

STANDARD CONSTRUCTION SPECIFICATIONS
FOR EARTHWORK

DIVISION 200

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**STANDARD CONSTRUCTION SPECIFICATIONS FOR EARTHWORK
DIVISION 200**



201.1 GENERAL

The work covered by these specifications consists of providing all plant, labor, equipment, supplies, material, transportation, handling, and storage, and performing all operations pertaining to the: **1)** Construction of sub-base for parking lots, streets, alleys, curbs, gutters, sidewalks and bike trails; **2)** Construction for all trench excavation, backfill, bedding, and foundation material for utility installation; and **3)** Excavation and backfill for building structures and retaining walls.

201.2 DEFINITIONS

Backfill - Material placed in an excavated area.

Bedding - Ground or support in which pipe is laid.

Borrow - Material used as fill and/or backfill which is obtained from a source other than required excavation.

Compaction - The expulsion of air from a soil mass by tamping by hand or machine to achieve required density in soils.

Disposal Site - Any area where waste from construction is placed.

Excavation - Area or material removed to provide a suitable base for improvement.

Fill - Fill is considered to be material placed above the original or natural ground lines.

Leveling Course - Leveling course consists of the processed gravel placed above the sub-base.

Non-Frost Susceptible Material - Non-organic soil containing less than three percent (3%), by weight, of grains smaller than .02mm obtained from minus three inch (3") material.

Sub-base - The sub-base is that material which is placed above the sub-grade and below the leveling course.

Sub-grade or Bottom Excavation - The sub-grade is that material below the bottom of excavation and upon which the sub-base material is placed.

Trench - Any excavation for a utility or drainage system.

Unsuitable or Unusable Material - Unsuitable or unusable material may consists of any material, which in the opinion of the Engineer is inadequate for use in the proposed construction.

201.3 **Applicable Standards**

The latest revision of the following standards of the American Society for Testing and materials (*ASTM*) and the American Association of State Highway Transportation Officials (*AASHTO*) are hereby made a part of these specifications:

- | | |
|----------------|---|
| ASTM C-29 | Test for Unit Weight of Aggregate |
| ASTM C-117 | Test for Materials Finer than No. 200 Sieve in Aggregates by Washing. |
| ASTM C-131 | Test for Resistance to Abrasion of Small Size Course Aggregate by Use of the Los Angeles Machine. |
| ASTM C-136 | Test for Sieve or Screen Analysis of fine and Course Aggregates |
| ASTM D-422 | Test for Particle Size Analysis of Soil |
| ASTM D-424 | Test for Plastic Limit and Plasticity Index of Soils |
| AASHTO M-147 | Materials for Aggregate and Soil-Aggregate, Sub-base, Base, and Surface Courses |
| ASTM D-1557 | Modified Proctor Density |
| AASHTO T-180-D | Test for Moisture-Density Relations of Soil |
| AASHTO T-205 | Test for Field Determination of Density of Soil In-Place |
| AASHTO T-238 | Test for Density of Soil In Place by Nuclear Method |

201.4 **Equipment**

All equipment, tools, and machines used in the performance of the work covered by these specifications shall be subject to the approval of the Engineer and shall comply with all applicable safety requirements. All equipment used on the project shall be adequately maintained and shall be the proper equipment for the work being accomplished so as to produce the result required by the contract documents.

201.5 **Compaction Standards**

The required density of fill and backfill shall meet the requirements as outlined in *Section 205 Classified Fill and Backfill, 205.3 Construction, Section 214 Mechanical*

Compaction, 214.2 Construction, of this division. In areas outside of road rights-of-way, the density shall be as required by the contract documents or as directed by the Engineer.

Where compaction density is specified, the maximum density shall be determined in accordance with the current requirements of ASTM D-1557 Standard Methods.

201.6 Subsurface Investigation

Information pertaining to subsurface exploration, borings, test pit locations, and other preliminary investigations may appear in the Bidding Documents or may be available at selected locations for review by the Bidder. This information, if provided, was acquired for design purposes only, and is not considered adequate for construction. The Owner does not warrant the correctness of the soils investigation or of any interpretation, deduction, or conclusion given in the report relative to subsurface conditions. The Bidder shall make his own deductions and conclusions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavations, the difficulties which may arise from subsurface conditions, and of doing any other work affected by the subsurface conditions, and shall accept full responsibility therefore.

201.7 Weather Limitations

Unless otherwise authorized by the Engineer, fill and backfill material, base course, and leveling course shall not be placed when the atmospheric temperature is below thirty-five degrees (35°) Fahrenheit. When the temperature falls below thirty-five (35) degrees Fahrenheit, it shall be the responsibility of the Contractor to protect all areas of completed work against any detrimental effect. Any areas of work that are damaged by weather shall be reconditioned, reshaped, and re-compacted by the Contractor in conformance with the requirements of the contract documents and without additional cost to the Owner.

SECTION 202 CLEARING AND GRUBBING

202.1 General

The work under this section consists of performing removal of all vegetation, brush, trees, logs, tree stumps, roots and root mat to a Contractor provided disposal site and the preservation from damage of all items designated to remain. Limits of clearing and grubbing shall be in conformance with right-of-way easements, contractual stipulations, and directions by the Engineer. The Contractor's surveyor shall mark the limits of clearing prior to any construction activity.

202.2 Construction

The Contractor shall protect and preserve all objects designated to remain. Paint required for cut or scarred surfaces of trees or shrubs selected for retention shall be an approved asphaltum base paint prepared especially for tree surgery.

All surface objects and all trees, stumps, roots, brush, berm piles, boulders, and other protruding obstructions not designated to remain shall be cleared and grubbed. Undisturbed stumps, roots, and inorganic, solid objects which are located more than 4 feet (4') below the new roadway sub-grade are excluded unless designated by the Engineer for removal.

The Engineer may permit sound stumps to be cut off not more than 6 inches (6") above the existing ground in areas outside the limits of the new roadway cut and embankment areas.

All burning shall be done in accordance with applicable laws and ordinances. All burning shall be constantly supervised and controlled by competent watchmen at such times and in such a manner that the surrounding forest cover and other adjacent property will not be jeopardized.

Clearing debris piles shall not block any traffic way or stream or drainage channel at any time. Clearing debris piles shall not be located in areas that will hinder the operations of City snow removal or utility maintenance equipment. Emergency vehicles and school buses will be afforded unobstructed passage through the project.

Clearing debris may be disposed of at locations off of the project with written permission of the property owners on whose property the materials and debris are placed. The Contractor shall make all arrangements with the property owner for obtaining suitable disposal locations, and the costs involved with private property disposal shall be included in the bid price.

The Contractor shall take whatever cautions necessary to protect private property, utility transformers, pedestals, and underground or overhead cables from damage during tree falling and clearing operations.

202.3 **Method of Measurement**

The measurement of clearing and grubbing shall be by lump sum or by the acre. The method of measurement for any individual project shall be as specified in the Bid Schedule.

202.4 **Basis of Payment**

Payment shall include full compensation for all mobilization and demobilization, clearing, grubbing, disposal, and clearing debris.

Payment shall be made under the following unit

<u>Bid Item</u>	<u>Description</u>	<u>Unit</u>
202	Clearing and Grubbing	Lump Sum or (Acre)

SECTION 203

REMOVAL OF OBSTRUCTIONS

203.1 **General**

This work shall consist of the removal, wholly or in part, and satisfactory disposal or relocation as directed by the Engineer, of all fences, structures, abandoned vehicles and utilities, and any other obstructions which are not designated or permitted to remain, except for the obstructions to be removed and disposed of under other items in the Contract. Also included in the work will be the removing and resetting of mailboxes and newspaper delivery tubes and the preservation from injury and defacement of all vegetation and objects not scheduled to be removed.

203.2 **Construction**

The Contractor shall either raze, remove and relocate, or remove and dispose as directed by the Engineer all foundations, fences and other obstructions, any portions of which are in the right-of-way, except utilities and those for which other provisions have been made for removal. Basements or cavities left by structure removal shall be filled to the level of the surrounding ground and, if within the prism of construction, shall be compacted in accordance with *Section 205 Classified Fill and Backfill*.

Existing mail boxes and newspaper delivery tubes within the limits of the project shall be removed and temporarily reset at locations designated by the Engineer. The boxes and tubes shall be installed in such a position that their usefulness will not be impaired. Any posts, boxes, tubes or other material broken or damaged by the Contractor shall be repaired or replaced at no additional cost to the City.

The Contractor shall exercise reasonable care when relocating private property.

No metal pipes, wires, or cables may be placed in any embankment and no debris may be placed under any city street.

All waste areas shall be graded to drain.

Combustible debris shall be burned or otherwise disposed of in an approved manner.

Culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic.

The Contractor shall not remove manholes, inlets, valves, or any other portion or portions of existing sewer or water systems until the new systems are in operation or suitable arrangements have been made for the diversion or interruption, or a temporary system has been installed.

When designated on the plans to be abandoned in place, flexible pipe shall have the ends crushed and flattened before covering; other conduits shall be securely plugged by an approved method.

The Contractor will not be allowed to operate valves or fire hydrants that are in use on an active water system. The City will provide personnel when needed and when scheduled. Except in an emergency the Contractor should allow twenty-four (24) hours notice for assistance by the City's personnel.

203.3 **Method of Measurement**

When the Contract stipulates that payment will be made for removal of obstructions on a lump sum basis, the item, Removal of Obstructions, will include all structures and obstructions encountered within the right-of-way in accordance with the provisions of this section.

Temporary relocation of mail boxes and tubes will not be measured for payment, but will be considered incidental to this item of work.

203.4 **Basis of Payment**

The accepted quantities of removal of obstructions, determined as provided above will be paid for at the Contract lump sum price and will be full compensation for removing and disposing of the obstructions in accordance with the Contract.

The price shall also include salvage of materials removed, their custody, preservation, storage in the right-of-way, and disposal as provided herein.

Payment will be made under:

<u>Pay Item</u>	<u>Description</u>	<u>Unit</u>
203	Removal of Obstructions	Lump Sum

SECTION 204

EXCAVATION FOR TRAFFIC WAYS

204.1 General

This item consists of furnishing all plant, labor, equipment, supplies, and material in performance of all operations pertaining to the excavation of unsuitable and/or surplus material for streets, alleys, access roads, parking lots, sidewalks, curbs, gutter, and bike trails.

204.2 Construction Surveys

The surveying shall be completed in accordance with the *General Provisions, Section 10.05, Control of Work; Article 5.9, Construction Surveying by the Contractor*, and in accordance with *Division 100, Section 102* of these specifications.

204.3 Miscellaneous

Public property laying within the right-of-way, such as signs and markers, that interfere with construction shall be removed and reset at the time and place as directed by the Engineer or his designated representative. Any damage by the Contractor shall be repaired or the item replaced in kind at the Contractor's expense. Temporary signs must be installed in place of removed traffic control signs.

A disposal site for non-salvageable materials shall be provided by the Contractor.

All existing key boxes, clean-outs, manholes, etc., shall be located and exposed by the Contractor and carefully protected during the course of the work. **The Contractor, in conjunction with the Public Works Department, shall check all City owned utilities prior to the start of the construction and record their condition.** All manholes, catch basins, clean-outs, etc., will be checked for damage resulting from the Contractor's operation prior to the final acceptance by the Owner. The Contractor is responsible for restoring all existing utilities to pre-existing conditions.

All existing City utilities requiring adjustment to grade shall be adjusted by the Contractor in accordance with the applicable Standard Details. Payment for such adjustment shall be as specified under the applicable section of these specifications.

204.4 Unusable and Usable Excavation

Unusable excavation shall consist of all excavation which is excess or not suitable for classified fill or backfill as determined by the Engineer.

Usable excavation shall consist of material from excavation that is designated by the Engineer as suitable for fill or backfill.

If suitable soil conditions are encountered at elevations different from those indicated on the drawings, the Engineer may direct, in writing, that the excavation be carried to elevations either above or below those specified.

The Contractor shall control the banks of all excavated areas as necessary to prevent movement of soil in areas supporting existing foundations or slabs.

Unauthorized excavation beyond the plan limits shall be filled with a suitable compacted material at no cost to the Owner. Sub-excavation that is authorized by the Engineer shall be paid at the Contract unit price for Unusable Excavation. The Engineer may require additional surveyed cross sections to determine the quantities of excavation or sub-excavation.

The excavation shall be uniformly shaped so that classified backfill material can be properly placed and compacted. The excavated area shall be feathered to adjoining areas where suitable material is found. Excavated areas shall not be backfilled until approved by the Engineer.

It shall be the responsibility of the Contractor during construction to keep all embankments and excavation well shaped and drained. The sub-grade shall be maintained, compacted in cut sections if required, and kept free of leaves, sticks or other debris.

The Contractor shall perform whatever work necessary to prevent flow and accumulation of surface water or ground water in excavations. Unless otherwise provided in the special provisions, all work associated with pumping or de-watering shall not be paid for directly, but shall be considered as a subsidiary obligation of the Contractor.

204.5 **Utilization or Disposal of Excavated Material**

Excavated material conforming to the specifications for fill and backfill shall be used where practical for fill and backfill as directed by the Engineer. Usable excavation shall be compacted in accordance with *Section 214 Mechanical Compaction*, of this division. When not used on the project site, the material shall be hauled away to the Contractor provided disposal site unless otherwise stated in special provisions.

204.6 **Excavation Methods**

The Contractor shall utilize whatever methods and equipment necessary to excavate to the limits designated by the drawings and specifications and authorized by the Engineer, except that no equipment or method may be utilized that, because of its action, deteriorates the sub-grade, making additional excavation necessary beyond the limits originally authorized.

Borrow material shall not be placed until after the usable excavation has been incorporated into the fill areas.

204.7 **Method of Measurement**

Authorized excavation and sub-excavation shall be measured in its original position by surveyed cross sections prior to the beginning of excavation operations. After the excavation is completed, a second set of cross sections shall be taken at the same locations as the original ground measurements.

The volume of excavation shall be computed by the average end area method based upon the original ground cross sections and cross sections taken after excavation is completed.

If the nature of the excavation is such that cross sectioning is unsafe or impractical, excavation may be measured by the cubic yard, truck volume measure.

Truck volume measure must be agreed, in writing, prior to initiating the work. Truck count tickets will be serialized and delivered to the Engineer at the end of each work shift. Any truck count ticket not so delivered within twenty-four (24) hours from the subject work shift may not be considered for payment.

204.8 **Basis of Payment**

Payment shall be made under the following units:

<u>Bid Item</u>	<u>Description</u>	<u>Unit</u>
204	Excavation	Cubic Yard (or Truck Count)

SECTION 205 CLASSIFIED FILL AND BACKFILL

205.1 General

The work under this section consists of performance of all operations pertaining to the placement of classified fill and backfill.

205.2 Material

The Contractor shall furnish a sieve analysis (gradation) performed by a certified lab according to the following schedule, unless otherwise specified in the Special Provisions of the Project:

Type I	One analysis per 2000 ton, or 1000 CY
Type II	One analysis per 2000 ton, or 1000 CY
Type III	One analysis per 1000 ton, or 500 CY
Leveling Course	One analysis per 500 ton, or 250 CY

Classified fill and backfill shall contain no lumps, frozen material, organic matter or other deleterious matter. It shall have a plasticity index not greater than six (6) as determined by ASTM D-424 and shall conform to one of the following types, as required by the drawings and specifications:

a. Type I

Materials furnished by the Contractor for use as classified fill and/or backfill shall be graded within the limitation of Table I. Gravelly material shall have a coefficient of uniformity greater than four (4), and sandy material shall have a coefficient of uniformity greater than six (6). Type I material shall be non-frost susceptible.

TABLE I

<u>U.S. Std. Sieve</u>	<u>Cumulative % Passing</u>
3"	100
3/8"	56-100
#10	30-64
#40	9-34
#200	0-6

b. Type II

Materials furnished by the Contractor for use as Type II classified fill and/or backfill shall be graded within the limitations of Table II.

TABLE II

<u>U.S. Std. Sieve</u>	<u>Cumulative % Passing</u>
8"	100
3"	66-100
1/2"	32-100
#4	20-60
#10	12-50
#40	2-30
#100	0-14
#200	0-10

c. Type III

Materials furnished by the Contractor for use as Type III classified fill and/or backfill shall be crushed aggregate material with at least fifty percent (50%) of the coarse aggregate having at least one fresh mechanically fractured face and graded within the limits of Table III.

TABLE III

<u>U.S. Std. Sieve</u>	<u>Cumulative % Passing</u>
Coarse Aggregate	
2"	100
1-1/2"	90-100
1"	70-100
3/4"	60-90
3/8"	45-75
Fine Aggregate	
#4	30-60
#8	22-52
#40	8-30
#200	0-6

d. Type IV

Materials furnished by the Contractor for use as Type IV classified fill and/or backfill shall be an approved material consisting of sand or gravel with a maximum of twelve percent (12%) passing the 200 sieve.

205.3 Construction

The sub-grade shall be cleared of all debris and organic material. All depressions or holes below the general area surface level, whether caused by removal of debris or unacceptable material, or otherwise, shall be backfilled with approved material and compacted to the specified density and to a level, uniform surface before the placement of other layers.

When embankment material is to be placed and compacted on hillsides or against existing embankments with slopes greater than 4:1, the new fill shall be continuously benched into the existing embankment. Benching shall be of sufficient width to permit operations of placing and compacting equipment. Earthen material removed from the existing slope during benching operations shall not be measured as excavation. Benching is considered incidental to other pay items of work.

Whenever an existing roadway surface lies within three (3) vertical feet below the new roadway subgrade, such old surface will be scarified to a depth of six (6") inches and recompacted.

Embankment shall not be placed over frozen ground except when written permission is received.

Roadway embankment shall be placed in horizontal layers twelve (12") inches in depth (loose measurement) for the full width of the embankment, and shall be compacted as specified before the next layer is placed. Spreading equipment shall be used on each lift to obtain uniform thickness prior to compacting. Continuous leveling and manipulating will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. Compaction equipment shall be routed uniformly over the entire surface of each layer.

If continued hauling over a partially completed embankment causes loss of stability as evidenced by pumping, rutting, or other damage, the Contractor shall repair the damaged embankment at his own expense and adjust his hauling equipment and procedures so as to avoid further damage.

During grading operations, the roadbed surface shall be adequately crowned and drained at all times.

The maximum dimensions of any particle of the embankment material shall not be greater than two-thirds (2/3) of the compacted thickness of the layer in which it is placed unless specified elsewhere. Portions of any layer in which the embankment material becomes segregated shall be removed and replaced with satisfactory material or shall be added to, and remixed, to secure proper gradation as directed by the Engineer. No separate payment will be made for any material removed or regraded in areas where material becomes segregated.

The Engineer may permit lifts in excess of twelve (12") inch thickness when fill or backfill is placed over swampy or saturated ground, or where he is satisfied that the Contractor's methods and equipment will consistently produce the specified density.

205.4 **Method of Measurement**

Classified fill or backfill material obtained from borrow pits will be measured in tons (2,000 lbs./ton) of material delivered and placed in accordance with these Specifications.

Imported fill and backfill will be weighed on a scales certified by the State of Alaska. Weight tickets will be serialized and witnessed at the time of weighing by a Contractor-furnished weighman. The Engineer may at any time verify load weights and the weighing process.

Each load of fill or backfill arriving on the project must be accompanied by a weight ticket. Imported backfill that is not accompanied by a weight ticket shall not be considered for payment.

Where excavation of unsuitable material beyond the lines and grades shown on the plans is ordered in writing, the measurement of Classified backfill will include the material required for replacement. No measurement will be made for imported fill placed beyond the authorized lines and grades or for quantities placed outside the limits of the authorized excavation or embankment.

205.5 **Basis of Payment**

Payment shall be made under the following units:

<u>Bid Item</u>	<u>Description</u>	<u>Unit</u>
204	Type () Fill and Backfill	Ton

SECTION 206

LEVELING COURSE

206.1 **General**

The work under this section consists of performing all operations necessary to complete construction of the leveling course upon a prepared sub-base.

206.2 **Material**

The leveling course shall consist of crushed gravel, rock, sand, or other approved material. The aggregate shall be free from lumps, balls of clay, or other objectionable matter. The portion of the material retained on a No. 4 sieve shall be known as coarse aggregate. Both coarse and fine aggregates shall conform to the quality requirements of AASHTO M-147.

The acceptance of the leveling course gradation will be based upon samples taken by the City from the roadway. It is the Contractor’s responsibility to sample the aggregates during production in accordance with the schedule in *Section 205.2 Material*.

a. Coarse Aggregate

The coarse aggregate material conforming to the requirements specified above shall have a percentage of wear not to exceed fifty (50) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131. It shall consist of angular fragments reasonably uniform in density and quality, and reasonably free from thin and elongated pieces, dirt and other objectionable material. At least seventy percent (70%) of the coarse aggregate particles shall have one (1) or more mechanically fractured faces.

b. Fine Aggregate

The fine aggregate shall consist of material free of organic or other objectionable matter. The fine aggregate, either naturally combined with the coarse aggregate or separately obtained and mixed therewith, shall be of such character that the composite material will conform to the gradation and other requirements specified.

c. Gradation

The composite mixture of coarse aggregate and fine aggregate, processed as hereinafter specified, shall conform to the following gradation limits:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1”	100
3/4”	70-100
3/8”	50-80
No. 4	35-65
No. 8	20-50
No. 40	8-30
No. 200	0-6

206.3 Construction

The leveling course shall be placed to the lines, grades and thickness shown on the drawings and shall consist of the materials herein before specified. The leveling course shall provide a smooth, stabilized, compacted and uniformly graded surface upon which to place the asphalt pavement.

a. Preparation of Existing Roadway

Roadway preparation shall consist of scarifying, shaping, wetting, and compacting of the existing roadway to a minimum density of ninety-five percent (95%) in accordance with ASTM D-1557. Roadway surfaces shall be cleaned of all foreign substances and debris. Any ruts or soft yielding spots that may appear in the roadway surface shall be corrected by loosening, removing and adding approved material, reshaping and re-compacting the affected areas to the lines and grades shown on the plans and to the specified density requirements.

b. Placing

The approved leveling course material shall be deposited and spread in a uniform layer to the required contour and grades and to such loose depth that when compacted to the density required will achieve the specified thickness. The material shall be spread uniformly on the prepared sub-base from moving vehicles or spreading boxes, then leveled to the required contour and graded with blade graders. Portions of the layer which become segregated in spreading shall be re-mixed to the required gradation.

c. Compacting

The leveling course shall be compacted to at least ninety-five percent (95%) of maximum density in accordance with ASTM D-1557. Blading, rolling, and tamping shall continue until the surface is smooth and free from waves and inequalities. If at any time the mixture is excessively moistened by rain, it shall be aerated by means of blade graders, harrows, or other approved equipment until the moisture content is such that the surface can be re-compacted and finished as stated above. If paving is required as a part of the Contract, the finished leveling course shall be maintained by the Contractor in the above condition until the pavement is applied.

d. Smoothness Test

The surface of the leveling course, when finished, shall not show any deviation in excess of three-eighths of an inch (3/8") within ten (10) linear feet, in any direction. Any deviation in excess of this amount shall be corrected by loosening, adding, or removing material and reshaping and compacting to satisfy the above requirement.

206.4 Method of Measurement

Leveling course shall be measured by tons delivered, placed, and accepted in accordance with these specifications.

206.5 Basis of Payment

Payment shall be made under the following unit.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
206	Leveling Course	Ton

SECTION 207 TRENCH EXCAVATION AND BACKFILL

207.1 General

The work under this section consists of providing all materials and performance of all operations pertaining to items of work involved in excavation, bedding, backfill and compaction of trenches.

207.2 Description

This work shall consist of all excavation and backfill of trenches as specified for pipe installation and other miscellaneous items as specified in this Section.

a. Trench Section

Trench depth shall be as shown on the drawings, specified, and as staked in the field by Contractor. Trench width at or below the top of the pipe shall be of a width that will allow compaction equipment to be utilized at the sides of the pipe. Trenches shall be of the necessary width for proper laying of pipe or conduit and the banks shall be sloped so as to conform to the prevailing safety requirements.

207.3 Construction

a. Trench Excavation

The Contractor shall perform all excavation of every description and whatever substance encountered including rock and permafrost. Excavation will be to the extent indicated on the drawings, and as staked in the field by the Contractor. All excavated materials for backfill shall be placed at a distance from the trench section that conforms to all State and/or Federal Safety Codes.

The Contractor shall not begin excavation of the trench until all materials, equipment and personnel are present to complete the work in the most expedient manner. Not more than four hundred feet (400') of trench shall be open in advance of pipe or conduit installation unless authorization, in writing, is obtained from the Engineer. Unless otherwise indicated in the drawings and specifications, all excavations will be open cut. There shall be no more than one hundred feet (100') of open trench at the end of the work day, unless approved by the Engineer.

Where rock or permafrost is encountered, it shall be removed as shown on the drawings or as directed by the Engineer, and shall be replaced with approved material.

b. Dewatering of Trench

When it is specifically called for on the drawings and/or in the special provisions of the contract documents, the Contractor shall submit as a part of his proposal the method to be

used in the dewatering of the trench section. When dewatering is not called for specifically, it shall be considered incidental to other pay items of work.

c. Bedding

All pipe shall be placed in Class B or C bedding, as specified.

Bedding materials, for the type specified, shall conform to the requirements of *Section 211, Bedding, 211.2, Materials*, of this division.

Where Class B or C bedding material is available from trench excavation, the Contractor shall use care to separate it from unsuitable material. Class B or C bedding material shall be placed under and around the pipe in lifts not to exceed twelve inches (12") and compacted to ninety-five percent (95%) of maximum density. In no case shall bedding material be placed above the spring line of the pipe in a single lift.

Where Class B or C bedding materials are encountered in the trench bottom, the trench shall be accurately graded to provide uniform bearing and support for each section of the pipe for its entire length, except for the portion of the pipe sections where it is necessary to excavate for the bell holes and other type joints and for the proper sealing of the joints. Bell holes and depressions for joints shall be dug after the trench bottom has been graded. In order that the pipe will rest on the prepared bottom for as nearly its full length as practical, bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Where unsuitable material such as, but not limited to hard pan or rock is encountered, the trench shall be over-excavated so a minimum of six inch (6") depth of bedding material is required to bring the trench bottom up to the specified grade. This bedding material shall be compacted to ninety-five percent (95%) of maximum density prior to the installation of the pipe. If the Engineer determines that excavated material is unsuitable for bedding, he may direct the Contractor to "Furnish Bedding Material."

d. Trench Backfill

Trench backfill is defined as the placement of material above the level of bedding material. Material for backfill shall be obtained from trench excavation if the material is suitable or conforms to the specifications for backfill. If the Engineer determines that excavated material is unsuitable for trench backfill, he may direct the Contractor to "Furnish Backfill." Backfill shall be placed in lifts and compacted in such a manner that ninety percent (90%) of maximum density is obtained. No separate payment will be made for compaction to ninety (90%) of maximum density unless otherwise stated in the plans or special provisions. Backfill shall not contain broken bituminous pavement or Portland Cement Concrete, and shall be placed in accordance with *Section 205 Classified Fill and Backfill*.

Trench backfill construction in traffic ways shall conform to *Section 210, Foundation Material*.

e. Cleanup

This item consists of cleanup and finishing of all construction areas to their original condition or better.

207.4 Method of Measurement

Trench excavation and compaction will be considered incidental to *Divisions 500 and 600* of these specifications. Imported trench backfill shall be paid at the Contract price for the foundation material, or by letter of agreement.

207.5 Basis of Payment

None

SECTION 208 COMPACTION CONTROL BY THE CONTRACTOR

208.1 General

The Contractor shall provide field compaction testing for quality control based upon the following schedule or as specified in the Special Provisions.

One compaction test per 400 lineal feet per lift of classified fill

The generation of the maximum density curves and the field density testing shall be certified by an Engineer registered in the State of Alaska. The Contractor shall space the testing uniformly throughout the project earthwork. Copies of all proctor curves and field density test results shall be made available immediately to the City’s representative.

If a field density test does not meet the contract compaction requirements, the Contractor shall initiate additional compaction efforts. Additional lifts of earthwork shall not be placed over a zone that has failed a field density test, until a passing test has been achieved. All re-testing of failed areas shall be performed by the Contractor at no additional cost to the City.

The Owner reserves the right to perform independent, field density testing to confirm the results of the Contractor’s quality control program.

208.2 Compaction Standards

Maximum density shall be based upon ASTM D-1557, Modified Proctor Density.

208.3 Method of Measurement

No measurement will be made for this item of work.

208.4 Basis of Payment

Payment will be made under the following unless not included in the Bid Schedule. If not included in the Bid Schedule, this item will be considered incidental:

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
208	Compaction Control by the Contractor	Lump Sum

SECTION 210 FOUNDATION MATERIAL

210.1 General

This work shall consist of furnishing, placing, and compacting imported foundation material in areas of sub-excavation, in utility trenches, and in other areas as directed.

210.2 Materials

Foundation material shall meet the requirements of Type II classified fill as described in *Section 205 Classified Fill and Backfill (2.b.)*.

210.3 Construction

Foundation material shall be placed in lifts not to exceed twelve inches (12”) and compacted to ninety percent (95%) of maximum density.

210.4 Method of Measurement

Foundation material shall be paid at the contract unit price per ton delivered, placed, shaped, and compacted. Each truck load delivered to the project must be accompanied by a delivery ticket.

210.5 Basis of Payment

Payment for this item shall be made under:

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
210	Foundation Material	Ton

SECTION 211 FURNISH BEDDING MATERIAL

211.1 General

The Work under this Section consists of performance of all operations pertaining to providing Class B and C bedding material for underground utilities.

211.2 Materials

a. Class "B" Bedding

Material for Class "B" Bedding shall conform to the specifications for Type I backfill in *Section 205.2a, Classified Fill and Backfill*, of this division, and in addition shall contain material no larger than three-fourths inch (3/4").

b. Class "C" Bedding

Material for Class "C" Bedding shall conform to the specifications for Type II backfill in *Section 205.2b, Classified Fill and Backfill*, of this division, with one hundred percent (100%) of the material passing the two inch (2") sieve.

211.3 Construction

Placement of Class B or C bedding shall conform to the requirements of *Section 207, Trench Excavation and Backfill, 207.3 Construction, C. Bedding*, of this division.

211.4 Method of Measurement

Measurement of Class B and Class C bedding shall not be made but shall be considered incidental to the utility to be constructed.

211.5 Basis of Payment

Payment shall be made under the following units:

None

SECTION 214 MECHANICAL COMPACTION

214.1 General

The work under this section consists of the performance of all operations pertaining to mechanically compacting backfill to the specified density.

214.2 Construction

Backfill under traffic ways and building structures shall be compacted to ninety-five percent (95%) of Modified Proctor maximum density, unless otherwise noted and approved by the Engineer. Trench backfill shall be compacted to ninety percent (90%) of modified Proctor maximum density from a point six (6) inches above the top of pipe to the bottom of the roadway or building template.

The backfill material shall be placed in horizontal lifts not exceeding twelve inches (12") in thickness and compacted. Any excavations improperly filled shall be reopened to the depth required for proper compaction, then refilled and compacted at the Contractor's expense. The use of water, in excess of the quantity required to obtain specified density with optimum moisture content, to settle or compact the backfill, will not be permitted.

214.3 Method of Measurement

Mechanical compaction shall be considered incidental to all divisions of these specifications.

214.4 Basis of Payment

None

SECTION 215 PIPE CASING AND BORING

215.1 General

The work under this section consists of performing all operations necessary for furnishing and placing a casing by jacking and/or boring under a roadway.

215.2 Materials

Materials shall be as required by the contract documents.

215.3 Construction

The method of boring or jacking a casing shall be optional to the Contractor, except that prior to commencing jacking or boring operations, the Contractor will be required to furnish evidence to the Engineer showing that his planned method of jacking and boring has worked satisfactorily in other areas under similar conditions. The excavation at both ends of the boring shall be included under the Pipe Casing and Boring Pay Unit.

The pipe within the casing shall be arrested from movement by sand filling or wood slats and banding according to the Standard Detail of these specifications.

The Contractor is responsible for repairing any damage to the roadway or structural fill being penetrated by the casing.

All boring pits shall be adequately signed and barricaded to protect the public from entering the pit.

215.4 Method of Measurement

Measurement shall be from end to end of the casing accepted and completed. No measurement will be made for trench excavation and backfill where casing is installed. No compensation will be made for casing installation abandoned or aborted due to deviations in excess of allowable tolerances.

Payment shall include compensation for all boring pit excavations and backfill and for the repair of any damage done to areas surrounding the boring operations.

215.5 Basis of Payment

Payment shall be made under the following unit:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
215	Pipe Casing and Boring	Linear Foot

SECTION 219 REMOVAL OF EXISTING PAVEMENT

219.1 General

The work under this section consists of performance of all operations pertaining to the removal and disposal of asphaltic pavement in accordance with the limits indicated on the drawings and as directed by the Engineer.

The Contractor will remove existing pavement (parking areas, driveways, etc.), within the right-of-way to a line one foot (1') back of the proposed improvements during the initial clearing/excavation operations. Further removal will be as directed by the Engineer in order to provide a proper transition between new and existing pavement. The intent is to minimize unnecessary removal of pavement.

219.2 Construction

Pavement shall be removed by the Contractor in a manner that will produce a straight, uniform edge along the section removed. The method of producing the straight edge shall be by cutting the section with an air chisel, or other methods approved by the Engineer. The Contractor shall dispose of the removed pavement at a Contractor provided storage area.

219.3 Method of Measurement

Pavement removed will be measured by the square yard of pavement designated for removal.

219.4 Basis of Payment

Payment shall be made under the following unit:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
219	Remove Existing Pavement	Square Yard

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