water ponding deeper than 1/4" in gutter: remove and replace panel, or grind gutter in adjacent panels to drain; Owner reserves the right to select method of correcting defects at no cost to Owner.
- C. Remove and replace pavement more than 0.50" deficient in thickness.

11. SIDEWALK CONSTRUCTION AND DRIVEWAY APPROACH

- A. Conform to details shown on Standard Drawing and plans for driveway approaches and sidewalks; prepare subgrade as specified under EARTHWORK AND INCIDENTALS FOR PAVEMENT.
- B. Remove existing concrete as shown on Standard Drawings or plan; use saw or other devices to cut smooth, even lines perpendicular to existing pavement surface.
- C. Concrete materials:
  1. Portland cement, admixtures, fine aggregate and water; as specified for pavement.
  2. Coarse aggregate: as specified for pavement, except conform to following sieve analysis:

<u>Sieve Size</u>	<u>% Passing</u>
1-1/2"	100
1"	95-100
1/2"	25-60
No. 4	0-10
No. 8	0-5
No. 200	0-1.5

- D. Concrete mix: use IDOT Section 2301.04 C-4 mix as specified for street pavement. Use M-4 mix on driveways and on sidewalks in driveway areas as indicated on plans.
- E. Concrete quality:
1. Minimum compressive strength: psi at 28 days: 4,000.
  2. Water-cement ratio: gallons per sack, maximum, including water in aggregates: 6-1/2.
  3. Cement contents: sacks per cubic yard, minimum: 6.
  4. Admixtures: per manufacturer's recommendations.
  5. Concrete mix: meet approval of Engineer.
  6. Slump: 2" to 4"; measure according to ASTM C143.
  7. Air entrainment: use for all concrete: 5% to 7%, measure in accordance with ASTM C231; number of tests as required by Engineer.
  8. Concrete compression cylinders: two cylinders for each day's pour, or as directed by Engineer.
- F. Curb ramps
1. Pedestrian curb ramps scheduled for installation or replacement shall comply with the requirements of the Americans with Disabilities Act.
    - a. Ramps shall contain a strip of detectable warnings measuring 2' in the direction of pedestrian travel and extend the full width of curb ramp.
    - b. Detectable warning strip shall be located adjacent to the curb and shall be constructed of contrasting color and texture; color to be selected by Owner.
    - c. Detectable Warnings shall be fiberglass panels as manufactured by Armor-Tile or equal.
    - d. See plans for details and location of pedestrian curb ramps.
- G. Form setting and placing concrete:
1. Use wood or steel forms along edge of sidewalk; set true to line and grade and hold rigidly in place by stakes placed outside forms and flush with or below top edge of forms; form height equal to full specified depth of sidewalk; wood form minimum nominal thickness: 2".
  2. Cross section: conform to type shown on plans.
  3. Spreading: deposit concrete on subgrade in manner requiring as little rehandling as possible; prevent segregation of concrete when discharged; spread with shovels; do not walk on freshly mixed concrete with boots or shoes coated with earth or other foreign substances.
  4. Construction joints: place at end of each day's work or any other time when process of depositing concrete is stopped for more than 30 min.; sections less than one division into which walk is being divided not permitted;

## Portland Cement Concrete Pavement

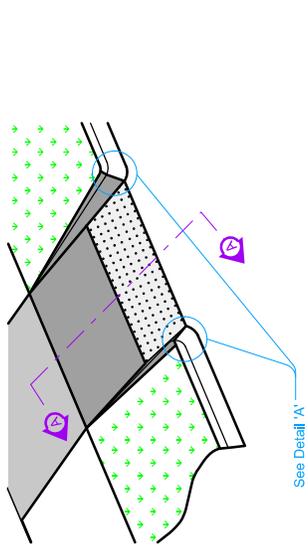
construct construction joint using header board made from clean lumber having minimum 2" nominal thickness; set header board accurately and hold perpendicular to surface.

5. Expansion joints: install transverse or longitudinal expansion joints whenever sidewalk or driveway concrete is placed against curb, driveway or pavement slab, existing sidewalk or structure; install expansion joint at property side of crosswalks in intersections and at intervals not greater than 100'; construct expansion joints by installing 1/2" thick strip of approved non-extruded, premolded joint material full depth of concrete; carefully trim any expansion joint material protruding above finished work to level or abutting concrete.
- I. Concrete finishing
    1. Place concrete to slightly overfill space between forms; spread immediately and consolidate with vibrator; smooth with straight edge; float with wooden float to depress large aggregate and create dense surface; after floating, allow to set until shine has disappeared from surface.
    2. Use steel trowel or magnesium float to smooth concrete surface free from defects and blemishes.
    3. Finish concrete edges with edging tool having radius of approximately 1/2".
    4. Provide soft broom finish; broom at right angles to surfacing.
  - J. Cure and protect sidewalks and driveway approaches as specified for pavement.
  - K. Form removal
    1. Timing: remove forms after initial set has taken place but not less than 6 hours after concrete has been placed; Engineer may vary minimum time according to weather and temperature conditions.
    2. Concrete protection: backfill areas adjacent to concrete immediately after forms are removed or construct check dams or other protection to prevent saturation or erosion of subgrade under or near concrete.
  - L. Cleaning sidewalks and driveway crossings
    1. Clean sidewalk or driveway immediately after end of curing period of all litter, construction materials and tools; remove excess dirt from site and broom sidewalk or driveway clean.
  - M. Restrictions on construction and use of pavement apply to sidewalks and driveway approaches.

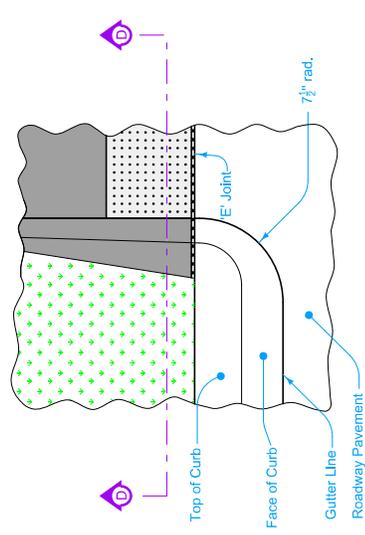
12. PAYMENT

- A. No separate payment will be made for work covered under this part of the specifications except as set forth below. All other items are incidental to construction. Surfacing damaged by Contractor beyond removal limits replaced by Contractor at no cost to Owner.
- B. Concrete Curb and Gutter, LF: Unit price includes cost of equipment, labor, materials and incidentals necessary to complete work required for construction of new portland cement concrete curb and gutter as specified. Gutter thickness 6". Measurement based on length along back of curb.
- C. Sidewalk, SY: Unit price includes furnishing all labor, equipment and materials necessary to complete work required for removal of existing walks, construction of new portland cement concrete sidewalks including subgrade preparation, forming, reinforcing steel, placing, consolidating, testing, finishing, jointing, curing, and miscellaneous associated work including cleanup.
  - 1. Sidewalk thickness: minimum thickness is 4" except at section through driveways where minimum thickness is 6" and except at pedestrian curb ramps where minimum thickness is 6" and thickened to 8" where sidewalk forms or abuts curb.
  - 2. 6" thick sidewalk sections through driveways will be paid for as 6" thick sidewalk; all other sidewalk including pedestrian curb ramps and thickened edges will be paid for as 4" thick sidewalk.
  - 3. Welded wire fabric not required for sidewalks.
  - 4. Detectable Warnings will be paid separately from the underlying sidewalk.
- D. Portland Cement Concrete Pavement, SY: Unit price includes cost of equipment, labor and materials and incidentals necessary to complete work required for construction of new portland cement concrete pavement and driveways as specified and shown on plans.
- E. Detectable Warnings, SF: Unit price includes cost of equipment, labor and materials and incidentals necessary to complete work required for construction of detectable warnings in curb ramps as specified and shown on plans.

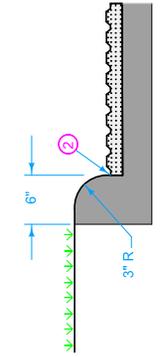
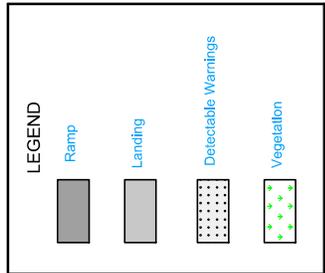




**CURB RAMP PERPENDICULAR TO CURB**

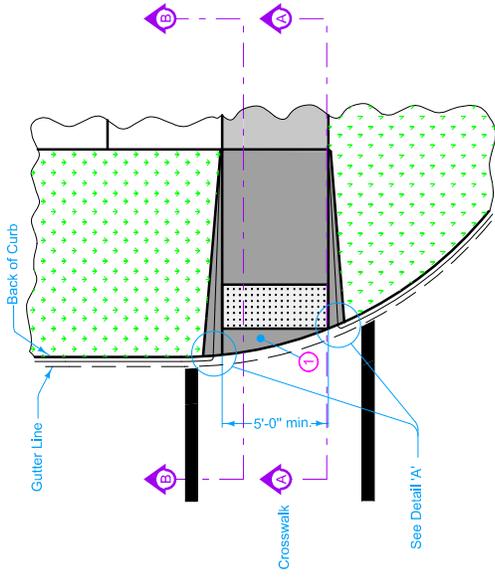


**DETAIL 'A'**

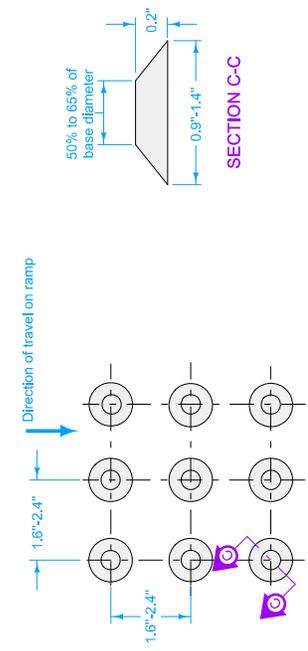


**SECTION D-D**

- ① Unless curb ramp is aligned perpendicular to the street radius, provide an area of special shaping at the bottom of the ramp. This area allows the grade break at the bottom of the ramp to be perpendicular to the ramp and provides a smooth transition to gutterline for wheelchair access.
- ② Use vertical curb adjacent to ramp unless flares are specified in the project plans. Install Detectable Warnings so that no gap is left between warning panel and base of curb.



**CURB RAMP NOT PERPENDICULAR TO CURB**



**SQUARE PATTERN (Parallel alignment)**

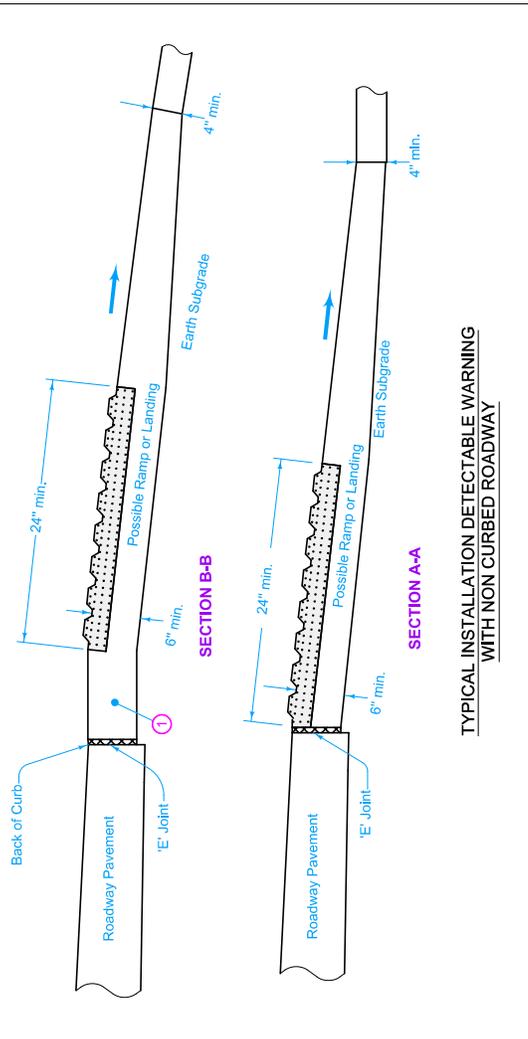
**DOMED DETAILS ON DETECTABLE WARNINGS**

Possible Contract Items:  
 Detectable Warnings  
 Sidewalk, P.C. Concrete, 6 in.  
 Sidewalk, P.C. Concrete, 4 in.  
 Removal of Sidewalk  
 Possible Tabulation:  
 113-1

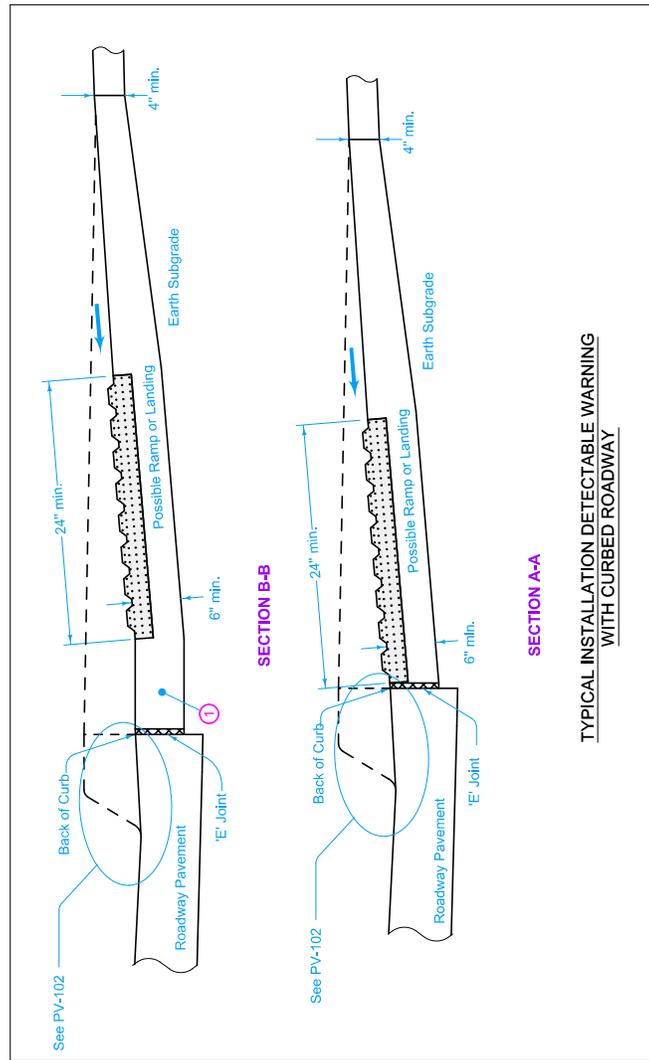
 Iowa Department of Transportation	REVISION 5   10-18-12
	<b>MI-220</b> SHEET 1 of 3
<b>STANDARD ROAD PLAN</b>	
REVISIONS: Removed DETAIL B on page 2 and placed similar detail on P4-V102. Modified DETAIL A on page 1.	
APPROVED BY DESIGN METHODS ENGINEER  Deanna M. Smith	

**DETECTABLE WARNINGS  
AND PEDESTRIAN RAMP**





TYPICAL INSTALLATION DETECTABLE WARNING WITH NON CURBED ROADWAY



TYPICAL INSTALLATION DETECTABLE WARNING WITH CURBED ROADWAY

**LEGEND**

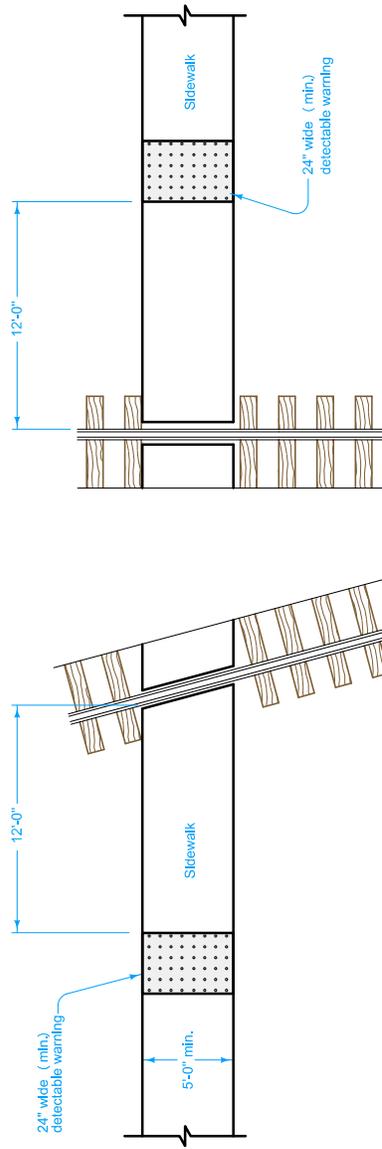
	Ramp
	Landing
	Detectable Warnings
	Vegetation

① Unless curb ramp is aligned perpendicular to the street radius, provide an area of special shaping at the bottom of the ramp. This area allows the grade break at the bottom of the ramp to be perpendicular to the ramp and provides a smooth transition to gutterline for wheelchair access.

	REVISION	5	10-18-12
	<b>MI-220</b> SHEET 2 of 3		
<b>STANDARD ROAD PLAN</b>			
REVISIONS: Removed DETAIL B on page 2 and placed similar detail on PV-102. Modified DETAIL A on page 1.			
APPROVED BY DESIGN METHODS ENGINEER <i>Deanna Marshall</i>			
<b>DETECTABLE WARNINGS AND PEDESTRIAN RAMP</b>			



 Iowa Department of Transportation	REVISION	5	10-16-12
	<b>MI-220</b> SHEET 3 of 3 <small>REVISIONS: Removed DETAIL B on page 2 and placed similar detail on P4-V102. Modified DETAIL A on page 1.</small>		
<b>STANDARD ROAD PLAN</b>			
<small>APPROVED BY DESIGN METHODS ENGINEER</small> <i>Deanna Marshall</i>			
<b>DETECTABLE WARNINGS AND PEDESTRIAN RAMP</b>			

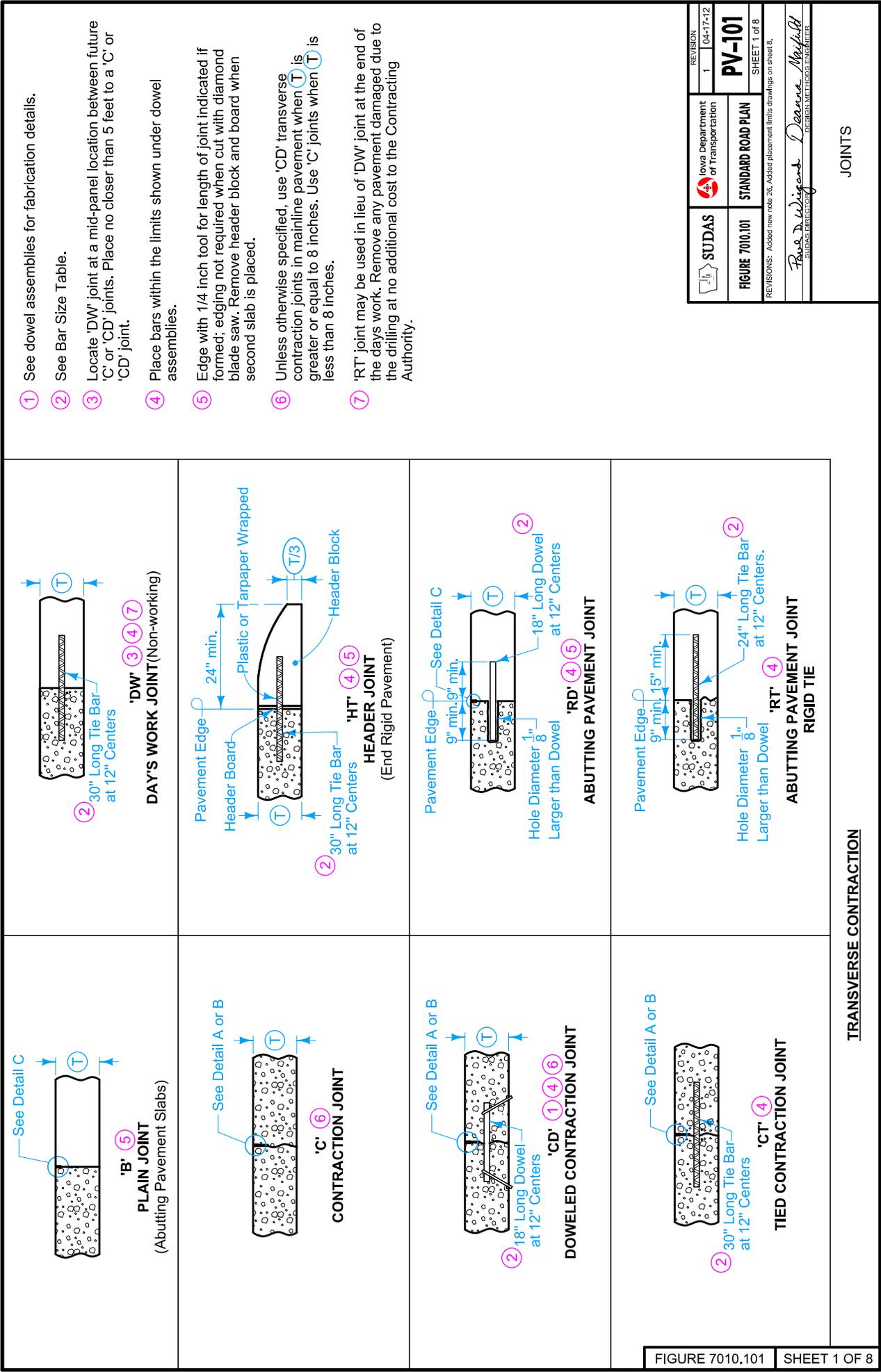


**RAILROAD CROSSING**

**LEGEND**

	Ramp
	Landing
	Detectable Warnings
	Vegetation

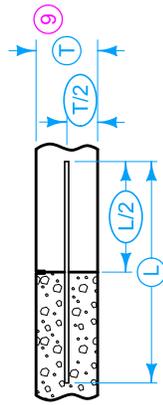




- ① See dowel assemblies for fabrication details.
- ② See Bar Size Table.
- ③ Locate 'DW' joint at a mid-panel location between future 'C' or 'CD' joints. Place no closer than 5 feet to a 'C' or 'CD' joint.
- ④ Place bars within the limits shown under dowel assemblies.
- ⑤ Edge with 1/4 inch tool for length of joint indicated if formed; edging not required when cut with diamond blade saw. Remove header block and board when second slab is placed.
- ⑥ Unless otherwise specified, use 'CD' transverse contraction joints in mainline pavement when **T** is greater or equal to 8 inches. Use 'C' joints when **T** is less than 8 inches.
- ⑦ 'RT' joint may be used in lieu of 'DW' joint at the end of the days work. Remove any pavement damaged due to the drilling at no additional cost to the Contracting Authority.

SUDAS FIGURE 7010.101	Iowa Department of Transportation STANDARD ROAD PLAN	REVISION 1 04-17-12 <b>PV-101</b> SHEET 1 of 8
	REVISIONS: Address new note 26. Address placement limits drawings on sheet 8. Ross D. Wiegand, <i>Deanne McNeil</i> SUDAS DIRECTOR DESIGN METHOD ENGINEER	



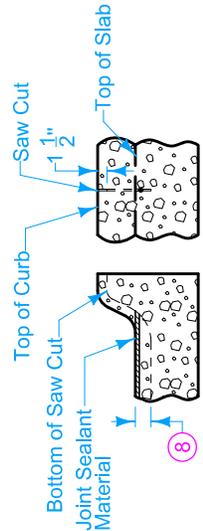


**BAR PLACEMENT**

(Applies to all joints unless otherwise detailed.)

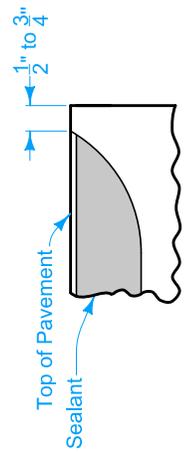
8 Saw 'CD' joint to a depth of  $T/3 \pm 1/4"$ ; saw 'C' joint to a depth of  $T/4 \pm 1/4"$ .

9 When tying into old pavement, T represents the depth of sound PCC.



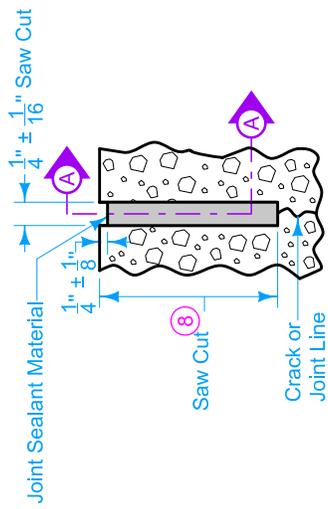
**'C' JOINT IN CURB**

(Match 'CT', 'CD', or 'C' joint in pavement.)



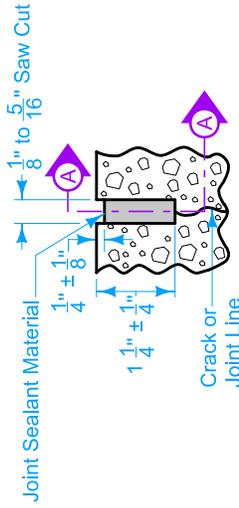
**SECTION A-A**

(Detail at Edge of Pavement)



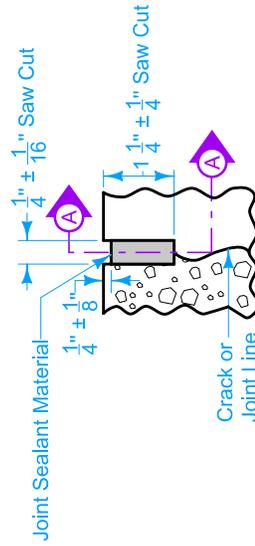
**DETAIL A**

(Saw cut formed by conventional concrete sawing equipment.)



**DETAIL B**

(Saw cut formed by approved early concrete sawing equipment.)



**DETAIL C**

BAR SIZE TABLE	
(T)	Tie Bar Size
< 8"	$\frac{3}{4}$ " #6
$\geq 8"$ but < 10"	$1 \frac{1}{4}$ " #10
$\geq 10"$	$1 \frac{1}{2}$ " #11

		REVISION 1 04-17-12
	<b>FIGURE 7010.101</b>	<b>PV-101</b> SHEET 2 of 8
REVISIONS: Added new note 28. Added placement limits drawings on sheet 8.		
SUDAS DIRECTOR <i>Deanne McFadden</i> DESIGN METHOD ENGINEER		



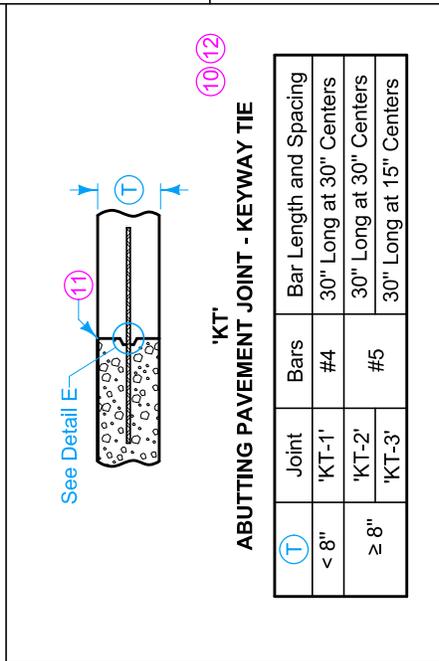
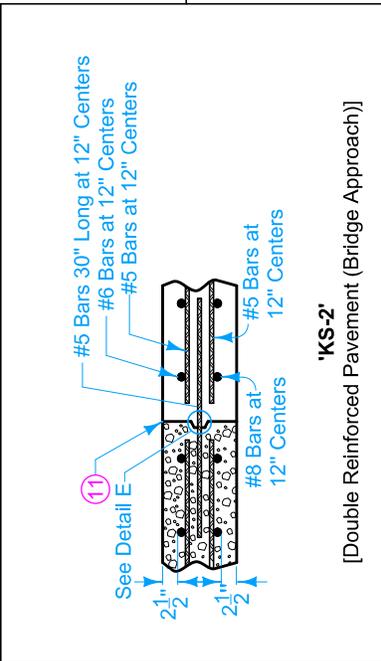
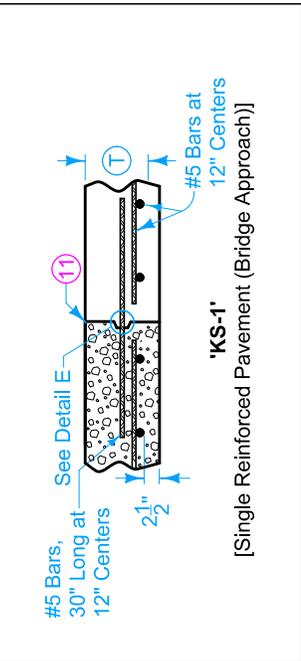
- 10 Bar supports may be necessary for fixed form paving to ensure the bar remains in a horizontal position in the plastic concrete.
- 11 Sawing or sealing of joint not required.
- 12 The following joints are interchangeable, subject to the pouring sequence: 'BT-1', 'L-1', and 'KT-1'; 'KT-2' and 'L-2'; 'KT-3' and 'L-3'.



**'L'**  
CONTRACTION JOINT

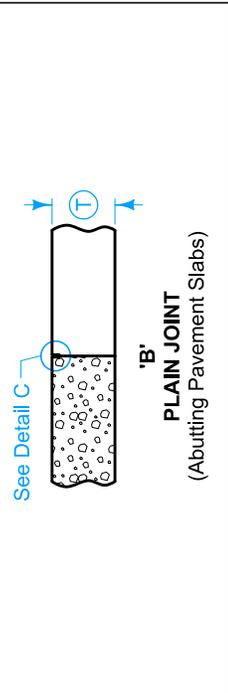
Joint	Bars	Bar Length and Spacing
'L-1'	#4	36" Long at 30" Centers
	#5	36" Long at 30" Centers
'L-2'	#5	36" Long at 15" Centers
'L-3'	#5	36" Long at 15" Centers

SUDAS	Iowa Department of Transportation	REVISION 1 04-17-12
	FIGURE 7010.101	STANDARD ROAD PLAN
REVISIONS: Added new note 26. Added placement limits drawings on sheet 8.		PV-101 SHEET 3 of 8
 Deanne McFadden SUDAS DIRECTOR DESIGN METHOD ENGINEER		JOINTS



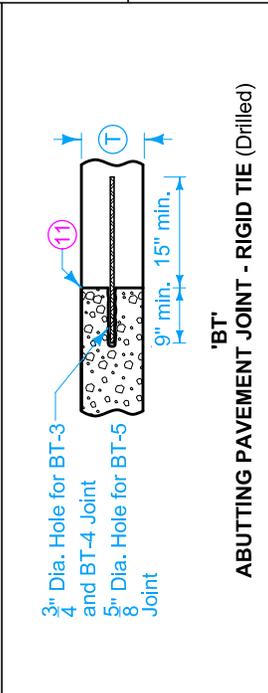
**'KT'**  
ABUTTING PAVEMENT JOINT - KEYWAY TIE

Joint	Bars	Bar Length and Spacing
'KT-1'	#4	30" Long at 30" Centers
	#5	30" Long at 30" Centers
'KT-2'	#5	30" Long at 30" Centers
'KT-3'	#5	30" Long at 15" Centers



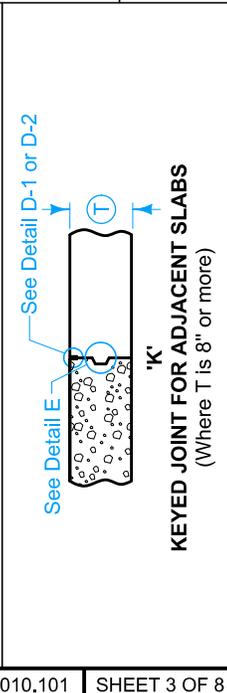
**'BT'**  
ABUTTING PAVEMENT JOINT - RIGID TIE

Joint	Bars	Bar Length and Spacing
'BT-1'	#4	36" Long at 30" Centers
	#5	36" Long at 30" Centers
'BT-2'	#5	36" Long at 30" Centers

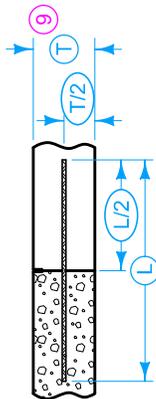


**'BT'**  
ABUTTING PAVEMENT JOINT - RIGID TIE (Drilled)

Joint	Bars	Bar Length and Spacing
'BT-5'	#4	24" Long at 30" Centers
	#5	24" Long at 30" Centers
'BT-3'	#5	24" Long at 30" Centers
'BT-4'	#5	24" Long at 15" Centers





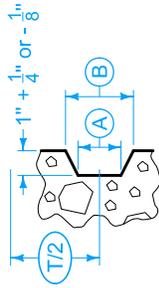


**TIE BAR PLACEMENT**

(Applies to all joints unless otherwise detailed.)

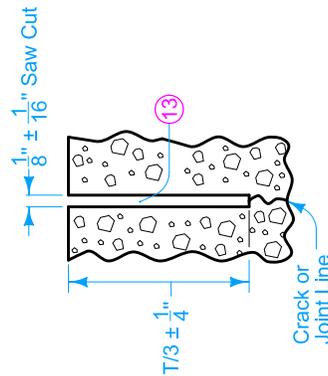
9 When tying into old pavement, T represents the depth of sound PCC.

13 Sealant or cleaning not required.



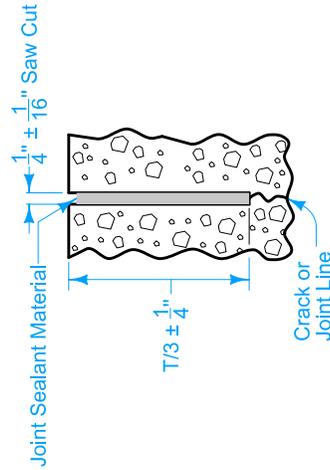
**DETAIL E**

KEYWAY DIMENSIONS			
Keyway Type	Pavement Thickness (T)	A	B
Standard	8" or greater	$\frac{13}{4}$ "	$2\frac{3}{4}$ "
Narrow	Less than 8"	1"	2"



**DETAIL D-1**

(Required when the Department of Transportation is the Contracting Authority, or when specified in the contract documents.)

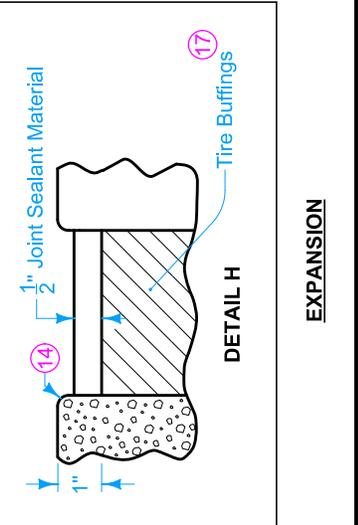
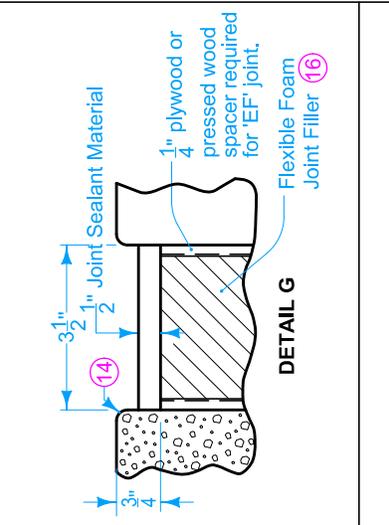
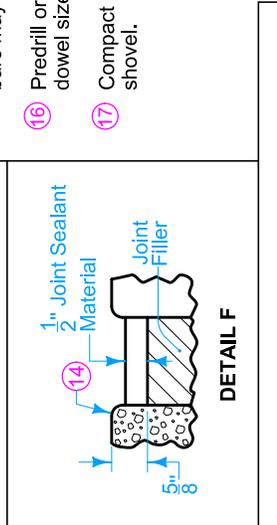
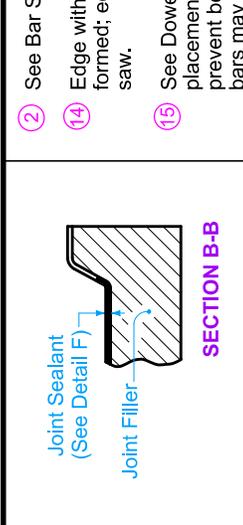
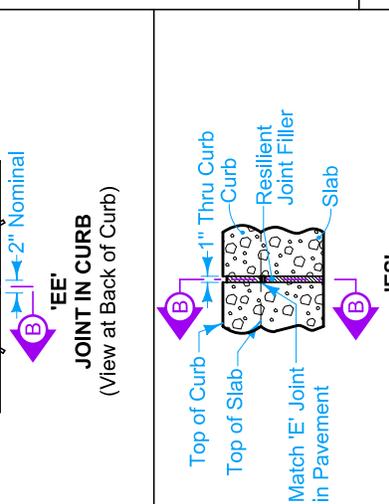
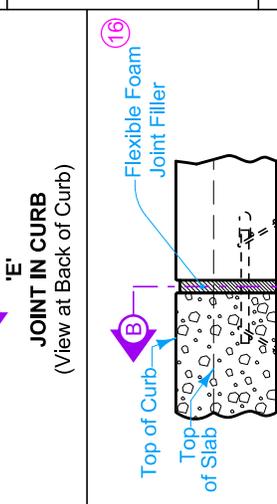
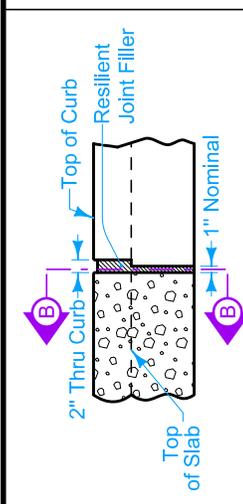
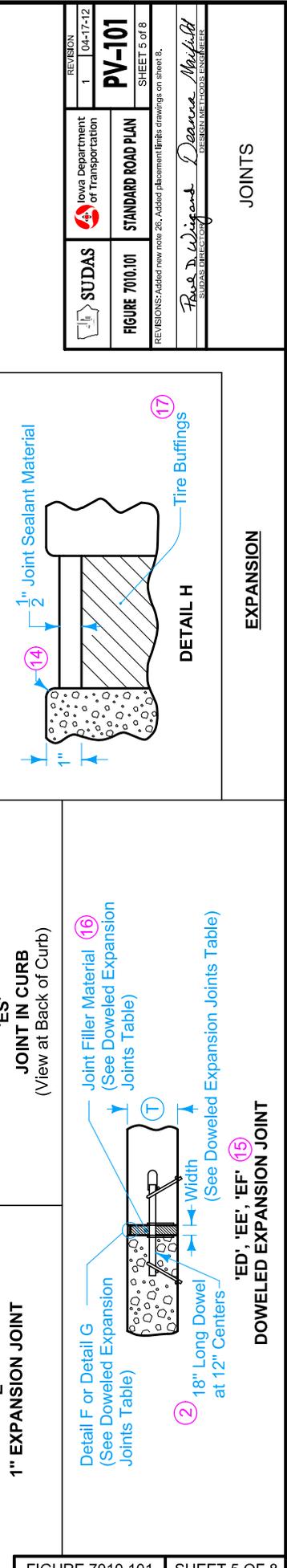
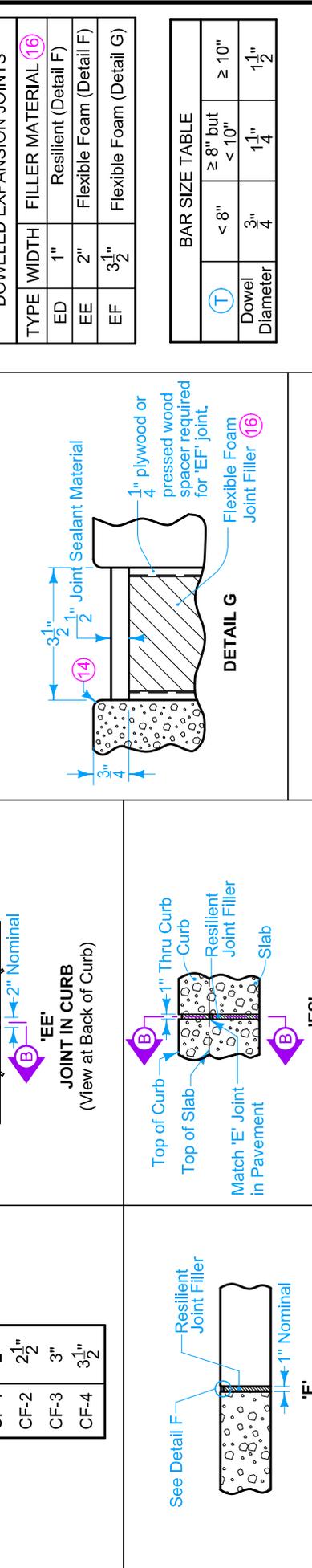
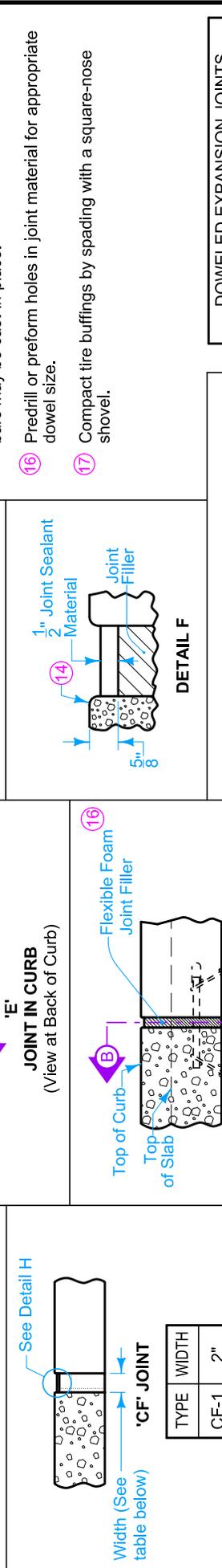


**DETAIL D-2**

(Required when the Department of Transportation is not the Contracting Authority, or when specified in the contract documents)

		REVISION 1 04-17-12
	STANDARD ROAD PLAN FIGURE 7010.101	PV-101 SHEET 4 of 8
REVISIONS: Added new note 26. Added placement limits drawings on sheet 6.		
Paul D. Wiegand SUDAS DIRECTOR		Deanne McFarland DESIGN METHOD ENGINEER
JOINTS		





(2) See Bar Size Table.  
(14) Edge with 1/4 inch tool for length of joint indicated if formed; edging not required when cut with diamond blade saw.  
(15) See Dowel Assemblies for fabrication details and placement limits. Coat the free end of dowel bar to prevent bond with pavement. At intake locations, dowel bars may be cast-in-place.  
(16) Pre-drill or preform holes in joint material for appropriate dowel size.  
(17) Compact tire buffings by spading with a square-nose shovel.

**DOWELED EXPANSION JOINTS**

TYPE	WIDTH	FILLER MATERIAL (16)
ED	1"	Resilient (Detail F)
EE	2"	Flexible Foam (Detail F)
EF	3 1/2"	Flexible Foam (Detail G)

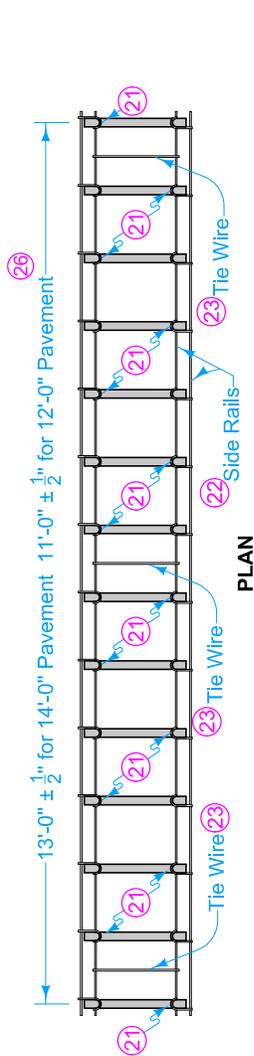
**BAR SIZE TABLE**

(T) Dowel Diameter	< 8"	≥ 8" but < 10"	≥ 10"
	3/4"	1 1/4"	1 1/2"

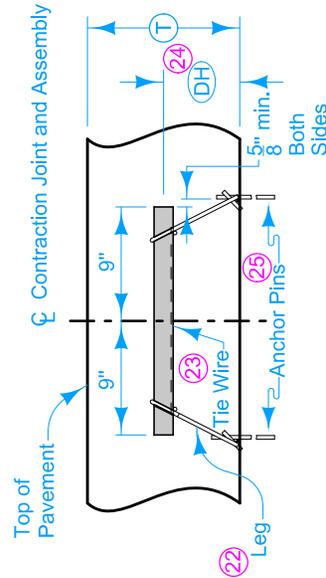
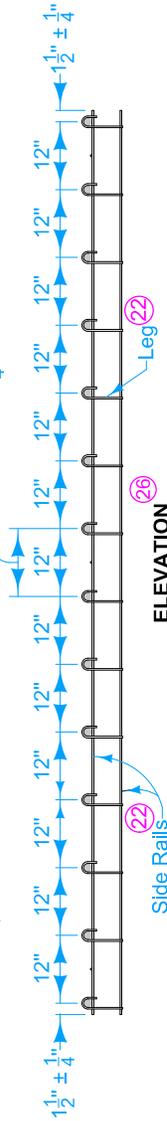
**SUDAS** Iowa Department of Transportation  
**FIGURE 7010.101** STANDARD ROAD PLAN SHEET 5 of 8  
 REVISIONS: Added new note 20. Added placement limits drawings on sheet 8.  
 SUBAS DIRECTOR *Deanna McNeil* DESIGN METHOD ENGINEER  
 JOINTS



**CONTRACTION JOINTS**



Spaces between dowel bars are nominal dimensions with a  $\frac{1}{4}$ " allowable tolerance.



**LONGITUDINAL SECTION**

**DOWEL ASSEMBLIES**

DOWEL HEIGHT AND DIAMETER		
(T)	(DH) (24)	Diameter
7" to $7\frac{1}{2}$ "	$3\frac{1}{2}$ "	$\frac{3}{4}$ "
8" to $9\frac{1}{2}$ "	$4\frac{1}{4}$ "	$1\frac{1}{4}$ "
10" to $11\frac{1}{2}$ "	$5\frac{1}{4}$ "	$1\frac{1}{2}$ "
12" to 13"	$6\frac{1}{4}$ "	$1\frac{1}{2}$ "

(18) Use 18 inch long dowel bars with a tolerance of  $\pm 1/8$  inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within  $\pm 1/8$  inch.

(19) Wire sizes shown are the minimum required. Use wires with a minimum tensile strength of 50 ksi.

(20) Details apply to both transverse contraction and expansion joints.

(21) Weld alternately throughout.

(22) #1/0 gauge (0.306 inch diameter) wire.

(23) #10 gauge (0.135 inch diameter) wire, welded or friction fit to upper side rail, both sides.

(24) Measured from the centerline of dowel bar to bottom of lower side rail +  $1/4$  inch.

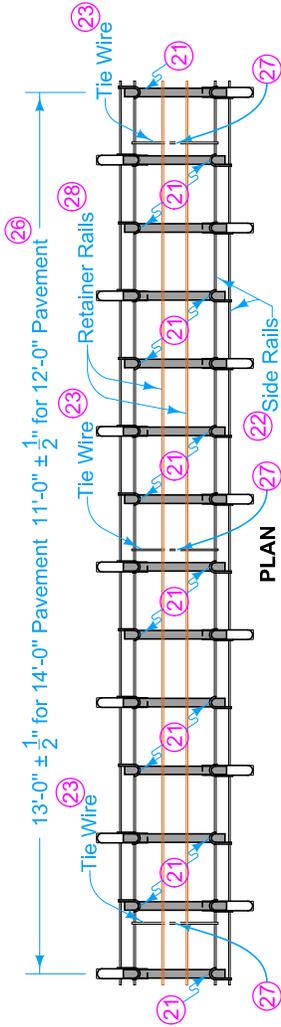
(25) Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

(26) If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

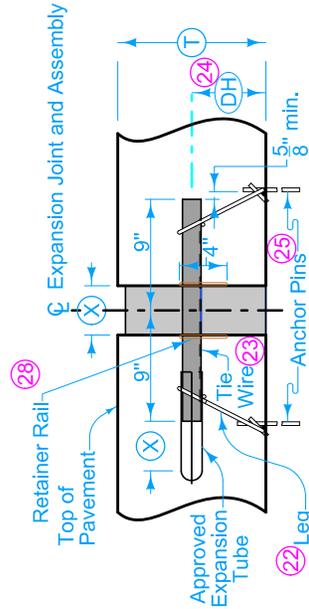
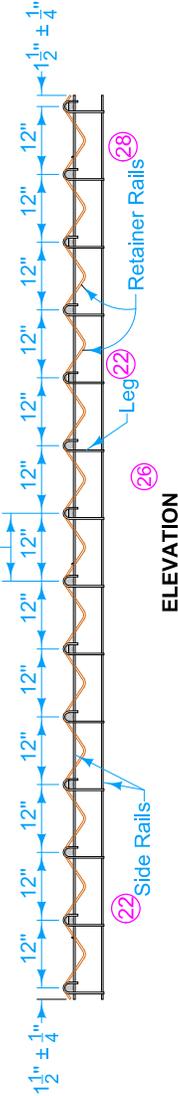
		REVISION 1 04-17-12
	FIGURE 7010.101	STANDARD ROAD PLAN SHEET 6 of 8
REVISIONS: Added new note 26. Added placement limits drawings on sheet 8.		
SUDAS DIRECTOR <i>Deanne McNeil</i> DESIGN METHOD ENGINEER		
JOINTS		



**EXPANSION JOINTS**



Spaces between dowel bars are nominal dimensions with a  $\frac{1}{4}$  inch allowable tolerance.



**SECTION THRU EXPANSION JOINT**

JOINT OPENING AND EXPANSION TUBE EXTENSION	
Joint Type	Minimum Tube Length
"ED"	6"
"EE"	7"
"EF"	9"

DOWEL HEIGHT AND DIAMETER		
T	DH (24)	Diameter
7" to 7 1/2"	3 1/2"	3/4"
8" to 9 1/2"	4 1/4"	1 1/4"
10" to 11 1/2"	5 1/4"	1 1/2"
12" to 13"	6 1/4"	1 1/2"

18 Use 18 inch long dowel bars with a tolerance of  $\pm 1/8$  inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within  $\pm 1/8$  inch.

19 Wire sizes shown are the minimum required. Use wires with a minimum tensile strength of 50 ksi.

20 Details apply to both transverse contraction and expansion joints.

21 Weld alternately throughout.

22 #1/0 gauge (0.306 inch diameter) wire.

23 #10 gauge (0.135 inch diameter) wire, welded or friction fit to upper side rail, both sides.

24 Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

25 Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

26 If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

27 Clip and remove center portion of tie during field assembly.

28 1/4 inch diameter wire.

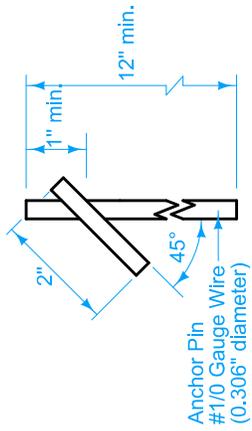
18 19 20

**DOWEL ASSEMBLIES**

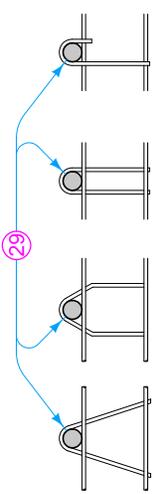
SUDAS	Iowa Department of Transportation	REVISION
		1 04-17-12
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101
REVISIONS: Added new note 26. Added placement limits drawings on sheet 8.		SHEET 7 of 8
 Rose D. Wiegand SUDAS DIRECTOR		 Deanne McFalls DESIGN METHOD ENGINEER
		JOINTS



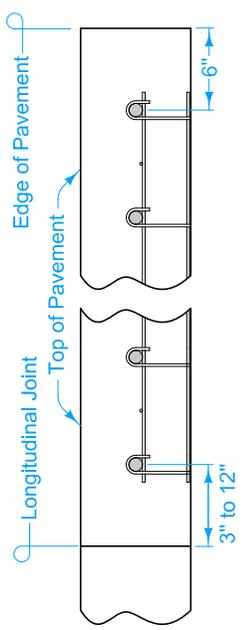
- ⑱ Use 18 inch long dowel bars with a tolerance of  $\pm 1/8$  inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within  $\pm 1/8$  inch.
- ⑲ Wire sizes shown are the minimum required. Use wires with a minimum tensile strength of 50 ksi.
- ⑳ Details apply to both transverse contraction and expansion joints.
- ㉑ Diameter of bend around dowel is dowel diameter +  $1/8$  to  $3/16$  inches.



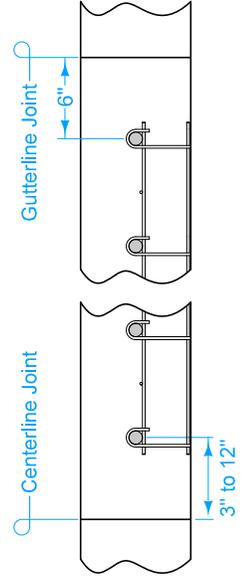
**ANCHOR PIN**



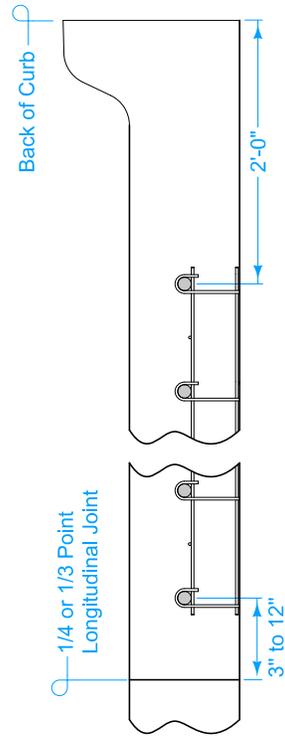
**OPTIONAL LEG SHAPES**



**PLACEMENT LIMITS**  
(Rural Section)



**PLACEMENT LIMITS**  
(Curb and Gutter - Gutterline Jointing)



**PLACEMENT LIMITS**  
(Curb and Gutter -  $1/4$  or  $1/3$  Point Jointing)

SUDAS	Iowa Department of Transportation	REVISION
		1 04-17-12
FIGURE 7010.101	STANDARD ROAD PLAN	<b>PV-101</b>
REVISIONS: Added new note 28. Added placement limits drawings on sheet 8.		SHEET 8 of 8
<i>Bob D. Wiegand</i> SUDAS DIRECTOR		<i>Deanne McNeil</i> DESIGN METHODS ENGINEER
		JOINTS

**DOWEL ASSEMBLIES**

