ADDENDUM No. 1

CONTRACT DOCUMENTS

Item No 1 – Table of Contents
Delete the Table of Contents in its entirety and replace with attached Table of Contents dated May 2013.

Item No 2 – Bid
Delete the Bid in its entirety and replace with the attached Bid dated May 2013.

Item No 3 – Agreement
Delete the Agreement in its entirety and replace it with the attached Agreement dated May 2013.

Item No 4 – Special Conditions
Delete the Special Conditions in its entirety and replace with the attached Special Conditions dated May 2013.

Item No 5 – Specifications
Add the following:
a. Performance Graded Binder
b. Superpave Asphaltic Concrete
c. Concrete Mix Table
d. 1PF Cement

PLANS

Item No 1 – Delete in their entirety plan sheets A.01, B.01, D.01, D.03, D.04, J.01 and T.01 and replace with the attached sheets dated 5-8-2013.

TABLE OF CONTENTS

BID

To: Linda Welsher, Clerk/Treasurer
City of Fort Calhoun
City Hall – 110 South 14th Street
Fort Calhoun, Nebraska 68023

The undersigned having carefully examined the CONTRACT DOCUMENTS for the construction of the 14th Street Water Main Replacement and all related appurtenances thereto in City of Fort Calhoun, Nebraska and having examined the site of the WORK and become familiar with all local conditions affecting the cost thereof, do hereby propose to perform all WORK in strict accordance with said CONTRACT DOCUMENTS, within the time set forth herein, and at the prices stated below.

14th Street Water Main Replacement

Item No.	Description	Appr. Qty	Unit	Unit Price	Amount
1.	Mobilization	1	L.S.	_____	_____
2.	Remove Curb & Gutter	1551	L.F.	_____	_____
3.	Remove Sidewalk & Drives	1400	S.Y.	_____	_____
4.	Remove Pavement	1250	S.Y.	_____	_____
5.	Remove Fire Hydrant	2	EA	_____	_____
6.	Clear Work Area	1	L.S.	_____	_____
7.	Traffic Control	1	L.S.	_____	_____
8.	Pavement Marking	1	L.S.	_____	_____
9.	Seed, Fertilize & Mulch	1	L.S.	_____	_____
10.	Special Topsoil for Planting Beds	5.3	C.Y	_____	_____
11.	Construct Driveway (8")	200	S.Y.	_____	_____
12.	Construct Sidewalk (5")	1050	S.Y.	_____	_____
13.	Construct Curb & Gutter	1551	L.F.	_____	_____
14.	8" PCC Base Course	850	SY	_____	_____
15.	Asphalt Pavement Surface Course (2" – Type SPR)	200	TON	_____	_____
16.	Granular Foundation Course	240	TON	_____	_____
17.	Mill Asphalt Pavement	600	S.Y.	_____	_____
18.	2" PVC Conduit	710	L.F.	_____	_____
19.	Handicap Ramp Truncated Domes	148	S.F.	_____	_____
20.	Pull Box	3	EA	_____	_____
21.	Rebuilt Inlet Top	6	EA	_____	_____
22.	Imported Fill	150	C.Y.	_____	_____
23.	Temporary Surfacing	75	TON	_____	_____
24.	6" Watermain	1106	L.F.	_____	_____
25.	Abandon 6" Watermain	765	L.F.	_____	_____
26.	Abandon 4" Watermain	341	L.F.	_____	_____

27.	6x6 Taping Sleeve with 6" Valve	1	EA	_____	_____
28.	6" Gate Valve	7	EA	_____	_____
29.	8" Gate Valve	2	EA	_____	_____
30.	6"x6" Tee	2	EA	_____	_____
31.	8"x6" Tee	1	EA	_____	_____
32.	6" – 90 Elbow	1	EA	_____	_____
33.	6" Plug	3	EA	_____	_____
34.	¾" Copper Service Line	100	L.F.	_____	_____
35.	1" Copper Service Line	100	L.F.	_____	_____
36.	1 ½" Copper Service Line	200	L.F.	_____	_____
37.	¾" Corp & Curb Stop	4	EA	_____	_____
38.	1" Corp & Curb Stop	4	EA	_____	_____
39.	1 ½" Corp & Curb Stop	8	EA	_____	_____
40.	Fire Hydrant Assembly	2	EA	_____	_____
	TOTAL				$ _____

The undersigned acknowledges receipt of the following addendums: _____

The undersigned hereby agrees to commence with WORK within five (5) calendar days after written notice to proceed and further agrees to fully complete the WORK within 90 calendar days thereafter: For each consecutive calendar day that any of the WORK shall remain uncompleted after the calendar days stipulated in the CONTRACT TIME has elapsed, the undersigned agrees to pay the OWNER Two Hundred Dollars ($200.00) per calendar day, not as a penalty, but as predetermined and agreed liquidated damages.

The undersigned agrees to execute the Agreement and to furnish the required bond or bonds within eight (8) days of the written Notice of Award. Accompanying this proposal, as a guarantee that the undersigned will execute the agreement and furnish the required bond or bonds, is a bid bond or certified check in the amount of 5% of the Bid Price which shall become the property of the Owner, as liquidated damages, in case of failure by the undersigned to either execute the Agreement or furnish the required bond or bonds. It is understood that in case the undersigned is not awarded the work, the accompanying guaranty will be returned.

Respectfully submitted,

_____

(SEAL - if BID is by a Corporation)

BY: _____

TITLE: _____

ATTEST: _____

ADDRESS: _____

_____

If awarded the Contract, our Surety will be _____,

_____ of _____.

AGREEMENT

THIS AGREEMENT executed in quadruplicate this _____ day of _____ , 2013 between CITY OF FORT CALHOUN, NEBRASKA, (hereinafter called the OWNER) and _____ (hereinafter called the CONTRACTOR);

WITNESSETH:

WHEREAS, the CONTRACTOR did on the _____ day of_____ 2013, submit to the OWNER the lowest bid for performing all work necessary or incidental thereto for 14th Street Water Main Replacement in the City of Fort Calhoun, Nebraska, pursuant to the Notice to Contractors duly published by the OWNER which Work is described in the Contract Documents.

NOW, THEREFORE, the OWNER and CONTRACTOR in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK. The CONTRACTOR will perform all Work as shown in the Contract Documents.

Article 2. ENGINEER. The Project has been designed by The Schemmer Associates Inc., 1044 North 115th Street, Suite 300, Omaha, Nebraska 68154-4436, who will act as the ENGINEER in connection with completion of the Project in accordance with the Contract Documents.

Article 3. CONTRACT TIME and LIQUIDATED DAMAGES. Time is of the essence in this Agreement. The Work shall be completed within 90 consecutive calendar days after the date from the date of the "Notice to Proceed". If the CONTRACTOR shall fail to complete the Work within the Contract Time, the CONTRACTOR will pay to the OWNER, not as a penalty, but as predetermined and agreed liquidated damages, the sum of Two Hundred Dollars ($200.00) for each consecutive calendar day that any of the Work shall remain uncompleted after the Contract Time has elapsed.

Article 4. CONTRACT PRICE. The OWNER will pay the CONTRACTOR for performance of the Work and completion of the Project in accordance with the Contract Documents subject to adjustment by modifications as provided therein as follows:

14th Street Water Main Replacement

Item No.	Description	Appr. Qty	Unit	Unit Price	Amount
1.	Mobilization	1	L.S.	_____	_____
2.	Remove Curb & Gutter	1551	L.F.	_____	_____
3.	Remove Sidewalk & Drives	1400	S.Y.	_____	_____
4.	Remove Pavement	1250	S.Y.	_____	_____
5.	Remove Fire Hydrant	2	EA	_____	_____
6.	Clear Work Area	1	L.S.	_____	_____
7.	Traffic Control	1	L.S.	_____	_____
8.	Pavement Marking	1	L.S.	_____	_____
9.	Seed, Fertilize & Mulch	1	L.S.	_____	_____
10.	Special Topsoil for Planting Beds	5.3	C.Y.	_____	_____
11.	Construct Driveway (8")	200	S.Y.	_____	_____
12.	Construct Sidewalk (5")	1050	S.Y.	_____	_____
13.	Construct Curb & Gutter	1551	L.F.	_____	_____

14.	8" PCC Base Course	850	SY	_____	_____
15.	Asphalt Pavement Surface Course (2" – Type SPR)	200	TON	_____	_____
16.	Granular Foundation Coarse	240	TON	_____	_____
17.	Mill Asphalt Pavement	600	S.Y.	_____	_____
18.	2" PVC Conduit	710	L.F.	_____	_____
19.	Handicap Ramp Truncated Domes	148	S.F.	_____	_____
20.	Pull Box	3	EA	_____	_____
21.	Rebuilt Inlet Top	6	EA	_____	_____
22.	Imported Fill	150	C.Y.	_____	_____
23.	Temporary Surfacing	75	TON	_____	_____
24.	6" Watermain	1106	L.F.	_____	_____
25.	Abandon 6" Watermain	765	L.F.	_____	_____
26.	Abandon 4" Watermain	341	L.F.	_____	_____
27.	6x6 Taping Sleeve with 6" Valve	1	EA	_____	_____
28.	6" Gate Valve	7	EA	_____	_____
29.	8" Gate Valve	2	EA	_____	_____
30.	6"x6" Tee	2	EA	_____	_____
31.	8"x6" Tee	1	EA	_____	_____
32.	6" – 90 Elbow	1	EA	_____	_____
33.	6" Plug	3	EA	_____	_____
34.	¾" Copper Service Line	100	L.F.	_____	_____
35.	1" Copper Service Line	100	L.F.	_____	_____
36.	1 ½" Copper Service Line	200	L.F.	_____	_____
37.	¾" Corp & Curb Stop	4	EA	_____	_____
38.	1" Corp & Curb Stop	4	EA	_____	_____
39.	1 ½" Corp & Curb Stop	8	EA	_____	_____
40.	Fire Hydrant Assembly	2	EA	_____	_____
	TOTAL				$ _____

Article 5. PROGRESS AND FINAL PAYMENTS. The OWNER will make progress payments on account of the Contract Price as provided in the General Conditions and as follows:

5.1 Progress and final payments will be on the basis of the CONTRACTOR's Application for Payment as approved by the ENGINEER.

5.2 Each month the OWNER will pay the CONTRACTOR for 90% of the value of completed work as of the end of the previous month, less the aggregate of payments previously made.

5.3 The remainder of the Contract Price will be paid upon final completion of the Work, settlement of all claims and City or Governmental approval where necessary; PROVIDED, that before payment of the final three (3) percent of the

Contract Price, the CONTRACTOR shall furnish a written clearance from the COMMISSIONER OF LABOR of the STATE OF NEBRASKA certifying that all payment due of contributions and interest which may have arisen under this Contract have been paid by the CONTRACTOR, or his Subcontractor(s), to the State of Nebraska Unemployment Compensation Fund.

Article 6. CONTRACT DOCUMENTS. The Contract Documents which comprise the contract between the OWNER and the CONTRACTOR are incorporated herein by reference, made a part hereof, and consist of the following:

6.1 This Agreement (pages A-1 to A-4 inclusive)

6.2 Exhibits and Attachments to this Agreement (Certificate of Assessment)

6.3 CONTRACTOR'S Performance and Payment Bonds

6.4 CONTRACTOR'S Bid and Bid Bonds

6.5 Notice to Contractors

6.6 Instructions to Bidders (pages IB-1 to IB-2, inclusive)

6.7 General Conditions (pages 1 to 60)

6.8 Supplementary General Conditions (page SGC-1 to SGC-5, inclusive)

6.9 Special Conditions (Pages SC-1 to SC-10, inclusive)

6.10 Drawings dated March 2013

6.11 Addenda numbers ___ to ___ inclusive

6.12 Any Modifications, including Change Orders, duly delivered after execution of this Agreement

6.13 Notice of Award

6.14 Notice to Proceed

6.15 Applicable laws governing the City's authority to contract.

Article 7. MISCELLANEOUS.

7.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

7.2 The CONTRACTOR shall not, without the prior written consent of the OWNER, assign or sublet in whole or in part his interest under any of the Contract Documents and, specifically, the CONTRACTOR shall not assign any moneys due or to become due without the prior written consent of the OWNER.

7.3 The OWNER and the CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents.

7.4 The Contract Documents constitute the entire agreement between the OWNER and the CONTRACTOR and may only be altered, amended or repealed by a duly executed written instrument.

Article 8. OTHER PROVISIONS.

8.1 PUBLIC LIABILITY and PROPERTY DAMAGE INSURANCE. The limits of liability for this insurance shall be as specified in Article 5 of the General Conditions.

8.2 EQUIPMENT ASSESSMENT FOR TAXATION. In accordance with the provisions of Legislative Bill 126 of the Seventy-Third Session of the Legislature of Nebraska (1963) and amendments, if any, the CONTRACTOR shall furnish a certified statement to be attached to the Contract that all equipment to be used on this project, except that acquired since the assessment date, has been assessed for taxation for the current year giving the county where assessed.

8.3 PERFORMANCE AND PAYMENT BONDS. The CONTRACTOR shall furnish Performance and Payment Bonds for 100% of the Contract Price as security for the faithful performance and payment of all his obligations under the Contract Documents.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first above written.

CITY OF FORT CALHOUN FORT CALHOUN, NEBRASKA OWNER	_____ CONTRACTOR
BY:_____	BY:_____
ATTEST:_____	ATTEST:_____

SPECIAL CONDITIONS

The following Special Conditions modify, change, delete from, or add to the PROJECT SPECIFICATIONS. Where any Article of the PROJECT SPECIFICATIONS is modified or any Paragraph, Subparagraph, or Clause thereof is modified or deleted by these Special Conditions, the unaltered provisions of the Article, Paragraph, Subparagraph, or Clause shall remain in effect.

A. GENERAL REQUIREMENTS

1. GENERAL DESCRIPTION: The work described in these SPECIFICATIONS shall consist of 14th Street Water Main Replacement, including all related appurtenances as shown on the DRAWINGS and as described herein. All materials shall be new and both workmanship and materials shall be of highest quality.

2. NOTICE TO PROCEED: The CONTRACTOR shall commence work within five (5) days after the date specified in the Notice to Proceed, and the calendar days to complete all work shall begin on that specified date.

3. PRECONSTRUCTION CONFERENCE: The CONTRACTOR is advised that prior to beginning any construction, a Preconstruction Conference shall be held with the ENGINEER, representatives of utility companies, and the CONTRACTOR'S representatives, (including the superintendent/foreman who will be responsible for work on the project site), to discuss the drawings, procedures, and the order of construction of this project. The CONTRACTOR shall also supply the ENGINEER with the construction progress schedule at the time of the Preconstruction Conference. This schedule shall be subject to the approval of the ENGINEER and shall be adhered to during the construction progress of the project.

4. CONSTRUCTION MANAGEMENT: The CONTRACTOR shall designate a superintendent/foreman who is to be present on-site at all times during construction.

5. SAFETY: In accordance with generally accepted construction practices, the CONTRACTOR shall assume sole and complete responsibility for job site conditions during the course of construction of the project, including safety of all persons and property.

6. SOILS INFORMATION: No investigations were performed for this project.

7. UTILITIES: The CONTRACTOR shall familiarize himself with the exact location of existing utility lines, and shall take every precaution to protect these lines. The CONTRACTOR shall notify the One Call Service (Phone 344-3565) at least 48 hours prior to beginning construction. The CONTRACTOR shall be responsible for any damage to utilities as a result of his operation.

8. UTILITY COORDINATION: The CONTRACTOR shall coordinate construction activity with the utility companies. If utility lines and other appurtenances require special protective measures, as required by the respective utility companies, the CONTRACTOR shall provide such protection (whether by him or by the utility companies and coordinated with his operations). The cost of all labor, material, and equipment for such protection shall be included in the unit bid prices for the work items involved.

9. TRAFFIC CONTROL: CONTRACTOR shall maintain traffic signage throughout the construction of the project. He shall move and relocate traffic signage as his operations require with prior approval of the ENGINEER.

   a. All barricades, warning signs, lights, temporary signals and other protective devices must conform with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways published by the U. S. Government Printing Office. All barricades and signs shall be constructed and erected in accordance with Barricading Standards, Specifications, Methods and Materials for the City of Omaha.

   b. The CONTRACTOR shall provide, erect and maintain all necessary barricades, suitable and sufficient lights, hazard beacons, other signs, provide a sufficient number of flagmen and take all necessary

precautions for the protection of the work and the safety of the public. All lights shall be kept burning from sunset to sunrise.

c. The CONTRACTOR shall erect warning signs in advance of any place within the project limits where operations interfere with the use of the road by traffic, and at all intermediate points where the new work crosses or coincides with an existing road.

d. Each light shall be checked and serviced with sufficient frequency to insure that lights are always operating with the brightness available with fresh batteries and new lamps. The lenses shall at all times be clean, free of mud or dust film.

e. The furnishing, erecting and maintaining of all barricades, traffic control and protection devices as called for by the standards or as ordered by the ENGINEER shall not be measured and paid for directly, but they shall be considered subsidiary to the items for which the contract provides that direct payment will be made.

10. STREET CLOSING: All streets and roadways are to remain open to traffic at all times.

11. PROJECT SPECIFICATIONS: Construction details and material specification shall conform to the current City of Omaha "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," 2003 EDITION and applicable Standard plates (excluding Section 100, "GENERAL REQUIREMENTS AND COVENANTS"), except as modified by these SPECIFICATIONS, the SPECIAL CONDITIONS, and/or the DRAWINGS.

12. REFERENCED SPECIFICATIONS: All referenced specifications shall include any supplements or revisions thereto to date.

13. SPECIAL CONDITIONS: Where any conflict arises between the SPECIAL CONDITIONS and the PROJECT SPECIFICATIONS, the SPECIAL CONDITIONS shall govern.

14. WORK WITHIN LIMITS OF CONSTRUCTION: The CONTRACTOR shall familiarize himself with the location of the property lines, and shall conduct his operations within the limits of construction.

15. DAMAGE TO PROPERTY: Any damage caused by the CONTRACTOR'S operations to real or personal property during construction under this CONTRACT shall be promptly repaired by the CONTRACTOR at no additional cost to the OWNER. All claims for damages shall be settled by the CONTRACTOR to the satisfaction of the ENGINEER and the OWNER'S attorney prior to final payment.

16. NOTICE TO STAKE: Staking will be provided by the Owner. 48 hour notice shall be given before stakes are needed.

17. LINES AND GRADES: Lines and grades will be the Contractors responsibility.

18. MUD AND CONSTRUCTION DEBRIS: The CONTRACTOR shall take the necessary precautions to keep mud and debris from being deposited onto open lanes of the existing paving during construction operations. Should mud and debris become deposited upon such open lanes of existing paving due to the project, the CONTRACTOR shall promptly remove it at no additional cost to the OWNER.

19. CLEAN UP: Before the work will be accepted by the Owner, the CONTRACTOR shall be required to remove all debris resulting from his operation, which also includes cleaning of streets, ditches and driveways of earth, sod or other objectionable material and shall dispose of such debris off the project.

20. FINAL INSPECTION: The CONTRACTOR shall notify the ENGINEER when he has completed all work in accordance with the DRAWINGS and SPECIFICATIONS. He shall avail himself for an on-site inspection of the project with the ENGINEER. Any items found to be incomplete or improperly constructed shall be listed, and the CONTRACTOR shall take prompt action to correct such items. Upon completion of all such work, a final inspection will be scheduled to include the CONTRACTOR'S representative, the OWNER'S representative, and the ENGINEER. Should the CONTRACTOR fail to complete the items

listed (thereby causing final inspection to be repeated), the cost of engineering or any other costs incurred by the OWNER, due to such repeated inspections shall be at the expense of the CONTRACTOR and will be deducted from the final contract amount.

21. PAYMENT FOR SUPPLEMENTARY ITEMS: Any supplementary item shown on the DRAWINGS or called for in the SPECIFICATIONS and not provided for in the BID will not be paid for separately, but will be considered incidental to items for which payment is made.

22. TESTS AND INSPECTION: The cost of all inspections, tests, and approvals meeting the specification requirements and not designated the CONTRACTOR'S responsibility, will be borne by the OWNER. Costs of all tests not meeting the specification requirement will be paid for by the OWNER but shall be deducted from the CONTRACTOR'S final payment.

23. DUST CONTROL: If dust from the CONTRACTOR's operations within the project area would be a nuisance or hazard to others, the CONTRACTOR shall take such measures as necessary to control dust. Dust control will not be paid for directly, but is considered subsidiary to the contract items for which payment is made.

24. PROJECT DOCUMENTS: The Contractor shall be required to have a copy of the City of Omaha Standard Specifications for Public Works Construction, 2003 Edition, a copy of the City of Omaha Standard Plates, Current Revisions, the project plans and these specifications on the job site at all times.

25. PROSECUTION OF WORK: The Contract Time is 90 calendar days. The Notice to Proceed will be issued to the Contractor at his preferred date, except the Notice to Proceed shall be issued by June 14, 2013. Once issued, the Contractor will have 90 consecutive calendar days to complete the project.

26. NOTIFICATION OF PROPERTY OWNERS: The Contractor shall contact and provide written notice to property owners 48 hours in advance of performing work that will affect access to and from their residence or business or interrupt their water service.

B. REMOVALS

1. REMOVE EXISTING PAVEMENT: This work shall conform with Section 207 of the Standard Specifications. A full depth saw cut will be required where pavement to be removed abuts pavement to remain.

2. SAW CUT EXISTING PAVEMENT: Saw cuts for the removal of existing P.C.C. or A.C. pavement shall be full depth. The edges of all pavement to be removed which abut pavement to remain shall be saw cut prior to removal. Saw cutting existing sidewalk, driveway and roadway pavements will not be measured for payment but shall be considered subsidiary to the item for which payment is being made.

3. IMPORTED FILL: Imported Fill shall conform with Section 200 of the Standard Specifications. Material not available on the site to complete construction to the grade lines indicated shall be furnished by the contractor from a borrow area designated and provided by the City.

   Contractor furnished borrow will be measured on an agreed to volume basis. Payment for the borrow material shall be at the contract unit price per cubic yard for the item Imported Fill. The contract price shall be full compensation for loading, hauling, placing, adjusting for moisture and compacting in place per the plans and details.

   No measurement will be made for on site earthwork items. All on site earthwork shall be performed to the lines and grades detailed in the plans. All on site earthwork required to complete the project shall be considered subsidiary and incidental to items for which payment is made.

4. UNSUITABLE EXCAVATION: As directed by the Engineer, the Contractor shall excavate designated areas below the subgrade which are unsuitable for compacting in place. The areas so excavated shall be

backfilled with imported fill to obtain the desired compaction. The unsuitable excavated materials shall be wasted on site and replaced with imported fill.

Payment will be made at the contract unit price per cubic yard for borrow material. The Contract price shall be full compensation for excavation, segregation and wasting of unsuitable material, furnishing, hauling and placing imported fill material, adjusting the backfill material moisture content to specified optimum, backfilling and compacting the excavations to obtain the pre-unsuitable excavation grade.

The unsuitable excavation will not be measured.

5. CLEAR WORK AREA: Clear Work area shall consist of clearing the work area of all trees, bushes shrubs, benches, planters, and miscellaneous items that interfere with construction. This work shall be paid for on a lump sum bid price basis.

C. PAVEMENT RECONSTRUCTION

1. CONCRETE MIX

The concrete mix design shall be NDOR 47B-3500 Type 1PF.

2. SUBGRADE PREPARATION

a. Ensure backfill and grading has brought subgrade to required elevations. All required fill material shall be select material. Subgrade shall be compacted to 95 percent of the maximum dry density at a moisture content of within 4 percent above or 2 percent below optimum moisture content as determined by ASTM D698 (Standard Proctor).

b. Fill soft spots and hollows with additional fill.

c. After all necessary grading has been completed to bring the surface to subgrade, the top twelve (12) inches of the subgrade shall be scarified, adjusted for moisture, if necessary, and compacted to 95 percent of the maximum dry density at a moisture content of 4 percent above or 2% below optimum moisture content as determined by ASTM D698 (Standard Proctor).

d. A 6" lift of Granular Foundation Coarse shall be placed above the prepared subgrade for street and curb and gutter construction. This work shall conform to NDOR Standard Specifications Section 307.

3. FINISH GRADING

a. All disturbed areas shall be struck off to conform to the lines and grades indicated on the drawings or to the existing contours. All disturbed areas are to be left smooth and free from ridges and ditches.

b. All newly graded areas shall be protected against action of the elements. Prior to acceptance of the work, all damage due to washes and settlement which may occur from any cause shall be repaired and grades re-established.

4. ACC PAVEMENT: Shall conform to the following requirements.

a. NDOR Standard Specification for Performance Graded Binder and Superpave Asphaltic Concrete.

b. Measurement and Payment

1) Asphaltic Concrete Pavement - Measurement of Asphaltic Concrete pavement shall be by the per ton basis of the project specification for the item "Asphalt Concrete Surface Coarse, Type SPR.

5. SEEDING: Seed all areas disturbed by the Constructor's operations in accordance with Section 802 of the project specifications. Seed shall be non-irrigated lawn and turf seed. Apply at 1.5 times the application rate of table 802.06. Seeding will not be measured for payment. Payment will be made on a lump sum basis for seeding all areas disturbed by the Contract operations. The lump sum price will be for furnishing all items per 802.04 of the project specifications.

6. MILL ASHPLAT PAVEMENT: This work shall consist of milling a nominal 2 inches of asphalt along the west side of 14th Street as shown on the plans. This work will be paid for per the square yard bid price.

7. HANDICAP RAMP TRUNCATED DOMES: This work shall consist of constructing truncated domes at handicap ramps in the locations shown on the plans. This work will be paid for at the contract square foot unit bid price.

8. TEMPORARY SURFACING: This work will consist of placing rock surfacing as directed by the engineer to aid people in accessing residences and businesses in the event that the exposed subgrade becomes wet during construction. This work will be paid for at the unit bid price.

9. PAVEMENT MARKING: This work shall consist of painting parking stalls and crosswalks as shown on the plans. This work will be paid for on a lump sum unit price.

10. REBUILD INLET TOP: This work will consist of removing the existing top and grate from the inlets during curb and gutter removal and reconstructing the inlet top and reusing the existing grate during the construction of the new curb and gutter. Gutters shall be reconstructed per NDOR Standard Plan 443. This work will be paid for on a per each unit price.

11. SPECIAL TOPSOIL FOR PLANTING BEDS: This work shall consist of placing clean highly organic topsoil in at 12 inch depth in all planting beds. This work shall be paid for at the cubic yard contract price.

12. 2" PVC CONDUIT: This work shall consist of installing a 2" PVC conduit for future use to power street lights. This work shall be paid for at the lineal foot contract price.

13. PULL BOX: This work shall consist of installing Type PB-2 pull boxes for future use. The 2" PVC conduits shall be brought up in the pull boxes as shown on the detail. The depth of the pull box shall be 24". The work will be paid for at the per each unit price.

D. WATER DISTRIBUTION

1. GENERAL: This section includes the general work related to the construction of the water main and services, to include water pipe, service connections, valves, fittings, and hydrant assembly included on the plans and as required to complete the water line construction indicated.

2. DESIGN SUMMARY: The design working pressure for the new water main ranges from 92 psi on 14th Street to 98 psi on 13th Street.

3. WATER MAIN: The water main shall be of the following material:

   a. Polyvinyl Chloride (PVC) Pipe: Comply with AWWA C900 or AWWA C905 with gray iron pipe equivalent outside diameters.

      1) Minimum Wall Thickness:
         a) 4 inch through 24 inch size : DR 14

      2) Joint Type: Use push-on joint type, except as otherwise specified in the contract documents

or as authorized by the Engineer.

a) Push-on: According to AWWA C900 or AWWA C905.
b) Integral Restrained Joint: AWWA C900 or AWWA C905 pipe with restraining system manufactured integrally into pipe end.
c) Mechanical Restrained Joint: Ductile iron mechanical device designed for joint restraint of AWWA C900 or AWWA C905 pipe complying with the requirements of ASTM F 1674

3) Markings on Pipes:
   a) Name of manufacture
   b) Size and class.
   c) Spigot insertion depth gauge
   d) National Sanitation Foundation (NSF) seal.

4. FITTINGS:

a. For PVC Pipe: Comply with AWWA C110 (ductile iron or gray iron) or AWWA C153 (Ductile iron).
   1) Joint Type:
      a) For Pipe sizes 16 inches and less, use mechanical joint complying with AWWA C111.

5. BOLTS FOR WATER FITTINGS:

Use corrosion resistant bolts.

a. Tee-bolts and Hexagonal Nuts for Mechanical Joints:

   1) High-strength, low-alloy steel manufactured according to AWWA C111.

   2) Provide ceramic-filled, baked-on, fluorocarbon resin coating for bolts and nuts.

   3) Include factory-applied lubricant that produces low coefficient of friction for ease of installation.

6. GATE VALVES:

All gate valves shall be of resilient seat type and shall conform to the requirements of AWWA C509. The valve operator shall be provided with a standard AWWA 2" operating nut; the valve shall open by turning the nut to the left.
End fittings shall be as follows:

a. PVC pipe 2 ½" through 12" joint ends – mechanical joints ends per AWWA C111.

b. On detailed drawings – use type of end fittings indicated

c. Bolts and hex nut stainless steel according to ASTM A240, Type 304. Gate Valve shall be Mueller A-2360 resilient wedge gate valve or an approved comparable product.

All Gate Valves shall be wrapped with a polyethylene wrap and taped in accordance with Method C of AWWA C105 after installation. The wrap shall completely cover the valve, end joints, and operator, taped around the ends to form a good seal.

7. VALVE BOXES: Valve boxes shall be cast iron with top section and cover with lettering "WATER". Boxes shall be 5" in diameter with base of the size to fit over valve. The valve box shall be adjustable in length. In paved areas provide a slide type. In all other areas provide a screw extension type. Factory finish with asphalt coating. All valve boxes shall include a centering ring and valve stem extension to within 3 feet of finished grade. Stem diameter according to valve manufacture, but not less than 1 inch.

8. 6" HYDRANTS: Hydrants shall comply with AWWA C502 with features detailed on the drawings. The hydrants shall be installed as detailed on the drawings. Outlet threads: NFPA 1963, with external hose thread used by local fire department. Included cast iron caps with steel chains. The operating nut shall be a pentagon 1 ½" point to flat and open to left. The paint finish shall be alkyd-glass enamel according to AWWA C502. External bolts and hex nuts shall be stainless steel according to ASTM A193, Grade B8. Hydrants shall be Mueller A423 Centurion or an approved comparable product.

9. CURB STOPS: Bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet to match service piping material. Curb stops shall be Mueller oriseal curb valves Model #H-15154 (Minneapolis top thread) or approved comparable product. Curb box shall be Mueller extension type with Minneapolis pattern base catalog number H-10332 with stationary rods.

10. SERVICE BOXES FOR CURB STOPS: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include lid with pentagon plug, and bottom section with stationary rod. Curb stop box shall be Mueller extension type with Minneapolis pattern base, Model #H-10332.

11. EXCAVATION AND BACKFILLING

    a) The backfill shall be hand tamped under and around the pipe to a distance of six inches above the top of the pipe in six inch lifts, loose thickness. Caution shall be used in placing and tamping backfill material around the above the pipe to prevent disturbance of the joints or pipe alignment. Backfilling shall be in accordance with AWWA C600.

    b) Backfilling: Trenches shall be mechanically compacted to 95% of Standard Proctor, ASTM 698 at or near the optimum moisture content. The owner will pay for compaction tests that meet the requirements contained in these specifications. When these tests fail to meet the specified requirements, the contractor shall pay the cost of all such failing tests.

12. PIPE INSTALLATION

    a) Pipe installation shall be in accordance with AWWA C600. Pipe shall be handled with slings or lifting arms.

    b) Water Main Installation: The Water Main shall be constructed in a trench with allows a minimum of 5.5 feet between the top of the pipe and finished grade or a minimum of 5.5 feet between the top of pipe and the grade line of the road shoulder. In areas where the existing finish grade line along the pipeline is higher in elevation that the shoulder of the existing road, the Contractor shall provide the necessary extra exaction to meet the specified pipe bury. Where pipeline crosses a ditch, the minimum bury shall be 5'-0". Water Main installation shall conform to AWWA C600.

13. TESTING

    a) Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

    b) Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours, per Section 4 AWWA C600.

    c) Disinfection: All new main and connections to existing main shall be disinfected in accordance with AWWA C651-92. Following chlorination the main shall be flushed within 24 hours. Provisions shall be made to prevent contamination of existing mains by cross-connection during pressure testing, disinfection or flushing of new mains. After flushing and before the new main is connected to the distribution system, two consecutive sets of acceptable samples, taken 24 hours apart shall be collected from the new main. At least one set of samples shall be collected from every 1200 feet of new water main plus one set from the end of each branch.

d) All testing and sampling, flushing and or reflushing testing and sampling shall be at the contractor's expense and will be considered subsidiary to items for which direct payment is made.

14. INSTALLATION OF HYDRANTS:

a) Hydrants shall be set plum.

b) Hydrants shall be set on concrete not less than 6 inches thick and 15 inches square.

c) Hydrants shall have a concrete thrust block poured against undisturbed earth with minimum dimensions of 12 inches each way.

d) Hydrants shall have a minimum of seven cubic feet of coarse gravel, crusted stone or broken concrete placed at the base for drainage.

e) Hydrants shall be set with the pumper connection facing the street. The hydrant set back form pavement or roadway surface shall be as detailed on the drawings.

f) When the depth of main exceeds nominal bury depth on standard hydrants, extensions shall be installed as necessary at the contractor's expense.

15. INSTALLATION OF VALVE BOX:

a) All valves shall have a valve box (CC box) and cover. The word "WATER" shall be cast in the cover.

b) All valve and valves boxes shall be set plumb.

c) The valve boxes shall be cast iron and include base, middle section, top section and a deep skirt cover similar to Tyler Union 6850 series. The valve box shall not be secured to the valve.

d) The box shall be set over the valve, plumed and dirt tamped around the box. If the box is not plumb and centered over the valve after the trench is backfilled, the Contractor shall dig out and reset the box.

e) The top of the valve box shall set at the elevation of the existing ground or top of the pavement if in a surfaced street.

f) If the valve box is not set in a concrete surfaced street, a six inch thick concrete pad shall be poured around the top.

16. WATER SERVICE PIPING: All water service pipes 3/4" through 1-1/4" diameter shall be Type K copper tubing. All water services 1-1/2" diameter and larger shall be type K copper, red brass or Class 151 ductile iron pipe. All underground connections used on copper service piping shall be flared or hard soldered.

Service line shall have a curb stop located between the curb line and property line and be installed within a stop box. If located in the street install within a roadway box.

The installation of curb stop boxes, roadway boxes and CC boxes shall be performed so that they will function properly and so that access to the shut off device is maintained. All shall be set vertically with the top flush with the surrounding surface.
The water service shall be run perpendicular to the main and have a cover not less than five feet.

All service lines up to 1 ¼ " shall be laid with sufficient slack to provide for settlement and shall be one continuous piece from corporation to curb stop.

17. MEASUREMENT AND PAYMENT: The payment listed below shall be full compensation for all labor, materials, equipment, tools and incidentals necessary to complete the work. Payment shall be for quantities in place, measured after completion of the work.

    a) PVC Water Main will be measured in units of lineal feet. Payment shall be at the contract unit price for the item water main.

    b) Sleeves and retaining glands used for connecting to existing facilities will not be measured for payment but shall be considered a subsidiary item of work to the water main.

    c) Testing of the water system for performance will not be measured for payment, but shall be considered a subsidiary item of work to the entire project.

    d) Pipe bedding will not be measured for payment, but will be considered subsidiary to the installation of the pipe for which the bedding is required unless otherwise specified in the specified in the Special Conditions.

    e) Undercutting of the trench for the placement of granular pipe bedding will not be measured for payment, but shall be considered a subsidiary item of work to the installation of the pipe.

    f) Hydrants assembly will be measured in units of each and shall include the connecting pipe from the water main to the hydrant, 6" tee, gate valve and box and all appurtenances. Payment will be at the contact unit price for the item "FIRE HYDRANT ASSEMBLY".

    g) Gate valves will be measured for payment in units of each. Payment will be at the contract unit price for the item "_____" Gate Valve" and shall be full compensation for furnishing and installing the gate valve complete with valve box and cover and concrete work as specified or shown on the drawings for the gate valve installation.

    h) Corporation stops and curb stops will be measured in units of each. Payment shall be at the contract unit price for the item "_____ "CORP AND CURB STOP".

    i) Thrust blocks will not be measured for payment but shall be considered subsidiary to the pipe for which payment is made.

    j) Copper service pipe will be measured in units of lineal feet from corporation stop to curb stop without allowances for goose necks, sag, or meanders. Payment shall be at the contract unit price for the item "_____" Copper Service LINE" for each respective size listed in the proposal.

17. ABANDON WATER MAIN: The existing water mains shall be abandoned in place after the new water main has been disinfected, tested and put into service. The main shall be drained and the exposed ends capped with concrete.

18. MAINTENANCE OF WATER SERVICE: The Contractor shall maintain water service throughout the project at all times. Water service may be interrupted due to water main shut down for work on individual service connections for a maximum of 4 hours. It is the Contractor's responsibility to notify each affected property owner 48 hours in advance of shutoff and the day of shutoff.

    All work associated with maintaining water service is subsidiary to items for which direct payment is made.

PERFORMANCE GRADED BINDER

Section 503 in the Standard Specifications is amended to include Performance Graded Binders.

Section 1029 in the Standard Specifications is void and superseded by the following:

I. Description

The performance graded binder to be used on this project shall be PG Binder supplied by a Certified Supplier.

II. Certified Supplier

A supplier must be certified by the Nebraska Department of Roads to be allowed to supply Performance Graded Binder in Nebraska. To be considered certified by the NDR, a supplier must participate in one or more of the following PG Binder groups.

1. AASHTO Materials Reference Laboratory (AMRL)
2. Western Cooperative Testing Group (WCTG)
3. Combined States Binder Group (CSBG)

The supplier must also maintain and follow the requirements of the group or groups in which they participate in, to maintain certification by the Nebraska Department of Roads. In addition, active participation is required to maintain certification by the Department. Active participation will include submitting of round robin sample results, along with meeting other requirements of the group or groups.

A certified supplier may be asked to supply to the Department, past round robin results, laboratory inspection reports, reasons for and investigative reports on out lying results, quality control testing, and/or technician training and proficiency testing reports.

The binder supplier agrees to inspection of their plant or terminal without notice anytime during production or supplying of material to the Department. The inspection may also include the supplier's laboratory.

A certified supplier can voluntarily submit samples of binders proposed for use to the Materials and Research Bituminous Laboratory for quality and verification testing.

III. Supplier Certification

A supplier may request certification by contacting the Nebraska Department of Roads, Materials and Research Division, Flexible Pavement Engineer at (402) 479-4675. A temporary certification may be issued for a period of up to one year. Split sample testing will be required prior to receiving a temporary certification. Split sample testing will be done on all grades of binder that the supplier intends to supply during the temporary certification. The supplier will have up to one year to become certified by participating in and following the requirements of one or more of the approved binder groups.

A supplier may become certified through active participation in other binder certification/round robin groups that are approved by the NDR. The NDR may request from the supplier prior to approval, past or current round robin results, quality control testing, laboratory inspection reports, and/or technician training and proficiency testing reports.

IV. Loss of Certification

Certification will be withdrawn from a supplier for a minimum of 6 months when one or more of the following conditions exist.

1. Inability to consistently supply material meeting specifications as outlined herein.

2. Failure to maintain an acceptable quality control program.

3. The failure to meet one or more of the conditions of being a Certified Supplier as outlined above.

Notification of decertification of a supplier will be submitted in writing by the NDR. Material from a decertified source will not be accepted for use on NDR projects and the NDR districts will be notified of this action.

V. Supplier Recertification

If a supplier has lost certification and seeks to be recertified, the following steps are required.

1. Fulfill the requirements outlined above for gaining Certified Supplier status.

2. Submit documentation to the Flexible Pavement Engineer explaining why decertification occurred, and the actions that are going to be taken to correct the problems identified in writing by the NDR.

VI. Binder Sampling and Testing:

1. Lots. Each 3750 tons (3400 Mg) of HMA produced will be a binder lot.

2. A binder lot will include only one PG Binder grade or a blend as allowed in paragraph VI.6.e.

3. A binder lot will only include one supplier of the PG Binder or a blend as allowed in paragraph VI.6.e.

4. Blending of different binder grades and binders from different suppliers will be allowed with restrictions as noted in paragraph VI.6.e. The Engineer must be notified of the intent to blend prior to actual blending.

5. All binders shall be sampled at the rate of at least one sample per lot.

    a. The sample shall consist of two one-quart (liter) cans and shall be taken by the Contractor's Certified Sampling Technician, with assistance from or under supervision of NDR personnel. The sample shall be taken at the plant from the line between the storage tank and the mixer or from the tank supplying material to the line, at a location at which material sampled is representative of the material in the line to the mixer. One can will be tested for specification compliance, and the other can portion will be saved for check tests and dispute resolution, if needed. The

sampling process shall follow procedures of the NDR Materials Sampling Guide.

b. Testing. When the tested PG Binder is in compliance, the binder lot will be accepted and both cans of the sample can be discarded. If the tested PG Binder does not comply, then the price of the PG Binder lot represented by the sample shall be adjusted according to Tables 2 and 3. Overall project average testing requirements and price adjustments will also apply, as stated in Table 4.

6. Material Requirements

a. Performance graded binder, as specified in the contract items, shall be in accordance with the PG+ specifications as noted, and AASHTO M320 with the exception of Direct Tension.

b. Substitution of a PG Binder, which exceeds the upper and lower grade designations from the specified, requires advance notification of the Engineer, and be documented by a no cost change order. The bill of lading or delivery ticket shall state the binder grade and specific gravity.

c. Material Certification - A Material Certification shall be submitted prior to construction, stating the type of modifier being used, and the recommended mixing and compaction temperatures for the Hot Mix Asphalt. The Material Certification must state that acid has not been used. The Material Certification must also state that the material has not been air blown or oxidized.

d. The Contractor shall receive from the supplier, instructions on the proper storage and handling of each grade and shipment of PG Binder.

e. Blending of PG Binders at the hot mix plant site will be allowed only when transitioning to an asphalt mixture requiring a different grade of binder, and with the following restrictions:

(1) The resultant blend will meet PG+ (modified binders) and/or AASHTO M320 specifications when tested as ±3° C of the specified PG binder. The sample of the blended material 1) will be considered as a lot sample, 2) will be taken during initial production following the blending of the binders, and 3) shall have deductions applied as per Tables 2, 3, and 4 when not meeting specifications, will apply. On the blended sample's identification form will be a note explaining the blending conditions and a statement that the sample is a blend of materials. The next lot sample, following the sample representing the blend, will be tested as the specified binder grade for the asphalt mixture being produced and shall meet AASHTO M320 and PG+ (if modified) specifications.

(2) Modified Binders - Only blending of the same type of elastomer modifiers listed in VI.6.f.(1) will be allowed.

f. When modified binders are specified, the following PG+ specifications (Table 1) and AASHTO M320 (with the exception of Direct Tension) will apply:

(1) The performance graded binder shall be a binder, which incorporates a blend of base asphalt and elastomer modifiers of styrene-butadiene (SB), styrene-butadiene-styrene (SBS) or styrene-butadiene-rubber (SBR). Acid shall not be used. Air blown and/or oxidized asphalt will not be allowed. The supplier must certify that the binder is not acid modified, and that acid was not used. The binder supplier must also certify that air blowing or oxidization has not been done/used to modify the binder or used to change the properties of the binder.

(2) The composite material shall be thoroughly blended at the asphalt refinery or terminal prior to being loaded into the transport vehicle. The polymer modified binder shall be heat and storage stable and shall not separate when handled and stored as per the supplier's storage and handling recommendations.

(3) The composite material shall be homogenous, and shall not demonstrate evidence of 1) localized gellation or over-crosslinking of polymers, 2) improper use of gelling modifiers used in addition to polymer modification, or 3) otherwise any other lumpy conglomerations.

(4) To insure the binder is of a modification system in which no acid is used, the Materials and Research Bituminous Laboratory will perform a random free-acid verification test. ARR-MAZ AD-here LOF65-00, amine anti strip will be added at the rate of 0.5% to sample(s) that have been heated to 300 degrees F or until viscous and stirred for a minimum of 5 minutes. The resultant blend will then be tested for PG grading and compared to PG grading prior to the blending. Binders tested for acid modification shall meet AASHTO M320 specifications, and shall not show a drop of G*/sin(delta) of more than 25% when compared to the result(s) of the sample prior to the verification test. If the verification test reveals material that does not meet AASHTO M320 specifications, or shows a drop of G*/sin(delta) greater than 25%, the material that is represented by the sample will be rejected. If a random sample demonstrates acid modification, additional samples will be tested.

(5) Supplier-submitted samples of binder proposed for use, can be tested for acid modification. Binders that demonstrate acid modification will not be accepted for use.

(6) Lot samples of the binder shall meet or exceed the PG+ specifications as listed, in addition to AASHTO M320 specifications. For PG+, Table 1 specification testing, material will be tested on original unaged binder for phase angle specification, and RTFO aged material for elastic recovery. Project lot samples can also be tested for acid modification as described in VI.6.f.(4).

(7) When it is determined that material exceeds Table 1, Table 2 will apply. When it is determined that a single sample(s) does not meet AASHTO M320 specifications, Table 3 will apply.

(8) All project samples will be tested for original binder dynamic shear rheometry compliance.

(9) Modified binders with a temperature spread of 104 shall be exempt of the AASHTO M320 requirement for the test of Viscosity, AASHTO T316.

(10) All specified binders with a temperature spread of 92 or greater, shall be modified with an elastomer modifier as specified in paragraph VI.6.f.(1).

Table 1

Additional Specifications for Modified Binders

PG+ Specifications	**Spec Base**			**Spec w/Tol.[2]**		
Temperature Spread [1]	**92**	**98**	**104**	**92**	**98**	**104**
Elastic Recovery; AASHTO T301 tested at 77°F (RTFO Aged AASHTO T301)	Minimum 65%			Minimum 60%		
Phase Angle; degrees (Maximum) (Original Binder)	77.0	75.0	73.0	79.0	77.0	75.0

[1] Temperature Spread is determined by subtracting the low temperature from the high temperature. Example (PG 64-28: 64 – (-28) = 92).

[2] Tolerances were determined from CSBG round robin data and AASHTO or ASTM precision statements. Material exceeding these tolerances is subject to 75% pay or removal.

Table 2

PG + Single Sample Tolerance and Pay Factor Table

	Pay Factor of 0.75 or Removal[1]		
Temperature Spread	**92**	**98**	**104**
Elastic Recovery Percentage (RTFO Aged AASHTO T301)	< 60%		
Phase Angle (degrees) (Original Binder)	> 79.0	> 77.0	>75.0

[1] Price Reduction will be applied to contract unit price of asphalt binder. The Engineer will determine if the non-compliant material will be removed. Removal and replacement will be at no additional cost to the Department. If the non-compliant material is accepted, a price factor of 0.75 will be applied. The price factor will be applied to the contract unit price of asphalt binder.

Table 3

Single Sample Tolerance and Price Factor Table

	Pay Factor of 0.75 or Removal[1]
Tests on Original Binder Dynamic Shear, G*/Sin δ, kPa	< 0.93
Tests on Rolling Thin Film Oven Residue Dynamic Shear, G*/Sin δ, kPa	< 1.98
Tests on Pressure Aging Vessel Residue Dynamic Shear, G*Sin δ, kPa	> 5600
Creep Stiffness S, mPa	> 325
m-Value	< 0.285

[1] Price Reduction will be applied to contract unit price of asphalt binder. The Engineer will determine if the non-compliant material will be removed. Removal and replacement will be at no additional cost to the Department. If the non-compliant material is accepted, a price factor of 0.75 will be applied. The price factor will be applied to the contract unit price of asphalt binder.

VII. Overall Project Average - Price Reduction Based on Complete M320 Testing

1. Binders that demonstrate acid modification as per VI.6.f.(4) shall be rejected, and the test results will not be included in Overall Project Averages.

2. PG+, Table 1 specifications do not apply to Overall Project Averages.

3. Out of specification material will be determined by the specifications outlined in AASHTO M320, excluding Direct Tension.

4. The Nebraska Department of Roads, Materials and Research Bituminous Laboratory, will do complete specifications testing on a minimum of two samples or 20% of the total samples from the project, whichever is the greatest. The Department will randomly select one sample for complete specifications testing out of every five samples received. When any test result shows a sample not meeting specifications, the previous and following sample received will also be tested for complete specifications compliance. Adjacent-sample testing will continue in this manner until tested samples meet all specifications, or there are no more lot samples to be tested.

5. Samples not selected for complete specifications testing are "control" samples. Control samples will be tested for AASHTO M320 Dynamic Shear, as well as PG+ phase angle if modified. When a control sample falls out of AASHTO M320 Dynamic Shear and/or PG+ phase angle specification, it will then be tested for complete M320 and PG+ specifications compliance. And, as mentioned in VII.4, adjacent samples will be tested when any results do not meet specification. Adjacent testing will continue until tested samples meet all specifications, or there are no more lot samples to be tested. This additional complete testing for

M320 and PG+ compliance is in addition to the minimum number of samples that will be tested for complete M320 and PG+ compliance.

6. At the completion of testing, all M320 test results will be averaged. The average will not include M320 results from any binder lots that have already been reduced in pay by Table 3. For averages that do not meet M320 specifications, the largest reduction shown in Table 4 will be applied to all the Performance Graded Binder used on the project, with the exception of any binder lots that were already reduced in pay by Tables 2 and/or 3. In cases where there is only one PG Binder Grade lot sample left for determining the Overall Project Average tests results, that one sample will be used for Project Average Factor determination by Table 4.

Table 4

Overall Project Average – Pay Factor Table

	Range of Average	Pay Factor Applied
Tests on Original Binder Dynamic Shear, G*/Sin δ, kPa Min. 1.00 kPa	< 1.00 – 0.98 < 0.98 – 0.96 < 0.96 – 0.94 < 0.94	0.98 0.95 0.92 0.85
Tests on Rolling Thin Film Oven Residue Dynamic Shear, G*/Sin δ, kPa Min. 2.20 kPa	< 2.20 – 2.156 < 2.156 – 2.09 < 2.09 – 2.024 < 2.024	0.98 0.95 0.92 0.85
Tests Pressure Aging Vessel Residue Dynamic Shear, G*Sin δ, kPa Max. 5000 kPa	>5000 – 5100 >5100 – 5250 >5250 – 5400 >5400	0.98 0.95 0.92 0.85
m-Value Min. 0.300	< 0.300 – 0.298 < 0.298 – 0.293 < 0.293 – 0.290 < 0.290	0.98 0.95 0.92 0.85
Creep Stiffness S, mPa Max. 300 mPa	>300 – 306 >306 – 315 >315 – 324 >324	0.98 0.95 0.92 0.85

VIII. Single Sample Reduction and Overall Project Average Reduction

A sample representing a lot, incurring pay reduction or removal by Table 2 and/or 3, will incur pay reduction or removal only for the material that the sample represents.

Only the largest overall project average reduction from Table 4 will apply when more than one test average falls out of AASHTO M320 specifications.

Pay Factors or removals, based on single sample test results, and pay factors based on overall project average test results, are separate from each other, and both will be applied.

IX. Investigation of Verification Lot Samples That Do Not Meet Specifications

When the lot sample shows test results out of specification limits, the process of resolving the sample failure will include the following actions, as appropriate:

1. The Bituminous Lab may conduct retesting of the remaining portion of the sample as determined necessary to confirm or disaffirm the original test result(s).

2. The Bituminous Laboratory will notify the NDR project personnel, who will in turn notify the Contractor. All will arrange to investigate all aspects of the testing, loading, handling and delivery of the material in question. The Contractor and NDR project personnel shall report findings to the Bituminous Laboratory.

3. The Bituminous Laboratory will collect and compile all information provided.

4. The Bituminous Laboratory will issue the standard report of tests for all samples tested, to include any resulting pay factor deductions or removals. A copy of the report of tests will be distributed to the District and Construction Division. The District will then provide a copy to the Contractor. Supplier requests for a copy of this report will be directed to the Contractor.

X. Dispute Resolution

After testing and investigations have been completed on the sample, and there is still a dispute, the NDR will select an independent laboratory for referee testing to take place on the remainder of the sample, or any other representative samples obtained. The identity of the independent laboratory will not be revealed until the selected laboratory has completed the referee testing, and the NDR has submitted a final report of the results. If the independent lab's tests indicate failing results and pay deductions equal to or greater than the NDR's, the Contractor will reimburse the NDR for the cost of testing. If the independent lab's tests indicate that the material meets specification or is at a pay deduction less than the NDR's, the NDR will assume the cost of testing. When the independent lab's tests indicate a pay deduction, the lesser of the NDR's and the independent lab's deductions will be applied.

Only the Contractor can initiate dispute resolution, and request referee testing. The request must be made, in writing, to the NDR Construction Division within 60 days of awareness of sample results. For any period of time past 60 days, dispute resolution is forfeited.

SUPERPAVE ASPHALTIC CONCRETE

Section 1028 in the Standard Specifications is amended to provide that Asphaltic Concrete, Type SPR shall use the 0.5 inch gradation band.

SECTION 1028 - SUPERPAVE ASPHALTIC CONCRETE (J-7-0512)

Section 1028 in the Standard Specifications is void and superseded by the following:

1028.01 -- Description

1. a. Superpave Asphaltic Concrete is a Contractor-designed mix.

   b. The Contractor shall be required to define properties using a gyratory compactor that has met the Superpave evaluation test procedures, during mix design and production.

2. Job Mix Formula

   a. Before production of asphaltic concrete, the Contractor shall submit, in writing, a tentative Job Mix Formula (JMF) on the NDOR Mix Design Submittal Form for verification to the Department.

   b. The JMF shall be determined from a mix design for each mixture. A volumetric mixture design in accordance with AASHTO R 35 as modified within this specification will be required. However, the mixture for the Superpave specimens and maximum specific gravity mixture shall be aged for two hours at compaction temperature. The mixture shall be prepared using the following:

      (1) Mixture Conditioning of Hot Mix Asphalt (HMA), AASHTO R 30.

      (2) Method for Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the SHRP Gyratory Compactor, AASHTO T312.

   c. The JMF shall identify:

      (1) The virgin mineral aggregates and pit locations

      (2) Recycled Asphalt Pavement (RAP) and source locations

      (3) Hydrated lime

      (4) Mineral filler

      (5) The percent passing value for each specified sieve for the individual and blended materials

   d. (1) The Contractor shall submit one uncoated, proportioned 22 lb. (10,000 gram) sample of the blended mineral aggregates for consensus properties and specific gravity testing, for all mix types except SPS. Once verified, the Contractor may begin plant production and QC testing with the QA/QC program.

(2) The Contractor has the option of submitting the following; 2 proportioned 22 lb. (10,000 gram) samples of the blended mineral aggregates (which are precoated with hydrated lime) and two one-quart (liter) samples of the proposed PG Binder to be used in the mixture to the Department Materials and Research Central Laboratory at least 15 NDR working days before production of asphaltic concrete. If submitted these samples will be used to verify the Contractor's Superpave mix design test results and mix properties.

(3) Submitted with these samples shall be a copy of the Contractor's results for all Superpave mix design tests.

(4) Mix design shall include at a minimum:

(i) The bulk specific gravity (Gsb), which shall be 2.585, for data purposes and as information only, for all mixes.

(ii) The target binder content. The binder content will be determined by ignition oven results. A correction factor of 0.4% will be added to the ignition oven results for mixes containing hydrated lime.

(iii) The supplier and grade of PG Binder.

(iv) The maximum specific gravity of the combined mixture (Rice).

(v) The bulk specific gravity (Gmb) and air voids at N initial (Nini), N design (Ndes) and N maximum (Nmax) of the gyratory compacted specimens.

(vi) Voids in the Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA) at Ndes.

(vii) Fine Aggregate Angularity (FAA) and specific gravity, Coarse Aggregate Angularity (CAA), Flat and Elongated Particles and Sand Equivalent of the aggregate blend.

(viii) Location description and/or legal descriptions and producers of materials used in the mix.

(ix) Dust to Binder Ratio.

(x) JMF compaction temperatures from NDOR Gyratory Temperature Table (See Table 1028.11).

(xi) The hydrated lime content.

3. Quality Control Program:

a. The Contractor shall establish, provide, and maintain an effective Quality Control (QC) Program. The QC Program shall detail the methods and procedures that will be taken to assure that all materials and completed construction conforms to all contract requirements.

b. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract, the Contractor shall

assume full responsibility for placing a pavement course that meets the target field values.

c. The Contractor shall establish a necessary level of control that will:

(1) Adequately provide for the production of acceptable quality materials.

(2) Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.

d. (1) The Contractor shall develop and submit a copy of their QC Program to the Department. A copy of the QC Program shall be kept on file in the QC lab trailer. This Program shall be updated as needed and submitted annually for review.

(2) The Contractor shall not begin any construction or production of materials without an approved QC Program.

e. The QC Program shall address, as a minimum, the following items:

(1) QC organization chart.

(2) Inspection requirements.

(i) Equipment.

(ii) Asphalt concrete production.

(iii) Asphalt concrete placement.

(3) QC testing plan.

(4) Documentation of QC activities.

(5) Requirements for corrective action when QC or acceptance criteria are not met.

(6) Any additional elements deemed necessary.

(7) A list, with the name and manufacturers model number, for all test equipment used during laboratory testing.

(8) A description of maintenance and calibration procedures, including the frequency that the procedures are performed.

f. The QC organization chart shall consist of the following personnel:

(1) A Program Administrator:

(i) The Program Administrator shall be a full-time employee of the Contractor or a Subcontractor (Consultant) hired by the Contractor.

(ii) The Program Administrator shall have a minimum of 5 years' experience in highway construction.

(iii) The Program Administrator need not be on the job site at all times but shall have full authority to institute any and all actions necessary for the successful implementation of the QC Program.

(iv) The Program Administrator's qualifications and training shall be described in the QC Program.

(2) Quality Control Technicians:

(i) The quality control technicians shall report directly to the Program Administrator and shall perform all sampling and quality control tests as required by the contract.

(ii) The QC technicians shall be certified every 5 years by the Department Materials and Research Division.

(iii) Certification at an equivalent level by a state or nationally recognized organization may be acceptable.

(iv) The QC technician's credentials and training records shall be submitted to the Department.

(v) The Contractor may have a non-certified technician working under the direct supervision of a certified technician for no more than one construction season.

g. (1) Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the work.

(2) QC test results and periodic inspections shall be used to ensure the mix quality and to adjust and control mix proportioning.

4. Contractor's Lab Equipment:

a. The Contractor shall calibrate and correlate the testing equipment according to the procedures prescribed for the individual tests and conduct tests in conformance with specified testing procedures.

b. The Contractor shall have the following equipment (or approved equal) at or near the project location:

(1) A gyratory compactor and molds meeting AASHTO criteria.

(2) An Asphalt Content Ignition Oven meeting AASHTO criteria.

(3) Rice equipment specified in AASHTO T 209, procedure 9.5.1, Weighing in Water. The thermometer being used to measure water temperature will be as specified in T 209.

(4) FAA equipment specified in AASHTO T304.

(5) To test density of compacted asphaltic concrete, a minimum 6000 gm balance, 0.1 gm resolution, with under body connect and water container large enough to conveniently place specimen in the basket and completely submerge the basket and specimen without touching the sides or bottom is required.

(6) QC Laboratory which contain the following:

Air conditioner.

Dedicated phone.

FAX machine or email.

Photocopy machine.

Sample storage.

Work table.

Bulletin board.

Running water.

Desk and chair.

Separate power supply.

Incidental spoons, trowels, pans, pails.

(7) Diamond saw for cutting cores.

(8) Diamond core drill minimum 3 inch (75 mm).

(9) Oven, 347°F (175°C) minimum, sensitive plus 5°F (plus 2°C).

(10) USA Standard Series Sieves for coarse and fine aggregate with appropriate shakers (12 inch (300 mm) recommended).

(11) Personal Computer capable of running the latest version of Department Superpave software, creating an electronic copy of the data, and printing to a Color Printer.

5. QC Testing Plan:

a. The testing plan shall provide that the samples be collected in accordance with the Department statistically based procedure of random sampling.

b. The Contractor may add any tests necessary to adequately control production.

c. All QC test results shall be reported on the latest version of the Department's provided Superpave software by the Contractor with a copy provided to the Engineer within 1 week after the tests are complete. Daily review by the Engineer shall be allowed. At the completion of the asphalt production, the Contractor shall submit to the Department a final copy of the Superpave test results on electronic recording media (CD, e-mail, flash drive, etc.).

d. Corrective Action Requirements:

(1) The Contractor shall establish and utilize QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

(2) The Contractor's QC Program shall detail how the results of QC inspections and tests will be used to determine the need for corrective action.

(3) (i) A clear set of rules to determine when a process is out of control and the type of correction to be taken to regain process control will be provided.

(ii) As a minimum, the plan shall address the corrective actions that will be taken when measurements of the following items or conditions relating to the mixture approach the specification limits:

(I) Plant produced mix gradations at laydown (See gradation tolerances).

(II) Binder content.

(III) Air voids.

(IV) VMA (mix design only).

(V) VFA (mix design only).

(VI) FAA AASHTO T 304.

CAA ASTM D 5821.

(VII) Dust to Binder Ratio.

(VIII) Density.

(IX) Contaminates.

(iii) Corrective actions that will be taken when the following conditions occur:

(I) Rutting.

(II) Segregation.

(III) Surface voids.

(IV) Tearing.

(V) Irregular surface.

(VI) Low Density.

1028.02 -- Material Characteristics

1. The type of PG Binder will be shown in the contract.
2. Recycled Asphalt Pavement:
   a. The Contractor may submit to the State a proposal to supplement the virgin aggregates of the asphaltic concrete mix with a Contractor's specified percentage of Recycled Asphalt Pavement (RAP). The Contractor is responsible for investigating and maintaining the quality and verifying the quantity of the RAP material.
   b. In recycled asphaltic concrete mixtures, the allowable percent of RAP will be as shown in Table 1028.01.

Table 1028.01

Asphaltic Concrete Type	Percent, RAP	
	Minimum	Maximum
SPS	0	50
SPR	0	50
SPH	0	35

3. Aggregates:

   a. Aggregates for use in superpave asphaltic concrete shall be tested on an individual basis.

   b. With the exception of Asphaltic Concrete Type SPS the blended mineral aggregate shall not contain more than 80% limestone on the final surface lift of asphaltic concrete.

   c. Asphaltic Concrete Type SPR may contain a total maximum of 10% of the virgin material that is composed of natural, uncrushed aggregate by manmade methods commonly known as but not limited to: 47B gravel, 2A gravel, gravel surfacing, sluice sand, blow sand, waste sand, fill sand, road gravel, roofing gravel, hot mix sand or gravel, coarse sand, fine sand, plaster sand, masonary sand, pit run sand or gravel. For clarification on any proposed gravel, contact the Department Flexible Pavements Engineer.

   d. Chat or coal sand will not be allowed in any mix.

   e. Crushed rock material for use in asphaltic concrete, 1/4 inch (6.35 mm) and smaller, screenings and manufactured sand shall have a Sodium Sulfate loss of not more than 12% by mass at the end of 5 cycles. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.

   f. Quartzite and granite shall conform to the requirements of Subsection 1033.02, Paragraph 4, a. (8). Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.

   g. Crushed rock (Limestone) and Dolomite shall conform to the requirements of Paragraph 4.a. (4), (5) and (6). of Subsection 1033.02 of the Standard Specifications. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.

   h. Soundness tests shall not be required for fine sand.

   i. Once the satisfactory quality of aggregates from a source has been established, sufficient additional soundness tests will be performed to insure the continued satisfactory quality of the material, as determined by the Materials Sampling Guide

   j. Aggregate consensus properties may be performed on material prior to the application of hydrated lime.

k. The coarse aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic concrete type as shown in Table 1028.02. If the coarse portion of the blend is all ledge rock the CAA tests may be waived.

Table 1028.02
Coarse Aggregate Angularity
(ASTM D 5821)

Asphaltic Concrete Type	CAA (minimum)
SPS	--
SPR	83
SPH	95/90*

* Denotes two faced crushed requirements

l. The fine aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic concrete type as shown in Table 1028.03.

m. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a washed combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150 µm) sieve. The Contractor will determine the specific gravity to be used in the calculation of FAA mixture design value(s) and, if verified by the Department Aggregate Laboratory, this same value can be used throughout production. The verification value determined by the Department Aggregate Laboratory will be on a combined aggregate sample supplied by the Contractor that is representative of the material proposed or being used during production. The specific gravity to be used throughout production to calculate FAA values will be the Contractor's verified value or the Department determined value (whenever verification is not made) and will be noted on the Mix Design. Changes in aggregate percentages during production may require determination of a revised specific gravity for FAA.

Table 1028.03
Fine Aggregate Angularity
(AASHTO T304 Method A)

Asphaltic Concrete Type	FAA (minimum)
SPS	--
SPR	43.0
SPH	45.0

n. The coarse aggregate shall not contain flat and elongated particles exceeding the maximum value for the appropriate asphaltic concrete type category shown in these provisions according to Table 1028.04.

Table 1028.04
Flat and Elongated Particles*
(ASTM D 4791)

Asphaltic Concrete Type	Percent, Maximum
SPS	25
SPR	10
SPH	10

*Criterion based on a 5:1 maximum to minimum ratio.

o. The sand equivalent of the blended aggregate material from the fine and coarse aggregates shall meet or exceed the minimum values for the appropriate asphaltic concrete type shown in these provisions according to Table 1028.05.

Table 1028.05
Sand Equivalent Criteria
(AASHTO T 176)

Asphaltic Concrete Type	Sand Equivalent, Minimum
SPS	30
SPR	45
SPH	45

p. Dust to binder ratio is the ratio of the percentage by weight of aggregate finer than the No. 200 (75 µm) sieve to the asphalt content expressed as a percent by weight of total mix. The dust to binder ratio shall be within 0.70 and 1.70.

q. The blended aggregate shall conform to the gradation requirements specified in Table 1028.06 and Table 1028.07 for the appropriate nominal size.

Table 1028.06
Gradation Control Points for 0.75 Inch (19 mm) and 0.5 Inch (12.5 mm) Nominal Size

	0.75 Inch (19 mm) Control Points (percent passing)		0.5 Inch (12.5 mm) Control Points (percent passing)	
English Sieve (Metric)	**Minimum**	**Maximum**	**Minimum**	**Maximum**
1 inch (25 mm)	100.0			
3/4 inch (19 mm)	90.0	100.0	100.0	
1/2 inch (12.5 mm)		90.0	90.0	100.0
3/8 inch (9.5 mm)				90.0
No. 8 (2.36 mm)	23.0	49.0	28.0	58.0
No. 16 (1.18 mm)				
No. 30 (600 µm)				
No. 50 (300 µm)				
No. 200 (75 µm)	2.0	8.0	2.0	10.0

Table 1028.07
Gradation Control Points for 0.375 Inch (9.5 mm) Nominal Size and SPR

	0.375 Inch (9.5 mm) Control Points (percent passing)		SPR Control Points (percent passing)		SPR (Fine) Control Points (percent passing)	
English Sieve (Metric)	**Minimum**	**Maximum**	**Minimum**	**Maximum**	**Minimum**	**Maximum**
3/4 inch (19 mm)			98.0	100.0		
1/2 inch (12.5 mm)	100.0					
3/8 inch (9.5 mm)	90.0	100.0	81.0	89.0	81.0	96.0
No. 4 (4.75 mm)		90.0				
No. 8 (2.36 mm)	32.0	67.0	46.0	56.0	46.0	56.0
No. 16 (1.18 mm)						
No. 30 (600 µm)						
No. 50 (300 µm)			12.0	21.0	12.0	21.0
No. 200 (75 µm)	2.0	10.0	4.0	9.0	4.0	9.0

r. The combined mineral aggregate for Asphaltic Concrete, Type SPS, shall be an aggregate or a combination of aggregates, and mineral filler if needed, that conforms to the gradation requirements specified in Table 1028.08.

Table 1028.08
Gradation Control Points for Type SPS

	Control Points (percent passing)	
English Sieve (Metric)	**Minimum**	**Maximum**
1 inch (25 mm)	100.0	
¾ inch (19 mm)	94.0	100.0
½ inch (12.5 mm)	81.0	100.0
No. 4 (4.75 mm)	70.0	90.0
No. 8 (2.36 mm)	42.0	70.0
No. 16 (1.18 mm)	29.0	43.0
No. 30 (600 µm)	19.0	34.0
No. 50 (300 µm)	11.0	20.0
No. 200 (75 µm)	2.0	10.0

s. Mineral filler shall consist of pulverized soil, pulverized crushed rock, broken stone, gravel, sand-gravel, sand or a mixture of these materials that conforms to the requirements in Table 1028.09.

Table 1028.09
Mineral Filler for Type SPS

	Min.	Max.
Total Percent Passing the No. 50 (300 µm) Sieve	95	100
Total Percent Passing the No. 200 (75 µm) Sieve	80	100
Plasticity Index (material passing the No. 200 (75 µm) Sieve, except soil	0	3
Plasticity Index for Soil	0	6

1028.03 -- Acceptance Requirements

1. Mix Criteria:

   a. The target value for the air voids of the SPH Asphaltic Concrete shall be 4% (±1%) at the Ndes number of gyrations. For Type SPS Asphaltic Concrete the air voids at Ndes shall be a minimum of 1.5% with a maximum of 5.0%. For Type SPR Asphaltic Concrete the air voids shall be 3% (±1%) at the Ndes number of gyrations.

   b. The design criteria for each mixture shall be determined from Tables 1028.10, 1028.11, and 1028.12.

Table 1028.10
Gyratory Compaction Effort
(Average Design High Air Temperature <39 degrees C)

Asphaltic Concrete Type	Nini	Ndes	Nmax
SPS	6	40	62
SPR	7	65	100
SPH	8	95	150

Table 1028.11
Gyratory Compaction Temperatures

Mix Type	% RAP	Compaction Temp °F
SPS	0-25	270 ± 5
	26-50	280 ± 5
SPR	0-35	280 ± 5
	36-50	290 ± 5
SPH	0-35	300 ± 5

Table 1028.12
Minimum Binder Content

Mix Type (Metric)	Minimum Binder Content, Percent
SPS	4.8
SPR	5.0
3/8 inch (9.5 mm)	5.5
1/2 inch (12.5 mm)	5.1
3/4 inch (19 mm)	5.0

c. During production of Lot #1, the Contractor shall provide to the Department 6 properly prepared gyratory samples for AASHTO T 283 testing for all mixtures. Superpave mixtures shall contain 1% hydrated lime as specified in the Special Provision "Hydrated Lime for Asphaltic Mixtures". Each Superpave mixture shall be tested for moisture sensitivity in accordance with AASHTO T 283. The 6 inch (150 mm) specimens shall be compacted in accordance with AASHTO T 312 to 7% (± 0.5%) air voids at 95 mm in height and evaluated to determine if the minimum Tensile Strength Ratio (TSR) of 80% has been met. If the mixture has not met the minimum TSR value, additional lime may be added with approval from the Department, such that the mix will meet the minimum TSR of 80%. A TSR test result of less than 80% will require mixture modifications and a sample from subsequent lots will be tested until a TSR value of at least 80% is achieved.

d. During production of Lot #1, the Contractor shall provide to the Department two 75mm gyratory puck samples at 4.0% voids (± 0.5%) for APA testing for all mixtures except Asphaltic Concrete Type SPS.

2. The Contractor shall make Mix adjustments when:

   a. The mix does not meet the current approved JMF or any other requirements of the contract.

   b. Surface voids create a surface or texture that does not meet the criteria of Sections 502 and 503 in these Standard Specifications.

   c. Rutting occurs.

3. The Contractor shall inform the Engineer when changes in mixture properties or materials used occur for any reason. Changes such as, but not limited to, types or sources of aggregates or changes in grades, sources, properties or modification procedures (if modified) of PG Binders. The Department may require a new job mix formula, mix design and moisture sensitivity test. The new proposed job mix formula shall be in accordance with the requirements as stated above.

4. Mix adjustments at the plant are authorized within the limits shown in Table 1028.13 as follows:

   a. The adjustment must produce a mix with the percent air voids and all other properties as stated in these specifications.

   b. All adjustments must be reported to the Engineer.

   c. The adjustment values in Table 1028.13 will be the tolerances allowed for adjustments from the Department verified mix design "Combined Gradation" target values which resulted from production or mix design adjustments, but cannot deviate from Superpave gradation criteria. Mix adjustments for individual aggregates, including RAP, greater than 25% of the original verified mix design proportion or greater than 5% change in the original verified mix design percentage, whichever is greater, may require the Contractor to submit a new mix design, as determined by the Engineer. The Contractor is responsible for requesting new mix design targets as they approach these tolerances, failure to do so may result in a suspension of operations until a new mix design is approved.

Table 1028.13

Aggregate Adjustments	
Sieve Size	**Adjustments**
1 inch (25 mm), 3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (4.75 mm)	± 6%
No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (600 µm), No. 50 (300 µm)	± 5%
No. 200 (75 µm)	± 2%

5. Sampling and Testing:

a. The Contractor shall take samples at frequencies identified by the Engineer, according to the Department statistically based procedure. The samples shall be approximately 75 lbs (34 kg) and split according to AASHTO T-248 to create a companion sample. This sample splitting can be either at: 1) the sampling location, with the Department taking custody of their sample at that time or 2) after being transported to the test facility in an insulated container, with the Department taking custody of their sample at that time as determined by the Engineer. The details of sampling, location, splitting etc. shall be determined at the pre-construction conference.

b. All samples transported to the test facility and companion samples within the Lot shall be identified by attaching or faxing the lab calculation sheet from the latest version of the superpave software, stored, and retained by the Contractor until the Department has completed the verification testing process. Transporting of all samples will be under the observation of Department.

c. (1) The sample shall be taken from the roadway, behind the paver before compaction or from the windrow.

(2) At least one QC sample shall be tested for every 750 tons (680 Mg) of plant produced mix.

(i) If, at the completion of the project, the final lot consists of less than 3,750 tons (3,400 Mg) of asphaltic concrete, 1 sample for each 750 tons (680 Mg) or fraction thereof, shall be taken and tested.

(3) Additional sampling and testing for the Contractor's information and quality control may be performed at the Contractor's discretion. Any additional testing will not be used in pay factor determination.

(4) (i) When cold feed samples are being taken, the acquisition shall be timed such that the material in the sample represents, as close as possible, the same material in the sample taken behind the paver. If cold feeds are sampled and tested by Contractor, a split of that sample must be submitted with the hot mix sublot sample. The Contractor will be notified what sublot (a minimum of 1 sublot per lot) sample must be tested for FAA and CAA from the blended cold feed material according to the Department random sampling schedule. All other FAA and CAA sublot samples may be taken from the randomly selected portion of the blended cold feed material or obtained from the random samples taken behind the paver. Samples shall be taken under the observation of Department and split according to AASHTO T-248, with the Department taking custody of their sample at that time.

(ii) For projects using RAP material the FAA shall be established as follows: a RAP sample will be processed through an ignition oven and then combined with the proportioned amount of virgin

aggregate defined by the mix design and then proceeding with FAA and CAA testing.

d. The sample shall be compacted immediately while still hot (additional heating may be required to raise the temperature of the sample to compaction temperature).

e. Each production sample shall be tested as follows:

(1) Bulk Specific Gravity (Gmb) shall be determined for each specimen in accordance with AASHTO T 166 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens. One specimen shall be compacted for each production sample.

(2) One Theoretical Maximum Specific Gravity (Gmm) test for each production sample of uncompacted mixture shall be determined in accordance with AASTHO T 209 procedure 9.5.1. Weight in water - Maximum Specific Gravity of Bituminous Paving Mixtures.

(3) (i) The Blended Aggregate Bulk Specific Gravity (Gsb) shall be 2.585 for information only for all mixes.

(ii) FAA - AASHTO T 304 Method A. The pour time of the test sample into the funnel shall be completed in 5±1 seconds.

(iii) CAA - ASTM 5821. For SPR mixes, CAA testing and results are only required on the cold feed verification test for the lot.

(4) The laboratory air voids shall be determined in accordance with the following:

Table 1028.14

Gmb(corr)@Nany = Gmb(meas)@Nmax x (height@Nmax ÷ height@Nany)
%Gmm(corr)@Nany = 100 x (Gmb(corr)@Nany ÷ Gmm(meas))
% Air Voids@Nany = 100 - %Gmm(corr)@Nany
VMA@Ndes = 100 – (Gmb(corr)@Ndes x Ps ÷ Gsb)
VFA@Ndes = 100 x ((VMA@Ndes - % Air Voids@Ndes) ÷ VMA@Ndes)
Measured = (meas)
Corrected = (corr)

(5) (i) The percent of PG Binder shall be determined for each QC test. The percent of PG Binder will be computed by ignition oven results. A correction factor of 0.4% will be added to the ignition oven results for mixes containing hydrated lime.

(ii) The gradations shall be determined for each QC test using AASHTO T 30.

(6) Except as noted in this Subsection, all sampling and testing shall be done as prescribed in the Department Materials Sampling Guide and Standard Method of Tests.

f. Testing Documentation:

(1) All test results and calculations shall be recorded and documented on data sheets using the latest version of Department provided "Superpave" software. A copy containing complete project documentation will be provided to the Department at the completion of asphalt production.

g. Superpave Software:

(1) QC charts from the software shall be made available for review by the Engineer at any time.

(2) As a minimum, the following values shall be reported on Department provided software:

(i) Laboratory Gyratory density.

(ii) Ignition oven or cold feed aggregate gradations for all Superpave sieves will be reported.

(iii) PG Binder content shall be plotted to the nearest 0.01% by ignition oven results in accordance with AASHTO T 308.

(iv) The theoretical maximum specific gravity (Rice) to the nearest 0.001% will be reported.

(v) Laboratory Gyratory air voids at Ndes shall be plotted to nearest 0.1%. Laboratory Gyratory air voids, at Nini, Ndes and Nmax shall be reported to nearest 0.1%.

(vi) FAA and CAA of the asphaltic concrete for both cold feed and ignition oven samples will be reported to the nearest 0.1% for FAA and 1% for CAA. A minimum of one sublot FAA and CAA cold feed sample per lot will be tested and recorded on Department provided software.

(vii) VMA content shall be plotted to nearest 0.1% and VFA shall be reported to the nearest 0.1%.

(viii) Dust to Binder ratio to the nearest 0.01 will be reported.

6. Verification Sampling and Testing:

a. The Department will select and test at random one of the sublot samples (750 tons, 680 Mg) within a Lot (3750 tons, 3400 Mg) for verification and report results.

b. The results of Contractor QC testing will be verified by the Department's verification tests. Any samples outside of the tolerances in Table 1028.15 and 1028.16 will result in an Independent Assurance (IA) review of testing and may result in the Department test results being applied.

(1) On any given Lot, if the results of Air Void verification testing and its companion QC testing are within 1.0% air voids, the Air Void verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factors. If the Air Void verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that sublot. Any or all of the remaining four Department sublot samples may be tested and the Department sublot test results may be applied to the respective sublots and the resulting pay factors will apply.

(2) On any given Lot, if the results of the FAA verification testing and its companion QC testing are within 0.5 percent, the FAA verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factor. If the FAA verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that sublot. Any or all of the remaining four Department sublot samples may be tested and the Department sublot test results may be applied to the respective sublots and the resulting pay factors will apply.

c. When verification tests are within testing tolerance but results show a consistent pattern of deviation from the QC results, the Engineer may cease production and/or request additional verification testing or initiate a complete IA review.

Table 1028.15
Asphaltic Concrete Testing Tolerances

Test	Tolerance
Asphalt Content by Ignition Oven	0.5%
Gyratory Density	0.020
Maximum Specific Gravity	0.015
Bulk Dry Specific Gravity (Gsb)	0.020
FAA	0.5%
CAA	10%
Field Core Density	0.020
Air Voids	1.0%

Table 1028.16
Blended Aggregate Gradation
Testing Tolerances

Sieve Size	Tolerance
3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (12.5 mm), No. 8 (2.36 mm)	5%
No. 16 (1.18 mm), No. 30 (600 µm), No. 50 (300 µm)	4%
No. 200 (75 µm)	2%

d. Independent Assurance (IA) Review of Testing:

(1) The Contractor shall allow the Department personnel access to their laboratory to conduct IA review of technician testing procedures and apparatus. Any deficiencies discovered in testing procedures will be reported by the department and corrected by the Contractor.

(2) During IA review, the Department personnel and the Contractor will split a sample for the purpose of IA testing. The samples selected will be tested in the Department Branch Laboratory. Any IA test results found to be outside of defined testing tolerances above will be reported. The Contractor shall verify the testing apparatus and make corrections if the apparatus is out of tolerance.

(3) See Section 28 of the Materials Sample Guide for more information on IA testing.

e. If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Department will be asked to resolve the dispute, which will be final. It is the Contractor's responsibility to obtain a large enough sample size for any referee testing (a total sample size of 6000 grams, to be retained by the Department after splitting, is recommended for FAA testing). All dispute resolutions will be in accordance with the Quality Assurance Program requirements in the NDOR Materials Sampling Guide.

7. Production Tolerances, Acceptance, and Pay Factors

Table 1028.17
Production Tolerances*

Test	***Allowable*** **Deviation from Specification**
Dust to Asphalt Ratio	None
Coarse Aggregate Angularity	- 5% below Min.
Fine Aggregate Angularity for SPR Only	- 0.2% below Min. for cold feed - 0.5% below Min. for ignition oven
Fine Aggregate Angularity for all other mixes	- 0.5% below Min. for cold feed - 1.0% below Min. for ignition oven
Minimum Binder Content	None

* These tolerances are applied to the mix design specification values, not the submitted mix design targets.

a. The Contractor shall notify the Engineer whenever a test result approaches the Specification limits.

b. When any single test result for FAA testing falls outside the allowable production tolerances in Table 1028.17, the material represented by this test will be accepted with a penalty as shown in Table 1028.18 or

rejected, as determined by the Engineer. For all other tests, when any single test result, on the same mix property, from two consecutive QC samples fall outside the allowable production tolerances in Table 1028.17, the material represented by these tests will be accepted with a 20% penalty or rejected, as determined by the Engineer.

Table 1028.18
FAA Penalty Scale

Percentage outside of allowable deviation given in Table 1028.17	Penalty for SPR	Penalty for SPH
0.1%	20% or reject	5% or reject
0.2%	20% or reject	10% or reject
0.3%	20% or reject	15% or reject
0.4% or greater	20% or reject	20% or reject

c. The Contractor shall assume the responsibility to cease operations when specifications are not being met.

d. Acceptance and pay factors for Asphaltic Concrete Type SPS will be based on compacted in place average density.

e. For each sublot of Asphaltic Concrete Type SPR and SPH, the asphaltic concrete unit price is a product of all applicable pay factors for the item "Asphaltic Concrete, Type SPR". Included in a sublot, following approval of the control strips, may be any roadway Asphaltic Concrete Type SPR or SPH which is produced and approved by the Engineer for use as Patching, State Maintenance Patching, and Asphalt for Intersections and Driveways on project shall be eligible for inclusion in sublot(s) tonnage pay factor determination using the roadway Asphaltic Concrete Type SPR unit price. When a control strip is not constructed, the pay factor for the running average of four air voids shall be fixed at 1.0 for the first three asphaltic concrete sublots.

(1) When there is a production tolerance pay factor penalty as stated in Paragraph 7.b. subsection 1028.03 this penalty percentage will be entered in the Superpave Asphalt Pay Factor Summary under production specifications for each sublot affected. These individual pay factors will then be multiplied by each other to determine a total pay factor for each sublot [(750 tons) (680 Mg)].

f. The pay factors for the single test air voids and moving average of four air voids pay factors will be determined in accordance with Table 1028.19.

Table 1028.19
Acceptance Schedule
Air Voids - N_{des}

Air voids test results for Asphaltic Concrete Type SPR	Air voids test results for SPH Asphaltic Concrete	Pay Factor	
		Moving average of four	Single test
Less than 0.5%	Less than 1.5%	50% or Reject	50% or Reject
0.5% to 0.9%	1.5% to 1.9%	50% or Reject	50%
1.0% to 1.4%	2.0% to 2.4%	50% or Reject	95%
1.5% to 1.9%	2.5% to 2.9%	90%	95%
2.0% to 2.4%	3.0% to 3.4%	100%	100%
2.5% to 3.5%	3.5% to 4.5%	102%	104%
3.6% to 4.0%	4.6% to 5.0%	100%	100%
4.1% to 4.5%	5.1% to 5.5%	95%	95%
4.6% to 5.0%	5.6% to 6.0%	90%	95%
5.1% to 5.5%	6.1% to 6.5%	50% or Reject	90%
5.6% to 6.0%	6.6% to 7.0%	50% or Reject	50%
6.1% and over	7.1% and over	50% or Reject	50% or Reject

8. Asphalt Concrete Density Samples:

   a. The Contractor shall perform density tests under direct observation of Department personnel. The Contractor shall establish the method of testing in the preconstruction conference and shall test in accordance with the AASHTO T 166 or NDR T 587. The Contractor shall insure that the proper adjustment bias and/or correction factors are used and accessible to Department personnel along with all other inputs when NDR T 587 is selected. All correlation factors and test results shall be generated and reported on the Department Density spreadsheet. When AASHTO T 166 is being used, the Department will observe the Contractor taking, transporting, and testing the cores. The Department will take immediate custody of the cores at the completion of the testing. All disputed values determined using NDR T 587 will be resolved using AASHTO T 166.

   b. The Contractor shall determine the density of samples by comparing the specific gravity of the core sample to the Maximum Specific Gravity (Rice) as follows:

$$\% \text{ Density} = \frac{\text{Specific Gravity of Core}}{\text{Maximum Mix Specific Gravity Rice)}} \times 100$$

where:

$$\text{Sp. Gr. of Core} = \frac{\text{Wt. of Core in Air}}{\text{Wt. of SSD Core} - \text{Wt. of Core in Water}}$$

$$\text{Maximum Mix Specific Gravity (Rice)} = \frac{\text{Wt. of Mix in Air}}{\text{Wt. of Mix in Air} - \text{Wt. of Mix in Water}}$$

Note: The individual QC test value of the Maximum Mix Specific Gravity (Rice), determined by AASHTO T 209, will be used to calculate the density of each corresponding core.

c. The Contractor shall cut cores the first day of work following placement of the mixture. The core samples shall be a minimum of a 3 inch (75mm) diameter.

d. Normally, 1 sample for determination of density will be taken from each sublot (750 tons) (680 Mg) at locations determined by the Engineer.

e. The average density of the lot shall be used to compute the pay factor for density. Exceptions to the sampling and testing of core samples for the determination of density are as follows:

(1) When the nominal layer thickness is 1 inch (25 mm) or less, the sampling and testing of density for this layer will be waived.

(2) When the average thickness of the 5 cores for a lot is 1 inch (25 mm) or less, the testing of density samples for this lot will be waived.

(3) When the nominal layer thickness and the average of the original 5 cores for a lot are both more than 1 inch (25 mm), but some of the cores are less than 1 inch (25 mm) thick, additional cores shall be cut at randomly selected locations to provide 5 samples of more than 1 inch (25 mm) thickness for the determination of the pay factor for density.

f. (1) If, at the completion of the project, the final lot consists of less than 3,750 tons (3400 Mg) of asphaltic concrete, a minimum of 3 samples, or 1 sample for each 750 tons (680 Mg) or fraction thereof, whichever is greater, shall be taken and tested for density.

(2) The test results shall be averaged and the density pay factor based on the values shown in Table 1028.20.

(3) Should the average of less than 5 density tests indicate a pay factor less than 1.00, additional density samples to complete the set of five shall be taken at randomly selected locations and the density pay factor based on the average of the 5 tests.

Table 1028.20

Acceptance Schedule Density of Compacted Asphaltic Concrete	
Average Density (5 Samples, Percent of Voidless Density)	**Pay Factor**
Greater than 92.4	1.00
Greater than 91.9 to 92.4	0.95
Greater than 91.4 to 91.9	0.90
Greater than 90.9 to 91.4	0.85
Greater than 90.4 to 90.9	0.80
Greater than 89.9 to 90.4	0.70
89.9 or Less	0.40 or Reject

g. If requested by the Contractor, check tests for all density tests in the original set, taken no later than the working day following the receipt of all test results for the lot, will be allowed in lots with a density pay factor of less than 1.00. No re-rolling will be allowed in these lots. Locations for checks tests will be provided by the Engineer from the Random Sampling Schedule. The average density obtained by the check tests shall be used to establish the density pay factor for the lot.

h. The location of density samples are identified by the Random Sampling Schedule. When the random location is noted as zero or the lane width (i.e., zero or 12 ft. on a 12-foot lane), the core shall be cut with the outer edge of the core barrel no greater than 4 inches away (laterally) from the edge of the top of the mat for an unconfined edge or from the edge of the top of the hot mat (joint) for a confined edge. If using a nuclear gauge, the 4 inches would be measured to the edge of the gauge base. The percent density value at these edge-of-lane locations shall be adjusted upward by 2.5%, but to a value of no greater than 92.5%, and the resultant value used in determining the density pay factor. No initial value of 92.5 or greater shall be adjusted.

ENGLISH
TABLE 1002.02

Concrete Mixes (Cubic Yard Batch)

Class of Concrete (1)	Base Cement Type *	Portland Cement (Min. lb/cy)	Pre-Blended Class Fly Ash (Min. lb/cy) *	GGBFS Slag (Min. lb/cy)	Class C Fly Ash (Min. lb/cy)	Silica Fume (Min. lb/cy)	Total Cementitious Materials (Min. lb/cy)	Total Agg. (Min. lb/cy)	Total Agg. (Max. lb/cy)	Coarse Agg. (%) (3)	Type of Coarse Aggregate ****	Air Content (% Min.-Max.) (2)	Water/Cement Ratio Max. (4)	Required Strength (Min. psi) (7)
47B**	1PF	423	141	0	0	0	564	2850	3150	30±3	Limestone	7.5 – 10.0	0.48	3500
47B***	1PF	423	141	0	0	0	564	2850	3150	30±3	Limestone	6.0 – 8.5	0.48	3500
47BD	1PF	494	164	0	0	0	658	2500	3000	30±3	Limestone	6.0 – 8.5	0.42	4000
PR1	I/II	752	0	0	0	0	752	2500	2950	30±3	Limestone	6.0 – 8.5	0.36	3500
PR3	III	799	0	0	0	0	799	2500	2950	30±3	Limestone	6.0 – 8.5	0.45	3500
SF	I/II	564	0	0	0	25	589	2850	3200	50±3	Limestone	6.0 – 8.5	0.36	4000
47BHE	1PF	564	188	0	0	0	752	2500	3000	30±3	Limestone	6.0 – 8.5	0.40	3500
BX (8)	1PF	423	141	0	0	0	564	2850	3150	0	0 (5)	6.0 – 8.5	0.48	3500
47BFS** (6)	1PF	338	113	113	0	0	564	2850	3150	30±3	Limestone	7.5 – 10.0	0.48	3500
47BFS*** (6)	1PF	338	113	113	0	0	564	2850	3150	30±3	Limestone	6.0 – 8.5	0.48	3500
47BDFS (6)	1PF	396	131	131	0	0	658	2500	3000	30±3	Limestone	6.0 – 8.5	0.42	4000

(1) Each class shall identify the minimum strength requirement. (For example, 47B-3500, where the last four digits indicate the strength in pounds per square inch. In the chart, strength of 3500 psi is indicated fro 47B-3500; however, other strengths may be authorized elsewhere in the contract. The classes shown in the chart are typical examples.)
All classes of concrete shall be air-entrained.
A slump test shall be performed to check for consistency and/or workability. Any increase in slump must be pre-approved by the Engineer.
A water reducer admixture shall be used at the manufacturer's recommendations.

(2) As determined by ASTM C 138 or ASTM C 231.
FOR INFORMATION ONLY. The contractor may develop a Quality Control Program to check the quantity of air content on any given project; such as, checking air content behind the paver.

(3) Coarse aggregate shall be limestone unless otherwise specified.

(4) The Contractor is responsible to adjust the water/cement ratio so that the concrete supplied achieves the required compressive strength without exceeding the maximum water/cement ratio. The minimum water/cement ratio for any slip form concrete pavement is 0.38.

(5) Single aggregate (sand-gravel) used for these classes of concrete.

(6) 47BFS is an acceptable substitute for 47B and 47BDFS is an acceptable substitute for 47BD.

(7) For each class of concrete acceptance, refer to the specifications

(8) For temporary pavement type I/II cement is allowed

(*) Mixes with Type 1PF and Class F fly ash designation are pre-blended or interground with Class F fly ash by the cement mill producer at a rate of 25%±2%, no additional Class F fly ash is added at the batch plant.

(**) For slip form applications.

(***) For hand-pours and substructures applications.

(****) Quartzite aggregate can be used in place of limestone providing the aggregate meets Paragraph 3. b. of subsection 1033.02 of the Standard Specifications.

METRIC
TABLE 1002.02

Concrete Mixes (Cubic Meter Batch)

Class of Concrete (1)	Base Cement Type *	Portland Cement (Min. kg/m³)	Pre-Blended Class F Fly Ash (Min. kg/m³) *	GGBFS Slag (Min. kg/m³)	Class C Fly Ash (Min. kg/m³)	Silica Fume (Min. kg/m³)	Total Cementitious Materials (Min. kg/m³)	Total Agg. (Min. kg/m³)	Total Agg. (Max. kg/m³))	Coarse Agg. (%) (3)	Type of Coarse Aggregate ****	Air Content (% Min.-Max.) (2)	Water/Cement Ratio Max. (4)	Required Strength (Min. Mpa) (7)
47B**	1PF	251	84	0	0	0	335	1691	1869	30±3	Limestone	7.5 – 10.0	0.48	25
47B***	1PF	251	84	0	0	0	335	1691	1869	30±3	Limestone	6.0 – 8.5	0.48	25
47BD	1PF	293	97	0	0	0	390	1483	1780	30±3	Limestone	6.0 – 8.5	0.42	30
PR1	I/II	446	0	0	0	0	446	1483	1750	30±3	Limestone	6.0 – 8.5	0.36	25
PR3	III	474	0	0	0	0	474	1483	1750	30±3	Limestone	6.0 – 8.5	0.45	25
SF	I/II	335	0	0	0	15	349	1483	1899	50±3	Limestone	6.0 – 8.5	0.36	30
47BHE	1PF	335	112	0	0	0	446	1483	1780	30±3	Limestone	6.0 – 8.5	0.40	25
BX (8)	1PF	251	84	0	0	0	335	1691	1869	0	0 (5)	6.0 – 8.5	0.48	25
47BFS** (6)	1PF	201	67	67	0	0	335	1691	1869	30±3	Limestone	7.5 – 10.0	0.48	25
47BFS*** (6)	1PF	201	67	67	0	0	335	1691	1869	30±3	Limestone	6.0 – 8.5	0.48	25
47BDFS (6)	1PF	234	78	78	0	0	390	1483	1780	30±3	Limestone	6.0 – 8.5	0.42	30

(1) Each class shall identify the minimum strength requirement. (For example, 47B-3500, where the last four digits indicate the strength in pounds per square inch. In the chart, strength of 3500 psi is indicated fro 47B-3500; however, other strengths may be authorized elsewhere in the contract. The classes shown in the chart are typical examples.)
All classes of concrete shall be air-entrained.
A slump test shall be performed to check for consistency and/or workability. Any increase in slump must be pre-approved by the Engineer.
A water reducer admixture shall be used at the manufacturer's recommendations.

(2) As determined by ASTM C 138 or ASTM C 231.
FOR INFORMATION ONLY. The contractor may develop a Quality Control Program to check the quantity of air content on any given project; such as, checking air content behind the paver.

(3) Coarse aggregate shall be limestone unless otherwise specified.

(4) The Contractor is responsible to adjust the water/cement ratio so that the concrete supplied achieves the required compressive strength without exceeding the maximum water/cement ratio. The minimum water/cement ratio for any slip form concrete pavement is 0.38.

(5) Single aggregate (sand-gravel) used for these classes of concrete.

(6) 47BFS is an acceptable substitute for 47B and 47BDFS is an acceptable substitute for 47BD.

(7) For each class of concrete acceptance, refer to the specifications

(8) For temporary pavement type I/II cement is allowed

(*) Mixes with Type 1PF and Class F fly ash designation are pre-blended or interground with Class F fly ash by the cement mill producer at a rate of 25%±2%, no additional Class F fly ash is added at the batch plant.

(**) For slip form applications.

(***) For hand-pours and substructures applications.

(****) Quartzite aggregate can be used in place of limestone providing the aggregate meets Paragraph 3. b. of subsection 1033.02 of the Standard Specifications.

PORTLAND CEMENT CONCRETE
(J-15-1207)

Paragraph 1. of Subsection 1002.02 in the Standard Specifications is amended to include the following:

b. Concrete mixes will be in accordance of Table 1002.02.

Paragraph 3. of Subsection 1002.02 is void and superseded by the following:

3. Type 1 PF cement shall be used for all classes of concrete except for pavement repair. Pavement repair shall include Type I/II Portland cement for Class PR1 concrete and Type III Portland cement shall be used in Class PR3 concrete. Type 1 PF cement shall meet all requirements of ASTM C 595.

PORTLAND CEMENT
(J-15-0307)

Section 1004 in the Standard Specifications is void and superseded by the following:

1004.01 – Description

1. Portland cement is the binder in concrete, locking the aggregate into a solid structure. It is manufactured from lime, silica, and alumina (with a small amount of plaster of gypsum).

2. Equivalent alkali referred to herein is hereby defined as the sum of the sodium oxide (Na20) and the potassium oxide (K20) calculated as sodium oxide (equivalent alkali as Na20 = Na20 + 0.658 K20).

1004.02 – Material Characteristics

1. Type I, Type II and Type III Portland cement shall conform to the requirements in ASTM C 150 with the following additional requirements:

   a. Portland cement shall not contain more than 0.60 percent equivalent alkali.

   b. Processing additions may be used in the manufacture of the cement, provided such materials have been shown to meet the requirements of ASTM C 465 and the total amount does not exceed 1 percent of the weight of Portland cement clinker.

2. Type 1PF shall be a Type IP made exclusively with Class "F" fly ash as the pozzolan. Type IP cement shall conform to the requirements as prescribed in ASTM C 595 and the following requirements:

   a. The pozzolan content shall be 25±2 percent of the cementitious materials by weight.

   b. The pozzolan shall be Class F fly ash.

   c. Additional fly ash substitution shall not be allowed with Type IP cement containing Class F fly ash.

   d. A water-reducing admixture shall be used in all classes of concrete.

   e. Mortar bars made and tested according to the provisions of ASTM 1567 shall have an expansion of no more than 0.10 percent after 28 days. The mortar bars shall be composed of Type 1PF cement, limestone, and sand and gravel in the proportions used for 47B concrete. The limestone shall be from a Weeping Water, NE, source and the sand/gravel shall be from an eastern Platte River Valley source.

   f. 47B and 47BD concrete made with Type 1PF shall have a Durability Factor not less than 70 and a mass loss not greater than five percent after 300 freeze/thaw cycles when tested in accordance with ASTM C 666. The freeze/thaw testing shall be conducted according to Procedure A.

1004.03 – Procedures

1. The Contractor shall provide adequate protection for the cement against dampness. Cement shall be stored in railroad cars or in suitable moisture-proof buildings. The use of tarpaulins for the protection of the cement will not be allowed.

2. No cement which has become caked or lumpy shall be used.

3. Cement which has been spilled shall not be used.

4. Accepted cement which has been held in storage at the concrete mix plant more than 90 days shall be retested.

1004.04 – Acceptance Requirements

1. a. Approved cements are on the NDR Approved Products List.

   b. Cements will be placed on the NDR Approved Products List based on conformance with the NDR Acceptance Policy for Portland Cements. This information is available upon request from the NDR Concrete Materials Section.

2. Portland cement chemical and physical test requirements shall conform to NDR Acceptance Policy for Portland Cements contained in the NDR's Materials Sampling Guide.

3. Cement coming directly from the manufacturer shall not be used until the temperature is 150°F (66°C) or less.

4 Cement which is placed in storage or is received on the project at temperatures of over 200°F (93°C) shall not be used until acceptable test results are obtained. Samples shall be taken when the temperature of the cement has decreased to 180°F (82°C).

5. a. Should any sample indicate noncompliance with the specifications, use of material from that source based on certification only may be withheld. It will be necessary that the cement be held in special silos or bins at the plant or some facility under control of the company furnishing the cement until such time that test results show compliance.

   b. When it can be shown that continuing production from that plant has a high assurance of meeting specifications, material acceptance may once again be based on certification only.

6. a. If tests made on field samples taken by the Department fail to meet any of the specification requirements, all shipments from the supplier will be held until tests have been completed by the NDR Materials and Research Division and approval for use is issued.

   b. This procedure will be continued until it can reasonably be assured that the cement from the supplier will again continue to meet contract requirements.

FORT CALHOUN CIP PROJECT STR-236

HWY 75 BETWEEN COURT STREET AND ADAMS STREET, ADAMS STREET BETWEEN 14TH STREET AND 13TH STREET

FORT CALHOUN, NEBRASKA

PROJECT LOCATION:

US HIGHWAY 75

PROJECT BEGINS 1315 FEET NORTH OF THE SOUTH LINE OF SECTION 11, TOWNSHIP 17N, RANGE 12E, WASHINGTON COUNTY.

THE PROJECT BEGINS 370 FEET NORTH OF MILEPOST 106.

THE PROJECT LENGTH IS 770 FEET.

OWNER:
CITY OF FORT CALHOUN
110 S. 14th STREET
FORT CALHOUN, NE 68023
CONTACT: LINDA WELSHER
PHONE: 402-468-5303

ENGINEER:
SCHEMMER ASSOCIATES
1044 N. 115th STREET
SUITE 300
OMAHA, NE 68154
CONTACT: RANDY FEHL
PHONE: 402-493-4800

SURVEYOR:
SCHEMMER ASSOCIATES
1044 N. 115th STREET
SUITE 300
OMAHA, NE 68154
CONTACT: MARK FREDRICKSON
PHONE: 402-493-4800

TESTING LAB:
SCHEMMER ASSOCIATES
VALLEY VIEW VILLAGE
928 VALLEY VIEW DRIVE
SUITE 12
COUNCIL BLUFFS, IA 51503
CONTACT: LORAS KLOSTERMAN
PHONE: 712-329-0300

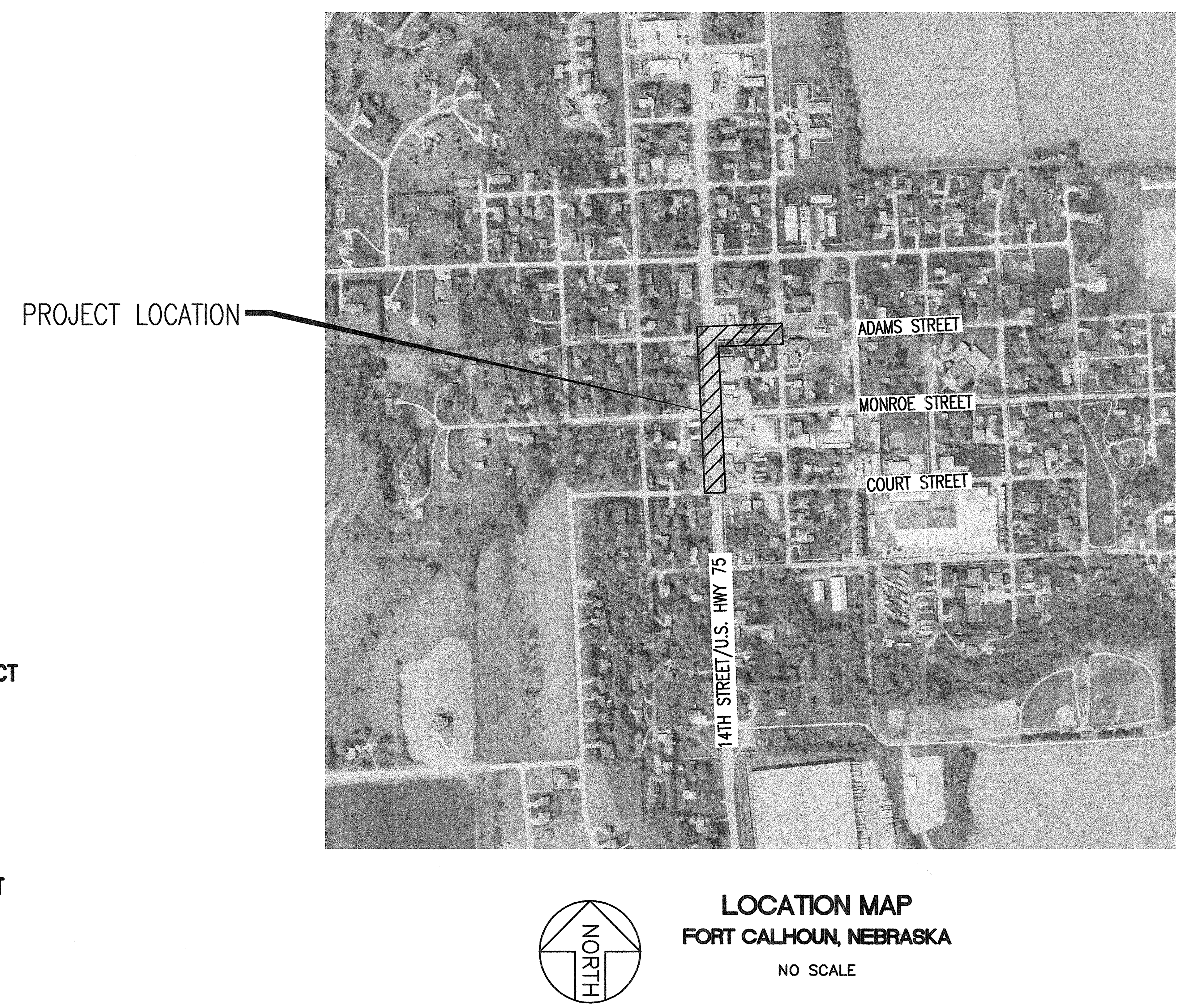
WATER:
CITY OF FORT CALHOUN
110 S. 14TH STREET
FORT CALHOUN, NE 68023
CONTACT: BRUCE SILL
PHONE: 402-306-4859

GAS:
METROPOLITAN UTILITIES DISTRICT
3100 S. 61ST AVENUE
OMAHA, NE 68106
CONTACT: DAVE STROEBLE
PHONE: 402-504-7783

ELECTRIC:
OMAHA PUBLIC POWER DISTRICT
444 S. 16TH STREET
OMAHA, NE 68102
CONTACT: PAT CARNAZZO
PHONE: 402-536-4131

SANITARY SEWER:
CITY OF FORT CALHOUN
110 S. 14TH STREET
FORT CALHOUN, NE 68023
CONTACT: BRUCE SILL
PHONE: 402-306-4859

TELEPHONE:
AMERICAN BROADBAND
CONTACT: PAT EDWARDS
PHONE: 402-426-6231



LOCATION MAP
FORT CALHOUN, NEBRASKA
NO SCALE

Horizontal Control:

CP #1: PK Nail on the NW corner of Hwy 75 & Monroe Street. SW 11.2' from SW corner of lamp post, S 11' from SE corner of sign post, SE 20.3' from SE building corner. N:6723.93 E:5721.06 El:1099.28

CP#2: PK Nail on the NW corner of 13th Street and Monroe Street. SW 16' from south side of fire hydrant, N 8' from edge of Monroe St. pavement, E 16.6' from center of water valve. N:6725.88 E:6135.29 El:1087.21

Vertical Control:

BM#1: North upper bonnet bolt of fire hydrant on NE corner of 13th Street and Monroe Street. El:1089.31

BM#2: North upper bonnet bolt of fire hydrant on SW corner of 10th Street and Monroe Street. El:1066.00

DRAWING INDEX

NDOR STANDARD PLAN NO.

STANDARD PLATE	NAME	REVISED
329-R9	DETAILS OF TIE BAR	OCTOBER 25, 1994
443-R8	CURB INLETS AND JUNCTION BOX	FEBRUARY 22, 1974

CITY OF OMAHA STANDARD PLATES

STANDARD PLATE	NAME	REVISED
320	SIDEWALK CONSTRUCTION DETAILS	FEBRUARY 6, 2009
321	SIDEWALK LOCATION STANDARD	SEPTEMBER 23, 2010
712	CURB INLETS	JANUARY 1, 1968
1-52	CONCRETE CURB DETAILS	MARCH 26, 2003
1-70	CONCRETE DRIVEWAY DETAILS	MARCH 12, 2009
1-82	CONCRETE CURB RAMP TYPICAL DETAILS	MAY 30, 2012
3-01	SEWER BEDDING DETAILS	FEBRUARY 1, 2008
6-01R1	PULL BOX DETAILS	APRIL 26, 2006

SEE DETAIL SHEET FOR ADDITIONAL DETAILS

ISSUE DATE: 03/27/2013
REVISIONS:

No.:	DATE:	BY:	DESCRIPTION:
1	05/08/2013	RGF	ADDED NDOR DETAILS

DESIGNED: RGF
DRAWN: BRW
CHECKED: RGF

PROFESSIONAL CIVIL ENGINEER
RANDY G. FEHL
E-10214
STATE OF NEBRASKA

SCHEMMER
ARCHITECTS | ENGINEERS | PLANNERS

FORT CALHOUN CIP PROJECT STR-236
FORT CALHOUN, NEBRASKA

COVER SHEET

PROJECT NO.: 03453.058

A.01

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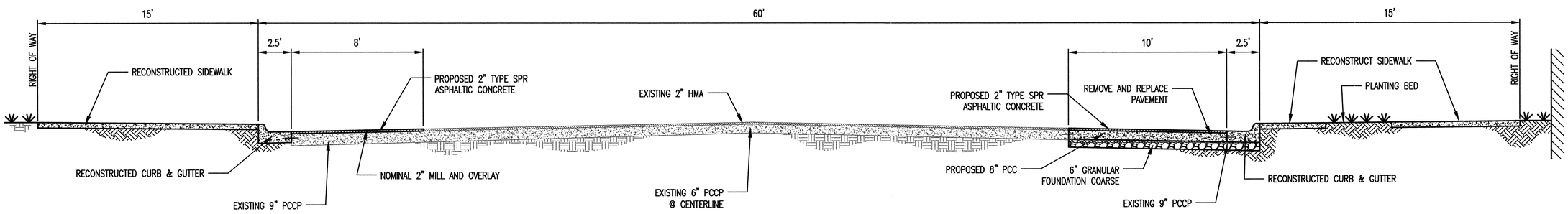
5/8/2013 10:51:41 AM Weikert, Bret

NOTE: TIE NEW PAVEMENT AND CURB AND GUTTER TO EXISTING PAVEMENT USING NDOR STANDARD PLAN NO. 329-R9.



S 14TH STREET TYPICAL CROSS SECTION
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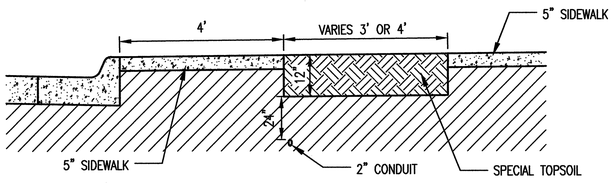

PLANTING BED DETAIL
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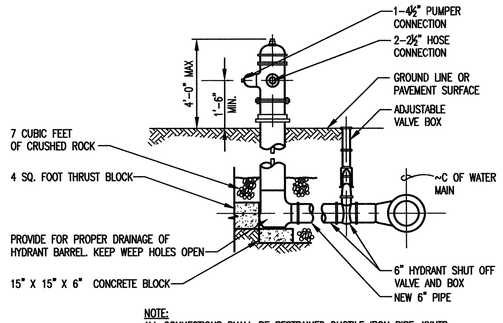
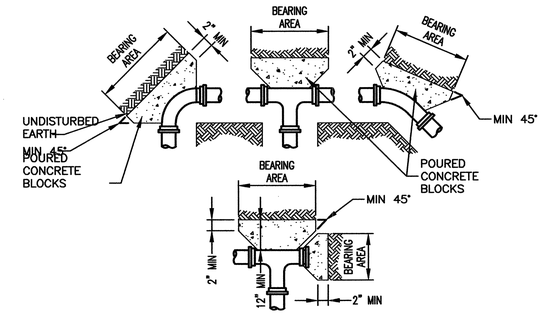


NOTE:
ALL CONNECTIONS SHALL BE RESTRAINED DUCTILE IRON PIPE JOINTS

TYPICAL FIRE HYDRANT SETTING
NO SCALE



NOTES:
1. PLACE 4 MIL. POLYETHYLENE BETWEEN CONCRETE AND FITTING (CONCRETE SHALL NOT INTERFERE WITH JOINT.)
2. MINIMUM CONCRETE THICKNESS SHALL BE 12 INCHES.
3. THE HORIZONTAL DIMENSION OF THE BEARING AREA SHALL BE BETWEEN 0.8 AND 1.25 TIMES THE VERTICAL DIMENSION.
4. THRUST BLOCK ORIENTATION SHALL BE SUCH THAT THE CENTER OF THE FITTING CORRESPONDS WITH THE CENTER OF THE THRUST BLOCK.
5. THE MINIMUM ALLOWABLE ANGLE (EITHER VERTICAL OR HORIZONTAL) SHALL BE 45 DEGREES.
6. CONCRETE SHALL PROVIDE MIN. COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.
7. ASSUMED SOIL BEARING CAPACITY EQUALS 1000 PSF.
8. THRUST BLOCK DESIGN PRESSURE EQUALS 100 PSI WITH SAFETY FACTOR OF 1.5.

BEARING AREA OF BLOCK IN SQ. FT.					
FITTING SIZES (IN)	TEE & END	90° BEND	45° BEND	22½° BEND	11¼° BEND
6	3.75	5.50	3.00	1.50	0.75
8	6.50	9.25	6.00	2.50	1.25
10	9.75	13.75	7.50	4.00	2.00
12	13.75	19.50	10.50	5.50	2.75
16	24.00	33.75	18.25	9.50	4.75

TYPICAL THRUST BLOCKING DETAIL
NO SCALE

DESIGNED: RGF
DRAWN: BRW
CHECKED: RGF

ISSUE DATE: 03/27/2013

REVISIONS:

No.:	DATE:	BY:	DESCRIPTION:
1	05/08/2013	RGF	ADDED DIMENSIONS TO CROSS SECTION

PROFESSIONAL CIVIL ENGINEER
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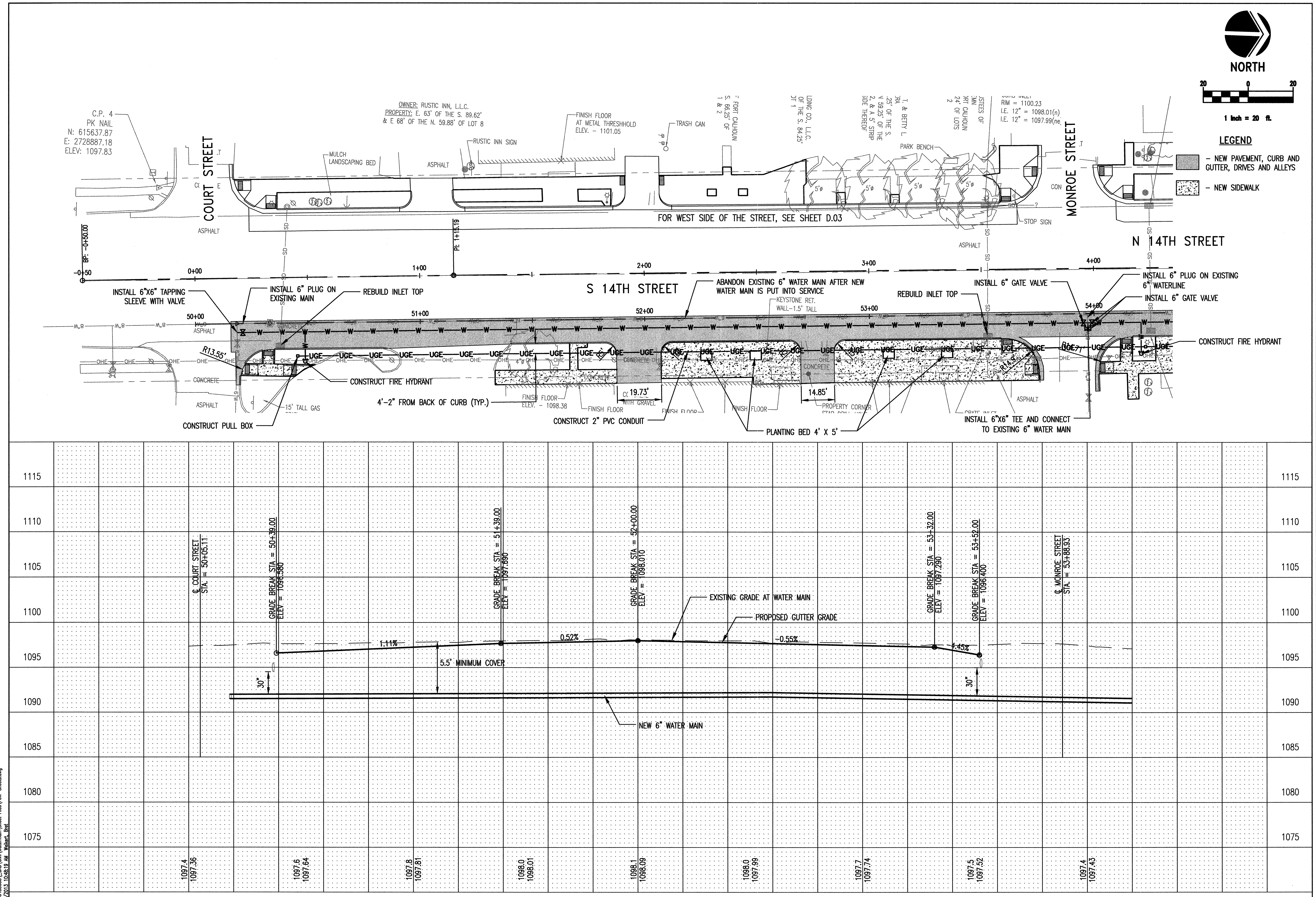
FORT CALHOUN CIP PROJECT
STR-236
FORT CALHOUN, NEBRASKA

TYPICAL CROSS SECTION & MISCELLANEOUS DETAILS

PROJECT NO.: 03453.058

B.01



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5/8/2013 10:48:19 AM Weikert, Bret

ISSUE DATE: 03/27/2013

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1	05/08/2013	RGF	ADDED DIMENSIONS

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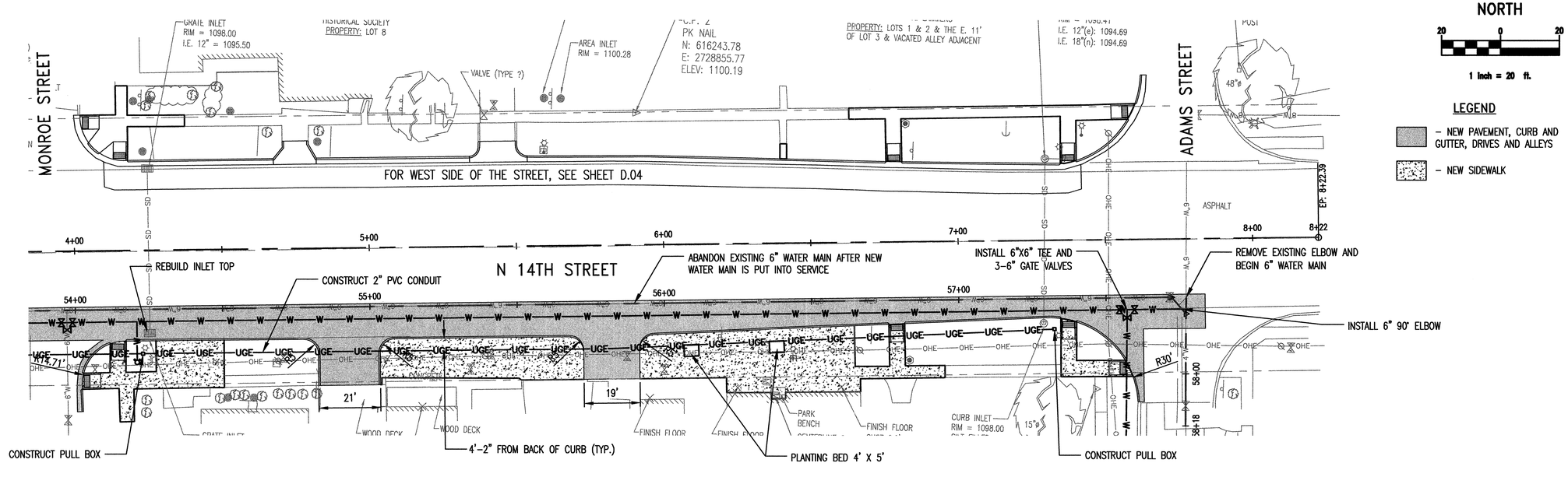
STR-236
FORT CALHOUN, NEBRASKA

S 14TH STREET EAST SIDE PLAN & PROFILE

PROJECT NO.: 03453.058

D.01



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ISSUE DATE: 02/27/2013

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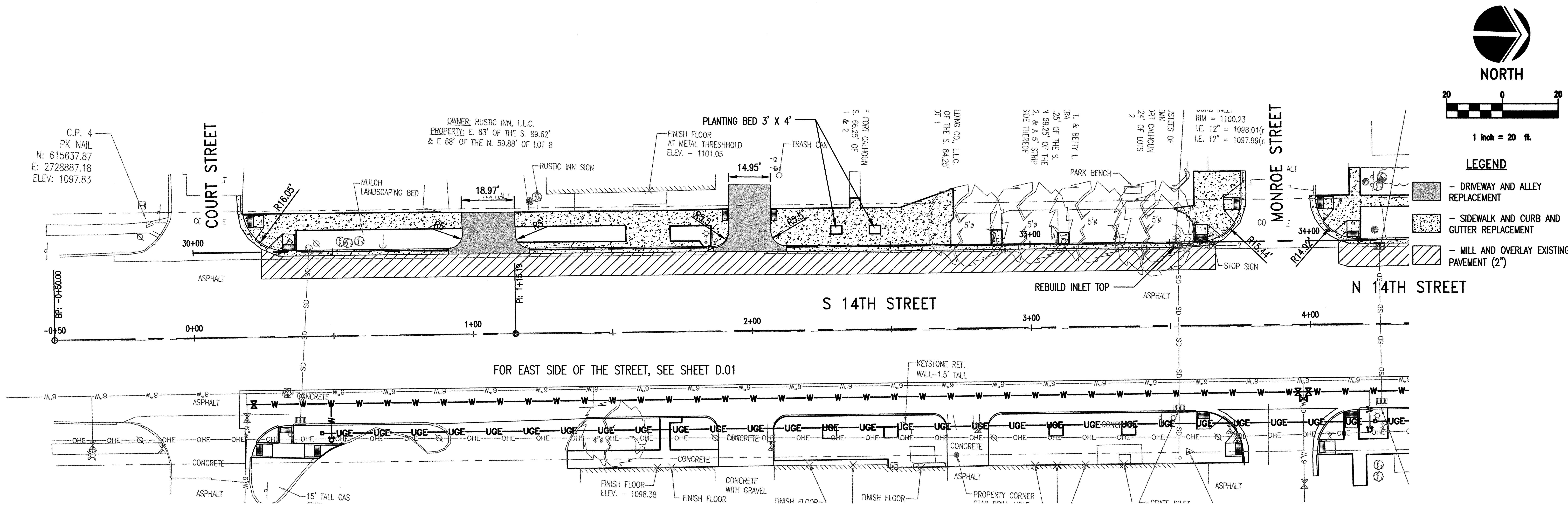
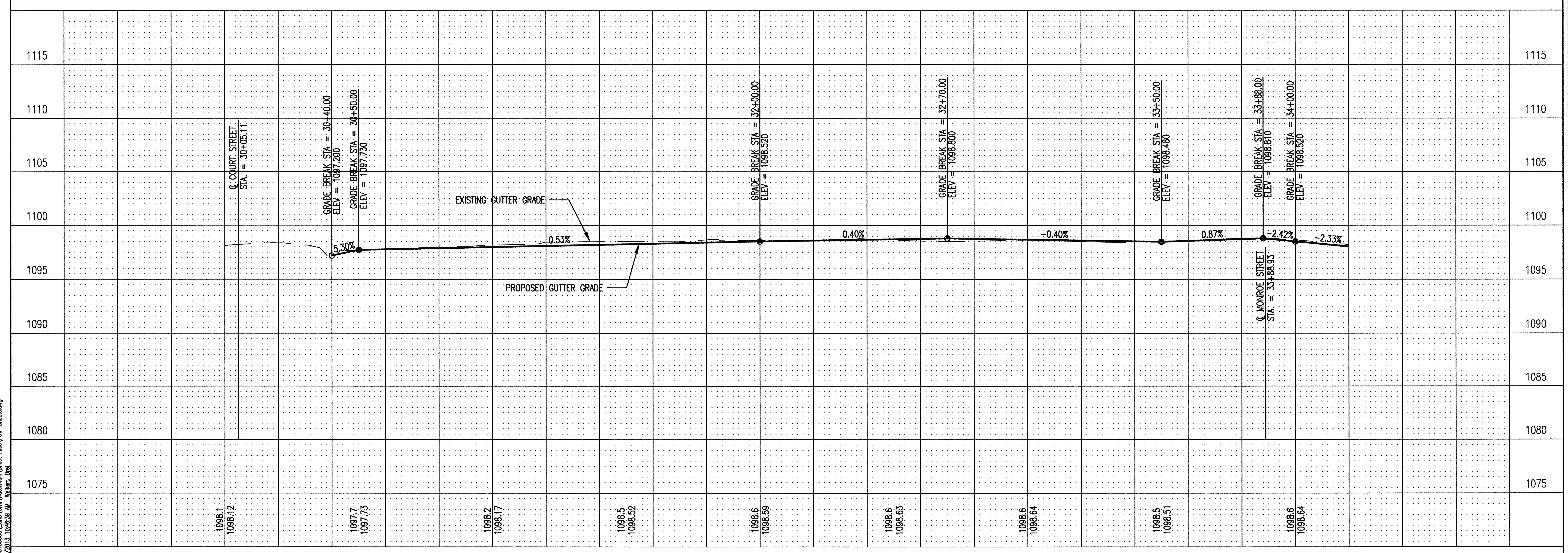
FORT CALHOUN CIP PROJECT
STR–236
FORT CALHOUN, NEBRASKA

N 14TH STREET
EAST SIDE PLAN & PROFILE

PROJECT NO.: 03453.058

D.02





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ISSUE DATE: 03/27/2013

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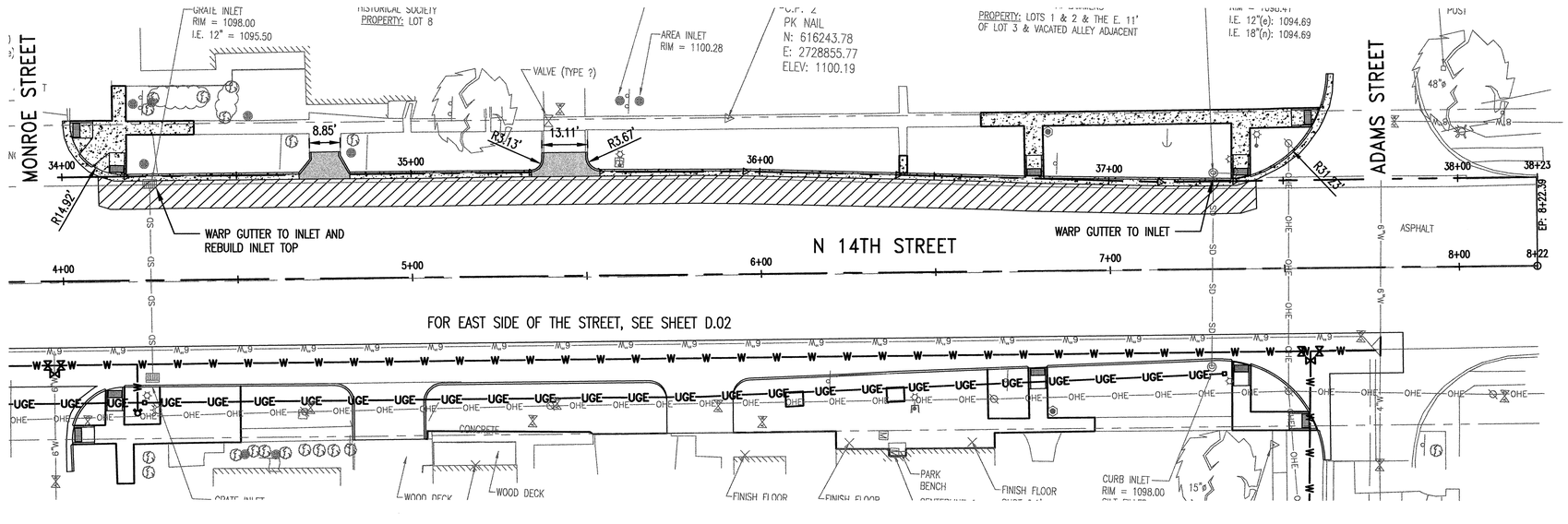
FORT CALHOUN CIP PROJECT
STR-236
FORT CALHOUN, NEBRASKA

S 14TH STREET
WEST SIDE PLAN & PROFILE

PROJECT NO.: 03453.058

D.03



NORTH

20 0 20

1 inch = 20 ft.

LEGEND

- DRIVEWAY AND ALLEY REPLACEMENT
- SIDEWALK AND CURB AND GUTTER REPLACEMENT
- MILL AND OVERLAY EXISTING PAVEMENT (2")

ISSUE DATE: 02/27/2013

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1	05/08/2013	RGF	ADDED DIMENSIONS

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STR-236
FORT CALHOUN, NEBRASKA

N 14TH STREET
WEST SIDE PLAN & PROFILE

PROJECT NO.: 03453.058

D.04

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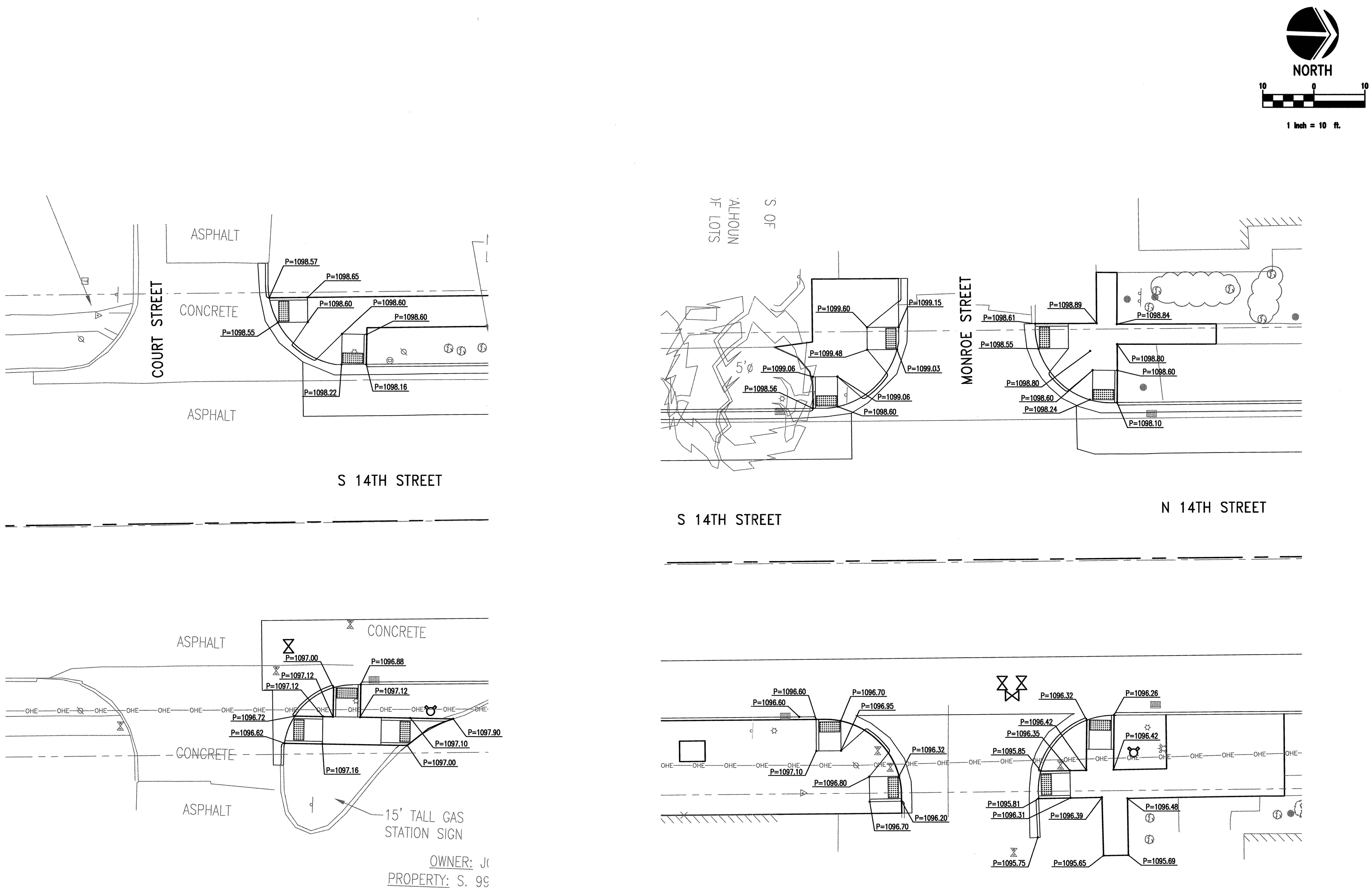
5/8/2013 10:45:53 AM Wolbert, Bret



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ISSUE DATE: 03/27/2013
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No.:	DATE:	BY:	DESCRIPTION:
1	05/08/2013	RGF	ADJUSTED CURB RAMPS

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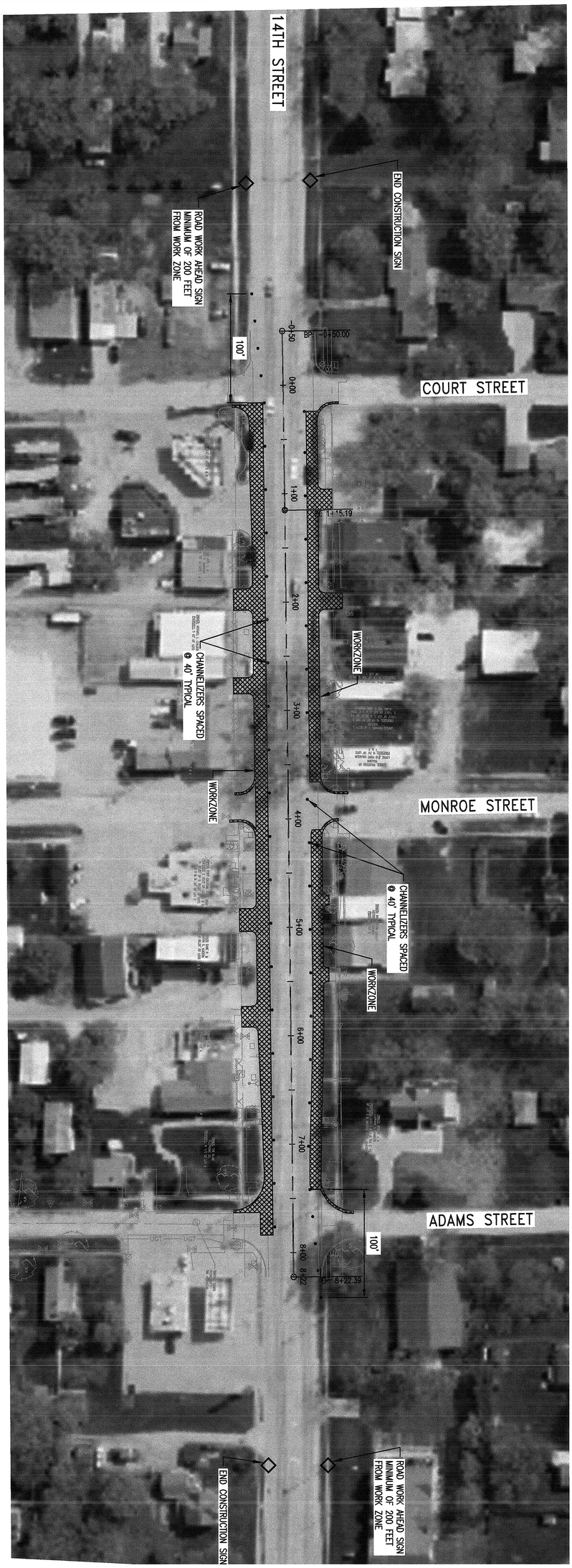
FORT CALHOUN CIP PROJECT
STR-236
FORT CALHOUN, NEBRASKA

14TH STREET, COURT STREET & MONROE STREET INTERSECTION PLAN

PROJECT NO.: 03453.058

J.01



NOTE: ALL TRAFFIC CONTROL INCLUDING SIGNS AND BARRICADES SHALL CONFORM TO THE MUTCD. THE CONTRACTOR SHALL MAINTAIN ALL TRAFFIC CONTROL DEVICES AT ALL TIMES.

1 Inch = 50 ft.

50 0 50

NORTH

FORT CALHOUN CIP PROJECT
STR-236
FORT CALHOUN, NEBRASKA

14TH STREET
TRAFFIC CONTROL PLAN

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PROJECT NO.: 03453.058

T.01

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1	05/08/2013	RGF	ADDED CHANNELIZERS