

GENERAL SPECIFICATIONS

3:00-A General. All elements of construction for streets, storm sewer, sanitary sewer and water supply lines, inclusive of materials, methods of construction, standards of workmanship, testing, and acceptance shall conform with the City of Pendleton Standard Specifications and the Standard Specifications for Public Works Construction, Oregon Chapter, A.P.W.A., 1980 Edition and any later revisions, except as further clarified or supplemented by the provisions herein.

All references to Contract Owners shall mean all the individuals, partnership, company or corporation that is building or contracting to build public improvements.

All references prefixed by the form ASTM refer to Standard Specifications or methods of the American Society for Testing Materials of the Serial Designation indicated by number following and prefix, and, unless otherwise stated, refer to the latest adapted revision of said specification or method.

All references to AASHTO Designations refer to Standard Specifications or methods of the American Association of State Highway Officials, unless otherwise stated, refer to the latest adopted revision of said specification or method.

The latest edition of the Oregon State Highway Commission's Standard Specifications for Highway Construction along with any modifications are adopted as standard specifications, unless they are modified by these General Specifications. All references to Oregon State Highway Commission refer to City of Pendleton.

A. Commission or Highway Commission: The City council of City of Pendleton, Oregon, as constituted under the laws of the State for the administration of highway work.

B. Department or Highway Department: Engineering Department of City of Pendleton, Oregon.

C. Engineer: Public Works Director of City of Pendleton, Oregon, acting either directly or through his authorized representatives.

D. City: City of Pendleton or other owner contracting for public improvements.

3:00-B Scope of Work. The work covered by this section includes the furnishing of all plant, labor, tools, equipment and material, and performing all operations in connection with the work shown on the plans, to include but not be limited to, street construction, excavation, trenching, and backfilling of all water and sewer lines, manholes, structures, accessories and lines connected thereto, complete, including sheeting and shoring, dewatering, grading, top soiling and cleanup, all in accordance with these specifications and the applicable drawings.

3:00-C Limitation. At any time before all scheduled work is completed, the City may limit any remaining work to be done in order to keep the cost of the entire project within available funds.

3:00-D Access to Work and Use of Rights-of-Way Easements. The proposed sewer facilities lie either in dedicated rights-of-way, City-owned land or on rights-of-way easements. The Contractor shall be responsible for securing permission from the City of Pendleton or the appropriate property owner, to use any other areas for access of construction operations.

The Contractor shall not block or impede use of any right-of-way for extended periods of time. The City shall reserve the right to direct the Contractor to move from an area of construction and restore

it, if the City determines that work is not progressing satisfactorily or not being prosecuted in an efficient and workmanlike manner.

3:00-E Protection of Site. Except as otherwise provided herein, the Contractor shall protect all structures such as, but not limited to, walks, underground utilities, and trees during the progress of his work and shall, upon completion of the work, remove all debris and unused materials and restore the site, as nearly as possible, to its original condition. Any facility which has been damaged beyond restoration to its original condition, or destroyed, shall be replaced at the Contractor's expense.

3:00-F Survey and Layout. General layout of the work under these specifications including line and grade, will be furnished by the City or consultant. The Contractor shall exercise every precaution to avoid damaging or destroying survey stakes and monuments already established. Reasonable replacement of stakes will be at no cost to the Contractor. However, if the Contractor, through negligence and carelessness, destroys survey stakes, replacement will be at the Contractor's expense. City may deduct this cost from final payment of contract. The Contractor will be required to give the City five (5) working days notice before he will require layout and/or grade line and grade stakes. The Contractor will be required to clear all right-of-way prior to construction staking.

3:00-G Disruption of Existing System. The Contractor shall cause as little disruption to the present water and sewer systems as possible. The Pendleton Water Department shall be notified 72 hours in advance of any scheduled water shutdown. The Contractor shall notify the City 48 hours before any road closure. All severed lines shall be promptly reconnected, by or under the supervision of the City, with the Contractor taking reasonable care to see that there is no contamination of the water system. The Contractor shall notify the City immediately of any disruption of the existing system and shall be liable for all damages and charges related to the disruption.

3:00-H Underground Utilities. The Contractor shall check with the local electric, telephone, television and gas companies for utility lines in the construction area prior to excavation. "Call before you dig" provider shall be notified at 1-800-332-2344.

3:00-I Materials. Materials utilized in this project shall be hereinafter specified or be an approved equal. Where material that is not definitely specified below is necessary to provide a complete project, such material shall be new, of good construction quality, consistent with normal construction and engineering practices, and subject to the approval of the City before use. A yardstick for the selection of such materials, Federal, A.W.W.A. and A.S.T.M. specifications shall be used.

3:00-J Approvals. The Contractor shall submit two (2) copies of brochures, samples, manufacturer's name, model number, pressure rating, and any other pertinent information as may be necessary to completely describe any piece of material that he desires to use in place of specified "brand names". Equipment or material replacing "brand name" items must be approved by the City prior to installation; all such approvals must be in writing. Approvals are not necessary for those items which carry the specified brand name, rating, and model number.

3:00-K Compliance With State Regulations. The Contractor shall comply with any state and county regulations that may apply to any part of the construction covered under these specifications. The City or Contract Owner shall obtain any county or state permits, franchise, or bonds necessary to perform the construction across county and state highways.

3:01

EXCAVATION, BEDDING AND BACKFILLING

3:01-A Excavation. The Contractor shall perform all excavation of every description and whatever substances encountered to the depths indicated on the drawings. Excavated materials shall be piled a sufficient distance from the banks of the excavation to avoid overloading and to prevent slides or cave-ins.

Where it is necessary during excavation or trenching operations to cut through pavement, pavement shall be cut on a straight line and shall be beveled in such a way that the cut will be approximately 2" wider at the top than at the bottom, care being taken to avoid damage to adjacent surfaces. Replacement of pavement, oiled gravel, curb and gutter, sidewalks, or any other surface improvements, shall be accomplished in an approved manner so that the original condition and appearance is restored.

During trenching operations, the pavement shall be removed to a width 12" wider than the width of trench.

Trenches shall be carefully and accurately excavated to the lines and grades shown on the Plans. Except for unusual circumstances, and then only with the approval of the City, trench sides shall be cut as nearly vertical as possible, consistent with safety requirements, and the trench width shall be only wide enough to provide adequate working space for pipe bedding and laying operations. Trenching and laying operations of sewer shall always be up grade. the maximum permissible trench width, at the bottom of the trench and up to a point at the crown of the pipe shall be as follows:

15" Diameter and smaller	40 inches
16" Diameter and larger +	1-1/2 I.D. + 18 inches

Surface water shall be diverted to prevent it from entering the trench, which must be kept free of water during pipe laying operations. The Contractor shall keep adequate equipment on the job at all times to insure compliance with these provisions.

Boulders, rocks, roots, organic matter, other obstructions or other undesirable material as defined by the City, in the trench shall be removed to a dept of at least 6 inches below grade; trench shall then be brought to grade by backfilling with approved bedding material thoroughly compacted by tamping or other means in a manner satisfactory to the Engineer to provide adequate trench foundation.

Where needed to protect the workmen, the work, other utilities, or adjacent property, timbering, cribbing, and/or sheeting shall be installed by the Contractor. It shall be the Contractor's responsibility to protect the workmen and insure their safety at all times. Such cribbing, timbering and/or sheeting shall be of the Contractor's design which shall comply with applicable local, state, and federal safety codes. Removal of any cribbing, timbering and/or sheeting from the trench shall be accomplished in such a manner to fulfill the above requirements. Damages resulting from improper cribbing, timbering and/or sheeting or failure to do so shall be the sole responsibility of the Contractor. Timbering, cribbing or sheeting shall be removed prior to backfilling.

Operations shall be coordinated in such a way as to minimize the length of time between trenching and backfilling. Streets shall be kept open to traffic as much as is possible and obstruction of driveway shall be kept to a reasonable minimum. In no event shall trenching operations along public right-of-way proceed more than 300 feet in advance of laying operations, except by special written permission from the Engineer. No driveway or street shall be closed or impassable overnight

except by special written permission from the Engineer.

3:01-B Tunneling, Jacking, and Boring. Tunneling, jacking and boring will be permitted only where shown, specified or approved.

For tunneling, make the subgrade, upon which the pipe is to be placed or constructed, firm, thoroughly compacted and true to grade. Pipe bedding shall conform to the Standard Plans for the type of bedding specified. Restore to grade by backfilling with approved bedding material. All excavation below grade, which is made inadvertently or without authority shall be at no expense to the City.

For jacking and boring equip the leading section of pipe or conduit with a jacking head securely anchored thereto to prevent any wobble or alignment variation during the jacking or boring operation. For jacking, all excavation shall be carried out entirely within the jacking head, and no excavation in advance thereof shall be permitted. For jacking, every effort shall be made to avoid any loss of earth outside the jacking head. Remove excavated material from the pipe or conduit as excavation progresses, and do not allow such material to accumulate within the pipe or conduit.

Jack or bore all pipes or conduits to true line and grade. Should any deviation from true line and grade be considered excessive, in the judgment of the Engineer, take up and relay that portion of the pipe or conduit at no expense to the City.

Should appreciable loss of ground occur during the jacking or boring operations, backpack all voids promptly. Fill all remaining voids upon completion of the operations; such filling or backpacking shall be with grout or approved granular material.

The design of all sewer pipe or conduit is based upon the superimposed loads and not upon the loads resulting from the jacking or boring operations. The Contractor shall be responsible for any increase in pipe strength necessary to withstand jacking or boring loads.

Protect the driving ends of concrete pipe or conduit against spalling and other damage. Intermediate joints shall be similarly protected by the installation of sufficient bearing shims to properly distribute the bearing stresses. Remove any section of pipe or conduit showing signs of failure and replace with a new section or with a cast-in-place section which, in the judgment of the Engineer, is adequate to carry the loads imposed upon it.

Join sections of smooth steel casing to be jacked or bored by welding the joints with a continuous weld for full circumference or by other approved means. Provide joints which are capable of resisting the jacking and boring forces without failure.

Brace pipe or conduit installed in a casing to prevent shifting and floatation. Fill the void between the casing and the pipe or conduit with grout, or other material as specified or approved at end of casing.

When grouting is specified, after the casing has been jacked into position or the liner plates have been placed in the tunnel, pressure grout to fill all voids outside the casing or liner plates through the grout holes provided. Start grouting at the spring line hole at one end and pump grout until grout appears in the grout hole at the crown, then start grouting through the opposite spring line hole until grout appears at the hole in the crown. Next grout through the hole at the crown until grout appears in the next set of holes along the pipe. Plug the holes at the starting point and move to the next set of holes and repeat grouting sequence until full length of jacked, bored, or tunneled

pipe has been grouted. Grouting once commenced at any one point shall be completed without stopping.

Where shown or when directed, completely fill the annular space between the casing or tunnel liner and the carrier pipe or conduit with specified or approved backfill material. Accomplish backfilling by pumping material from the two ends at such intermediate points as may be necessary in a manner in which will insure all voids are filled. When grouting, use approved low pressure grouting equipment.

3:01-C Dewatering. Dewatering of the trenches shall be considered incidental to and all costs included in the various contract pay items in the proposal. The pipe trenches at all times during the pipe laying and jointing operation shall be kept free from water by such methods as the Contractor chooses, provided they are acceptable to the Engineer.

The Contractor shall remove and dispose of all water entering the trenches and shall keep the trenches water-free until the City lines, fittings, manholes, and other appurtenances are in place. In no case shall earth or any foreign materials be allowed to enter the City lines. Water pumped from trenches shall be conducted to a place where disposal is possible without damage to property or creation of a nuisance as determined by the City's Representative.

3:01-D Topsoil. Imported topsoil as specified in the contract shall be natural, fertile friable topsoil, representative of local productive soil. Topsoil shall be 90 percent free of foreign matter larger than 2 inches diameter, shall not contain gravel (particles larger than 2mm) in excess of 15 percent by volume nor contain noxious vegetation and seeds.

3:01-E Extra Depth Trench Excavation Bedding and Backfilling. The only portion of the water line or sewer line installation which will be considered as extra depth is where extra depth excavation is indicated necessary on the plans. All other portions of the water and sewer line including any steep slopes are not considered to have extra depth to the installation and no extra payment shall be made for trenching, bedding or backfill or any other special construction necessary.

3:01-F Backfilling. Trench shall be carefully backfilled as noted in the bedding schedule and shown on the plans. Remainder of backfill material may be placed by machine, provided it is done in such a way as to avoid damaging the pipe. Backfill shall be water settled, unless otherwise permitted, or directed, by the Engineer. Backfill shall be compacted to at least the density of the original undisturbed material, and excess material shall be neatly heaped over the trench, except in paved roadway areas. Excess paved material shall be loaded and hauled to points of disposal to be designated by the Engineer, or waste site provided by Contractor. Settling of the trench, in public rights-of-ways, within a period of one year after inadequate compaction for public rights-of-way and the Contractor shall be responsible for remedying the condition in accordance with the provision of the General Conditions.

In yards, fields or otherwise cultivated areas, the upper 12" of top soil shall be segregated and replaced or imported to its original state. Sod in lawn areas shall be removed prior to trenching and carefully replaced upon completion of the work.

3:01-G Roadway Patching. Whenever existing roadways are disturbed during the normal course of construction, the Contractor shall restore the roads to their original condition.

Trench backfill within the limits of a roadway shall require special compaction to at least 90 percent of maximum density from pipe level to within three feet of the surface. The top three feet shall be compacted to not less than 95 percent of maximum density. Density of compaction material in place

determined by ASSHTO - T99, Method D. Backfill shall be compacted using a mobile trench compactor with a maximum lift of one foot.

In lieu of this special compaction, the Contractor may use a well-graded gravel as backfill. The gravel shall be clean and may vary in size from 3/8 inch to 1-1/2 inch with not more than ten percent (10%) of the material less than 3/8 inch in size. The gravel shall be compacted in 6-inch layers, as directed by the Engineer. Asphalt mix surfacing shall be in the roadway to a depth equal to the existing surfacing, but not less than three inches. A compacted stabilized gravel base 3 inches in depth shall be placed in the roadway at all locations where surfacing is required, prior to placement of the bituminous wear course.

Final rolling shall be accomplished by steel roller. All work shall be done as directed by the Engineer and shall conform to all construction requirements of the applicable municipal, county, state and federal highway authorities. The Contractor shall obtain written permission from the necessary agencies, prior to beginning any roadway excavation.

3:01-H Restoration. All utility right-of-way areas on public right-of-way, private property, or otherwise shall be substantially restored to the condition in which the Contractor found it to the satisfaction of the Engineer. All roadway and right-of-way restoration along State rights-of-way including roadway preparation, materials and resurfacing shall be in accordance with the technical requirements of the State of Oregon Standard Specifications for Road and Bridge Construction. Unless given other permission by the authority responsible for the roadway, the final grade and cross section shall conform to the roadway that existed prior to construction. Any utilities that were damaged or moved or destroyed shall be restored to the satisfaction of the authority responsible. The restoration or removal and disposal of excess or existing materials shall be considered incidental to the construction and the costs thereof shall be included in the items for which payment is provided.

3:01-I Excavating Unsuitable Foundation Material and Backfill. Where shown on the plans, or directed by the Engineer, foundation materials which are unsuitable to carry the structure to be placed on it shall be excavated and replaced with foundation material. The backfill materials shall be deposited and spread in layers not to exceed six inches and each layer shall be thoroughly compacted by tamping to a 90% Proctor density.

3:01-J Finish Grading. After the structures have been constructed and installed, all piping installed and all backfilling and embankments have been completed, areas on the site of the work shall be brought to the true grades. All slopes shall be trimmed and dressed, and all surfaces graded such that effective drainage is secured.

3:01-K Disposal of Excess Materials. All excavated materials not required or not suitable for fill or backfill shall be disposed of at either a pre-designated waste site contained in the contract documents or at a waste site provided by the Contractor. All costs for disposing of this excess material shall be incidental to other items of work contained in the proposal.

The Contractor shall be responsible for obtaining necessary permits in accordance with Chapter 70 of the Uniform Building Code, for excavation or fill that is done on land that is not public right-of-way or public easement.

3:01-L Moving Fences and Minor Structures. The Contractor shall make all temporary openings in fences and make the necessary repairs to replace the existing fences in their original locations and conditions. Culverts, drainage pipes, mail boxes or other minor structures which may have to be moved temporarily from the alignment of the work shall be removed, cared for, and reset by the

Contractor in a satisfactory manner as approved by the Engineer at Contractor's expense.

It shall be the Contractor's responsibility to visit the project site and determine actual conditions prior to construction. No separate payment will be made for clearing of the right-of-way. It shall be considered as part of the Contractor's obligation and no additional payment shall be made.

3:01-M Rock Excavation. The inclusion of a bid item and estimated quantity for rock excavation in the bid schedule indicates that rock excavation is certain. The following paragraphs define solid rock. The excavation and the method of measurement upon which payment will be based. Payment shall be for cubic yards of rock excavated, measured as specified in the following paragraphs.

Solid rock shall be defined as large masses of igneous, metamorphic, or sedimentary rock which, in the opinion of the City's Representative, cannot be excavated without drilling, blasting, wedging, sledging, boring or breaking with power hand tool.

Solid rock excavation shall be measured in cubic yards from the top of the rock to a point six inches below the invert of the pipe and a maximum of thirty-six (36) inch trench width being allowed, and ten (10) inches each side of a tee or wye. Rock shall be removed from the excavation in such a way that a clear width of at least six (6) inches exists between the rock and the pipe or appurtenances. Rock excavation measurements around manholes shall not exceed eighteen (18) inches below invert of channel bottom and one foot outside of the actual dimensions of the manhole.

It is anticipated that the "Hardpan" type soil cemented gravel, loose, shaken, previously blasted rock, or broken rock in fills, all may be encountered during excavation. This type of excavation shall not be considered rock excavation.

3:01-N Unclassified Excavation. All excavation material shall be unclassified material regardless to type, nature, characteristic and/or condition of the material to be encountered in the line and grade as shown on plans. The Contractor, by signing the proposal, has certified that he has carefully examined the plans and working site and satisfied himself as to the nature and location of the work, quality and quantity of material required and the character of equipment and facilities needed to accomplish the work, and he has included any costs associated with the extra effort of excavating unclassified material in his unit cost of excavation, or lineal foot of storm, water or sewer pipe installed. There will be no separate pay item for rock excavation. Contractor is responsible for compaction of all trench backfill.

3:01-O Explosives. Excavation which requires explosives shall use explosives which are fresh, stable materials manufactured to the standards of the "Institute of Makers of Explosives" and conforming to applicable requirements of ORS Chapters 476 and 480.

No blasting shall take place without written consent of the City of Pendleton's Fire Chief.

3:01-P State Highway Crossings. Contractor shall notify the State Highway Maintenance Engineer 48 hours in advance of any work and obtain permission to proceed. All applicable State regulations and laws shall be adhered to.

3:01-Q Railroad Crossing. Unless indicated otherwise, the Union Pacific Railroad tracks or any other railroad line shall be crossed by use of a steel carrier pipe bored or jacked into place. The depth of the pipe shall be as shown on the plans. The Contractor shall comply with the Union Pacific Railroad Company Standard Specifications, C.S. 1029 or its latest revision and shall coordinate all

construction activities of the railroad crossing with Union Pacific Company's Chief Engineer or Authorized Representative.

3:01-R Records. The Contractor shall maintain records during the project, showing locations of all facilities installed under this contract. This record shall include, but not be limited to, locations of all manholes, sewer and water laterals, sewer wyes, clean outs, manhole stubouts, valves, water services, blow-offs.

3:02

SEWERS

3:02 Materials.

a. Concrete Sewer Pipe. Concrete sewer pipe 12" and smaller shall be Extra Strength non-reinforced concrete pipe conforming with ASTM C-14 and have rubber gasket joints. Concrete sewer pipe larger than 12" shall be reinforced concrete conforming with ASTM C76 and ASTM C361 and shall be the class as specified.

b. Ductile Iron Pipe. Use ductile iron pipe conforming to ANSI A21.51 or AWWA C151, with push-on Tyton joint or mechanical joints as specified, conforming to Federal Specification WW-P-421c and ANSI A21.11.

c. PVC Pipe. Use PVC pipe conforming to ASTM C 3033 or D 3034.

d. Galvanized Corrugated Iron & Steel Pipe. Use galvanized corrugated iron or steel pipe and coupling bands of the gauges and type as shown or specified, and conforming to the material, fabrication and inspection requirements of ASSHTO Designation M 36 or M 167. This shall be used for storm sewer out of street area only.

e. Bituminous Coating. Complete coating of the inside surfaces of corrugated metal pipe with bituminous material conforming to AASHTO M 190, with a minimum thickness of 0.05 inch at the crest of the corrugations shall be required.

3:02-A Bedding. The bottom of the trench shall be finished according to the bedding schedule to insure uniform bearing along the barrel of the pipe and to provide suitable depressions to accommodate joints. Any rocks, or silty or fine sandy soils of sufficient size or extent to cause undue flexural or punching stresses in the pipe or any unsuitable foundation shall be removed from the trench bottom and replaced by select backfill material. The trench bottom shall be excavated below grade so as to allow at least four inches for placement of imported bedding material for pipes 27" in diameter and smaller and 6" for placement of imported bedding for pipe 30" and larger. Bedding material shall consist of clean, granular, well graded, sand and gravel of material of which 100 percent will pass the U. S. Standard 3/4" opening, and not more than three (3) percent will pass the U. S. Standard 200 (wet sieve) with a minimum sand equivalent of 50. Bedding shall be brought up around the pipe to approximately the springline and select backfill laid to twelve inches over the top of the pipe. Other classes of bedding shall be in accordance with APWA Standard Specifications.

3:02-B Select Backfill. In areas where the Engineer designates the native material as unsuitable, the Contractor shall obtain and place select backfill material. Native material which is surplus shall be removed and hauled to a nearby spoil site located by the Contractor and approved by Engineer. Select backfill shall meet the specification for Class B bedding material except 100% shall pass 1" standard opening.

3:02-C Installation of Sewer Pipe.

a. Pipe Laying. Trench excavation and bedding shall conform to Class B bedding shown in the Standard Drawings or as specified on plans. Pipe laying shall proceed upgrade, with the spigot end pointing in the direction of the flow. Each pipe shall be laid true to grade, and in such manner as to form a close concentric joint with the adjoining pipe. As the work progresses the interior of the sewer shall be cleared of all dirt and superfluous material of every description. If the maximum width of the trench at the top of the pipe specified in Section 3:12 of these specifications is exceeded for any reason other than by direction, the Contractor shall install such concrete cradling, encasement, gravel base or other bedding as directed by the Engineer to satisfactorily support the added load of the backfill. Trenches shall be kept free from water and the pipe shall not be laid when conditions of the trench or the weather are unsuitable for such work. At all times when work is not in progress, all open ends of pipe and fittings shall be securely closed so that no earth or other substance will enter the pipe.

b. Jointing. Jointing of pipe shall be performed using factory installed slip type joints. Installation of these joints shall be in strict accordance with the manufacturer's recommendations.

3:02-D Fill Under and Over Sewer Pipe. Where fill is indicated necessary on the plans the Contractor shall use imported bedding and select backfill material per Class B Standard Pipe Bedding as shown in standard plans. The remainder of fill can be native material secured from areas immediately adjacent to the fill area or if designated by Engineer, select backfill shall be required. The fill shall be compacted in accordance with 3:18 General Specifications.

3:02-E Manholes

a. General. Manholes shall be classified as standard or shallow according to depth. Standard manholes are manholes which have a depth, measured from the invert of the outlet pipe to the top of the cover of six (6) feet or more. Shallow manholes have a depth of less than six feet. Standard manholes shall be constructed of four-inch thick precast concrete adjustment rings and cast iron frames and covers. Shallow manholes shall be constructed of four-inch thick precast concrete sections with six (6) inch concrete base slab, with six (6) inch reinforced concrete cover. Standard and shallow manholes shall be constructed as shown on the detail drawings. The invert channels shall be smooth and semicircular in shape, conforming to the inside of the adjacent sewer section. A minimum invert elevation drop of one-tenth of a foot from the entrance to the outlets shall be provided in all manholes where there is a change in direction.

Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of manhole will permit. Changes in size and grade of the channels shall be made gradually and evenly. The invert channels may be formed directly in the concrete, or may be constructed by laying a full section of pipe through the manhole and cutting out the top half after the surrounding concrete has hardened. Manholes under 4 feet depth shall be concentric cones and rings. Manholes over 4 feet depth shall be eccentric cones and rings.

The floor of the manhole outside the channels shall be smooth and shall slope toward the channels not less than one inch per foot and not more than two inches per foot. Steps shall be installed in the manholes over 4 feet in depth.

Steps for manholes shall be steel reinforced plastic that conform to AASHTO M 199M (ASTM C 478M) and AASHTO T 280 (ASTM C 497). The plastic material surrounding the reinforcing steel bar shall have textured non-slip surface, be injection molded and have a minimum thickness over the steel of .006 in. (1/16"). Voids in the plastic will be cause for rejection of the step.

b. Concrete. All concrete used in manholes shall have a compressive strength of not less than 2,500 pounds per square inch at 28 days of age. The aggregates, Portland Cement, and concrete shall comply with the provision of ASTM Designation C-144, ASTM Designation C-150, Type II, and Federal Specification SSOC618a. The concrete mix shall be approved by the Engineer. The maximum permissible water/cement ratios by weight shall be 0.58. When directed by the Engineer, the Contractor shall have compressive strength test made of the concrete to be used in accordance with ASTM Standard Specifications.

c. Installation. Manholes shall be installed at the locations and elevations shown on the plans, or as directed by the Engineer. Mortar for jointing shall consist of one part Portland Cement and two parts of fine sand. Manhole sections and adjustment rings shall be grouted in place when the manhole is constructed. The jointing material shall be approved by the Engineer prior to installation.

d. Frames and Covers. The frames and covers shall be made of cast iron and shall conform to requirements by the City as shown on the detail sheet. Standard castings differing in non-essential details and approved by the Engineer may be acceptable. The manhole frames and covers shall be so set that the top of the cover will be above the finished grade or as instructed by the Engineer.

3:02-F Testing.

a. Test for Displacement of Sewers. Sewer mains shall be checked by television inspection to determine whether any displacement or damage of the pipe has occurred after the trench has been backfilled and compacted as specified. If the television inspection of the interior of the pipe shows poor alignment, displaced pipe or any other defects, the defects designated by the Engineer shall be corrected by the Contractor at the Contractor's expense.

b. Air Testing of Sewers. All sewer mains shall be pressure tested by the time pressure drop method for acceptance after backfilling has been completed.

3:02-G Wye Branches. The Contractor shall furnish and install 4-inch wye branches on the sanitary sewer main in locations as shown on the plans. Compression type stoppers shall be installed and left in place until service line construction begins. Wyes shall be properly referenced, locations recorded, shown on "as-builts" and provided to the Engineer, and stakes placed to permit ready relocations.

3:02-H Laterals. The Contractor shall install lateral sewers in the location and manner as shown on the plans, ten (10) feet past property line, or as directed by the Engineer. All codes and ordinances shall be followed.

3:02-I Shoulder Rock. The Contractor shall furnish and place in an acceptable manner 3/4" minus crushed rock where directed and approved by the Engineer. This rock shall replace rock disturbed during the installation of the sewer line along the shoulder of the roadway.

3:02-J Standard Frames and Grates for Inlets and Catch Basins. Frames and grates for catch basins and storm drain inlets shall be fabricated of steel conforming to ASTM A 7, A 36 or A 373 in accordance with the details shown on the Standard Drawings. All connections shall be welded. Welding shall conform to requirements of current code for welding in building construction of the American Welding Society. Frames and gratings shall be tested one within the other and there shall be not more than 1/16-inch rock.

3:02-K Installation of Inlet & Catch Basin Frames and Grates. Set frames and grates at elevations shown on Standard Drawings or as directed. Frames may be cast in, or shall be set in mortar.

Bearing surfaces shall be clean and provide uniform contact. Anchor bolts and other fastenings shall be firmly bedded in concrete or otherwise secured as approved.

3:02-L Drop Assemblies. Construct drop assemblies at locations indicated on Plans and as shown on the Standard Drawings.

3:02-M Cleanouts. Construct cleanouts at locations indicated on Plans and as shown on the Standard Drawings.

3:02-N Anchor Walls. Conform to details shown on the Standard Drawings. Do not over-excavate in the areas where anchor walls are to be poured. Construct suitable forms that will allow the downhill wall to have a full bearing surface against undisturbed earth. Cure concrete for 5 days before conducting hydro-static or air tests.

3:02-O Cleaning Sewer. Upon completion of sewer system, clean each structure of all silt, debris and foreign matter.

3:03

WATER

3:03-A Materials.

a. Ductile Iron Water Pipe as required shall be manufactured and tested in accordance with A.W.W.A. latest specifications.

All pipe shall be supplied by a bona fide waterworks supplier with a reputable past service of similar nature and who is capable of providing competent service with a reasonable guarantee on all materials. Pipe shall be Tyton Joint Class 52 for ductile iron pipe 12" in diameter and smaller and Class 50 ductile iron for pipe larger than 12" in diameter. Affidavit of compliance with the above Specifications shall be supplied upon request. The City reserves the option to have an independent testing laboratory conduct pressure tests and chemical analysis on random pieces at any time. Total length tested shall not exceed 1/20 of one (1) percent of project length. Cost of above testing shall be borne by the Contractor.

b. Gate Valves shall be waterous resilient sealed gate valves or approved equal to meet AWWA Standard Specification No. 6509. Valves shall have a two (2) inch square operating nut and open with a left-hand turn. Valve shall have O-ring stem seals which shall stand the test pressure without leaking.

c. Butterfly Valves. Butterfly valves shall be Dresser 450 Butterfly valve or approved equal to meet AWWA Standard Specification No. C504. Same as (b) valves shall have a two (2) inch square operating nut and open with a left-hand turn. Valve shall have O-ring stem seals which shall stand the test pressure without leaking.

d. Cast Iron Valve Box shall be of the slip type and twenty-four (24) inches to thirty-six (36) inches standard length unless otherwise specified. The minimum lap at the joint shall be two (2) inches. Covers for valve box shall be of standard cast iron type imprinted with the word "WATER".

e. Valve Marker Posts shall be Graystone No. S-10 or an approved equal.

f. Fire Hydrants shall be compression type, mechanical joint shoe, two 2-1/2" NST discharges, 4-foot burial, meeting A.W.W.A. Standards, one 4-1/2" Steamer Pumper, Pendleton-Type thread,

painted as designated by City, shall open left, traffic model. M & H No. 129, Mueller No. A423, Clow No. F-2500, Waterous No. WB-67, Kennedy No. K-11 or K81A, US Pipe "Metropolitan" or Pacific States are the only acceptable brand name fire hydrants.

g. Service Clamps shall have malleable iron body with electroplated single or double band with O-ring type gaskets. Clamps shall be designed for iron pipe threads for use with asbestos cement pipe similar to Jones, Smith-Blair, Mueller, or equal.

h. Corporation Stops shall be Mueller Catalog No. H-15025, or approved equal.

i. Water Service Pipe shall be non-toxic, flexible, copper pipe type "K" designed for a working pressure of not less than 160 psi. The pipe shall be designed for, and used with, standard brass flared fittings or conventional compression fittings. The inside diameter of service pipe furnished for this project shall be the full dimension shown on the Proposal Form.

j. "U" Branch Connections shall be Mueller 8" cc., H15364, or approved equal.

k. Meter Stops shall be angle type with lock wing such as Mueller H14255, or an approved equal.

l. Service Meters shall conform to A.W.W.A. Specifications C700 with a sealed register, a frost protection device and shall be direct reading in cubic feet. Meters shall be of the type as approved by City.

m. Water Meter Couplings with copper service pipe connection shall be Mueller H14200 or an approved equal.

n. Meter Boxes shall be Brooks No. 36-T, or an approved equal for 3/4" and 1" service meter installations. Meter boxes to accommodate 3/4" and 1" service meters with a customer installed PRV shall be Brooks No. 37-T or an approved equal. For 1-1/2" and 2" services, the meter boxes shall be Brooks No. 38-T and 65-T, respectively, or an approved equal. Meter boxes to accommodate dual service connections shall be Brooks No. 37-A5 or an approved equal.

o. Bedding Sand shall be a natural bank sand, graded from fine to coarse, not lumpy or frozen, and free from slag, cinders, ashes, rubbish or other material which is objectionable or deleterious. It shall not contain a total of more than ten (10) percent by weight of loam and clay and all material must be capable of being passed through a 3/4" sieve. Not more than five (5%) percent shall remain on a No. 4 sieve and not more than three (3%) percent shall pass the U. S. No. 200 (wet sieve).

p. Gravel Backfill shall be crushed or natural bank gravel having durable particles graded from fine to coarse in a reasonably uniform combination, with 100% of the materials passing the 2-1/2 inch square opening. It shall be free from slag, cinders, ashes, refuse or other deleterious or objectionable materials. It shall not contain excessive amounts of loam and clay and shall not be lumpy or frozen. A minimum of 25% and a maximum of 75% shall pass the 1/4 inch sieve. A maximum of 5% shall pass the U. S. No. 200 sieve (wet sieving).

3:03-B Installation of Water Mains. Installation of ductile iron water pipe shall be in accordance with the manufacturer's installation guide.

Before lowering into the trench, the pipe shall be inspected for defects; and the interior of the pipe shall be thoroughly cleaned of foreign matter. The pipe shall be kept clean during laying operations by plugging or other approved methods. Pipe shall not be laid in water, or when trench or weather

conditions are unsuitable for the work. Deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets shall not exceed the pipe manufacturer's recommendation.

Whenever it becomes necessary to cut a length of pipe, the cut shall be made in a neat and workmanlike manner without damage to the pipe. Cut ends shall be firmly wedged by the use of concrete thrust blocks bearing against solid undisturbed earth. The size of the thrust blocks shall be dependent upon the soil conditions and shall be in accordance with the typical details in these specifications.

3:03-C Bedding Sand and Gravel Backfill. Bedding sand shall be used in areas containing large amounts of rock or other unsuitable bedding where suitable material cannot be obtained from the excavated material or from the sides of the trench. In such areas, the water mains shall be bedded on four (4) inches of granular material and backfilled to the spring line with the same granular material.

If in the opinion of the Engineer, the excavated material is unsuitable for backfill purposes, it shall be disposed of by the Contractor and the trench shall be backfilled with gravel, or approved granulated material. No additional compensation will be made for wasting excavated material.

3:03-D Installation of Water Services. Service Connections shall consist of tapping into the main, providing and installing a corporation stop, service pipe, meter box, all installed and connected to provide a complete service from the main to the customer's property line. (See typical meter setter or angle meter stop installation.)

Where shown on the Plans, or where directed by the Engineer, the Contractor shall install dual services. Dual services shall be installed in the same manner as single services with the exception of the addition of a "U" branch connection and the use of a 37-A5 meter box.

All service lines crossing County roads, or State Highway rights-of-way shall be open cut.

3:03-E Setting Valves, Valve Boxes and Hydrants. Valves, valve boxes and fire hydrants shall be installed where shown on the drawings or directed by the Engineer. Valves, valve boxes and hydrants shall be set plumb. Earth fill shall be carefully tamped around each valve box. Fire hydrants shall be set plumb. Fire hydrants shall be set at such elevations that the connecting pipe will not have less cover than the distribution main. The back of the hydrant, opposite the pipe connection, shall be firmly blocked against the face of the trench to prevent the hydrant from blowing off the line. Not less than four (4) cubic feet of broken stone or coarse gravel shall be placed around the base of the hydrant to insure drainage. Valves and hydrants shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the hydrant or valve shall be inspected in opened and closed positions to insure that all parts are in working condition.

The ground around fire hydrants within a radius of three (3) feet shall be cleared and leveled to provide easy access to the hydrant. If excavation is required around the hydrant to obtain proper clearance, in no case shall the fire hydrant be left in a "Pocket". Instead, excavation shall be continued toward the road and to "day-light", thus providing access and drainage.

3:03-F Thrust Blocking. On all pipelines, securely anchor all tees, plugs, caps and bends as shown in Standard Drawings or as directed by Engineer to prevent movement due to thrust. Achieve anchorage only by use of approved thrust blocking or approved joint restraint.

Place the concrete blocking between undisturbed earth and the fitting to be anchored. The bearing surface shall be sized and located to adequately withstand the applied thrust force. Do not encase pipe joints or fitting joints with concrete.

3:03-G Blow-off Assembly. Blow-off assemblies shall be constructed at the locations shown on the plans, or where directed by the Engineer and in complete accordance with the standard detail entitled, "Typical Blow-Off-Assembly". Care must be taken to insure that the drain hole is kept clear of concrete thrust blocks or other material.

3:03-H Air Release Valve Assembly. Air release valve assemblies shall be constructed at the locations shown on the Plans, or where directed by the Engineer, and in complete accordance with the standard detail entitled, "Air Release Valve Assembly". Care must be taken to insure that the corporation stop is turned to "OPEN".

3:03-I Testing Water Mains. After the pipe is laid, the joints completed, the thrust blocks and the trench partially backfilled, the pipe, appurtenances and service connections shall be subjected to a hydrostatic pressure of 200 psi.

After the main has been brought up to test pressure, it shall be held at that pressure for one (1) hour and the make-up water carefully measured by the use of a displacement meter or by pumping water from the vessel of known volume.

The allowable leakage shall be determined by using the formula:

$$L = ND (P)^{1/2} / 11,000$$

Where L = The allowable leakage in gallons per hour.

N = The number of joints in the length of pipe line tested.

D = The nominal diameter of the pipe in inches.

P = The average test pressure during the leakage test, in psi.

Should a test of the pipeline disclose leakage greater than the allowable, the Contractor shall at his own expense, locate and repair all defects until the leakage is within the specified limits. Defective material furnished by the Contractor shall be replaced at his own expense.

3:03-J Disinfection of Water Mains. Sections of pipe to be disinfected shall first be flushed to remove any solids or contaminated materials that may have become lodged in pipe.

The following is a reprint of Washington State Health Department, Division of Public Health Engineering, "Instructions for the Disinfection of Mains" describing three alternative methods for disinfecting water mains, in order of preference.

"Method No.1

"(1) Liquid Chlorine. A chlorine gas-water mixture or dry chlorine gas may be applied by means of a chlorinator, or the gas may be fed directly from a chlorine cylinder equipped with proper devices for regulating the rate of flow and the effective diffusion of gas within the pipe. (Use of the chlorinator is preferred to direct feed from the cylinder.)

"(2) Point of Applications. The preferable point of application for the chlorinating agent is at the beginning of the pipe line extension, or any valved section of it, and through a corporation cock inserted in the horizontal axis of the pipe. The water injector for delivering the gas-water mixture into the pipe may be supplied from a tap on the pressure side of the gate valve, controlling the flow into the pipe line extension. In a new system, application may be at the pumping station or the

elevated tank or the standpipe or the reservoir.

"(3) Rate of Application. Water from the existing distribution system or other source of supply should be controlled to flow very slowly into the newly laid pipe line during the application of the chlorine. The rate of chlorine gas-water mixture or dry gas feed should be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe will be at least fifty (50) parts per million. (If the ordinary chlorine residual comparator is used, a satisfactory dosage is indicated if the sample turns a deep brick red upon addition of the orthotolidin.)

"(4) Back-Pressure Prevented. Back-pressure, causing a reversal of flow in the pipe being treated, should be prevented.

"(5) Retention Period. Treated water should be retained in the pipe at least three (3) hours and preferably longer. After this period, the chlorine residual at pipe extremities and at other representative points should be at least five (5) parts per million. (If an ordinary comparator is used, a satisfactory residual is indicated by a deep yellow color).

"(6) Chlorinating Valves and Hydrants. In the process of chlorinating newly laid water pipes, all valves or other appurtenances should be operated while the pipe line is filled with the chlorinating agent.

"(7) Final Flushing and Chlorine Residual Test. Follow Chlorination, all treated water should be thoroughly flushed from the newly laid pipe line at its extremity, until the replacement water throughout its length, upon test, shows the absence of chlorine (or in the event chlorine is normally used in the source of supply, then the test should show a residual not in excess of that carried in the system). Contractor is responsible to adhere to all applicable regulations regarding the discharge of chlorinated water.

"(8) Bacteriological Test. Before placing the lines in service, a satisfactory report should be received from the local or state health department on samples collected from representative points in the new system. (If a chlorine residual is present, the samples must be collected in specially treated bottles.)

"Method No. 2

"(1) Calcium or Sodium Hypochlorite or Chlorinated Lime in Water. A mixture of either calcium or sodium hypochlorite or chlorinated lime of known chlorine content and water may be substituted as an alternative for liquid chlorine. (Typical commercial products of this type are HTH, Perchloron, Clor, Purex, etc.)

"(2) Proportions of Chlorine Compound and Water Mixtures. Prepare a solution containing approximately five (5) percent available chlorine by weight. In the case of HTH or Perchloron, at seventy (70) percent available chlorine, use six (6) pounds per ten (10) gallons of water. In the case of Clor, at fifteen (15) percent available chlorine, add two (2) parts of water to one (1) part of Clor. For other strength compounds, adjust dilutions accordingly.

"(3) To Prepare the Chlorine Compound-Water Mixture, first make a paste, and then thin to a slurry, to insure getting all active ingredients into solution. The prepared solution should be injected or pumped by means of a hypo-chlorinator into the newly laid pipe under conditions outlined under Method No. 1 for liquid chlorine application. See items (2) to (6), inclusive, under 'Method No. 1.' (A five percent solution equals 50,000 ppm. Therefore, to obtain a 50 ppm dosage, the ratio of solution feed to water flow past the point of application should be 1000 to 1. Example: If the hypo-

chlorinator feeds at the rate of 5 gallons per hour, the rate of water flow should be about 5000 gph or 83 gpm.)

"(4) Further Procedures. Provisions for final flushing and bacteriological testing under this alternative should be the same as those described in Items (7) to (9) inclusive, under Method No. 1 above."

"Method No. 3

"(1) Dry Calcium Hypochlorite or Chlorinated Lime. Dry calcium Hypochlorite or chlorinated lime, of the same chlorine content as that specified above, may be employed as an alternative procedure where facilities are not available for chlorinating in the manner outlined under Methods No. 1 and 2. The practice of chlorinating newly laid pipe line extensions by introducing bleaching powder or calcium, hypo-chlorite powder in dry form precludes preliminary flushing and often results in insufficient concentration of chlorine in certain parts of the system; therefore, this practice is considered the least effective method of water main chlorination. It should be used only on the installation of minor extensions and where other methods are impractical and not feasible. Caution:

Do not allow more than two (2) days between time of adding hypo-chlorite and filling with water.

"(2) Dosage. The dosage of calcium hypochlorite powder containing seventy (70) percent available chlorine should be about one (1) pound for each 1680 gallons of water pipe capacity treated (See following table); chlorine yielding compounds other than calcium hypochlorite powder may be used in amounts proportional to their available chlorine contents.

QUANTITY OF HIGH TEST HYPOCHLORITE PER 100 FEET OF MAIN

Diameter of Pipe (inches)	Ounces	Tablespoonsful
4	1	2
6	2	4
8	4	8
10	5	10
12	7	14
16	13	26

"(3) Point of Application. Distribute the required amount of hypochlorite as uniformly as possible while the pipe is being laid.

"(4) Further Procedure. When this method is used, the newly laid pipe shall be filled very slowly, to avoid washing the powder to the extremity of the pipe line.

3:04

STREETS

3:04-A Street Excavation. The Contractor shall furnish all labor, materials, and equipment necessary to complete all excavation, including the disposal of all excess excavated material, as specified herein or as shown on the plans. Excavation shall include existing curb and asphalt removal as required to prepare the roadway for base rock and asphalt.

3:04-B Roadway Compacted Fill. Fill material shall be compacted to not less than 95% relative density as determined by AASHTO Test Method T-99.

3:04-C Preparation of Roadway Subgrade. The term subgrade as used herein shall be considered that area under the street section including sidewalks. All excess material and debris from construction within the street area shall be removed and disposed. The subgrade shall be brought to the required grades and elevation as shown on the Plans or as established by the Engineer.

In the event that soft or spongy locations are evident, the objectionable material shall be removed and the holes filled with suitable excavated material satisfactory to the Engineer. Fill material shall be placed in eight-inch layers, loose depth, and thoroughly compacted. Unsatisfactory material does not contain sufficient moisture for maximum compaction, the surface shall be wetted as directed by the Engineer to assure compaction. Shaping and rolling of the subgrade shall continue until the surface is at the established grade, or cross-section and is compacted to not less than 95% relative compaction as designated by AASTHO-T99 Test Method D. Care shall be exercised during the rolling operation to prevent damage or scarring to existing concrete curbs, or structures. Any curb or gutter damaged during construction will be removed and replaced at the Contractor's expense.

All compaction equipment shall be by means of a power roller of approved type.

3:04-D Roadway Aggregate Rock Base Fill Material. Material for base fill shall be crushed rock, crushed gravel or a combination thereof as the Contractor may elect, and when screened by laboratory analysis shall meet the following designated gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
3/4"	100
1/2"	90-100
#8	28-58
#40	8-25
#200	2-10

Aggregate base material shall have at least one fractured face produced by mechanical crushing. This fracture requirement shall be applicable throughout the grading of the materials involved. Materials that are tested and indicated non-conformance with this requirement shall be immediately removed from the construction site. The Engineer shall determine the limits of aggregate placed that do not conform to this requirement and the Contractor shall immediately comply with any order given by the Engineer to correct deficiencies in grading, or to remove material that does not comply with these specifications. Aggregate rock base shall be placed in lifts not to exceed 8" loose depth prior to rolling. Each lift shall be watered as directed and thoroughly compacted to not less than 95% relative compaction as designated by AASTHO-T99 Test Method D. Aggregate rock base material shall be delivered to the road bed as a uniform mixture and each layer shall be spread as nearly as possible in one operation. Segregation shall be avoided and the base material when compacted shall be free from pockets of coarse or fine material. Rolling shall commence at the sides and continue toward the center. Dumping of aggregate on the subgrade, in piles, will not be permitted. Depth of base shall meet design criteria of OSHD for a 30 year life as published in the "Asphalt Paving Design Guide" dated December 30, 1998, for APO and as it may be updated in the future.

Aggregate rock base shall meet the following:

- a. Durability - the source material from which aggregate base materials are obtained, produced or manufactured, shall meet the following qualifying test requirements:

<u>Test</u>	<u>Test Method</u>	<u>Requirements</u>
Degradation:		
Passing No. 20 sieve	OSHD TM 208	30% Max.
Sediment Height	OSHD TM 208	3" Max.
Abrasion:	OSHD TM 211	35% Max.

- b. Sand Equivalent - base aggregates to be incorporated in the work shall have a sand equivalent of not less than 30 when tested in conformance with OSHD TM 101.
- c. Liquid Limit and Plasticity - Base aggregate shall meet the following requirement:

LIQUID LIMIT AND PLASTICITY INDEX VALUES

<u>Percent of Material Passing No. 40 Sieve</u>	<u>Liquid Limit (Maximum) OSHD TM 102</u>	<u>Plasticity Index (Maximum) OSHD TM 103</u>
0.0 to 5.0, inclusive	33	6
5.1 to 10.0, inclusive	30	5
10.1 to 15.0, inclusive	27	4
15.1 to 20.0, inclusive	24	3
20.1 to 25.0, inclusive	21	2
Over 25.0	21	0 or N.P.

3:04-E Asphalt Concrete Paving. Asphaltic concrete shall be composed of asphaltic cement, mineral filler, sand and gravel, any chemical additives or crushed rock mixed together in the proportions specified. Depth of asphalt concrete paving shall meet design criteria of OSHD for a 30 year life as published in the "Asphalt Paving Design Guide" dated December 30, 1998, for APO and as it may be updated in the future.

Where the Plans indicate total asphalt concrete depth of three inches (3") or more the asphaltic concrete shall be placed in two successive courses, the last being not less than one inch (1") deep.

3:04-F Proportions of Aggregate Materials. The aggregate shall be clean and free of organic or harmful materials. When combined the aggregate shall be of such size and grading so as to produce a uniform dense graded mixture which shall conform to a mix design established for the project and approved by the City.

The mix design preparation shall be the responsibility of the City of Pendleton or other Contracting owner and shall meet the specifications and design criteria of OSHD for a 30 year life as published in the "Asphalt Paving Design Guide" dated December 30, 1998, for APO and as it may be updated in the future.

At least fifteen (15) working days prior to producing any of the mixture for use in the asphalt concrete pavement, the Contractor shall provide representative samples of acceptable materials proposed for use in the mix to be furnished to the Engineer for use in determining the mix formula. No mixture will be accepted for use until the mix formula for the project is determined. Should a change in the source of material be made during construction of the project, the Contractor shall notify the Engineer immediately. No mixture with these different materials will be accepted for use

until a new mix formula is determined, and the Contractor shall be responsible for all costs, including costs incurred due to the delay, for determining a new mix formula.

3:04-G Asphaltic Cement. Asphaltic cement shall be as specified in the mix design conforming with AASHTO Standard Specifications for asphaltic cement. Asphaltic cement shall be added in the amount as specified by mix design. Asphalt content shall be percentage of the total weight of mix.

3:04-H Tolerances.

After the job mix formula is determined, the mixture shall conform to the formula within the following tolerances:

<u>Constituents of mixture</u>	<u>Narrow Band Tolerance (from job mix formula)</u>
	<u>Base and surface course</u>
Aggregate passing 1", 3/4" and 1/2" specified in Section 3:04-D	Within the broadband ranges specified in Section 3:04-D
Aggregate passing #8 sieve	+/- 6.0%
Aggregate passing 1/2" sieve	+/- 4.0%
Aggregate passing #40 sieve	+/- 4.0%
Aggregate passing #200 sieve	+2.0%/-1.0%
Asphalt cement	+0.5%/-0.2%
Moisture content at time of discharge from the mixing plant (upper limit)	0.6% max.

3:04-I Mixing Plant. Asphaltic concrete shall be proportioned and mixed in a plant of modern design with facilities coordinated and operated so as to produce a consistent mixture within the job mix formula. The plant shall be equipped with suitable storage bins for aggregates weighing devices, heating and mixing equipment. Plant facilities shall be open to the Engineer at all times during the paving operation for checking and verifying weights; proportions, and character of materials; checking temperatures of the aggregates and oil prior to and after complete mixing.

3:04-J Preparation of Mixture. The size of batch shall be as determined by the Engineer and shall not exceed the manufacturer's capacity rating or the net cubic contents of the mixer below the center of the mixer shafts. The weights of charge in a batch mixer or the rate of feed to the mixer, shall not exceed that which will permit complete mixing of all the material.

The combined mineral aggregate shall be thoroughly mixed dry, after which the proper amount of bituminous cement shall be introduced uniformly in the mixer and distributed over the aggregate and the whole thoroughly mixed for such period of time as is necessary to produce a homogeneous mixture, of unchanging appearance, in which all particles of the mineral aggregate are uniformly coated with bituminous cement.

*Asphalt Paving Design Guide dated December 10, 1998

For batching plants, the mixing time, after introduction of bituminous cement shall not be less than 30 seconds and longer, if in the opinion of the Engineer, it is necessary in order to obtain the specified result. Batching and mixing shall be from a central type batch plant. Portable type mixers must be approved by the Engineer in writing prior to production or use on this Contract. The use of continuous type mixers must be approved prior to use on this Contract; if the Engineer feels samples are necessary, samples of the A. C. mix will be taken and an analysis made. Any portion of the mix not meeting specifications will be disallowed for payment and shall be replaced with an adequate mix, or other corrective action acceptable to the City. The cost of analysis will be borne by the City or owner, if the mix is acceptable, and will be borne by the Contractor if the analysis shows the mix to be unacceptable. Nothing in this article shall be construed to relieve the Contractor from his obligation of completing the Contract work and of performing and placing asphaltic concrete paving as aforementioned in the Contract Documents and in this section. The ingredients of the mixture shall be heated, combined and mixed in such a manner as to produce a mixture of such temperature that when deposited on the road it will be within the temperature range set forth hereinafter.

3:04-K Temperature Limits. The temperature to which the aggregates and bituminous cement are to be heated and at which the asphaltic concrete is to be deposited on the road shall be in accordance with the following:

Degrees Fahrenheit to which aggregates
are to be heated before mixing 250° to 325°

Degrees Fahrenheit to which bituminous
cement is to be heated before mixing . . . 250° to 325°

Degrees Fahrenheit which the asphalt concrete is to be deposited on the base will be as specified by the mix design.

3:04-L Hauling, Spreading and Finishing. The mixture shall be transported from the mixing plant to the point of use in dump trucks having tight, clean smooth metal beds, which have been sprayed with a minimum amount of thin fuel oil, paraffin oil, lime solution or other product approved by the City to prevent the mixture from adhering to the beds.

No loads shall be sent out so late in the day as to prevent completion of the spreading and compacting during daylight, unless artificial light satisfactory to the City is provided, if required by City. Trucks shall be provided with suitable approved covers to prevent loss of heat.

The mixture shall be laid on the finished aggregate base course. Aggregate base surfacing that is disturbed, rutted or damaged by trucking, Contractor's equipment or the public shall be shaped and rolled as necessary and repaired prior to placing of any asphaltic concrete. The placing of the mixture will be permitted only during dry weather and when the atmospheric temperature can reasonably be assured of being not less than 40° F., and rising. Placing during rain or other adverse weather conditions, normally will not be permitted, except that mix which is in transit at the time, may be laid if of proper temperature; if the mix has been covered during transit, if placing on a base free from pools or flow of water and if all other requirements of the specification are met.

The lengths of strips and the time of placing adjoining strips shall be such that the edge of any strip along a longitudinal joint on the finish mat, shall have the adjoining strip constructed against it the same day.

The mixture shall be delivered to the site and spread by a standard self-propelled asphaltic concrete paver which meets with the approval of the Engineer. The mixture shall be laid in strips of such width as to hold to a minimum the number of longitudinal joints required and shall be struck-off and

finished to the specified grade and cross-section.

No asphaltic concrete material shall be placed on or next to a mat that has been rolled, cooled and left for a period of 72 hours or is otherwise dirty, or raveled without sweeping the surface and the application of tack.

On areas of irregular shape, of limited area or where unavoidable obstacles make the use of specified spreading and finishing equipment impracticable, in the judgment of the Engineer, the mixture may be spread and finished by hand methods which shall be performed in a skillful manner, without segregation of materials, and to specified grade, cross-section and smoothness.

Care shall be taken at all times to prevent segregation in the mixture as evidenced by areas of fine and coarse materials, and any portion where such segregation occurs shall be removed and replaced with material of the proper consistency in compliance with these specifications.

3:04-M Compacting. Immediately after the bituminous mixture has been spread, struck off and surface irregularities and other defects remedied, it shall be thoroughly and uniformly compacted by rolling until the mixture is compacted to at least 92 percent of relative maximum density, as established by OSHD Standards.

Rollers shall be operated by a competent, experienced operator and, while the work is underway, shall be kept as nearly practicable in continuous operation. Rolling shall begin at the sides and progress gradually to the center, except that on super-elevated curves rolling shall progress from the lower to the upper edge parallel with the centerline of the road, and in each case uniformly overlapping each preceding track by not less than 1/3 the width of the roller until the entire surface has been completely rolled. If a three-wheeled roller is used, the entire surface shall be covered and compacted with the compression wheels.

The motion of the roller at all times shall be slow enough to avoid displacement of the hot mixture. Any displacement occurring as a result of the reversing of direction of the roller, or from any other cause, shall be corrected at once by the use of rakes and of fresh mixture when required. To prevent adhesion of the mixture to the roller the wheels shall be kept properly moistened with water, excess water will not be permitted.

Generally, when an adjoining strip of asphaltic concrete is to be placed against a strip which is still hot, the six-inch width of the asphaltic concrete which is nearest the joint with a successive strip shall not be rolled until the adjoining strip has been placed against it, at which time the rolling strip of the successive strip shall overlap the six-inch width of the preceding strip of asphaltic concrete. During the rolling operations, hand raking and spotting shall be performed at edges and joints of the mixture to provide neat lines at edges and smooth, uniform surfaces at joints.

Along forms, curbs, headers, and walls, around manholes and catch basins, and at other places not accessible to the roller, the mixture shall be thoroughly compacted with pneumatic tampers, smoothing irons or mechanical tampers. On depressed areas, a trench roller may be employed, or compression strips may be used under the roller to transmit compression to the depressed area.

The surface of the asphaltic concrete after compaction shall be smooth and true to the established cross-section and grade. Any mixture that becomes loose or broken, mixed with dirt, or is in any way defective, shall be removed and replaced immediately with fresh hot mixture, which shall be immediately compacted to conform with the surrounding area. Areas showing an excess of bituminous cement, shall be removed and replaced.

Care shall be taken during the rolling operation to prevent damage or scarring to existing concrete curbs or retaining walls. The Contractor shall be liable for any such damage.

3:04-N Transverse Joints. Placing of a course or strip of asphaltic concrete shall be as nearly continuous as practicable and the roller shall pass over an unprotected end of freshly laid mixture only when the laying of the course or strip is to be discontinued long enough to permit the mixture to become chilled. In all such cases, when the work is resumed, the material previously laid and permitted to become chilled shall be cut back or removed along the end so as to produce a slightly beveled edge for the full thickness of the course and the old cut away material shall be removed from the work. The new mixture shall be placed or raked against the fresh cut, thoroughly tamped, and rolled to provide a smooth joint exactly meeting the line, grade and cross section of adjoining asphaltic concrete after thorough compaction.

When the end of a course or strip of asphaltic concrete is to be temporarily subjected to traffic, the end shall be left on a bevel of approximately 1:1 to provide a fresh edge against which subsequently placed asphaltic concrete is to abut.

3:04-O Surface Smoothness. The surface of the top or wearing surface course, when finished, shall be of uniform texture, smooth, true to crown and grade and free from defects of all kinds. The smoothness shall be such that when tested with a 10-foot straightedge placed on the surface with its centerline parallel to the centerline of the highway, the maximum deviations of the surface from the edge of the straightedge will not exceed 1/8 of an inch.

3:04-P Asphalt Testing. Testing shall be performed as directed by the Engineer. Testing that may be required is as follows:

TEST	MINIMUM SPECIFICATION
1. Gradation and Oil Content	Based on Current OSHD
2. Voids and Compaction	Mix Design Criteria

Oil content shall be determined by the extraction method. One sample per 500 tons or a minimum of three samples per project. When samples are not obtained as required, core cut samples may be taken.

The Engineer shall designate location of samples. The Contract owner shall be responsible for taking the necessary samples. The Contractor shall furnish new like materials and fill the holes with no extra compensation. The City of Pendleton or other contracting owner shall be responsible for having the tests performed. In the case of conflicting lab reports, a mutually agreeable certified lab shall be the final testing authority.

The cost of retesting mix not meeting minimum requirements, shall be the Contractor's responsibility.

3:04-Q Price Adjustments. Use the Summary of Failing Test method below for City of Pendleton projects.

Summary of Failing Test Method:

(1) Aggregate Gradation and Asphalt Content:

A deduction of 1.0% of the in-place price for asphalt concrete and cement will be made for each 1.0% cumulative weighted deviation beyond the allowable tolerance of

each component of the job mix formula. The following factors will be used to calculate deduction due to deviations from the job mix formula:

Deviation Weighting

PERCENT PAY

<u>Job Mix Component</u>	<u>Weight Factor</u>	<u>% beyond Allowable</u>
Asphalt Content	12 x deviation	
Passing #200	3 x deviation	
Passing #8	1.5 x deviation	
Passing #40	1.5 x deviation	
All other sieves	1.0 x deviation	

The cumulative weighted deviations is the sum of all weighted deviations as determined from the table above. A minimum of three samples shall be averaged to determine any reduction in payment. Where the cumulative weighted deviation equals or exceeds 15.0%, the materials shall be removed and replaced at no cost to the City.

When asphalt paving materials with a cumulative deviation of less than 15.0% are furnished, the City may require the Contractor to remove and replace defective materials at no cost to the City or may deduct from payments to the Contractor an amount equal to the cumulative weighted percentage deviations from the job mix formula.

(2) Compaction

Asphalt concrete pavement which does not comply with compaction requirements shall be removed and replaced or, at the discretion of the City, be subject to a price reduction determined from the following table. Compaction shall be determined by laboratory analysis of pavement core samples. Price reduction shall be based on at least five random samples.

Compaction Price Reduction Schedule

<u>% Maximum Density</u>	<u>% Pay</u>
92.0 and above	100
91.5 - 91.9	95
91.0 - 91.4	90
90.5 - 90.9	85
90.0 - 90.4	80
89.5 - 89.9	70
89.0 - 89.4	60
Below 89.0	0 - 50

(3) Pavement Thickness

When pavement thickness, as determined by the City's measurement or test cores, is found to be less than the thickness of the specified surface course of asphalt concrete, the City may require the Contractor to place an additional lift of asphalt concrete to bring the total thickness of the pavement into conformance with the specifications.

When the pavement in any section of pavement is found deficient in thickness by less than the specified thickness of the surface course, and the City allows the pavement to remain in place, payment for that pavement will be made at an adjusted price based on at least five random measurements determined from the following table:

<u>% Reduction in Pay</u>	<u>% Deficiency in Thickness</u>
No deduction	0.0 to 5.0
No deduction	5.1 to 10.0
0.5 x deficiency	10.1 to 20.0
1.0 x deficiency	20.1 to 30.0

No payment will be made for any area of pavement found deficient in thickness by more than 30.0% even though the work is permitted by the engineer to remain in place.

When the pavement in any section is found to exceed the specified thickness by more than 6 mm, the engineer will calculate the material in the excess thickness of the pavement and shall deduct that quantity from the payments due under the Contract.

3:04-R Control of Traffic. Traffic shall be prohibited from entering onto any course or lift of the pavement until the course or lift has cooled and set sufficiently to prevent marking. Those edges which are to be along longitudinal joints shall be protected from traffic to the extent that no breakdown of the edge shall occur.

3:04-S Warning Signs, Flags, and Barricades. Whenever the Contractor's operations create a condition hazardous to traffic or to the public, he shall furnish, erect, and maintain such fences, barricades, lights, signs or other devices as are necessary to prevent accidents or damage or injury to the public. The Contractor shall also furnish such flagmen and guards as are necessary to give adequate warning to traffic or to the public of any dangerous conditions to be encountered. When not listed as a pay item, all temporary traffic control shall be considered incidental work for which no separate payment shall be made.

3:04-T Patching. Omissions or damage to the wearing surface shall be immediately corrected by hand patching. Defects such as raveling, low centers, lack of uniformity, or other imperfections caused by faulty workmanship shall be corrected as directed by the Engineer. All costs incurred shall be borne by the Contractor, and no additional compensation will be made for such work. The maximum permissible water/cement ratio by weight shall be 0.58.

3:05 CURBS, GUTTERS, DRIVEWAYS, AND SIDEWALKS

3:05-A Concrete. Concrete shall have a minimum compressive strength of 3000 psi, 28 days after placement. An air-entraining admixture shall be used. It shall be added to the mixer at the time of mixing in such a manner as to insure uniform distribution of the admixture throughout the batch. Entrained air (% by volume) range shall be 4-1/2% to 7%. The maximum water added per sack of cement shall be 6 gallons and the slump range shall be between 2 and 3 inches. Concrete shall be subject to approval by the Engineer for mix design, materials, batching and mixing. The placement of concrete shall be permitted only during dry weather and when temperature can reasonably be assured of being not less than 35° F and rising. The Contractor shall notify the City Engineer 24 hours in advance of placing or of depositing concrete. Concrete placed without

inspection by the Engineer will be subject to removal unless written permission has been obtained from the Engineer, not less than 24 hours prior to such work.

3:05-B Forms. Pre-fabricated steel forms may be used. Lumber used in forms shall be of 2-inch material dressed to a uniform thickness, of good sound material free from loose knots or other defects. Re-used lumber or forms shall be thoroughly cleaned before being used again. Re-use of forms and form lumber will be permitted only when their condition is approved by the City Engineer. All forms shall be lightly oiled with an approved oil substance.

The forms shall conform to the shape, lines, grade, and dimensions as called for on the Plans. The acceptable tolerance on line and grade shall be 1/8 inch. Prior to each concrete pour, grade, alignment and steel placement shall be inspected and approved by the Engineer.

3:05-C Premoulded Joint Filler. Premoulded joint filler shall be a bituminous type of 1/2" minimum thickness, conforming to AASHO M33-48 and ASTM D-994.

3:05-D Curing of Concrete. Protection against loss of moisture shall be accomplished by keeping the surface continuously wet for seven days, or by application of an approved curing compound shall be a white-ligmented liquid membrane-forming compound conforming to the requirements of ASTM C309 (Specification for liquid Membrane-Forming Compounds for Curing Concrete). The curing seal shall be thoroughly applied so as to give a complete and equal seal. No gray spots, streaks or gray areas will be permitted.

3:05-E Base for Curbs, Gutters and Sidewalks. The base for concrete curbs and gutters shall consist of aggregate rock base materials as specified in 3:04-D hereof, and shall be compacted to not less than 95% relative compaction as designated by AASHO Test Method T-99. Where soft, spongy, or other material is found in the subgrade, the Engineer shall require that excavation be carried to firm, solid foundation material. The subgrade shall be backfilled to the required grade with aggregate rock base as specified above. This determination and the amount required will be the independent decision of the Engineer. Any additional cost will be considered incidental work for which no separate payment will be made.

3:05-F Expansion Joints. Expansion joints shall be of the premoulded type or approved alternate, and shall be composed of fibre of cellular nature and asphalt or other approved material and shall conform to the AASHO Standard Specifications for non-extruding type filler.

Expansion joints shall be 1/2 inch in thickness and extend full depth of the concrete.

Contraction joints shall be 1/8 inch in thickness and be no less than 1/4 the thickness of the concrete. They shall be formed at the time of pouring or formed by sawing.

Expansion joints shall be located as directed by the Engineer.

Contract joints shall be located at intervals not to exceed 15 feet.

3:05-G Placing Concrete. Before depositing of concrete will be permitted, the work crew and all equipment and tools must be immediately available, all debris shall be removed from the space to be occupied by the concrete. The base shall be lightly wetted. Concrete shall be deposited in its proper place in a continuous operation. An interval of more than 45 minutes between any 2 consecutive batches or loads, or a placing rate of less than 8 cubic yards of concrete per hour, shall constitute cause for a construction joint at the location and of the type directed by the Engineer in concrete already placed.

In hot weather, concrete that has been placed shall be adequately protected until final finishing can be completed. Fog nozzles when requested by the Engineer shall be used. Curing operations shall begin as soon as concrete has set enough to avoid surface damage. Concrete shall be finished as soon as is practicable and only that amount of concrete that can be properly handled will be allowed to be placed. The Engineer may cancel concrete operations if in his opinion, the Contractor is employing inadequate finishing provision or curing methods.

3:05-H Removal of Forms. The form on the front of the curb and retaining walls forms shall be removed between 2 and 6 hours after the concrete has been placed. In no event shall the form be removed if the concrete has not reached its initial set.

3:05-I Finishing. After removal of the forms from exposed faces, holes left after the removal of form ties shall be grouted and cured. The patching mixture shall consist of 1 part cement and 2 parts mortar sand. Plywood or metal forms shall be used to produce a uniformly smooth surface on the exposed face. The use of form ties buried in the curb or wall must have the approval of the PWD, and when used as part of the integral design of a prefabricated and manufactured standard curb form.

The finishing shall be accomplished in a manner satisfactory to the Engineer. In general all edges and joints shall be finished with standard edging and grooving tools. The surface shall be troweled smooth and then lightly brushed. Poor workmanship and finishing shall be sufficient cause for rejecting by the Engineer. Patching of curbs or portions of retaining walls will not be permitted. The entire section or portion shall be removed and replaced with new concrete.

3:05-J Concrete Patching. Concrete used for patching shall meet the same specifications as sidewalks with Masco concrete bonding agent or approved equal added in accordance with manufacturer's specifications. This item shall be used to repair sidewalks damaged by tree removal, utility relocations, etc., where possible, damaged sidewalk sections shall be completely removed and replaced. Edges of existing concrete shall be tacked with, Masco concrete bonding agent or approved equal.

3:06

RESTORATION

3:06-A Tree Removal. Trees shall be removed in sections to protect utility lines and private property. Trees shall be removed completely from the job site by competent personnel and disposed of in an acceptable manner.

3:06-B Adjustment of Manholes. Manhole covers shall be left below finished grade prior to paving. After the paving has been completed a three foot diameter section centered on the manhole shall be cut out. The manhole shall then be brought to grade using concrete grout and the surrounding area patched and compacted in accordance with Section 3:04-L.

3:06-C Surface Dressing. Slopes, sidewalk areas, planting areas, and roadway shall be smoothed and dressed to the required cross section and grade by means of a grading machine insofar as it is possible to do without damaging the work or existing improvements, trees and shrubs. Supplement machine dressing by hand work as directed by Engineer.

Upon completion of the cleaning and dressing, the project shall appear uniform in all respects. Grade all areas true to line and grade as shown and as approved. Where the existing planting is below sidewalk and curb, fill and dress the area to the walk regardless of limits shown. Wherever fill material is required in the planting area or where the existing driveway is below or above grade,

fill or/excavation shall be required to provide access, as approved by City. The Contractor shall then place 2" of 1-1/4" minus rock on the driveway. Make final surface high enough to allow for final settlement. When not listed as pay item, all work on grading, fill and/or excavation on driveways shall be considered incidental work for which no separate payment shall be made.

3:06-D Removal of Materials. Remove and dispose of all excavated or construction materials, equipment, and trash of all kinds resulting from the work. Where brush and trees beyond the limit of the project have been disturbed, remove and dispose of or restore same as directed, at no expense to City.

3:06-E Cleaning Drains. Clean all drainage facilities such as inlets, catch basins, culverts and open ditches of all excess material or debris which is the result of the work, as approved.

3:06-F Cleaning Paved Surfaces and Appurtenances. Clean all pavement surfaces, whether new or existing within the limits of the project. Clean existing improvements such as curbs, gutters, walls, sidewalks, castings for manholes, monuments, water valves, lamp holes, vaults, signs, and other similar installations as approved.

Flush the street with a pressure type flusher as approved. Hand broom or flush all sidewalks as directed.

3:06-G Restoring Planted Areas. Hand-rake and drag all former grassed and/or planted areas leaving disturbed areas free from rocks, gravel, clay, or any other foreign material and ready, in all respects, for seeding. The finished surface shall conform to the original surface, be free-draining and free from holes, rough spots, or other surface features detrimental to a seeded area.

3:06-H Restoring Borrow and Disposal Areas. Clean all properties which were disturbed during construction of the project. Dispose of all uprooted stumps, felled trees, brush, excess excavation, rock, discarded materials, rubbish and debris. Remove all plant, equipment, tools and supplies and put the property occupied in a neat, clean and orderly condition, in equal or better condition to that existing before move in.

3:06-I Removal of Signs. Do not remove warning, regulatory, guide, or project signs prior to formal acceptance, except as directed.

3:06-J Payment For Cleanup. Unless a separate pay item is listed in proposal for restoration and cleanup, all restoration and cleanup will be considered incidental work for which no separate payment will be made.

3:07 **LABOR**

3:07-A Standards of Workmanship. All materials and workmanship shall be in every respect in accordance with the best modern practice. Whenever the Contract Plans, Specifications, or directions of the Engineer admit of a reasonable doubt about what is permissible, and when they fail to state the quality of any work, the interpretation which requires the best quality of work is to be followed.

3:07-B Time of Completion. The time of completion of the work to be performed under this Contract is the essence of the Contract. Delays and extensions of time allowed in accordance with Paragraph 2:05-I of the General Conditions.

3:07-C Schedule of Minimum Hourly Wage Rates. The minimum hourly wage rates applicable to the work to be done under this Contract as prescribed under the current prevailing wage rates

published by the Oregon Bureau of Labor and Industries at the time of advertisement. This prevails unless project is governed by Federal Davis-Bacon Act or the project is below minimum set by Oregon Bureau of Labor and Industries.

3:08

METHOD OF PAYMENT

3:08-A Method of Measurement and Basis For Payment. All clearing, grubbing, sheathing, shoring, moving and setting fences and minor structures, grading, shaping and incidentals required to complete the work and return the work site to the conditions as found prior to construction, shall not be measured for payment separately but shall be considered as a subsidiary obligation of the contractor. The following are the pay items and the basis of their measurement.

<u>ITEM</u>	<u>PAYMENT BASIS</u>
(a) Asphaltic Concrete Mix In Place	Ton
(b) 3/4" Minus Base Rock In Place	C.Y.
(c) Curb and Gutter	L.F.
(d) Type "C" Curb In Place	L.F.
(e) Sidewalk	S.Y.
(f) Cross Gutters	L.F.
(g) Manhole Adjustment	EA.
(h) Embankment	C.Y.
(I) Excavation	C.Y.
(j) Asphalt Cutting	L.F.
(k) Asphalt Patching	S.Y.
(l) Fire Hydrant Assembly In Place	EA.
(m) Ductile Iron Water Line In Place	L.F.
(n) Water Valves In Place	EA.
(o) Sanitary Sewer In Place	L.F.
(p) Sewer M.H. In Place	EA.
(q) Sanitary Sewer Pump Station In Place	EA.
(r) Sanitary Sewer Wyes In Place	EA.
(s) Storm Drain System	EA.
(t) Storm Sewer In Place	L.F.
(u) Catch Basin In Place	EA.
(v) Catch Basin Relocation	EA.
(w) Clean Out Adjustment	EA.
(x) Steps In Place	EA.
(y) Signal Relocation	Job
(aa) Tree Removal	EA.
(bb) Trench Dewatering	L.F.

a. Asphaltic Concrete Mix In Place. Shall be measured as the tons of mix in place as directed by the Plans and approved by the Engineer. Payment shall include all necessary equipment, labor and materials for a complete and approved job.

b. 3/4" Minus Base Rock In Place. Shall be measured as the total compacted cubic yards in place to bring the road base up to grade. All placing, grading, and compacting shall be included and payment shall be full compensation for all labor, materials, and equipment and tools necessary for a complete and approved job.

c. Curb and Gutter. Shall be measured as the total lineal feet in place per plans and specifications as directed and approved by the Engineer. All subbase preparation, grading, compaction and base rock shall be included and payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.

d. Type "C" Curb. Shall be measured as the total lineal feet in place per plans and specifications as directed and approved by the Engineer. All subbase preparation, grading, compaction and base rock shall be included and payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.

e. Sidewalk. Shall be measured as the total square yards in place as directed in the plans and specifications. Sidewalks shall be built to the City of Pendleton Standards and payment shall include all subbase preparation, grading, compaction base rock. Concrete or asphaltic concrete, labor, equipment and tools necessary for a complete and approved job.

f. Cross Gutters. Shall be measured as the number of lineal feet placed as directed and measured by the Engineer. Cross gutters shall be City of Pendleton Standard and payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.

g. Manhole Adjustment. Shall be measured as the number of manholes that are adjusted. Payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.

h. Embankment. Shall be measured as the number of cubic yards placed as per the plans and specifications as directed and measured by the Engineer. Payment shall include all hauling, placing, moisture content adjustment, compacting, and grading, and for all labor, equipment and tools necessary for a complete and approved job.

i. Excavation. Shall be measured as the number of cubic yards placed as per the plans and specifications and as directed and measured by the Engineer. Excavation shall include all existing curb, existing pavement and other incidentals as noted on the plans or as directed and approved by the Engineer. Payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.

j. Asphalt Cutting. Asphalt or Concrete cutting shall be measured by the total lineal feet of single cut measured lineally along the roadway which is cut to allow placement of sewer. Payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job. Method of cutting shall be approved by the Engineer.

k. Asphalt Patching. Roadway patching shall be measured by the total square yards of patching asphalt or finish concrete surface which is replaced. A maximum width of four feet shall be allowed measured across the roadway. Payment shall include all labor, material, equipment and tools required for a complete and approved job.

l. Fire Hydrant Assembly In Place. This item shall be measured as the total number of fire hydrant assemblies actually installed in accordance with the plans. Payment for this item shall be full compensation for all labor, tools, and equipment necessary for a complete and approved job.

m. D.I.W.L. In Place. Payment for this item shall be made at the unit contract price per lineal foot actually installed. Size and class shall be as specified in the drawings and specifications. This item shall include, but not be limited to, all trench excavation and backfill, bedding material, select

backfill, installation of miscellaneous fittings, and all labor, equipment and tools necessary for a complete and approved job in place according to plans and as directed by the Engineer.

n. Water Valves In Place. Payment for this item shall be made at the unit price for each valve actually installed, size and type shall be as specified in the plans and specifications. This item shall include, but not be limited to, trench excavation and backfill, installation of approved valve casings, all labor, equipment and tools necessary for a complete and approved job.

o. Sanitary Sewer In Place. Payment for this item shall be made at the unit price per lineal foot actually installed. Size and class shall be as specified in the drawings and specifications. This item shall include, but not be limited to, all trench excavation and backfill, bedding material, select backfill and all labor, materials, equipment and tools necessary for a complete and approved job in place.

p. Sewer Manhole. Payment shall be made at the unit contract price for "Standard Sewer Manhole" as specified in the plans and specifications. Payment shall be full compensation for excavation backfill, concrete, frame and cover, and all tools, labor and equipment required for a complete and approved job.

q. Sanitary Sewer Pump Station In Place. Payment for this item shall be made at the unit price for each pump station actually installed. Payment shall include but not be limited to, all material, labor, equipment, and tools necessary for a complete and approved installation.

r. Sanitary Sewer Wyes In Place. This item shall be measured as the total number of wyes actually installed. Size and type of Wyes shall be as specified on the plans and specifications. Payment shall be full compensation for all labor, tools and equipment necessary for a complete and approved installation.

s. Storm Drain System. Payment for this item shall be made upon completion and approval of this line item in accordance with plans and specifications. Payment shall include but not be limited to, all trench excavation and backfill, bedding material, select backfill, catch basins and all labor, equipment and tools necessary for a complete and approved job.

t. Storm Sewer. Payment for this item shall be made at the unit price per lineal foot actually installed. Size and class shall be as specified in the drawings and specifications. This item shall include, but not be limited to, all trench excavation and backfill, bedding material, select backfill and all labor, materials, equipment and tools necessary for a complete and approved job in place.

u. Catch Basin In Place. Payment for this item shall be made at the unit price for each catch basin actually installed as specified in the plans and specifications. This item shall include, but not be limited to, trench excavation backfill, all material, labor, tools and equipment necessary for a complete and approved job.

v. Catch Basin Relocation. Payment for this item shall be made at the unit price for each catch basin relocated as specified in the plans and specifications. This item shall include, but not be limited to, trench excavation, backfill, all material, labor, tools and equipment necessary for a complete and approved job.

w. Clean Out Adjustment. Shall be measured as the number of clean outs that are adjusted. Payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.

x. Steps In Place. Payment for this item shall be made upon completion and approval of this line item in accordance with plans and specifications. Payment shall include but not be limited to, all materials, labor, and equipment and tools necessary for a complete and approved installation.

y. Signal Relocation. Payment for this item shall be made upon completion and approval of this line item in accordance with plans and specifications. Payment shall include but not be limited to, all material, labor and equipment and tools necessary for installation.

z. Tree Removal. Shall be measured as the total number of trees actually removed. Trees shall be removed completely from the job site and disposed of in an acceptable manner. Payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.

aa. Trench Dewatering. Shall be measured as the total lineal feet of trench necessary to be dewatered as directed by the Engineer. Payment shall be full compensation for all labor, materials, equipment and tools necessary for a complete and approved job.