JOINT BASE ELMENDORF-RICHARDSON
STANDARD CONSTRUCTION SPECIFICATIONS
AND DETAILS

DIVISION 20
EARTHWORK

2016

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JBER STANDARD CONSTRUCTION SPECIFICATIONS AND DETAILS

DIVISION 20 - EARTHWORK

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DIVISION 20 - EARTHWORK

SECTION 20.01 - GENERAL

Article 20.01.1 - Scope, Applicability, and Content of Specifications

The Work covered by these Specifications consists of providing all labor, supervision, equipment, supplies, material, transportation, handling and storage, and performing all operations necessary for storm water pollution prevention, concrete and asphalt demolition, earthwork, and restoration as necessary to complete new construction, modification, and/or repair of water distribution and wastewater collection facilities operated by Doyon Utilities LLC on Joint Base Elmendorf Richardson, hereafter referred to as JBER.

All Division 20 materials and construction shall be in accordance with the Plans, Special Provisions, Standard Details, and all applicable JBER Specifications. In the event of differences between the requirements contained in these various documents and specifications, the most stringent requirements, as determined by Doyon Utilities' Authorized Representative, shall govern.

Much of the content of this JBER Division 20 is taken from the 2009 Municipality of Anchorage Standard Specifications (MASS), but this JBER Division 20 also includes requirements not found in the 2009 MASS.

Article 20.01.2 - Safety

The Contractor is solely responsible for all construction-related safety and safety compliance, including, but not limited to: worker and jobsite safety; safety of Doyon Utilities employees and agents; safety of other JBER personnel and property; safety of the general public; safety of military operations; safety of wildlife and the environment; and, safety of the water distribution system, the wastewater collection system, and other utility safety.

Article 20.01.3 - Applicable Standards

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

AASHTO M147 ... Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses
AASHTO T85..... Test for Specific Gravity and Absorption of Coarse Aggregate
AASHTO T88..... Test for Particle Size Analysis of Soils
AASHTO T180-D Test for Moisture-Density Relations of Soils
AASHTO T205.... Test for Field Determination of Density of Soil In-Place
AASHTO T238.... Test for Density of Soil In-Place by Nuclear Method
ASTM C29 ..... Test for Unit Weight of Aggregate
ASTM C117 ..... Test for Materials Finer than No. 200 Sieve in Aggregates by Washing
ASTM C131 ..... Test for Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
ASTM C136 ..... Test for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C272 ..... Test for Water Absorption of Core Materials for Structural Sandwich Constructions

ASTM C518 ..... Test for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C578 ..... Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM D422 ..... Test for Particle Size Analysis of Soil
ASTM D424 ..... Test for Plastic Limit and Plasticity Index of Soils
ASTM D1621 ..... Test for Compressive Properties of Rigid Cellular Plastics
ASTM D4355 ..... Test for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
ASTM D4491 ..... Test for Water Permeability of Geotextiles by Permittivity
ASTM D4533 ..... Test for Trapezoid Tearing Strength of Geotextiles
ASTM D4632 ..... Test for Grab Breaking Load and Elongation of Geotextiles
ASTM D4751 ..... Test for Determining Apparent Opening Size of a Geotextile
ASTM D4759 ..... Standard Practice for Determining the Specification Conformance of Geosynthetics
ASTM D4873 ..... Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples
ASTM D6241 ..... Test for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe
AWS D1.1 ..... Structural Welding Code - Steel

Article 20.01.4 - Equipment

All equipment and tools used in the work covered by these Specifications shall comply with all applicable safety requirements, shall be adequately maintained, and shall be the proper equipment and tools to produce the results required by the Plans, Standard Details, Special Provisions, and these Specifications, all to the satisfaction of Doyon Utilities' Authorized Representative.

Article 20.01.5 - Compaction Standards

The required density of all pipe bedding, trench backfill, fill, and leveling course shall be 95% of maximum density. The maximum density shall be determined in accordance with the current requirements of AASHTO Standard Method T180-D.

The diameter of the test mold in AASHTO Standard Method T180-D limits the size of particles which may be included in the test to that passing the 3/4 inch sieve. In those instances where the particles are retained on the 3/4 inch sieve, a correction must be applied to the standard laboratory density prior to calculating the percent compaction. To expedite results, the plus 3/4 inch material may be sieved wet and the weight computed as a percent of the total weight of the material from the sample. The corrected laboratory density shall be computed in each instance by the formula:

$$\text{Corrected Lab Density} = 62.4 / [(A/C) + ((62.4 \times B) / (r \times D))]$$

Where:

A = % by weight of original material retained on 3/4" sieve, expressed as a decimal
B = % by weight of original material passing the ¾" sieve, expressed as a decimal
C = Specific Gravity of 3/4" and larger material (apparent specific gravity as determined by AASHTO T85)
D = Uncorrected laboratory density (material passing the ¾ inch sieve)
r = Coefficient with value depending A, as follows: for $A \leq 0.185$, $r = 1.00$; for $A > 0.185$, $r = 1.037 - (0.2 \times A)$

Article 20.01.6 - Subsurface Investigation

Information pertaining to subsurface exploration, borings, test pit locations, and other preliminary investigation may appear in the Request for Proposal or Bidding Documents or be available at selected locations for review by Bidders. This information was acquired for design purposes only and is not considered adequate for construction.

The soils classifications and geotechnical designations recorded are informational only and represent only those subsurface conditions on the particular date, at the specific location, as indicated on each soils log and on the Plans. Any ground water levels indicated on the test hole logs and/or shown on the Plans were recorded at the time the test holes were performed. These water levels may vary seasonally and are shown for design and informational purposes only. Bidders shall assume responsibility for any conclusions that may be drawn from such information and the conclusions shall not be considered just cause for a claim for additional compensation or contract time extension. Bidders should obtain and analyze such additional information as the Bidders may feel necessary and shall be responsible for any conclusions drawn from that information.

Neither JBER nor Doyon Utilities LLC warrants the correctness of the soils investigation or of any interpretation, deduction, or conclusion given in the report relative to subsurface conditions. Bidders shall make their 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.

Article 20.01.7 - Weather Limitations

Bedding, backfill, structural fill, and leveling course shall not be placed when the atmospheric temperature is below +40° Fahrenheit. When the temperature falls below +40° Fahrenheit, the Contractor shall be responsible to protect all areas of completed work against any detrimental effects. Any areas of work that are, in the opinion of Doyon Utilities' Authorized Representative, inadequately installed or damaged because of or by weather conditions, shall be reconditioned, reshaped, and/or re-compacted by the Contractor in conformance with the requirements of these Specifications at Contractor expense.

Article 20.01.8 - Contaminated Material

Unless otherwise noted in the Contract Documents, neither JBER nor Doyon Utilities LLC is aware of any contaminated material within the project limits. If such material is encountered, the Contractor shall notify Doyon Utilities' Authorized Representative immediately for direction. Unless the contamination was caused by Contractor's operations, discovery of contaminated material will be treated as a changed condition.

Article 20.01.9 - JBER Access Privileges for Contractor Personnel

The Contractor shall provide Doyon Utilities LLC with a list of personnel, including Subcontractor personnel, requiring regular access to JBER, as well as .required personnel identification documents as required by JBER military base security personnel, all at least 7 calendar days prior to the date that access is required. JBER access privileges for Contractor personnel are contingent on passing of background checks to the satisfaction of JBER military base security personnel.

JBER access privileges for Contractor and Subcontractor personnel are revocable at the discretion of JBER military base security personnel.

Denial or revocation of JBER access privileges by JBER military base security personnel for Contractor or Subcontractor personnel shall not be grounds for extra Contractor or Subcontractor compensation.

Article 20.01.10 - Inspection, Notices, and Official Communications

All work activities covered under this section, including but not limited to traffic maintenance, storm water pollution prevention, construction, welding, and punch list work, are subject to inspection and acceptance by Doyon Utilities LLC. Work completed without inspection by Doyon Utilities' Authorized Representative shall be subject to rejection.

The Contractor shall schedule welding, punch list work, and similar activities to occur on non-holiday weekdays during normal working hours of 7:30 AM to 4:00 PM to facilitate inspection by Doyon Utilities' Authorized Representative.

Written notice of traffic lane closures shall be provided to Doyon Utilities LLC, the JBER Fire Department, and the JBER Police Department by the Contractor at least 14 calendar days in advance.

Written notice of traffic maintenance (excluding lane closure work), storm water pollution prevention, construction, demolition, welding, punch list work, and similar activities requiring inspection shall be provided to Doyon Utilities LLC by the Contractor at least 5 calendar days prior to beginning any of these operations.

The Contractor shall notify Doyon Utilities' Authorized Representative again in person or by e-mail one calendar day before starting any of the work listed above.

Failure by the Contractor to provide the required notice(s) shall be grounds for issuance of a stop-work order and/or complete rejection of the work.

To be considered official and binding, all communication from and to Doyon Utilities LLC shall be in writing.

Article 20.01.11 - Utility Locations and Dig Clearance Permit Requirements

The Contractor shall place a telephone, fax, or on-line locate request with Alaska Digline Inc. (Anchorage telephone - 278-3121 or 811, statewide telephone - 1-800-478-3121, statewide fax – 1-907-278-0696, on-line – http://www.akonecall.com/). Documentation of the Alaska Digline request shall be provided to Doyon Utilities' Authorized Representative. The Contractor shall coordinate with utility companies' locator personnel to locate all existing utilities before digging.

In addition to obtaining utility locations through Alaska Digline Inc., the Contractor shall obtain a Dig Clearance Permit from JBER CES (673 ABW Form 3 – BCE Work Clearance Request), and provide a copy of the fully executed Dig Clearance Permit to Doyon Utilities' Authorized Representative. A minimum of 14 calendar days shall be allowed by the Contractor for complete processing of an Dig Clearance Permit. The Contractor shall comply with all requirements of the fully executed Dig Clearance Permit.

Article 20.01.12 - Hot Work Permit Requirements

For any activity producing open flames, or heat or sparks sufficient to cause combustion, the Contractor obtain a hot work permit signed by the JBER Fire Department, and provide a copy of the fully executed hot work permit to Doyon Utilities' Authorized Representative. A minimum of 14 calendar days shall be allowed by the Contractor for complete processing of a hot work permit. The Contractor shall comply with all requirements of the fully executed hot work permit.

Article 20.01.13 - Fire Hydrant Use Permit Requirements

Prior to use of any JBER fire hydrant for any reason other than emergency usage, the Contractor shall obtain a fire hydrant use permit from Doyon Utilities. Issuance of fire hydrant use permits is at the discretion of Doyon Utilities. A minimum of 3 working days shall be allowed by the Contractor for complete processing of a fire hydrant use permit. The Contractor shall comply with all requirements of the fully executed fire hydrant use permit.

Article 20.01.14 - Submittals

The Contractor shall provide paper submittals or electronic submittals, at the option of Doyon Utilities' Authorized Representative, for review and acceptance by Doyon Utilities. Duplicate paper submittals shall be supplied in the quantities requested by Doyon Utilities' Authorized Representative. Submittals shall clearly document compliance with Contract requirements, as well as any deviations from Contract requirements, all to the satisfaction of Doyon Utilities' Authorized Representative. Any materials ordered and/or work done in advance of written acceptance of submittals by Doyon Utilities' Authorized Representative is subject to rejection.

Submittals for Doyon Utilities review and acceptance are required for the following items:

1. Documentation of Alaska Digline utility locate requests.
2. Fully executed Dig Clearance Permit(s).
3. Fully executed hot work permit(s).
4. Submittals for all permanent materials.
5. Storm Water Pollution Prevention Plan (SWPPP) or SWPPP Work Plan.
6. SWPPP Notice of Intent (NOI).
7. SWPPP weekly or monthly inspection reports.
8. SWPPP Notice of Termination (NOT).
9. Work Site Traffic Supervisor certification and resume.
10. Traffic Control Plans.
11. Casing pipe installation plan.
12. Alaska Railroad Corporation (ARRC) Excavation Plan (if required) and documentation of ARRC acceptance of the Plan.
13. Casing pipe butt joint and vent piping field welding procedures.
14. Casing pipe butt joint and vent piping welder qualifications.
15. Red-lined drawings.

Permanent material submittals shall be provided to Doyon Utilities' Authorized Representative at least 30 calendar days prior to ordering of materials. Except for the NOI, NOT, SWPPP inspection reports, and redlined drawings, other submittals listed above shall be provided to Doyon Utilities' Authorized Representative at least 14 calendar days prior to the activity covered by the submittal. The NOI and NOT shall be provided to Doyon Utilities' Authorized Representative immediately after submittal to the Alaska Department of Environmental Conservation. SWPPP weekly or monthly inspection reports shall be provided to Doyon Utilities' Authorized Representative within 3 calendar days of the required inspection date. Completed red-lined drawings shall be submitted to Doyon Utilities' Authorized Representative within 14 calendar days of substantial completion.

Doyon Utilities' Authorized Representative reserves the right to request additional submittals for other Contractor procedures and personnel qualifications.

Article 20.01.15 - Permanent Materials Furnished by Doyon Utilities and by Contractor

Doyon Utilities may furnish some permanent materials on some projects. When Doyon Utilities does furnish permanent materials, a list of these Doyon Utilities'-provided permanent materials, and locations where these Doyon Utilities'-provided materials shall be received by the Contractor, will be provided in the Contract Documents. The Contractor shall perform a complete take-off of all permanent materials required for the Project. The Contractor shall furnish any and all permanent materials not supplied by Doyon Utilities, in order to complete the Project in accordance with the Plans, Standard Details, Special Provisions, and these Specifications.

The Contractor shall be responsible for receiving, inspecting, and inventorying Doyon Utilities'-provided materials at locations specified in the Contract Documents, notifying Doyon Utilities Authorized Representative of damage, shortages, etc., loading as required, delivery to the jobsite, and unloading at the jobsite. Materials damaged during Contractor-provided loading, delivery to the jobsite, and/or unloading at the jobsite shall be replaced at Contractor expense.

Any surplus Doyon Utilities'-provided materials not used on a project shall remain the property of Doyon Utilities, and shall be delivered by the Contractor to the Doyon Utilities storage yard and carefully off-loaded and stored on Contractor-provided wooden pallets or other suitable dunnage.

Article 20.01.16 - Other Division Requirements

Except as specifically stated otherwise in the various Sections of this Division 20, the following other Divisions and Sections of these Standard Specifications are incorporated by reference into all Sections of Division 20:

A. Wastewater Collection Facility Construction

The Contractor shall construct wastewater collection facilities in accordance with applicable sections of Division 50 - Wastewater Collection Systems.

B. Water Distribution Facility Construction

The Contractor shall construct water distribution facilities in accordance with applicable sections of Division 60 - Water Distribution Systems.

C. Surface Restoration

Unless shown otherwise on the Plans and/or Standard Details, specified otherwise in the Special Provisions, or directed otherwise by Doyon Utilities' Authorized Representative, the Contractor shall provide the following materials as required for surface restoration:

1. For restoration of concrete pavement, sidewalks, curb and gutter, etc. – Class AA-3 Portland cement concrete in accordance with Division 30 - Portland Cement Concrete, with concrete dimensions to match existing.

2. For restoration of asphalt pavement - Class E asphalt pavement, 2 inches minimum compacted thickness, in accordance with Division 40 - Asphalt Surfacing, over a 2 inches minimum compacted base of leveling course in accordance with this Division 20.

3. For restoration of gravel-surfaced roads, road shoulders, parking lots, etc. Leveling course gravel surfacing, 2 inches minimum compacted thickness, in accordance with this Division 20.

4. For restoration of vegetated surfaces or bare dirt surfaces not scheduled for other surface restoration - 4 inches minimum rolled thickness of topsoil and hydro-seeding with Schedule A seeding mix (for mowed areas) or Schedule D seeding mix (for unmowed areas) in accordance with Division 75 - Seeding, Landscaping, and Revegetation.

D. Construction Surveying and Red-Lined Drawings

The Contractor shall provide construction surveying and maintain red-lined drawings in accordance with Division 65 - JBER Construction Surveys. The red-lined drawings shall be up-dated weekly by the Contractor to the satisfaction of Doyon Utilities' Authorized Representative. Completed red-lined drawings shall be submitted within 14 calendar days of substantial completion, for review and acceptance by Doyon Utilities' Authorized Representative.

E. Traffic Maintenance

The Contractor is solely responsible to provide all traffic maintenance for vehicular, non-motorized, and pedestrian traffic. All traffic maintenance shall be in accordance with the Division 70 - Miscellaneous Construction, and the Manual of Uniform Traffic Control Devices, latest edition adopted by State of Alaska, and current State amendments. For any operations involving disruption of normal traffic flow, the Contractor shall provide Traffic Control Plans for review and acceptance by Doyon Utilities' Authorized Representative. Traffic Control Plans shall be provided at least 14 calendar days prior to beginning any operations involving disruption of normal traffic flow. Acceptance of Traffic Control Plans by Doyon Utilities' Authorized Representative is required prior to any operations involving disruption of normal traffic flow.

Article 20.01.17 - Site Housekeeping and Clean-Up

Littering is strictly prohibited.

The Contractor shall clean up all construction debris as soon as possible after it is generated and store it properly in suitable containers, all to the satisfaction of Doyon Utilities' Authorized Representative. Trash shall be disposed of weekly or more often if directed by Doyon Utilities' Authorized Representative.

The entire project site shall be cleaned up of all debris and litter at the end of the project and all debris and litter shall be properly disposed of, all to the satisfaction of Doyon Utilities' Authorized Representative.

SECTION 20.02 - STORM WATER POLLUTION PREVENTION

Article 20.02.1 - General

Work described in this Section includes providing all labor, equipment, materials, and services to:

A. Prepare and submit a full Storm Water Pollution Prevention Plan (SWPPP) for projects with total ground disturbance areas of one acre or larger, or a SWPPP Work Plan for projects with total ground disturbance areas of less than one acre, to Doyon Utilities Environmental Division. SWPPP or SWPPP Work Plan revisions shall be prepared and resubmitted as necessary based on review comments from Doyon Utilities. Full SWPPPs for projects with total ground disturbance areas larger than five acres, incorporating Doyon Utilities review comments, shall be submitted to the Alaska Department of Environmental Conservation (ADEC) for review and acceptance.

B. Prepare and submit a Notice of Intent (NOI) to ADEC and Doyon Utilities Environmental Division for projects with total ground disturbance areas of one acre or larger.

C. Install and maintain erosion, sediment control, and good house-keeping Best Management Practices (BMPs) to eliminate or minimize adverse impacts on all receiving surface waters and groundwater.

D. Provide weekly and monthly inspections and inspection reports on BMPs and SWPPP or SWPPP Work Plan compliance.

E. After Final Stabilization is achieved, prepare and submit a Notice of Termination (NOT) to ADEC and Doyon Utilities Environmental Division for projects with total ground disturbance areas of one acre or larger.

F. After Final Stabilization is achieved, remove erosion and sediment control BMPs.

G. When the project is complete, remove good housekeeping BMPs.

All storm water pollution prevention and related activities shall be completed in accordance with the Alaska Construction General Permit (AGCP) and all applicable State and Federal laws and regulations. The AGCP and other information on SWPPP and SWPPP Work Plan requirements are found at the following website:

http://www.dec.state.ak.us/water/wnpspc/stormwater/index.htm.

For a project with a total ground disturbance area of less than one acre, but which is part of a larger project, a full SWPPP, NOI, and NOT shall be required.

Total ground disturbance area for a project includes the primary construction site(s) and also includes, but is not limited to, any other associated sites that are not covered by another SWPPP, such as material borrow areas, material disposal areas, batch plant sites, material storage sites, and/or equipment storage sites. The total ground disturbance area for a project shall be calculated by the Contractor to the satisfaction of Doyon Utilities' Authorized Representative.

Regardless of total ground disturbance area of a project, and regardless of whether the Contractor provides a full SWPPP or a SWPPP Work Plan for the project, the Contractor is responsible to prevent erosion, sedimentation, and/or pollution of all receiving surface waters or groundwater.

Refer to Section 20.01 – General for additional general requirements.

Article 20.02.2 - Full Storm Water Pollution Prevention Plan (SWPPP), Notice of Intent (NOI), and Notice of Termination (NOT)

A. Contractor's SWPPP Preparer

The Contractor's SWPPP shall be prepared by an individual meeting the requirements of the ACGP. As a minimum, the SWPPP preparer shall have a current certification as a Certified Erosion and Sediment Control Lead (CESCL), or as a Certified Professional in Erosion and Sediment Control (CPESC), and shall have at least two years experience in erosion and sediment control. The SWPPP preparer(s) shall be acceptable to Doyon Utilities' Authorized Representative.

B. Full SWPPP Contents

The Contractor's initial full SWPPP submittal to Doyon Utilities' Authorized Representative shall include the following items:

1. A title page.
2. The Contractor's SWPPP field personnel contact information.
3. A brief description of the purpose of the completed construction project.
4. A description of the construction site, as well as separate material borrow sites, disposal sites, equipment and construction material storage sites, project-specific concrete and/or asphalt plants, and/or similar sites that are impacted by the Contractor's project but are not covered under another SWPPP, including a general location map, a detailed site map, and a statement of the total acreage of ground disturbance for the main construction site and all associated sites that are not covered under another SWPPP.
5. A description of construction activities, including schedules for and descriptions of ground disturbing activities, temporary stabilization activities, and final stabilization activities for the main construction site and all associated sites that are not covered under another SWPPP.
6. A description of all non-storm discharges for the main construction site and all associated sites that are not covered under another SWPPP.
7. A description of erosion and sedimentation control Best Management Practices (BMPs) for the main construction site and all associated sites that are not covered under another SWPPP.
8. Descriptions of good housekeeping BMPs for control of construction-related non-storm discharges, handling and storage of construction materials, proper fueling and lubrication practices for construction vehicles and equipment, management of construction waste, washout of construction equipment, and spill prevention and response for the main construction site and all associated sites that are not covered under another SWPPP.
9. Documentation of AGCP eligibility of the main construction site and all associated sites with regard to the Endangered Species Act.
10. Documentation of AGCP eligibility of the main construction site and all associated sites with regard to total maximum daily pollutant loads (TMDLs) with regard to receiving waters for storm and non-storm runoff from the project.

11. A description of SWPPP inspection and maintenance procedures, including sample weekly and monthly SWPPP inspection reports.

12. A Hazardous Materials Control Plan (HMCP); see description of contents below.

13. If required; a Spill Prevention, Control, and Countermeasure (SPCC) Plan. See below for specific requirements as to when a SPCC Plan is required.

14. Other information as required to comply with the ACGP.

15. A copy of the AGCP.

16. Contractor certification of the SWPPP.

C. Hazardous Materials Control Plan (HMCP) Contents

The Contractor shall prepare the HMCP for prevention of pollution from storage, use, containment, cleanup, and disposal of hazardous materials, including but not limited to chemical substances used in Project construction, fuels, lubricants, and coolants. The Contractor shall append the HMCP to the SWPPP. The Contractor's initial full HMCP submittal to Doyon Utilities' Authorized Representative shall include the following items:

1. Designation of the Contractor's Spill Response Field Representative, Subcontractors' Spill Response Field Representatives, and twenty-four hour contact information for all Spill Response Field Representatives.

2. Listing of all hazardous materials (including materials or substances listed in 40 CFR 117 and 302, and petroleum products) to be used or stored on the Project, including names of hazardous materials, estimated quantities on the Project, and locations of Project storage and usage.

3. Identification of the locations where fueling and equipment maintenance activities will take place, descriptions of these activities, and descriptions of controls to prevent the accidental spillage of fuels, lubricants, coolants, and related hazardous materials.

4. Description of methods of disposing of waste lubricants, coolants, and other hazardous materials generated on the Project by routine construction and maintenance activities, including waste collection and transport methods, final waste disposal sites, and assurance that final disposal sites are permitted for hazardous material disposal.

5. Description of procedures for containment, cleanup, and disposal of hazardous materials, soil, water, spill clean-up materials, and other substances contaminated by hazardous materials spills.

6. Procedures for responding to previously unknown hazardous material contamination encountered during construction.

7. Listing of the types and quantities of response equipment and cleanup materials available on the Project, including lists and location maps of cleanup materials at each different work site (including construction sites, materials sources, material processing sites, disposal sites, staging areas, etc) and readily available off site.

8. Description of methods of compliance with AS 46.04.010-900, Oil and Hazardous Substances Pollution Control, and 18 AAC 75, Oil and Other Hazardous Substances Pollution Control, including contact information for reporting

hazardous materials and petroleum product spills to Doyon Utilities and federal, state and local agencies.

9. Material Safety Data Sheets (MSDS) for all hazardous materials proposed for use on the Project.

D. Requirements for Preparation of a Spill Prevention, Control, and Countermeasure (SPCC) Plan

The Contractor shall prepare and implement a SPCC Plan when required by 40 CFR 112 and when both of the following conditions will be present on the Project:

1. Oil or petroleum products from a spill may reach navigable waters (as defined in 40 CFR 112).

2. Total above ground storage capacity for oil and petroleum products is greater than 1,320 gallons (not including onboard tanks for fuel or hydraulic fluid used primarily to power the movement of a motor vehicle or ancillary onboard oil-filled operational equipment, and not including containers with a storage capacity of less than 55 gallons).

E. Initial SWPPP Submittal and Review

The Contractor shall submit the initial SWPPP for review by Doyon Utilities. The Contractor shall revise the SWPPP as requested by Doyon Utilities. Revisions to the Contractor's SWPPP Work Plan shall be provided within 7 calendar days of request by Doyon Utilities.

For projects where the total area of ground disturbance exceeds five acres, the Contractor shall submit the Doyon Utilities accepted SWPPP to Alaska Department of Environmental Conservation (ADEC) for review and comment. The Contractor shall revise the SWPPP as requested by ADEC, and provide a copy of the revised SWPPP to Doyon Utilities' Authorized Representative.

Regardless of Doyon Utilities or ADEC acceptance of the SWPPP, the Contractor is solely responsible for compliance with the ACGP and other applicable laws and regulations, and for payment of any fines or penalties for violation of the ACGP and/or other applicable State and Federal laws and regulations.

F. Notice of Intent (NOI)

Promptly after the SWPPP has been reviewed and accepted by Doyon Utilities' and, if required, reviewed and accepted by ADEC, the Contractor shall file a Notice of Intent (NOI) with the ADEC on the required form, shall pay any required filing fees, and shall wait for any mandatory waiting period required by ADEC to expire prior to beginning ground disturbing activities.

A copy of the ADEC-accepted NOI shall be provided to Doyon Utilities.

G. SWPPP Updates

As the project progresses, the SWPPP shall be updated by the Contractor to include the following:

1. The ADEC-accepted NOI.

2. SWPPP inspection and maintenance records.

3. SWPPP revisions necessary to comply with any previously unanticipated changes to the project. Any revisions to the SWPPP shall be to the satisfaction of Doyon Utilities. A copy of SWPPP revisions shall be provided to Doyon Utilities.

The Contractor shall maintain an up-to-date copy of the Doyon Utilities accepted SWPPP, including the NOI, inspection and maintenance records, and revisions, available on site at all times for review by Doyon Utilities' Authorized Representative, JBER personnel, regulatory agency personnel, and the general public.

H. Notice of Termination (NOT)

When the project is complete and when Doyon Utilities' Authorized Representative has notified the Contractor in writing that Final Stabilization has been accomplished, the Contractor shall file a Notice of Termination (NOT) with ADEC on the required form. When the NOT has been received and posted by ADEC, and any mandatory waiting period required by ADEC has expired, the Contractor shall provide a copy of the NOT to Doyon Utilities.

Article 20.02.3 - SWPPP Work Plan

A. Contractor's SWPPP Work Plan Preparer

The Contractor's SWPPP Work Plan shall be prepared by an individual meeting the same requirements as for a full SWPPP. See Article 20.02, paragraph A above.

B. SWPPP Work Plan Contents

The Contractor's SWPPP Work Plan submittal to Doyon Utilities' Authorized Representative shall include Items 1 through 8, 11 through 14, and 16 as defined in Article 20.02, paragraph B above.

C. SWPPP Work Plan Review and Revision

The Contractor's SWPPP Work Plan shall be submitted to Doyon Utilities for review and acceptance. Revisions to the Contractor's SWPPP Work Plan shall be provided within 7 calendar days of request by Doyon Utilities.

Article 20.02.4 - Material

A. General

The Contractor shall accomplish erosion, sediment control, and good house-keeping BMPs utilizing materials in conformance with the ACGP and the Doyon Utilities - accepted SWPPP or SWPPP Work Plan.

B. Silt Fence

Silt fence filtration fabric shall meet the requirements of AASHTO M288, shall have a minimum width of 3 feet, and shall be "Propex Geotex 2130" or Doyon Utilities' Authorized Representative accepted equal. Specific requirements are as specified below:

Property	Test Method	Value
Grab Tensile Strength	ASTM D4632	124 LB x 124 LB Minimum
Puncture Strength	ASTM D4833	65 LB Minimum
Mullen Burst Strength	ASTM D3786	300 LB Minimum
Trapezoidal Tear Strength	ASTM D4533	65 LB Minimum
Permittivity	ASTM D4491	0.10 sec^{-1} Maximum
UV Resistance	ASTM D4355	80% Minimum

Poultry fence material for silt fence support shall galvanized 20-gauge fencing with 2-inch mesh and shall have a minimum width of 2-feet.

Support posts shall be 1.5 inch square structurally sound wood, metal, or Doyon Utilities' Authorized Representative accepted synthetic material, and shall have a minimum length of 4 feet.

C. Coir Fiber Roll

Coir (coconut) fiber rolls shall consist of long rolls of the specified diameter of coconut fiber encased in coconut fiber netting. Coir fiber roll diameters shall be as shown on the Plans, specified in the Special Provisions, or directed by Doyon Utilities' Authorized Representative.

Fiber shall be 100% mattress grade coconut fiber, 6-pounds per cubic foot. Netting shall be 100% coconut (coir) 2 inch mesh. Yarn tensile strength shall be 55 pounds dry and 40 pounds wet. Coir fiber rolls shall be "BonTerra BioLogs" or an approved equal.

D. Erosion Control Blankets

Erosion control blankets shall be required in disturbed areas of highly erosive soils, critical slope areas, channels where storm and/or other flows are concentrated, slopes directly adjacent to bodies of surface water, and other areas where control of erosion is critical, and that can be expected to require protection from the time of initial ground disturbance through Final Stabilization.

Erosion control blankets shall be selected to meet requirements for the specific application, taking in to account the following factors:

1. Erosion potential of soils.
2. Steepness of slopes to be protected.
3. Steepness and flow rates in channels to be protected.
4. Proximity of slopes to bodies of water.
5. Duration of protection required.
6. Other site-specific erosion control factors.

Erosion control blankets and appurtenances shall be "North American Green" or Doyon Utilities' Authorized Representative accepted equal. Specific erosion control blankets shall be appropriately provided to meet the required site conditions to the satisfaction of Doyon Utilities' Authorized Representative.

Article 20.02.5 - Construction

A. Signage

Prior to beginning ground disturbing activities, the Contractor shall also post a sign or other notice with SWPPP-related information at a main entrance(s) to the construction site, or other location in compliance with the ACGP and acceptable to Doyon Utilities' Authorized Representative. The sign or other notice shall include a copy of the NOI submitted to ADEC, if required, and the Contractor's SWPPP or SWPPP Work Plan personnel contact information.

B. Best Management Practices (BMPs)

The Contractor shall not begin ground disturbing work on the project until erosion, sedimentation, and good housekeeping BMPs are installed to the satisfaction of Doyon Utilities' Authorized Representative in accordance with the ACGP and the Doyon Utilities' Authorized Representative-accepted SWPPP or SWPPP Work Plan.

The Contractor shall modify BMPs as necessary to comply with the most current revised SWPPP or SWPPP Work Plan.

The Contractor shall regularly maintain BMPs to Doyon Utilities' Authorized Representative satisfaction in accordance with the ACGP and the most current revised SWPPP or SWPPP Work Plan.

If existing in-place BMPs are insufficient in the opinion of Doyon Utilities' Authorized Representative to prevent water pollution, then the Contractor shall provide more and/or improved BMPs to the satisfaction of Doyon Utilities' Authorized Representative at the Contractor's expense.

C. Silt Fence

Unless otherwise shown on the Plans or directed by Doyon Utilities' Authorized Representative, the Contractor shall install silt fence parallel with horizontal contours, shorelines, and edges of creeks and rivers.

The term "up gradient" refers to the side of a silt fence that normal storm water run-off will flow toward. The term "down gradient" refers to the side of a silt fence that normal storm water run-off will flow away from.

The top of silt fence shall be a minimum of 18 inches above adjacent ground.

Silt fence shall be installed in accordance with the following minimum requirements:

1. A slot trench approximately 6 inches deep by 6 inches wide shall be excavated along the entire length of the silt fence.
2. Support posts shall be placed a maximum of 8 feet on center, within and on the down-gradient side of the slot trench, and driven a minimum of 18 inches into the ground. Damaged posts shall be replaced to the satisfaction of Doyon Utilities' Authorized Representative.
3. Poultry fence fabric shall be place on the up-gradient sides of support posts, with the top of fencing at 18 inches above adjacent ground, stretched tight between posts, and securely stapled or otherwise securely attached to posts at 6 inches on center. Fencing roll ends shall be overlapped 6 inches minimum at posts.

4. The bottom 18 inches of silt fence fabric shall be inserted in the slot trench to form a J-shape with the short side of the "J" oriented up gradient, the fabric shall be stretched tight between posts, and the slot trench shall be backfilled and tamped over the silt fence fabric. Exposed fabric shall be securely stapled or otherwise securely attached to the up-gradient sides of posts and poultry fence fabric at 6 inches on center. Fabric shall extend 18 inches minimum above adjacent ground when attached to posts. Fabric roll ends shall be overlapped 6 inches minimum at posts.
5. The top of silt fence fabric shall be tie-wrapped or otherwise securely attached to the top of poultry fencing at 2 feet on center.

Silt fence shall be maintained in good working condition and to the satisfaction of Doyon Utilities' Authorized Representative until Final Stabilization of the site.

Silt fence shall be removed and disposed of by the Contractor after Final Stabilization.

D. Coir Fiber Roll

The Contractor shall prepare the site for installation of the coir fiber roll by removing or leveling surface objects and irregularities that may prevent the coir from making direct and firm contact with the soil, but shall protect existing vegetation to the extent possible, and shall minimize site disturbance that can lead to erosion and sedimentation.

Unless otherwise shown on the Plans or directed by Doyon Utilities' Authorized Representative, the Contractor shall install coir rolls parallel with horizontal contours, shorelines, and edges of creeks and rivers.

The Contractor shall select and use wooden stakes made from strong, durable wood species that do not have knots or flaws. The stakes shall be pointed at one end, not wedge shaped. Stakes for coir rolls shall be 1.5 inches square. Stake length shall be specified on the Plans but shall not be less that the diameter or coir rolls plus 12 inches.

If shown on the Plans, required by the Special Provisions, or directed by Doyon Utilities' Authorized Representative, live willow stakes shall be placed in the coir fiber rolls. A sharpened steel bar shall be used to create a hole for willow stakes by pulling the roll's fibers apart. The willow stakes shall be placed to the base of the coir roll without damaged. Damaged willow stakes shall be replaced at Contractor expense. See Division 75 – Seeding, Landscaping, and Revegetation for additional requirements for willow staking.

Coir fiber roll shall be maintained in good working condition and to the satisfaction of Doyon Utilities' Authorized Representative until Final Stabilization of the site.

E. Erosion Control Blankets

Erosion control blankets shall be installed in disturbed areas of highly erosive soils, critical slope areas, channels where storm and/or other flows are concentrated, slopes directly adjacent to bodies of surface water, and other areas where control of erosion is critical, and that can be expected to require protection from the time of initial ground disturbance through Final Stabilization.

Erosion control blankets shall not be installed on days when the wind or rain would cause undue erosion or displacement of bare soils. Use of vehicles and/or tracked equipment shall be permitted for installation of erosion blanket only if such use does not cause rutting and displacement of soils.

Erosion control blankets shall be installed in accordance with manufacturer's recommendations.

On critical slope areas, the blankets shall be installed perpendicular to contours and shall overlap adjacent blankets by at least 12 inches. Edges of erosion control blankets at tops and bottoms of slopes shall be buried in slot trenches or otherwise secured to the satisfaction of Doyon Utilities' Authorized Representative. Upper blankets shall lap over lower blankets. Staples shall be spaced as needed to hold blankets securely in place.

In channels, the blankets shall be applied perpendicular to flow direction in the channel and shall overlap adjacent blankets by at least 12 inches. Edges of erosion control blankets at top of slopes on channel sides shall be buried in slot trenches or otherwise secured to the satisfaction of Doyon Utilities' Authorized Representative. Upstream blankets shall lap over downstream blankets. Staples shall be spaced as needed to hold blankets securely in place.

The Contractor shall maintain erosion control blankets to control erosion for as long as needed from the time of ground disturbance until Final Stabilization.

F. Inspections

The Contractor shall provide qualified personnel, meeting the requirements of the ACGP and acceptable to Doyon Utilities' Authorized Representative, to perform weekly and monthly site inspections to document compliance with the ACGP and the most current SWPPP or SWPPP Work Plan. As a minimum, the qualified personnel shall have a current certification as a Certified Erosion and Sediment Control Lead (CESCL), a Certified Inspector of Sediment and Erosion control (CISEC), or a Certified Professional in Erosion and Sediment Control (CPESC), and shall have at least two years of experience in erosion and sediment control.

During non-winter seasons and when construction work is actively in progress, the Contractor's qualified personnel shall inspect the site weekly in accordance with the ACGP and the most current revised SWPPP or SWPPP Work Plan. During winter season, when construction operations are shut down, and when the likelihood of erosion and water pollution is minimal, inspection frequency by the Contractor may be reduced to once every month, if such a reduction in inspection frequency is authorized by Doyon Utilities' Authorized Representative in writing. Inspections shall be continued until Final Stabilization is achieved and until documentation of NOT submittal to ADEC (for projects with total ground disturbance areas of one acre or larger) is received by the Doyon Utilities' Authorized Representative.

For each weekly or monthly site inspection, the Contractor shall provide a written inspection report, per the requirements of the ACGP. The Contractor shall submit each inspection report to the Doyon Utilities' Authorized Representative within 3 calendar days after the inspection.

If a weekly or monthly site inspection report is not received within 3 calendar days of the required date of inspection, Doyon Utilities' Authorized Representative reserves the right to perform the required inspection, and to back-charge the Contractor in the minimum amount of Two Hundred Dollars ($200.00) for each inspection report that is not submitted by the Contractor in the required time frame, and is subsequently completed by Doyon Utilities' Authorized Representative.

G. Final Stabilization and NOT Submittal

Final stabilization occurs when ground disturbing activities at a site have been completed and the following criteria are met:

1. A uniform and evenly distributed perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on unpaved areas that are not covered by non-erodible permanent stabilization.
2. Non-erodible permanent stabilization measures such as pavement, sidewalk, curb and gutter, cobbles, gabions, and/or stable gravel surfacing have been constructed where vegetative cover is not required.

Doyon Utilities' Authorized Representative will make the determination of when Final Stabilization has been achieved, and will notify the Contractor of same in writing.

For projects with total ground disturbance areas of one acre or larger, the Contractor shall promptly submit a NOT to ADEC after notification of Final Stabilization, and provide a copy of the NOT to Doyon Utilities.

H. Hazardous Materials Control and Spill Prevention and Control

The Contractor shall also be responsible for performing all fueling and lubrication operations, and all handling of hazardous materials and waste, in a safe and environmentally responsible manner in compliance with the HMCP and SPCC Plan (if required) in the Doyon Utilities accepted SWPPP or SWPPP Work Plan, all applicable JBER rules, and State and Federal laws and regulations.

The Contractor shall be responsible for the containment, cleanup, and remediation for all construction-related spills of petroleum fuels, oil, and/or other substances hazardous to the land and/or water, all at Contractor expense.

Specific requirements for hazardous materials control and spill prevention and response include the following:

1. Hazardous materials shall be stored in covered storage areas with secondary containment.
2. Absorbent pads or other suitable containment shall be provided under fill ports while fueling and under equipment during maintenance or repairs.
3. Secondary containment shall be provided under all stationary equipment such as pumps, compressors, and generators that contain petroleum products.
4. Spill response materials shall be stored in sufficient quantity at each work location, appropriate to the hazards associated with that site.
5. All spills or contaminated surfaces shall be cleaned up immediately.

I. Violations and/or Non-Compliance

If, after receiving written notice of a violation and/or non-compliance from Doyon Utilities' Authorized Representative or an appropriate regulatory official, the Contractor fails to promptly correct a violation of the ACGP or other applicable laws or regulations, or if the Contractor fails to promptly come into compliance with the most current accepted SWPPP or SWPPP Work Plan or with these Specifications, then Doyon Utilities' Authorized Representative reserves the right to withhold payment to the Contractor, and to have violation and/or non-compliance corrected by others at the Contractor's expense.

SECTION 20.03 - CLEARING, GRUBBING, STRIPPING, AND DISPOSAL

Article 20.03.1 - General

Work under this Section includes all staking, flagging, tree and brush clearing, gathering, handling, hauling, and stacking of firewood, stump, root, and debris grubbing, chipping, and removal of non-firewood clearing debris, topsoil and vegetation stripping, loading, hauling, disposal, and incidentals to prepare area for project construction earthwork.

Refer to Section 20.01 – General for additional general requirements.

Article 20.03.2 - Construction

Prior to clearing, grubbing, and stripping, the Contractor shall accurately stake and/or flag the clearing limits shown on the Plans, listed in the Special Provisions, or directed by Doyon Utilities' Authorized Representative.

The Contractor shall remove all vegetation, brush, trees, logs, tree stumps, roots, root mat, debris, piles, and topsoil to a depth of one foot maximum from within the clearing limits.

The Contractor shall collect all sound wood tree trunks and branch parts that are 6-inches in diameter and larger, remove all smaller branches, cut the 6-inch diameter and larger wood into random log lengths, deliver the logs to a firewood area shown on the Plans, listed in the Special Provisions, or directed by Doyon Utilities' Authorized Representative, and neatly stack the logs at the firewood area.

The Contractor shall chip, load, haul, and dispose of all other clearing, grubbing, and stripping debris at a disposal site shown on the Plans, listed in the Special Provisions, or directed by Doyon Utilities' Authorized Representative. Chipping shall be to the satisfaction of Doyon Utilities' Authorized Representative.

The Contractor shall protect all existing improvements within or adjacent to the clearing limits that are not specifically called out for demolition and removal. Vegetation adjacent to clearing limits that is not specifically called out for removal shall be protected. All protection of existing improvements and vegetation shall be to the satisfaction of Doyon Utilities' Authorized Representative.

If overhanging vegetation, outside of but on the perimeter of clearing limits, is damaged during clearing, grubbing, and stripping operations, the Contractor shall, as a minimum, neatly cut off the damaged vegetation at ground level with hand-operated chain saws, chip, and dispose of all cuttings at the designated disposal site, all to the satisfaction of Doyon Utilities' Authorized Representative.

When grubbing and stripping adjacent to the clearing limits, the Contractor shall transition the depth of grubbing and stripping to the satisfaction of Doyon Utilities' Authorized Representative to avoid excessive differences in finished grade between areas within and outside of clearing limits.

SECTION 20.04 - REMOVAL AND DISPOSAL OF CONCRETE SIDEWALK, CURB AND GUTTER, AND SIMILAR STRUCTURES

Article 20.04.1 - General

Work under this Section includes all surveying, marking, saw cutting, demolition, removal, loading, hauling, and disposal of existing reinforced and un-reinforced Portland cement concrete sidewalk, curb and gutter, apron, pavement, and similar structures, and incidentals.

Refer to Section 20.01 – General for additional general requirements.

Article 20.04.2 - Construction

Prior to removal, the Contractor shall survey and mark the removal limits as shown on the Plans and/ or as directed by Doyon Utilities' Authorized Representative.

Sidewalks, curb and gutter, apron, pavement, and/or similar structures to be removed shall be saw cut at removal limits.

The Contractor shall load, haul, and dispose of removed concrete debris at a disposal site shown on the Plans, listed in the Special Provisions, or directed by Doyon Utilities' Authorized Representative.

The Contractor shall protect existing sidewalk, curb and gutter, apron, pavement, and similar structures that are not specifically called out for removal, to the satisfaction of Doyon Utilities' Authorized Representative. Any Contractor-caused over-break beyond removal limits shall be repaired or replaced at Contractor expense to the satisfaction of Doyon Utilities' Authorized Representative.

SECTION 20.05 - REMOVAL AND DISPOSAL OF ASPHALT PAVEMENT

Article 20.05.1 - General

Work under this Section includes all surveying, marking, saw cutting, removal, loading, hauling, and disposal of existing asphalt concrete pavement, and incidentals.

Refer to Section 20.01 – General for additional general requirements.

Article 20.05.2 - Construction

Prior to removal, the Contractor shall survey and mark the removal limits as shown on the Plans and/ or as directed by Doyon Utilities' Authorized Representative.

Initially, pavement shall be removed to one foot inside of the removal limits. Immediately prior to repaving, remaining pavement to be removed shall be saw cut at removal limits and removed, all to the satisfaction of Doyon Utilities' Authorized Representative.

The Contractor shall load, haul, and dispose of removed pavement at a disposal site shown on the Plans, listed in the Special Provisions, or directed by Doyon Utilities' Authorized Representative.

The Contractor shall protect existing pavement that is not specifically called out for removal to the satisfaction of Doyon Utilities' Authorized Representative. Any Contractor-caused pavement damage beyond removal limits shall be repaired or replaced at Contractor expense to the satisfaction of Doyon Utilities' Authorized Representative.

SECTION 20.06 - TRENCHING, PIPE BEDDING, AND BACKFILL FOR UTILITIES AND CULVERTS

Article 20.06.1 - General

Work under this Section includes trenching, existing utility protection and handling as required, shoring as required, dewatering as required, pipe bedding, backfilling, moisture conditioning as required, compaction, scarification as required, final grading, cleanup, and incidentals for installation of underground utilities and culverts.

Refer to Standard Details 20.06-1 through 20.06-5 for additional information on Class “B”, “C”, and “D” bedding and Type II and II-A classified fill and backfill.

Refer to Standard Detail 20.06-7 for additional information on temporary support of existing telephone duct and other existing utilities subject to damage due to lack of ground support during excavation for new utilities or existing utility modifications or repairs.

Refer to Division 50, Standard Detail 50.02-1, and Division 60, Standard Detail 60.02-1, for typical sewer line and water line trench sections.

Refer to Division 50, Standard Detail 50.02-2, and Division 60, Standard Detail 60.02-2, for earthwork requirements at sewer/water crossings.

Refer to Section 20.01 – General for additional general requirements.

Article 20.06.2 - Material

Prior to import of any backfill or pipe bedding materials to the Project, the Contractor shall submit recent sieve analysis and moisture-density test results for each import material in accordance with AASHTO T88 and AASHTO T180-D for acceptance by Doyon Utilities’ Authorized Representative. When similar material is supplied from different material sources, recent sieve analysis and moisture-density test results shall be provided for each material type from each material source.

A. Import Pipe Bedding

The type of import pipe bedding shall be as called out in the Plans, the Special Provisions, the Standard Details, as directed by Doyon Utilities’ Authorized Representative, or as specified herein.

Import pipe bedding shall contain no lumps, frozen material, organic matter, or other deleterious matter, and shall be durable and sound, all to the satisfaction of Doyon Utilities’ Authorized Representative.

Bedding material shall not contain mechanically fractured materials.

The portion of material retained on a #4 sieve shall be known as coarse aggregate. Coarse aggregate material in import pipe bedding shall have a percentage of wear not to exceed 30% after 500 revolutions, as determined by the current requirements of ASTM C131.

1. Import Class "B" Bedding

Unless otherwise called out in the Plans, the Special Provisions, the Standard Details, or directed otherwise by Doyon Utilities’ Authorized Representative, import Class “B” bedding shall be used for pipe and utility bedding in trenches

above the groundwater table, for water line and sewer line bedding at water/sewer crossings, and for water line and storm drain bedding at water/storm drain crossings.

Class “B” Bedding

U.S. Std. Sieve	Cumulative % Passing by Weight
1"	100
3/8"	60 – 100
#4	40 – 85
#10	25 – 70
#40	5 – 40
#200	0 – 5

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than 35% of that fraction passing the #4 sieve.

2. Import Class "C" Bedding

Unless otherwise called out in the Plans, the Special Provisions, the Standard Details, or directed otherwise by Doyon Utilities’ Authorized Representative, import Class “C” bedding shall be used for pipe and utility bedding in trenches above the groundwater table.

Class “C” Bedding

U.S. Std. Sieve	Cumulative % Passing by Weight
2"	100
1/2"	40 – 100
#4	20 – 75
#10	12 – 60
#40	2 – 30
#200	0 – 5

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than 20% of that fraction passing the #4 sieve.

3. Import Class "D" Bedding

Unless otherwise called out in the Plans, the Special Provisions, the Standard Details, or directed otherwise by Doyon Utilities’ Authorized Representative, import Class “D” bedding shall be used for pipe bedding in trenches below the groundwater table and for HDPE pipe bedding except at water/sewer crossings.

Class “D” Bedding

U.S. Std. Sieve	Cumulative % Passing by Weight
1"	100
3/4"	90 – 100
1/2“	50 – 70
3/8”	20 – 50
#4	0 – 10
#20	0 – 1

B. Import Backfill

The type of import backfill shall be as called out in the Plans, the Special Provisions, or the Standard Details, as directed by Doyon Utilities' Authorized Representative, or as specified herein.

The Contractor shall submit a processing and blending plan to Doyon Utilities' Authorized Representative for review and acceptance prior to utilization of import fill and/or backfill from more than one source. The plan must be accompanied by materials analysis reports for each material source and fully describe how the material will be placed and blended to ensure that timely and accurate in-place density testing can be achieved.

Import fill and/or backfill shall contain no lumps, frozen material, organic matter, or other deleterious matter, and shall be durable and sound, all to the satisfaction of Doyon Utilities' Authorized Representative. Import fill and/or backfill shall have a plasticity index not greater than 6 as determined by ASTM D424. The coarse aggregate material conforming to the requirements specified below shall have a percentage of wear not to exceed 30% after 500 revolutions, as determined by the current requirements of ASTM C131.

The portion of the material retained on a #4 sieve shall be known as coarse aggregate. Both coarse and fine aggregates shall conform to the quality requirements of AASHTO M147.

1. Import Type II Classified Fill and/or Backfill

Unless specified otherwise on the Plans or directed otherwise by Doyon Utilities' Authorized Representative, Type II classified fill and/or backfill shall be used for all import fill and/or backfill.

Type II Classified Fill and/or Backfill

U.S. Std. Sieve	Cumulative % Passing by Weight
8"	100
3"	70 – 100
1-1/2"	55 – 100
3/4"	45 – 85
#4	20 – 60
#10	12 – 50
#40	4 – 30
#200	2 – 5

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than 15% of that fraction passing the #4 sieve.

2. Type II-A Classified Fill and/or Backfill

Type II-A Classified Fill and/or Backfill	
U.S. Std. Sieve	Cumulative % Passing by Weight
3"	100
3/4"	50 – 100
#4	25 – 60
#10	15 – 50
#40	4 – 30
#200	2 – 5

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than 20% of that fraction passing the #4 sieve.

3. Type III Classified Fill and/or Backfill

Materials furnished by the Contractor for use as Type III classified fill and/or backfill shall be approved sand or gravel with a maximum of 10% passing the #200 sieve.

4. Type IV Classified Fill and/or Backfill

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 25% passing the #200 sieve.

Article 20.06.3 - Construction

A. General

Prior to any trenching, the Contractor shall have all utilities located and shall obtain an Dig Clearance Permit in accordance with Section 20.01 – General.

The Contractor shall not begin any trenching until all materials, equipment, and personnel are present to complete the work in the most expedient manner.

The Contractor shall perform all required trenching of all materials encountered, including sands and gravels, excessively silty material, clay, organics, rock, permafrost, contaminated soils, and/or otherwise unsuitable materials. Usable excavated materials shall be separated on site from unsuitable materials to the satisfaction of Doyon Utilities' Authorized Representative. Contaminated soils shall be separated from all other materials and handled in accordance with the Contract Documents or as directed in writing by Doyon Utilities' Authorized Representative.

Unusable, surplus, and/or contaminated excavated material shall be disposed of by the Contractor in accordance with Section 20.10 - Disposal of Unusable or Surplus Material.

Suitable excavated materials for use as on-site backfill shall be stockpiled in an orderly manner and placed at a distance from the trench or excavation which conforms to all State and Federal Occupational Safety and Health Administration (OSHA) regulations. Suitable excavated material shall not be stockpiled on vegetated areas.

Surplus suitable excavated materials shall be stockpiled off-site in accordance with Section 20.10 - Disposal of Unusable or Surplus Material.

Not more than 400 feet of trench shall be open in advance of pipe installation unless more open trench is authorized in writing by Doyon Utilities' Authorized Representative.

Trench sections shall be constructed as shown on the Plans and/or Standard Details, or as directed by Doyon Utilities' Authorized Representative. The trench bottom width shall be of a minimum width to facilitate proper laying of pipe and compaction of bedding on the sides of the pipe to the satisfaction of Doyon Utilities' Authorized Representative.

Trench sides shall be sloped so as to conform to all current OSHA regulations. Where trench space is limited, the Contractor shall provide shoring or supports systems as necessary to ensure that the trench size does not exceed the available space, but complies with all current OSHA regulations.

The Contractor shall provide and maintain adequate signs, barricades with operational flashers, safety fencing, etc., to insure public safety at all times during the prosecution of the work. The Contractor shall erect and maintain continuous barricades and/or safety fencing to prevent unauthorized access to all trenches left open at the end of the workday. Safety fencing shall be securely supported at 8 feet maximum on center. All signs, trench barricades, flashers, and/or safety fencing shall be in accordance with Division 70 – Miscellaneous Construction, Section 70.02 – Traffic Maintenance, and to the satisfaction of Doyon Utilities' Authorized Representative.

The Contractor shall be responsible for protection and/or restoration of existing buildings, pavements, sidewalks, curb and gutter, retaining walls, gravel pads, drainage courses, culverts, fences, trees, shrubbery, lawns, landscaping, gardens, flower beds, rockeries, flag poles, military, commercial, and residential building signs, street and traffic signs, traffic signals, street and area lighting, utility lines and appurtenances, survey monuments, and other improvements and existing vegetation located outside of the work limits, or located inside the work limits but noted to be protected on the Plans or directed to be protected by Doyon Utilities' Authorized Representative. Repair of damage to facilities and/or vegetation shown and/or directed to be protected shall be at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative.

B. Existing Underground Utilities

Existing underground utility system components may include, but are not limited to: water mains, services, valves, valve boxes, and key boxes, sanitary sewer gravity mains, services, manholes, and cleanouts, sanitary sewer lift stations and force mains, storm drains mains, laterals, manholes, and catch basins, fuel pipelines, natural gas mains and services, pipeline casings and vents, telephone trunk and service cables, ducts, and vaults, cable television trunk and service lines, ducts, and vaults, fiber optics cables, ducts, and handholes, electric primary, secondary, and service cables and conduits, electrical ground grids, street and/or area lighting power cables and conduits, and traffic signal power, control, and loop detection lines and conduits.

The Contractor shall have all underground utilities located before digging. Underground utilities shall be carefully exposed in accordance with Alaska Digline or JBER requirements, whichever are more stringent.

The Contractor shall exercise all due diligence during trenching, backfilling, and related work to avoid damage to existing underground utility lines and related facilities to the satisfaction of Doyon Utilities' Authorized Representative.

Exposed underground utilities shall be supported and protected as necessary to avoid damage to the utility, interruption of utility service, and/or safety hazard.

When backfilling trenches, underground utilities shall be carefully placed back at their lines and grades that existed prior to trenching. As a minimum, existing underground utilities shall be bedded for 12 inches minimum all around with sand and/or 3-inch minus gravel.

When backfilling an existing sanitary sewer or storm drain crossing a new water line trench, or when backfilling an existing water line crossing a new sanitary sewer or storm drain trench, all exposed new and existing water lines, sanitary sewers, and/or storm drains shall be bedded from 6 inches below to 6 inches above, full trench width or for 2 feet minimum laterally on either side of existing pipe centerline, and for the full exposed length, with Class B bedding.

Any underground utility line that is broken by the Contractor shall be assumed to be in service and potentially dangerous until the broken line is positively identified as being out of service by the appropriate utility personnel.

If existing underground utilities are damaged during trenching, backfilling, or related activities, the Contractor shall stop work immediately, shut off equipment and/or other ignition sources if natural gas or other flammable substances could be released, take all other safety measures appropriate for the situation, notify Doyon Utilities' Authorized Representative as soon as possible, and suspend construction until utility repairs are completed and until resumption of construction is authorized by Doyon Utilities' Authorized Representative.

Existing underground utilities that are shown on the Plans, and/or are located by utility location personnel, but are damaged by the Contractor, shall be repaired or replaced to current utility standards at Contractor expense.

Any spill resulting from breakage of an existing utility line that is shown on the Plans, and/or is located by utility location personnel, shall be cleaned up at Contractor expense to the satisfaction of Doyon Utilities' Authorized Representative.

The Contractor shall obtain accurate GPS coordinates and elevations on all existing underground utilities that are exposed during construction, and shall record these coordinates and elevations in red on a clean set of issued-for-construction drawings in accordance with Division 65 - JBER Construction Surveys.

C. Existing Above-Ground Utilities

Existing above-ground utility appurtenances and overhead utility lines may include, but are not limited to: fire hydrants, valve boxes, key boxes, utility towers, poles, guys, and anchors, electric transmission, distribution, and service lines, load centers, and transformers, telephone cables and drops, cable television lines and drops, fiber optics cables, communications pedestals, street and/or area lights, and traffic signals.

The Contractor shall exercise all due diligence during trenching and backfilling to avoid damage to existing above-ground utility appurtenances and overhead utility lines and related facilities.

If existing above-ground utility appurtenances and/or overhead utility lines are damaged during trenching, backfilling, or related activities, the Contractor shall stop work immediately, take all safety measures appropriate for the situation, notify Doyon Utilities'

Authorized Representative as soon as possible, and suspend construction until utility repairs are completed and until resumption of construction is authorized by Doyon Utilities' Authorized Representative.

Existing above-ground utility appurtenances or overhead utility lines damaged by the Contractor shall be repaired or replaced to current utility standards at Contractor expense.

D. Trench Dewatering

All design, installation, and operation of dewatering systems shall comply with the Contractor's Storm Water Pollution Prevention Plan (SWPPP) or SWPPP Work Plan, and the most current Alaska Construction General Permit. The Contractor shall handle all dewatering discharges to avoid erosion, flooding, sedimentation, and/or other damage or nuisance conditions, to prevent sediment, debris, toxics, and/or turbid water from entering surface waters and/or storm drain systems, to prevent groundwater contamination, and to strictly comply with State and Federal laws, all in accordance with Section 20.02 - Storm Water Pollution Prevention, and all to the satisfaction of Doyon Utilities' Authorized Representative.

Trenches shall be dewatered at all times to the satisfaction of Doyon Utilities' Authorized Representative.

E. Trench Bottom Preparation

Prior to placement of bedding, tubing, pipe, or culvert on the trench bottom, the trench bottom shall be cleaned of rocks and debris to the satisfaction of Doyon Utilities' Authorized Representative.

Where in-place material in the trench bottom is accepted by Doyon Utilities' Authorized Representative in writing for use as pipe bedding, the trench bottom shall be accurately graded and compacted to a minimum of 95% in accordance with Section 20.01 – General, to provide uniform bearing and support for each section of the pipe or tubing for its entire length, except at bell holes as needed for pipe joining and for polyethylene encasement, if required.

All adjustments to pipe grade shall be done by removing in-place trench bottom material as required or by filling with suitable compacted bedding material under the pipe, but not by forcing the pipe down or blocking or wedging the pipe up.

Where rocky material, hard pan, rock, or other unsuitable material is encountered in the trench bottom, the trench shall be over-excavated by 6 inches minimum below bottom of pipe.

F. Pipe Bedding

Unless Doyon Utilities' Authorized Representative directs the Contractor in writing that excavated material is suitable for pipe bedding, the Contractor shall haul in and place import pipe bedding.

Where excavated on-site material is accepted by Doyon Utilities' Authorized Representative in writing for use as pipe bedding, the Contractor shall use care to separate this material from other excavated material to the satisfaction of Doyon Utilities' Authorized Representative.

When the trench is over-excavated below bottom of pipe to remove rocky material, hard pan, rock, or other unsuitable material, the trench shall be backfilled with bedding material placed in 6 inch maximum loose lifts and compacted.

Compaction of bedding material shall be completed as necessary to firmly and uniformly support the new piping, while avoiding damage to new piping, existing utilities, and adjacent improvements.

When bedding and compacting around and over coated piping or piping with polyethylene encasement, special care shall be taken to protect the pipe coating, lining, and/or polyethylene encasement from damage. Damaged pipe coating, lining, and/or polyethylene encasement shall be either repaired or pipe shall be replaced, all to the satisfaction of Doyon Utilities' Authorized Representative and all at Contractor expense.

When bedding and compacting around and over plastic pipe, special care shall be taken to maintain design pipe grade and to protect the pipe from excessive deformation. Pipe that deviates excessively from design pipe grade or excessively deformed pipe shall be replaced to the satisfaction of Doyon Utilities' Authorized Representative at Contractor expense.

All on-site and import bedding shall be compacted to a minimum of 95% in accordance with Section 20.01 – General. The entire surface of each lift of bedding shall be completely compacted before additional bedding is placed. Adequate water shall be used to facilitate compaction of bedding to the satisfaction of Doyon Utilities' Authorized Representative. If at any time bedding becomes excessively saturated, it shall be moisture conditioned, at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative, until the moisture content is satisfactory.

All adjustments to pipe grade shall be done by removing in-place trench bottom material as required or by filling with suitable compacted bedding material under the pipe, but not by forcing the pipe down or blocking or wedging the pipe up.

Bell holes shall be excavated after the trench bottom has been graded and compacted. Bell hole size shall be minimized, but shall be large enough for proper joining of the pipe, and for placement of polyethylene encasement, if required, around pipe joints.

After placement of pipe and tubing smaller than 4 inch nominal diameter on a properly prepared trench bottom, bedding material shall be carefully placed full trench width to a depth of 6 inches above the top of pipe or tubing, and then compacted.

After placement of pipe from 4 inches to 12 inches nominal diameters in the trench, bedding material shall be carefully placed to springline on each side of the pipe, manually worked under the pipe on each side to assure full contact with the pipe, and then compacted.

After placement of pipe larger than 12 inches nominal diameter in the trench, bedding material shall be placed in loose lifts of 6 inches maximum thickness to springline on each side of the pipe, with each lift manually worked under the pipe on each side to assure full contact with the pipe, and then compacted.

For pipe of 4 inch nominal diameter and larger, after bedding is place and compacted to springline, bedding material shall be placed to 6 inches above the top of the pipe, in loose lifts of 6 inches maximum thickness, and then compacted.

Care shall be taken not to inadvertently raise the grade of plastic piping during placement and compaction of bedding.

Adequate time and safe access shall be provided to complete compaction tests for each lift of bedding prior to placement of successive lifts of material. Compaction tests shall be provided for each lift of bedding at 100 feet maximum on center. For trenches shorter than 100 feet, a minimum of two compaction tests shall be completed for each lift.

G. Trench Backfill

A 2 foot thick loose lift shall be placed, as the first layer of backfill over the top of pipe bedding, and compacted. This first 2 feet thick loose lift of backfill shall contain no boulders or cobbles with any dimension larger than 8 inches.

Subsequent lifts of trench backfill shall be placed in lift thicknesses called out on the Plans or Standard Details, specified in the Special Provisions, called out in these Specifications based on type of compaction equipment, or directed by Doyon Utilities' Authorized Representative.

All on-site and import backfill shall be compacted to a minimum of 95% in accordance with Section 20.01 – General. Compaction of backfill shall be completed as necessary to prevent settlement of fill and backfill while avoiding damage to new and existing utilities in the fill or backfill area, and to other adjacent improvements. The entire surface of each lift of fill and backfill shall be completely compacted before additional fill or backfill is placed.

Backfill for 3 feet minimum all around manholes, clean-out risers, fire hydrants, valve boxes, indicator posts, key boxes, and any other vertical piping or structure shall be non-frost-susceptible, to reduce the possibility of frost jacking damage.

When compacting around manholes, clean-out risers, fire hydrants, valve boxes, indicator posts, key boxes, and any other vertical piping or structure, the Contractor shall compact each lift immediately adjacent to the piping or structure all around using a walk-behind vibratory plate compactor or walk-behind vibratory "rammer" or "jumping jack" compactor, all to the satisfaction of Doyon Utilities' Authorized Representative.

Adequate water shall be used to facilitate compaction of backfill to the satisfaction of Doyon Utilities' Authorized Representative. If at any time backfill becomes excessively saturated, the material shall be moisture conditioned at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative, until the moisture content is satisfactory.

Unless loose lift thicknesses for fill or backfill are called out on the Plans or Standard Details, specified in the Special Provisions or elsewhere in these Specifications, or directed by Doyon Utilities' Authorized Representative, lift thicknesses shall be as shown in the table below for various types of common compaction equipment. Maximum loose lift thickness for compaction equipment not listed below shall be as called out on the Plans or Standard Details, specified in the Special Provisions, or directed by Doyon Utilities' Authorized Representative.

Type of Compactor	Maximum Loose Lift Thickness
Walk-Behind Vibratory Plate	4 Inches
Walk-Behind Vibratory “Rammer” or “Jumping Jack”	6 Inches
Self-Propelled Remote Controlled Vibratory Plate 1,200+ Pound Operating Weight	9 Inches
Self-Propelled Riding Vibratory Drum Less Than 10,000 Pound Operating Weight	12 Inches
Self-Propelled Riding Vibratory Drum 10,000 to 20,000 Pound Operating Weight	16 Inches
Self-Propelled Riding Vibratory Drum More Than 20,000 Pound Operating Weight	20 Inches

Upon request of Doyon Utilities’ Authorized Representative, the Contractor shall compact proof sections of trench backfill at Contractor expense to demonstrate that compaction equipment, lift thickness, backfill moisture content, and number of passes of compaction equipment are adequate to consistently achieve 95% minimum compaction.

Adequate time and safe access shall be provided to complete compaction tests for each lift of backfill prior to placement of successive lifts of material. Compaction tests shall be provided for each lift of backfill at 100 feet maximum on center. For trenches shorter than 100 feet, a minimum of two compaction tests shall be completed for each lift.

If trenching occurs in an existing or proposed road, or beneath a proposed structure or similar improvement, trench backfill shall conform to the required subgrade structural section for the existing or proposed road, proposed structure, or similar improvement with regard to material type, minimum compaction, and other details, all as shown on the Plans or Standard Details or to the satisfaction of Doyon Utilities’ Authorized Representative.

See Section 20.07 - Excavation, Fill, and Backfill for Roads, Trails, and Structures for minimum requirements for subgrade for concrete structures and asphalt pavement.

H. Scarification

Where trenching runs beneath an existing or proposed paved street or road, and parallel with the centerline of that paved street or road, and where the width of the pavement section to be installed above the trench extends beyond the trench top width, then the subgrade material immediately below the new or restored pavement shall be scarified after trenching is completed, by the following process:

1. Subgrade material shall be excavated to a depth of 2 feet below the bottom of pavement base material.

2. Any unsuitable excavated material, as determined by Doyon Utilities’ Authorized Representative, shall be separated and disposed of in accordance with Section 20.10 - Disposal of Unusable or Surplus Material. Unsuitable excavated material is defined as material that does not match the requirements for the structural section of the street or road, as determined by Doyon Utilities’ Authorized Representative.

3. The remaining suitable excavated material and import material as required shall be thoroughly mixed, placed back in the excavation in uniform loose lifts, and compacted. Lift thicknesses and compaction requirements shall be the same as those for trench backfill as specified above.

4. See Section 20.07 - Excavation, Fill, and Backfill for Roads, Trails, and Structure for minimum subgrade requirements for new asphalt pavement.

I. Final Grading and Cleanup

Backfilled trenches in non-traffic areas shall be graded to drain in conformance with existing drainage patterns to the satisfaction of Doyon Utilities' Authorized Representative.

All areas impacted by trenching, backfilling, dewatering, and/or related activities shall be cleaned up to their original condition or better at Contractor expense to the satisfaction of Doyon Utilities' Authorized Representative.

SECTION 20.07 - EXCAVATION, FILL, AND BACKFILL FOR ROADS, TRAILS, AND STRUCTURES

Article 20.07.1 - General

Work under this Section includes excavation, existing utility protection and handling as required, shoring as required, dewatering as required, filling, backfilling, moisture conditioning as required, compaction, final grading, cleanup, and incidentals for roads, trails, and structures.

Refer to Standard Details 20.06-4 and 20.06-5 for additional information on Type II and II-A classified fill and backfill.

Refer to Standard Detail 20.06-7 for additional information on temporary support of existing telephone duct and other existing utilities subject to damage due to lack of ground support during excavation for new utilities or existing utility modifications or repairs.

Refer to Section 20.01 – General for additional general requirements.

Article 20.07.2 - Material

Prior to import of any fill and/or backfill materials to the Project the Contractor shall submit recent sieve analysis and moisture-density test results for each import material in accordance with AASHTO T88 and AASHTO T180-D for acceptance by Doyon Utilities' Authorized Representative. When similar material is supplied from different material sources, recent sieve analysis and moisture-density test results shall be provided for each material type from each material source.

The type of import fill and/or backfill shall be as called out on the Plans, the Special Provisions, or the Standard Details, as directed by Doyon Utilities' Authorized Representative, or as specified herein.

The Contractor shall submit a processing and blending plan to Doyon Utilities' Authorized Representative for review and acceptance prior to utilization of import fill and/or backfill from more than one source. The plan must be accompanied by materials analysis reports for each material source and fully describe how the material will be placed and blended to ensure that timely and accurate in-place density testing can be achieved.

Import fill and/or backfill shall contain no lumps, frozen material, organic matter, or other deleterious matter, and shall be durable and sound, all to the satisfaction of Doyon Utilities' Authorized Representative. Import fill and/or backfill shall have a plasticity index not greater than 6 as determined by ASTM D424. The coarse aggregate material conforming to the requirements specified below shall have a percentage of wear not to exceed 30% after 500 revolutions, as determined by the current requirements of ASTM C131.

The portion of the material retained on a #4 sieve shall be known as coarse aggregate. Both coarse and fine aggregates shall conform to the quality requirements of AASHTO M147.

A. Type II Classified Fill and/or Backfill

Unless specified otherwise on the Plans or directed otherwise by Doyon Utilities' Authorized Representative, Type II classified fill and/or backfill shall be used for all import fill and/or backfill.

Type II Classified Fill and/or Backfill

U.S. Std. Sieve	Cumulative % Passing by Weight
8”	100
3"	70 – 100
1-1/2”	55 – 100
3/4"	45 – 85
#4	20 – 60
#10	12 – 50
#40	4 – 30
#200	2 – 6

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than 15% of that fraction passing the #4 sieve.

B. Type II-A Classified Fill and/or Backfill

Type II-A Classified Fill and/or Backfill

U.S. Std. Sieve	Cumulative % Passing by Weight
3"	100
3/4"	50 – 100
#4	25 – 60
#10	15 – 50
#40	4 – 30
#200	2 – 6

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than 20% of that fraction passing the #4 sieve.

C. Type III Classified Fill and/or Backfill

Materials furnished by the Contractor for use as Type III classified fill and/or backfill shall be approved sand or gravel with a maximum of 10% passing the #200 sieve.

D. Type IV Classified Fill and/or Backfill

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 25% passing the #200 sieve.

Article 20.07.3 - Construction

A. General

Prior to any excavation, the Contractor shall have all utilities located and shall obtain an Dig Clearance Permit in accordance with Section 20.01 – General.

The Contractor shall not begin excavation work until all materials, equipment, and personnel are present to complete the work in the most expedient manner.

The Contractor shall perform all required excavation of all materials encountered, including sands and gravels, excessively silty material, clay, organics, rock, permafrost, contaminated soils, and/or otherwise unsuitable materials. Usable excavated materials shall be separated on site from unsuitable materials to the satisfaction of Doyon Utilities’ Authorized Representative. Contaminated soils shall be separated from all other

materials and handled in accordance with the Contract Documents or as directed in writing by Doyon Utilities' Authorized Representative.

Unusable, surplus, and/or contaminated excavated material shall be disposed of by the Contractor in accordance with Section 20.10 - Disposal of Unusable or Surplus Material.

Suitable excavated materials for use as on-site fill or backfill shall be stockpiled in an orderly manner and placed at a distance from the excavation which conforms to all State and Federal Occupational Safety and Health Administration (OSHA) regulations. Suitable excavated material shall not be stockpiled on vegetated areas.

Surplus suitable excavated materials shall be stockpiled off-site in accordance with Section 20.10 - Disposal of Unusable or Surplus Material.

Excavation sides shall be sloped so as to conform to all current OSHA regulations. Where excavation space is limited, the Contractor shall provide shoring or supports systems as necessary to ensure that the excavation size does not exceed the available space, but complies with all current OSHA regulations.

Permanent earthwork cuts shall under no circumstances be excavated beyond design cut limits unless authorized in writing by Doyon Utilities' Authorized Representative.

The Contractor shall provide and maintain adequate signs, barricades with operational flashers, safety fencing, etc., to insure public safety at all times during the prosecution of the work. The Contractor shall erect and maintain continuous barricades and/or safety fencing to prevent unauthorized access to excavations left open at the end of the workday. Safety fencing shall be securely supported at 8 feet maximum on center. All signs, trench barricades, flashers, and/or safety fencing shall be in accordance with Division 70 – Miscellaneous Construction, Section 70.02 – Traffic Maintenance, and to the satisfaction of Doyon Utilities' Authorized Representative.

The Contractor shall be responsible for protection and/or restoration of existing buildings, pavements, sidewalks, curb and gutter, retaining walls, gravel pads, drainage courses, culverts, fences, trees, shrubbery, lawns, landscaping, gardens, flower beds, rockeries, flag poles, military, commercial, and residential building signs, street and traffic signs, traffic signals, street and area lighting, utility lines and appurtenances, survey monuments, and other improvements and existing vegetation located outside of the work limits, or located inside the work limits but noted to be protected on the Plans or directed to be protected by Doyon Utilities' Authorized Representative. Repair of damage to facilities and/or vegetation shown and/or directed to be protected shall be at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative.

B. Existing Underground Utilities

Existing underground utility system components may include, but are not limited to: water mains, services, valves, valve boxes, and key boxes, sanitary sewer gravity mains, services, manholes, and cleanouts, sanitary sewer lift stations, and force mains, storm drains mains, laterals, manholes, and catch basins, fuel pipelines, natural gas mains and services, pipeline casings and vents, telephone trunk and service cables, ducts, and vaults, cable television trunk and service lines, ducts, and vaults, fiber optics cables, ducts, and handholes, electric primary, secondary, and service cables and conduits, electrical ground grids, street and/or area lighting power cables and conduits, and traffic signal power, control, and loop detection lines and conduits.

The Contractor shall have all underground utilities located before digging. Underground utilities shall be carefully exposed in accordance with Alaska Digline or JBER requirements, whichever are more stringent.

The Contractor shall exercise all due diligence during excavation, filling, backfilling, and related work to avoid damage to existing underground utility lines and related facilities to the satisfaction of Doyon Utilities' Authorized Representative.

Exposed underground utilities shall be supported and protected as necessary to avoid damage to the utility, interruption of utility service, and/or safety hazard.

When backfilling excavations, underground utilities shall be carefully placed back at their lines and grades that existed prior to excavation. As a minimum, existing underground utilities shall be bedded for 12 inches minimum all around with sand and/or 3-inch minus gravel.

Any underground utility line that is broken by the Contractor shall be assumed to be in service and potentially dangerous until the broken line is positively identified as being out of service by the appropriate utility personnel.

If existing underground utilities are damaged during excavation, backfilling, filling, or related activities, the Contractor shall stop work immediately, shut off equipment and/or other ignition sources if natural gas or other flammable substances could be released, take all other safety measures appropriate for the situation, notify Doyon Utilities' Authorized Representative as soon as possible, and suspend construction until utility repairs are completed and until resumption of construction is authorized by Doyon Utilities' Authorized Representative.

Existing underground utilities that are shown on the Plans, and/or are located by utility location personnel, but are damaged by the Contractor, shall be repaired or replaced to current utility standards at Contractor expense.

Any spill resulting from breakage of an existing utility line that is shown on the Plans, and/or is located by utility location personnel, shall be cleaned up at Contractor expense to the satisfaction of Doyon Utilities' Authorized Representative.

The Contractor shall obtain accurate GPS coordinates and elevations on all existing underground utilities that are exposed during construction, and shall record these coordinates and elevations in red on a clean set of issued-for-construction drawings in accordance with Division 65 - JBER Construction Surveys.

C. Existing Above-Ground Utilities

Existing above-ground utility appurtenances and overhead utility lines may include, but are not limited to: fire hydrants, valve boxes, key boxes, utility towers, poles, guys, and anchors, electric transmission, distribution, and service lines, load centers, and transformers, telephone cables and drops, cable television lines and drops, fiber optics cables, communications pedestals, street and/or area lights, and traffic signals.

The Contractor shall exercise all due diligence during excavation, filling, backfilling, and related activities to avoid damage to existing above-ground utility appurtenances and overhead utility lines and related facilities.

If existing above-ground utility appurtenances and/or overhead utility lines are damaged during excavation, backfilling, filling, or related activities, the Contractor shall stop work immediately, take all safety measures appropriate for the situation, notify Doyon Utilities'

Authorized Representative as soon as possible, and suspend construction until utility repairs are completed and until resumption of construction is authorized by Doyon Utilities' Authorized Representative.

Existing above-ground utility appurtenances or overhead utility lines damaged by the Contractor shall be repaired or replaced to current utility standards at Contractor expense.

D. Excavation Dewatering

All design, installation, and operation of dewatering systems shall comply with the Contractor's Storm Water Pollution Prevention Plan (SWPPP) or SWPPP Work Plan, and the most current Alaska Construction General Permit. The Contractor shall handle all dewatering discharges to avoid erosion, flooding, sedimentation, and/or other damage or nuisance conditions, to prevent sediment, debris, toxics, and/or turbid water from entering surface waters and/or storm drain systems, to prevent groundwater contamination, and to strictly comply with State and Federal laws, all in accordance with Section 20.02 - Storm Water Pollution Prevention, and all to the satisfaction of Doyon Utilities' Authorized Representative.

E. Compaction of Fill and Backfill

All on-site and import fill and backfill shall be compacted to a minimum of 95% in accordance with Section 20.01 – General. Compaction of fill and backfill shall be completed as necessary to prevent settlement of fill and backfill while avoiding damage to new and existing utilities in the fill or backfill area, and to other adjacent improvements. The entire surface of each lift of fill and backfill shall be completely compacted before additional fill or backfill is placed.

When compacting around manholes, clean-out risers, catch basins, fire hydrants, valve and key boxes, vent piping, and any other vertical piping or structure, the Contractor shall compact each lift immediately adjacent to the piping or structure all around using a walk-behind vibratory plate compactor or walk-behind vibratory "rammer" or "jumping jack" compactor, all to the satisfaction of Doyon Utilities' Authorized Representative.

Adequate water shall be used to facilitate compaction of fill and backfill to the satisfaction of Doyon Utilities' Authorized Representative. If at any time fill or backfill becomes excessively saturated, the material shall be moisture conditioned at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative, until the moisture content is satisfactory.

Unless loose lift thicknesses for fill and backfill are called out on the Plans or Standard Details, specified in the Special Provisions or elsewhere in these Specifications, or directed by Doyon Utilities' Authorized Representative, lift thicknesses shall be as shown in the table below for various types of common compaction equipment. Maximum loose lift thickness for compaction equipment not listed below shall be as called out on the Plans or Standard Details, specified in the Special Provisions, or directed by Doyon Utilities' Authorized Representative.

Type of Compactor	Maximum Loose Lift Thickness
Walk-Behind Vibratory Plate	4 Inches
Walk-Behind Vibratory “Rammer” or “Jumping Jack”	6 Inches
Self-Propelled Remote Controlled Vibratory Plate 1,200+ Pound Operating Weight	9 Inches
Self-Propelled Riding Vibratory Drum Less Than 10,000 Pound Operating Weight	12 Inches
Self-Propelled Riding Vibratory Drum 10,000 to 20,000 Pound Operating Weight	16 Inches
Self-Propelled Riding Vibratory Drum More Than 20,000 Pound Operating Weight	20 Inches

Upon request of Doyon Utilities’ Authorized Representative, the Contractor shall compact a proof sections of fill and/or backfill at Contractor expense to demonstrate that compaction equipment, lift thickness, fill and/or backfill moisture content, and number of passes of compaction equipment are adequate to consistently achieve 95% minimum compaction.

Adequate time and safe access shall be provided to complete compaction tests for each lift of fill and/or backfill prior to placement of successive lifts of material. Compaction tests shall be provided for each lift of fill and/or backfill at 100 feet maximum on center. For trenches shorter than 100 feet, a minimum of two compaction tests shall be completed for each lift.

F. Subgrade for Concrete Structures and Asphalt Pavement

If detailed and specific structural sections for subgrade for concrete structures or asphalt pavements are shown on the Plans, those requirements shall take priority over the subgrade requirements specified below.

As a minimum, the entire subgrade for concrete structures and for asphalt pavement shall be firm, unyielding, thawed, clean granular material (5% or less passing the No. 200 sieve) that is compacted to 95% minimum density per Section 20.01 - General.

Clean granular subgrade material for concrete structures shall extend to depths of 2 vertical feet minimum below the bottom of concrete, and to 2 feet minimum horizontally beyond the perimeters of concrete structures all around.

Clean granular subgrade material for asphalt pavement shall extend to depths of 2 vertical feet minimum below the bottom of pavement base (leveling course or recycled asphalt pavement), and to 2 feet minimum horizontally beyond the edges of asphalt pavement all around.

G. Final Grading and Cleanup

Backfilled excavations in non-traffic areas shall be graded to drain in conformance with existing drainage patterns to the satisfaction of Doyon Utilities’ Authorized Representative.

All areas impacted by excavation, filling, backfilling, dewatering, and/or related activities shall be cleaned up to their original condition or better at Contractor expense to the satisfaction of Doyon Utilities' Authorized Representative.

SECTION 20.08 - EXCAVATION OF OPEN DITCHES

Article 20.08.1 - General

The work under this Section includes excavation and incidentals as necessary to construct open drainage ditches.

Refer to Section 20.01 – General for additional general requirements.

Article 20.08.2 - Construction

Open ditches shall be constructed to the lines, elevations, grades, side slopes, and cross-sectional shapes as shown on the Plans or as directed by Doyon Utilities' Authorized Representative. Ditches shall be excavated to sufficient depths, side slopes, and cross-sectional areas such that when topsoil, cobbles, or other ditch lining is placed, ditch elevations, side slopes, and cross-sections conform to the grades and cross-sections shown on the Plans or as directed by Doyon Utilities' Authorized Representative.

Unless specifically shown otherwise on the Plans or directed otherwise by Doyon Utilities' Authorized Representative, ditches shall be completely free-draining with no visually detectable ponding.

SECTION 20.09 - CASING PIPE

Article 20.09.1 - General

Work under this Section includes providing casing pipe installed by trenchless methods under structures, roadways, railroad tracks, runways, or similar structures for installation of water or sewer carrier pipe in casing.

Casings shall be designed and constructed based on actual site conditions, including but not limited to subsurface conditions (types of soils, possible presence of large boulders and/or bedrock, presence and quantity of groundwater, etc.), depth of cover, and live load conditions.

At Alaska Railroad crossings, casings shall designed and installed in accordance with the following criteria and documents:

1. Cooper E-80 live loads with diesel impact.
2. The most current American Railway Engineering and Maintenance Association (AREMA) “Manual of Railway Engineering”.
3. The most current Alaska Railroad Corporation (ARRC) “Technical Standards for Roadway, Trail, and Utility Facilities in the ARRC Right-of-Way”, or equivalent document as determined by ARRC.

Refer to Division 50 Standard Detail 50.02-10 and Division 60 Standard Detail 60.02-16 for additional information on casings at ARRC crossings.

Refer to Section 20.01 – General for additional general requirements.

Article 20.09.2 - Material

A. Casing Pipe

Casing pipe shall be new steel, API 5L X42, 42,000 PSI minimum yield stress, or other grade and yield strength as shown on the Plans or accepted by Doyon Utilities’ Authorized Representative.

Casing pipe minimum diameter and minimum wall thicknesses shall be as follows for carrier pipe up to 24 inch diameter:

Carrier Pipe Nominal Diameter	Casing Pipe Minimum Diameter	Casing Pipe Minimum Wall Thickness*
3” to 18”	30”	0.500”
20” to 24”	36”	0.562”

*Heavier wall thickness may be required based on site specific conditions.

For carrier pipe sizes larger than 24 inch diameter casing pipe diameter shall be at least two standard pipe diameters larger than the proposed carrier pipe.

Spiral pipe shall not be used as casing pipe.

B. Casing Vent Pipe and Related Materials

Casing vent pipe shall be new steel, ASTM A53 Grade B, or ASTM A500 Grade B, 35,000 PSI minimum yield stress, Schedule 80. Casing vent fittings shall be ASTM

A234 Grade B, 35,000 PSI minimum yield stress. Casing vent flanges shall be ASTM A105 Grade II, 36,000 PSI minimum yield stress. Casing vent flange nuts and bolts shall be Type 304 stainless steel.

C. Carrier Pipe, Casing Spacers, and Casing End Seals

Carrier pipe, casing spacers, and casing end seals shall be in accordance with Division 50, Section 50.02 - Gravity Sewer Lines and Force Mains, or Division 60, Section 60.02 – Water Lines, and Division 50 Standard Detail 50.02-10 or Division 60 Standard Detail 60.02-16.

Article 20.09.3 - Construction

A. Alaska Railroad Corporation (ARRC) Requirements

The Contractor shall comply with all current ARRC requirements for pipe casing installation under Alaska Railroad facilities, including but not limited to ARRC insurance requirements, administrative procedures, flagging requirements, and casing pipe material and installation requirements.

An Excavation Plan may be required by the ARRC for installation of casing pipe. If an Excavation Plan is required, the Excavation Plan shall be provided by the Contractor to the ARRC, for review and comment by the ARRC Chief Engineer. The Contractor's Excavation Plan shall be stamped and signed by an Alaska Registered Professional Engineer. A copy of the Contractor's Excavation Plan and documentation of ARRC's acceptance of the Excavation Plan shall be provided to Doyon Utilities' Authorized Representative.

All required ARRC flag protection shall be provided at the Contractor's expense.

B. Casing Pipe Installation

Access pits shall be provided at both ends of an installed casing incidental to pipe casing installation. One pit shall be provided for casing pipe installation, and a second pit shall be provided at the opposite end of the casing for verification of line and grade and access for casing cleaning. Access pit excavation, dewatering, backfilling, and incidental activities shall be in accordance with Section 20.06 - Trenching, Pipe Bedding, and Backfill for Utilities and Culverts.

The method of installing a casing pipe shall be optional to the Contractor, except that prior to commencing installation operations, the Contractor shall furnish a written casing pipe installation plan for acceptance by Doyon Utilities' Authorized Representative, demonstrating that the planned method of installation has worked satisfactorily on similar projects and under similar conditions.

Casing pipe shall be installed to the alignment and grade shown on the Plans, subject to tolerances listed below.

For water lines and wastewater force mains, casing line and/or grade shall not deviate from Plan alignment and/or grade by more than 0.5 foot.

For gravity sewer lines, the following casing criteria shall apply:

1. Casing line shall not deviate from Plan alignment by more than 0.5 foot.

2. Casing grade misalignment shall be such that sewer grade would not be flatter than minimum slopes specified in Division 50, Section 50.02 - Gravity Sewer Lines and Force Mains, or would not cause a reversed grade.

The Contractor shall be responsible for correction of casing line and/or grade misalignment to the satisfaction of Doyon Utilities' Authorized Representative at the Contractor's expense.

All casing pipe installation operations shall be prudently conducted to ensure protection and safe operation of the JBER buildings, roads, taxiways and runways, the Alaska Railroad, and/or other areas on or adjacent to the casing pipe alignment. Special care shall be taken by the Contractor to prevent ground loss, caving, and void formation at the heading of the casing pipe.

The diameter and shape of the casing hole through the ground shall be essentially the same as the diameter and shape of the outside of the casing pipe. If voids develop outside of the casing pipe cross-section, or if the hole diameter exceeds the casing diameter by one inch or more, then remedial measures, such as pressure grouting of the resulting void or annular space, shall be directed by Doyon Utilities' Authorized Representative at the Contractor's expense.

The Contractor shall reinforce the leading edge of the casing pipe as necessary to maintain the structural integrity of the casing pipe through completion of the installation. If the installed casing pipe is damaged to the extent that it is unacceptable to Doyon Utilities' Authorized Representative, a sufficient length of the damaged casing pipe shall be cut off and replaced with a new equal length of casing pipe at Contractor's expense, all to the satisfaction of Doyon Utilities' Authorized Representative.

C. Venting and Sealing of Casings

Casings for sewer lines shall be vented to atmosphere with minimum 2 inch diameter vents at the high end of the casing for casings of 150 feet in length or less, and at both ends for casings longer than 150 feet.

Venting is not required for water line casings.

Ends of sewer line and water line casings shall be sealed as shown on the Plans or in accordance with Division 50, Section 50.02 - Gravity Sewer Lines and Force Mains, or Division 60, Section 60.02 – Water Lines, and Division 50 Standard Detail 50.02-10 or Division 60 Standard Detail 60.02-16.

D. Welding

The Contractor shall provide casing pipe butt joint and casing vent field welding procedures in compliance with the most recent version of AWS D1.1, for acceptance by Doyon Utilities' Authorized Representative.

Individual welder certifications, in accordance with AWS D1.1, shall be submitted for Doyon Utilities' Authorized Representative review and acceptance.

All welding shall be in accordance with the most current revision of AWS D1.1. No field welding shall commence until Doyon Utilities' Authorized Representative written acceptance of certified welders and Contractor-provided weld procedures is provided.

Prior to use, all weld electrodes shall be stored in warm, clean, dry conditions, free of contaminates, and in strict accordance with their manufacturers' recommendations.

Improperly stored and unidentifiable weld electrodes shall not be used and shall be removed from the site.

Immediately prior to welding, all welded casing pipe ends and all casing vent field weld joints shall be dried and cleaned of rust, scale, paint, and other contaminants, to the satisfaction of Doyon Utilities' Authorized Representative, to a minimum distance of one inch from the weld all around. Water and other environmental conditions inside and outside of the casing shall be controlled during field welding to the satisfaction of Doyon Utilities' Authorized Representative to facilitate satisfactory completion of welds.

At the Doyon Utilities' Authorized Representative's option, all casing pipe and casing vent field welds shall be subject to visual inspection by Doyon Utilities' Authorized Representative and/or to Doyon Utilities' Authorized Representative-provided non-destructive testing. Acceptance criteria for welding by visual inspection and non-destructive testing shall be in accordance with AWS D1.1, Section 6. All required weld repairs, as well as stand-by costs for weld inspection and testing, shall be at the Contractor's expense.

E. Casing Pipe Clean-Up

After installation of the casing pipe is completed, the casing interior shall be cleaned of dirt, rocks, and other debris to the satisfaction of Doyon Utilities' Authorized Representative.

F. Casing Pipe Red-Lining

The Contractor shall obtain accurate GPS coordinates and elevations on the ends of casing pipes, and shall clearly record these coordinates and elevations in red on a clean set of issued-for-construction drawings in accordance with Division 65 - JBER Construction Surveys.

SECTION 20.10 - DISPOSAL OF UNUSABLE OR SURPLUS MATERIAL

Article 20.10.1 - General

Work under this Section includes loading, hauling, unloading, and disposal of unusable or surplus usable material encountered in the trench excavation. Unusable material may include peat, excessively silty material, clay, large rocks, septic systems, cesspools, privy pits, petroleum- or chemical-contaminated soil, or any other material which in the opinion of Doyon Utilities' Authorized Representative is unsuitable for use as fill or backfill.

Refer to Section 20.01 – General for additional general requirements.

Article 20.10.2 - Construction

A. Unusable Material Handling and Disposal

During trench excavating, the Contractor shall use care in separating unusable excavated material from required and surplus usable material to the satisfaction of Doyon Utilities' Authorized Representative.

When removal and disposal of additional in-place unusable material is required, over and above what is required for normal water line or sewer line installation, Doyon Utilities' Authorized Representative will define the limits of removal of unusable material.

All unusable material shall be hauled to a disposal site or disposal sites designated by Doyon Utilities' Authorized Representative. Payment will not be made for disposal of unusable material unless the material is moved in excess of 100 feet from the excavation and/or unless special handling procedures, over and above normal earth moving activities, are required.

All surplus usable material shall be hauled to a disposal site or disposal sites designated by Doyon Utilities' Authorized Representative. Payment will not be made for disposal of surplus usable material unless the material is moved in excess of 100 feet from the excavation.

B. Septic Systems, Cesspools, and Privy Pits

Existing septic tanks, drain fields, cesspools, and privy pits shall be removed as follows. The liquid and sludge from existing cesspools or septic tanks shall be pumped into septic pumper trucks, transported, and disposed of at an approved sewage dump station designated by Doyon Utilities' Authorized Representative. The Contractor shall then remove the remaining sludge, the septic tank or cesspool, drain field piping, privy pit logs or cribbing, and any saturated soil remaining in the trench area, and shall dispose of this material at a location designated by Doyon Utilities' Authorized Representative. Disposal of this material will be coordinated with Doyon Utilities' Authorized Representative, in order that the materials disposed of can be covered with fill material at the disposal site immediately after it is dumped. Care shall be exercised so that spillage does not occur during transportation and disposal.

C. Petroleum- and Chemical-Contaminated Soils

Soil found to be contaminated with petroleum or other chemical substances shall be handled on a case-by-case basis. If such material is encountered, Contractor shall immediately notify Doyon Utilities' Authorized Representative for direction. Unless the contamination was caused by the Contractor's operations, discovery of contaminated material will be treated as a changed condition.

SECTION 20.11 - BOARD INSULATION

Article 20.11.1 - General

Work under this Section consists of providing board insulation and incidentals on a smooth compacted surface, and covering of the board insulation with permanent earth cover so as not to damage or displace the insulation.

Refer to Section 20.01 – General for additional general requirements.

Article 20.11.2 - Material

Rigid board insulation shall be high density extruded or expanded polystyrene rigid board insulation, in accordance with ASTM C578. Properties shall be as follows:

Property	Test Methods	Requirements
Minimum Compressive Strength (5% Deformation)	ASTM D1621	60 PSI
Thermal Resistance, Minimum R-Value at 75ºF, ºF-Ft^2-Hr/BTU (at 20 Years)	ASTM C518	4.5/Inch
Water Absorption, Maximum Percent by Volume	ASTM C272	0.1%
Board Dimensions	N/A	2” x 4’-0” x 8’-0”

Article 20.11.3 - Construction

Board insulation shall be placed to the limits and thickness as shown on the Plans or as directed by Doyon Utilities’ Authorized Representative.

Prior to placement of board insulation, the area to be insulated shall be graded flat to the satisfaction of Doyon Utilities’ Authorized Representative, and compacted to 95% density in accordance with Section 20.01 - General. If on-site material is too rocky in the judgment of Doyon Utilities’ Authorized Representative to provide support of insulation without damage, then a lift of 4 inches of Type II-A classified fill per Section 20.06 - Trench Excavation, Pipe Bedding, and Backfill, shall be placed, leveled, and compacted to 95% minimum density in accordance with Section 20.01 - General prior to placement of the insulation.

Board insulation shall be placed with a minimum installed thickness shall be 4 inches total in two each 2 inch thick layers. Joints between adjacent insulation boards shall be tight to the satisfaction of Doyon Utilities’ Authorized Representative. Joints in successive layers of insulation shall be staggered 2 feet from joints in the previous layers. Insulation shall be weighted as necessary to prevent displacement by the wind or other forces prior to permanent earth cover, and shall be reset if displaced prior to or during backfilling.

The Contractor shall not at any time operate any vehicle or equipment on the unprotected board insulation.

The Contractor shall provide Doyon Utilities' Authorized Representative with time and safe access to inspect each layer of board insulation prior to placement of the next layer, and prior to installation of permanent earth cover over board insulation. Failure to facilitate inspection by Doyon Utilities' Authorized Representative shall be grounds for rejection of board insulation.

Insulation boards that are damaged before or during placement or backfilling shall be removed and replaced to the satisfaction of Doyon Utilities' Authorized Representative at Contractor expense.

A 12 inch thick lift of on-site backfill material shall be placed over board insulation prior to any compaction. If on-site material is unsuitable, in the judgment of Doyon Utilities' Authorized Representative, to prevent damage of insulation, then a lift of 12 inches of Type II-A classified fill per Section 20.06 - Trench Excavation, Pipe Bedding, and Backfill shall be placed directly over the insulation and leveled. The one foot lift of on-site backfill material or Type II-A classified fill shall be compacted to 95% minimum density, in accordance with Section 20.01 – General, using manually propelled walk-behind vibratory plate compactors only.

Other than manually propelled walk-behind vibratory plate compactors, no equipment shall be operated over board insulation until a minimum of 2 feet of total cover have been placed over insulation. When placing subsequent lifts and compacting over insulation, construction equipment shall not make sudden stops, starts, or turns over the insulation.

The Contractor shall obtain accurate GPS coordinates on limits of board insulation and shall record the elevation and thickness of board insulation installed, and shall clearly record these coordinates, elevations, and insulation thickness information in red on a clean set of issued-for-construction drawings in accordance with Division 65 - JBER Construction Surveys.

SECTION 20.12 - GEOTEXTILE FABRIC

Article 20.12.1 - General

Work under this Section includes providing of geotextile fabric for embankment separation, subgrade reinforcement of roadways, subsurface drainage, or cobble lining, on a smooth compacted surface, and covering of the geotextile fabric with permanent earth cover so as not to damage or displace the geotextile fabric.

Refer to Section 20.01 – General for additional general requirements.

Article 20.12.2 - Material

Geotextile fabrics shall conform to the following specifications.

			Geotextile Class [a, b]			
			Class 1		Class 2	
Property	Test Method	Units	Elongation <50% [c]	Elongation ≥50% [c]	Elongation <50% [c]	Elongation ≥50% [c]
Grab Strength	ASTM D4632	LBS	315	200	250	160
Sewn Sean Strength	ASTM D4632	LBS	285	182	225	140
Tear Strength	ASTM D4533	LBS	115	80	90	56
Puncture Strength	ASTM D6241	LBS	620	435	495	310

[a] The severity of installation conditions for the application generally dictates the required geotextile class. Class 1 is specified for more severe or harsh installation conditions where there is greater potential for geotextile damage. Class 2 is specified for less severe conditions.

[b] All numeric values represent MARV in the weaker principal direction.

[c] As measured in accordance with ASTM D4632.

Acceptance of geotextile material shall be determined according to ASTM D4759 and ASTM D4873.

A. Separation Geotextile

Separation geotextile shall be a woven or nonwoven pervious fabric constructed from long chain polymeric filaments such as polypropylene, polyethylene, polyester, polyvinylidene chloride, or polyamide formed into a stable network such that the filaments or yarns retain their relative position to each other. The geotextile shall be inert to commonly encountered chemicals and shall be free from defects.

Non-woven geotextile may be formed by the needle-punched, spun-bonded or melt-bonded process.

Woven geotextile shall be a pervious sheet of yarn woven into a uniform pattern with distinct and measurable openings. Edges of the cloth shall be salvaged to prevent the outer yarn from pulling away from the cloth.

Separation geotextile supplied shall be Class 2, unless otherwise specified in the Contract Documents and shall meet the physical and mechanical properties listed below:

			Requirements % in Situ Soil Passing #25 Sieve [a]		
Property	Test Methods	Units	< 15	15 to 50	> 50
Permittivity	ASTM D4491	Sec $^{-1}$	0.5	1.2	0.1
Apparent Opening Size	ASTM D4751	ASTM US Sieve	40	60	70
Ultraviolet Stability (retained strength)	ASTM D4355	%	50% after 500 hours of exposure		

[a] Based on grain size analysis of in situ soil in accordance with AASHTO T88.

B. Reinforcement Geotextile

Reinforcement geotextile shall consist of a regular grid structure of select polypropylene material; it shall have aperture geometry and rib and junction cross sections sufficient to permit significant mechanical interlock with the material being reinforced.

Reinforcement geotextile shall have high flexural rigidity and high tensile strength at ribs and junctions of the grid structure.

Reinforcement geotextile shall maintain its reinforcement and interlock capabilities under repeated dynamic loads while in service and shall also be resistant to ultraviolet degradation, to damage under normal practices, and to all forms of biological or chemical degradation normally encountered in the material being reinforced.

Reinforcement geotextile supplied shall be Class 1 unless otherwise specified and shall meet the physical and mechanical properties listed below:

Property	Test Methods	Units	Requirements
Permittivity	ASTM D4491	Sec $^{-1}$	0.02 [a]
Apparent Opening Size	ASTM D4751	mm	0.60 max average roll value
Ultraviolet Stability (retained strength)	ASTM D4355	%	50% after 500 hours of exposure

[a] Default value; permittivity of the geotextile should be greater than that of the soil.Doyon Utilities' Authorized Representative may also require the permeability of the geotextile to be greater than that of the soil.

C. Drainage Geotextile

Drainage geotextile shall be constructed from long chain polymeric filament or yarns such as polypropylene, polyethylene, polyester, nylon, polyvinylidene chloride or polyamide formed into a stable network such that the filaments or yarns retain their relative position to each other. The geotextile shall be inert to commonly encountered chemicals and shall be free from defects.

Non-woven drainage geotextile may be formed by the needle punched, spun-bonded or melt-bonded process.

Woven drainage geotextile shall be a pervious sheet of yarn woven into a uniform pattern with distinct and measurable openings. Edges of the cloth shall be salvaged to prevent the outer yarn from pulling away from the cloth.

Drainage geotextile made from yarns of a flat, tape-like character are not allowed.

Drainage geotextile shall also be used for lining under cobbles.

Drainage geotextile shall be Class 1, unless otherwise specified and shall meet the physical and mechanical properties listed below:

Property	Test Methods	Units	Requirements
Permittivity	ASTM D4491	Sec $^{-1}$	0.05 [a]
Apparent Opening Size	ASTM D4751	mm	0.43 max average roll value
Ultraviolet Stability (retained strength)	ASTM D4355	%	50% after 500 hours of exposure

[a] Default value. Permittivity of the geotextile should be greater than that of the soil. Doyon Utilities' Authorized Representative may also require the permeability of the geotextile to be greater than that of the soil.

Article 20.12.3 - Construction

Geotextile of the type shown on the Plans or directed by Doyon Utilities' Authorized Representative shall be placed to the limits as shown on the Plans or as directed by Doyon Utilities' Authorized Representative.

Exposure of geotextile to sunlight and weather after removal of protective covering shall not exceed 5 calendar days.

Prior to placement of geotextile, the area shall be graded flat to the satisfaction of Doyon Utilities' Authorized Representative, and compacted to 95% minimum density in accordance with Section 20.01 - General. If on-site material is too rocky in the judgment of Doyon Utilities' Authorized Representative to avoid damage to geotextile, then a lift of 4 inches of Type II-A classified fill per Section 20.06 - Trench Excavation, Pipe Bedding, and Backfill, shall be placed, leveled, and compacted to 95% minimum density in accordance with Section 20.01 - General prior to placement of geotextile.

Geotextile shall be placed flat on the prepared surface, without folds or irregularities. Geotextile shall be lapped a minimum of 3-feet over adjacent geotextile as required at roll ends and edges.

Geotextile shall be weighted prior to placement of permanent earth cover to avoid displacement due to wind or other forces, and shall be reset if displaced by wind or other forces.

Lap joints in reinforcement geotextile shall be tied with plastic ties specifically manufactured for this purpose and installed at intervals recommended by the reinforcement geotextile manufacturer.

The Contractor shall not at any time operate any vehicle or equipment on the unprotected geotextile.

The prepared surface, geotextile placement, lapping of adjacent pieces of fabric, and all other placement details shall be to the satisfaction of Doyon Utilities' Authorized Representative. Covering of geotextile with permanent earth cover shall not begin until Doyon Utilities' Authorized Representative has inspected and accepted geotextile placement. Failure to facilitate inspection by Doyon Utilities' Authorized Representative shall be grounds for rejection of geotextile.

Geotextile that is damaged before or during placement or backfilling shall be removed and replaced to the satisfaction of Doyon Utilities' Authorized Representative at Contractor expense.

The Contractor shall follow the manufacturer's recommendations or these Specifications, whichever is more stringent, for placing of permanent earth cover over geotextile. The Contractor shall place permanent earth cover over geotextile in a manner so as to maintain minimum 3-foot laps and avoid fabric displacement.

As a minimum, a one-foot thick lift of on-site backfill material shall be placed over geotextile prior to any compaction. If on-site material is unsuitable, in the judgment of Doyon Utilities' Authorized Representative, to prevent damage of geotextile, then a lift of 12 inches of Type II-A classified fill material per Section 20.06 - Trench Excavation, Pipe Bedding, and Backfill shall be placed directly over the geotextile and leveled. The one foot lift of on-site backfill material or Type II-A classified fill shall be compacted to 95% minimum density, in accordance with Section 20.01 – General, using manually propelled walk-behind vibratory plate compactors only.

Other than manually propelled walk-behind vibratory plate compactors, no equipment shall be operated over geotextile until a minimum of 2 feet of total cover have been placed over geotextile When placing subsequent lifts and compacting over geotextile, construction equipment shall not make sudden stops, starts, or turns over the geotextile.

The Contractor shall obtain accurate GPS coordinates on limits of geotextile, shall record the elevation(s) at which geotextile is installed, and shall clearly record these coordinates and elevations in red on a clean set of issued-for-construction drawings in accordance with Division 65 - JBER Construction Surveys.

SECTION 20.13 - LEVELING COURSE

Article 20.13.1 - General

Work under this Section includes providing compacted leveling course to the required depth and to the required elevations and grades on prepared subgrade to provide either a smooth stabilized pavement base or a finished gravel surface.

Refer to Section 20.01 – General for additional general requirements.

Refer to Standard Detail 20.13-1 for additional information on leveling course.

Article 20.13.2 - 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 to the satisfaction of Doyon Utilities' Authorized Representative, and shall be durable and sound. 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 M147.

Prior to import of any leveling course to the project, the Contractor shall submit recent sieve analysis and moisture-density test results for leveling course in accordance with AASHTO T88 and AASHTO T180-D for acceptance by Doyon Utilities' Authorized Representative. When leveling course is supplied from different material sources, recent sieve analysis and moisture-density test results shall be provided for leveling course from each material source.

A. Coarse Aggregate

The coarse aggregate material conforming to the requirements specified above shall have a percentage of wear not to exceed 35% after 500 revolutions, as determined by the current requirements of ASTM C131. 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 to the satisfaction of Doyon Utilities' Authorized Representative. At least 50% of the coarse aggregate particles shall have two or more mechanically fractured faces.

B. Fine Aggregate

The fine aggregate shall consist of material free of organic or other objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative. 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 shall conform to the following gradation limits:

Leveling Course

U.S. Std. Sieve	Cumulative % Passing by Weight*
1"	100
3/4"	70 – 100
3/8"	50 – 80
#4	35 – 60
#8	20 – 50
#50	8 – 28
#200	2 – 6

- In addition to the grading limits stipulated above, the fraction passing the #200 sieve shall not be greater than 75% of the fraction passing the #50 sieve.

Article 20.13.3 - Construction

The entire existing subgrade onto which leveling course is to be placed shall be firm, unyielding, thawed material that is compacted to 95% minimum density per Section 20.01 - General.

If specific and detailed structural sections for subgrade for asphalt pavements are shown on the Plans, those requirements shall take priority over the subgrade requirements specified below.

Where leveling course is placed as base for asphalt pavement, the upper 2 feet minimum of the subgrade, extending at least 2 feet horizontal beyond the edges of asphalt pavement, shall consist of clean granular material (5% or less passing the No. 200 sieve). Prior to placing leveling course, all unsuitable subgrade shall be excavated and replaced with suitable compacted backfill material in accordance with Section 20.01 – General, and Section 20.07 – Excavation, Fill, and Backfill for Roads, Trails, and Structures, and all to the satisfaction of Doyon Utilities' Authorized Representative.

Leveling course shall be placed to the required loose lift thickness, such that when compacted to a 95% minimum density in accordance with Section 20.01 - General, the compacted material meets the required finished thickness. The minimum thickness of compacted leveling course is 2 inches.

Leveling course that becomes segregated during placement shall be remixed to the required gradation and re-compacted.

Adequate water shall be used to facilitate compaction of leveling course to the satisfaction of Doyon Utilities' Authorized Representative. If at any time leveling course becomes excessively saturated, it shall be moisture conditioned at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative until the moisture content is satisfactory.

Leveling course shall be placed to the elevations, centerline grades, and/or transverse slopes as shown or indicated on the Plans, the Standard Details, and/or as directed by Doyon Utilities' Authorized Representative. The surface of the leveling course for pavement base, when finished, shall be within 3/8 inch of straight when tested with a 10 foot straightedge applied parallel with, and at right angles to, the centerline of the area to be paved. Any deviation in excess of this amount shall be corrected by adding or removing material, and re-compacting to satisfy the above requirement.

Leveling course for pavement base shall extend one foot beyond the edge of pavement wherever possible.

Leveling course for pavement base shall be subject to acceptance by Doyon Utilities' Authorized Representative prior to paving.

SECTION 20.14 - COBBLES

Article 20.14.1 - General

Work under this Section includes providing cobbles to limits and depths as shown on the Plans or as directed by Doyon Utilities' Authorized Representative.

Refer to Section 20.01 – General for additional general requirements.

Article 20.14.2 - Materials

Materials furnished by the Contractor for cobbles shall be graded within the limitations delineated below:

Cobbles	
U.S. Std. Sieve	Cumulative % Passing by Weight
12"	100
8"	50 – 80
6"	25 – 50
3"	0 – 25
2"	0 – 10
#200	0 – 1

Article 20.14.3 - Construction

The cobbles shall be placed to the depths, dimensions, and limits shown on the Plans or as directed by Doyon Utilities' Authorized Representative.

SECTION 20.15 - EXPLORATORY TEST PITS

Article 20.15.1 - General

Work under this Section includes of furnishing a qualified heavy equipment operator and hydraulic track mounted or rubber tired excavator, qualified laborers with compactors, and all required small equipment and tools, manpower and equipment transportation, and consumables in order to dig and backfill exploratory test pits as directed by Doyon Utilities' Authorized Representative.

Refer to Section 20.01 – General for additional general requirements.

Article 20.15.2 - Construction

Prior to exploratory test pit excavation, the Contractor shall have all utilities located and shall obtain an Dig Clearance Permit in accordance with Section 20.01 – General.

The Contractor shall provide an excavator of the type, size, and reach as requested by Doyon Utilities' Authorized Representative, and compactors of the size and type as requested by Doyon Utilities' Authorized Representative, and shall mobilize and demobilize the excavator and compactors promptly when directed by Doyon Utilities' Authorized Representative.

The Contractor shall excavate at locations and to depths as directed by Doyon Utilities' Authorized Representative.

Handling and backfilling of existing utilities shall be in accordance with Section 20.06 - Trench Excavation, Pipe Bedding, and Backfill.

After logging of a test pit is complete, Contractor shall backfill with native material and compact so that the site is essentially returned to its original condition. The Contractor shall segregate the excavated material if necessary, and shall place excavated material as backfill so that the surface of the backfilled pit is as stable as possible to the satisfaction of Doyon Utilities' Authorized Representative. Pit backfill shall be placed in lifts be in accordance with Section 20.06 - Trench Excavation, Pipe Bedding, and Backfill, and compacted to 95% minimum in accordance with Section 20.01 – General.

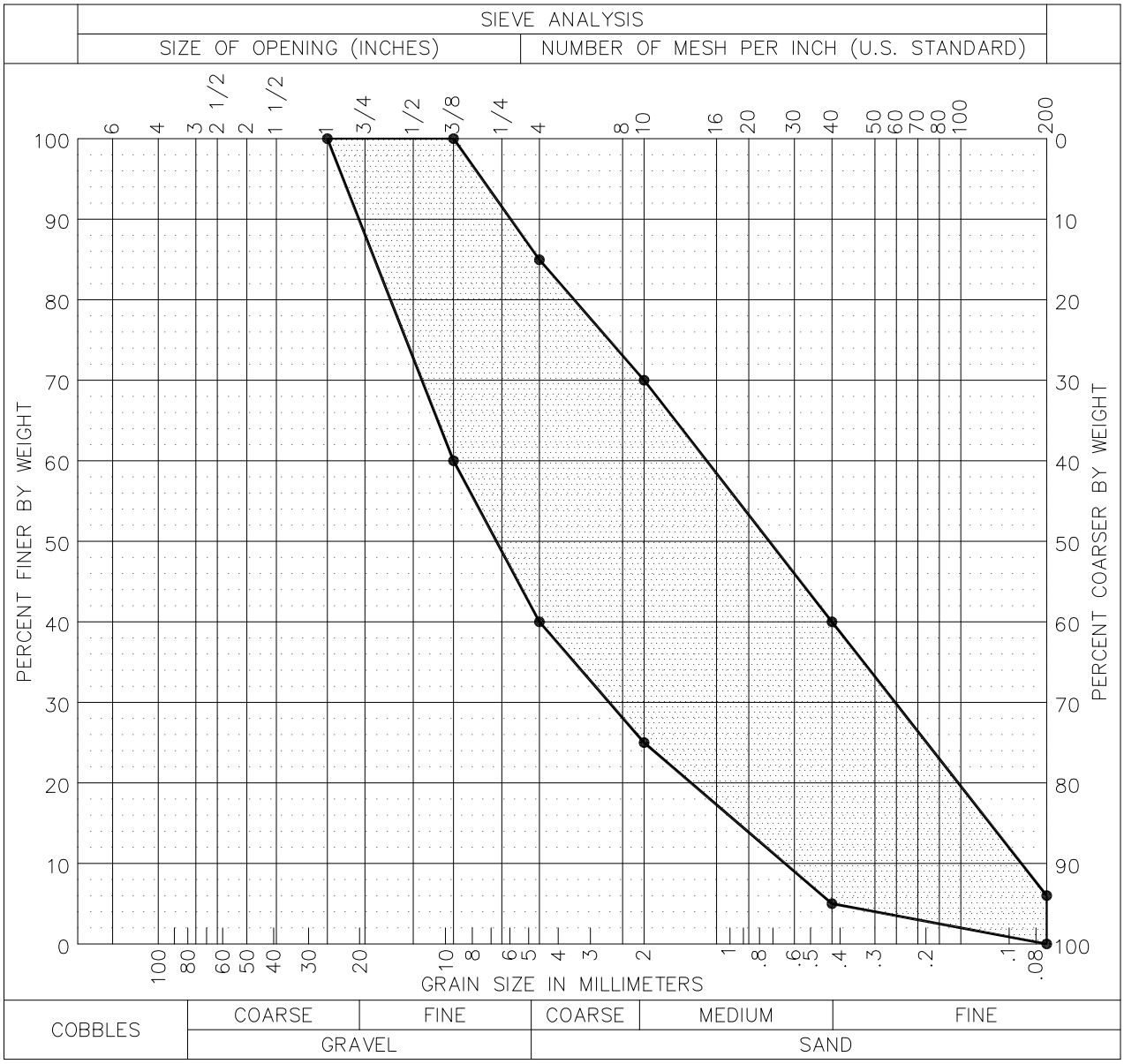
LIST OF EARTHWORK STANDARD DETAILS

Detail #	Description
20.06-1	JBER Class “B” Bedding Material
20.06-2	JBER Class “C” Bedding Material
20.06-3	JBER Class “D” Bedding Material
20.06-4	JBER Type II Classified Fill and Backfill
20.06-5	JBER Type II-A Classified Fill and Backfill
20.06-6	JBER Temporary Support of Telephone Duct & Other Utilities
20.13-1	JBER Leveling Course

GRADING LIMITS

U.S. STANDARD SIEVE	CUMULATIVE % PASSING BY WEIGHT
1"	100
3/8"	60–100
#4	40–85
#10	25–70
#40	5–40
#200	*0–6

* IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 20% OF THAT FRACTION PASSING THE #4 SIEVE. BEDDING MATERIAL SHALL NOT CONTAIN MECHANICALLY FRACTURED MATERIALS.



THIS DETAIL IS A COPY OF MASS STANDARD DETAIL #20–10.

DOYON UTILITIES LLC

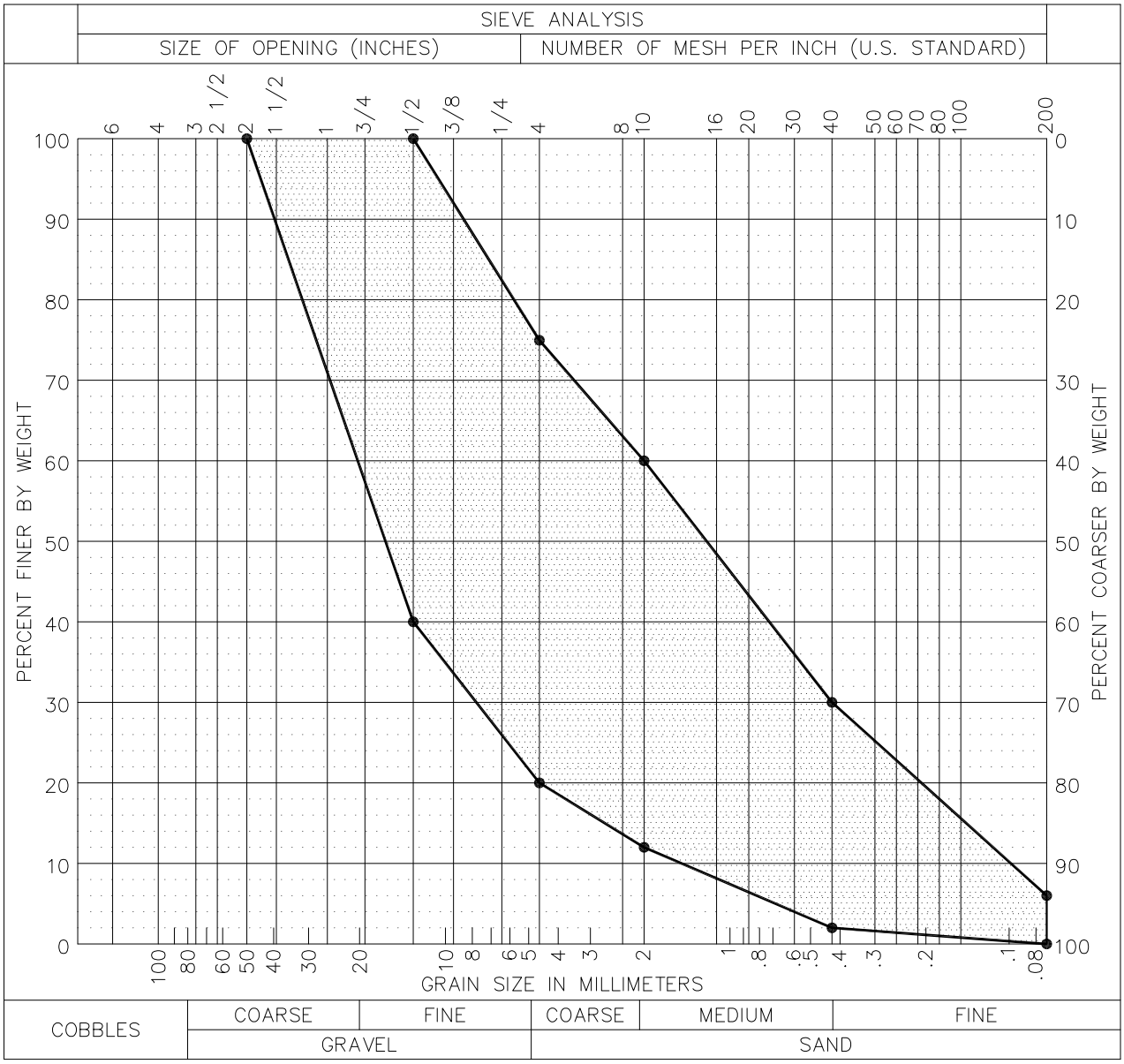
JBER CLASS "B" BEDDING MATERIAL

SCALE: NTS	SPEC SECTION: 20.06
DATE: 7/1/2014	STD DETAIL #: 20.06–1

GRADING LIMITS

U.S. STANDARD SIEVE	CUMULATIVE % PASSING BY WEIGHT
2"	100
1/2"	40–100
#4	20–75
#10	12–60
#40	2–30
#200	*0–6

* IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 20% OF THAT FRACTION PASSING THE #4 SIEVE. BEDDING MATERIAL SHALL NOT CONTAIN MECHANICALLY FRACTURED MATERIALS.



THIS DETAIL IS A COPY OF MASS STANDARD DETAIL #20–11.

DOYON UTILITIES LLC

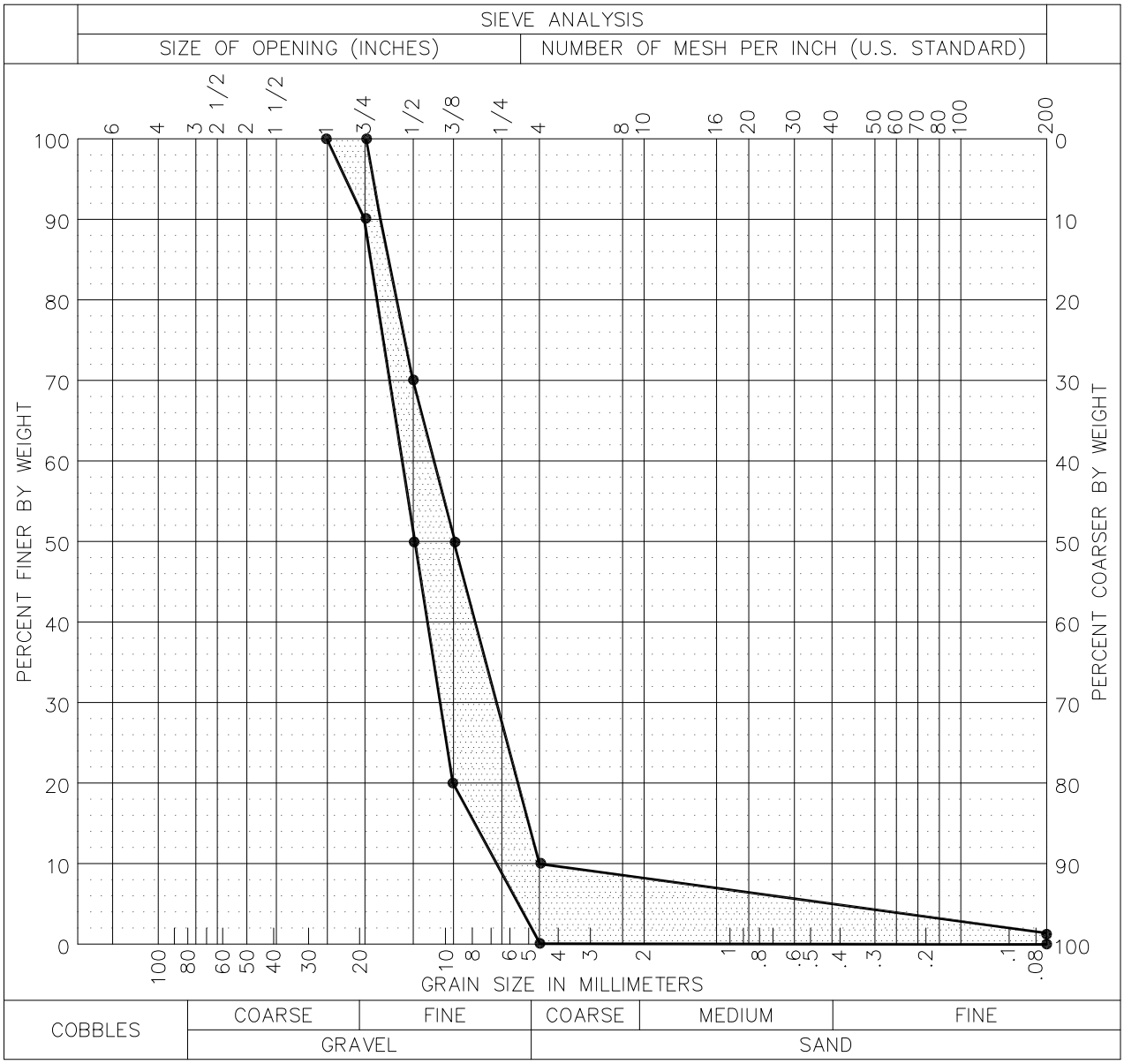
JBER CLASS "C" BEDDING MATERIAL

SCALE: NTS	SPEC SECTION: 20.06
DATE: 7/1/2014	STD DETAIL #: 20.06–2

GRADING LIMITS

U.S. STANDARD SIEVE	CUMULATIVE % PASSING BY WEIGHT
1"	100
3/4"	90–100
1/2"	50–70
3/8"	20–50
#4	0–10
#200	0–1

THE BEDDING MATERIAL SHALL NOT CONTAIN MECHANICALLY FRACTURED MATERIALS.



THIS DETAIL IS A COPY OF MASS STANDARD DETAIL #20–12.

DOYON UTILITIES LLC

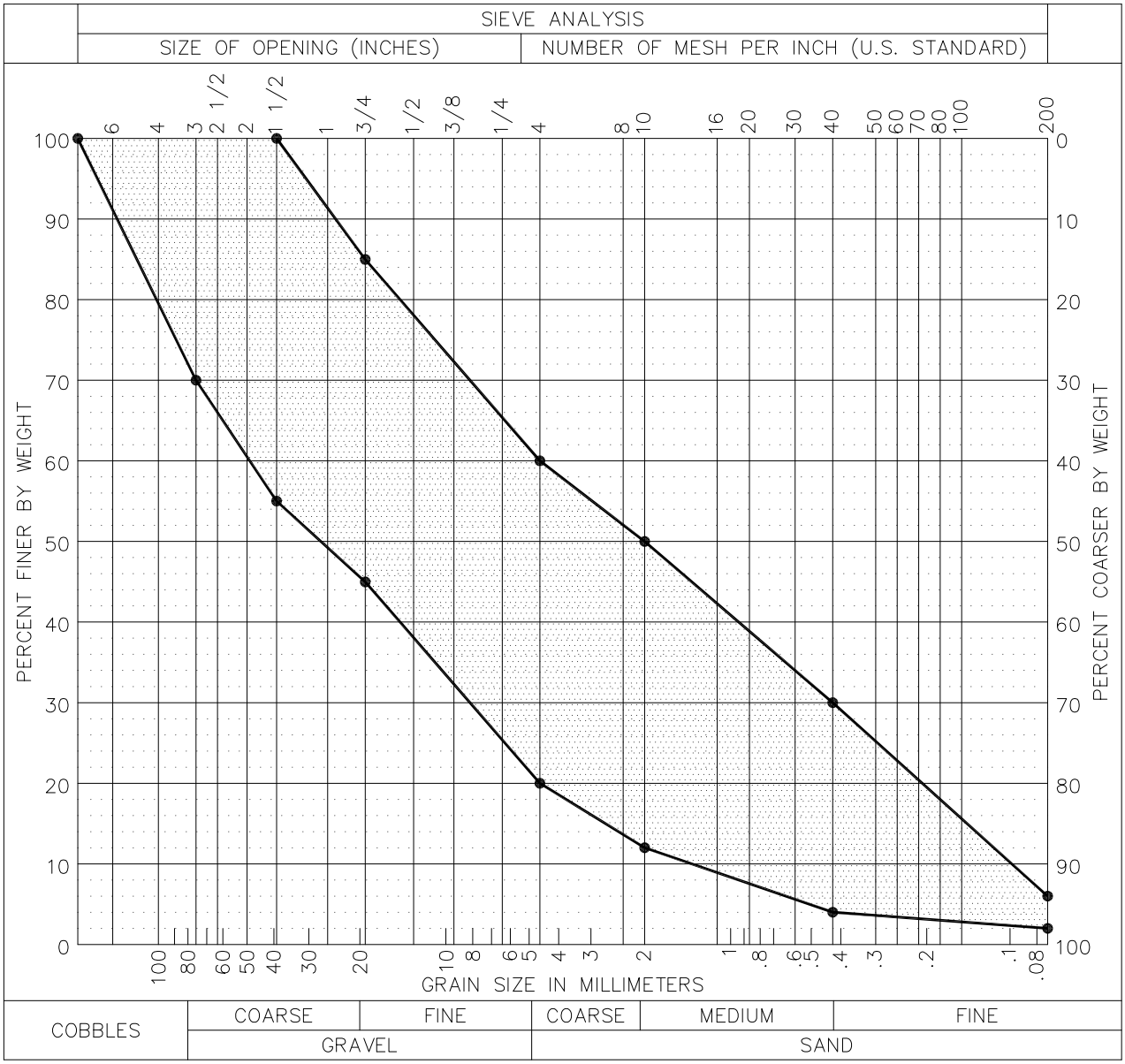
JBER CLASS "D" BEDDING MATERIAL

SCALE: NTS	SPEC SECTION: 20.06
DATE: 7/1/2014	STD DETAIL #: 20.06–3

GRADING LIMITS

U.S. STANDARD SIEVE	CUMULATIVE % PASSING BY WEIGHT
8"	100
3"	70–100
1–1/2"	55–100
3/4"	45–85
#4	20–60
#10	12–50
#40	4–30
#200	*2–6

* IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 20% OF THAT FRACTION PASSING THE #4 SIEVE.



THIS DETAIL IS A COPY OF MASS STANDARD DETAIL #20–14.

DOYON UTILITIES LLC

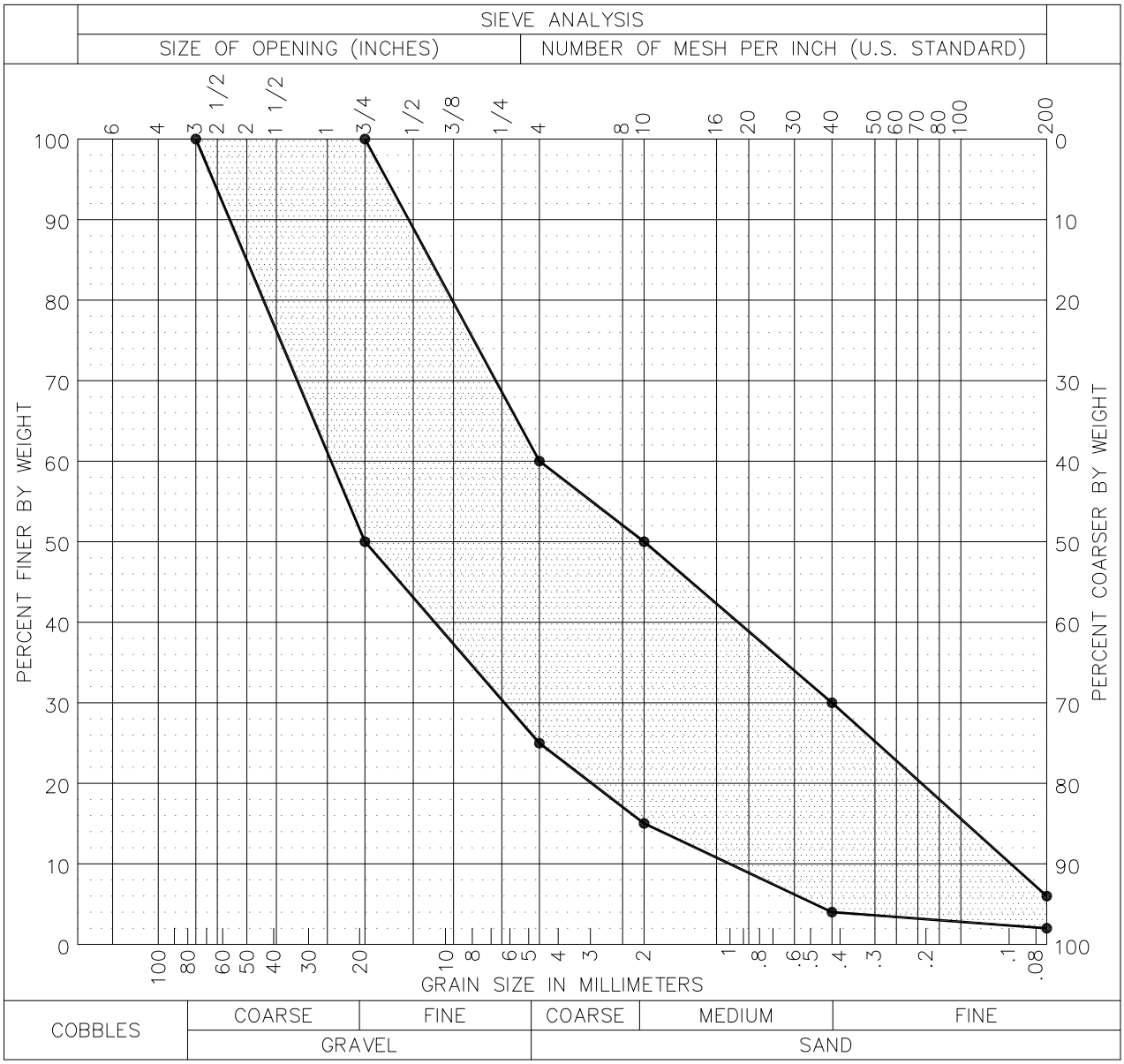
JBER TYPE II CLASSIFIED FILL & BACKFILL MATERIAL

SCALE: NTS	SPEC SECTION: 20.06 & 20.07
DATE: 7/1/2014	STD DETAIL #: 20.06–4

GRADING LIMITS

U.S. STANDARD SIEVE	CUMULATIVE % PASSING BY WEIGHT
3"	100
3/4"	50–100
#4	25–60
#10	15–50
#40	4–30
#200	*2–6

* IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 20% OF THAT FRACTION PASSING THE #4 SIEVE.

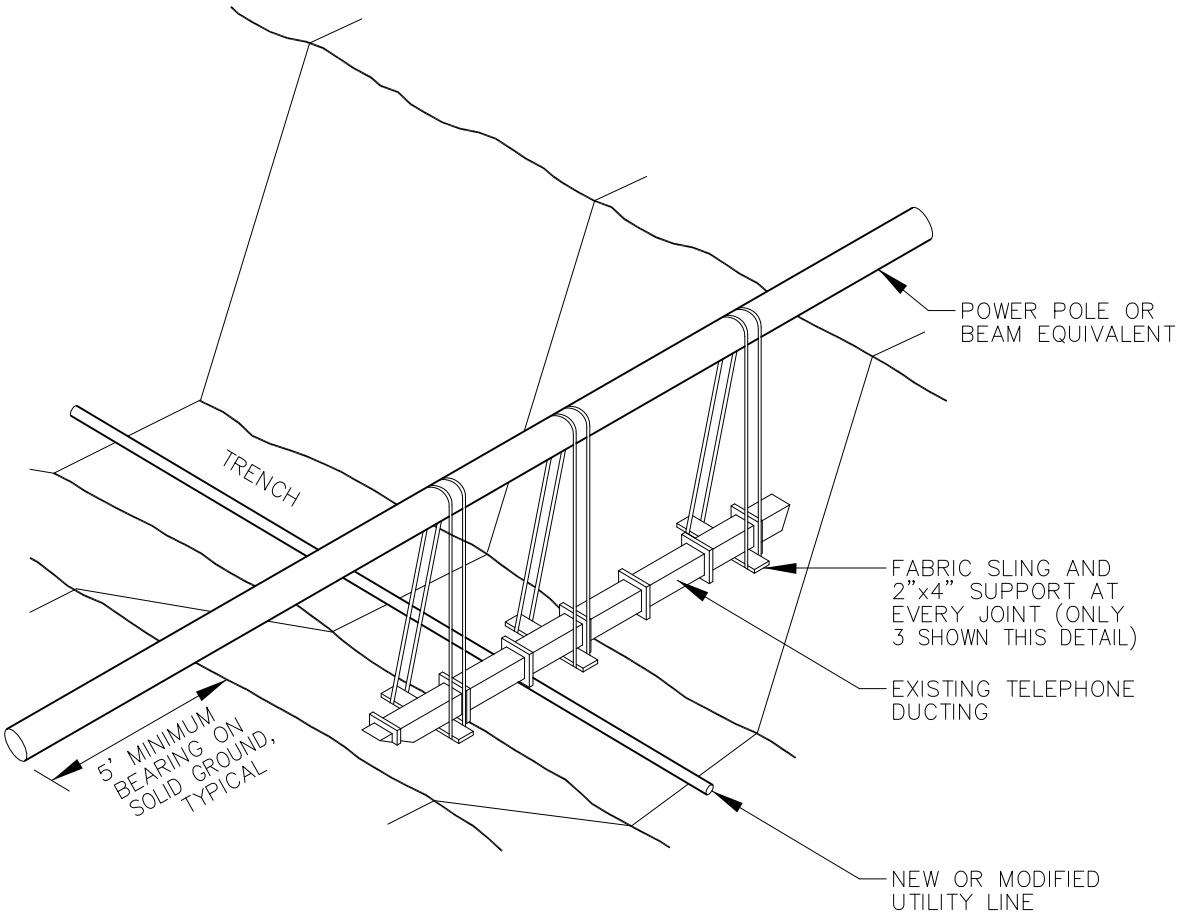


THIS DETAIL IS A COPY OF MASS STANDARD DETAIL #20–15.

DOYON UTILITIES LLC

JBER TYPE II–A CLASSIFIED FILL & BACKFILL MATERIAL

SCALE: NTS	SPEC SECTION: 20.06 & 20.07
DATE: 7/1/2014	STD DETAIL #: 20.06–5



ISOMETRIC VIEW

NOTES

BEFORE EXCAVATING UNDER TELEPHONE DUCT BANK, EVERY JOINT IN THE DUCT BANK TO BE EXPOSED SHALL BE SUPPORTED WITH 2x4s AND FABRIC SLINGS AS SHOWN ABOVE OR DOYON UTILITIES ACCEPTED EQUAL TEMPORARY SUPPORTS.

BACKFILL UNDER TELEPHONE DUCT BANK TO WITHIN 18" OF DUCT SHALL BE ON-SITE NFS GRAVEL OR TYPE II CLASSIFIED FILL, PLACED IN LIFTS AND COMPACTED TO 95% MINIMUM.

THE LAST 18" UNDER TELEPHONE DUCT BANK SHALL BE BACKFILLED WITH CLASS C-6 CONCRETE PER JBER STANDARD SPECIFICATION SECTION 30.02, BATCHED WITH TYPE III CEMENT, OR DOYON UTILITIES ACCEPTED EQUAL.

AFTER CONCRETE BACKFILL HAS CURED FOR 3 DAYS MINIMUM, THE DUCT SHALL BE BACKFILLED FOR 1' MINIMUM AT SIDES AND TOP WITH CLASS "B" BEDDING PER JBER STANDARD SPECIFICATION SECTION 60.02.

WHERE OTHER EXISTING BURIED UTILITIES WILL BE EXCAVATED FOR NEW UTILITY CONSTRUCTION OR EXISTING UTILITY MODIFICATION OR REPAIR, AND WHERE THE EXISTING BURIED UTILITY IS SUBJECT TO DAMAGE DUE TO LACK OF GROUND SUPPORT, THE EXISTING BURIED UTILITY SHALL BE SUPPORTED SIMILAR TO THE TEMPORARY SUPPORT SHOWN ABOVE FOR TELEPHONE DUCT BANK.

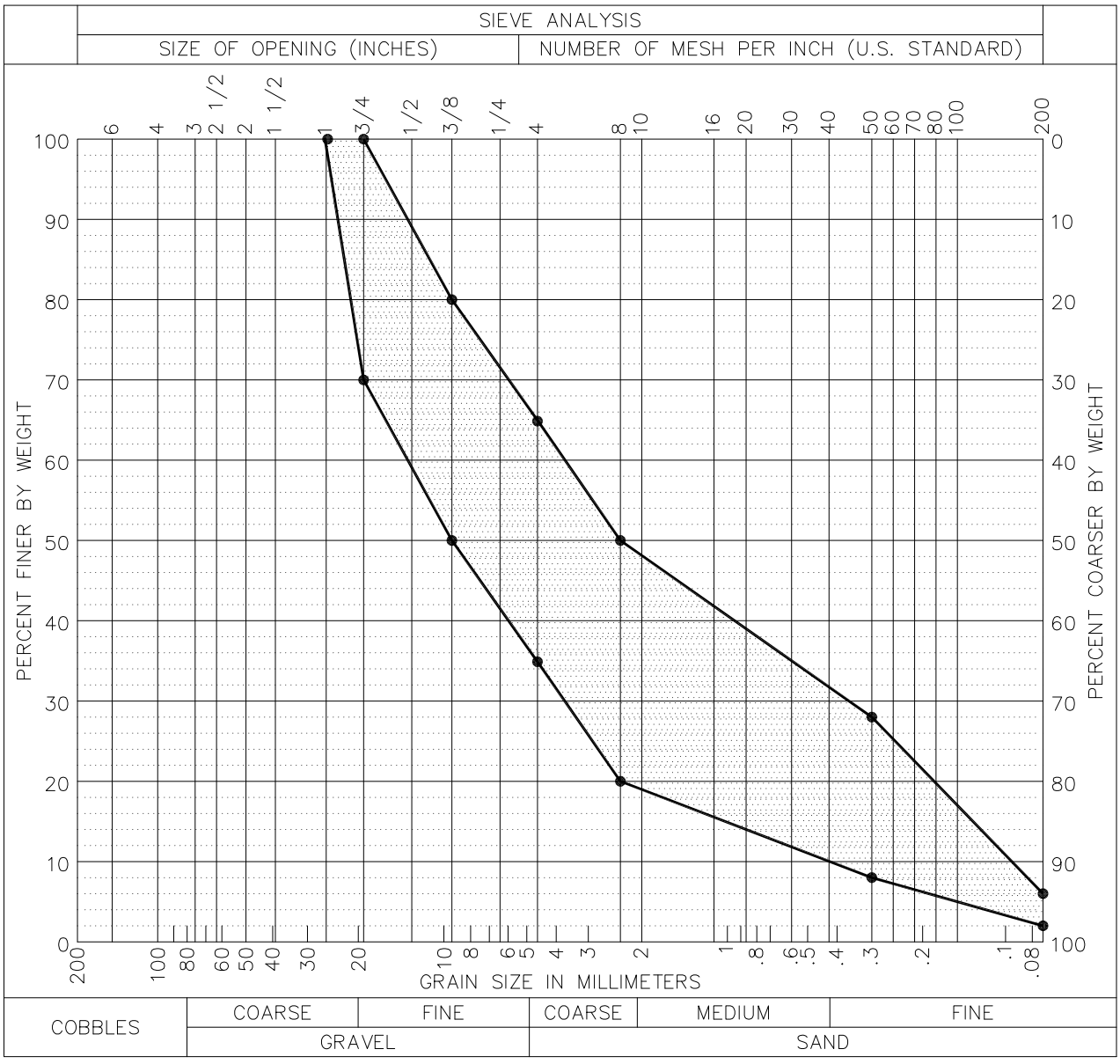
CONTENT FOR THIS DETAIL WAS COPIED FROM MASS STANDARD DETAIL #70-6.

DOYON UTILITIES LLC	JBER TEMPORARY SUPPORT OF EXISTING TELEPHONE DUCT & OTHER UTILITIES	SCALE: NTS	SPEC SECTION: 20.06
		DATE: 7/1/2014	STD DETAIL #: 20.06-6

GRADING LIMITS

U.S. STANDARD SIEVE	CUMULATIVE % PASSING BY WEIGHT
1"	100
3/4"	70–100
3/8"	50–80
#4	35–65
#8	20–50
#50	8–28
#200	*2–6

*IN ADDITION TO THE GRADING LIMITS LISTED ABOVE, THE FRACTION OF MATERIAL PASSING THE #200 SIEVE SHALL NOT BE GREATER THAN 75% OF THAT FRACTION PASSING THE #50 SIEVE.



THIS DETAIL IS A COPY OF MASS STANDARD DETAIL #20–18.

DOYON UTILITIES LLC

JBER LEVELING COURSE

SCALE: NTS	SPEC SECTION: 20.13
DATE: 7/1/2014	STD DETAIL #: 20.13–1

DOYON UTILITIES LLC

JOINT BASE ELMENDORF-RICHARDSON
STANDARD CONSTRUCTION SPECIFICATIONS AND DETAILS
DIVISION 20 - EARTHWORK

Revisions between 2015 Rev.001 and 2016

Item or Location	Description of Revision
Title Sheet	***Changed*** "2015 Rev.001" to "2016"
Entire Document	***Changed*** "2015 Rev.001" to "2016" in page footer