Iowa Department of Transportation

MINUTES
OF
IOWA DOT SPECIFICATION COMMITTEE MEETING

May 8, 2003

Members Present:	John Adam, Director	Statewide Operations Bureau
	Tom Reis, Chair	Specifications Section
	Jim Berger	Office of Materials
	Roger Bierbaum	Office of Contracts
	Bruce Kuehl	District 6-Construction Office
	Doug McDonald	RCE - Marshalltown
	Keith Norris	District 2-Materials Office
	Gary Novey	Office of Bridges and Structures
Members Not Present:	Bruce Brakke	Office of Maintenance
	Steve Gent	Office of Traffic and Safety
	Larry Jesse	Office of Local Systems
	Mike Kennerly	Office of Design
	John Smythe	Office of Construction
From FHWA:	Andy Wilson	
Others Present:	Donna Buchwald, Secretary	Specifications Section
	Leroy Bergman	Office of Local Systems
	Mark Brandl	RCE - Davenport
	Tony Ehrig	Cherokee RCE Office
	George Feazell	RCE - New Hampton
	Tom Jacobson	Office of Construction
	Troy Jerman	Traffic and Safety
	Mark Masteller	Office of Design
	Norman Miller	District 1 Office
	Will Stein	Office of Design
	Wayne Sunday	Office of Construction

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the May 2, 2003, agenda:

1. Article 1105.03, Working Drawings

The Office of Construction requested a discussion of numerous articles concerning the requirements for submitting working drawings.

Submitted by: John Smythe/Wayne Sunday	**Office:** Construction	**Item 1**
Submittal Date: February 13, 2003	**Proposed Effective Date:** October 21, 2003	
Article No.: As noted below **Title:** As noted below	**SS No.:**	**Other:**

Change (Redline/Strikeout):

The following Articles in the Standard Specifications include requirements for submittal of shop drawings or working drawings to be reviewed and approved prior to ordering materials or fabrication. There is an inconsistency in these Articles regarding number of submittal copies required and the specified review time to be provided (in some cases these are not even identified).

Article 2403.17F, Structural Concrete - Falsework Plans
Article 2405.02, Construction of Cofferdams
Article 2405.12, Reconstruction of Substructures
Article 2408.02, Steel Structures – Working Drawings, Shop Drawings, Changes, and Substitutions
Article 2408.33, Steel Structures - Falsework
Article 2414.03, Pipe and Structural Steel Pedestrian Hand Railings
Article 2414.06, Aluminum Pedestrian Hand Railings
Article 2423.02, Support Structures for Highway Signs, Luminaires, and Traffic Signals – General Requirements
Article 2425.03, Precast Prestressed Concrete Deck Panels – Design
Article 2522.02, Tower Lighting – Shop Drawings
Article 2523.02, Highway Lighting – Materials
Article 2524.02B, Highway Signing – Type B Signs
Article 2525.01B, Traffic Signalization – Equipment and Materials

Reason for Revision: Each of the above Specification Articles needs to be revised to specify the number of submittal copies required and the amount of review time to be provided to the Engineer for review and approval prior to ordering materials or fabrication. A decision needs to be made regarding the number of copies to be required and the specified review time. For simplification it may be beneficial to use the same number of submittal copies and amount of review time in applying to each of these Articles.

Another option may be to develop a Materials I.M. that addresses all of the above submittal types (ie: working drawings, shop drawings, etc.) and reference this I.M. in each of the Specification Article listed above in the Specification Book.

Note: This is not a Specification Revision request, but only a preliminary request for input from the Specification Committee on the most appropriate means to address this issue.

County or City Input Needed (X one)			**Yes**	**No**	
Comments:					
Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION SECTION USE ONLY

Specification Section Recommended Language:

Comments:

The following sections also reference shop drawings, working drawings, flasework plans, etc.

1101.03, Definitions
1105.03, Working Drawings
2406.02, Falsework and Forms
4186.10, B, Steel Breakaway Posts for Type B Signs

The potential changes suggested by this item cannot be incorporated into the October 2003 General Supplemental Specification due to the May 2003 meeting being the last meeting for approving such items for the October GS. The Specifications Engineer recommends the Specification Committee establish a task force to review all uses of working drawings and make a recommendation back to the Committee in time for inclusion with the April 2004 GS.

SPECIFICATION COMMITTEE ACTION

Final Approved Text:

Comments: The current specifications have varying requirements for shop drawing quantity, review times, submittal times, and where they are to be submitted.

The Specification Committee discussed where to send shop drawings. Even though the Resident Construction Engineer (RCE) doesn't need the shop drawings until they have been approved it was recommended that all shop drawing be submitted to the RCE for distribution for review.

It was decided that a team would be organized to review the shop drawing process. Representatives from the Office of Design, Bridges and Structures, Materials, Traffic and Safety; field Construction; and the Specifications Section should be included. The Specification Committee asked that the team review if the same number of shop drawings could be submitted in all instances and use the same time frames. Also asked that a list of the shop drawing turn-in requirements be placed in a central location in either the Construction Manual or Division 11 of the Standard Specifications.

Deferred: X	**Not Approved:**	**Approved Date:**	**Effective Date:**

2. Article 1108.01, Subletting of Contract

The Office of Contracts requests a change to Article 1108.01 that will allow contractors to subcontract up to 70% of a contract and will require all subcontract request forms on contracts over $600,000 to be submitted electronically.

Submitted by: Roger Bierbaum	**Office:** Contracts	**Item 2**
Submittal Date: April 1, 2003	**Proposed Effective Date:** October 2003	
Article No.: 1108.01 **Title:** Subletting of Contract	**SS No.:**	**Other:**

Change (Redline/Strikeout):

1. Modify the first paragraph of **1108.01 SUBLETTING OF CONTRACT** as follows:
"The Contractor's own organization shall perform work amounting to not less than ~~50%~~**30%** of the total contract cost. ~~Unless otherwise specified in the contract documents.~~ In order to meet this ~~50%~~**30%** requirement, the Contractor shall not purchase any materials for a subcontracted item nor shall they place other contractor's employees on their payroll".
2. In the last paragraph of **1108.01 SUBLETTING OF CONTRACT**, add the following sentence between the first and second sentence ➔ **"For contracts that exceed $600,000, the contractor shall submit the Subcontract Request and Approval electronically using the software furnished by the Department."**

Reason for Revision:

1. In the early 1980's the FHWA lowered the amount of work that the prime contractor had to complete with their own organization from 50% to 30%. The Iowa DOT however kept our requirement at 50%. The Speciation Committee in 1989 approved lowering the percentage on "selected" projects to 40%. In the mid-1990's the Specifications Committee lowered the percentage to 30% on selected projects.

The makeup of various work types in our current projects and the way we now package contracts makes it difficult on many projects for a single type of contractor to satisfy the 50% requirement. The effort to check projects to determine if the 30%-70% subcontract note, check contractors requesting to bid a project and then checking the Request for Subcontract adds additional work, but little benefit added. Therefore the request is to change the 50% to 30% on all contracts.

2. Designation of the proposed subcontractors within 48 hours of award of the contract is required by Iowa Code 307.49. The names of the subcontractors at award is also needed to allow the Iowa DOT to comply with the DBE regulations, Civil Rights requirements and allow the Department to provide the Sales Tax Exemption Certificates to the subcontractors. To facilitate the processing of the Request to Subcontract Form, we are requesting the contractors prepare this form electronically using AASHTO software similar to the software they used to prepare their bid. The same threshold (contracts greater than $600,000 will apply to the Subcontract Request and Approval Form that applies to the submission of bids.

County or City Input Needed (X one)	**Yes**	**No**
Comments:		

Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes**	**No** X	**Industry Concurrence:**	**Yes**	**No**

Comments:

1. We considered this change several years ago to the 50% requirement and contacted the AGC. The majority of the contractors favored the change because it would increase the number of projects they could bid on. However, at that time the Board of Directors has a couple of contractors who did multiple types of work and for personal reasons did not want to increase

competition for work they bid on. Therefore the AGC took no formal position on the change.

2. The software should make the processing of Request to Subcontract Form easier for the contractor. The importing of the electronic subcontract data will allow the Civil Rights poster letter and the Sales Tax Exemption Certificates to be issued with the signed contract to the contractor.

SPECIFICATION SECTION USE ONLY

Specification Section Recommended Language:

Replace the first and second sentence of the first paragraph.

The Contractor's own organization shall perform work amounting to not less than ~~50~~ 30% of the total contract cost ~~unless otherwise specified in the contract documents~~. In order to meet this ~~50~~ 30% requirement, the Contractor shall not purchase any materials for a subcontracted item nor shall they place other contractor's employees on their payroll.

Add as second sentence of last paragraph.

For contracts that exceed $600,000, the Contractor shall submit the Subcontract Request and Approval form electronically using the software furnished by the Department.

Comments:

SPECIFICATION COMMITTEE ACTION

Final Approved Text:

Add as second sentence to last paragraph.

For contracts that exceed $600,000, the Contractor shall submit the Subcontract Request and Approval form electronically using the software furnished by the Department.

Comments: In the early 1980's the FHWA approved changing to only 30% prime contractor work. At that time about half of the states changed to 30% and the rest, Iowa included stayed at 50%. It is believed that this change will be better for the majority of the Contractors, this should allow for better competition and better prices for the Department, allow different types of work on one contract, and it will be easier for the Department. After the meeting this topic was discussed with upper management.

Subsequent to the Specification Engineer requested feedback from the AGCI concerning the proposed revision to allowable percent to be subcontracted. The AGCI shared with the Department their overwhelming dissatisfaction with the proposed changes to the first paragraph of Article 1108.01. Thus the changes to the first paragraph of Article 1108.01 are being deferred.

The Specification Committee ask what should happen if a subcontractor is added or changed during the project and a new Subcontractor Request and Approval form is needed. The Office of Contracts stated that these forms should still be submitted electronically. It will be to the Contractor's advantage to submit the Subcontractor Request and Approval form all together at the beginning of the project so that there isn't a delay in the Sales Tax Exemption Certificate. The software that is being used for this process is the same software that the contractor's are using for bidding and is supplied by the Department.

Deferred: first paragraph	**Not Approved:**	**Approved Date:** 5-8-03 (last paragraph)	**Effective Date:** 10-21-03 (last paragraph)

3. Section 2105, Strip, Salvaging, and Spreading Topsoil
Article 2121.05, A, Preparation of Shoulder Area
Article 2122.04, Earth Shoulder Fill
Article 2525.01, B, 3, b, Excavation
Article 4170.09, A, Topsoil

The Office of Design requests several changes to Section 2105 and Articles 2121.05, 2122.04, 2525.01, and 4170.09 that will incorporate the use of compost into the specifications.

Submitted by: Mike Kennerly/Will Stein	**Office:** Design	**Item 3**
Submittal Date: 4/28/03	**Proposed Effective Date:** October 2003	
Article No.: 2105; 2121.05, A; 2122.04; 2525.01, B, 3, b; and 4170.09, A. **Title:** 2105 Stripping, Salvaging, and Spreading Topsoil 2121.05, A, Preparation of Shoulder Area. 2122.04, Earth Shoulder Fill. 2525.01, B, 3, b, Excavation. 4170.09, A, Topsoil	**SS No.:**	**Other:**

Change (Redline/Strikeout): ***For possible usage as a Special Provision and for the General Supplemental:***

2105 Stripping, Salvaging, and Spreading Topsoil,

Replace the title and entire article:

2105 Stripping, Salvaging, and Spreading Topsoil; and Compost Application.

2105.01 DESCRIPTION.
This item shall consist of removing topsoil from borrow pits, cuts, or areas to be covered by embankments, preparation of sod, and hauling, depositing, and spreading the topsoil on shoulders, slopes, excavated areas, borrow pits, and other designated areas, in accordance with the contract documents. This item may also include the usage of compost in lieu of topsoil.

2105.02 Materials

A. Topsoil
Article 4170.09, A, shall apply.

B. Compost
Article 4170.09, B, shall apply.

2105.03 Construction

A. Topsoil

~~2105.02~~ **1. PREPARATION OF SOD.**
All weeds, grass, and growing crops or other herbaceous vegetation shall be mowed close to the ground and burned or removed as directed by the Engineer. Sod shall be shredded by shallow plowing or blading and thorough disking. Shredding shall be sufficiently thorough to permit the soil to be easily spread in a thin layer over areas to be covered.

~~2105.03~~ **2. EXCAVATION OF TOPSOIL.**
After any existing sod has been prepared, the topsoil shall be removed to the depth specified. If not otherwise specified, the depth shall be 12 inches (0.3 m). The topsoil may

be moved directly to an area where it is to be used or may be stockpiled for future use.

~~2105.04~~ **3. PLACING TOPSOIL.**
The topsoil shall be spread uniformly over the area to be covered. The surface of the topsoil shall be smoothed and left in a finished condition so that it will drain properly.

B. Compost

1. Placing Compost.
Compost shall not be used in embankments, unless specified in the contract documents. The area where the compost is to be placed shall be disked to a depth of approximately 2 inches (50 mm). The compost shall be spread uniformly over the area to be covered. The surface of the compost shall be smoothed and left in a finished condition so that it will drain properly. The Contractor may use any of the following methods of installation:

a. Mechanical spreading
The compost shall be placed in accordance with Article 2105.03, A, 3.

b. Pneumatic spreading
The compost shall be blown using a pneumatic (air blower) system. The Contractor shall not operate equipment on any prepared areas.

2105.05 METHOD OF MEASUREMENT.

A. Topsoil
The number of cubic yards (cubic meters) of topsoil moved will be computed on the basis of a uniform 12 inch (0.3 m) cut, or the depth as specified in the contract documents, over the area involved. Sufficient field measurements will be taken to assure reasonable conformity with the required depth of cut. Topsoil salvaged from excavated areas and paid for as topsoil will not be included in excavation quantities for which payment is made.

B. Compost
The quantity of Compost, of the depth specified in acres (hectares) or cubic yards (cubic meters), measured to the nearest 0.1 acres (hectares), will be the quantity by area of the depth specified or the weight (mass) of individual loads of compost.

2105.06 BASIS OF PAYMENT.

A. Topsoil
For stripping, salvaging, and spreading topsoil, measured as specified above, the Contractor will be paid the contract unit price per cubic yard (cubic meter). This payment shall be full compensation for preparing, stripping, transporting, and placing the topsoil in accordance with the contract documents.

B. Compost
The Contractor will be paid the contract unit price for Compost per acres (hectares) or cubic yards (cubic meters) used measured as provided above. This payment shall be full compensation for furnishing, disking, applying, and shaping the compost.

Overhaul will not be paid for ~~this~~ these item**s**.

4170.09, A, Topsoil

Replace title and entire article:
A. ~~Topsoil~~ Backfill Material.

1. Topsoil.
Topsoil shall be high quality soil consisting of the top 6 inches (150 mm) of field or pasture loam containing a good supply of humus and a high degree of fertility. Surface soils from

ditch bottoms, drained ponds, and eroded areas, or soils which are supporting growth of noxious weeds or other undesirable vegetation will not be accepted. Topsoil shall have a pH value from 6.0 to 7.5. It shall be free from hard clods, rocks, and other debris larger than 2 inches (50 mm) in diameter.

2. Compost.
Compost shall be an organic substance produced by the biological and biochemical decomposition of source-separated compostable materials, separated at the point of waste generation, that may include, but are not limited to, leaf and yard trimmings, food scraps, food processing residues, manure and/or other agricultural residuals, forest residues and bark, and soiled and/or recyclable paper, and biosolids. Compost used in the production of compost-amended loam (CAL) shall contain no visible admixture of refuse or other physical contaminants nor any material toxic to plant growth. Compost shall meet the following additional specifications:

a. minimum organic matter shall be 30% (dry weight basis) as determined by loss on ignition;

b. moisture content shall be less than 60% and the product shall be loose and friable, not dusty;

c. particle size shall be 100% less than 1.0 inch (25 mm);

d. soluble salts shall be less than 5.0 mmhos/cm (dS/m);

e. stablility – stable and mature product;

f. pH shall be between 5.5 and 8.5.

For the General Supplemental only:

2121.05, A, Preparation of Shoulder Area.

Replace the third sentence of the first paragraph.
Material shall not be unsuitable soils of Article 2102.06, A, 3, compost, or topsoil.

2122.04, Earth Shoulder Fill.

Replace the fourth sentence of the first paragraph.
Material shall not be unsuitable soils of Article 2102.06, A, 3, compost, or topsoil.

2525.01, B, 3, b, Excavation.

Add second paragraph.
When restoring excavated area the Contractor may replace topsoil with compost.

Reason for Revision: Add in Compost Application					
County or City Input Needed (X one)			**Yes**	**No** X	
Comments:					
Industry Input Needed (X one)			**Yes**	**No** X	
Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION SECTION USE ONLY			
Specification Section Recommended Language: above.			
Comments: Roadside Development worked with the Specification Section in the development of these changes.			
SPECIFICATION COMMITTEE ACTION			
Final Approved Text:			
Comments: Roadside Development in the Office of Design has just completed a research project with Iowa State University on the affects of compost on erosion, water quality, and vegetation establishment. The results were good in all the cases. There are some benefits to using compost instead of topsoil since compost does not contain wheat seeds and is less expensive. These changes will allow the Contractor to supply compost in place of topsoil. Several producers of compost throughout the state have been approved as suppliers.			
Deferred: X	**Not Approved:**	**Approved Date:**	**Effective Date:**
Deferred for movement to Division 26 and measurement calculated on a nominal depth.			

4. Section 2511, Removal and Construction of Portland Cement Concrete Sidewalks

The Specification Section requests numerous changes to Section 2511 that updates the specification and incorporates recreational trail specifications.

Submitted by: Donna Buchwald	**Office:** Specifications	**Item 4**
Submittal Date: April 18, 2003	**Proposed Effective Date:** October 21, 2003	
Article No.: 2511 **Title:** Removal and Construction of Portland Cement Concrete Sidewalks	**SS No.:**	**Other:**

Change (Redline/Strikeout):

Replace **the title and entire article.**

Section 2511. Removal and Construction of Recreational Trails and Sidewalks

2511.01 DESCRIPTION.
This work shall consist of removal of recreational trails and sidewalks or portions of them and/or the construction of new recreational trails and sidewalks according to the contract documents.

2511.02 MATERIALS.

A. Portland Cement Concrete.
The Portland cement concrete used for recreational trails and sidewalks shall be Class B concrete produced and placed in accordance with Section 2301. For sidewalk and recreational trail construction included in PCC paving projects, the Contractor may use the approved paving mixture for the project. A Class 2 durability or better aggregate, in accordance with Article 4115.04, A, will be required.

When construction of a recreational trail or sidewalk is associated with a bridge structure the concrete used shall be Class C or better. The Contractor may use the concrete approved for the bridge structure with Class C as the minimum.

B. Hot Mix Asphalt.
The HMA used for recreational trails and sidewalks not adjacent to pavement shall be 100,000 ESAL, 3/8 inch (9.5 mm) in accordance with Section 2303. When the recreational trail or sidewalk is adjacent to the pavement and also functions as the pavement shoulder, 1,000,000 ESAL, 1/2 inch (12.5 mm) base mixture shall be used. The Performance Grade binder shall be PG 58-28.

C. Subbase and Granular Surface.
The subbase and granular surface shall be as specified in the contract documents.

2511.03 CONSTRUCTION.

A. Removal of Recreational Trails and Sidewalks.
The Contractor shall remove the recreational trails and sidewalks as shown in the contract documents. If only portions of the recreational trails or sidewalks are to be removed, the boundaries of removal shall be made by a vertical saw cut not less than 1 inch (25 mm) deep before breaking the removal. Any areas of the recreational trail or sidewalk not designated for removal but which are removed, broken, or damaged by the Contractor's operations shall be removed and replaced by the Contractor with no additional cost to the Contracting Authority. Removal of recreational trails and sidewalks shall be in accordance with Article 2510.02.

B. Preparation of Subgrade.

1. Sidewalks.

The subgrade for sidewalks shall be prepared by excavating or filling with suitable earth to a depth below the finished grade line so that, when tamped or rolled until smooth, firm, and hard, the subgrade will be uniform and at the required depth below the finished grade line.

2. Recreational Trails.
When the recreational trail is to be constructed on natural subgrade special compaction of subgrade for the recreational trail will be required. The Contractor shall disk, scarify, mix, and recompact the top 12 inches (300 mm) of subgrade with moisture and density control. Compact to not less than 95% maximum density as determined by Iowa DOT Materials Laboratory Test Method 103; moisture content not less than optimum or more than 4% above optimum moisture content.

When the recreational trail surface is to be constructed on an existing granular surface, the subbase (existing granular surface) shall be prepared in accordance with the contract documents.

C. Portland Cement Concrete.

1. Placing.

a. Hand Finished Recreational Trails and Sidewalks.
Forms of wood or steel shall be in accordance with Article 2301.07, A, 1, b.

The subgrade shall be thoroughly moistened. Concrete shall be deposited for the full depth of slab in one operation. It shall be consolidated by tamping or vibration, and the excess concrete screeded off flush with the forms. Edges adjacent to all forms, expansion joints, curbs, or fixtures in the surface shall be thoroughly consolidated.

b. Slip Form Recreational Trails and Sidewalks.
Self propelled slip form pavers shall meet the requirements of Section 2301. Other slip form paving machine shall be approved by the Engineer and designed for the specific purpose of placing, consolidating, and finishing concrete recreational trails and sidewalk slabs without use of fixed side forms.

2. Finishing.
After consolidation, the concrete surface shall be finished to a uniform, slip resistant, wet burlap drag or broom finish texture true to the line and grade specified in the contract documents. The broom finish shall be obtained by dragging a suitable broom transversely across the surface of the plastic concrete.

a. Sidewalks.
After the surface has been floated, the edges of the slabs shall be finished with a suitable edging tool.

For PCC sidewalks the transverse joints shall be equal to the pavement width. The concrete shall be cut through for not less than 25% of the depth with a pointed trowel or suitable spading tool, and the concrete edged on both sides. In lieu of using a pointed trowel or suitable spading tool, the Contractor may cut these lines within 12 hours after placement of concrete with a 1/8 inch (3 mm) blade saw that is approved by the Engineer. Metal dividers will be considered for approval, in lieu of cutting.

b. Recreational Trails.
For PCC recreational trails the transverse joints shall be equal to the pavement width. All transverse joints shall be saw cut not tooled. The transverse joints shall be cut 1/8 inch (3 mm) wide and not less than 1 inch (25 mm) in depth. No sealant will be required.

Recreational trails 12 feet (2.6 m) wide or less, shall not have a longitudinal joint.

3. Protection and Curing.

After finishing, the concrete shall be cured and protected by one of the methods described in Article 2301.19.

4. Isolation Joints.
Isolation joints shall be constructed at all points where recreational trails or sidewalks meet other walks, curbs, or fixtures in the surface. These joints shall be constructed by installing a 1/2 inch (13 mm), full depth strip of approved premolded joint material.

5. Time for Opening Pavement for Use.
PCC recreational trails and sidewalks shall be opened a minimum of 7 days after placement or when flexural strength reaches 400 psi (2.75 MPa) as determined by Materials I.M. 383.

D. Hot Mix Asphalt.
HMA recreational trails and sidewalks shall be constructed in accordance with Article 2303.03 and 2303.04. Compaction shall be Class 1C.

E. Smoothness.
Sidewalk and recreational trail smoothness shall be in accordance with Article 2301.16, D, of the Standard Specifications, except for the requirements for pavement and bridge approach sections for Primary projects.

All areas will be checked with a surface checker by the Engineer and shall not exceed 1/4 inch in 10 feet (6 mm in 3 m). For each bump exceeding these requirements, the Contractor shall be assessed $50 or the bump corrected as agreed upon by the Engineer and Contractor.

F. Weight Limits.
Construction equipment on both PCC and HMA recreational trails and sidewalks shall be limited to 5 ton (5 Mg).

G. Pavement Markings.
Pavement markings shall be placed in accordance with Section 2527.

2511.04 METHOD OF MEASUREMENT.

A. Removal of Recreational Trails or Sidewalks.
The quantity of recreational trail or sidewalk removed, in square yards (square meters), will be the quantity shown in the contract documents.

B. Construction of Recreational Trails or Sidewalks.
The quantity of recreational trail or sidewalk constructed of the material type and depth specified, in square yards (square meters), will be the quantity shown in the contract documents. Deductions will not be made for fixtures having an area of 1 square yard (1 m^2) or less.

C. Special Compaction of Subgrade for Recreational Trail.
The quantity of special compaction of subgrade for recreational trail, in stations (meters), will be the quantity shown in the contract documents.

2511.05 BASIS OF PAYMENT.

A. Removal of Recreational Trails or Sidewalk.
The Contractor will be paid the contract unit price for removal of recreational trail or sidewalk per square yards (square meters). This payment shall be full compensation for all equipment, tools, labor, and disposal for removal of the recreational trail or sidewalk as specified in the contract documents.

B. Construction of Recreational Trails or Sidewalks.
The Contractor will be paid the contract unit price for construction of recreational trail or sidewalk, of the material type and thickness specified, per square yard (square meter). This payment shall be full compensation for furnishing all material, equipment, tools, and labor to construct the

recreational trail or sidewalk in accordance with the contract documents.

C. Special Compaction of Subgrade for Recreational Trail.
The Contractor will be paid the contract unit price for special Compaction of subgrade for recreational trail, per station (meter). This payment shall be full compensation for furnishing all material, equipment, tools, and labor to construct the special compaction of subgrade for recreational trail in accordance with the contract documents.

Reason For Revision: A group was organized to add requirements to the specifications for recreational trails. It was determined that the information for recreational trails should be added to the article on sidewalks. The current specifications for sidewalks are outdated with current practices. The entire article needed revised, added to, and changed to the 5-part format.

The revised text was used on several projects over the last year in the form of a Special Provision. A survey was distributed to all contracting authorities and contractors on those projects. Most comments were positive with very few comments for changes. The results were reviewed by the group and addressed appropriately.

Members of the group included representatives from the Office of Materials, Office of Construction, District Construction, consulting firms versed in recreational trail design, ICPA, the Urban Standards, and the Specifications Section. Both PCC and HMA were represented and several members were also bike riders.

County or City Input Needed (X one)	**Yes** X	**No**
Comments: Comments were made on the survey.		

Industry Input Needed (X one)			**Yes** X		**No**
Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION SECTION USE ONLY

Specification Section Recommended Language: see above specification language.

Comments:

SPECIFICATION COMMITTEE ACTION

Final Approved Text:

Replace the title and entire article.

Section 2511. Removal and Construction of ~~Portland Cement Concrete~~ Sidewalks and Recreational Trails

2511.01 DESCRIPTION.
This work shall consist of removal of sidewalks and recreational trails or portions of them and/or the construction of new sidewalks and recreational trails according to the contract documents.

2511.02 MATERIALS.

A. Portland Cement Concrete.
The Portland cement concrete used for sidewalks and recreational trails shall be Class B concrete produced and placed in accordance with Section 2301. For sidewalk and recreational trail construction included in PCC paving projects, the Contractor may use the approved paving mixture for the project. A Class 2 durability or better aggregate, in accordance with Article 4115.04, A, will be required.

When construction of a sidewalk or recreational trail is associated with a bridge project the Contractor may use the concrete approved for the bridge structure with Class C as the minimum.

B. Hot Mix Asphalt.
The HMA used for sidewalks and recreational trails not adjacent to pavement shall be 100,000 ESAL, 3/8 inch (9.5 mm) in accordance with Section 2303. When the recreational trail or sidewalk is adjacent to the pavement and also functions as the pavement shoulder, 1,000,000 ESAL, 1/2 inch (12.5 mm) base mixture shall be used. The Performance Grade binder shall be PG 58-28 or PG 52-34 as specified in the plans.

C. Subbase and Granular Surface.
The subbase and granular surface shall be as specified in the contract documents.

2511.03 CONSTRUCTION.

A. Removal of Sidewalks and Recreational Trails.
The Contractor shall remove the sidewalks and recreational trails as shown in the contract documents. If only portions of the sidewalks or recreational trails are to be removed, the boundaries of removal shall be made by a vertical saw cut not less than 1 inch (25 mm) deep before breaking the removal. Any areas of the sidewalk or recreational trail not designated for removal but which are removed, broken, or damaged by the Contractor's operations shall be removed and replaced by the Contractor with no additional cost to the Contracting Authority. Removal of sidewalks and recreational trails shall be in accordance with Article 2510.02.

B. Preparation of Subgrade.

1. Sidewalks.
The subgrade for sidewalks shall be prepared by excavating or filling with suitable earth to a depth below the finished grade line so that, when tamped or rolled until smooth, firm, and hard, the subgrade will be uniform and at the required depth below the finished grade line.

2. Recreational Trails.
When the recreational trail is to be constructed on natural subgrade special compaction of subgrade for the recreational trail will be required. The Contractor shall disk, scarify, mix, and recompact the top 12 inches (300 mm) of subgrade with moisture and density control. Compact to not less than 95% maximum density as determined by Iowa DOT Materials Laboratory Test Method 103; moisture content not less than optimum or more than 4% above optimum moisture content.

When the recreational trail surface is to be constructed on an existing granular surface, the subbase (existing granular surface) shall be prepared in accordance with the contract documents.

C. Portland Cement Concrete.

1. Placing.

a. Hand Finished Sidewalks and Recreational Trails.
Forms of wood or steel shall be in accordance with Article 2301.07, A, 1, b.

The subgrade shall be thoroughly moistened. Concrete shall be deposited for the full depth of slab in one operation. It shall be consolidated by tamping or vibration, and the excess concrete screeded off flush with the forms. Edges adjacent to all forms, expansion joints, curbs, or fixtures in the surface shall be thoroughly consolidated.

b. Slip Form Sidewalks and Recreational Trails.
Self propelled slip form pavers shall meet the requirements of Section 2301. Other slip form paving machine shall be approved by the Engineer and designed for the specific purpose of placing, consolidating, and finishing concrete sidewalk and recreational trail

slabs without use of fixed side forms.

2. Finishing.
After consolidation, the concrete surface shall be finished to a uniform, slip resistant, wet burlap drag or broom finish texture true to the line and grade specified in the contract documents. The broom finish shall be obtained by dragging a suitable broom transversely across the surface of the plastic concrete.

a. Sidewalks.
After the surface has been floated, the edges of the slabs shall be finished with a suitable edging tool. Unless otherwise shown, the finished surface shall have a cross slope of 1/4 inch per foot (20 mm/m) for drainage.

For PCC sidewalks the transverse joint spacing shall be equal to the pavement width. The concrete shall be cut through for not less than 25% of the depth with a pointed trowel or suitable spading tool, and the concrete edged on both sides. In lieu of using a pointed trowel or suitable spading tool, the Contractor may cut these lines within 12 hours after placement of concrete with a 1/8 inch (3 mm) blade saw that is approved by the Engineer. Metal dividers will be considered for approval, in lieu of cutting.

b. Recreational Trails.
For PCC recreational trails the transverse joints spacing shall be equal to the pavement width. All transverse joints shall be saw cut not tooled. The transverse joints shall be cut 1/8 inch (3 mm) wide and not less than 1 inch (25 mm) in depth. No sealant will be required.

Recreational trails 12 feet (2.6 m) wide or less, shall not have a longitudinal joint.

3. Protection and Curing.
After finishing, the concrete shall be cured and protected by one of the methods described in Article 2301.19.

4. Isolation Joints.
Isolation joints shall be constructed at all points where sidewalks or recreational trails meet other walks, curbs, or fixtures in the surface. These joints shall be constructed by installing a 1/2 inch (13 mm), full depth strip of approved premolded joint material.

5. Time for Opening Pavement for Use.
PCC sidewalks and recreational trails shall be opened a minimum of 7 days after placement or when flexural strength reaches 400 psi (2.75 MPa) as determined by Materials I.M. 383.

D. Hot Mix Asphalt.
HMA sidewalks and recreational trails shall be constructed in accordance with Article 2303.03 and 2303.04. Compaction shall be Class 1C.

E. Smoothness.
Sidewalk and recreational trail smoothness shall be in accordance with Article 2301.16, D, except for the requirements for pavement and bridge approach sections for Primary projects.

Areas may be checked by the Engineer with a surface checker and shall not exceed 1/4 inch in 10 feet (6 mm in 3 m). For each bump exceeding these requirements, the Contractor will be assessed $50 or the bump corrected as agreed upon by the Engineer and Contractor.

F. Weight Limits.
Construction equipment on both PCC and HMA sidewalks and recreational trails shall be limited to 5 ton (5 Mg).

G. Pavement Markings.
Pavement markings shall be placed in accordance with Section 2527.

2511.04 METHOD OF MEASUREMENT.

A. Removal of Sidewalks or Recreational Trails.
The quantity of sidewalk or recreational trail removed, in square yards (square meters), will be the quantity shown in the contract documents.

B. Construction of Sidewalks or Recreational Trails.
The quantity of sidewalk or recreational trail constructed of the material type and depth specified, in square yards (square meters), will be the quantity shown in the contract documents. Deductions will not be made for fixtures having an area of 1 square yard (1 m^2) or less.

C. Special Compaction of Subgrade for Recreational Trail.
The quantity of special compaction of subgrade for recreational trail, in stations (meters), will be the quantity shown in the contract documents.

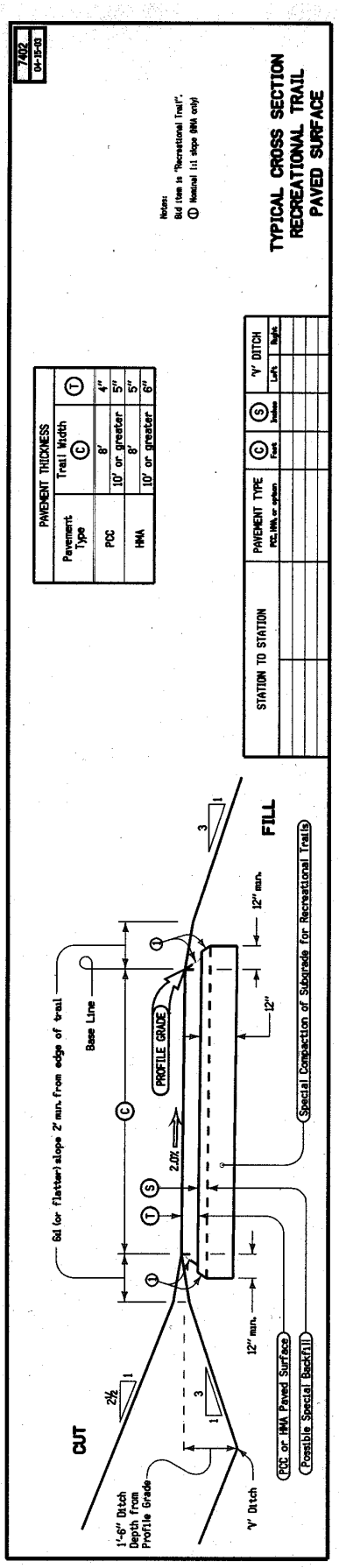
2511.05 BASIS OF PAYMENT.

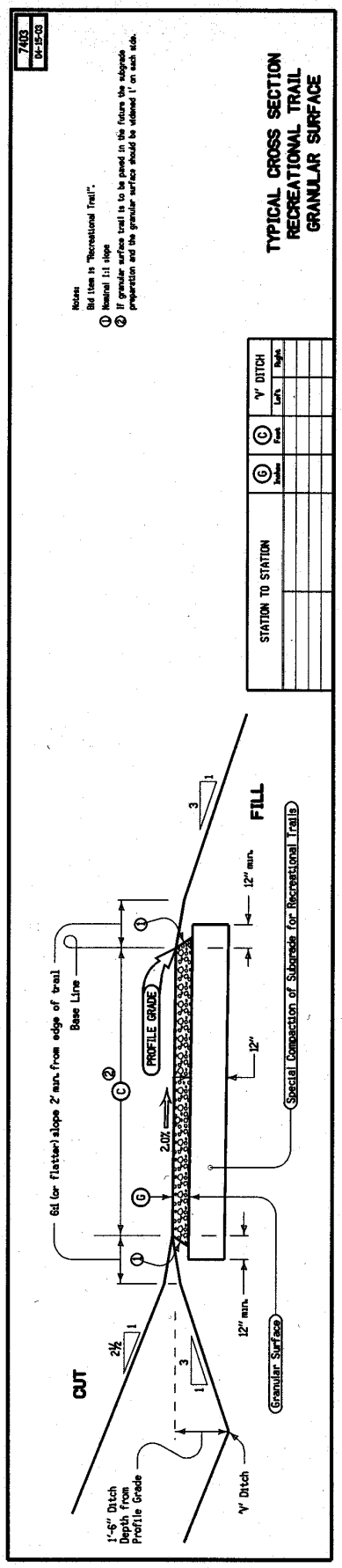
A. Removal of Sidewalks or Recreational Trails.
The Contractor will be paid the contract unit price for removal of sidewalk or recreational trail per square yards (square meters). This payment shall be full compensation for all equipment, labor, and disposal for removal of the sidewalk or recreational trail as specified in the contract documents.

B. Construction of Sidewalks or Recreational Trails.
The Contractor will be paid the contract unit price for construction of sidewalk or recreational trail, of the material type and thickness specified, per square yard (square meter). This payment shall be full compensation for furnishing all material, equipment, and labor to construct the sidewalk or recreational trail in accordance with the contract documents.

C. Special Compaction of Subgrade for Recreational Trail.
The Contractor will be paid the contract unit price for Special Compaction of Subgrade for Recreational Trail, per station (meter). This payment shall be full compensation for furnishing all material, equipment, and labor to construct the special compaction of subgrade for recreational trail in accordance with the contract documents.

Comments:			
Deferred:	**Not Approved:**	**Approved Date:** 5-8-03	**Effective Date:** 10-21-03


7402
04-15-03
TYPICAL CROSS SECTION
RECREATIONAL TRAIL
PAVED SURFACE
Notes:
Bid item is "Recreational Trail".
① Nominal 1:1 slope (HMA only)
PAVEMENT THICKNESS
Pavement Type
Trail Width ©
①
PCC
8' 4"
10' or greater 5"
HMA
8' 5"
10' or greater 6"
STATION TO STATION
PAVEMENT TYPE PCC, HMA or option
© Feet
Ⓢ Inches
"V" DITCH Left
"V" DITCH Right
6d (or flatter) slope 2' min. from edge of trail
Base Line
PROFILE GRADE
2.0%
CUT
FILL
2½
1
3
12" min.
12"
Special Compaction of Subgrade for Recreational Trails
1'-6" Ditch Depth from Profile Grade
"V" Ditch
PCC or HMA Paved Surface
Possible Special Backfill


7409
04-15-03
TYPICAL CROSS SECTION
RECREATIONAL TRAIL
GRANULAR SURFACE
Notes
Bid item is "Recreational Trail".
① Nominal 1:1 slope
② If granular surface trail is to be paved in the future the subgrade preparation and the granular surface should be widened 1' on each side.
STATION TO STATION
G
C
'V' DITCH
Left
Right
6d (or flatter) slope 2' min. from edge of trail
Base Line
PROFILE GRADE
2.0%
CUT
FILL
2½
1
3
1
3
1
12" min.
12"
12" min.
Special Compaction of Subgrade for Recreational Trails
Granular Surface
1'-6" Ditch Depth from Profile Grade
'V' Ditch

5. Section 2526, Construction Survey

The Office of Construction requests several changes to Section 2526 that are intended to update the construction survey specifications including a major revision that modifies the method of placing project control points.

Submitted by: John Smythe	**Office:** Construction	**Item 5**
Submittal Date: May 8, 2003	**Proposed Effective Date:** October 2003	
Article No.: 2526 **Title:** Construction Survey	**SS No.:**	**Other:**

Change (Redline/Strikeout):

Revision #1

April 21, 2003

2526.01 DESCRIPTION.
This work involves survey for construction projects. The Contractor shall furnish ~~the~~ all survey necessary for construction of the project as intended by the contract documents and approved revisions. The provisions of Article 1105.06 do not apply to this work, except that the original stakes set by the Engineer shall be preserved. If, in the opinion of the Engineer, any of the original survey stakes or marks have been carelessly or willfully destroyed or disturbed by the Contractor, the cost of replacing shall be charged to the Contractor. Construction survey shall include qualified personnel, equipment, and supplies required for, but not limited to, the following items:

A. Grading.

1. Set Right-of-way line stakes between ~~break points~~ permanent Right-Of-Way corners at 100 foot (~~approximately 25~~20 m) intervals, ~~(~~or less if needed~~)~~, including borrows, temporary easements, and right of entry. These points shall be ~~marked by placement of a wood hub and~~ identified ~~with~~ by placing a wood hub, a ~~"~~flat~~"~~, and lath ~~adjacent to the hub~~. The flat shall be clearly marked with the station ~~number~~location, ~~and~~ distance from centerline, and elevation (cut or fill) to the subgrade. This work shall be accomplished ~~within the first 20 working days~~ before work begins in the area. These should be set at the same location as the slope stakes.

2. Set S~~s~~lope stakes at 100 foot (~~25~~ 20 m) intervals, or less if needed, for all embankment and excavation work including roadway, channel changes, and borrow areas. Interpolations may be necessary to match the cross-sections. Slope stakes shall be set at the toe of the foreslope, and/or the top of the backslope. Slope stakes shall be marked with a flat and lath. The flat shall be clearly marked with the station location, distance, slope, and cut or fill information.

3. Set G~~g~~rade check~~s~~ stakes ~~1 every~~ at 100 feet (20 m) intervals for the bottoms of subgrade treatments. Grade check stakes shall be set on centerline for two-lane roads and in the median for four-lane roads. Grade check stakes shall be marked with a lath. The lath shall be clearly marked with the station location and cut or fill information.

4. Set F~~f~~inish grade stakes (blue tops) at 100 foot (20 m) intervals or less if needed. The blue tops shall be set at each shoulder line and each point where there is a change in cross slope. ~~In superelevated curves, also place a line of finish grade stakes at 100 foot (20 m) intervals on the upper side of the curve at the edge of the proposed pavement.~~ Blue tops shall be marked with a wood hub and a stake chaser or similar type tassel.

~~**5.** Cut or fill stakes to center line or shoulder line elevation at right-of-way line or an identified base line at 100 foot (25 m) intervals or less.~~

6~~5~~. Determine ~~T~~ake original and final ~~cross sections~~ elevations of all borrows~~and side borrows, to be calculated by the Engineer~~. Provide original and final graphical cross sections at 100 foot (20m) intervals, or less if needed, suitable for use by the engineer to calculate excavation quantities

~~**7.** Reference and preserve plan control points at:~~

~~Point of Curve (PC)~~
~~Point of Tangent (PT)~~
~~Point of Intersection (PI)~~
~~Point on Tangent (POT)~~

~~Both distance and angle or alternate method will be approved by the Engineer.~~

~~8. After grading is complete, reset all control points, as designated by the Engineer.~~

~~9~~6. Set bridge berm~~intermediate~~ slope stakes ~~at bridge abutments~~ to establish all transitions including the face of the berm. ~~Also place finish grade stakes on the centerline of abutment bearing and at the toe of slope of all bridge berms. Also p~~Place finish grade stakes (blue tops) on ~~each~~ all roadway shoulder lines and roadway centerlines projected down the face ~~side~~ of bridge berms at the following ~~points~~locations:

Top of Bridge Berm
Mid-point of Slope of Bridge Berm face
Toe of Bridge Berm face

~~10~~7. ~~Where~~ When Class 12 excavation is an item, ~~cross section~~ elevations shall be taken at top and bottom of rock. Graphical cross sections shall be provided at 100 foot (20m) intervals, or less if needed, suitable for use by the Engineer~~'s~~ to calculate excavation quantities ~~computations~~.

~~11~~8. Locate all ~~A~~agricultural drain tile shown in the contract documents on each side of the roadway at the Right-Of Way line. ~~will be located on each side of roadway center line with station, offset , and flow line.~~ Locations shall be marked with a lath. The lath shall be clearly marked to show station location, distance from centerline, tile size & type, and flow line elevation.

B. Pipe Culverts.

1. Locate the ~~C~~centerlines of all pipe ~~(roadway and culvert).~~

2. Locate each end of the pipe or apron and all elbows.~~Both ends.~~

3. Set ~~F~~flow line elevations at inlet, outlet, and all change in slope ~~breaks~~.

4. Locations shall be marked with a wood hub (tacked), flat, and lath. The flat shall be clearly marked with the station location of the pipe, cut or fill elevation, and offset distance to the end of pipe, apron, or centerline of pipe.

5. Questionable flow lines and alignments that do not match existing drainage shall be reported to the engineer.

C. Reinforced Concrete Box Culverts.

1. Locate the ~~C~~centerlines of all culverts ~~(roadway and culvert)~~.

2. Locate the ~~B~~back of parapets.

3. ~~Skew.~~Locate all changes in the horizontal alignment of culverts

4. Set ~~F~~flow line elevations at inlet, outlet, and all change in slope ~~breaks~~.

5. Perform ~~A~~an independent check of the above stakes.

6. Locations shall be marked with a wood hub (tacked), flat, and lath. The flat shall be clearly marked with the station location and design number of the culvert, cut or fill information, and offset distance from the centerline of the culvert and back of parapet.

7. A copy of the staking diagram shall be provided to the engineer before work begins.

8. Questionable flow lines and alignments that do not match existing drainage shall be reported to the engineer.

~~(For both B and C above, a check for flow line and alignment shall be made and reported to the Engineer, if questionable.)~~

D. Bridges.

1. Locate ~~C~~centerline of roadway ~~or bridge~~.

2. Locate ~~C~~centerline of all piers.

3. Locate ~~C~~centerline ~~or face~~ of each abutment.

4. Set a minimum of three temporary benchmark ~~E~~elevation references. One shall be set "low" for use during footing construction and two shall be set "high" for use during pier and deck construction.

5. Establish the ~~L~~location of any test pile.

6. Perform an ~~i~~independent check of the above stakes.

7. Determine the ~~E~~elevations of all beams as erected. Provide finish deck ~~the~~ elevations to the Engineer for review prior to forming the deck. ~~computation of finish elevations. Locations for determining beam elevations shall be in accordance with the contract documents.~~

8. Locations shall be marked with a metal pin, flat, and lath. The flat shall be clearly marked with the pier/abutment station location, design number, and offset distance to the centerline.

9. A copy of the staking diagram shall be provided to the engineer before work begins.

E. Pavements (PCC & HMA).

1. Set ~~E~~elevations on both sides of the pavement at 50 foot (10 m) intervals on straight and level sections and at 25 foot (10 m) intervals on horizontal and vertical curves.

2. Locate the ~~A~~alignment ~~(tack line)~~ on one side by placing a tack in the wood hub. A tack line is not necessary if metal pins are used.

~~**3. Reference, preserve, and re-establish control points mentioned in Paragraphs A, 7 and A, 8 of this specification.**~~

43. At fixed elevations (bridges and existing pavements), elevations at centerline and both pavement edges at 10-foot (3 m) intervals for 100 foot (30 m) shall be submitted to the Engineer to establish final elevations to be set by the surveyor.

54. For PCC overlays, ~~and~~ PCC and HMA inlays, PCC and HMA pavement replacements when existing shoulders are left in place, and similar projects that do not have a new design profile grade, ~~in addition to the above requirements,~~ the surveyor shall:

a. Obtain elevations of the existing shoulders and/or pavement as stated in Article 2526.01, E, 1.

b. ~~Design~~ Develop a ~~smooth~~ new profile grade line based on these elevations to provide the required pavement or shoulder thickness as detailed in the contract documents. This grade line shall tie into existing bridges, adjacent pavement and ramps, and provide the required pavement crown. This proposed grade line shall be submitted to the Engineer for approval.

5. Locations shall be marked with a wood hub (tacked) or a metal pin, flat, and lath (if desired). The flat shall be clearly marked with the station location, cut or fill information, and offset distance to the edge of the pavement. Pavement cross slope information shall be included in superelevated curves.

F. Sanitary and Storm Sewers.

1. Locate ~~C~~centerline of pipe.

2. Set ~~F~~flow line elevation.

3. Locations shall be marked with a wood hub or steel pin, flat, and lath. The flat shall be clearly marked with the pipe number, station location, cut or fill information, and offset information to the centerline of the pipe.

G. Intakes and Utility Access.

1. Locate~~ion~~ all intakes and utility access structures.

2. Set the ~~E~~elevation for the bottom of well and form grade ~~of top and base~~.

3. Locate the ~~B~~back of curb.

4. Locations shall be marked with a wood hub (tacked), flat, and lath. The flat shall be clearly marked with the intake or utility access number, station location, cut or fill information, and offset distance.

H. Pavement Overlays (PCC & ACC)

1. Reference and preserve existing control points located at each Point of Intersection (P.I.)
2. Method used to reference points shall be approved by the engineer
3. Control Points shall be reset after the work is complete.

I. Project Control – Project control points shall be established during the grading project and

preserved during subsequent projects.

1. Secondary permanent horizontal control monuments shall be planted along the project corridor at intervals not to exceed 2640' **and** provide for visible clear line of sight to the nearest secondary permanent control monument in either direction. The Engineer will provide monuments, similar to those used for GPS control by the Iowa DOT Office of Design. Monuments shall be placed as directed by the engineer at higher elevations along the corridor to provide a view of the immediate project topography and at locations likely to survive project construction. Primary project monuments may be substituted if appropriate. The monument shall by planted 1" to 4" (25mm to 100mm) below existing ground. A metal fence post shall be driven within one foot (0.3m) to mark its location. Project coordinates shall be carefully determined relative to the nearest primary project control monument using project coordinate values provided by the Iowa DOT Office of Design. The resulting error radius of the secondary monument shall not exceed 0.10 feet (30mm) + or - 2 ppm relative to the primary control. Unedited printed and/or electronic formatted field data of the field survey shall be provided to the Engineer along with an ASCII comma delineated file of the coordinates formatted as (Point #, Northing, Easting, -9999999, Point Description, Feature).
2. An independent traverse check between the secondary control monuments shall be performed by observing distance and angular measurements or by use of GPS. An unedited printed and/or electronic file of the field data for the traverse check shall be provided to the Engineer. A diagram shall be provided to the Engineer indicating horizontal ground distances to the hundredth of a foot (3mm) and angles to at least the nearest 10" between each secondary control monument. Inverses between the coordinate pairs of monuments used in this traverse as determined in Section 2526.01(I). 1 shall not exceed 0.10 feet (30mm) of the direct measurements.

   Secondary control monuments that are carelessly or willfully disturbed during construction activities will be replaced using procedures outlined above at the Contractor's expense.
3. Each control monument shall be referenced to at least three durable physical objects {for example trees, poles, fence posts, station marks in new roadway pavement, or set metal fence posts, all between 20 to 100 feet (6 to 30m) away from the monument} with measurements to the nearest 0.10 foot (30mm). A printed and/or electronic reference image (for example .JPG,. TIFF, etc) shall be provided to the Engineer to be included on the as built construction plan including each reference and project coordinates.
4. Permanent vertical control benchmarks shall be established at all structure sites (bridges and RCB culverts) within the project. The following list in order of preference will be used as a guide to determine placement of benchmarks:
   - °I.D.O.T brass plug on bridge barrier rail or headwall of RCB culvert
   - °Sawn (X) on bridge barrier rail or headwall of RCB culvert

   All benchmark elevations shall be transferred from construction plan benchmarks to the permanent benchmarks using the three-wire method or by trigonometric leveling. Temporary benchmarks of reasonable stability shall be used to preserve the plan benchmarks in the vicinity of all new or modified structures in case the plan benchmarks will be obliterated during the project. All unedited printed and/or electronic formatted field benchmark elevation data will be furnished to the Engineer. The x, y, project coordinates of all benchmarks shall be provided to the Engineer. An ASCII comma delineated file of the coordinates formatted as (Point #, Northing, Easting, Elevation, Point Description, Feature). Benchmark level loops shall not exceed an error of 0.05 feet X the square root of the loop's length (in Miles) and the error shall be distributed equally along the loop on all intermediate

traverse/benchmark points.

Office Relocations (O.R.) identified in the contract documents shall be staked from the original survey by the Contractor, including the control points as stated in Article 2526.01 A, 7. Survey work documentation shall be in a format acceptable to the Contracting Authority. Survey work shall be done with a Professional Engineer licensed in the State of Iowa or a Professional Land Surveyor licensed in the State of Iowa in responsible charge, in accordance with provisions of Chapter 542 B, Code of Iowa. The Contractor shall submit a resume identifying the field survey personnel and their capabilities to perform the intended requirements upon request.

The method of determining alignments and elevations and the method of preserving control points shall be subject to review and approval by the Engineer. This approval shall not act to relieve the Contractor of the responsibility for the correctness of the survey work. Plan cross-sections shall not be used for vertical or horizontal control.

The Engineer will provide benchmark elevations, right-of-way ~~break points~~ corners, ~~center line control points (PC's, PT's, necessary PI's, and POT's on the original survey line, adequate for a line of vision),~~ and control ~~reference~~ points on the original survey as shown in the contract documents for the Contractor's use. A Geopak alignment will be provided, if available. ~~In the event the coordinate system is used, the control point or points and the x axis or the y axis will be set from which the surveyor will do the survey work.~~

Tie-ins with existing roadways shall be checked for correctness of alignment prior to construction staking. Design errors discovered in this checking shall be brought to the Engineer's attention for review prior to staking.

When survey work is done under traffic, detail sheets in the contract documents will establish the required signing.

The Engineer will compute finish elevations (using Contractor provided beam elevations) and furnish them to the Contractor for deck construction, locate and take elevations of settlement plates, and re-establish land corners and permanent reference marker.

All survey work documentation is to become property of the Contracting Authority. The work of this specification will be considered finished when the documentation is furnished to and accepted by the Engineer.

For the purpose of subcontracting, this item will be considered a specialty item.

2526.02 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.

Construction survey will be measured and paid for at the lump sum contract price. This payment shall be full compensation for the survey work required for the project as let, including any interpolations that may be necessary between cross-section and field staking. Revisions after the letting will be paid for as extra work as described in Article 1109.03, B. The Engineer may make partial payments, in accordance with Article 1109.05, based on the estimate of the survey work completed. Final payment will be made at the time the survey books are submitted to the Engineer

Reason for Revision: Change method of project control points and various clarifications.					
County or City Input Needed (X one)			**Yes**	**No**	
Comments: This revision will effect Cities & Counties when they include a bid item for Construction Survey.					
Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes**	**No** X	**Industry Concurrence:**	**Yes**	**No** X
Comments: This revision will clarify several sections of Article 2526. Minor changes are intended to help Contractors and Consultants during the bidding process and help Resident Construction Offices administer the contract. A major change is proposed to change the method of placing project control points. The current specification includes a general note about centerline control in the grading section. There are no specifics on the spacing or accuracy of these points. This proposal includes spacing, accuracy, and location requirements. Placing the project control points along the ROW will be safer, take advantage of electronic survey equipment, will be more accurate, will be used by surveyors in the future, and will not be damaged by future resurfacing projects.					

SPECIFICATION SECTION USE ONLY

Specification Section Recommended Language:

Replace the entire article:

2526.01 DESCRIPTION.

This work involves survey for construction projects. The Contractor shall furnish ~~the~~ all survey necessary for construction of the project ~~as intended by the contract documents and approved revisions~~ before work begins in the area. The provisions of Article 1105.06~~Article 1105.06~~ do not apply to this work, except that the original stakes set by the Engineer shall be preserved. If, in the opinion of the Engineer, any of the original survey stakes or benchmarks have been ~~carelessly or willfully~~ destroyed or disturbed by the Contractor, the cost of replacing shall be charged to the Contractor. Design errors discovered shall be brought to the Engineer's attention for review prior to staking. Construction survey shall include qualified personnel, equipment, and supplies required for, but not limited to, the following items:

A. Project Control – Project control points shall be established during the grading project and preserved during subsequent projects.

1. Secondary Control Monuments.

Secondary permanent horizontal control monuments shall be planted along the project corridor at intervals not to exceed 2640 feet (0.8 km). Provide for visible clear line of sight to the nearest secondary permanent control monument in either direction.

The Engineer will provide monuments, similar to those used for GPS control by the Department. Monuments shall be placed as directed by the Engineer at higher elevations along the corridor to provide a view of the immediate project topography and at locations likely to survive project construction. Primary project monuments may be substituted if appropriate.

The monument shall by planted 1 to 4 inches (25 mm to 100 mm) below existing ground. A metal fence post shall be driven within 1 foot (0.3 m) to mark its location.

Project coordinates shall be carefully determined relative to the nearest primary project control monument using project coordinate values provided by the Engineer. The resulting error radius of the secondary monument shall not exceed 0.10 feet (30 mm) ±2 ppm relative to the primary control. Unedited printed and/or electronic formatted field data of the field survey shall be provided to the Engineer along with an ASCII comma delineated file of the coordinates formatted as (Point Number, Northing, Easting, Elevation, Point Description, Feature).

An independent traverse check between the secondary control monuments shall be performed by observing distance and angular measurements or by use of GPS. An unedited printed and/or electronic file of the field data for the traverse check shall be provided to the Engineer. A diagram shall be provided to the Engineer indicating horizontal ground distances to nearest 0.01 foot (3 mm) and angles to at least the nearest 10 inches (250 mm) between each secondary control monument. Inverses between the coordinate pairs of monuments used in this traverse as determined in Article 2526.01, A, 1, shall not exceed 0.10 feet (30 mm) of the direct measurements.

Secondary control monuments that are disturbed during construction activities will be replaced using procedures outlined above at the no additional expense to the Contracting Authority.

2. Durable Physical Objects.
Each control monument shall be referenced to at least three durable physical objects from 20 to 100 feet (6 m to 30 m) away from the monument with measurements to the nearest 0.10 foot (30mm). Durable physical objects could include trees, poles, fence posts, station marks in new roadway pavement, or metal fence posts. A printed and/or electronic reference image (for example .JPG, TIFF, etc), including each reference and project coordinate, shall be provided to the Engineer.

3. Benchmarks.
Permanent vertical control benchmarks shall be established at all bridges and reinforced concrete box culverts within the project. An I.D.O.T. brass plug on bridge barrier rail or headwall of reinforced concrete box culvert shall be used to indicate the benchmark. The Contractor may use a sawn “X” on bridge barrier rail or headwall of reinforced concrete box culvert if approved by the Engineer.

All benchmark elevations shall be transferred from construction plan benchmarks to the permanent benchmarks using the three-wire method or by trigonometric leveling. Temporary benchmarks of reasonable stability shall be used to preserve the plan benchmarks.

All unedited printed and/or electronic formatted field benchmark elevation data will be furnished to the Engineer. The project x and y coordinates of all benchmarks shall be provided to the Engineer. An ASCII comma delineated file of the coordinates formatted as (Point Number, Northing, Easting, Elevation, Point Description, Feature).

Benchmark level loops shall not exceed an error of 0.05 feet (15 mm) times the square root of the loop’s length in miles (kilometers) and the error shall be distributed equally along the loop on all intermediate traverse/benchmark points.

~~A~~ B. Grading.
~~1.~~ Right-of-way line between ~~break points~~ permanent right-of-way corners at 100 foot (~~approximately 25~~ 20 m) intervals, ~~(~~or less if needed~~)~~, including borrows, temporary easements, and right of entry. These points shall be marked by placement of a metal pin or wood hub, flat, ~~and identified with a "flat"~~ and lath ~~adjacent to the hub~~ at the same location as the slope stakes. The flat shall be clearly marked with the station number and distance from centerline. ~~This work shall be accomplished within the first 20 working days.~~

~~2.~~ Slope stakes at 100 foot (~~25~~ 20 m) intervals, or less if needed, for all embankment and excavation work including roadway, channel changes, and borrow areas. Interpolations may be necessary to match the cross-sections. Slope stakes shall be set at the toe of the foreslope, and/or the top of the backslope. Slope stakes shall be marked with a flat and lath. The flat shall be clearly marked with the station location, distance, slope, and cut/fill information.

~~3.~~ Grade check~~s 1 every~~ stakes at 100 feet (20 m) intervals for bottoms of subgrade treatments. Grade check stakes shall be set on centerline for two-lane roads and in the median for four-lane roads. Grade check stakes shall be marked with a lath. The lath shall be clearly marked with the station location and cut or fill information.

~~4.~~ Finish grade stakes (blue tops) at 100 foot (20 m) intervals, or less if needed. The blue tops shall be set at each shoulder line and each point where there is a change in cross slope. ~~In superelevated curves, also place a line of finish grade stakes at 100 foot (20 m) intervals on the upper side of the curve at the edge of the proposed pavement.~~ Blue tops shall be marked with a wood hub and a stake chaser or similar type tassel.

~~5. Cut or fill stakes to center line or shoulder line elevation at right-of-way line or an identified base line at 100 foot (25 m) intervals or less.~~

~~6.~~ Take original and final ~~cross sections~~ elevations of all borrows. ~~and side borrows, to be calculated by the Engineer.~~ Provide original and final graphical cross sections at 100 foot (20 m) intervals, or less if needed, suitable for use by the Engineer to calculate excavation quantities.

~~7. Reference and preserve plan control points at:~~
~~Point of Curve (PC)~~
~~Point of Tangent (PT)~~
~~Point of Intersection (PI)~~
~~Point on Tangent (POT)~~
~~Both distance and angle or alternate method will be approved by the Engineer.~~

~~8. After grading is complete, reset all control points, as designated by the Engineer.~~

~~9. Set intermediate~~ Bridge berm slope stakes ~~at bridge abutments~~ to establish all transitions including the face of the berm. ~~Also place finish grade stakes on the centerline of abutment bearing and at the toe of slope of all bridge berms. Also place f~~ Finish grade stakes (blue tops) on ~~each side~~ all roadway shoulder lines and roadway centerlines project down the face of bridge berms at the ~~following points:~~ top, midpoint, and toe.
~~Top of Bridge Berm~~
~~Mid-point of Slope of Bridge Berm~~
~~Toe of Bridge Berm~~

~~10. Where~~ When Class 12 excavation is an item, cross section elevations shall be taken ~~at top and bottom of rock for Engineer's computations.~~at 100 foot (20 m) intervals, or less if needed, and cross sections plotted for use by the Engineer to calculate the excavation quantities.

~~11.~~ Agricultural drain tile shown in the contract documents ~~will~~ shall be located on each side of roadway ~~center line with station, offset, and flow line.~~ at the right-of-way line with a lath. The lath shall be clearly marked to show station location, distance from centerline, tile size and type, and flowline elevation.

~~D~~ C. Bridges.

~~1. Centerline of roadway or bridge.~~

~~2. Centerline of piers.~~

~~3. Centerline or face of abutment.~~

~~4. Elevation reference.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the pier/abutment station location, design number, and offset distance from the centerline of the roadway or bridge.

Minimum of three temporary benchmarks.

~~5.~~ Location of test pile shall be marked with a wood hub.

~~6.~~ Independent check of the above stakes.

~~7.~~ Elevations of beams as erected. Provide ~~the elevations to the Engineer for computation of~~ finished elevations to the Engineer for review prior to forming the deck. ~~Locations for determining beam elevations shall be in accordance with the contract documents.~~

~~3.~~ A copy of the staking diagram shall be provided to the Engineer before work begins.

~~C~~ D. Reinforced Concrete Box Culverts.

~~1. Centerlines (roadway and culvert).~~

~~2. Back of parapet.~~

~~3. Skew.~~

~~4. Flow line elevations at inlet, outlet, and breaks.~~

~~(For both B and C above, a check for flow line and alignment shall be made and reported to the Engineer, if questionable.)~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the station location, design number, cut/fill elevation, and offset distance from the centerline of the culvert and back of parapet.

~~5.~~ An independent check of the above stakes.

A copy of the staking diagram shall be provided to the Engineer before work begins.

Questionable flow lines and alignments that do not match existing drainage shall be reported to the Engineer.

~~B~~ E. Pipe Culverts.

~~1. Centerlines (roadway and culvert).~~

~~2. Both ends.~~

~~3. Flow line elevations at inlet, outlet, and breaks.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the station location, cut/fill elevation, and offset distance to both ends or centerline of pipe.

Questionable flow lines and alignments that do not match existing drainage shall be reported to the Engineer.

F. Sanitary and Storm Sewers.

~~1. Centerline.~~

~~2. Flow line elevation.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the station location, pipe number, cut/fill elevation, and offset distance to centerline of pipe.

G. Intakes and Utility Accesses.

~~1. Location.~~

~~2. Elevation of top and base.~~

~~3. Back of curb.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the station location; intake or utility access number; cut/fill elevation, including bottom of well and form grade; and offset distance to the Station Location.

~~E~~ H. Pavements (PCC & HMA).

~~1. Elevations on both sides at 50 foot (10 m) intervals on straight and level sections and at 25 foot (10 m) intervals on horizontal and vertical curves.~~

~~2. Alignment (tack line) on one side.~~

~~3. Reference, preserve, and re-establish control points mentioned in Paragraphs A, 7 and A, 8 of this specification.~~

~~4. At fixed elevations (bridges and existing pavements), elevations at center line and both pavement edges at 10 foot (3 m) intervals for 100 foot (30 m) shall be submitted to the Engineer to establish final elevations to be set by the surveyor.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub (only tack one side), flat, and lath. Elevations on both sides of the pavement at 50 foot (10 m) intervals on straight and level sections and at 25 foot (10 m) intervals on horizontal and vertical curves. The flat shall be clearly marked with the station location, cut/fill information, and offset distance to the edge of pavement. Pavement cross slope information shall be included in superelevated curves.

Elevations of pavement centerline and both edges at bridges and existing pavement, shall be taken at 10 foot (3 m) intervals for 100 feet (30 m) and submitted to the Engineer to establish final elevations.

~~5. For PCC overlays and PCC and HMA inlays, in addition to the above requirements, the surveyor shall:~~ When a new profile grade is not included in the contract documents the Contractor shall:

~~a~~ 1. Obtain elevations of the existing shoulders and/or pavement as stated in ~~Article 2526.01, E, 1.~~Article 2526.01, H.

~~b~~ 2. Design a smooth profile grade line based on these elevations to provide the required pavement or shoulder thickness as detailed in the contract documents. This grade line shall tie into existing bridges, adjacent pavement and ramps, and provide the required pavement crown. This proposed grade line shall be submitted to the Engineer for approval.

I. Pavement Overlays (PCC and HMA)

~~1.~~ Reference and preserve existing control points located at each Point of Intersection (P.I.)

~~2.~~ Method used to reference points shall be approved by the Engineer

~~3.~~ Control Points shall be reset after the work is complete.

Office Relocations (O.R.) identified in the contract documents shall be staked from the original survey by the Contractor, including the control points as stated in ~~Article 2526.01 A, 7~~ Article 2526.01, A. Survey work documentation shall be in a format acceptable to the Contracting Authority. Survey work shall be done with a Professional Engineer licensed in the State of Iowa or a Professional Land Surveyor licensed in the State of Iowa in responsible charge, in accordance with provisions of Chapter 542 B, Code of Iowa. The Contractor shall submit to the Engineer a resume identifying the field survey personnel and their capabilities to perform the intended requirements.

The method of determining alignments and elevations and the method of preserving control points shall be

subject to review and approval by the Engineer. This approval shall not act to relieve the Contractor of the responsibility for the correctness of the survey work. Plan cross-sections shall not be used for vertical or horizontal control.

The Engineer will provide benchmark elevations, right-of-way ~~break points~~ corners, ~~center line control points (PC's, PT's, necessary PI's, and POT's on the original survey line, adequate for a line of vision),~~ and ~~reference~~ control points on the original survey as shown in the contract documents. ~~for the Contractor's use.~~ A GeoPak alignment will be provided if available. ~~In the event the coordinate system is used, the control point or points and the x axis or the y axis will be set from which the surveyor will do the survey work.~~

Tie-ins with existing roadways shall be checked for correctness of alignment prior to construction staking. ~~Design errors discovered in this checking shall be brought to the Engineer's attention for review prior to staking.~~

When survey work is done under traffic, detail sheets in the contract documents will establish the required signing.

The Engineer will ~~compute finish elevations (using Contractor provided beam elevations) and furnish them to the Contractor for deck construction,~~ locate and take elevations of settlement plates, and re-establish land corners and permanent reference marker.

All survey work documentation is to become property of the Contracting Authority. The work of this specification will be considered finished when the documentation is furnished to and accepted by the Engineer.

For the purpose of subcontracting, this item will be considered a specialty item.

2526.02 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.
Construction survey will be measured and paid for at the lump sum contract price. This payment shall be full compensation for the survey work required for the project as let, including any interpolations that may be necessary between cross-section and field staking. Revisions after the letting will be paid for as extra work as described in Article 1109.03, B. ~~The Engineer may make partial payments, in accordance with Article 1109.05, based on the estimate of the survey work completed. Final payment will be made at the time the survey books are submitted to the Engineer.~~

Comments: There are concerns about and inconsistence between English and metric units (100 ft. is a little more than 30 m) especially since it is being proposed to move from 25 m vs. 20 m.

Why does Pavement Overlay have a different format? Why only PI and only on Pavement Overlays (on long straight alignments, is this adequate)? Should the PI be marked on other types of work?

SPECIFICATION COMMITTEE ACTION

Final Approved Text:

Replace the entire article:

2526.01 DESCRIPTION.
This work involves survey for construction projects. The Contractor shall furnish ~~the~~ all survey necessary for construction of the project ~~as intended by the contract documents and approved revisions~~ before work begins in the area. The provisions of Article 1105.06 do not apply to this work, except that the original stakes set by the Engineer shall be preserved. If, in the opinion of the Engineer, any of the original survey stakes or benchmarks have been ~~carelessly or willfully~~ destroyed or disturbed by the Contractor, the cost of replacing shall be charged to the Contractor. Design errors discovered shall be brought to the Engineer's attention for review prior to staking. Construction survey shall include qualified personnel, equipment, and supplies required for, but not limited to, the following items:

A. Project Control.

1. Primary Control Monuments.
A primary control monument is a survey point established by the Department prior to project commencement and shown in the contract documents. The point will be established by placing a monument in the ground.

2. Secondary Control Monuments.

A secondary control monument is a survey point established by the Contractor on grading or other projects specified in the plans, and preserved by the Contractor on all other projects.

The Engineer will provide monuments, similar to those used for GPS control by the Department.

Secondary permanent horizontal control monuments shall be placed, as directed by the Engineer, at locations likely to survive project construction and at intervals not to exceed 2,640 feet (0.8 km). The Contractor shall place the monuments in the ground along the project corridor. Monuments shall be placed at higher elevations along the corridor to provide a view of the immediate project topography and provide for visible clear line of sight to the nearest secondary permanent control monument in either direction. Primary project monuments may be substituted if appropriate.

The monument shall by planted 1 to 4 inches (25 mm to 100 mm) below existing ground. A metal fence post shall be driven within 1 foot (0.3 m) to mark its location.

Project coordinates shall be carefully determined relative to the nearest primary project control monument using project coordinate values provided by the Engineer. The resulting error radius of the secondary monument shall not exceed 0.10 feet (30 mm) ±2 ppm relative to the primary control. Unedited printed and/or electronic formatted field data of the field survey shall be provided to the Engineer along with an ASCII comma delineated file of the coordinates formatted as (Point Number, Northing, Easting, Elevation, Point Description, Feature).

An independent traverse check between the secondary control monuments shall be performed by observing distance and angular measurements or by use of GPS. An unedited printed and/or electronic file of the field data for the traverse check shall be provided to the Engineer. A diagram shall be provided to the Engineer indicating horizontal ground distances to nearest 0.01 foot (3 mm) and angles to at least the nearest 10 inches (250 mm) between each secondary control monument. Inverses between the coordinate pairs as determined in the previous paragraph shall not exceed 0.10 feet (30 mm) of the direct measurements.

Secondary control monuments that are disturbed during construction activities will be replaced using procedures outlined above at the no additional expense to the Contracting Authority.

3. Durable Physical Objects.
Each control monument shall be referenced to at least three durable physical objects from 20 to 100 feet (6 m to 30 m) away from the monument with measurements to the nearest 0.10 foot (30 mm). Durable physical objects could include trees, poles, fence posts, station marks in new roadway pavement, or metal fence posts. A printed and/or electronic reference image (for example .JPG, TIFF, etc), including each reference and project coordinate, shall be provided to the Engineer.

4. Benchmarks.
Permanent vertical control benchmarks shall be established at all bridges and reinforced concrete box culverts within the project. An I.D.O.T. brass plug on bridge barrier rail or headwall of reinforced concrete box culvert shall be used to indicate the benchmark. The Contractor may use a sawn “X” on bridge barrier rail or headwall of reinforced concrete box culvert if approved by the Engineer.

All benchmark elevations shall be transferred from construction plan benchmarks to the permanent benchmarks using the three-wire method or by trigonometric leveling. Temporary benchmarks of reasonable stability shall be used to preserve the plan benchmarks.

All unedited printed and/or electronic formatted field benchmark elevation data will be furnished to the Engineer. The project x and y coordinates of all benchmarks shall be provided to the Engineer. An ASCII comma delineated file of the coordinates formatted as (Point Number, Northing, Easting, Elevation, Point Description, Feature).

Benchmark level loops shall not exceed an error of 0.05 feet (15 mm) times the square root of the loop's length in miles (kilometers) and the error shall be distributed equally along the loop on all intermediate traverse/benchmark points.

~~A~~ B. Grading.

~~1.~~ Right-of-way line between ~~break points~~ permanent right-of-way corners at 100 foot (~~approximately 25~~ 20 m) intervals, ~~(~~or less if needed~~)~~, including borrows, temporary easements, and right of entry. These points shall be marked by placement of a metal pin or wood hub, flat, ~~and identified with a "flat"~~ and lath ~~adjacent to the hub~~ at the same location as the slope stakes. The flat shall be clearly marked with the station number and distance from centerline. ~~This work shall be accomplished within the first 20 working days.~~

~~2.~~ Slope stakes at 100 foot (~~25~~ 20 m) intervals, or less if needed, for all embankment and excavation work including roadway, channel changes, and borrow areas. Interpolations may be necessary to match the cross-sections. Slope stakes shall be set at the toe of the foreslope, and/or the top of the backslope. Slope stakes shall be marked with a flat and lath. The flat shall be clearly marked with the station location, distance, slope, and cut/fill information.

~~3.~~ Grade check~~s 1 every~~ stakes at 100 feet (20 m) intervals for bottoms of subgrade treatments. Grade check stakes shall be set on centerline for two-lane roads and in the median for four-lane roads. Grade check stakes shall be marked with a lath. The lath shall be clearly marked with the station location and cut or fill information.

~~4.~~ Finish grade stakes (blue tops) at 100 foot (20 m) intervals, or less ~~at each shoulder line. In superelevated curves, also place a line of finish grade stakes at 100 foot (20 m) intervals on the upper side of the curve at the edge of the proposed pavement.~~ if needed. The blue tops shall be set at all grade breaks within the outside edge of the shoulder lines and at each change in cross slope, with a minimum of three stakes. Blue tops shall be marked with a wood hub and a stake chaser or similar type tassel.

~~5. Cut or fill stakes to center line or shoulder line elevation at right-of-way line or an identified base line at 100 foot (25 m) intervals or less.~~

~~6.~~ Take original and final ~~cross sections~~ elevations of all borrows. ~~and side borrows, to be calculated by the Engineer.~~ Provide original and final graphical cross sections at 100 foot (20 m) intervals, or less if needed, suitable for use by the Engineer to calculate excavation quantities.

~~7. Reference and preserve plan control points at:~~

~~Point of Curve (PC)~~
~~Point of Tangent (PT)~~
~~Point of Intersection (PI)~~
~~Point on Tangent (POT)~~

~~Both distance and angle or alternate method will be approved by the Engineer.~~

~~8. After grading is complete, reset all control points, as designated by the Engineer.~~

~~9. Set intermediate~~ Bridge berm slope stakes ~~at bridge abutments~~ to establish all transitions including the face of the berm. ~~Also place finish grade stakes on the centerline of abutment bearing and at the toe of slope of all bridge berms. Also place f~~ Finish grade stakes (blue tops) on ~~each side~~ all roadway shoulder lines and roadway centerlines project down the face of bridge berm~~s~~ at the ~~following points:~~ top, midpoint, and toe.

~~Top of Bridge Berm~~
~~Mid-point of Slope of Bridge Berm~~
~~Toe of Bridge Berm~~

~~10. Where~~ When Class 12 excavation is an item, cross section elevations shall be taken ~~at top and bottom of rock for Engineer's computations.~~at 100 foot (20 m) intervals, or less if needed, and cross sections plotted for use by the Engineer to calculate the excavation quantities.

~~11.~~ Agricultural drain tile shown in the contract documents ~~will~~ shall be located on each side of roadway ~~center line with station, offset, and flow line.~~ at the right-of-way line with a lath. The lath shall be clearly marked to show station location, distance from centerline, tile size and type, and flowline elevation.

~~D~~ C. Bridges.

~~1. Centerline of roadway or bridge.~~

~~2. Centerline of piers.~~

~~3. Centerline or face of abutment.~~

~~4. Elevation reference.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the pier/abutment station location, design number, and offset distance from the centerline of the approach roadway.

Minimum of three temporary benchmarks.

~~5.~~ Location of test pile shall be marked with a wood hub.

~~6.~~ Independent check of the above stakes.

~~7.~~ Elevations of beams as erected. Provide the elevations to the Engineer for computation of finished elevations to the Engineer for review prior to forming the deck. Locations for determining beam elevations shall be in accordance with the ~~contract documents~~ plans.

~~3.~~ A copy of the staking diagram shall be provided to the Engineer before work begins.

~~C~~ D. Reinforced Concrete Box Culverts.

~~1. Centerlines (roadway and culvert).~~

~~2. Back of parapet.~~

~~3. Skew.~~

~~4. Flow line elevations at inlet, outlet, and breaks.~~

~~(For both B and C above, a check for flow line and alignment shall be made and reported to the Engineer, if questionable.)~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the station location, design number, cut/fill elevation, and offset distance from the centerline of the culvert and back of parapet.

~~5.~~ An independent check of the above stakes.

A copy of the staking diagram shall be provided to the Engineer before work begins.

Questionable flow lines and alignments that do not match existing drainage shall be reported to the Engineer.

~~B~~ E. Pipe Culverts.

~~**1.** Centerlines (roadway and culvert).~~

~~**2.** Both ends.~~

~~**3.** Flow line elevations at inlet, outlet, and breaks.~~

Locations and elevations shall be marked with metal pin or a wood hub, flat, and lath. The flat shall be clearly marked with the station location, cut/fill elevation, and offset distance to both ends or centerline of pipe.

Questionable flow lines and alignments that do not match existing drainage shall be reported to the Engineer.

F. Sanitary and Storm Sewers.

~~**1.** Centerline.~~

~~**2.** Flow line elevation.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the station location, pipe number, cut/fill elevation, and offset distance to centerline of pipe.

G. Intakes and Utility Accesses.

~~**1.** Location.~~

~~**2.** Elevation of top and base.~~

~~**3.** Back of curb.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub, flat, and lath. The flat shall be clearly marked with the station location; intake or utility access number; cut/fill elevation, including bottom of well and form grade; and offset distance to the Station Location.

~~E~~ H. Pavements (PCC & HMA).

~~**1.** Elevations on both sides at 50 foot (10 m) intervals on straight and level sections and at 25 foot (10 m) intervals on horizontal and vertical curves.~~

~~**2.** Alignment (tack line) on one side.~~

~~**3.** Reference, preserve, and re-establish control points mentioned in Paragraphs A. 7 and A. 8 of this specification.~~

~~**4.** At fixed elevations (bridges and existing pavements), elevations at center line and both pavement edges at 10 foot (3 m) intervals for 100 foot (30 m) shall be submitted to the Engineer to establish final elevations to be set by the surveyor.~~

Locations and elevations shall be marked with metal pin or tack in a wood hub (only tack one side), flat, and lath. Elevations on both sides of the pavement at 50 foot (10 m) intervals on straight and level sections and at 25 foot (10 m) intervals on horizontal and vertical curves. The flat shall be clearly marked with the station location, cut/fill information, and offset distance to the edge of pavement. Pavement cross slope information shall be included in superelevated curves.

Elevations of pavement centerline and both edges at bridges and existing pavement shall be taken at 10 foot (3 m) intervals for 100 feet (30 m) and submitted to the Engineer for review.

~~5. For PCC overlays and PCC and HMA inlays, in addition to the above requirements, the surveyor shall:~~ When a new profile grade is not included in the contract documents the Contractor shall:

~~a~~ **1.** Obtain elevations of the existing shoulders and/or pavement as stated in ~~Article 2526.01, E. 1~~ Article 2526.01, H.

~~b~~ **2.** Design a smooth profile grade line based on these elevations to provide the required pavement or shoulder thickness as detailed in the contract documents. This grade line shall tie into existing bridges, adjacent pavement and ramps, and provide the required pavement crown. This proposed grade line shall be submitted to the Engineer for approval.

I. Pavement Overlays (PCC and HMA)

~~1.~~ Reference and preserve existing control points located at each Point of Intersection (P.I.)

~~2.~~ Method used to reference points shall be approved by the Engineer

~~3.~~ Control Points shall be reset after the work is complete.

~~Office Relocations (O.R.) identified in the contract documents shall be staked from the original survey by the Contractor, including the control points as stated in Article 2526.01, A, 7.~~ The method used by the Contractor to preserve project control shall be submitted to the Engineer for approval. Survey work documentation shall be in a format acceptable to the Contracting Authority. Survey work shall be done with a Professional Engineer licensed in the State of Iowa or a Professional Land Surveyor licensed in the State of Iowa in responsible charge, in accordance with provisions of Chapter 542 B, Code of Iowa. The Contractor shall submit to the Engineer a resume identifying the field survey personnel and their capabilities to perform the intended requirements.

The method of determining alignments and elevations and the method of preserving control points shall be subject to review and approval by the Engineer. This approval shall not act to relieve the Contractor of the responsibility for the correctness of the survey work. Plan cross-sections shall not be used for vertical or horizontal control.

The Engineer will provide benchmark elevations, right-of-way ~~break points~~ corners, ~~center line control points (PC's, PT's, necessary PI's, and POT's on the original survey line, adequate for a line of vision),~~ and ~~reference~~ control points on the original survey as shown in the contract documents. ~~for the Contractor's use.~~ A GeoPak alignment will be provided if available. ~~In the event the coordinate system is used, the control point or points and the x axis or the y axis will be set from which the surveyor will do the survey work.~~

Tie-ins with existing roadways shall be checked for correctness of alignment prior to construction staking. ~~Design errors discovered in this checking shall be brought to the Engineer's attention for review prior to staking.~~

When survey work is done under traffic, detail sheets in the contract documents will establish the required signing.

The Engineer will ~~compute finish elevations (using Contractor provided beam elevations) and furnish them to the Contractor for deck construction,~~ locate and take elevations of settlement plates~~., and re-establish~~ The Contractor shall replace land corners and permanent reference marker unless otherwise stated in the contract documents.

All survey work documentation is to become property of the Contracting Authority. The work of this specification will be considered finished when the documentation is furnished to and accepted by the Engineer.

For the purpose of subcontracting, this item will be considered a specialty item.

2526.02 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.
Construction survey will be measured and paid for at the lump sum contract price. This payment shall be full compensation for the survey work required for the project as let, including any interpolations that may be necessary between cross-section and field staking. Revisions after the letting will be paid for as extra work as described in Article 1109.03, B. ~~The Engineer may make partial payments, in accordance with Article 1109.05, based on the estimate of the survey work completed. Final payment will be made at the time the survey books are submitted to the Engineer.~~

Comments: Due to numerous requests and confusion over the last few years, the Office of Construction organized a team that reviewed the original specifications and developed the changed text submitted to the Specification Committee.

The monuments will be supplied by the Department for consistency of markers. Markers vary between manufactures. The RCEs will order the monuments for their own staff's use and for the Contractor.

The intervals of slope stakes are changing due to changes in the design metric cross-sections.

The Specification Committee asked if the Contractor could mark the stations on pavement overlays. It was stated that the 500 foot survey markers are usually used. If a project does not have 500 foot markers they are usually surveyed in during project preparation. A wheel or distance meter is used between the 500 foot markers by the inspectors. No change was recommended.

Office Relocations were eliminated from the specifications because of the current process for project survey.

A Registered Land Surveyor must be used to re-establish land corners and file the corner certificate. Since the land corners under the circumstances in these specifications are being re-set in the same location, the Specification Committee determined that it was not necessary for a Registered Land Surveyor be used and the language was modified for clarity. Under the item of Construction Survey, the specifications do not require the Contractor to use a Register Land Surveyor.

Deferred:	**Not Approved:**	**Approved Date:** 5-8-03	**Effective Date:** 10-21-03

6. Article 2528.08, Temporary Floodlighing
Article 2528.13, A, 5, Basis of Payment (Temporary Floodlighting)

The Office of Design requests several changes to Section 2528 that will incorporate some of the language currently in the general notes of the Standard Road Plans.

Submitted by: Mike Kennerly/Will Stein	**Office:** Design	**Item 6**
Submittal Date: April 24, 2003	**Proposed Effective Date:** October 2003	
Article No.: 2528.08 and 2528.13, A, 5 **Title:** Temporary Floodlighting	**SS No.:**	**Other:**

Change (Redline/Strikeout):

2528.08 TEMPORARY FLOODLIGHTING

Modify Paragraph 3
Temporary floodlighting shall consist of either a pole-mounted luminaire or a luminaire mounted on portable type equipment. The mounting height of luminaires shall be not less than 35 feet (11 m) above the roadway, and as shown in the contract documents. Poles shall be placed outside the normal shoulder line at the approximate locations shown. The contractor shall determine pole length by field measurement to obtain specified mounting height.

Add Paragraph
Aerial lighting circuits shall be aluminum or A.C.S.R. triplex. Underground lighting circuits shall be type U.S.E. or U.F. All circuit design and materials shall be approved by the engineer before installation commences.

2528.13 BASIS OF PAYMENT

A. While the following items are required for traffic control, there will be items included in the contract documents with payment as follows:

5. Temporary Floodlighting

The Contractor will be paid the contract unit price for each Temporary Floodlighting Luminaire installed. Price bid for "Temporary Floodlighting Luminaire" shall include all cost for furnishing, installing, maintaining and servicing the Temporary Floodlighting Units, all costs for electrical energy, and the cost of removing all lighting materials from the construction site.

Reason for Revision: In the process of making the Temporary Floodlighting Detail Sheets (570-1& 570-2) into Standard Road Plans, we would like to place some of the General Notes in the Specification Book, where they are more appropriate.

County or City Input Needed (X one)	**Yes**	**No** X
Comments:		

Industry Input Needed (X one)			**Yes**	**No** X	
Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION SECTION USE ONLY

Specification Section Recommended Language:

2528.08, Temporary Floodlighting.

Delete the first and second sentence of the first paragraph:

~~Floodlighting may be required. Floodlights will be required at the approximate locations shown in the contract documents.~~

Replace the third paragraph:

Temporary floodlighting shall consist of either a pole-mounted luminaire or a luminaire mounted on portable equipment. The mounting height of luminaires shall be not less than 35 feet (11 m) above the roadway, and as shown in the contract documents. The Contractor shall determine pole length by field measurement to obtain specified mounting height. Poles shall be placed outside the normal shoulder line at the approximate locations shown in the contract documents.

Add to beginning of fourth paragraph:

Aerial lighting circuits shall be aluminum or A.C.S.R. triplex. Underground lighting circuits shall be type U.S.E. or U.F. All circuit design and materials shall be approved by the Engineer before installation commences.

2528.13, B, 5, Temporary Floodlighting

Add after first sentence of the article:

This payment shall be full compensation for furnishing, installing, maintaining and servicing the temporary floodlighting units, all costs for electrical energy, and the cost of removing all lighting materials from the construction site.

Comments:

SPECIFICATION COMMITTEE ACTION

Final Approved Text:

2528.08, Temporary Floodlighting.

Delete the first and second sentence of the first paragraph:

~~Floodlighting may be required. Floodlights will be required at the approximate locations shown in the contract documents.~~

Replace the third paragraph:

Temporary floodlighting shall consist of either a pole-mounted luminaire or a luminaire mounted on portable equipment. The mounting height of luminaires shall be not less than 35 feet (11 m) above the roadway, and as shown in the contract documents. The Contractor shall determine pole length by field measurement to obtain specified mounting height. Poles shall be placed outside the normal shoulder line at the approximate locations shown in the contract documents.

Add as first and second sentence of fourth paragraph:

Above ground lighting circuits shall be aluminum or A.C.S.R. triplex. Underground lighting circuits shall be type U.S.E. or U.F.

2528.13, A, 5, Temporary Floodlighting

Add as second sentence of the article:

This payment shall be full compensation for furnishing, installing, maintaining and servicing the temporary floodlighting units, all costs for electrical energy, and the cost of removing all lighting materials from the construction site.

Comments:

Deferred:	**Not Approved:**	**Approved Date:** 5-8-03	**Effective Date:** 10-21-03