CONSTRUCTION SPECIAL PROVISIONS
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD CONTRACT NO. 84-10

FOR

35TH AVENUE BRIDGE
OVER THE
ARIZONA CANAL DIVERSION CHANNEL

To The
Maricopa Association Of Governments
Uniform Standard Details for
Public Works Construction
With
The City of Phoenix Supplement
And
The Maricopa County Highway Department Supplement

By
GREINER ENGINEERING SCIENCES, INC.
7310 North 16th Street, Suite 160
Phoenix, AZ 85020-5223

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PROPOSED WORK. The work includes the construction of a temporary detour, a temporary detour bridge, a permanent concrete bridge, approach roadways, underground utility modifications, waterline relocations at 31st and 39th Avenues and other miscellaneous items of work required for the completion of the project.

LOCATION OF WORK. This project is located in Phoenix, Arizona, on 35th Avenue at the Arizona Canal Diversion Channel, approximately 1/2 mile north of Dunlap Avenue.

SPECIFICATIONS. Except as otherwise required in these Construction Special Provisions, construction of this project shall be in accordance with all applicable Maricopa Association of Governments (MAG) Uniform Standard Specifications and Uniform Standard Details, latest revision, and the latest revision of the City of Phoenix Supplements to the MAG Uniform Standard Specifications and Details, together with Maricopa County Highway Department Supplements to the Uniform Standard Specifications.

PRECEDENCE OF CONTRACT DOCUMENTS. The Maricopa County Highway Department Supplements to the MAG Specifications and Details will govern over the City of Phoenix Supplements and the MAG Standard Specifications and Details. The City of Phoenix Supplements to MAG Specifications and Details will govern over the MAG Standard Specifications and Details. In case of discrepancy or conflict, Project Plans will govern over both the City of Phoenix Supplements, the Maricopa County Highway Department Supplements, and MAG Standard Specifications and Details. These Construction Special Provisions will govern over the City of Phoenix Supplements, the Maricopa County Highway Department Supplements, and MAG Standard Specifications and Details and the Project Plans.

WORK STANDARDS. The Contractor shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor Regulations (29 CFR Part 5).

CONTRACT TIME. The Contractor shall start work within 7 calendar days and complete all work on the project within 336 calendar days after the date of Notice to Proceed.

WATER, LIGHT, POWER, HEAT, TELEPHONE. All water for construction purposes, drinking water, lighting, temporary electric power, heat and telephone service shall be arranged for and provided for the requirements of the work by the Contractor at his expense.

PROGRESS SCHEDULE. The Contractor shall submit his proposed work progress schedule to the Engineer for approval before starting the work.

MATERIAL SOURCES. Select Material, Aggregate Base and Mineral Aggregate shall be obtained from commerical sources. The Contractor shall pay all royalties, or any other charges or expenses incurred in connection with the securing and hauling of the material. The Contractor will be required to furnish the Engineer with a list of his proposed commercial sources prior to use, and shall present certificates stating that the material produced from commercial sources is in accordance with the Uniform Standard Specifications and these Special Provisions.

GENERAL COMMENT. The cost of all work required under this contract as shown on the plans for which there are no specific items shown on the Bidding Schedule, shall be included in the prices bid for related items.

SECTION 101 - ABBREVIATIONS AND DEFINITIONS

SUBSECTION 101.2 - DEFINITIONS AND TERMS. Change the definition of Budget Project to read as follows: A project financed by funds set aside in the annual budget or otherwise approved by the Board of Directors of the Flood Control District of Maricopa County.

Change the definition of Engineer to read as follows: The Chief Engineer and General Manager of the Flood Control District of Maricopa County acting directly or through his authorized representative.

Change the definition of Owner to read as follows: The Flood Control District of Maricopa County, acting through its legally constituted officials, officers or employees.

Salvageable shall be defined as any item or material as determined by the Engineer to be of a reusable or saleable nature.

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS

It shall be the responsibility of prospective bidders to determine, prior to submission of a bid, if any addenda have been issued. This may be accomplished by calling the Flood Control District of Maricopa County at 602-262-1501. Any addendum issued, if not already bound into the Special Provisions, must be included as a part of the Special Provisions, and any quantities on the Bidding Schedule requiring change shall be adjusted by pen and ink to the new figure.

Bids that do not include appropriate addenda and show appropriate changes to the Bidding Schedule shall be invalid.

SUBSECTION 102.5(B) - PREPARATION OF PROPOSAL. Revise this subsection as follows:

The bidder's Arizona State Contractor's License number and classifications need not be shown on the proposal. The possession of such a license is no longer a bidding requirement; however, the Contractor may be required to provide certification of prior satisfactory completion for similar construction.

SECTION 103 - AWARD AND EXECUTION OF CONTRACT

SUBSECTION 103.6 - CONTRACTOR'S INSURANCE. Concurrently with the execution of the contract, the Contractor shall furnish the City a Certificate of Insurance.

The types of insurance and the limits of liability shall be as indicated per the Standard Specifications, including the following:

$1,000,000	bodily injury per person
$1,500,000	bodily injury each occurrence
$1,000,000	property damage

SECTION 105 - CONTROL OF WORK

SUBSECTION 105.2 - PLANS AND SHOP DRAWINGS. This subsection will be appended as follows:

The cost of furnishing all shop drawings shall be considered as included in the amount bid for the item or related item.

SUBSECTION 105.6 - COOPERATION WITH UTILITIES. This subsection will be appended as follows:

An attempt has been made to determine the location of all underground utilities and drainage pipes, culverts and structures; however, it shall be the Contractor's responsibility to cooperate with the pertinent utility companies so that any obstructing utility installation may be adjusted. Should the Contractor's operations result in damage to any utility the location of which has been brought to his attention, he shall assume full responsibility for such damage.

The following phone numbers should put the Contractor in contact with the proper personnel:

Maricopa County Flood Control District.	262-1501
Mountain Bell Telephone Company	842-7419
Salt River Project (Irrigation)	236-5461
Salt River Project (Power).	236-2090
Arizona Public Service.	371-6960
Location Staking (A.P.S., Mtn. Bell, S.R.P.). .	263-1100
City of Phoenix Streets and Traffic	262-6565
City of Phoenix (Field Engineering)	257-9599
Southwest Gas Company	484-5264
Dimension Cable Services.	866-0072

SUBSECTION 105.8 - CONSTRUCTION STAKES, LINES AND GRADES. This subsection shall be appended as follows:

The project control lines (roadway and detour) and benchmark elevation are shown on the drawings and will be established by the Engineer. The Contractor shall establish offset stakes and temporary bench marks for referencing the designated construction lines and grades. The Contractor shall provide all rough grade, fine grade, and structural reference lines and shall be responsible for their conformance with the plans and specifications.

Survey work shall be performed by a qualified and experienced surveyor under the supervision of a licensed land surveyor.

No separate payment will be made for construction surveying and the cost thereof shall be included in the price bid for related items of work.

SECTION 106 - CONTROL OF MATERIALS

Section 106 shall have the following added:

SUBSECTION 106.9 - CERTIFICATES.

a. General. The Contractor shall submit to the Engineer three copies of either a Certificate of Compliance or a Certificate of Analysis, as required, prior to the use of any materials for which these specifications or the special provisions require that such a certificate be furnished.

b. Certificate of Compliance. The Engineer may permit the use of certain materials or manufactured assemblies prior to sampling and testing if accompanied by a Certificate of Compliance, stating that the materials involved comply in all respects with the requirements of the cited specifications. Such a certificate shall be furnished with each lot of material delivered to the project.

The Certificate of Compliance shall contain the following information:

1) Project number to which the material is consigned.

2) Name of Contractor to whom the material is supplied.

3) Kind of material supplied.

4) Quantity of material represented, such as lot, batch, etc.

5) Means of material identification, such as label, lot number, marking.

6) Statement that the material complies in all respects with the specific requirements of the cited specifications.

7) The original signature of a person having a legal authority to bind the manufacturer or supplier of the material. A reproduction is not acceptable. The signature shall be notarized.

8) Materials or assemblies used on the basis of a Certificate may be sampled and tested at any time if found not in conformity with the requirements of the plans and the Specifications will be subject to rejection whether in place or not.

The Department reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

c. Certificate of Analysis. The Certificate of Analysis shall include all information required in a Certificate of Compliance and, in addition, shall include the results of all tests required by the specifications, such as mill test reports for certain types of structural steel.

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

SUBSECTION 107.2 - PERMITS. This subsection shall be appended as follows:

The Contractor shall be responsible for obtaining all permits and licenses, pay all charges, fees, taxes and give all notices necessary and incidental to the due and lawful prosecution of the work. Permits for earth moving may be obtained from the Bureau of Air Pollution Control, Maricopa County Department of Health Services, 1845 East Roosevelt, telephone number 258-6381. City of Phoenix and Salt River Project permits will be required.

SECTION 108 - COMMENCEMENT, PROSECUTION AND PROGRESS

SUBSECTION 108.5 - LIMITATION OF OPERATIONS. This subsection shall be appended as follows:

Should the Contractor elect to perform any work after regular working hours, on weekends, or legal holidays, any charges incurred by the District for inspection of the work, surveys, or tests of materials will be deducted from monies due or to become due to the Contractor.

SUBSECTION 108.9 - FAILURE TO COMPLETE ON TIME. The first paragraph shall be deleted and the following added:

The actual cost per calendar day incurred by the District for Consultant Administrative and Inspection Services on this project will be added to the daily charges as indicated by TABLE 108, LIQUIDATED DAMAGES, and will be deducted from monies due or to become due to the Contractor for each and every calendar day that work shall remain uncompleted after the time specified for the completion of the work in the proposal, or as adjusted by the Engineer. Nothing contained in this provision shall prohibit the District from deducting from monies due or to become due to the Contractor any other costs incurred by the District directly attributable to the delay in completing this contract.

SECTION 201 - CLEARING AND GRUBBING

The work under this item consists of removal and disposition of all hedges, stumps, asphaltic pavement and structures within the limits of the roadways, and canal structures designated on the plans. Also provided for is the relocation of existing trees to a location which is to be selected by the City of Phoenix Parks and Recreation Department. Also see Section 350 in these Special Provisions.

SECTION 205 - ROADWAY EXCAVATION

Material excavated from the new channel alignment may be used in the construction of the detour road. The detour, when no longer required, shall be excavated and the earth material removed to the channel excavation waste site. After the detour embankment has been removed, the site shall be restored to its original grades and conditions (see SECTION 350 of these Special Provisions).

The cost of excavation of the detour and restoration of the site shall be incidental to and included in the price bid for ITEM 350-7 REMOVAL OF DETOUR IMPROVEMENTS AND RESTORATION.

SECTION 206 - STRUCTURE EXCAVATION AND BACKFILL

Subsection 206.1 - Description, shall be appended as follows:

SUBSECTION 206.1.1 - EXCAVATION. Foundation excavation shall include the removal of all material, of whatever nature, necessary for the construction of foundations and substructures in accordance with the plans or as directed by the Engineer. It shall include the furnishing of all necessary equipment and the construction of all cribs, sheet piling, earth retaining or stabilization systems, dewatering, etc., which may be necessary for the execution of the work. It shall also include the subsequent removal of sheet piling, earth retaining systems, cribs, etc. and the placement of all necessary backfill as hereinafter specified. It shall also include the disposing of excavated material, which is not required for backfill, in a manner and in locations so as not to affect the carrying capacity of any channel and not to be unsightly.

Foundation excavation shall include removing old structures or parts thereof as required, and all necessary clearing and grubbing within the bridge site area. The bridge site is defined as the entire area between the right-of-way lines and between lines paralleling the bridge ends and passing through the longitudinal extremities of the substructure or superstructure, whichever is greater, unless a greater length is necessary for the required construction of the bridge.

Operations shall be conducted in such a manner that existing highway facilities, utilities, and other nonhighway facilities which are to remain in place will not be damaged. The contractor shall furnish and install sheet

piling, cribbing, bulkheads, shores or whatever materials may be necessary to adequately support material carrying such facilities, or to support the facilities themselves and shall maintain such supports until they are no longer needed. Temporary pavements, facilities, utilities and installations shall also be protected until they are no longer required. When temporary supports and other protective means are no longer required, they shall be removed completely and disposed of by the contractor. There shall be no measurement for this work. The contractor shall include the associated costs in the unit price for Structural Excavation.

When hauling is done over highways or city streets, and when directed by the Engineer, the loads shall be trimmed and all material removed from shelf areas of vehicles in order to eliminate spilling of material. When directed by the Engineer, loads shall be watered and/or covered to eliminate dust and debris.

SUBSECTION 206.1.1 (A) - CONSTRUCTION REQUIREMENTS. The contractor shall notify the Engineer at least 3 days in advance of the beginning of excavation to allow measurements to be taken of the undisturbed ground. The required excavation shall then be performed in reasonably close conformity to the lines, grade and cross sections established by the Engineer or shown on the plans.

Excavated material which is not suitable for, or not used as structure backfill shall be disposed of as directed by the Engineer and in accordance with the requirements of SUBSECTION 205.6.

Subsection 206.4 shall be deleted and the following substituted:

SUBSECTION 206.4 - STRUCTURE BACKFILL: Structure backfill shall consist of furnishing, placing and compacting backfill material around structures to the lines designated on the project plans, directed by the Engineer, and as specified herein.

Backfilling operations shall conform to the following requirements: Structure backfill shall not be placed until the structure footings or other portions of the structure or facility have been inspected by the Engineer and approved for backfilling. No backfill material shall be deposited against the back of concrete abutments, concrete retaining walls or outside walls of cast-in-place concrete box culverts until the concrete has attained a minimum compressive strength of 3,000 pounds per square inch and in no case less than 72 hours.

All earth material which has loosened or collapsed into the excavation from the adjacent ground and all trash, forms, and loose, large rock shall be removed from the excavation before backfill is placed.

Structure backfill material shall be material from excavation or from an approved contractor-furnished source.

Structure backfill shall conform to the requirements of one of the following types:

Type A. Well-graded native material, free from broken concrete, vegetation or other debris with sufficient fines to fill all voids and insure a uniform and throughly compacted mass of the required density, with a maximum plasticity index of five (5), and conforming to the following gradation:

Sieve Size	Percent Passing
3 inch	100
No. 4	50-100
No. 200	0- 20

Type B. Material conforming to the gradation and plasticity index requirements of SECTION 702 for Select Material Type B aggregate.

Structure backfill shall be placed in uniform horizontal layers not exceeding 12 inches in depth before compaction. Each layer shall be brought up uniformly on all sides of the structure or facility prior to placing the succeeding layer. Special precautions shall be taken to prevent wedging action against the structure on the excavation limits. The excavation limits shall be destroyed by stepping or roughening to prevent wedge action.

The abutments shall not be backfilled above elevation 1220.00 until the concrete bridge deck has been in place a minimum of seven days.

Backfill material may be compacted by either mechanical or pneumatic tamping devices. Compaction of structure backfill by jetting will not be permitted. Compaction equipment or methods which may cause excessive displacement shall not be used.

The material shall be placed at or near optimum moisture content. Backfill shall be thoroughly compacted to not less than 95% density when tested and determined by AASHTO T-99 and T-191.

Subsection 206.5 shall be deleted and the following substituted:

SUBSECTION 206.5 - MEASUREMENT AND PAYMENT

SUBSECTION 206.5.1 - STRUCTURAL EXCAVATION. Structural excavation will be measured for payment by the cubic yard based on the volume calculated from the pay limits given on the plans and shall be included in the price bid for ITEM 206-1 - STRUCTURAL EXCAVATION.

Payment for foundation excavation shall include the cost of all labor, material, equipment, and other items that may be necessary or convenient to the successful completion of the excavation to the elevation of the bottom of the footings. It shall also include the cost of removing sheet piling or other temporary supports and any surplus material which may have been thrown up during the process of excavation.

The quantity to be paid for shall be the actual number of cubic yards of material, in original position, acceptably excavated in conformity with the plans or as directed by the Engineer, but no quantity shall be included in the measurement for payment which is outside of a volume bounded by vertical planes 18 inches outside of and parallel to the neat lines of the footing. The cross sectional area measured shall not include water or other liquids, but shall include mud, muck, and other similar semi-solids.

The top and bottom limits of computed volume shall be the original ground or the top of the required grading cross section, whichever is lower, and the bottom of the completed footing.

No measurement for payment will be made of excavation required because of slides, cave-ins, siltings or filling due to lack of support of sides, the action of the elements or the carelessness of the Contractor.

SUBSECTION 206.3.2 - STRUCTURE BACKFILL. Structure backfill will be measured by the cubic yard of material based on the volume calculated from the pay limits shown on the plans and shall be included in the price bid for ITEM 206-2 - STRUCTURAL BACKFILL.

SUBSECTION 206.5.3 - BASIS OF PAYMENT. The accepted quantities of structural excavation and structure backfill, measured as provided above, will be paid for the contract unit price per cubic yard. The price shall be full compensation for the work complete as hereinbefore specified.

Full compensation for hauling, placing and compacting surplus structural excavation in embankments or otherwise disposing of the material shall be considered as included in the contract price paid for excavating the material.

No separate compensation shall be paid for the furnishing, construction or removal of any cribs, sheet piling, earth retaining or stabilization systems, dewatering, etc. which may be necessary for the execution of the work but shall be considered as included in the contract price paid for excavating the material.

Payment for additonal excavation, where it is found necessary to excavate to a depth greater than three feet below the elevation shown on the project plans for a footing, or to remove unsuitable material in accordance with the requirements of SUBSECTION 206.2.1 will be in accordance with the provisions of SUBSECTION 109.4.

SECTION 210 - BORROW EXCAVATION

Borrow shall consist of material excavated for use in the construction of the detour roadway embankment fills. Borrow material shall be excavated from the proposed channel alignment area to the lines and grades established on the channel plans.

The cost of the borrow excavation shall be incidental to and included in the price bid for ITEM 211 BORROW (DETOUR EMBANKMENT).

SECTION 211 - FILL CONSTRUCTION

This work shall consist of all embankment and fill construction (except Structure Backfill) on the temporary and the permanent work as indicated on the drawings and shall be in accordance with SECTION 211 of the Uniform Standard Specifications. Included in this item is construction of the detour fill.

The cost of all related work, such as borrow excavation, hauling, watering, and subgrade-preparation, shall be incidental to and included in the lump sum price bid for ITEM 211 BORROW (DETOUR EMBANKMENT) in addition to the work specified in SECTION 211 of the Uniform Standard Specifications.

SECTION 225 - WATERING

The work under this item shall be in accordance with SECTION 225 of the Uniform Standard Specifications and Highway Department Supplement. No separate payment will be made for this item.

SECTION 301 - SUBGRADE PREPARATION

Subgrade preparation shall also include the preparation of subgrades to the required lines and grades for the bridge approach slabs, in addition to the work specified in SECTION 301 of the Uniform Standard Specifications.

No separate payment will be made for subgrade preparation and the cost thereof shall be included in the price bid for related items of work.

SECTION 310 - UNTREATED BASE

Aggregate Base shall conform to the requirements of SECTION 702 of the Uniform Standard Specifications. Aggregate Base shall be crushed in accordance with SUBSECTION 702.2.

The Contractor will be required to furnish the Engineer certified weight tickets covering all of the Aggregate Base placed on the project. Payment for Untreated Aggregate Base will be made on the basis of the price bid per ton for ITEM 310-1 AGGREGATE BASE COURSE.

SECTION 321 - ASPHALT CONCRETE PAVEMENT

The bituminous material to be used shall be AC-30 Paving Asphalt and shall comply with SECTIONS 710 and 711 of the Uniform Standard Specifications. If

conditions require, the grade of the paving asphalt may be adjusted a maximum of one grade higher or lower with the approval of the Engineer.

Pavement of the detour roadway shall consist of D-1/2, 2 inches in thickness as indicated on the plans.

Pavement of the new permanent roadway shall consist of A-1-1/2, 8 inches in thickness overlaid with D-1/2, 1-1/2 inches in thickness as indicated on the plans.

The mineral aggregate shall meet the grading requirements within the range of the specified tolerances for Mix-Designations A-1-1/2 and D-1/2 in accordance with SECTION 710 of the Uniform Standard Specifications and the City of Phoenix Supplement to the Uniform Standard Specifications.

The work shall be in compliance with SECTION 321 except that no blending sand will be required.

In addition to pugmill type mixing plants, Drum Dryer Mixers will be allowed in accordance with SUBSECTION 710.8 of the Uniform Standard Specifications.

The moisture content of the bituminous mixture immediately behind the paver shall not exceed three percent.

The proper proportioning of the material at the cold feed shall be determined by the Contractor and approved by the Engineer prior to the production of ashpalt concrete. Production shall not commence until calibration tests indicate that an acceptable product can be obtained.

The correct proportions of each aggregate size introduced into the mixer shall be drawn from the storage bins by an approved type of continuous feeder. The feeder shall supply the correct amount of aggregate in proportion to the bituminous material and shall be so arranged that the proportion of each aggregate size can be separately adjusted. The continuous feeder for the aggregate may be mechanically or electrically activated.

The plant shall be equipped with a sampling device to take representative composite samples of the cold feed. If tests indicate non-compliance with specifications, operation shall cease until proper corrections have been made.

The production of the plant shall be governed by the rate required to obtain a thorough and uniform mixture of the materials. Mixing shall continue until the uniformity of coating, when tested in accordance with the requirements of AASHTO T 195, is at least 95 percent.

Payment for asphalt concrete pavement will be at the bid price per ton in place for ITEM 321-1 D-1/2 ASPHALT CONCRETE, for ITEM 321-2, A-1-1/2 ASPHALT CONCRETE, for ITEM 321-3 TACK COAT, and ITEM 321-4 PRESERVATIVE SEAL, ACP.

SECTION 336 - PAVEMENT MATCHING AND SURFACE REPLACEMENT

Existing pavements which are to be matched by temporary detour pavement and/or new roadway pavement shall be trimmed to a neat, straight and vertical edge. The trimmed edges shall be painted with a light coat of emulsified asphalt immediately prior to constructing the new abutting pavement. Pavement replacement shall be in accordance with SECTION 336 of the Uniform Standard Specifications.

There will be no direct payment for this item. The cost of which is considered incidental to: ITEM 205-2 GRADING ROADWAY FOR PAVEMENT and ITEM 321-1 ASPHALTIC CONCRETE D-1/2 and ITEM 321-2 ASPHALTIC CONCRETE A-1-1/2.

SECTION 340 - CONCRETE CURB AND GUTTER, SIDEWALK AND MEDIAN ISLAND

Work under this item shall conform to SECTION 340 of the Uniform Standard Specifications and shall include concrete curb and gutter, sidewalk and median island.

All concrete shall be Class B and shall conform to SECTION 725 of the Uniform Standard Specifications.

All concrete items shall conform to the Standard Details and the details shown on the plans.

Payment for these items will be made at the unit price bid per lineal foot for ITEM 340-1 CONCRETE CURB AND GUTTER, the unit price bid per square foot for ITEM 340-2 CONCRETE SIDEWALK, and the unit price bid per square yard for ITEM 340-3 CONCRETE MEDIAN ISLAND.

SECTION 350 - REMOVAL OF EXISTING AND DETOUR IMPROVEMENTS AND RESTORATION

Removal of existing improvements shall consist of the removal and disposal of any obstacle to construction, whether shown on the plans or not, unless specifically called out on the plans to be removed or relocated by other agencies.

The detour when no longer required, shall be excavated and the earth material disposed of as directed by the Engineer. The area where the detour was placed shall be completely restored to its original condition. This will include removal of the detour pavement, temporary fencing, temporary barriers and embankment. Also included shall be the resetting to grade any and all surface mounted utility fixtures which had been reset to accomodate the new detour alignment.

Restoration will also include replacement of curb and gutter, sidewalk and pavement on 35th Avenue, replacement of the chain link fence along 35th Avenue, reseeding of the bermuda grass after the detour embankment has been removed, planting of new trees as directed by the City of Phoenix Parks and Recreation Department, and any other incidentals required to restore the detour alignment to its original condition per the items applicable Standard Specifications Section.

The superstructure of the detour bridge shall be dismantled and the parts stockpiled by the Contractor at the same location where they were originally picked up. The Contractor shall remove the abutment cap beams down to the elevation (or below) shown on the plans. The Contractor shall restore the banks of the SRP Canal to preconstruction conditions in accordance with SRP compaction requirements (see SECTION 211). Disposal of all waste material under SECTION 350 shall be off-site and shall be the responsibility of the Contractor.

Designated materials shall be salvaged, including the precast, prestressed box beams, the handrail, and all temporary concrete median barriers. Resulting trenches, holes, and pits will be backfilled and compacted as required to restore the site to original condition. The Contractor shall state, before construction begins, the method of removal and salvaging he intends to furnish. All salvageable material shown on the plans, shall be stored by the Contractor as directed by the Engineer.

Unless otherwise directed by the Engineer, the temporary detour bridge will not be removed until the 35th Avenue Bridge is in place and accommodating traffic.

Utilities will be removed and relocated by the utility companies unless otherwise shown on the plans. The Contractor shall coordinate his removal work with the utility companies. The Contractor shall state, before construction begins, the method of removal he intends to furnish.

Major items to be removed (not provided for elsewhere in these Special Provisions) prior to detour construction and new construction on 35th Avenue (quantities are approximate):

1. Remove curb/gutter - 844 lin. ft.
2. Remove A.C. pavement - 4,245 sq. yds.
3. Remove sidewalk - 4,220 sq. ft.
4. Remove median - 248 sq. yds.
5. Remove 42" water line - 330 lin. ft.
6. Remove 96" storm drain pipe - 160 lin. ft.
7. Remove and replant trees - 11 each

Summary of items to be removed (not provided for elsewhere in these Special Provisions) after bridge construction and restoration of traffic to 35th Avenue (quantities are approximate):

1. Remove chain link fence - 260 lin. ft.
2. Remove embankment - 1000 cu. yds.

Payment for removal of existing and detour improvements shall be made at the lump sum bid basis in the proposal for ITEM 350-7 REMOVAL OF DETOUR IMPROVEMENTS AND RESTORATION. Payment for replacement of concrete curb and gutter, sidewalk and median island shall be made at the prices for ITEMS 340-1, 340-2, and 340-3.

SECTION 401 - TRAFFIC CONTROL

Traffic control shall conform to the applicable paragraphs of SECTION 401 of the Uniform Standard Specifications, the City of Phoenix Barricade Manual and as specified herein.

The number and type of barricades, signs, delineators, barriers and all other traffic control devices shall be subject to approval, however, approval of traffic control devices and the approval of the Contractor's method of application of all traffic control measures, shall not relieve the Contractor of the responsibility of protecting the work, the workman and the traveling public.

The Contractor shall provide and maintain safe and adequate access, including pavement surfacing of the detour for two-way traffic, at all times. Detour to bypass the construction zone shall be as shown on the plans. Internal construction barricading and signing shall be required to provide access and guide traffic through the zone with a speed posted at 25 miles per hour.

All necessary signs and barricades shall remain three working days beyond acceptance of the project by the Owner.

Payment for providing and maintaining traffic control will be at the lump sum bid price in the proposal for ITEM 401-1 MAINTENANCE AND PROTECTION OF TRAFFIC. Such price shall include all traffic control devices and traffic control measures, such as warning and control signs, barricades, lighting devices, paint striping, delineators, flagmen and other appurtenant items related to traffic control and safety. Included in the price shall be the maintenance of the detour pavement surface and pavement striping for the detour and the new bridge and approaches.

SECTION 505 - CONCRETE STRUCTURES

SUBSECTION 505.4 - FALSEWORK. This subsection shall be appended as follows:

Combination shoring of the bridge deck (shoring from the ground combined with shoring from the girders) during pouring will not be allowed. Shoring for the deck pour will either be supported entirely from the girders or entirely from the ground.

SUBSECTION 505.8 - CURING. The top surface of the bridge deck shall be cured by the liquid-membrane curing compound method or by the water curing method. The curing compound shall be applied progressively immediately following the surface finishing operation. Liquid-membrane curing compound shall be applied at a rate of one gallon per 100 square feet. The curing compound shall form a continuous unbroken surface. Water curing shall be applied not later than four hours after the completion of the deck finishing operations and shall be applied for a period of at least 10 days after placing.

SECTION 506 - PRECAST PRESTRESSED CONCRETE MEMBERS

SUBSECTION 506.1 - DESCRIPTION. The plans provide for alternate prestressed concrete girder designs. Alternate One designates a pretensioned concrete girder and Alternate Two designates a post-tensioned concrete girder. Both alternates are precast prestressed concrete girders and shall be fabricated and installed in accordance with the plans and the Standard Specifications.

The work under this item also includes the erection of the superstructure of the temporary detour bridge over the Arizona Canal. The Flood Control District will provide the box beams for the temporary detour bridge. The Contractor will be required to load and transport the box beams from where they are stored. The Contractor will be required to erect all box beams at the Arizona Canal 35th Avenue site.

SUBSECTION 506.10 - PAYMENT. Payment will be made at the contract unit bid price per each for **ITEM 506-1 - TYPE AASHTO GIRDERS** (Pretensioned or Post-tensioned).

The cost of transporting and erecting the box beams at 35th Avenue, installing steel tension rods, railings, safety barriers and furnishing and installing bearing pads on the detour structure shall be included in the lump sum price bid for **ITEM 506-2 - DETOUR BRIDGE SUPERSTRUCTURE.** For removal of the temporary detour bridge at 35th Avenue see SECTION 350 of these Special Provisions.

SECTION 507 - CONCRETE APPROACH SLABS

SUBSECTION 507.1 - DESCRIPTION. The work specified in this Section consists of the construction of concrete approach slab at both bridge ends and the Portland Cement Concrete Pavement located between the existing bridge approach slab and the new bridge approach slab. The slabs shall be of portland cement concrete, reinforced with steel bars, and shall be constructed in one course, on a prepared subgrade, in accordance with these specifications and in conformity with the lines, grades, dimensions and notes shown in the plans.

SUBSECTION 507.2 - MATERIALS. The materials used in concrete approach slabs shall meet the following requirements:

1. Concrete: Concrete for the slabs shall be Class A, meeting the requirements of SECTION 725.

2. Bar Reinforcement: Bar reinforcing steel shall meet the requirements of SECTION 727.

SUBSECTION 507.3 - CONSTRUCTION METHODS. The slabs shall be constructed in accordance with the applicable requirements of Section 324, "Portland Cement Concrete Street Pavement", except that the concrete used shall be Class A, as specified in SECTION 725. The reinforcement shall be placed as specified in and in accordance with the requirements of SECTIONS 505 and 727.

SUBSECTION 507.4 - OPENING TO TRAFFIC. Slabs may be opened to traffic 14 days after they are poured, provided that test cylinders representative of the concrete in the slabs, and of the same age, show a cylinder strength not less than 2500 psi.

SUBSECTION 507.5 - COMPENSATION. The quantity of concrete approach slabs shall be paid for at the contract unit price per square yard each for **ITEM 507-1 CONCRETE APPROACH SLABS** and for ITEM 507-2 - PORTLAND CEMENT CONCRETE PAVEMENT. Such price and payment shall be full compensation for all work and all materials specified in this Section or required for the entire slab, completed and accepted, including any curb or gutter included within the limits of the slab. When no item of grading for the slabs is include in the contract, the contract unit price for the slabs shall include all necessary preparation of the subgrade for the construction of the approach slabs.

SECTION 515 - STEEL STRUCTURES

SUBSECTION 515.1 - DESCRIPTION. The work under this item consists of furnishing and installing all miscellaneous metal fabrications incorporated into the project and not specified elsewhere, including the pipe hanger assembly, girder bearing assembly and threaded inserts on the 35th Avenue Bridge. Work shall conform to the applicable paragraphs of SECTION 515 of the Standard Specifications.

SUBSECTION 515.7. Payment shall be appended as follows:

The quantity of waterline suspensions and CATV suspension systems shall be paid for at the contract unit price per each for ITEM 515-1 - WATERLINE SUSPENSION and ITEM 515-2 - CATV SUSPENSION. Such price and payment shall be full compensation for all work and material associated with the suspension units and their installation and fabrication.

The quantity of the approach slab guard angle shall be paid for at the contract unit price per linear foot for ITEM 515-3 - GUARD ANGLE. Such price and payment shall be full compensation for all work and material associated including the anchor studs.

SECTION 610 - WATER LINE CONSTRUCTION

The work consists of removal and construction of water lines as shown on the drawings in accordance with SECTION 610 of the Uniform Standard Specifications, as modified herein, and the City of Phoenix "Special Construction Specification S.C.S.-W-8" included at the back of these Special Provisions.

Pipe material shall be as specified in SECTION 610.3 of the Uniform Standard Specifications and on the plans. The 4", 8", and 12" water lines shall be either restrained mechanical joint or class 52 flanged ductile iron pipe. Expansion couplings shall be installed as close as practicable to the abutment inside faces.

The 42" water line shall be reinforced concrete water pipe, steel cylinder type, prestressed per AWWA C-301, latest revision. The pipe may be either the lined cyliner type or the embedded cylinder type with restrained joints full length.

All new 42" I.D. pipe shall withstand a working pressure of 150 p.s.i. plus an additional surge pressure of 60 p.s.i. plus the earth loads for the depth of cover shown in the profile.

The new 42" I.D. pipe shall be connected to the existing 42" I.D. pipe at an existing joint. The Contractor shall increase the length of the new pipe as required to accomplish this joint requirement.

The allowable shutdown period for the 42" waterline shall not exceed 14 days. The Contractor shall acquire all necessary permits for the shutdown and notify all affected persons a minimum of 7 days prior to the shutdown. The Contractor shall be responsible for any fees or costs associated with the shutdown.

Connections to the existing potable water mains shall be in accordance with SECTION 610.9 of the Uniform Standard Specifications. The Contractor shall coordinate his work with the City of Phoenix especially regarding the water lines along 35th Avenue shut-down. The Contractor shall furnish all materials and equipment and perform all work related to the connections. The Contractor shall drain the pipe lines and dispose of the water in a manner which is not detrimental to adjacent properties or public health.

SUBSECTION 610.2 - WATER LINE, PAYMENT. Will be made by the linear foot for the respective pipe size and type. This payment will be full compensation for each item complete including testing, disinfecting, hardware, concrete encasements, permits and all incidentals for each item complete as described herein and on the plans.

SECTION 725 - PORTLAND CEMENT CONCRETE

SUBSECTION 725.1.2 - DESIGN PROCEDURES. At least two weeks prior to the appropriate concreting operation, the Contractor shall furnish a mix design for each class of concrete and strength of concrete for review and approval. More than one mix design for each class of concrete and strength of concrete may be submitted for approval provided specific items and locations of intended uses accompany the mix design. The contractor shall substantiate each mix design by furnishing test data and providing all details of the mixtures proposed for use.

The complete solid volume mix designs submitted for approval shall include all weights and volumes of all ingredients. The brand, type, and source of hydraulic cement and admixtures, the coarse aggregate size number designation, source of aggregates, the specific gravities of all ingredients, the proposed slump, a code number to identify the mix design, and the intended use of each mix design shall be an integral part of each mix design.

No changes in the approved mix designs or code numbers shall be made by the contractor except by approval of the Engineer. A new mix design shall be submitted for approval any time the contractor requests a change in materials or proportioning of the materials from that given in each approved mix design. In no case shall the approval of a mix design relieve the contractor of the responsibility for the results obtained by the use of such approved mix design.

Mix designs from previous or concurrent projects may be submitted for approval. The Engineer may waive trial batches at any time.

Prequalification of new mix designs by testing of trial batches will be required. For each trial batch, the materials, mixing equipment, procedures, and size of batch shall be the same as that to be used in the work. The number of trial batches required will be determined by the Engineer. Samples for testing will be taken by the Engineer. A new mix design shall be submitted for approval any time the test results of an approved mix design indicate that the concrete will not meet the required 28-day compressive strength.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower strength is required and such concrete will meet the requirements of the class of concrete at that location. The basis of payment for such concrete shall be that which applies to the concrete required at that location.

SUBSECTION 725.7 - PROPORTIONING. The cement shall be conveyed by means of an enclosed conveying system and the weighing hopper shall be equipped with one or more vibrators as required to insure the complete discharge of all cement from the hopper after each batch is weighed.

The moisture content of the aggregate shall be such that no free drainage of water from the aggregate will be visible during transportation from the stockpile to the point of mixing. Aggregate containing excess moisture shall be stockpiled prior to use until it is sufficiently dry to meet the above requirement.

In the event that either the coarse or fine aggregate has moisture absorption rate of more than 1.5 percent, the materials shall be thoroughly prewetted and allowed to drain in advance of use until the moisture content is stable.

SUBSECTION 725.8 - MIXING. The concrete may be mixed in a stationary mixer, either at a central mixing plant or at the site or it may be mixed in a truck mixer, either at a central mixing plant or at the site.

Each mixer shall meet the specified requirements for type and size and shall have attached in a prominent place a manufacturer's plate showing the gross volume of the mixer and the recommended speeds of the mixer for mixing and for agitating.

Each mixer shall be equipped to control the time when the water enters the mixer during the mixing cycle. Batch and mixing time shall be from the time hydraulic cement is combined with water.

Mixers shall be cleaned at suitable intervals. Water used for cleaning the mixer shall be discharged prior to further batching.

Equipment having components made of aluminum or magnesium alloys, which would have contact with plastic concrete during mixing and transporting, shall not be used.

All concrete shall be homogeneous and throughly mixed, and there shall be no lumps or evidence of undispersed cement.

SUBSECTION 725.8.1 PAVING AND STATIONARY MIXERS. The third paragraph shall be deleted.

After measurement is made of the materials in the required proportions and amounts, the batch of concrete materials shall be placed in the mixer. The flow of water into the mixer shall be uniform with a portion of the water entering in advance of the cement and aggregates and all of the water entering within the first 15 seconds of the mixing time.

The volume of concrete mixed per batch shall not exceed the capacity of the mixer as shown on the manufacturer's plate. No spillage of concrete will be allowed during the process of mixing.

The mixing time shall not be less than 60 seconds per batch of concrete and the mixing time shall be increased if directed by the Engineer.

The mixers shall have an automatic timing device which locks the discharge equipment until the required mixing time has been completed. The mixer shall be operating at mixing speed at the time that all ingredients enter the mixer to insure the immediate beginning of the mixing cycle. Mixing time shall end when the discharge chute opens. The contents of the mixer shall be completely discharged before the succeeding batch is placed in the mixer.

Any concrete discharged before the mixing time is completed shall be disposed of by the contractor at his expense.

Stationary mixers shall be equipped with automatic batch meters for counting the batches of concrete. The contractor shall furnish the batch count daily to the Engineer.

Mixed concrete shall be transported in truck mixers, truck agitators or in nonagitating trucks having special bodies.

When truck mixers or truck agitators are used, the concrete shall be continuously agitated from the time of loading until the time of discharge. Agitation shall be by rotation of the drum at the speed shown on the manufacturer's plate as agitating speed.

The truck mixer or truck agitator shall be loaded and operated within a capacity not to exceed 80 percent of the gross volume of the drum. The rate of discharge shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully opened.

Discharge from the truck mixer or truck agitator shall be completed within 90 minutes from the time batched.

Bodies of nonagitating trucks shall be smooth, mortar-tight, metal containers and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. If discharge of concrete is accomplished by tilting the body, the surface of the load shall be retarded by a suitable baffle. Covers shall be provided when needed for protection.

Discharge from nonagitating trucks shall be completed within 30 minutes from the time batched.

SUBSECTION 725.9 - LOADING AND TRANSPORTATION OF MATERIALS AND MIXED CONCRETE.

SUBSECTION 725.9.1 - DELIVERY. The organization supplying concrete shall have sufficient plant capacity and transporting apparatus to ensure continuous delivery at the rate required. The rate of delivery of concrete during concreting operations shall be such as to provide for the proper handling, placing, and finishing of the concrete. The rate shall be such that the interval between batches shall not exceed 20 minutes. The methods of delivering and handling the concrete shall be such as will facilitate placing with the minimum of rehandling and without damage to the structure or the concrete.

SUBSECTION 725.10 - SAMPLING AND TESTING. Compliance with the requirements indicated shall be determined in accordance with the following standard methods of AASHTO:

Sampling Fresh Concrete T-141 (ASTM C 172)

Weight per Cubic Foot, Yield and Air Content (Gravimetric) of Concrete T-121 (ASTM C 138)

Sieve Analysis of Fine and Coarse Aggregate T-27

Slump of Portland Cement Concrete T-119 (ASTM C 143)

Air Content of Freshly Mixed Concrete by the Pressure Method T-152 (ASTM C 231)

Specific Gravity and Absorption of Fine Aggregate T-84 (ASTM C 128)

Specific Gravity and Absorption of Coarse Aggregate T-85

Making and Curing Concrete Test Specimens in the Laboratory T-126 (ASTM C 192)

Tests for strength shall be made in accordance with the following:

Making and curing concrete compressive and flexural test specimens in the field. AASHTO T-23 (ASTM C 31).

Compressive strength of molded concrete cylinders. AASHTO T-22 (ASTM C 39).

Samples for strength tests of each class of concrete shall be taken by the Engineer not less than once a day nor less than once for each 50 cubic yards of concrete or once for each major pour. Strength tests of specimens cured under field conditions for the concrete used for bridge decks shall be carried out to check the adequacy of the curing protection of the concrete. Strength tests of field cured specimens may be required for concrete used in other parts of the structure. Each strength test result shall be the average of at least two cylinders from the same sample test at 28 days or the specified earlier age. At least four strength tests shall be made for each class of concrete on any project unless waived by the Engineer. The cylinders shall be cured under conditions that are not more favorable than the most unfavorable conditions for the portions of the concrete which they represent.

SECTION 727 - STEEL REINFORCEMENT

Section 727 shall be deleted and the following substituted:

SUBSECTION 727.1 - DESCRIPTION. The work under this section shall consist of fabricating, furnishing and placing steel reinforcement of the quality, coating, type, size, shape and quantity designated, all in accordance with the details shown on the project plans and the requirements of these specifications.

No reinforcing steel will be accepted under this specification until it has been approved by the Engineer. When required by the Engineer, the Contractor shall furnish a spot sample taken on the project and notify the Engineer as to when and where they will be available. Such samples shall be furnished at the expense of the Contractor but the cost of any testing that may be required will be borne by the Contracting Agency. Samples shall only be taken in the presence of the Engineer. The Contractor shall furnish three certified mill test reports or Certificates of Compliance for each heat or size of steel which can be clearly identified with the lot. When such information has been furnished, placing of the steel will not be held up until results of spot samples have been received.

When reinforcing steel is delivered to the site of the work, the Contractor shall furnish the Engineer with three copies of all shipping documents. Each shipping document shall show the sizes, lengths and weights of the reinforcing steel separately for each structure.

SUBSECTION 727.2 - MATERIALS.

a. Reinforcing Bars. Except when used for wire ties or spirals, steel bars used as reinforcement in concrete shall be deformed and shall conform to the requirements of ASTM A 615.

Where shown on the plans, the bars shall be Grade 60.

Where Grade 60 is not specified on the plans, Grade 40 shall be used if it is immediately available. If Grade 40 is not immediately available, Grade 60 may be used exclusively or in combination with Grade 40 provided that the conditions under which the grades are used in combination are acceptable to the Engineer and further provided that there is no additional cost to the Department.

b. Wire. Steel wire used as spirals or ties for reinforcement in concrete shall conform to the requirements of AASHTO M 32.

SUBSECTION 727.3 - GENERAL CONSTRUCTION REQUIREMENTS. When the project plans show a bar list and bending diagram, the contractor shall carefully check the schedule against the details in advance of ordering materials.

Any discrepancy or error found by the contractor in checking a bar list or bending diagram shown on the project plans or in preparing shop drawings or lists shall be reported immediately to the Engineer, and the discrepancy or error shall be corrected in advance of fabrication and delivery of materials.

Steel reinforcement shall be protected at all times from damage. When placed in the work, all reinforcement shall be free of dirt, oil, paint, grease, loose mill scale, loose or thick rust or any coating of any character which would destroy or reduce bond.

When bending is required, it shall be done without the use of heat, and bars having cracks or splits at the bends will be rejected.

Reinforcement shall be accurately fabricated and placed as shown on the plans and shall be firmly held in place by wire ties at all intersection and splices with 16 gauge or heavier tie wire and by using precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires or other approved supports. The use of pebbles, broken stone, concrete masonry blocks, brick, metal pipe and wood blocks will not be permitted for the purposes of spacing or support. Where reinforcement spacing is less than 12 inches in each direction alternate intersections may be tied. Tack welding of reinforcement will not be permitted.

Distances from the forms shall be maintained so that the reinforcement does not vary from the position indicated on the plans by more than 1/4 inch. Reinforcement in any member shall be placed, inspected and approved before any concrete is placed.

SUBSECTION 727.4 - STORING AND SURFACE CONDITION OF REINFORCEMENT. Steel reinforcement shall be stored above the surface of the ground on platforms, skids, or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust. When placed in the work, reinforcement shall be free from dirt, detrimental rust, loose scale, paint, grease, oil, or other foreign materials. Reinforcement shall be free from injurious defects such as cracks and laminations. Rust, surface seams, surface irregularities, or mill scale will not be cause for rejection, provided the minimum dimensions, cross section area, and tensile properties of a hand wire brushed specimen meets the physical requirements for the size and grade of steel specified.

SUBSECTION 727.5 - FABRICATION. Bar reinforcement shall be bent to the shapes shown on the plans. All bars shall be bent cold, unless otherwise permitted. Bars partially imbedded in concrete shall not be field bent except as shown on the plans or specifically permitted.

Diameters of bends measured on the inside of the bar shall be as shown on the plans. When the diameter of bend is not shown, the minimum bend diameter shall be in accordance with the Design Specifications, AASHTO "Standard Specifications for Highway Bridges".

Bar reinforcement shall be shipped in standard bundles, tagged and marked in accordance with the Code of Standard Practice of the Concrete Reinforcing Steel Institute.

SUBSECTION 727.6 - PLACING AND FASTENING. Steel reinforcement shall be accurately placed in the positions shown on the plans and firmly held during the placing and setting of concrete. Bars shall be tied at all intersections except where spacing is less than 1 foot in each direction, in which case alternate intersections shall be tied. Welding of cross bars (tack welding) shall not be permitted for assembly of reinforcement unless authorized.

Distances from the forms shall be maintained by means of stays, blocks, ties, hangars, or other approved supports so that the bars do not vary from the position indicated on the plans by more than 1/4 inch. Blocks for holding reinforcement from contact with the forms shall be precast mortar blocks of approved shape and dimensions.

SUBSECTION 727.7 - SPLICING AND LAPPING. All reinforcement shall be furnished in the full lengths indicated on the project plans. Splicing of bars, except as shown on the plans, will not be permitted without the Engineer's approval. Splices shall be staggered as far as possible. The type and method of splices or connections shall be approved by the Engineer.

The Contractor may use either lap splices, full welded splices or mechanical connections for reinforcement bars up to and including bar size No. 11.

In lapped splices, the bars shall be placed in contact with one another and wired together in such a manner as to maintain a clearance of not less than the minimum clear distance to other bars and the minimum distance to the surface of the concrete, as specified in the AASHTO "Standard Specifications for Highway Bridges". Lap lengths shall be as shown on the plans.

A full welded splice is one in which the bars are butted and welded to develop, in tension, at least 125 percent of the specified yield strength of the bar.

All welding and inspection shall be in accordance with the requirements of the American Welding Society (AWS), Structural Welding Code-Reinforcing Steel, AWS D1.4.

A mechanical connection is one in which the bars are connected to develop, in tension or compression as required, at least 125 percent of the specified yield strength of the bar.

Except as otherwise specified, mechanical splices shall be made in accordance with the manufacturer's recommendations as approved by the Engineer. As a condition of approval, the contractor shall make three test splices in the presence of the Engineer of each size he intends to splice. Two of the test splices shall be tension tested to 125 percent of the specified yield strength of the bar and one splice shall be tested to destruction by an approved laboratory and certified reports of the tests shall be submitted to the Engineer for approval. Field splices shall be subject to visual inspection and physical testing. A minimum of two percent of the field splices chosen at random by the Engineer shall be removed and tested to 125 percent of specified yield strength by the Engineer. Samples shall be at least 42 inches long with the splice at mid length.

SUBSECTION 727.8 - SUBSTITUTIONS. Substitution of different size bars will be permitted only with specific authorization. The substituted bars shall have an area equivalent to the design area, or larger, and shall conform to the requirements of Division I, Article 8.16.8.4 "Distribution of Flexural Reinforcement" of the Design Specifications, AASHTO "Standard Specifications for Highway Bridges".

SUBSECTION 727.9 - METHOD OF MEASUREMENT. No measurement for payment will be made for steel reinforcement, whether coated or uncoated as required, which is included in a precast concrete item which is listed in the bidding schedule as a unit to be paid for at a lump sum price.

Except for that contained in a precast concrete item to be measured as a unit, steel reinforcement will be measured by the pound, as listed in the bidding schedule, based on the total computed weight for the sizes and lengths of bars, mesh, or mats shown on the plans or authorized.

The weight of bars which comply with AASHTO M 31 will be calculated as follows:

Deformed Bar Designation Number	Weight - Pounds Per Linear Foot	Nominal Diameter, Inches
3	0.376	0.375
4	0.668	0.500
5	1.043	0.625
6	1.502	0.750
7	2.044	0.875
8	2.670	1.000
9	3.400	1.128
10	4.303	1.270
11	5.313	1.410
14	7.650	1.693
18	13.600	2.257

Note: The nominal diameter of a deformed bar is equivalent to the diameter of a plain round bar having the same weight per foot as the deformed bar. Bar numbers are based on the number of eighths of an inch included in the nominal diameter of the bars.

The weight of reinforcement used in railings shall not be included when railings are paid for on a linear foot basis. The weight of reinforcement in precast piles and other items where the reinforcement is included in the contract price for the item shall not be included.

No allowance will be made for clips, wire, separators, wire chairs, and other material used in fastening the reinforcement in place. If bars are substituted upon the contractor's request and as a result, more steel is used than specified, only the amount specified shall be included.

When laps are made for splices other than those shown on the plans for the convenience of the contractor, the extra steel will not be included in the measurement for payment.

The measurement of samples for testing will be the weight in pounds of the samples selected by the Engineer or the weight in pounds of the full length of reinforcing steel bars supplied for sampling purposes when sampling is done at the construction site.

SUBSECTION 727.10 - BASIS OF PAYMENT. The accepted quantities of Reinforcing Steel, of the type shown in the bidding schedule, measured as provided above, will be paid for at the contract unit price per pound, complete in place.

The lump sum price or unit price per pound shall also include the cost of chairs, supports, fasteners, connections, and any splices not specifically shown on the plans. If the Engineer permits the substitution of larger bars than those specified or splices not shown on the plans payment will be made only for the amount of steel which would have been required if the specified size and length had been used.

SECTION 730 - ELASTOMERIC BEARINGS

SUBSECTION 730.1 - DESCRIPTION. Elastomeric bearings as herein specified shall include plain bearings (consisting of elastomer only) and laminated bearings (consisting of layers of elastomer restrained at their interfaces by bonded laminates).

SUBSECTION 730.2 - MATERIALS. The sole polymer in the elastomeric compound shall be neoprene and shall be not less than 60 percent, by volume, of the total compound.

The elastomer, as determined from test specimens, shall conform to the following:

Test	ASTM Designation	Requirement
Tensile strength, psi	D 412	2,250 Min.
Elongation at break, percent	D 412	350 Min.
Compression set, 22 hrs. at 158 degress F., percent	D 395 (Method 8)	25 Max.
Tear Strength, pounds per inch	D 624 (Die C)	180 Min.
Hardness (Type A)	D 2240 w/2 Kg. wt.	55 ± 5
Ozone resistance 20 percent strain, 100 hrs. at 104 degrees ±3.6 degrees F.	D 1149 (except 100± 20 parts per 100,000,000)	No cracks
Lower temperature stiffness, Young's Modulus at -30 degrees F., psi	D 797	5,000 Max.
Low temperature brittleness, 5 hrs. at -40 degrees F.	D 2137	Passed

After accelerated aging in accordance with ASTM Designation: D 574 for 70 hours at 212 degrees F. the elastomer shall not show deterioration changes in excess of the following:

Tensile strength, percent	-15
Elongation at Break, percent	-40 (but not less than 300 percent total elongation of the material)
Hardness, points	+10

Fabric reinforcement shall be woven from 100 percent glass fibers of "E" type yarns with continuous fibers. The minimum thread count in either direction shall be 25 threads per inch. The fabric shall have either a crowfoot or an 8 Harness Satin weave. Each ply of fabric shall have a breaking strength of not less than 800 pounds per inch of width in each thread direction when 3-inch by 36-inch samples are tested on split drum grips. The bond between double plies shall have a minimum peel strength of 20 pounds per inch.

Metal reinforcement shall be rolled mild steel sheets conforming to the requirements of ASTM A 570, Grade 33 or 40.

The Contractor shall furnish to the Engineer certification by the manufacturer that the bearings to be furnished conform to all of the above requirements. The certifications shall be supported by Certificates of Analysis conforming to the requirements of SECTION 106.

SUBSECTION 730.3 - TOLERANCES. Flash tolerance, finish, and appearance shall meet the requirements of the latest edition of the Rubber Handbook as published by the Rubber Manufacturers Association, Inc., RMA F3 and T.063 for moulded bearings and RMA F2 for extruded bearings.

For both plain and laminated bearings, the permissible variation from the dimensions and confirguration required by the plans and these specifications shall be as follows:

(a)	Overall Vertical Dimensions Average Total Thickness	-0, +1/8 in.
(b)	Overall Horizontal Dimension	-0, +1/4 in.
(c)	Thickness of Individual Layers of Elastomer (Laminated Bearing Only)	±1/8 in.

(d)	Variation from a Plane Parallel to the Theoretical Surface (as determined by measurements at the edges of the bearings)	
	Top	1/8 in.
	Sides	1/4 in.
	Individual Nonelastic Laminates	1/8 in.
(e)	Position of Exposed Connection Members	1/8 in.
(f)	Edge Cover of Embedded Laminates or Connection Members	-0, +1/8 in.
(g)	Size of Holes, Slots, or Inserts	±1/8 in.
(h)	Position of Holes, Slots or Inserts	±1/8 in.

SUBSECTION 730.4 - MANUFACTURING REQUIREMENTS. Plain bearings may be molded individually, cut from previously molded strip or slabs, or extruded and cut to length. Cut edges shall be at least as smooth as ANSI 250 finish. Unless otherwise shown on the plans, all components of a laminated bearing shall be molded together into an integral unit, and all edges of the nonelastic laminations shall be covered by a minimum of 1/8 inch of elastomer except at laminate restraining devices and around holes that will be entirely closed on the finished structure.

Pads 1/2 of an inch or less in thickness shall be either laminated or all elastomer. Pads over 1/2 of an inch in thickness shall be laminated. Stacking of individually laminated pads to attain thicknesses over 1/2 of an inch will be permitted providing the bond between the pads has a minimum peel strength of 20 pounds per inch when tested in accordance with the requirements of California Test 663.

Laminated pads shall consist of alternate layers of elastomer and fabric reinforcement bonded together. The top and bottom layers of reinforcement shall be uniformly covered with a maximum of 1/8 of an inch and a minimum of 1/16 of an inch of elastomer.

Laminated pads shall have reinforcement every 1/2 of an inch through the entire thickness. Fabric reinforcement shall be single ply at top and bottom surfaces of the pad and double ply within surfaces of the pad.

Variations in the location of the reinforcement in excess of 1/8 of an inch from its theoretical location will be cause for rejection.

Pads of all elastomer or with fabric reinforcement may be cut from large sheets. Cutting shall be performed in such a manner as to avoid heating of the material and to produce a smooth edge with no tears or other jagged areas and to cause as little damage to the material as possible.

The bond between the elastomer and fabric shall be such that when a sample is tested for separation, it shall have a minimum peel strength of 30 pounds per inch when tested in accordance with the requirements of California Test 663.

SUBSECTION 730.5 - STEEL REINFORCED ELASTOMERIC BEARING PADS. At the Contractor's option, steel reinforced elastomeric bearing pads may be furnished in lieu of fabric reinforced elastomeric bearing pads.

Steel reinforced elastomeric bearing pads shall conform to the requirements for steel-laminated elastomeric bearings as specified in ASTM Designation: D 4014 and the following:

The bearings shall consist of N internal elastomer laminates and N+1 steel laminates where N is equal to the bearing pad thickness shown on the project plans divided by 1/2 of an inch. The thickness of the internal elastomer laminates shall be 1/2 of an inch. The steel laminates shall have a nominal thickness of 1/8 of an inch. A 1/4 of an inch thick elastomer cover shall be provided over the top and bottom steel laminates. The elastomer cover to the steel laminates at the sides of the bearings shall be 1/8 of an inch. If guide pins or other devices are used to control the side cover over the steel laminates, any exposed portions of the steel laminates shall be sealed by vulcanized patching. The length and width or the diameter of the bearings shall be as shown on the project plans.

The design load of the bearings shall be 800 pounds per square inch.

The shear modulus of the elastomer shall be 110 pounds per square inch. The elastomer shall be Type CR, Grade 100 millipascals (mPa) formerly referred to as 100 parts per hundred million.

The Contractor shall furnish to the Engineer certification by the manufacturer that the bearings to be furnished conform to all of the above requirements. The certification shall be supported by Certificates of Analysis conforming to the requirements of SECTION 106.

A sample pad from each lot will be selected at random at the project site for testing. Samples shall consist of complete pads as detailed on the project plans as specified herein. The contractor shall furnish additional complete pads to replace those taken for testing. All sample pads for testing shall be furnished by the contractor at his expense. Pads shall be available for sampling at least three weeks in advance of intended use.

Before constructing bearing seats upon which elastomeric bearing pads are to be placed, the contractor shall notify the Engineer, in writing, of the type of bearing to be used. The elevation of the bearing seats shall correspond to the thickness of the bearings to be used.

SUBSECTION 730.6 - PAYMENT. No separate payment will be made for Elastomeric Bearing Pads and the costs thereof shall be included in the price bid for the items to which they are appurtenant.

SECTION 731 - VERTICAL RESTRAINERS

SUBSECTION 731.1 - DESCRIPTION. The Contractor shall furnish and install restrainer units consisting of cables and assemblies and associated materials or components, in conformance with the details shown on the project plans, and in accordance with the Standard Specifications and these Special Provisions.

SUBSECTION 731.2 - MATERIALS. Cables shall be one (1") inch pre-formed, 6x19, wire strand core or independent wire rope core (IWRC), galvanized ASTM A-603 Class A coating, right regular lay, manufactured or improved plow steel with a minimum breaking strength of 75 kips. Two certified copies of mill test reports of each manufactured length of cable used shall be furnished to the Engineer.

Free ends of cable restrainer units shall be securely wrapped at each end to prevent separation.

The cable assemblies shall be shipped as a complete unit.

One complete cable assembly shall be furnished to the Engineer for testing.

Expanded polystyrene shall be commercially available polystyrene board. Expanded polystyrene shall have a flexural strength of 35 pounds per square inch, minimum, determined in accordance with AASHTO Designation M-203, and a compressive yield strength of between 16 and 40 pounds per square inch, at five (5%) percent compression. When shown on the plans, surfaces of expanded polystyrene shall be faced with hardboard. Hardboard shall be 1/8-inch minimum thickness, conforming the Federal Specification LLL-D-810, any type.

Other facing materials may be used provided they furnish equivalent protection. All boards shall be held in place by nails, waterpoof adhesive, or other means approved by the Engineer.

Expansion joint filler shall be new non-extruding and resilient filler (bituminous type) conforming to the provisions of ASTM D-1751.

SUBSECTION 731.3 - CONSTRUCTION REQUIREMENTS. Retrainers shall be installed as indicated on the project plans.

The Contractor shall provide means of holding the cable assemblies in their planned positions.

SUBSECTION 731.4 - MEASUREMENT. The Contractor shall be responsible for determing the required length of the cable assemblies.

No separate measurement will be made for ITEM 731 - VERTICAL RESTRAINER.

SUBSECTION 731.5 - BASIS OF PAYMENT. No separate payment will be made for ITEM 731 - VERTICAL RESTRAINERS. The cost of this item shall be included in the price bid for other items.

SECTION 735 - REINFORCED CONCRETE PIPE

Work under this item shall be in accordance with SECTION 735 of the Uniform Standard Specifications. Pipe size and class shall be as indicated on the plans.

Payment shall be made at the unit price bid per lineal foot for Items 735-1; 735-2 and 735-3 for 18", 24" and 96" reinforced Concrete Pipe respectively. This payment shall be for the pipe installation, complete in place, including all costs associated with the 48" standpipe construction shown on the plans.

SECTION 756 - FIRE HYDRANTS

Work under this item shall be in accordance with SECTION 756 of the Uniform Standard Specifications.

Payment shall be made at the unit price bid for each fire hydrant. This payment shall be considered full compensation for each fire hydrant installation complete in place including valve, box and cover.

SECTION 772 - CHAIN LINK FENCE

Work under this item shall be in accordance with SECTION 772 of the Uniform Standard Specifications. Where existing fence is to be cut, adequate bracing or end panels shall be installed to retain the integrity of the fence.

Existing fence and hardware may be used for the temporary fence and/or the permanent replacement if it is sound and undamaged as determined by the Engineer. All fence materials not required for the permanent construction shall become the property of the Contractor.

Measurement and payment for all fence installations and replacement shall be by the lump sum bid for Item 772 Chain Link Fence.

GENERAL COMMENTS

It shall be the Contractor's responsibility to protect the structure and construction site from any excessive or detrimental flooding, within the channel right-of-way, which may occur during the construction period and until final acceptance of the completed bridge by the Flood Control District of Maricopa County.

The Contractor shall exercise care to prevent damage to any existing facilities.

Upon completion of the construction, the Contractor shall clear the work area of all debris to the satisfaction of the Engineer.

An attempt has been made to determine the location of all underground utilities and to design the location and elevation of all drainage pipes, culverts and structures so as not to interfere with the existing utilities; however, it shall be the Contractor's responsibility to cooperate with the utility companies so that any obstructing utility installation may be adjusted.

No traffic will be allowed on the bridge until at least ten days after the last concrete has been placed on the deck and approach slabs and until the compressive strength of the placed concrete, as determined by test cylinders, has reached the required 28-day compressive strength.

The Flood Control District of Maricopa County reserves the right to adjust design grades or the location of drainage structures prior to construction, if it should become necessary in the opinion of the Engineer, without additional cost to the Flood Control District of Maricopa County.

The Contractor shall take special precautions to keep the area around the bridges properly barricaded with sand berms, barricades, barrels, etc. and marked with flares to prevent automotive traffic from running into the channel or the canal or crossing the new bridge structure prior to the bridge deck slab and approach slabs reaching their required strength as defined above.

GUARANTEE

The Contractor shall guarantee the construction work for one year against faulty materials, faulty workmanship and failure to meet the requirements of the specifications. Said guarantee by the Contractor shall not apply to damage caused by earthquakes or other acts of God, land subsidence or faulty operations or any abuse of the structures by others.

SALT RIVER PROJECT CONSTRUCTION SPECIFICATIONS

GENERAL

Construction of the temporary detour bridge and the 42" waterline shall comply with the following Salt River Project Specifications for bridge crossing of Salt River Project Canals.

The term "Engineer" as used in these specifications shall mean the Assistant General Manager - Water or his duly authorized representative.

Prior to any work being done, a construction clearance must be obtained from the SRP Supervisor of Transmission (236-5461).

Elevations of the proposed bridge floor and underside of the bridge deck are to be verified by the Engineer prior to placing concrete.

No concrete shall be placed without prior approval of the Engineer.

Realignment of the canal bank from the existing bank to the tie-in to the wingwall of the bridge is not to exceed a 4 to 1 taper.

If the canal bank is disturbed during installation of the abutment, the bank is to be reshaped, compacted, and lined, as directed by the Engineer in accordance with SRP Canal Lining Specification, CE 3.06.

The canal bank lining is to be 3 inch thick handplaced concrete or 1 1/2 inch thick pneumatically applied lining (minimum 3,000 psi 28 day strength) placed over 6 inch by 6 inch w1.4 by w1.4 (10 gauge) welded wire fabric. The bank lining under the bridge is to be tied to the underside of the bridge or to the abutment. The lining taper below the bridge is to be no flatter than 1:1 and no shelf will be permitted at the top of the lining. The bank lining is to extend 3 feet beyond the disturbed portion of the bank or to a point opposite 1-foot beyond the furthest end of the Maintenance Equipment Underpass ramp structures, whichever is greater. The lining is to be keyed in with a 12 inch deep cutoff lip for the full perimeter of the lining or is to be tied to the existing lining.

The canal bottom lining is to be 4 inch thick nonreinforced shotcrete or poured concrete (minimum 2000 psi 28 day strength) unless otherwise specified. The bottom lining is to extend 3 feet beyond the disturbed portion of the bottom or to a point opposite 1' beyond the furthest end of the Maintenance Equipment Underpass ramp structures, whichever is greater. The bottom lining is to be keyed in with a 12 inch deep cutoff lip for the full perimeter or tied to the existing lining.

If the existing bottom and bank lining does not meet the above requirements, it shall be removed and replaced as specified herein. All bottom and bank

preparation is to conform to the minimum standards as stipulated in SRP Specifications CD 3.06.

Any abandoned structures found within the zone of construction are to be completely removed to the Engineer's satisfaction.

Any material placed in the canal or other SRP facility is to be completely removed to the Engineer's satisfaction.

The approach ramp material shall consist of a well graded aggregate base in accordance with MAG Specifications Section 7.02, or a similar material approved by the Engineer, thoroughly mixed with a minimum of 20 percent to a maximum of 40 percent fines (material that will pass the #200 sieve).

All backfill is to be carefully placed in 8 inch compacted lifts and compacted to a minimum of 90 percent standard Proctor density, ASTM D-698.

All damage to SRP facilities is to be repaired by the Licensee or his contractor to the Engineer's satisfaction. If emergency repair work is necessary or the Licensee fails to complete all work covered by this License in a reasonable time as determined by the Engineer, this work will be performed by SRP forces and the Licensee agrees to pay the full cost of said work.

SPECIAL CONSTRUCTION REQUIREMENTS

GENERAL

The Contractor shall schedule his construction operations so as to install the 42" waterline and concrete canal lining during the period of the canal dry-up.

CITY OF PHOENIX
SPECIAL CONSTRUCTION SPECIFICATION S.C.S.-W-8
SHOP INSPECTION AND TESTS FOR STEEL AND STEEL CYLINDER PIPE

.01 GENERAL

This specification covers shop inspection and tests for both rigid and semi-rigid steel and steel cylinder water pipe.

a. Inspection

(1) The City and its representatives shall have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection during the manufacturing process.

(2) Inspection by the City or its representatives, or failure of the City or its representatives to provide inspection, shall not relieve the Contractor of his responsibility to furnish materials and to perform work in accordance with this specification.

(3) Material, fabricated parts, and pipe which are discovered to be defective or which do not conform to the requirements of this specification, will be subject to rejection at any time prior to final acceptance. Rejected material and pipe shall promptly be removed from the site of the work.

b. Tests and Materials

(1) In advance of manufacture of the pipe, the Contractor shall furnish the Engineer three (3) copies of the mill test certificate for all steel products incorporated in the pipe. Three copies shall be furnished of mill test reports on each heat from which the steel is rolled.

(2) The number of pipe cylinders from which weld test specimens are cut shall not exceed one for each type test in every 3,000 feet of pipe or less. The test specimens shall be tested by the City Engineer in accordance with AWWA C-201, or AWWA C-202, except as otherwise required herein. Cylinders from which test specimens are cut may be patch welded in an approved manner and used in the work.

(3) Compressive strength test cylinders of the concrete or cement mortar used in both lining and coating shall be furnished by the manufacturer. Not less than four cylinders for each test will be taken. At least one test shall be made for each day's pour. All cylinders shall be capped and tested in accordance with ASTM C-39 and C-192.

(4) Concrete cylinders for steel cylinder pipe, prestressed, shall be molded in accordance with ASTM C-31.

(5) Methods of test for cement mortars and concrete:

a. Mortar Lining. The mortal for all mortar lined pipe shall be supplied and molded by the following procedure.

The mortar sample shall be taken directly from the transfer bucket between the mixer and the charging trough which injects the mixed mortar into the spinning pipe. A sufficient amount shall be extracted to make four (4) 6" x 12" cylinders, and shall be placed in a wheelbarrow or other suitable container. The mortar sample material shall be transported to the location at which the cylinder cans are to remain without moving for the next 24 hours. The mortar shall be thoroughly mixed immediately prior to pouring into the cylinders in order to prevent segregation. After the mortar has been thorughly mixed, it shall be poured in a continuous stream ino the cylinder cans. The cans shall immediately be capped and allowed to remain without disturbing for 24 hours.

b. Mortar Coating. Mortar for all mortar coated pipe shall be sampled by molding four (4) cylinders for compressive tests of the representative material being used to coat the pipe. The mortar sample shall be molded in 4" diameter cylinder in accordance with applicable provisions of ASTM D-558.

c. Curing of Test Cylinders. The curing of concrete, lining and coating cylinders for the first 24 hours shall be the same as that for the pipe, except that the mortar for coating cylinders shall be covered with a piece of damp burlap to retard the drying out of the low moisture content of the mortar coating. At the end of 24 hours, the cylinders shall be transported to a moist curing cabinet and cured in accordance with ASTM C-192.

(6) Strength of cement mortar lining, coating, concrete and steel:

a. Mortar Lining. The average compressive strength, as per Section c. below, of cylinders for mortar lining for the several types of pipe shall be as follows:

1. Semi-Rigid Pipe. Steel pipe and steel cylinder pipe, single wrap, pretensioned, the average compressive strength of cylinders shall not be less than 1700 p.s.i. at seven days and 2300 p.s.i. at 28 days.

2. Rigid Pipe. Steel cylinder pipe prestressed, the average compressive strength of cylinders shall not be less han 3500 p.s.i. at

seven days and 4500 p.s.i. at 28 days. Steel cylinder pipe, double wrapped shall not be less than 1700 p.s.i. at seven days and 2300 p.s.i. at 28 days.

b. Mortar Coating and Concrete for Prestressed Pipe. The average compressive strength, as per Section c. below, of cylinders for mortar coating and concrete for the several types of pipe shall be as follows:

1. Semi-Rigid Pipe. Steel pipe and steel cylinder pipe, single wrap, pretensioned, the average compressive strength of cylinders shall not be less than 3500 p.s.i. at seven days and 4500 p.s.i. at 28 days.

2. Rigid Pipe. Steel cylinder pipe prestressed and steel cylinder pipe, double wrap pretensioned, the average compressive strength of cylinders shall not be less than 3500 p.s.i. at seven days and 4500 p.s.i. at 28 days.

c. To conform to these requirements, the average of any five consecutive strength tests of the laboratory cured specimens shall be equal to or greater than the specified strength, and not more than 20% of the strength tests shall have values less than the specified strength. If any one cylinder falls below 80% of the specified strength at seven days, an extra cylinder from the same batch shall then be broken, and if the strength of this cylinder also falls below 80% of the specified strength, then the entire production represented by these cylinders will not be accepted for purchase by the City until the results of the 28 day test is known, and if it also falls below 80% of the specified strength, the above non-acceptance will become final. The expense of the required tests of cylinders and of testing the welds shall be borne by the City of Phoenix and shall be performed by the Engineer or his duly authorized representative. The cost of cutting and matching metal test specimens shall be borne by the Contractor.

d. Testing of Steel Pipe Cylinders (Hydrostatic Pressure Test). Each steel pipe cylinder, prior to embedment in cement mortar or concrete, shall be hydrostatically tested under a water pressure which stresses the steel to a unit stress of at least 22,000 p.s.i. after the bell and spigot ends have been welded in place. The test shall be performed with rubber gaskets in place, utilizing companion bell and spigot test heads. While under this stress, the welded seams shall be hammered vigorously at one foot intervals with a one pound sledge hammer, and shall be thoroughly inspected.

All parts of the cylinder showing leakage shall be marked for rewelding. After rewelding, such cylinders shall be subjected to another hydrostatic test as stipulated above. The costs of hydrostatic pressure test shall be at the Contractor's expense.

e. Testing of Fittings and Specials. The seams in angle pipe, short-radius bends and special fittings shall be welded in two or more passes, and each weld tested for tightness by the air-soap method or by the dye-penetrant method. However, if the fitting is fabricated from cylinders which have been previously tested, hydrostatically, no further test is required for seams so tested. Hydrostatic testing of fittings to 150% of the design operating pressure may replace the tests described above. Any defects revealed under any of the alternate test methods shall be rewelded, and the weld again tested. The cost of these tests shall be at the Contractor's expense.

.02 MARKING, HANDLING AND DELIVERY

a. Marking

Special marks of identification, for each type of water pipe as specified herein, shall be placed on the pipes. These marks shall show the proper location of the pipe or special in the line by reference to layout drawings. All bends shall be marked on the ends with the angle of deflection and the plane through the axis of the pipe. All beveled pipe shall be marked with the amount of the bevel, and the point of maximum bevel shall be marked at the end of the spigot.

b. Handling and Delivery

All pipe shall be manufactured, handled, loaded, shipped, unloaded and stored at the job site in such a manner as to prevent any damage to the pipe. Any pipe section that becomes damaged shall be repaired as directed by the Engineer, if in his opinion a satisfactory repair can be made, otherwise, it shall be replaced with an undamaged section, at the Contractor's expense. No handling method will be permitted involving lifting from the inside of the pipe.

.03 ON-SITE INSPECTION

The Contractor shall be responsible for all expenses, including but not limited to travel and per diem expenses, for required inspections by the Engineer and/or the cost of inspection and testing by an independent testing laboratory as required by and at the discretion of the Engineer for any inspection of any pipe manufactured outside of a fifty-mile radius from the City limits of Phoenix, Arizona.